Convergence of Financial Services: Opportunities In the Wholesale Market

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I. Convergence of Banking and Insurance Markets

Drivers of Convergence: Regulatory Changes

Global deregulation of financial services:

- Europe – EU Banking and Insurance Directives
- United States – Gramm-Leach-Bliley Act (1999)
- Japan – "Big Bang" financial reforms

Drivers of Convergence: Demand-Side Factors

Demand side factors:

- Emergence of new risks (e.g., increasing exchange rate volatility)
- Increasing magnitude of existing risks (e.g., catastrophic property losses):
  - Natural hazards (increased property values in catastrophe prone regions)
  - Man-made disasters (oil spills, terrorism)
- Emergence of holistic (enterprise-wide) risk management

Drivers of Convergence: Supply Side Factors

- Modern financial theory
- Improvements in computing and communications technology facilitates
  - Security design
  - Pricing and valuation
- Capital market imperfections
  - Asymmetrical information: managers vs securities markets
  - External capital more costly than internal capital: hedging avoids shocks that deplete internal capital
- Insurance and reinsurance cycles

Risk Management and The Pure Theory of Finance

"Shares of widely held corporations are owned by diversified investors, who can structure their portfolios to take the desired amount of risk. Therefore, risk management at the firm level is a dead-weight cost that destoys firm value."

More Recent Theory: Why Hedging Can Create Value

- Avoid Financial Distress Costs
  - Bankruptcy and regulatory costs
  - Reputational loss affecting relationships with key employees, suppliers, and customers
- Preserve internal capital
- Hedge foreign exchange rate risk
- Avoid the under-investment problem
- Minimize taxes (convexity of income tax schedule)

Enterprise Risk Management

- Motivations for enterprise risk management
  - Firms can maximize value by focusing on core competencies, i.e., activities where they have comparative advantages
  - Firms should hedge pure risks – risks that are beyond their core competencies

Enterprise Risk Management: Risks

- Traditional "insurance-type" risks
  - Property loss
  - Legal liability
  - Work injuries
- Financial risks
  - Foreign exchange risk
  - Interest rate risk
  - Commodity price risk
  - Credit risk

Enterprise Risk Management: Advantages

- Coordinate pure risk management with corporate financial decisions
  - Capital structure
  - Dividend policy
  - Product diversification strategy
- Minimize costs of hedging by
  - Avoiding over-hedging
  - Taking advantage of natural hedges by recognizing correlations among risk exposures

Risk Management In Financial Institutions

- Financial institutions have core business motivations for hedging
  - Avoiding regulatory intervention
  - Providing financial safeguards for depositors and policyholders

"Demand for intermediated products and the prices commanded in the market are functions of the financial institution's default risk."

II. The Wholesale Financial Services Market

Wholesale Financial Services: The Market

- "A Business-to-Business Market" in
  - Securities issuance
  - Risk management: hedging products and strategies
  - Investment management
  - Securitization
  - Wholesale lending

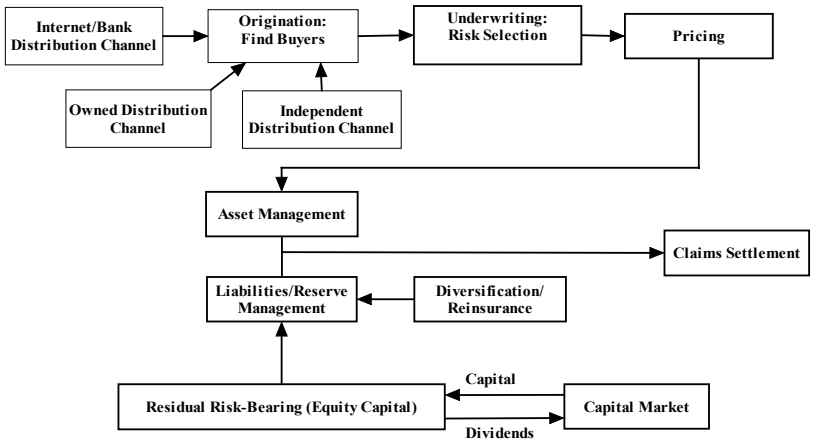
The Wholesale Market: Demand and Supply

- Demand side
  - Non-financial corporations
  - Financial institutions
  - Governments
- Supply-side
  - Investment banks
  - Commercial banks
  - Insurers and reinsurers
  - Other intermediaries: Brokers, financial consultants

