Enterprise Risk Management

University of Central Florida
Max J. Rudolph, FSA CFA CERA
Rudolph Financial Consulting, LLC
March 17, 2009

Enterprise Risk Management (ERM) Key Points

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

Historical View of Risk

- Silo based – one risk at a time
- Constraint – mitigation focus
- Incentives based only on my own results

Current Case Study

- Subprime mortgages
  - Culture
  - Tail risk
  - Outsourced decision making
  - Misaligned incentives
  - Mispriced risk

What to do now?

- What do you think?
- Fiscal policy – Stimulus
  - Partisan politics is hurting
- Monetary policy – Any bullets left?
- AIG – 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
- Equity
- Pricing/Insurance/Underwriting/Actuarial
- Interest rate
- Operational
- Strategic

Key Elements of ERM

- 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

Rudolph
FINANCIAL CONSULTING LLC

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
- NAIC – National Association of Insurance Commissioners

Culture

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

Knowledge

- Understand the risks taken
  - Transparency
- Risk
  - Accept risk where you have a competitive advantage (sometimes exploit)
  - Mitigate (e.g., hedging, reinsurance)
  - Avoid
  - Can’t transfer risk, can only share it
- Iteratively develop/borrow best practices

Value Added

- Building blocks
- Prioritize risks and optimize risk/return profile
- Determine risk appetite
- Focus on balance sheet risks – manage across silos
  - Risk aggregation across product lines and jurisdictions

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

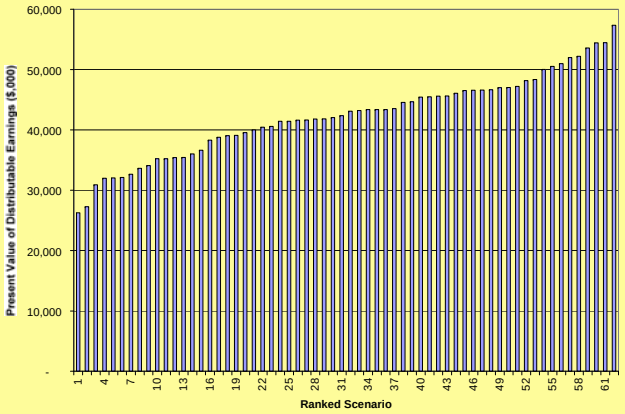
Skepticism

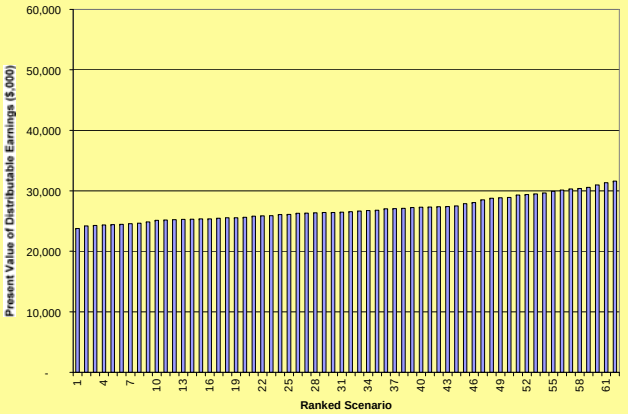
- Encourage challenges
- Listen and brainstorm
- Models have limitations
  - Brownian motion does not define the financial markets

