



Taking risks to market

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Agenda

- Reinsurance
 - basic functions,
 - some key reinsurance treaties,
 - pros and cons of reinsurance
- Securitisation
 - general features,
 - Insurance-Linked Securitisation (ILS),
 - Reasons for securitising insurance risks,
 - ILS as risk transfer tool,
 - Other motivations for ILS.
 - Insurance risk management: a full spectrum of solutions
- The ILS market today, challenges and opportunities



Different methods for managing risks

- Standard methods (reinsurance)
- Since mid 1990s, growth of alternative risk transfer: Insurance-linked securities

Pros and cons of reinsurance

Key advantages:

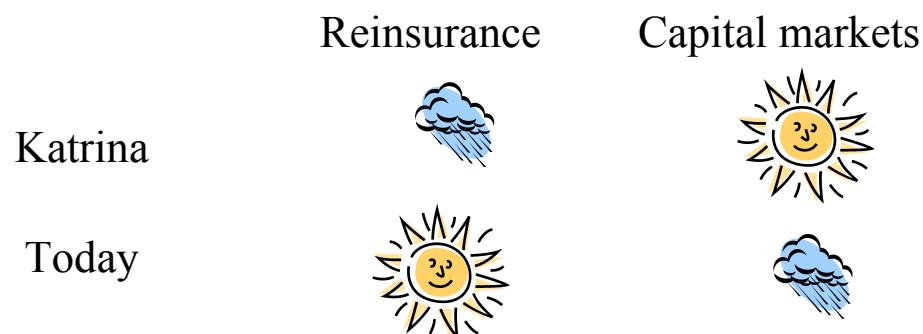
- Simplicity of execution
- Expertise
- Leverage
- Worldwide
- All types of business

Main drawbacks:

- Lack of capacity when most needed
- Credit exposure
- Lack of efficiency
(price & availability cycles)
- Lack of standards
- Single year

Pros and cons of reinsurance

- Some important potential issues:
 - Lack of capacity: potential difficulty to find reinsurance at a reasonable premium
 - Credit risk: exposure to the counterparty risk of the reinsurance company
 - Renewal and pricing risk: possible reduction of available capacity and exposure to future price increases.
- ⇒ Securitisation may be a complement.





Securitisation

■ Definition:

Securitisation can be defined as the transferring of underwriting risks to the capital markets through the creation and issuance of financial securities.

In particular, the securitisation process involves the following two elements:

- The pooling and transformation of underwriting risks into tradable financial securities.
- The transfer of underwriting risks to the capital markets through the trading of those securities.

■ Some historical facts:

- First securitisation in the Middle-Age to fund crusades
- Late 1970s: funding shortfall for the home mortgage market => MBS.

Securitisation of insurance risk

- Insurance Linked Securitisation (ILS):
First mentioned in 1973 by Goshay and Sandor (securitisation of natural catastrophic risks).
- Insurance-linked securitisation as a tool for risk and capital management.
 - Risk management
 - Additional capacity within the reinsurance programme
 - Coverage of new risks (e.g. pandemic risk)
 - Price guarantee over several years
 - Diversification
 - Security
 - Capital management:
 - Possibility to allow for capital release
 - Monetisation of future cash flows (liquidity generation)
 - Reserve funding



Securitisation of insurance risk

- Agenda

- The reasons for securitisation
- Securitisation as a risk transfer tool
- Other motivations for ILS
- The ILS market today
- Challenges and opportunities



Securitisation of insurance risk

- Cedant's perspective

- Key advantages of securitisation for the cedant:
 - Collateralisation
 - Better pricing in some cases (especially compared to retrocession and life reinsurance)
 - Diversification of protection sources
 - Reduction of the counterparty risk
 - Multi-year protection
 - Improvement of the cost of capital, reduction of earnings volatility
 - Increased underwriting capacity

Securitisation of insurance risk

- Investor's perspective

Why do capital markets have an interest?

- ⇒ Insurance risk and traditional financial risks are typically not correlated .
- ⇒ Diversification potential (time period 05/2001-09/2009):

	ILS	Equities	Interest rates	Credit
ILS	1.00	0.10	-0.04	0.12
CS/Tremont Blue Chip Index	0.11	0.79	-0.18	0.17
CS/Tremont HF Index Emerging Markets	0.01	0.82	-0.20	0.17
CS/Tremont HF Index Equity Market Neutral	0.22	0.61	0.07	0.03
CS/Tremont HF Index Event Driven	0.18	0.74	-0.33	0.03
CS/Tremont HF Index Global Macro	0.07	0.45	-0.10	0.24

ILS: Low Risk discretionary mandate

Equities: MSCI World

Interest rates: Govt. bonds, EFFAS US All Maturities

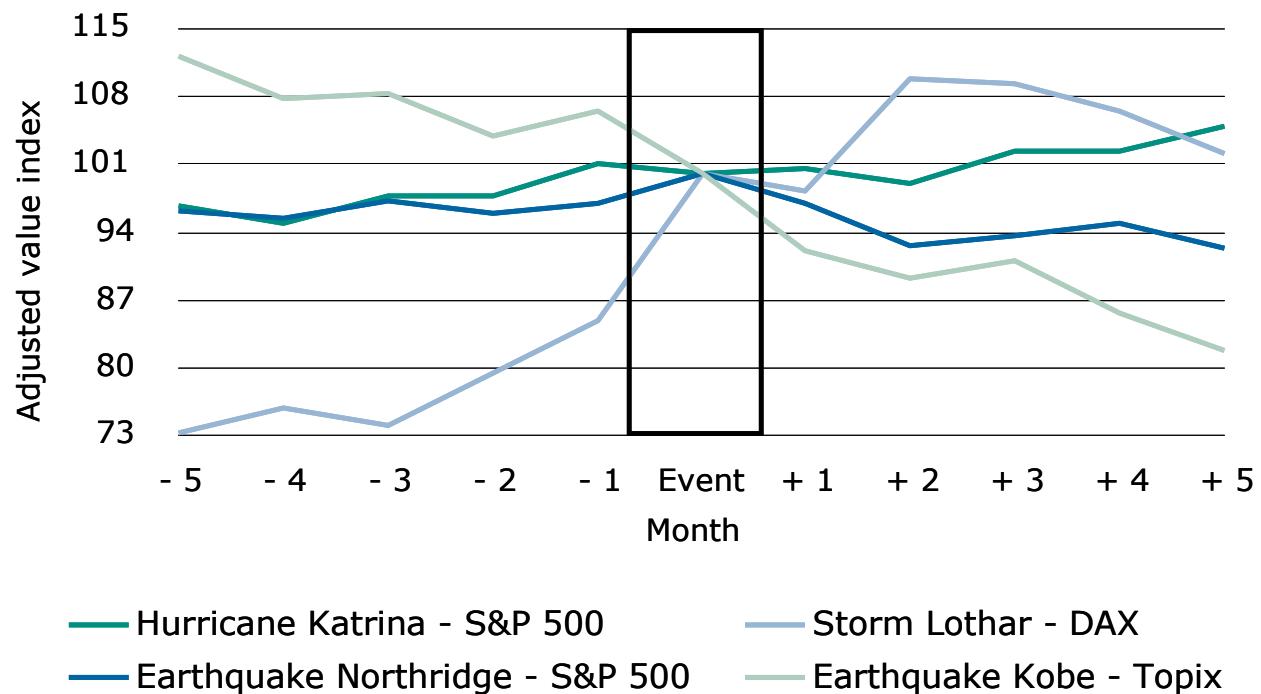
Credit: Corp. bonds, Barclays US Aggregate