Demand for New Instruments

- Securitizing on-balance-sheet assets and liabilities to
  - Enhance credit quality
  - Access wider capital markets
  - Meet regulatory requirements
    - » Risk-based capital
    - » Accounting requirements
- Provide new sources of diversification not previously available to most investors
  - Bank loan credit risk
  - Nature-linked risks
  - Insurance asset and liability risks
  - Other risks traditionally held on-balance-sheet

Integrated Insurer/Reinsurer



Core Competencies: Reinsurers

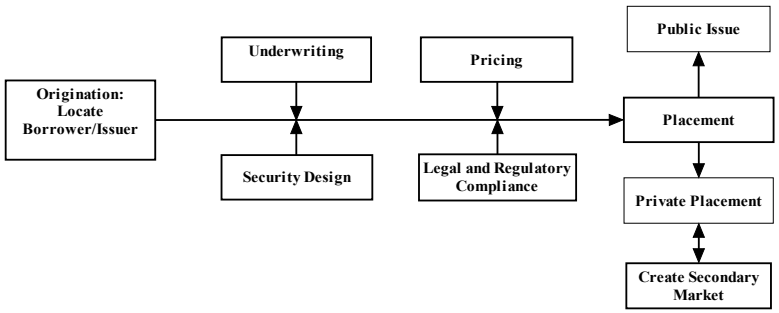
- Underwriting
  - Reducing information asymmetries
  - Controlling adverse selection
- Pricing – analyzing loss frequency and severity
- Contract design – controlling moral hazard
- Liability and reserve management
- Diversification and hedging underwriting risk

Unbundling Integrated Insurers

- Origination as a separate function:
  - Internet sales
  - Bank delivery channel
  - Independent distributors
- Reducing the degree of residual risk-bearing
  - Securitization of liabilities
  - Non-traditional hedging products: e.g., insurance-linked bonds and options

    "Reinsurer becomes an underwriter and manager of basis risk."

Investment Banking: Securities Issuance



Core Competencies: Investment Banks

- Deal origination
- Securities underwriting and placement
- Securities design
- Securities pricing
- Non-traditional securitizations
  - Moving assets and liabilities off balance sheets
  - Creating innovative asset-backed-securities
- Market making

Questions About Convergence

- Can investment banks compete with reinsurers in:
  - insurance underwriting
  - pricing
  - reserving and loss liability management?
- Can reinsurers compete with investment banks in:
  - underwriting, pricing, and distributing inherently financial products?

The Role of New Financial Exchanges

- Specialized exchanges: the experience
  - CATEX: Facilitates trading of conventional insurance and reinsurance products
  - Bermuda Commodity Exchange – failed to create a market for insurance-linked derivatives
  - Reinsurer-operated electronic markets, e.g., the Swiss Re Portal – "the jury is still out"

The Role of New Financial Exchanges II

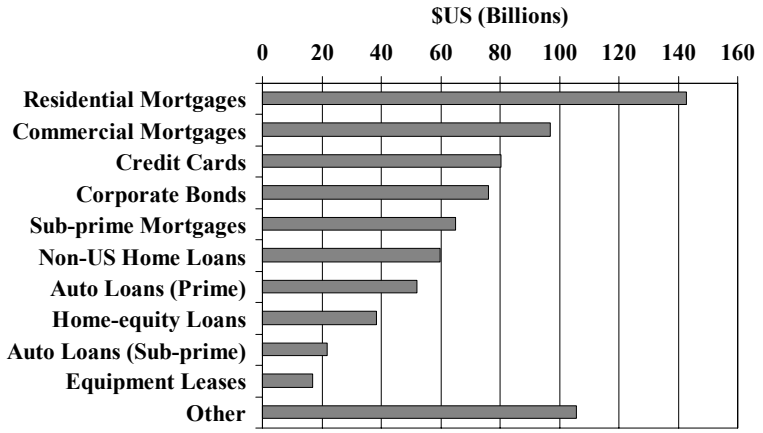
- Why specialized exchanges might be better
  - Informational economies of scale in specialized products
- Why existing exchanges might be better
  - Potentially bring new products to a wider market
  - Larger scale of operations provides better protection against counter-party credit risk

