



SOCIETY OF ACTUARIES

**Life 2008 Spring Meeting
June 16-18, 2008**

**Session 106, Nontraditional Reinsurance – From
Variable Annuity Reinsurance to P&C Natural
Catastrophe Bonds**

Moderator

David Addison, FSA, MAAA

Authors

Lawrence S. Carson, FSA, MAAA

William Dubinsky

Jean-Francois Poulin, FSA, FCIA

Non-Traditional Reinsurance-From Variable Annuity Reinsurance to P&C Natural Catastrophe Bonds

Annuity Reinsurance

Lawrence S. Carson FSA, MAAA
Vice President and Marketing Actuary
RGA Reinsurance Company
Financial Markets
Society of Actuaries Life Spring Meeting, Québec, QC
June 18, 2008



Annuity Reinsurance

- **What is annuity reinsurance, and where has it been?**
- **How does annuity reinsurance compare to other risk management and capital tools?**
- **How does annuity reinsurance differ from mortality reinsurance?**
- **What do annuity reinsurers bring to the table?**
- **Annuity reinsurance considerations**
- **The annuity reinsurance marketplace**

What is annuity reinsurance?

- **Just like reinsurance of other products**
- **Many more “moving parts”**
- **More fun than an actuary should be allowed to have**

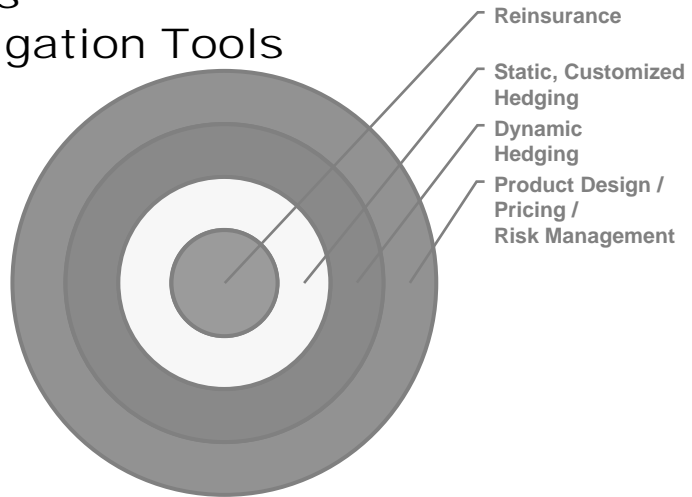
3

Where has annuity reinsurance been?

- **Fixed deferred (and fixed index) annuities – capacity has been available for a long time**
- **Variable annuities – capacity for full reinsurance of GMDB / IB dried up in 2000-2002, came back in 2006-07**
- **In-force deals can be challenging**

4

Annuities – Risk Mitigation Tools



5

Annuities – Matching Risks to Risk Mitigation Tools

	M Macroeconomic	A Actuarial	O Operational	I Intersection
Product Design				
Dynamic Hedging				
Static Hedging				
Reinsurance				

6

Reinsurance versus Other Forms of Capital

- **Equity**
- **Debt**
- **Hybrids**
- **Securitizations**

7

Mortality Reinsurance versus Annuity Reinsurance

	Mortality Reinsurance	Annuity Reinsurance
Information asymmetry	Yes	No
Reinsurer pricing advantage	More credible experience	Capital
Reinsurance vs. retail pricing	Less	Whole product: less
Administration and reporting	Complex	Even more complex
Sensitivity to emerging experience	Low to Moderate	High
Risk sharing	Minimum retention; Fac. Underwriting	Significant retention; Adjustable premiums / commissions
Reinsurers	Many	Handful
Counterparty risk (per unit)	Small	Larger

8

What do reinsurers bring to the table?