Tools

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

Risk/Return Profile

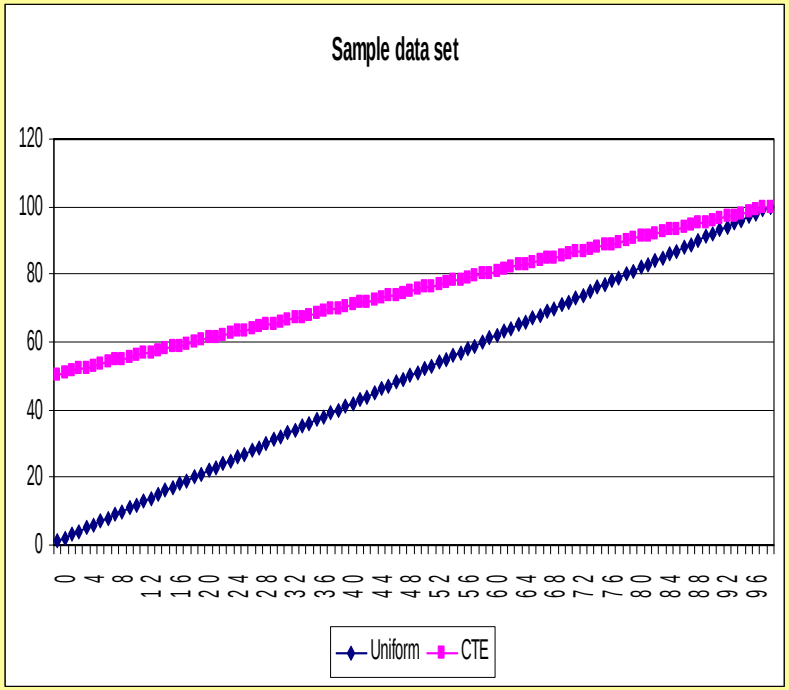




Rudolph
FINANCIAL CONSULTING LLC

Statistical tools – VaR and CTE

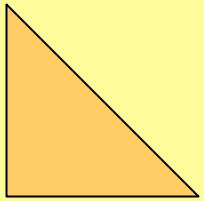
- VaR
  - Value at Risk
  - used by banks
- CTE
  - Conditional Tail Expectation
  - used by insurers
- Graphics
  - Look at entire distribution
- Metric pros and cons



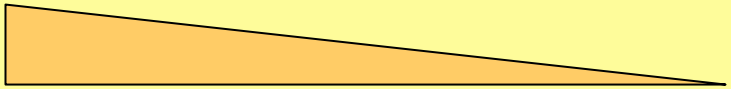
Rudolph FINANCIAL CONSULTING LLC

Balance of Risks

- Balanced firm



- Concentrated firm



Rudolph
FINANCIAL CONSULTING LLC

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

Principle-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

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
  - Municipalities
  - 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?

Catastrophic Risks

- RMS
  - Anthrax in Chicago
  - Trains in Chicago
  - New York City - water

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: Conseco 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

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

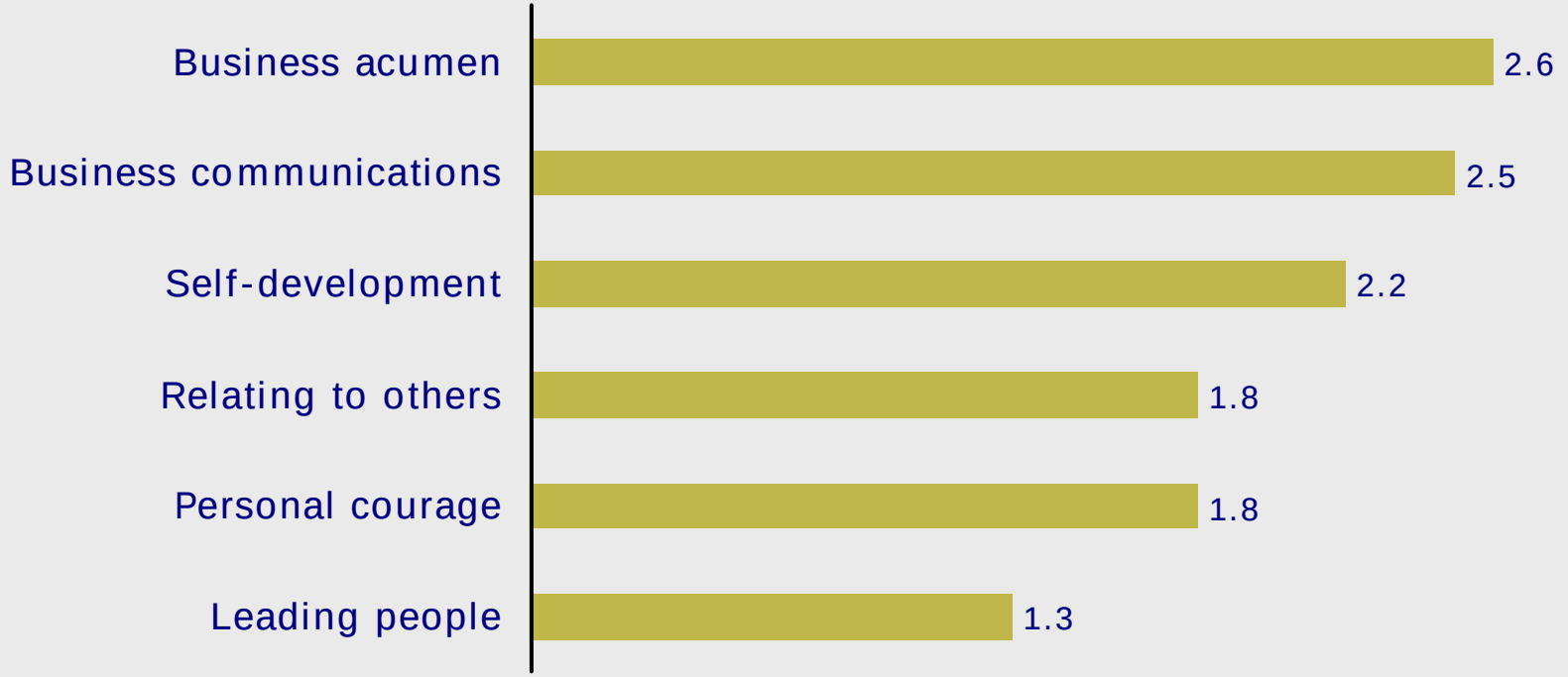
Max J. Rudolph, FSA CFA CERA
Rudolph Financial Consulting, LLC
max.rudolph@rudolphfinancialconsulting.com
(402) 895-0829
www.rudolphfinancialconsulting.com