III. Innovative Wholesale Financial Services Products

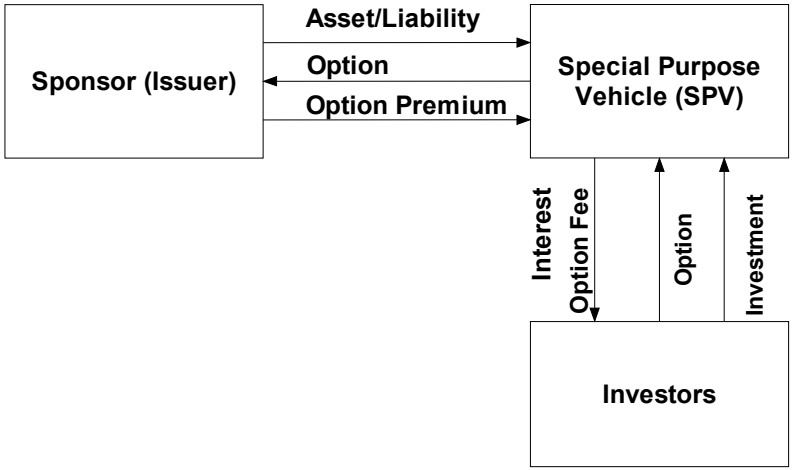
Financial Services Products: Outline

- Non-traditional asset-backed securities (ABS) and non-asset-backed derivatives
- Insurance-linked products
  - Alternative Risk Transfer (ART)
  - Insurance-linked securities
    - » Property-liability (including catastrophic risk)
    - » Life insurance/annuities
    - » Credit insurance

Asset-Backed Securities: New Issues 2001



Asset-Backed Security Structure



Motivations for Issuing ABS

- Credit enhancement
- Meeting regulatory requirements
- Creating tranches of securities that appeal to various groups of investors

Economic Rationale for ABS

- Sponsor sells risks to investors in return for an enhanced return in the form of an option premium.
- If investors value the option as a diversifying asset, the risk premium should be lower than the internal funding costs of the sponsor.

Why Use a Special Purpose Vehicle?

- Insulate investors from sponsor's credit risk
- Provide transparent servicing of asset/liability
- To structure tranches of debt to appeal to different classes of investors
- Insulate investors from agency costs of issuer, creating a "pure play" security
- Provide tax and accounting benefits to sponsor

Non-Traditional ABS: Credit-Linked

- Credit-linked notes
  - Structured notes where coupon or principal is linked to underlying reference credit
  - Synthetic bonds
- Credit linked notes: Advantages
  - Allow non-banks to diversify into bank loan credit risk
  - Create other non-redundant securities valuable as diversifying assets

Convergence: Can Reinsurers Succeed in Credit-Linked Notes?

