

Catastrophic Risk and Risk Capital

Christopher L. Culp

Senior Advisor, Compass Lexecon
and

Adjunct Professor of Finance, Graduate School of Business
The University of Chicago

Measuring & Managing Catastrophic Risk

*2nd Annual Chicago Actuarial Association/Midwest Actuarial Forum/Professional Risk
Managers' International Association Joint Conference on Enterprise Risk Management*

Chicago - June 5, 2008



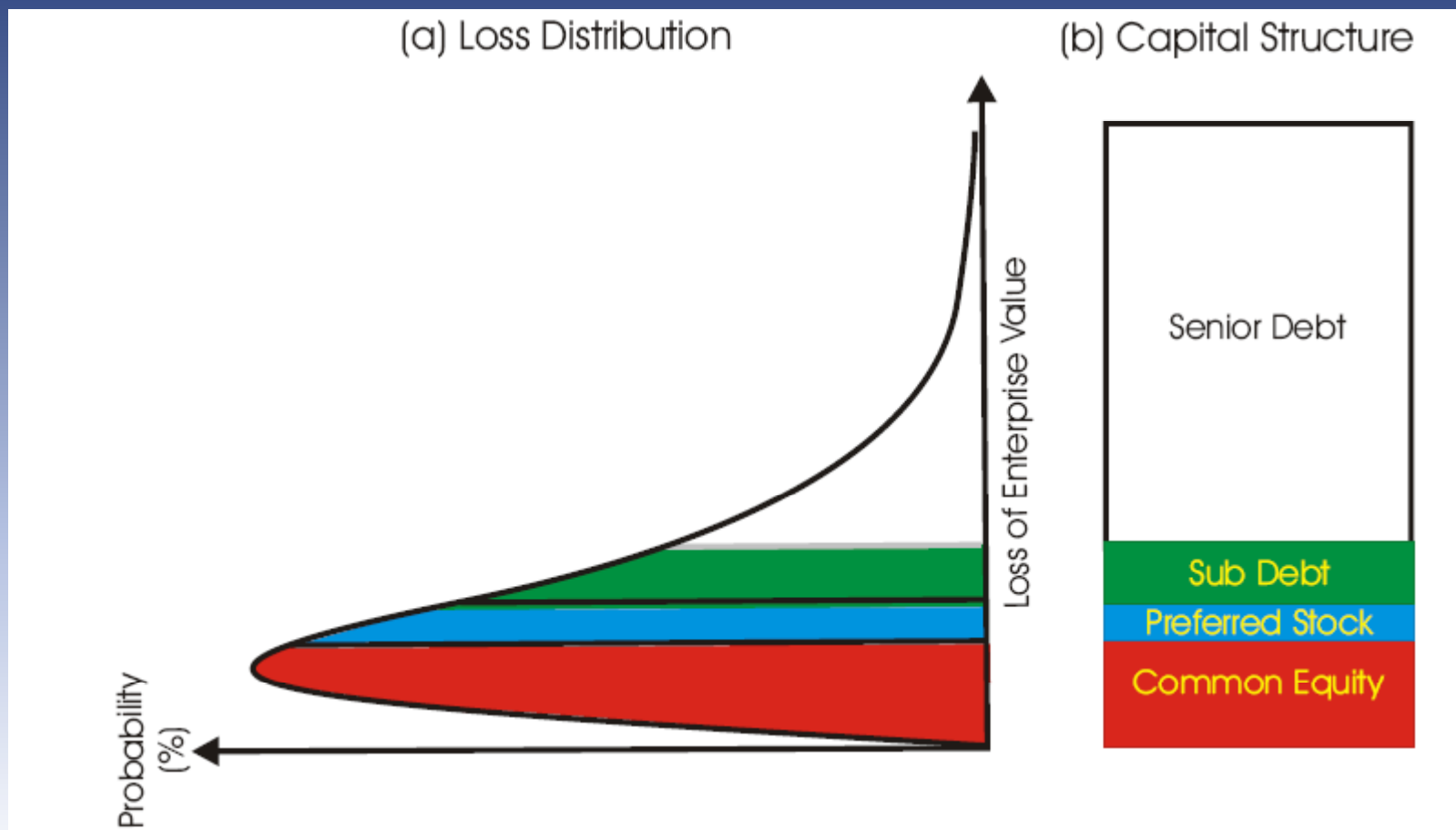
The Many Faces of Capital

- *Real Capital*: left side of the economic balance sheet
 - Factor of production
- *Financial Capital*: right side of the economic balance sheet
 - Claims issued to finance the acquisition of real capital, distribute risk across investors, and separate ownership from control
- *Risk Capital*: capital principally intended to absorb catastrophic losses
- *Regulatory Capital*: whatever the relevant regulator says it is