CERA: An ERM Credential

Rudolph
FINANCIAL CONSULTING

Employers want executives with

Employer ranking of importance of business savvy skills



Source: 2002 SOA Market Opportunity Research, Leading Solutions Group

Rudolph FINANCIAL CONSULTING LLC

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

Rudolph FINANCIAL CONSULTING LLC

ASA Components

- Economics
- P – Probability
- FM – Financial Mathematics
- MFE – Models for Financial Economics
- C – Construction of Actuarial Models
- APC – Associateship Professionalism Course
- Corporate Finance, Applied Statistics
- MLC – Models for Life Contingencies
- FAP – Fundamentals of Actuarial Practice
- FAP – Modules (8)

FSA Components

- Advanced Finance / ERM
- Operational Risk Module
- Track Exams (2)
- Track Modules (2)
- Decision Making and Communication Module
- FAC – Fellowship Admission Course

CERA

KEY: Exam, Module, Course, Validation by Educational Experience

Rudolph FINANCIAL CONSULTING LLC

Global ERM Credential

The SOA would consider amending its CERA requirements to meet international standards.

Competitive Positioning

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

Marketing campaign

Target Market	Completed	Planned
College students; academic counselors	Direct mail: 23,000+	College Outreach Plan
SOA candidates, ASAs, FSAs	●SOA/CIA publication ●SOA events ●Direct mail: 13,000	Additional promotions
Holders of other actuarial designations and other risk-related credentials		Partnering with other organizations
Employers / Recruiters		(in-planning)
Media	Interactive press kit to 90+ media outlets	Desk-side interviews

Rudolph FINANCIAL CONSULTING LLC

ceranalyst.org

CERA

Overview Benefits Eligibility Requirements Resources Contact Us

Do you want to use your quantitative strengths to bring technical sophistication to a rapidly emerging specialty?

View the CERA press kit.

Risk Management Has a New Face: The Chartered Enterprise Risk Analyst, a new international credential encompassing the most comprehensive and rigorous demonstration available of enterprise risk management. CERAs possess the unique ability to anticipate, identify, quantify and optimize risk to bring about creative solutions to complex financial challenges facing business and society.

The CERA credential was developed in response to the business world's increasing reliance on professionals who are best equipped to convert risk into opportunity. CERAs don't merely speak to what we can lose; they focus on what we can gain.