- Pro: Pricing of credit risk is similar to pricing traditional insurance frequency and severity risk (see CreditMetrics, CreditRisk+)
- Con: Credit risk is correlated with economic conditions and hence has elements unfamiliar to reinsurers (most insurance risks have very low "betas")

Weather-Linked Securities

- Weather derivatives
  - Settle on indices of heating degree days (HDDs) and cooling degree days (CDDs)
  - Appeal to energy companies, ski resorts, etc. to hedge against warm winters or cool summers
  - Example, Chicago Mercantile Exchange Put
    - » HDD = Max[65° F – daily average temp, 0]
    - » Option payoff
      = 100*Max[Strike – Monthly HDDs,0]
      = 100*Max[900 – 750,0]
    - » CME futures & options on 10 US cities

Weather Asset-Backed Securities

- Weather ABS: Asset-backed securities with an embedded weather derivative
- Advantage to issuer:
  - Hedge weather risk
  - Favorable accounting and tax treatment
- Advantage to investors:
  - Broadens the class of available instruments to diversify into weather risk

Aircraft Asset-Backed Securities

- Types:
  - Equipment trust certificates (ETCs)
  - Enhanced equipment trust certifications (EETCs)
  - Aircraft lease portfolio securitization (ALPS)
  - Securitized pools of aircraft loans

Aircraft Asset-Backed Securities

- Advantages to airlines:
  - Credit enhancement: higher credit rating, e.g., if ABS include multiple-countries and multiple-airlines to diversify risk
  - Flexible payment terms reduce default rates
- Advantages to investors:
  - Diversify into new type of risk
  - Familiar structure of collateralized loan obligations (CLOs)

IV. Insurance-Linked Products

Types of Insurance-Linked Products

- Alternative risk transfer (ART) products
  - Supplement traditional insurance and reinsurance by expanding market capacity to bear risk
  - However, do not access the broader capital markets
- Insurance-linked securities
  - ABS or options/swaps
  - Access the overall capital market

The Alternative Risk Transfer (ART) Market

- Buyer-organized diversification/hedging programs
  - Self insurance
  - Captive insurance companies
  - Risk retention groups
  - Other buyer-organized plans

The Alternative Risk Transfer (ART) Market II

- Supply-side products (from insurers, reinsurers, etc.) that extend conventional reinsurance to:
  - Cover non-traditional risks
  - Permit diversification across multiple time periods
  - Permit diversification of multiple risks
  - Incorporate multiple payoff triggers

ART: Principal Products

- Finite risk reinsurance
- Blended covers – combine elements of finite and conventional reinsurance
- Multi-year/multi-line products (MMPs)
- Multiple-trigger products (MTPs)

Finite Risk Reinsurance: Characteristics

- Transfers less underwriting risk than conventional reinsurance
- Usually covers multi-year periods
- Investment income is explicitly included in the contract price

"A multiple-year banking transaction with an insurance component."

Finite Risk Reinsurance and Convergence

- Reinsurer exposed to non-traditional risks
  - More credit risk due to multi-year period
  - Interest rate risk due to inclusion in price
  - Often denominated in foreign currency, exposing reinsurer to exchange rate risk

Spread Loss Reinsurance

- Objectives:
  - Reduce volatility of ceding insurer's net income
  - Protect against reinsurance underwriting cycle
- Ceding insurer swaps actual losses (within limits) for fixed premium payments
- "Experience account"
  - Credited with premium payments and interest
  - Losses are deducted from account

Spread Loss Reinsurance II

- Limit on reinsurer's obligation at end of contract period:

  Min[Max(-aB,0), D]

  where a = proportion between 0 and 1
  B = experience account balance
  D = overall cap on reinsurer obligation

Spread Loss Reinsurance III

- Could banks offer spread loss reinsurance?
  - Familiar with the banking aspects of the transaction but
  - Lack expertise in pricing the underwriting risk component
  - Might encounter regulatory problems
- Solving the problems:
  - Securitize the underwriting risk
  - Transfer the underwriting risk to a reinsurer

Retrospective Excess of Loss Covers (RXOLs)

- Background: Some policies (e.g., occurrence liability) cover insured for events during the coverage year ("accident year") regardless of when loss is filed
  - Incurred loss = paid claims + reserve for known claims + incurred but not reported (IBNR) reserve
  - Reserve development = resolution of uncertainty about incurred loss as reserved claims are paid over time