- Risk appetite / capacity
- Different internal offsets
- Pricing discipline
- Affirmation / validation
- Better accounting for direct writer
- Longer-term view
- But, we haven't repealed the laws of economics

9

Annuity reinsurance considerations

- Risk sharing / direct-writer retention
- Accounting / regulatory issues
- Coinsurance vs. modco / funds-withheld vs. combinations
- (VA) Rider-only vs. base + rider

10

Not All Reinsurance Is Created Equal

- **Custom hedges in “reinsurance wrapper”**
- **Caps, deductibles, and limits**
 - Per policy and in aggregate
- **May have difficulty taking statutory reserve credit in some states**
- **Move to principles-based reserves and capital may further highlight these differences**

11

The Annuity Reinsurance Marketplace

- **Small number of players providing true reinsurance**
- **Capacity: large, but unknown**
- **(VA) Typical pricing is either:**
 - Base + guarantee(s), with discount; or
 - Guarantees only, with extra premium
- **Uncertainty around policyholder behavior → more risk sharing**
- **Reinsurers are subject to the same macroeconomic environment**

12

Non-Traditional Reinsurance-From Variable Annuity Reinsurance to P&C Natural Catastrophe Bonds

Deferred Annuity Reinsurance

Lawrence S. Carson FSA, MAAA
Vice President and Marketing Actuary
RGA Reinsurance Company
Financial Markets
Society of Actuaries Life Spring Meeting, Québec, QC
June 18, 2008



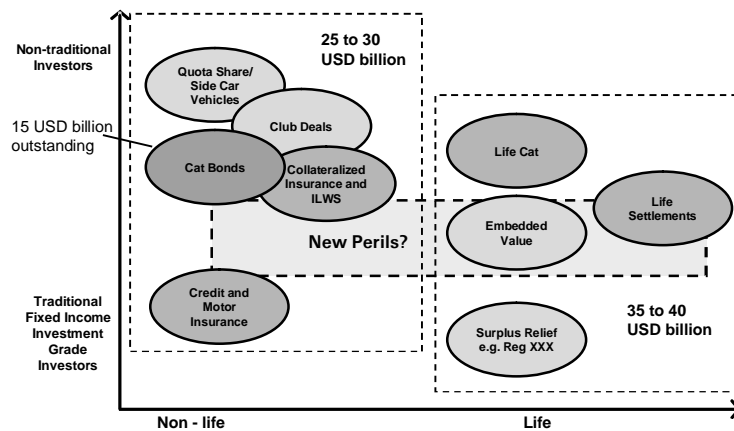


Nonlife Insurance-Linked Securities and Related Solutions

SOA Life
2008 Spring Meeting

William Dubinsky
Swiss Re Capital Markets
+1 (212) 407-7310
William_Dubinsky@swissre.com

Market Segmentation and Size



Market Segmentation: Basic Terms

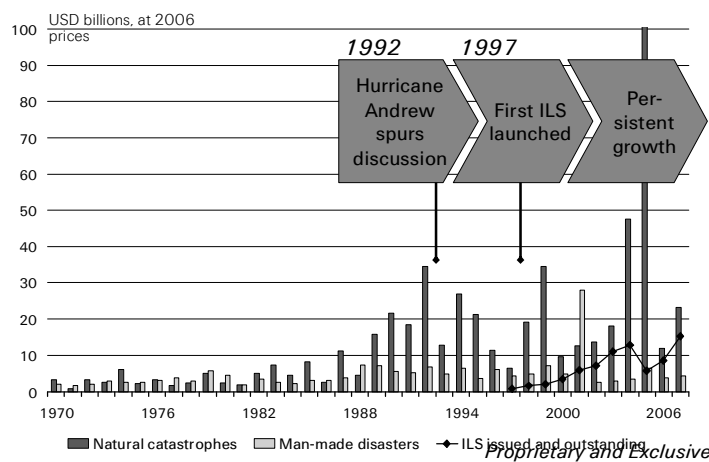
- n **Cat Bond:** source of collateralized excess of loss (re)insurance capacity raised in a private placement offering
- n **Sidecar:** source of proportional (re)insurance capacity raised in a private placement offering
- n **Industry Loss Warranty or ILW:** catastrophe protection where the payoff depends in whole or in part on whether industry losses from an event exceed a predetermined amount
- n **Club Deal/Private Deal:**
 - Transaction with either a handful investors or even a single capital markets investor
 - Investors take risk on in derivative, securities or reinsurance form