Hedge funds: CS/Tremont indices

Data period: May 2001 – September 2009

Securitisation of insurance risk

- Investor's perspective



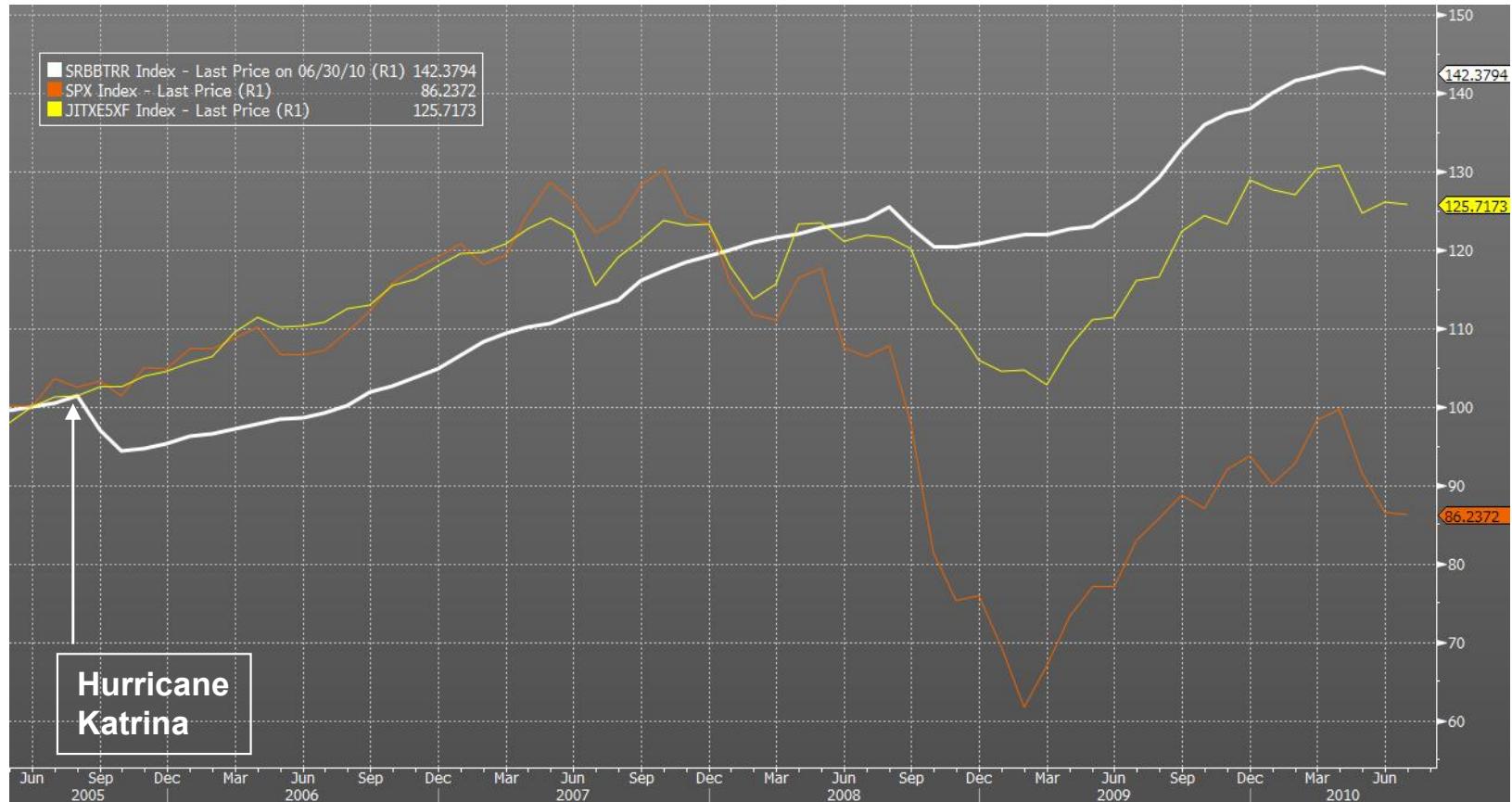
(Source: Horizon 21 2008)

But potentially some dependency in the extremes for some risks...

Securitisation of insurance risk

- Investor's perspective

- But also great stability in difficult times



(Source: Bloomberg July 2010)

Legend: SRBBTTR: Swiss Re BB Cat Bonds Total Return; SPX: S&P 500 index; JITXE5XF: 5 YEARS iTraxx Crossover – Total Return

Why securitising? - Regulatory frictions

- Insurers are subject to prudential regulation: capital requirements and liquidity requirements.
 - ⇒ These requirements may be above and beyond what is implied by shareholders' risk appetite.
 - ⇒ In this case, transferring risks to agents with different prudential rules can create value (if the transaction costs are smaller than the gain from regulatory relief).
- Example:

In 2000, regulation XXX has considerably increased the reserve requirements for U.S. life insurers.

 - ⇒ Issuance of securities backed by the embedded value of the portfolio.
 - ⇒ Between 2002 and 2007, 51% of life insurance securitisation is XXX.

Why securitising? - Information frictions

- Informational frictions when:
 - One agent is an insider:

Informational advantage over the other agents for a particular risk (proprietary information about it, or ownership of the expertise necessary to mitigate and control the risk).

and

 - This insider has a higher cost of bearing this risk than others in this economy.
- ⇒ In this case, there is a conflict between transferring risks to the other agents and maintaining the incentives of the insider to use his particular information/skills.
- ⇒ Optimal risk transfer is the art of maximizing risk transfer while preserving the insider's incentives.

Securitisation of insurance risk

- Any limit?

- How far can we go?

Very far if cost of warehousing the risk >> cost of market transaction

Costs include regulatory and accounting standards, taxes, liquidity costs, informational costs (moral hazard, adverse selection)

- Risks can be insured = Risks can be restructured

- Market risks being more dynamically managed through the use of suitable hedges
- Insurance risks being externalized through financial markets and reinsurance.
- Other risks still being kept and borne by insurers, especially when requirement of a specific expertise or prohibitive market prices.

Securitisation of insurance risk

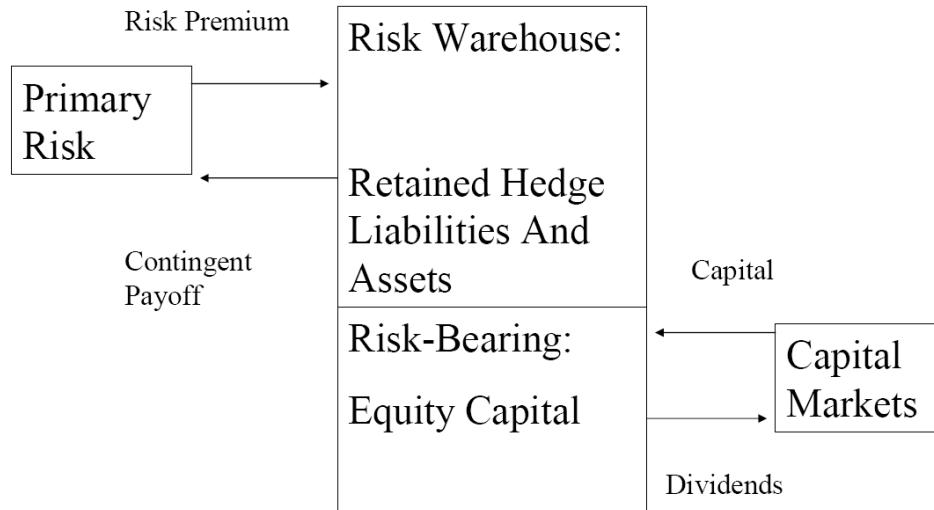
- Modification of the role of the insurer?