Actuaries
Risk is Opportunity.℠

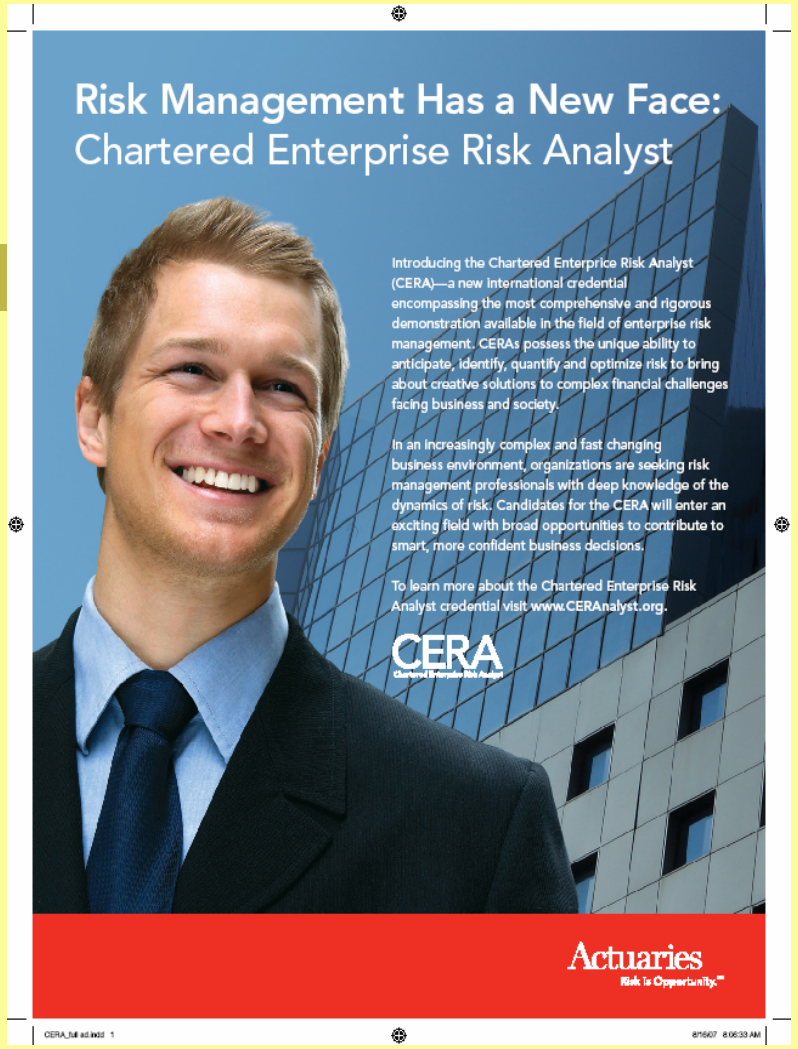
Rudolph
FINANCIAL CONSULTING LLC

Selected CERA messages

- *"CERAs are trained to have a forward-looking, comprehensive approach to enable smart, more confident business decisions"*
- *"CERAs provide real world solutions to the complex financial challenges facing businesses and society"*
- *"CERAs are trained to apply both qualitative and quantitative insights into risk management"*
- *"CERAs don't merely speak to what we can lose; they focus on what we can gain"*

Advertising

- *The Actuary* (SOA).
- *Beyond Risk* (CIA).
- *Contingencies* (AAA)
- CFO magazine
- Harvard Business Review



Rudolph FINANCIAL CONSULTING LLC

Supply – Update

- Over 300 CERAs
  - Most via syllabus requirements
    - Only option going forward
  - 20+ via thought leaders pathway
  - Over 100 via experienced practitioner pathway

Demand

- Markets
  - Insurance companies
  - Broader financial services companies
  - Consulting firms
- Positions
  - Chief Risk Officer
  - ERM department staff

Some companies are starting to request CERA designation in their ERM position descriptions

