Bank Capital and Risk Management: Operational risks in context

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Financial Firms Functionally

- Warehousing
  - Intermediate in illiquid exposures
  - Reduce illiquidity in their function as conduit
  - Add illiquidity as opaque corporate entities
  - Operational risks cut across both
- Is this
  - Efficient warehousing?
    - Deposit insurance
    - Payments and transactions processing
    - Monitoring of credits, claims, etc.
  - Inefficient warehousering?
    - Additional layer of taxation
    - Managerial discretion
    - Lack of transparency about assets

Financial Firms Functionally

- Distribution and origination
  - Services
  - Big balance sheet not required
  - Operational risks here too
- Financial firms are moving toward D&O and away from warehousing.
- How do we think about capital requirements and risk management in this context?
  - Many competing financial firms in service businesses have substantial oprisk, yet no capital requirements
  - Service risks (oprisk is one) can trigger illiquidity and systemic problems

Definition of Capital

- Market value of the assets (tangible and intangible)
- Value of customer liabilities contingent on repayment
- Market value of investor liabilities
  - Role of subordinated debt

Definition of Capital

- This calculation makes more sense for warehouse firm than for D&O firm

- Capital as ‘Collateral on Call’

How much Collateral on Call?

- Liquidity and deadweight costs reduce collateralizability
  - Fee businesses contribute expected profits as well as risk
  - Expected service profits collateralizable only when received
  - Expected profits accrue over time
  - This makes horizon critical

VaR and Horizon

- Standard VaR – measurement of instantaneous σ
- Risk is capital falling below $f(\sigma)$ at end of period
- What we care about is risk of falling below at any time during period
- Translates fairly directly from standard VaR
    - 5% first stopping time VaR / standard Var = 1.2

Adding expected profits to VaR

- Horizon matters

Percentage By Which First Passage Time VaR Exceeds Standard VaR

	Horizon		
	1 day	1 quarter	1 year
Expected return = 0	19%	18%	16%
Expected return = 20%	20%	37%	104%

How much Collateral on Call?

- For oprisks, data are limited and of questionable value
- Concern: big operational loss with externalities (e.g., 9/11 and the payment system, Enron and the energy market)
- Models of risk don’t provide full answer
    - Confidence, not just collateral, is the driver
    - Capital often far in excess of reasonable risk models
    - Risk measurement and risk charges are less useful for setting capital than they are for encouraging mitigation and hedging.

Insuring and Securitizing Oprisk

- Currently, we lack readily verifiable markers for oprisk severity and frequency
  - This is a problem for self-insuring, as well as for ceding risk
  - Ceding risk has additional problem of adverse selection / moral hazard
- Makes it hard and expensive to write contracts
- On the other hand, oprisks are highly diversifiable, so there is a strong argument for pooling