- Cummins (2006):

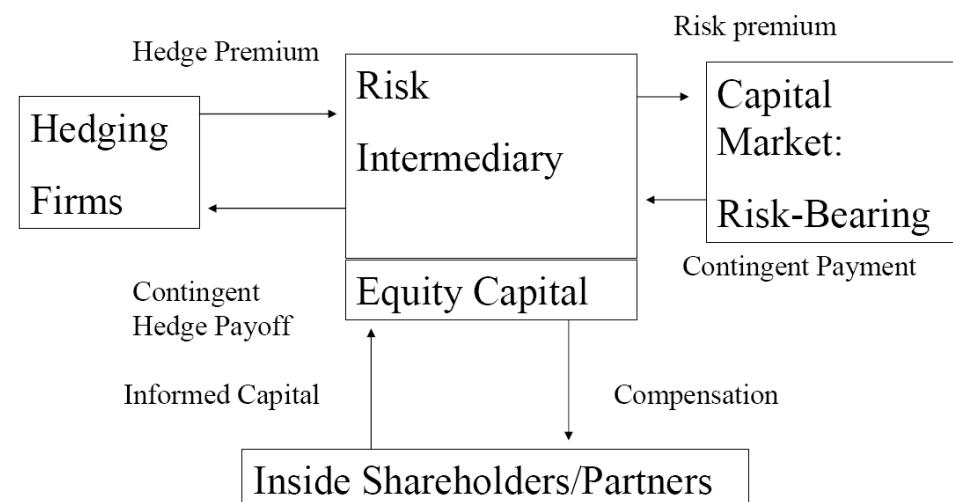
From warehousing the risk

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to risk intermediation



- Risk taken by policyholders
- Risk pooled and borne by insurer
- Risk transfer by reinsurance programs
- ⇒ Large diversification and underwriting
- ⇒ Heavy capital requirement

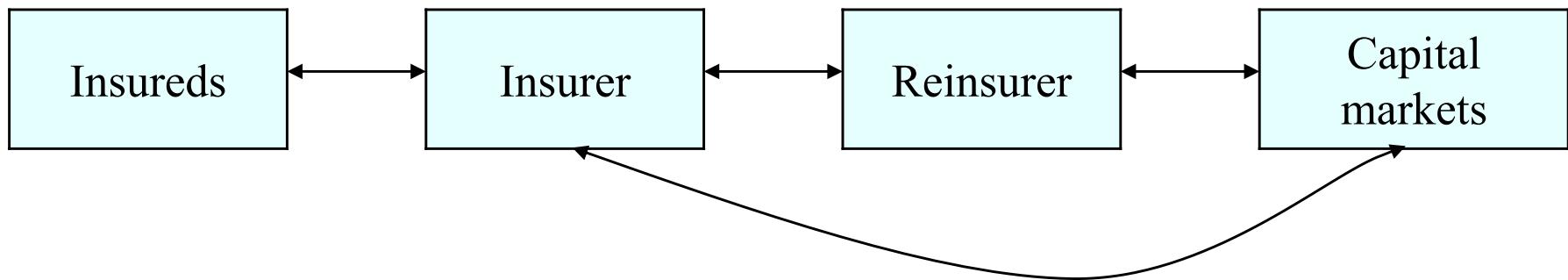


- Risk taken by policyholders
- Risk pooled and borne by insurer
- Risk transfer by reinsurance programs and financial markets
- ⇒ Efficient diversification
- ⇒ Moderate amount of capital

Securitisation as a risk transfer tool

- Capital markets have a large capacity
 - ⇒ The impact of a large loss could be better absorbed with the participation of capital markets.
 - ⇒ Transfer of insurance risk to capital markets

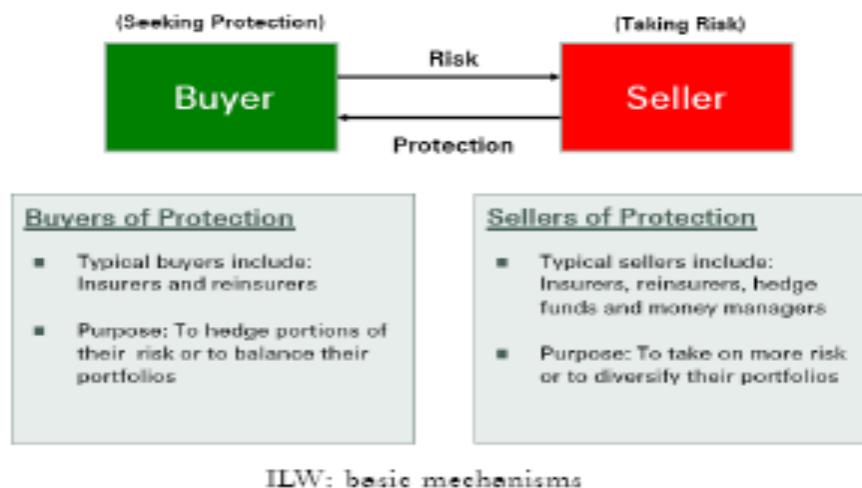
Risk transfer diagram:



- ⇒ The most successful example is the cat-bond structure.

A brief presentation of ILW (Industry Loss Warranty)

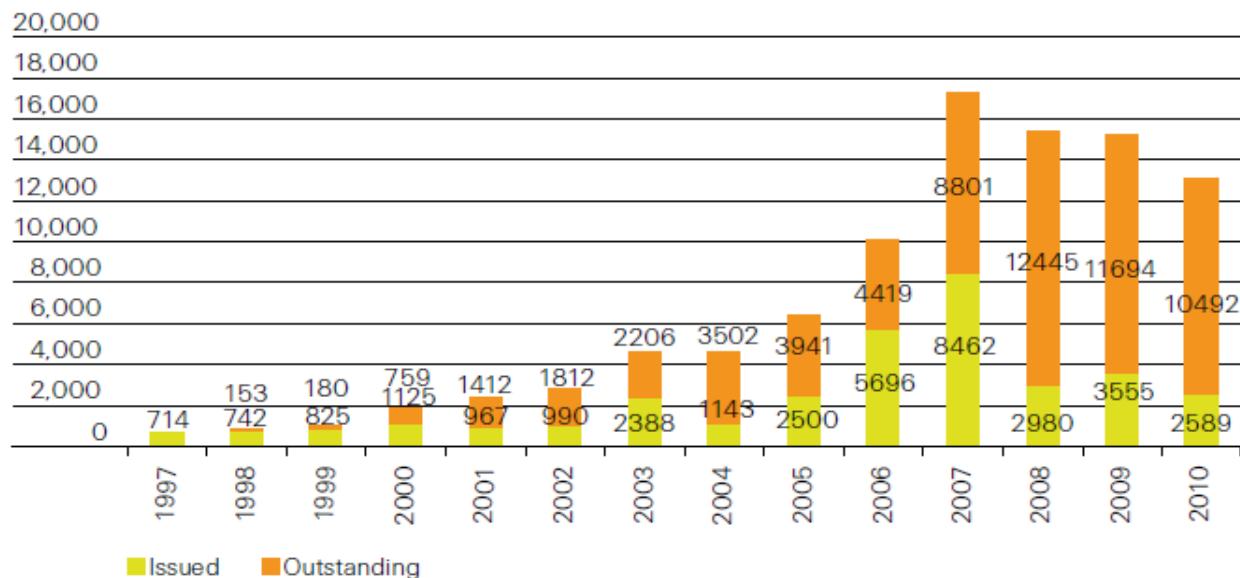
- Protection based on the total loss arising from an event to the entire insurance industry.
- Payouts linked to a predetermined trigger of estimated industry losses.



- Different types of coverage:
 - Live Cat contracts (traded while an event is in progress).
 - Dead Cat contracts (traded on an event that has already occurred, but for which the total amount of industry loss is not yet known).
 - Back-up Covers (protection for events that occur following the occurrence of a catastrophe).