Retrospective Excess of Loss Covers (RXOLs) II

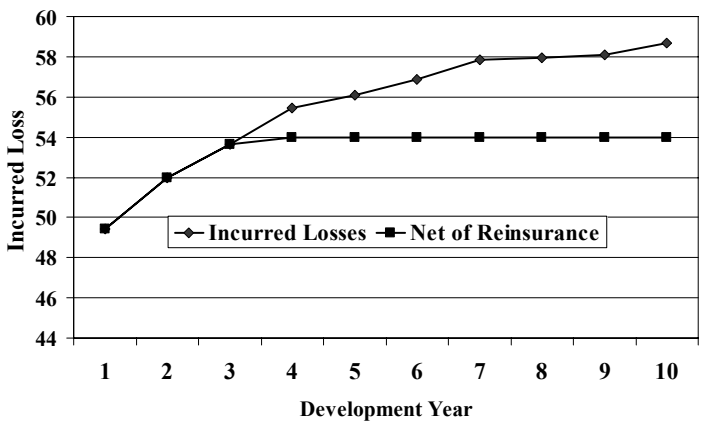
- RXOLs provide a call spread on incurred losses:

  $\text{Max}[IL_t\text{-M},0] - \text{Max}[IL_t\text{-U},0]$

  where M = lower strike, U = upper strike

- Premium = PV{ E[Option payment] }

RXOLs III: Example



RXOLs IV: Risks to Reinsurer

- Timing risk – the risk that claims are paid sooner than expected
- Interest rate risk – due to discounting of expected claims in premium calculation
- Underwriting risk
- Credit risk – reinsurer sometimes agrees to pay claims if other reinsurers default

RXOLs V: Benefits to Ceding Insurer

- Transfers significant risk to the reinsurer
- Information arbitrage reduces cedant's cost of capital
  - Reinsurer has more information about reserve adequacy than the capital market
  - Issuing reinsurance is a positive signal to market that cedant's reserves are sound
  - Therefore, reinsurer leverages its knowledge base (core competency) to create value

Loss Portfolio Transfers (LPTs)

- Block of loss reserves transferred to reinsurer in return for premium = present value of expected losses incurred on the block of policies
- Unlike RXOLs, LPTs move reserves off the cedant's balance sheet

LPTs: Benefits to Cedant

- Reduces cedant's leverage (liabilities/equity)
- Increase cedant's attractiveness as merger partner
- Avoid costly reserve runoff operations
- Permit cedant to focus on new opportunities and markets

LPTs: Future Opportunities

- LPT could be securitized rather than transferred to reinsurer
- Reinsurer participation in a proportion of the securitization would signal markets that the deal is priced appropriately

Blended Covers

- Combine elements of finite reinsurance and traditional reinsurance
  - Meet regulatory requirements that significant risk must be transferred
  - Can be structured to cover
    - » Underwriting risk
    - » Timing risk
    - » Credit risk
    - » Foreign exchange rate risk
  - Often are multi-year to hedge underwriting cycle

Multi-year/Multi-line Products (MMPs)

- Modify conventional reinsurance by
  - Incorporating multiple lines (e.g., auto liability, commercial liability, homeowners, etc.)
  - Covering multiple years at fixed yearly premium
  - Hedging financial as well as underwriting risk
  - Sometimes covering "uninsurable" risks such as political risk and business risks

MMP Example

- Cover auto liability, products liability, homeowners, and workers' compensation
- For 5 years at fixed annual premium based on present value of expected losses
- Reinsurer makes payments in multiple currencies for multi-national firm
- Hedges commodity price risk by covering the "demand surge" in construction prices following a catastrophic event

MMPs: Advantages to Cedant

- Protects against multiple risks
- Reduces transactions costs because only one reinsurer is involved
- Reduces price relative to separate reinsurance policies by recognizing diversification across lines of business

"Represents cross-selling at the wholesale level."

Multiple-Trigger Products (MTPs)

- Recognizes "states of the world" theory – money is more valuable in some states of the world than in others
- Example: MTP covering triggered when
  - A defined property catastrophe occurs and
  - Market interest rates increase by a specified amount

  "Both triggers must be satisfied."