Slide 3

Proprietary and Exclusive

Increasing Catastrophe Claims

Development of catastrophe losses and insurance linked securities (ILS)



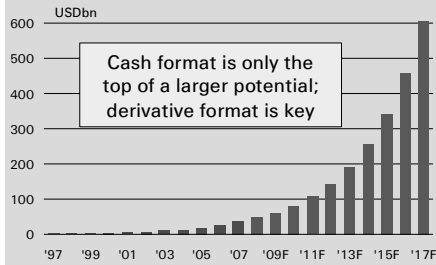
Note
 The natural catastrophe losses also include flood losses in the US insured via the National Flood Insurance Program (NFIP). Source: Swiss Re, sigma No 2/2007

Slide 4

Proprietary and Exclusive

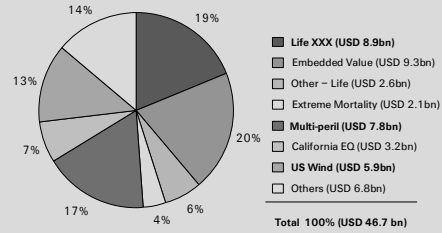
Transfer to Capital Markets May Increase

Potential future growth of ILS outstanding Projections using 75% of actual historical CAGR



Source: Swiss Re Capital Markets

Risks Securitized from 1997-2008* in USD billions



*As of 5 March 2008
 Source: Swiss Re Capital Markets

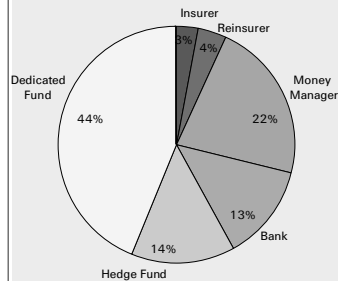
**securitization, ILW, collateralised quota shares and
 sidecars add to the flexibility of capital in the industry**

Slide 5

Proprietary and Exclusive

Who Participates in the ILS market?

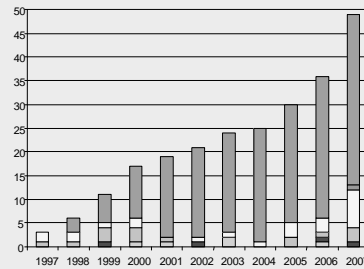
A diverse range of institutional investors participate in the sector



Market size » USD 15.4 bn

As of 5 March 2008
 Source: Swiss Re Capital Markets

Primary insurance companies make up the largest percentage of sponsors

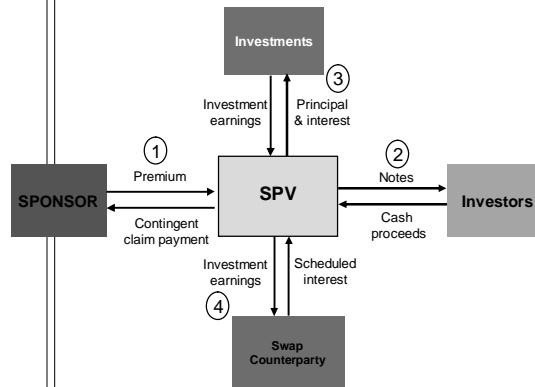


Gov't Entity
 Corporate
 Reinsurer
 Insurer
 Hedge Fund
 Previous

Slide 6

Proprietary and Exclusive

Focus on Cat Bonds: Typical Structure

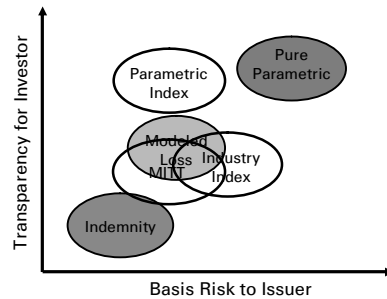


1. The Sponsor enters into a financial contract with a Special Purpose Vehicle (SPV)
2. The SPV hedges the financial contract by issuing Notes to investors in the capital markets
3. Proceeds from the securities offering are invested in high quality securities and held in a collateral trust
4. Investment returns are swapped to a LIBOR - based rate by the Swap Counterparty