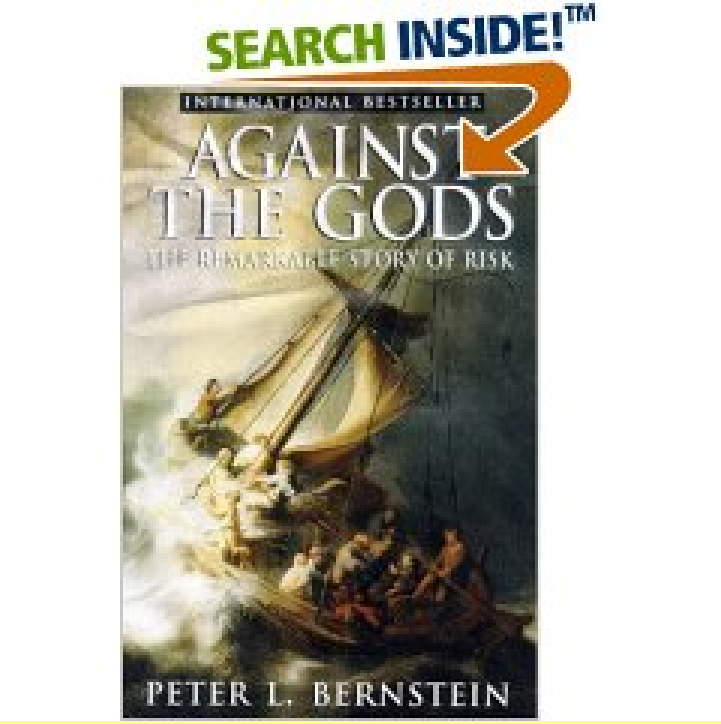
Risk Management Jobs

- 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

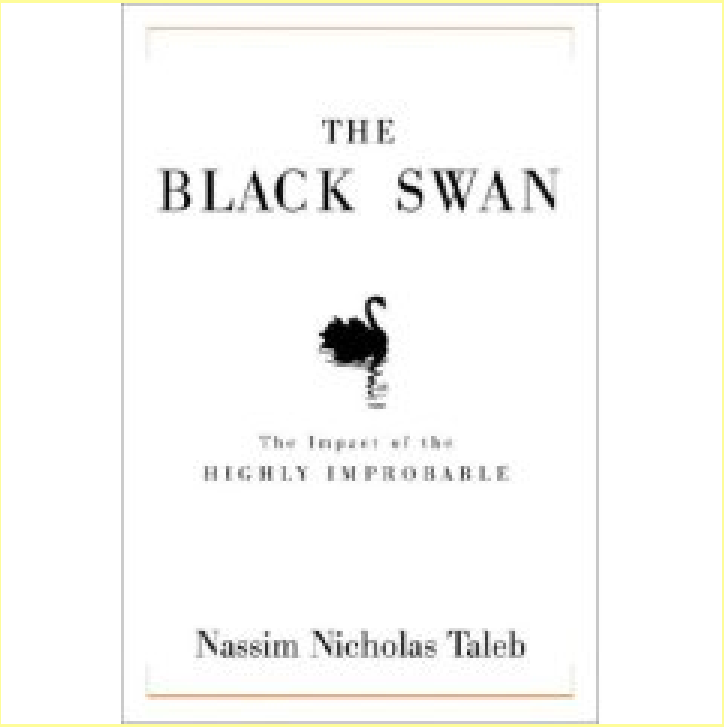
Rudolph
FINANCIAL CONSULTING

Peter Bernstein



Rudolph
FINANCIAL CONSULTING LLC

Nassim Taleb



Rudolph
FINANCIAL CONSULTING LLC

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.