MTPs: Advantages

- Reduces price of reinsurance by triggering payment only in adverse states of the world
- Can be structured to cover multiple time periods

"Combines conventional reinsurance and financial derivatives in a single, integrated contract." E.g., CAT XOL reinsurance with an embedded interest rate derivative.

ART Products: Caveats

- Most exploit market imperfections and thus would not be viable in efficient capital markets
  - Finite reinsurance often motivated by regulatory accounting rules
  - Spread loss reinsurance would not be attractive if external capital were not more costly than internal
  - In informationally efficient markets, LPTs would be priced exactly at market value, leaving no "gains from trade"

ART Products: Caveats II

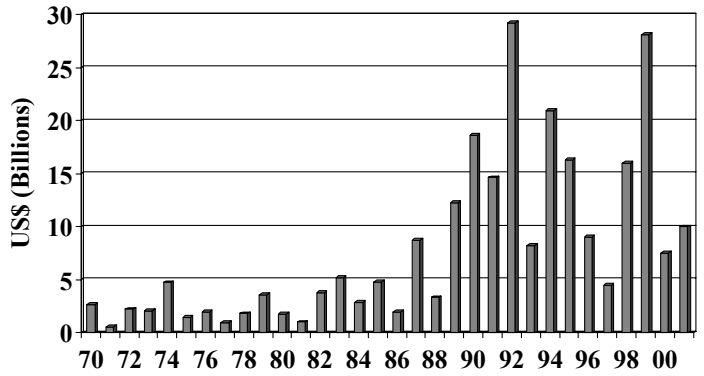
- Markets may be evolving away from opaque, highly structured products such as MMPs and towards simpler and more transparent products
- Broader capital markets are not accessed
- Could be replicated by trading insurance derivatives and financial derivatives
- Value added by the reinsurer is in underwriting, pricing, and liability management, not necessarily residual risk bearing

Insurance-Linked Securities

Catastrophic Loss (CAT) Securities

- Interest in CAT securities generated by
  - Increase in frequency and severity of property catastrophes
  - Projection of even larger losses in the future
  - Recognition that reinsurance is not the most efficient way to finance low frequency-high severity events
- Securitization more feasible due to technological advances in CAT modeling

Insured Losses: Natural Catastrophes



Projected Catastrophes

- $75 billion Florida hurricane
- $21 billion Northeast hurricane
- $72 billion California earthquake
- $100 billion New Madrid earthquake

US Property-Liability Insurance Market: Capacity

Equity capital = $350 billion

But . . .

- Only a fraction of insurers write property insurance in Florida, California, etc.
- Parents not obligated to bail out failing subsidiaries ("corporate veil" rule)
- Guaranty funds' capacity limited

International Reinsurance Market Capacity

Capacity has increased since Andrew

But . . .

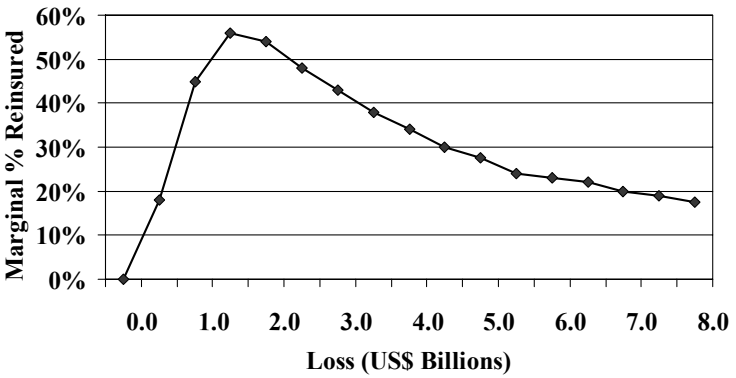
- Bulk of premiums for non-CAT losses
- CAT-XL RE = 40% of $56Billion US hurricane loss (1997 Swiss Re estimate)
- Market is cyclical

Why Time-Diversification Fails

"Holding large amounts of capital to finance infrequent events is not possible in practice."