Slide 7

Proprietary and Exclusive

Focus on Cat Bonds: Trigger Types



- An indemnity transaction is based on the actual losses of the sponsor
- An industry index transaction is based on an industry-wide index of losses (e.g., Property Claim Services or "PCS" in the United States)
- A pure parametric trigger is based on the actual reported physical event (i.e., magnitude of earthquake or wind speed of hurricane)
- A parametric index is a more refined version of the pure parametric trigger using more complicated formulas and more detailed measuring locations
- In a modeled loss transaction, losses are determined by inputting actual physical parameters into an escrow model which then calculates the loss
- In a Modeled Industry Trigger Transaction ("MITT")*, industry index weights are set post-event using modeled loss techniques

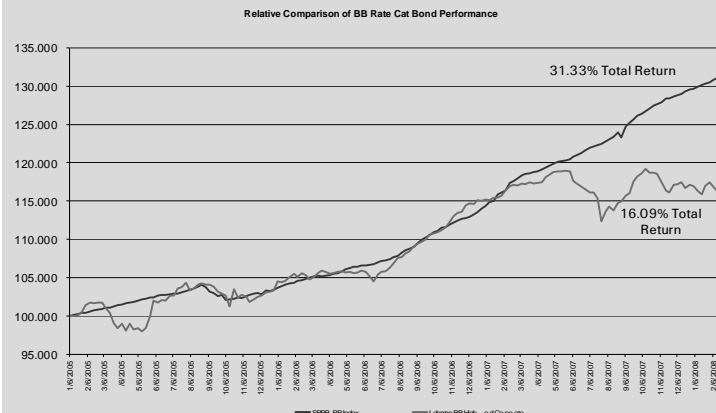
Slide 8

* Developed and patented by Swiss Re

Proprietary and Exclusive

Focus on Cat Bonds: Cat Bond and Corporate BB Returns

BB Performance from 1 January 2005 – 1 March 2008



"SRBB Cat Bond Index", calculated by Swiss Re Capital Markets, is an equally-weighted basket of nat cat BB-rated cat bonds traded by Swiss Re Capital Markets, calculated on a weekly basis. Past performance is no guarantee of future results. Underlying data for Lehman BB Index provided by Lehman Brothers

Proprietary and Exclusive

Slide 9

This document is solely for your use ("you"). The concepts and structures it contains are confidential and proprietary information, as well as business assets of Swiss Re Capital Markets Corporation and our affiliates ("SRCM", "us" or "we"). They are shared with you for the exclusive purpose of allowing you to evaluate your interest in such structures. In particular, this information may not be used to discuss similar structures with any person SRCM could reasonably consider a competitor in this field. Unless otherwise agreed in writing, SRCM and its affiliates act solely in the capacity of an arm's length contractual counterparty and not as an adviser or fiduciary. Accordingly, you should not regard transaction proposals or other written or oral communications from us as a recommendation or advice that a transaction is appropriate for you or meets your financial objectives.

Any financial transaction involves a variety of potentially significant risks and issues. Before entering into any financial transaction, you should ensure that you fully understand the terms, have evaluated the risks and determined that the transaction is appropriate for you in all respects. If you believe that you need assistance, you should consult appropriate advisers before entering into the transaction. Swiss Re Capital Markets Corporation does not provide accounting, tax or legal advice. In addition, we agree that, subject to applicable law, you (and each employee, representative or other agent of or for you) may disclose to any and all persons, without limitation of any kind, the tax treatment and tax structure of any potential transaction or structure described herein that is necessary to support any U.S. federal income tax benefits, without Swiss Re Capital Markets Corporation imposing limitation of any kind. However, both you and SRCM should keep confidential any such information relating to the tax treatment and tax structure of any potential transaction or structure to the extent necessary to comply with any applicable federal or state securities laws. This material does not constitute an offer to enter into any transaction. Such material is believed by us to be reliable, but we make no representation as to its accuracy or completeness. This brief statement does not purport to describe all of the risks associated with financial transactions and should not be construed as advice to you.

Proprietary and Exclusive

Slide 10