A typical structure: Cat-bond

- Some background on cat-bond (= notes with payments contingent on some natural catastrophes)

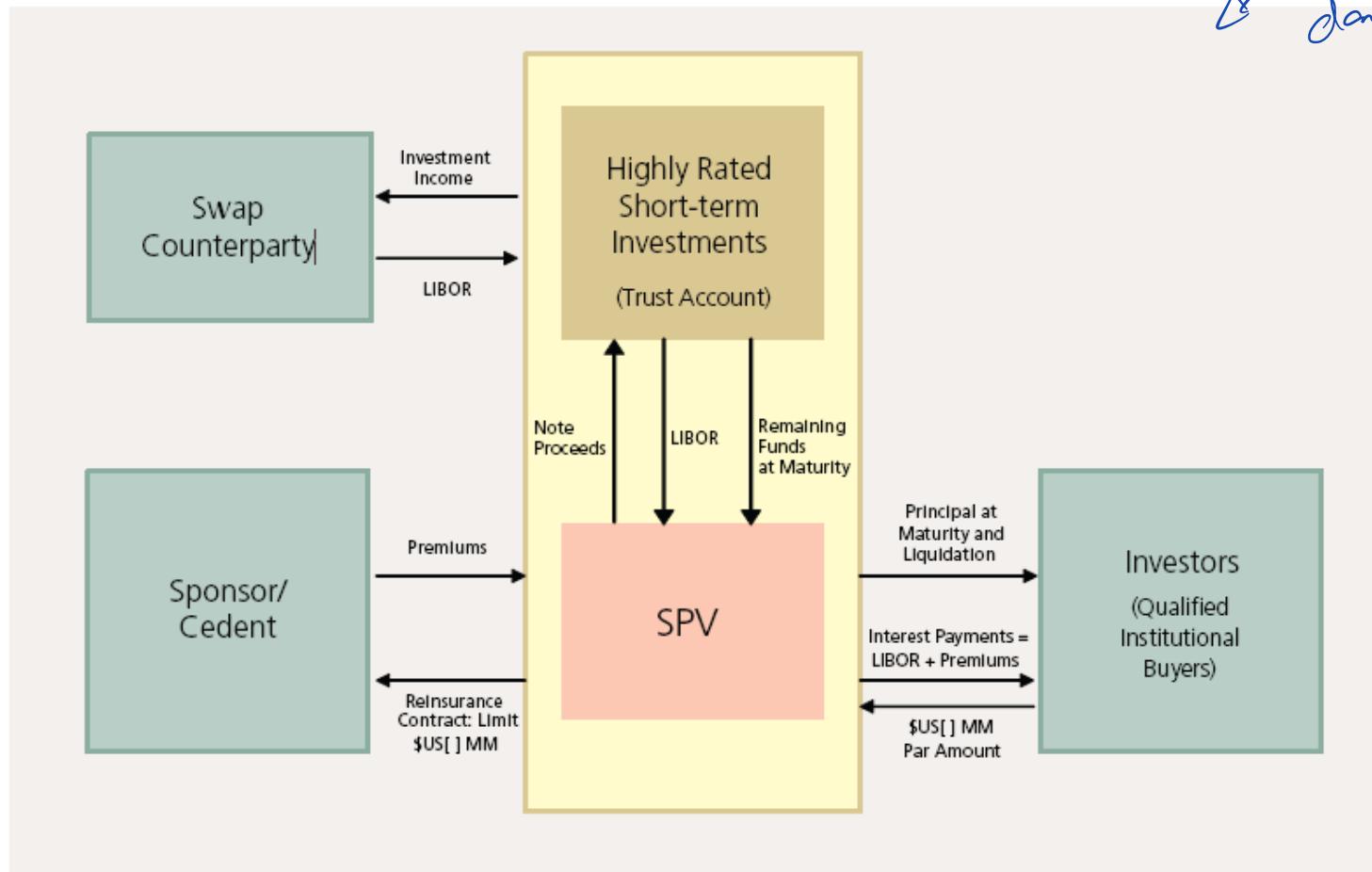


- First rated transaction in 1996 (George Town Re)
- More than 120 (public) issues so far.
- Outstanding (August 2010): about 13.5b USD
- 12 transactions (Jan-Aug 2010), for 2.6b USD.

(Source: Swiss Re Capital Markets – August 2010)

A typical structure: Cat-bond

- General structure

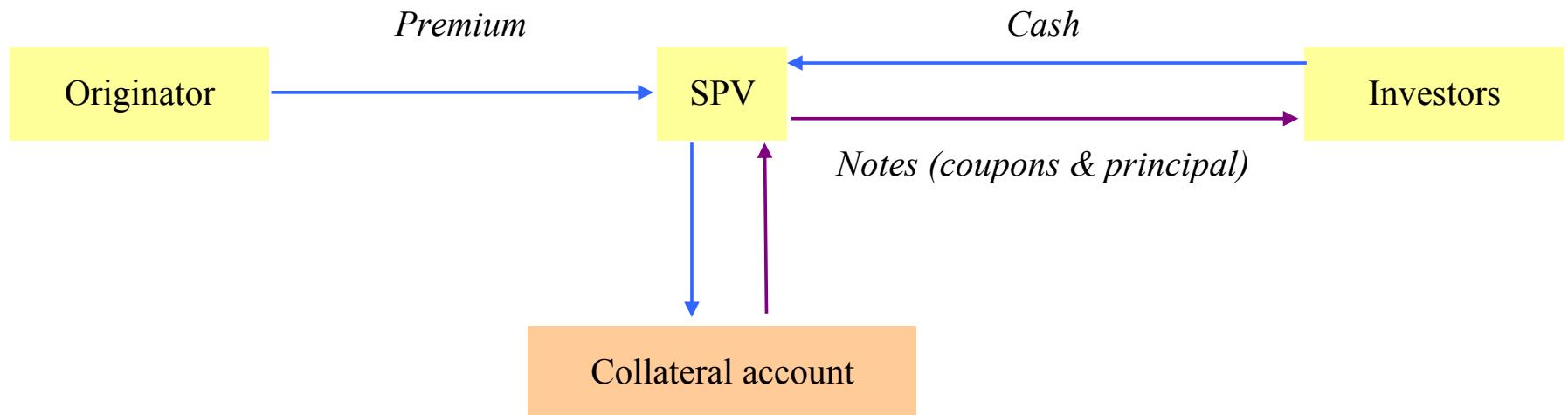


(Source: Guy Carpenter 2009)