- Holding capital is costly due to agency costs and other market imperfections
- "Underutilized" capital attracts raiders
- Tax and accounting rules discourage holding "excess" capital
- Insurance price regulation penalizes firms with "excess" capital

Percent of Marginal Exposure to CAT Loss Reinsured (By Event Size)



Why Securitization Is the Solution

- $100 billion loss would be
  - Equivalent to about 75% of equity capital of the global reinsurance market
  - Less than 0.5 of 1% of US stock and bond market capitalization
- CATs uncorrelated with other events that move markets (zero-beta securities)
- Markets reveal information -- reduce reinsurance price/quantity cycles

Securitized CAT Products

- CAT options (CBOT)
- CAT bonds
- CAT equity puts
- Contingent capital

CAT Call Spreads

- Underlying Instrument: CAT Loss Indices
  - National
  - Regional
  - State (California, Florida, Texas) or sub-state
- Asian options, i.e., triggered by loss accumulation over a specified loss period
- Index valuation = loss estimate/$100 million, 1 point = $200

PCS Call Spreads

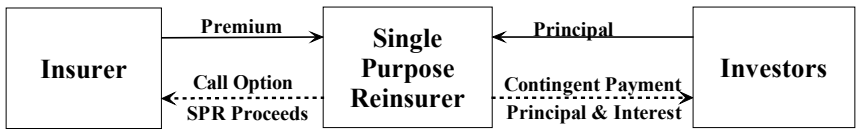
- Asian options, i.e., based on accumulated losses over the loss period rather than loss from a defined event
- Index Valuation = PCS Industry-wide insured CAT loss estimate/$100 million
- Index Quotes: Points and tenths of points. 1 point = $200

PCS Call Spreads

Example: 40-60 Eastern Call Spread

- Pays off if losses exceed $4 billion
- Payoff function: $200*[Max(I-40,0) - Max(I-60,0)]
- E.g., Loss = $5.5 billion $\Rightarrow$ I = 55, Payoff = $3,000 per contract

CAT Bond With Single Purpose Reinsurer



Index Linked vs. Insurer Specific CAT Securities

	Index Linked	Insurer Specific
Moral Hazard	Relatively Low	Relatively High
Transactions Costs	Low	High
Liquidity	Relatively High	Relatively Low
Basis Risk	?	Low

"If basis risk is sufficiently low, index-linked CAT securities may dominate insurer specific contracts, at least for some insurers."

Contingent Capital

- Usually an asset-backed structure similar to a CAT bond, except
  - When triggering event occurs, insurer can withdraw funds from the SPR and substitute contingent capital certificates (surplus notes)
  - Usually a provision for retiring the surplus notes
- Therefore, investors are subject to the ultimate credit risk of issuer (failure to retire the notes) but otherwise are principal protected

CAT E-Puts

- Unlike CAT bonds and contingent capital, CAT E-Puts are not asset-backed
- Before a CAT: Insurer buys put options from investors allowing it to issue stock following a defined event at specified price
- After CAT: Insurer has the option to issue preferred stock at the pre-agreed price

CAT Bonds vs. CAT E-Puts

CAT Bonds

- Low counterparty risk
- No dilution of share value after a CAT
- No change in capital structure at issue
- High transactions costs

CAT E-Puts

- More counterparty risk
- Possible dilution of share values after a CAT
- No change in capital structure at issue
- Somewhat lower transactions costs

Critique: CAT-Linked Securities

- Attractive for diversification especially if market develops to include securities covering various regions of the world
  - But, is a Mega-CAT really zero-beta?
- Realizing their full potential will require the development of public markets in relatively standardized bond and option contracts