Traditional Capital Structure

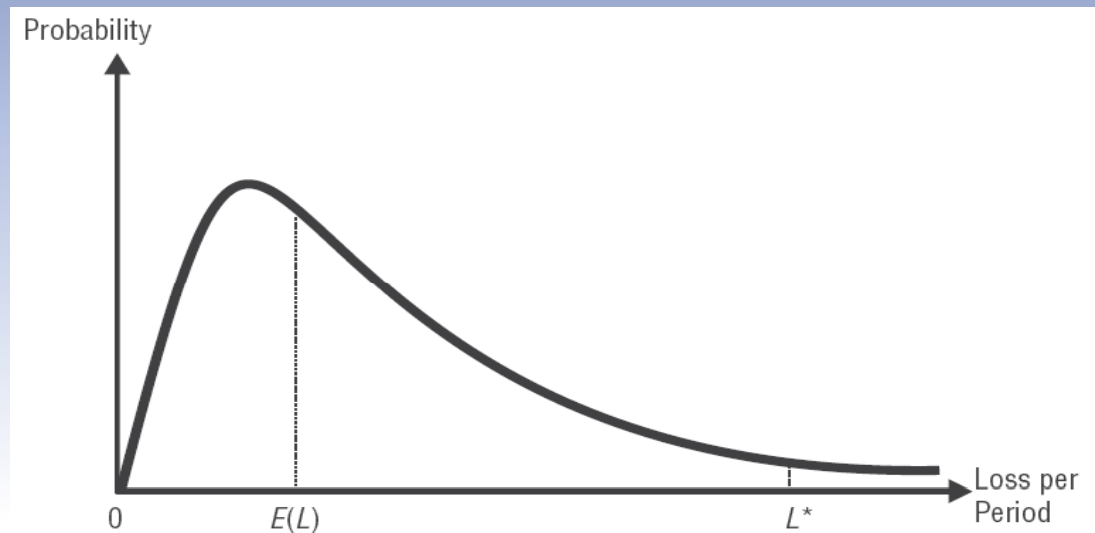
- Financial capital
 - Equity
 - Debt
- Traditional capital structure is usually characterized by...
 - Depth of subordination of claims
 - Maturity structure of liabilities
 - Voting rights of claimants

Risk is Related to Traditional Capital Structure



Risk Capital: Catastrophe Shock Absorber

- Companies examine catastrophic exposures and then acquire protection against these potential firm-killing events
- Usually operationalized with capital-at-risk (CaR)
- But is this too simplistic?



Risk Capital Structure

- Risk capital structure may be characterized along the lines of...
 1. Risk transfer vs. risk finance
 2. Balance sheet vs. cash flow vs. earnings protection
 3. Funded vs. unfunded
 4. Structure of risk capital facilities

1. Is the Risk Capital Transferring or Financing a Cat Risk?

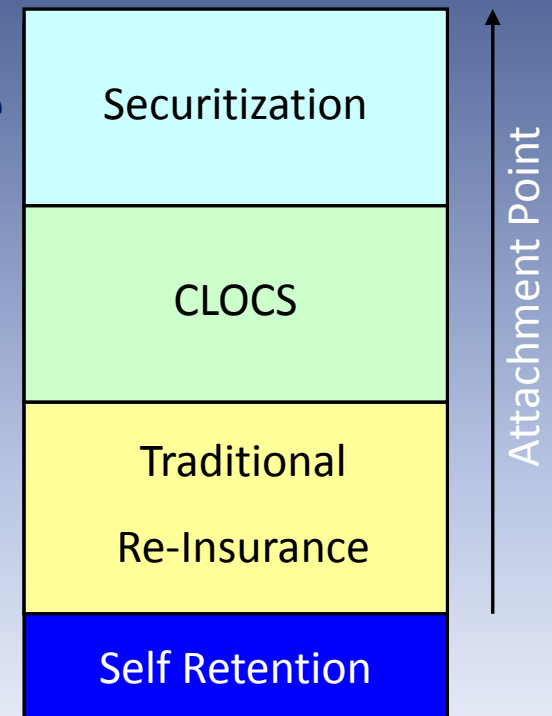
- Risk transfer
 - Shifting the financial consequences of catastrophic events to one or more external firms
 - Shareholders of one or more other firms pick up or share in the tab
- Risk finance
 - Event-contingent borrowing
 - Delays the cash flow impact of an adverse event without actually getting rid of the impact of risk (and any return) on shareholders
 - Shareholders of one or more other firms assume event-contingent credit risk, not the actual cat loss