A typical structure: Cat-bond

- Basic structure

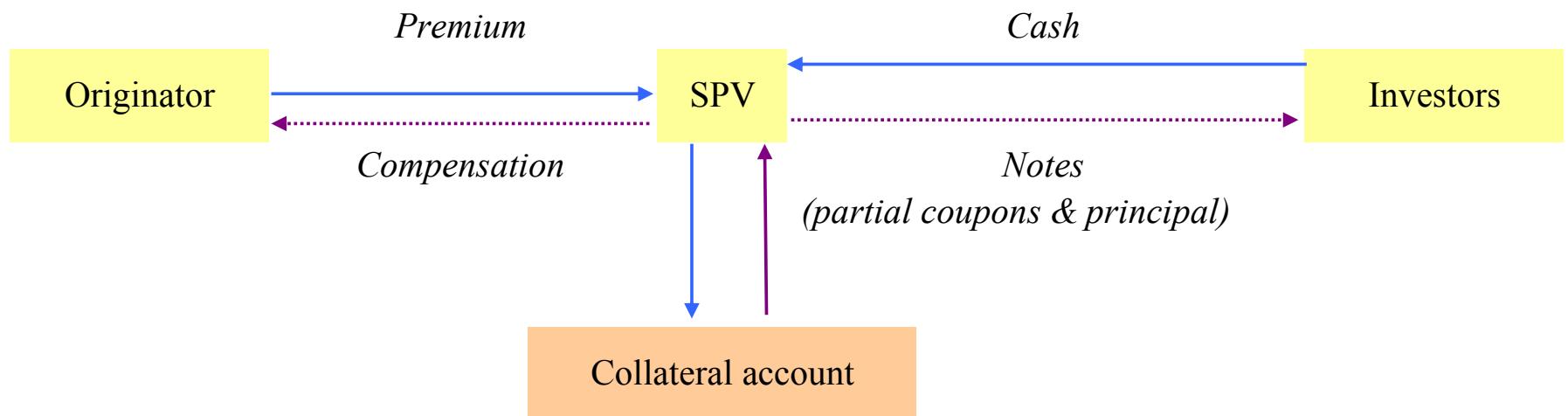
If no triggering event



A typical structure: Cat-bond

- Basic structure

If a triggering event



Some comments on the collateral

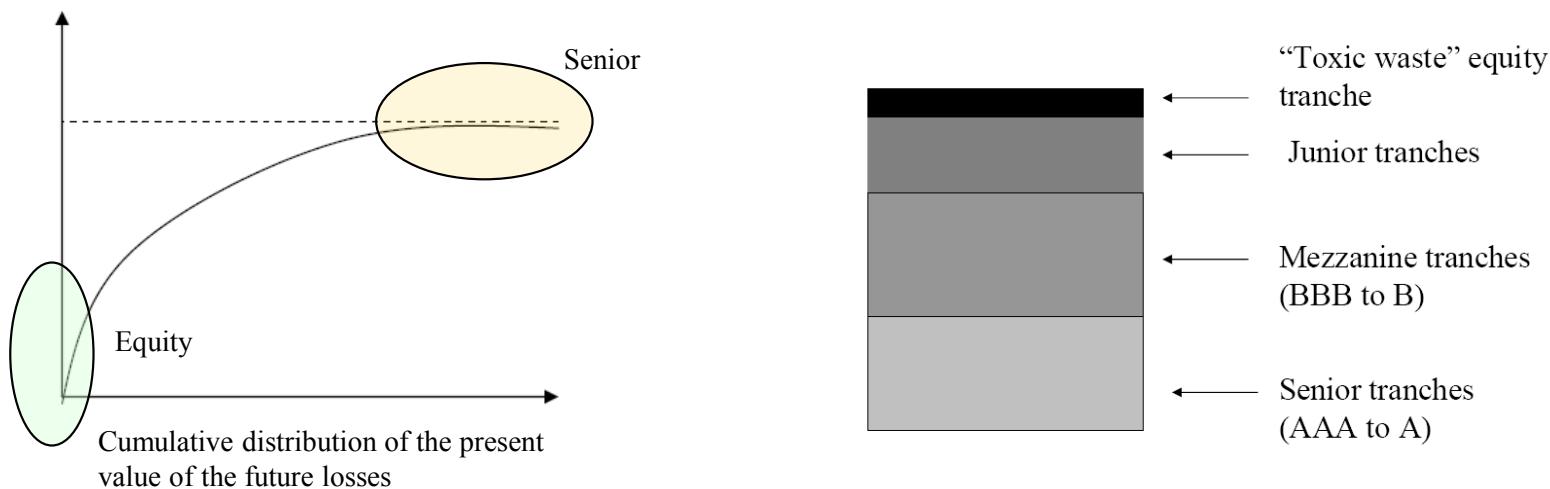
- Two phases: until September 2008 (Lehman Brothers) and after.
 - As TRS (Total Return Swap) counterparty, Lehman's default had a direct effect on 4 cat-bonds.
 - Potential issues of security and liquidity (AAA is not risk-free, Libor is not the risk-free rate).
 - Problem in the structure but not in the fundamentals
 - Innovative structural changes in the new transactions.

Some comments on the collateral

- Identified issues:
 - Lack of transparency on the investments in the collateral account
 - Too broad investment criteria for eligible assets
 - Lack of collateral asset diversification
 - Maturity mismatch between collateral assets and cat-bond
 - Lack of regular mark-to-market valuations of the collateral assets
 - No specific provision for the TRS provider if the value of the collateral falls below a certain threshold, or in relation with the rating of the TRS counterparty.
- Innovative structures in 2009:
 - *When using a TRS counterparty (only 4 deals):* Improved collateral management with more restricted investment guidelines, regular mark-to-market valuations, top-up provisions.
 - *When no TRS counterparty (most popular):*
 - Collateral account invested in AAA rated government-guaranteed entity, with an option to be sold at par on each quarterly payment date, and no mismatch in the maturity date or;
 - Collateral account invested in money market funds.
- Innovative structures in 2010:
 - All of the 2010 trades invest their collateral in money market funds (except USD50m of Vita Capital IV which was invested in a supranational bond (EBRD)).

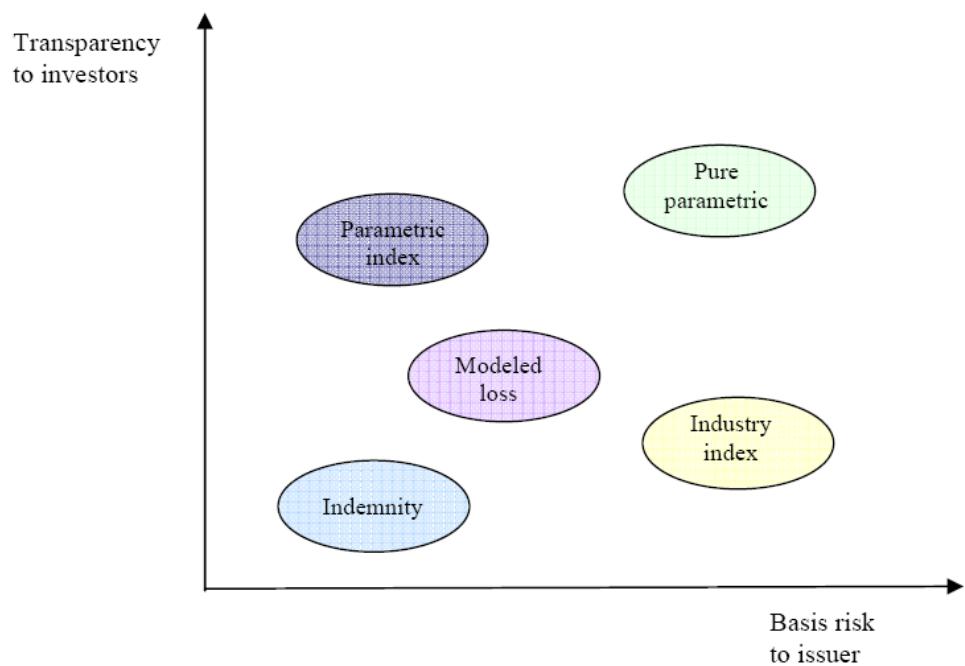
A typical structure: Cat-bond

- Agents involved in the transaction:
 - Modelling agency
 - Rating agency
 - Law firm
 - Swap counterparty
 - Calculation agent
- Idea of tranching to appeal to many different types of investors



A typical structure: cat-bond

- Some important questions:
 - Pricing
 - Structuring



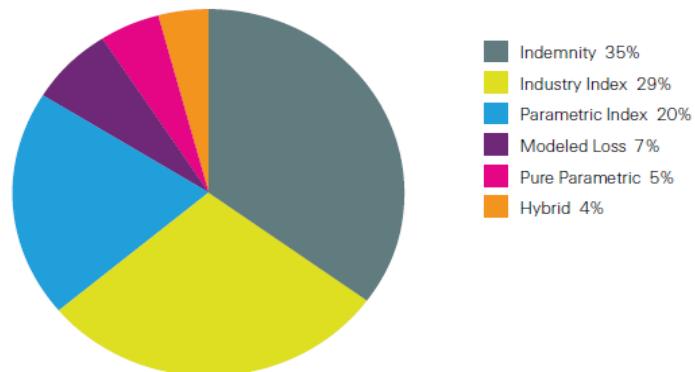
(Source: Swiss Re 2008)

- Different types of trigger

- *Indemnity*: based on the actual losses of the sponsor
- *Industry-index*: based on an industry-wide index of losses (PCS in the US...)
- *Pure parametric*: based on the actual reported physical event (earthquake magnitude...)
- *Parametric index*: more refined version of the pure parametric trigger
- *Modeled loss*: losses are determined by inputting actual physical parameters into a model that computes the losses.