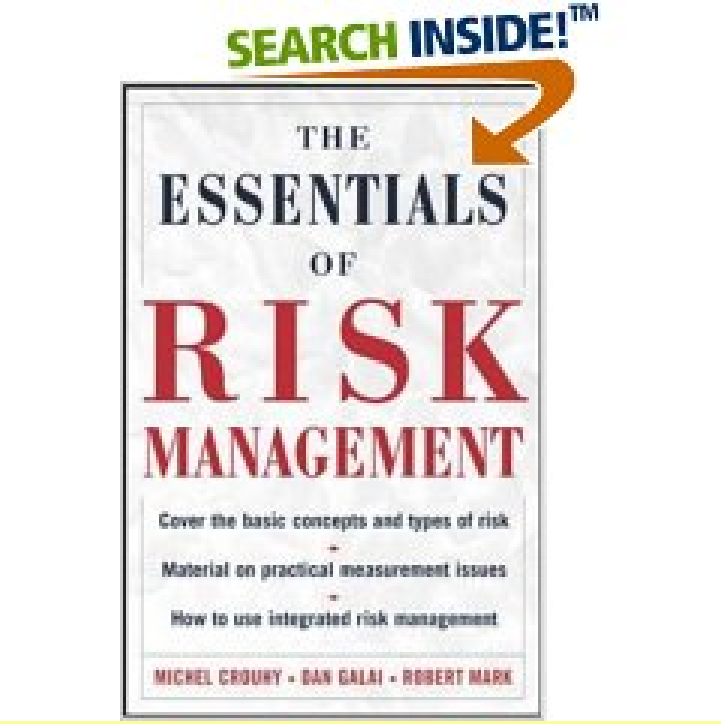
WHAT COULD POSSIBLE GO WRONG?

- 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?

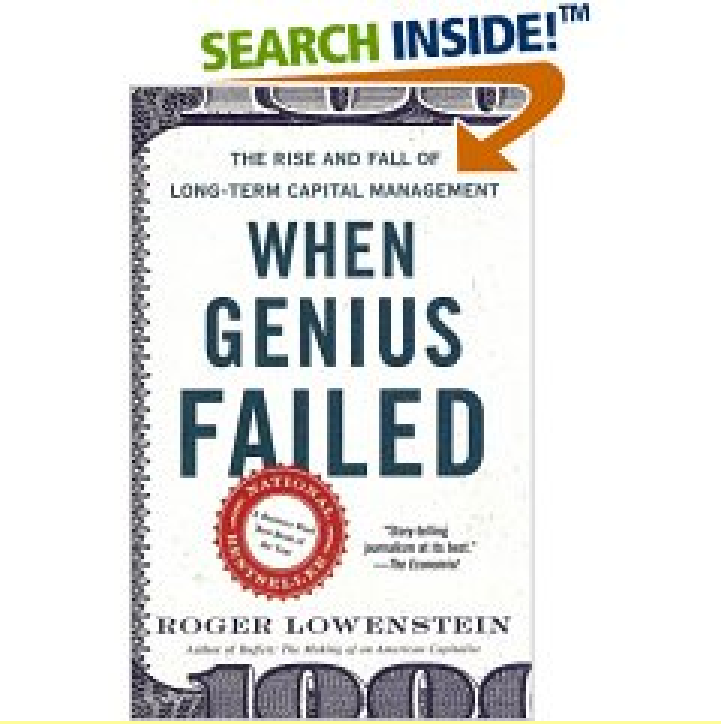
- Gigantic Natural Disaster: an Isle of Man-sized chunk could fall of Canary Islands Tsunami
- Major War
  - WWII 40 – 70 million
  - Vietnam 2.5 – 5 million
- Famine
  - Russian 6-8 million 1932
  - Chinese 20-40 million 1960
- Spanish flu 20-40 million 1918
- Asteroid (Extinction?)
- Yellowstone eruption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