2. What Kind of Loss is the Risk Capital Intended to Absorb/Finance?

- Economic Balance Sheet & Net Asset Values
 - Protect shareholders and policy holders from firm-killing cat loss
 - Maintain debt capacity
 - Preserve regulatory and ratings capital
- Cash Flows
 - Protect short-term liquidity position
 - Preserves debt/underwriting capacity
- Accounting Earnings
 - Enhance quality of earnings
 - Decrease earnings volatility
 - Subject to the latest accounting hoo-ha's

Example: 2007 Farmers/Swiss Re CLOCS™

- \$500mn contingent surplus note
 - Triggered by 1:100 windstorm loss
- Complemented existing cat reinsurance
 - Provided contingent risk finance but no earnings cover
 - Commitment fee was well below ROL of earnings reinsurance cover
- Balance sheet protection
 - Provided rating agency and regulatory capital
 - Preserved debt/underwriting capacity following a big storm and subsequent policy claims



SOURCE: Swiss Re/Tom Skwarek

CaR Measurement & Risk Mgmt Objectives

- The "At Risks"
 - Value at Risk (VaR)
 - Cash Flows at Risk (CFaR)
 - Liquidity-adjusted VaR (LVaR)
 - Earnings at Risk (EaR)
- Many other alternatives
 - EVT-based risk measures
 - Downside/shortfall risk measures
- Don't confuse the concept with the methodology used to implement it

CaR Measurement Warnings

- Quality of inputs and assumptions
 - Actuarial assumptions
 - Market linkages and correlations
- CaR puts diverse risks on similar footing, but methodological limitations abound
 - Mapping NatCat and insurance risks into a financial risk framework can be challenging
 - The quality of the different component risk measures may be quite dissimilar
- Be cognizant and wary of "technical addiction"

3. Is the Risk Capital Funded?

- Funded risk capital
 - Paid-in risk capital
 - Cedant has the cash before the cat loss occurs
- Parallels to traditional capital structure
 - Risk Finance \approx Debt
 - Risk Transfer \approx Equity
- *Examples:*
 - Risk reserves
 - Captives and funded retentions
 - Insurance-linked securities
 - Pre-funded trust-issued contingent surplus notes

3. Funded vs. Unfunded (cont'd)

- Unfunded risk capital
 - Contingent risk capital
 - Cedant does not get the cash until the cat event occurs
- *Examples:*
 - Traditional insurance and reinsurance
 - Contingent cover
 - Event derivatives
 - Retrospectively rated blended finite
 - Event-contingent debt

4. What is the Structure of the Risk Capital?

- Specific underlying risks/events covered
 - Can be administered in aggregate or can be tailored to specific lines/exposures/reserves
- Maturities
- Contract terms
 - Payout structure (*e.g.*, indemnity, valued, indexed, modeled loss, etc.)
 - Fac vs treaty (and proportional versus XOL)
 - Low claims bonus, reinstatement options, etc.
- Attachment points

Provocative Yet Obvious Statement

Companies are always 100% insured against all catastrophic risks. The only question is how much "insurance" companies buy from their own investors versus how much they buy from external risk capital suppliers.

Risk Capital and ERM

- Managing risk capital provides a focal point for comprehensive enterprise-wide risk management
- Thinking in terms of risk capital...
 - Forces companies to think about risk management as a *corporate finance* problem
 - Puts insurance and financial risks on equal footing
 - Reduces organizational gaps/overlaps
- Risk capital structure is the outcome of capital structure optimization
 - *Objective*: Minimize WACC
 - *Constraints*:
 - Preserve target value of the firm
 - Value/cash flow/earnings risk targets

Risk-Based Capital Regulations

- Risk-based capital regulations can create distortions and highlight opportunities for risk capital arbitrage
 - Different costs of capital
 - Different risk measurement frameworks
 - Different modeling frameworks (*e.g.*, standard approach vs. internal models in Solvency II)
- But is risk capital arbitrage "bad"?

Questions?