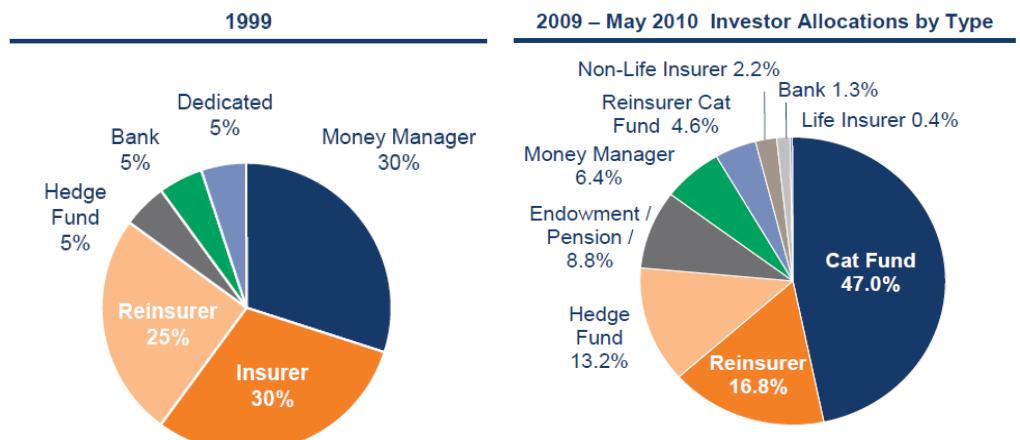
A typical structure: cat-bond

- Types of triggers in 2010
(until August)



(Source: Swiss Re Capital Markets 2010)

- Increased investor base



(Source: Leadenhall Capital Partners June 2010)



A typical structure: cat-bond

- Main advantages:

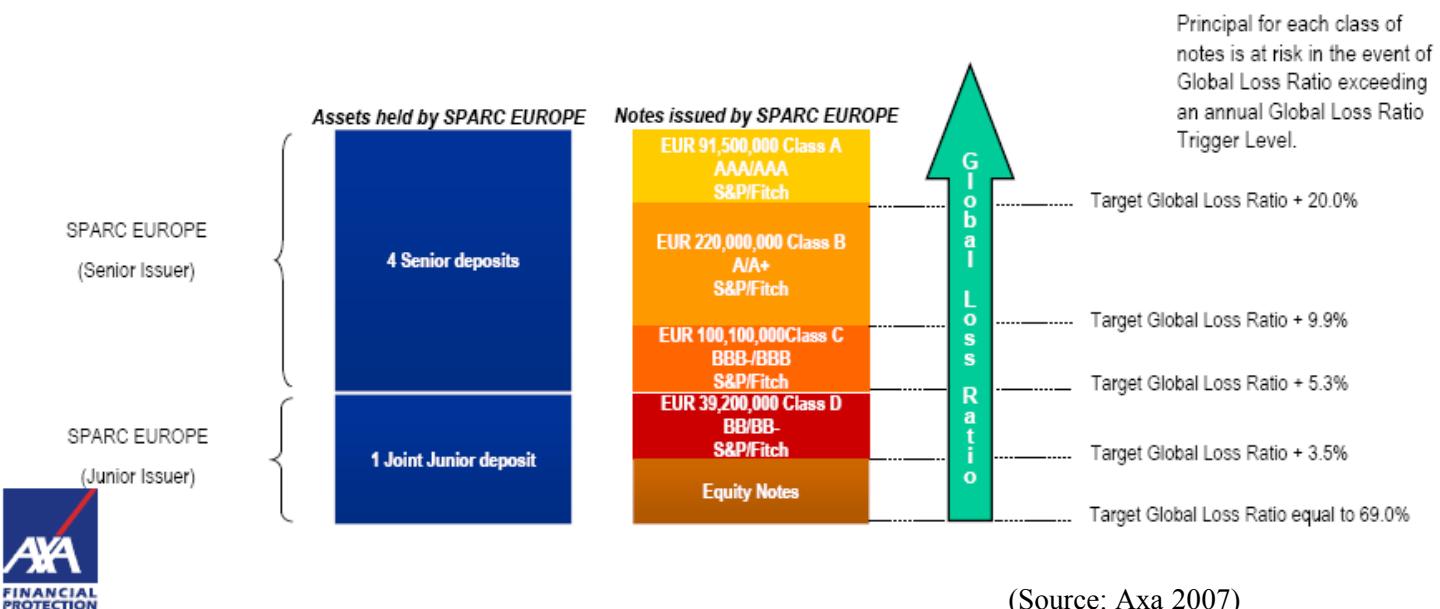
- Fully collaterised
- Multi-year coverage
- Single peril, specific coverage
- High layers
- Fast claim settlement

- Main drawbacks:

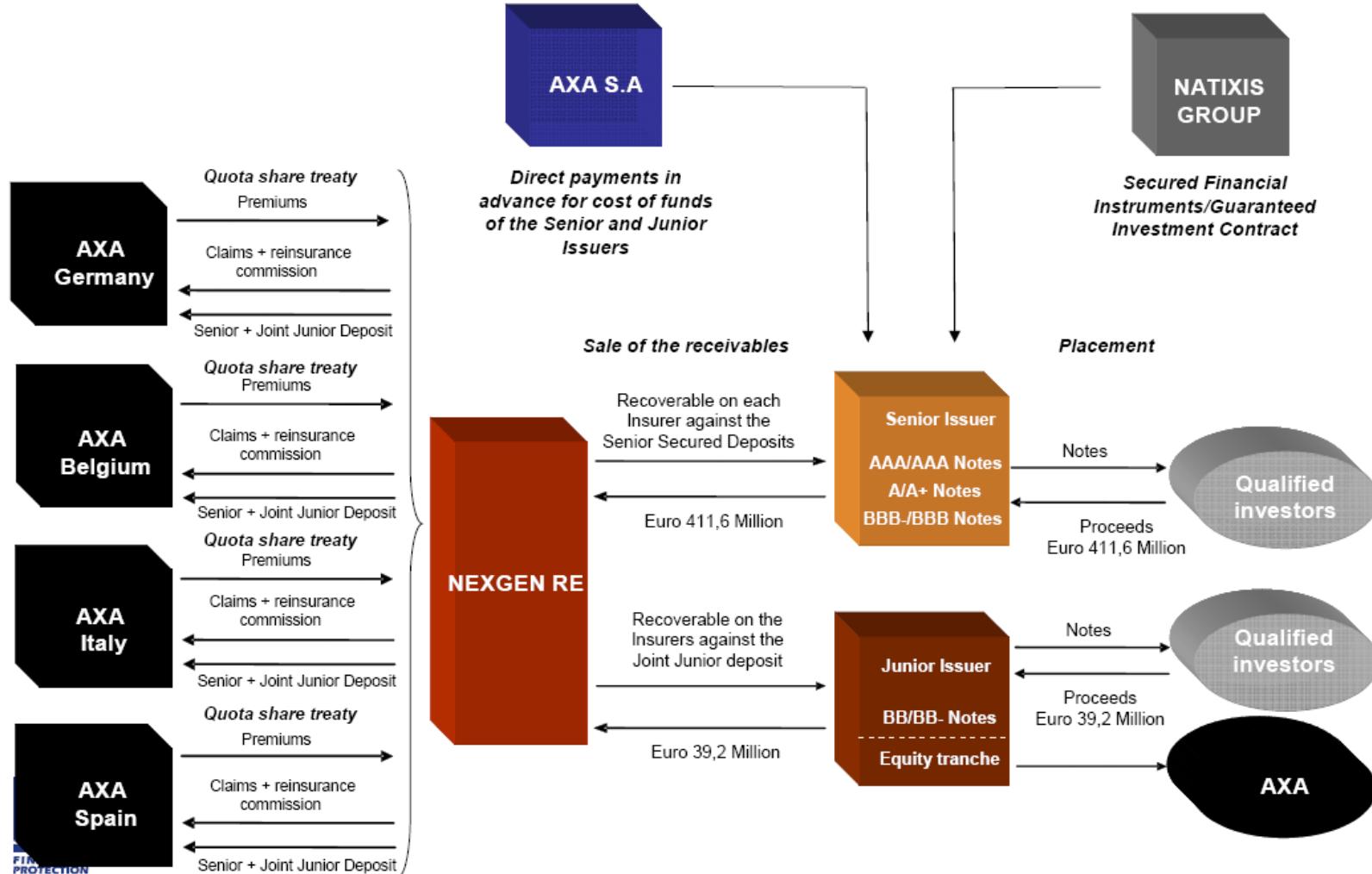
- Basis Risk (if not indemnity based)
- Implementation costs
- Hardly no loss history
- No reinstatement

Another P&C securitisation

- Motor securitisation SPARC (2005 and 2007)
 - Principle: Transfer of the risk of deviation above a certain threshold of the loss ratio of the securitized portfolio.
 - Objective (SPARC 2007): transfer of 450 million Euros risks over 4 independent cover periods (2007 to 2010). Improvement of balance sheet efficiency and capital management.
 - Structure similar to a synthetic ABS, with 4 tranches (from AAA to BB).
 - The performance is measured by the Global Loss Ratio (sum of claims / sum of earned premiums).