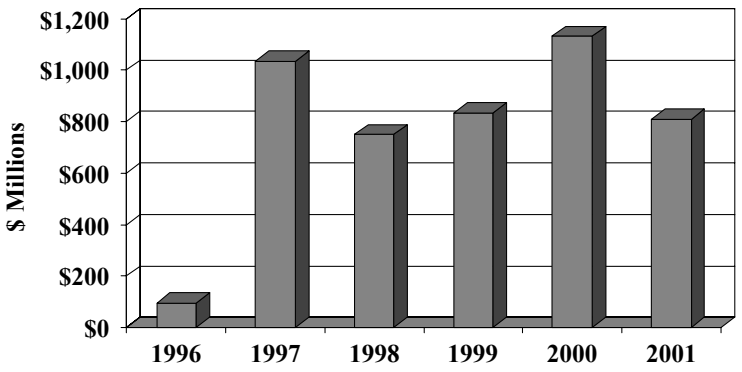
Life Insurance/Annuity Securitization

- "Closed block" life insurance securitizations (e.g., Hannover Re)
  - Insurer originates a block of policies and sells the block to investors through a securitization structure
  - Enables insurer to realize profits from the policy block immediately rather than over time
  - Improves regulatory leverage ratios and potentially provides lower cost financing

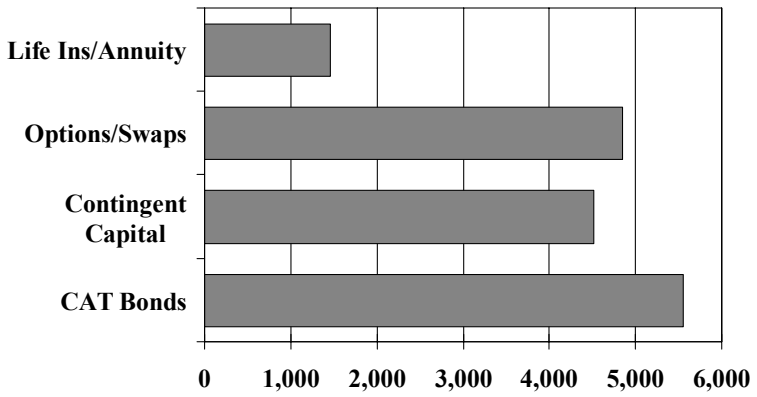
Representative Excess Returns (1999)

Issuer	*Instrument Type*	*Term*	*Rating*		*Amount ($USM)*	*Excess Return*
Domestic Re/Kemper CatBond	Mid-west Earthquake	3 Year	BB+	$	80.00	3.24%
Cocentric Re/Oriental Land Co. CatBond	Japan Earthquake	5 Year	BB+	$	100.00	2.72%
USAA/Residential Re CatBond	US East Coast Windstorm	1 Year	BB	$	200.00	3.27%
Golden Eagle CatBond	Parametric Disaster	2 Year	BBB-	$	50.00	2.82%
Gerling/Sectors -- Tranche C	European Credit	3 Year	BBB	$	82.00	1.00%
Kelvin 2nd Event/ Koch Energy Trading	Weather Derivatives	3.5 Year	BBB-	$	23.00	4.52%

CAT Bonds: $ Volume



Insurance Linked Securities: Volume 1995-2001 ($ Millions)



Conclusions: Future Opportunities

- Review of developments of the recent past as well as theoretical considerations suggest that new opportunities will be products that:
  - Assist firms in enterprise risk management
  - Are credit enhancing by tranching or accessing new forms of diversification
  - Move risky assets or liabilities off-balance sheet
  - Create non-redundant securities that are valuable to investors in improving portfolio efficiency

Conclusions: Future Opportunities II

- Financial wholesalers are most likely to succeed if they
  - Focus on their core competencies
  - Look for opportunites to add value through information arbitrage
- Market imperfections create opportunities but eventually will become less important
  - Regulatory arbitrage
  - Information asymmetries and costly external capital

Convergence Questions

- What will be the dominant model for wholesale financial products in the future:
  - Complex, relatively opaque private placements?
  - Standardized, transparent public offerings?
- Will reinsurers continue to bear significant residual risk?
- How can we best promote the development of a more liquid market in CAT risk?