Michel Crouhy, Dan Galai, Bob Mark



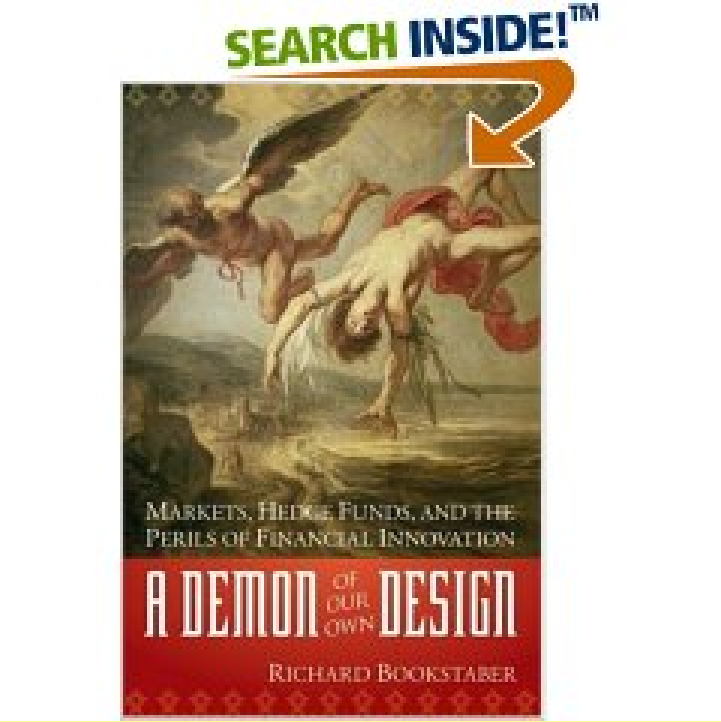
Rudolph
FINANCIAL CONSULTING LLC

Roger Lowenstein



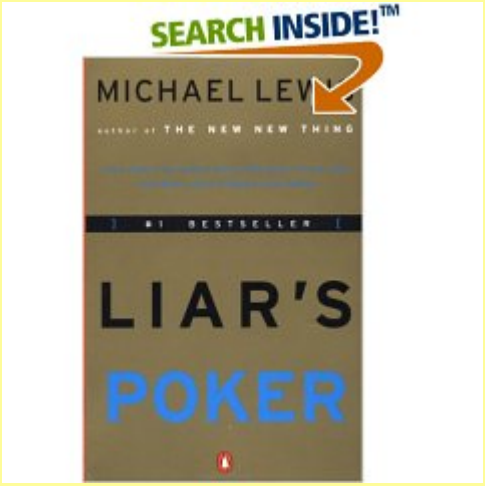
Rudolph
FINANCIAL CONSULTING LLC

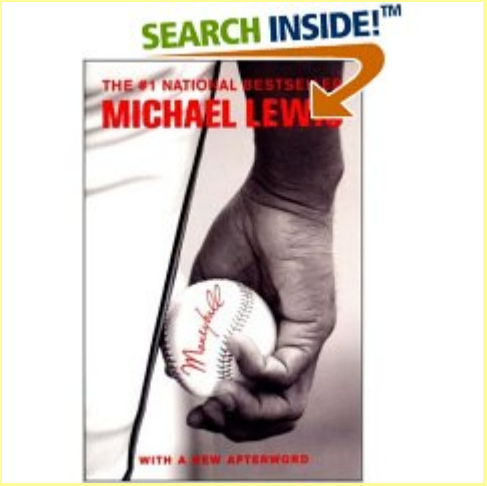
Richard Bookstaber



Rudolph
FINANCIAL CONSULTING LLC

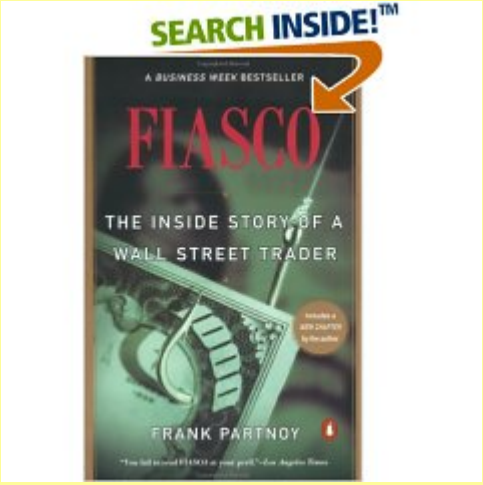
Michael Lewis

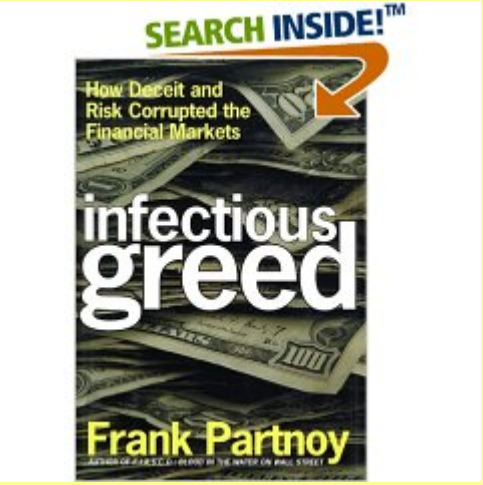




Rudolph
FINANCIAL CONSULTING LLC