Other P&C securitisation



(Source: AXA 2007)

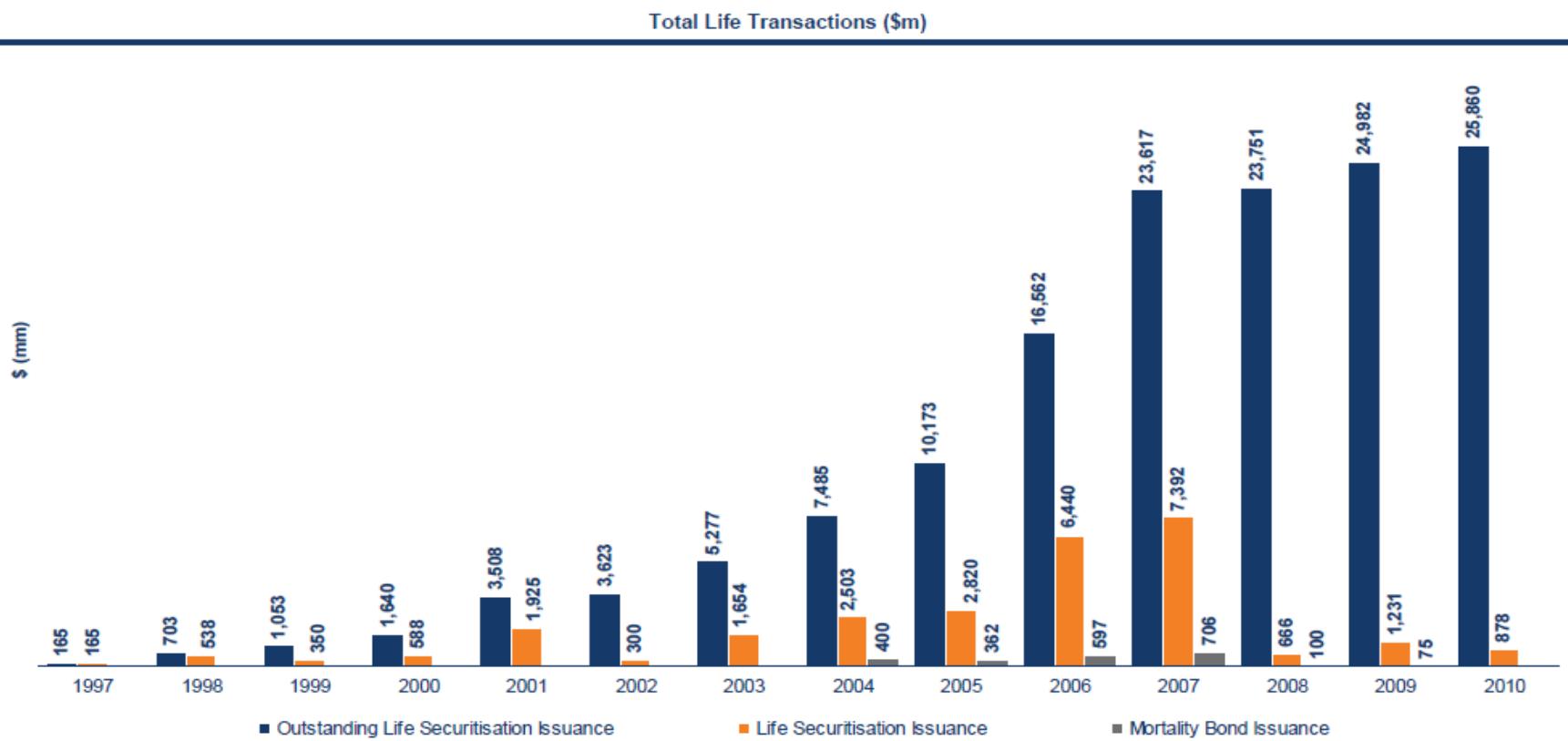


Other motivations for ILS

- Motivation for using ILS can include:
 - Risk transfer
 - Capital strain relief
 - Acceleration of profits
 - Speed of settlement
 - Duration
- Traditional non life securitisation
 - Transferring risk, particularly peak load risks, to supplement (re)insurance capacity (e.g. catastrophe bonds).
 - Increasing underwriting capacity
- Traditional life securitisation
 - Regulatory arbitrage or releasing capital (e.g. XXX and EV).

Life securitisation

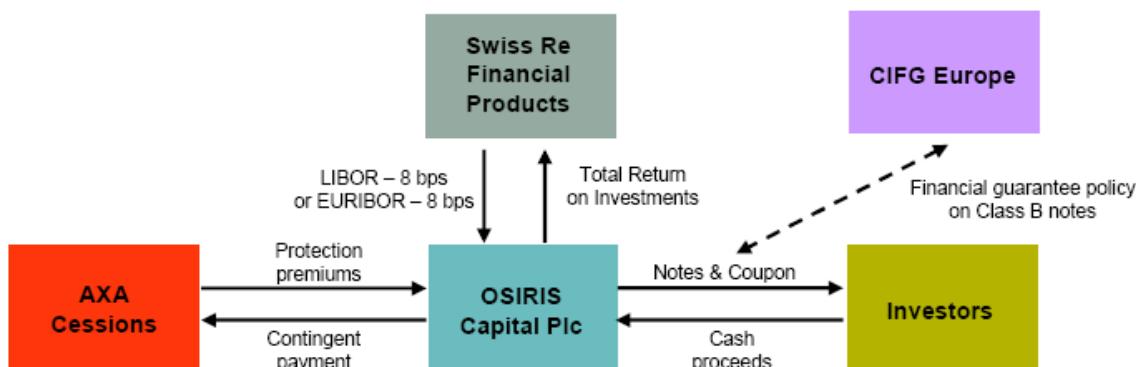
- The life market today



(Source: Leadenhall Capital Partners June 2010)

Life securitisation

- Coverage of new risks (e.g. pandemic risk): Osiris transaction (AXA 2006)



Tranches	Trigger/exhaustion levels (% of base index)	Size	Rating	Coupon
A	119%/124%	100m Euros	AAA/Aaa	3mE + 20
B	114%/119%	50m Euros	A-/A3	3mE + 120
C	110%/114%	150m USD	BBB/Baa2	3mL + 258
D	106%/110%	100m USD	BB+/Ba1	3mL + 500

Notional	1b Euros
Mortality index	60% France 25% Japan 15% United States
Maturity	Jan-2010
Index calculation	2 year average

Estimated Number of Deaths if Event is Concentrated in One Country			
Even Distribution across Country and Population			
	France	Japan	United States
Index Weighting	60.0%	25.0%	15.0%
Population Weighting	12.7	26.5	60.8
Class of Notes Estimated Additional Deaths to Reach Trigger Level (in total)			
A	257,100	1,291,400	4,943,600
B	189,400	951,900	3,643,000
C	135,300	679,900	2,602,000
D	81,200	408,000	1,561,300