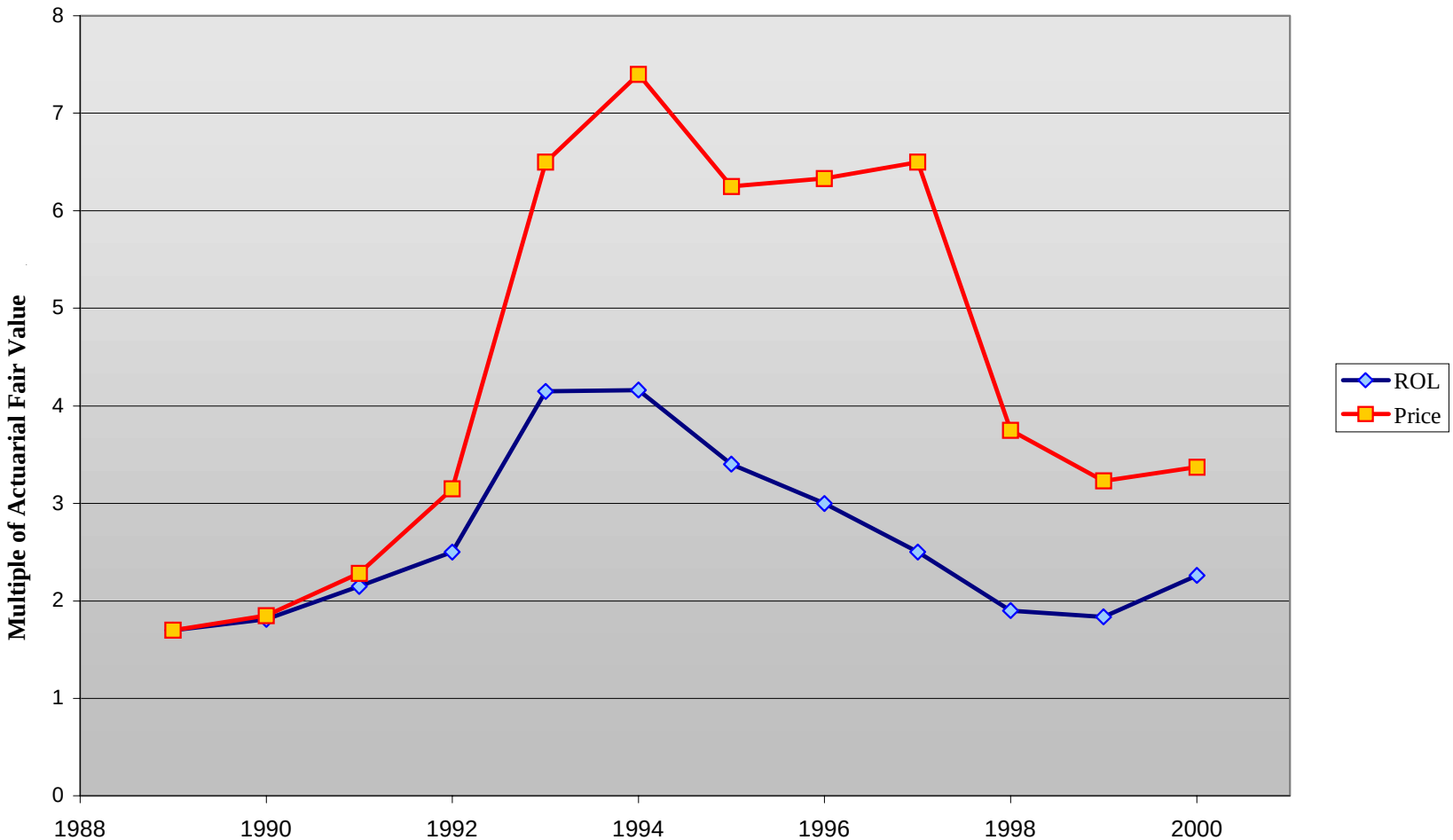
Allocation of Capital and Risk

- Internal systems needed
  - Charges for:
    - systematic risk exposures
    - corporate deadweight costs of financing
    - Externalities
- Helps create incentives to mitigate and clarify risk
- Helps to understand benefits of insurance

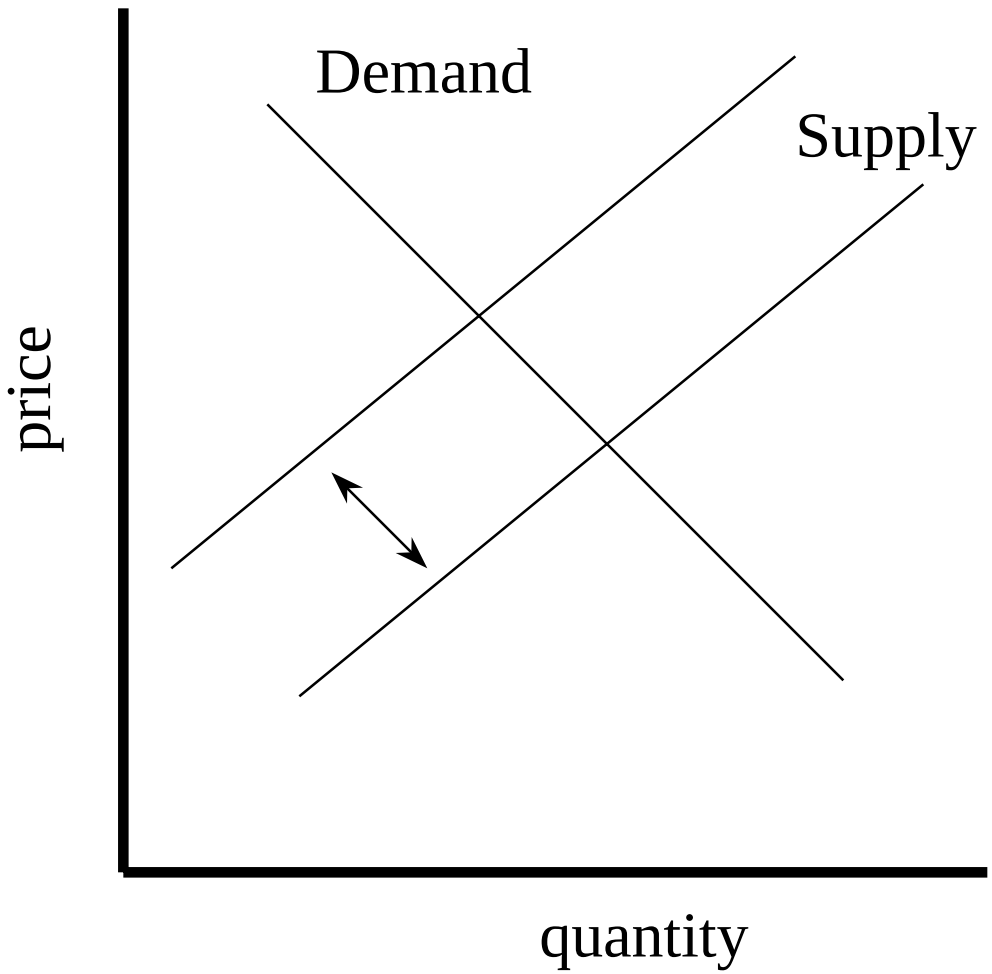
$$k_i = r_f + \beta_{i,m}(k_m - r_f) + \beta_{i,b}Z_b + \beta_{i,l}Z_l$$

Insuring and securitizing oprisk: Lessons from the past

Figure 4b: Price of Reinsurance Relative to Actuarial Value, 1989-2000



Supply shock dominant?