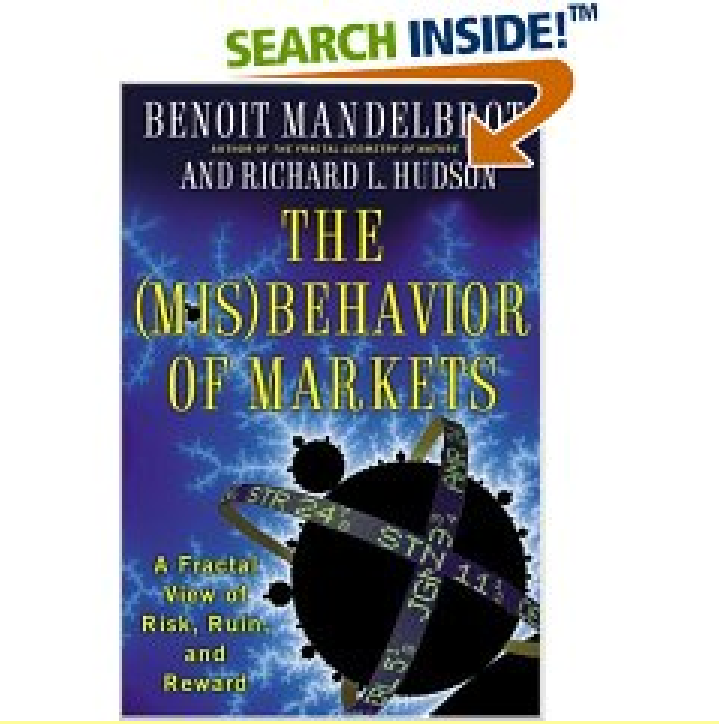
Frank Partnoy





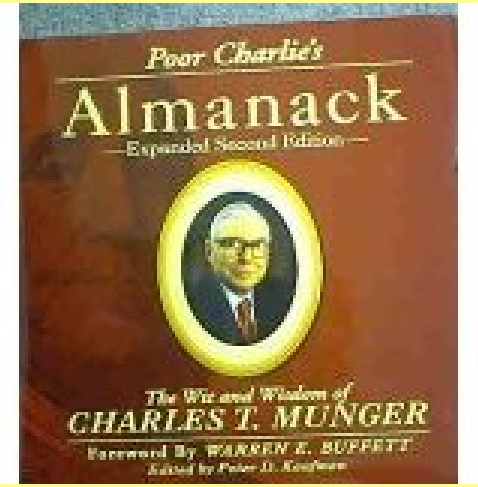
Rudolph
FINANCIAL CONSULTING LLC

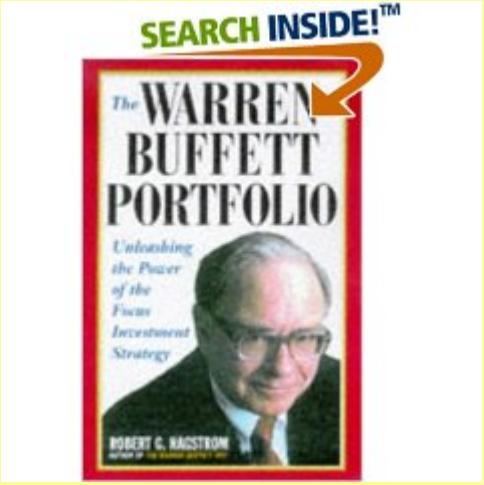
Benoit Mandelbrot



Rudolph FINANCIAL CONSULTING LLC

Berkshire Hathaway





Rudolph
FINANCIAL CONSULTING LLC

Thank you!

Max J. Rudolph, FSA CFA CERA
Rudolph Financial Consulting, LLC
max.rudolph@rudolphfinancialconsulting.com
(402) 895-0829
www.rudolphfinancialconsulting.com