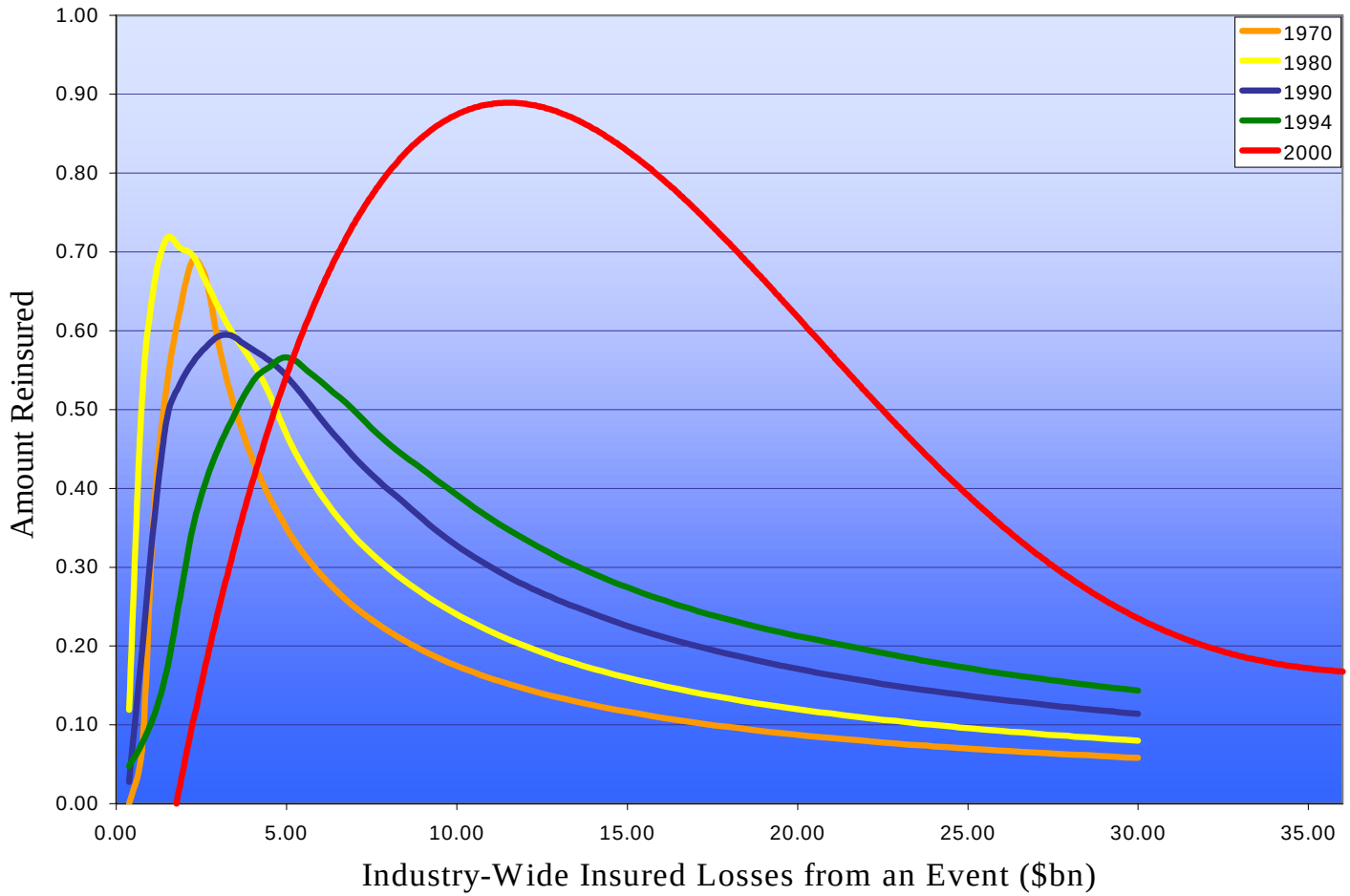


Yes

- Price moves by more than ROL (retentions rise)
- Prices of hurricane risk rise after an earthquake
- Post Sept-11 price of outstanding cat bonds increased by 200 basis points (450 to 650).

Cobwebs are inefficient
(so they go away)

Figure 4d: Marginal Percent Reinsured 1970-2000



Capital market response to 9/11

- $8 billion + of capital moved into new/enhanced entities in first 6 weeks
- Lots of innovation in vehicles and instruments

Conclusions

- In the past market was pretty efficient over ‘medium’ term
- Good reasons to think ‘medium’ term is much shorter now
- Tremendous leverage from building hardware and software around insurance markets and risk measurement
- Hopefully, we don’t need need a large oprisk event as a wakeup call.