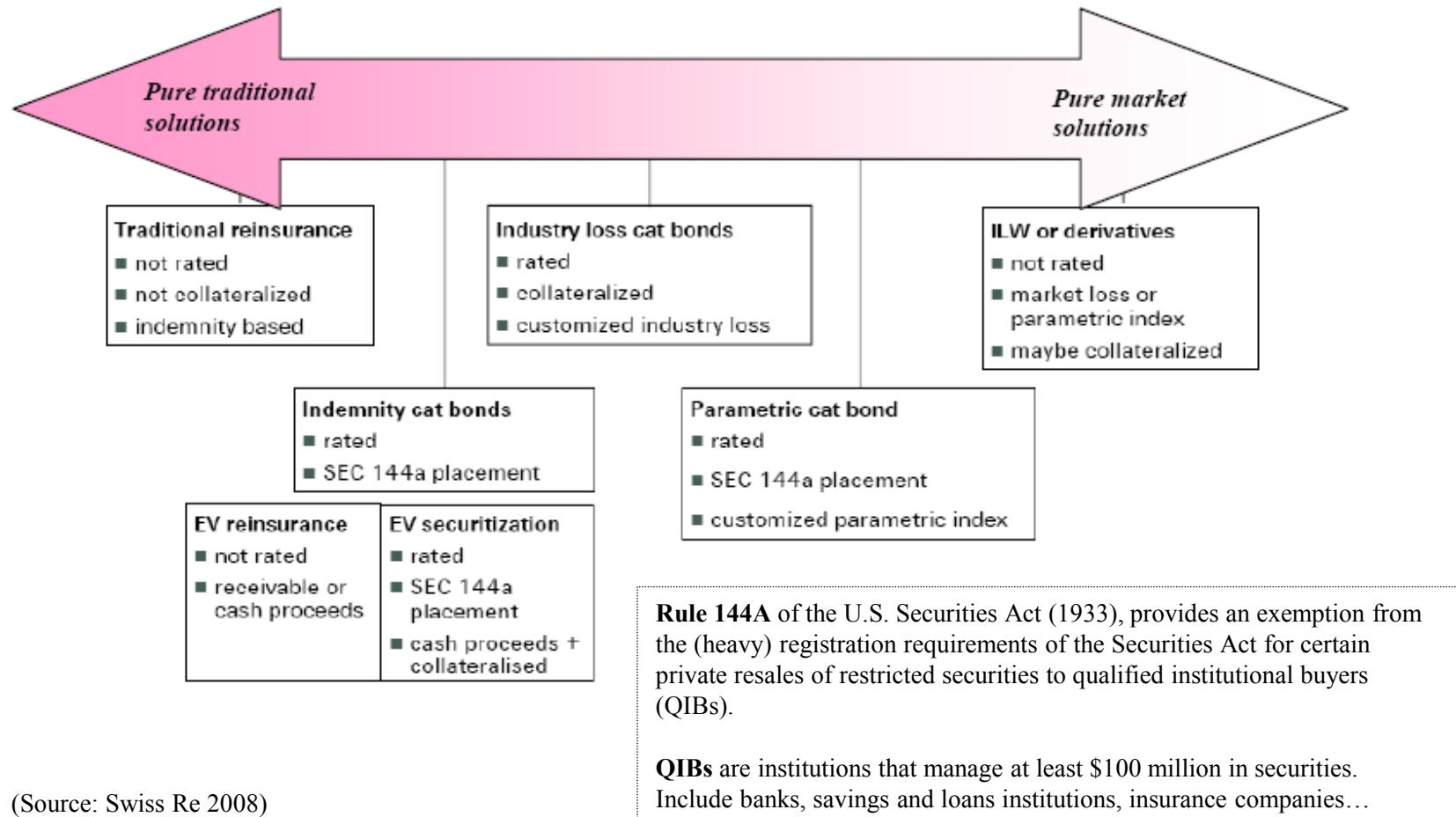
Based on 2003/2004 population and mortality levels

Source: Milliman

- First catastrophic mortality transaction for a direct insurer
- First catastrophic mortality transaction with main exposures in Europe (60% France),
- First catastrophic mortality transaction with risk layers below investment grade (below BBB).

Insurance risk management

- A full spectrum of solutions



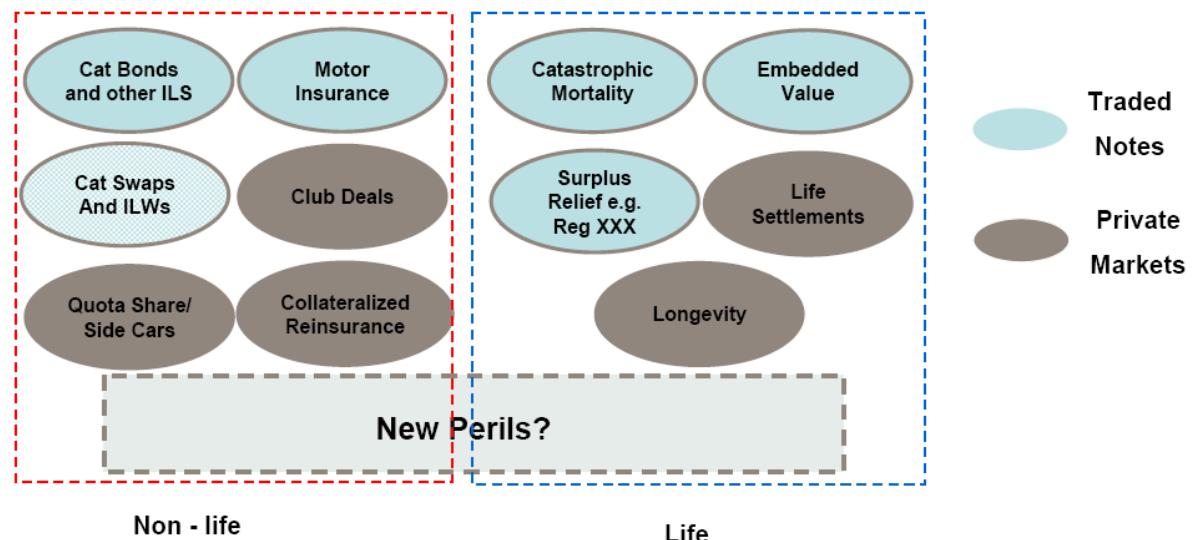
Insurance risk management - A full spectrum of solutions

- Traditional ILS transactions tend to have significant upfront costs:
 - Size therefore important to make it worthwhile
 - Duration also important
 - Increased role for multiple transactions
 - + still traded at a premium (liquidity and novelty)
 - Exchange-traded derivatives
 - Increase basis risk
 - But reduce costs
 - Provide access for smaller players
 - Different risks can be mitigated via different capital market solutions depending on:
 - Size of the risk portfolio (costs of securitisation),
 - Information: basis risk, complexity of the underlying risk,
 - Accounting of capital market solutions (reinsurance vs derivatives treatment)
 - Effect on SCR depending on the structure (in particular on the trigger)
- ⇒ Large and established players better able to use indemnity based triggers and acceleration of profits transactions

The ILS market today

- The ILS market

(Source: Leadenhall Capital Partners 2010)



- About 150 investors outside the insurance industry, 42 sponsors securitised and 31 different risks securitised.
- Total ILS market (public and private transactions, life and non life) has the size of a large reinsurance company.
- Two different markets: non-life vs life
 - Different motivations and different structures
 - Different evolution: impact of the financial crisis (impact of having market risk embedded in life transactions, impact of monoline crisis).

The ILS market today

- Various recent developments to the ILS market
 - Different types of protection buyers
 - Different instruments to address specific needs
 - A dedicated investor base
 - Increased modelling and analysis of ILS
 - Portfolio management tools
- ⇒ New opportunities and challenges to further develop this market.

Challenges for the ILS market

- Key success factors
 - Capital markets:
 - Education of market participants to accept more and more sophisticated risks
 - Increased transparency on modelling, data and structures (increased disclosure...)
 - Creation of indices to develop index-based contracts and secondary market
 - Regulators:
 - Need to fully recognize risk transfer and allow for capital relief
 - Be consistent between reinsurance and capital market solutions
 - Sponsors:
 - Education of insurer/reinsurer to transfer risks to the market and use ILS as a risk and capital management tool (Issue of separation of insurance/finance functions in many companies)
- Some issues
 - Information and basis risk
 - Pricing
 - Specific issues related to « new risk frontiers » (e.g. longevity)

Challenges for the ILS market

■ Information-related issues:

- Greater and clearer information on indemnity transactions
- Updated information over the life of the transactions
- Greater transparency on the pricing
- Development of an indicative secondary pricing of notes from key market participants (similar to Markit on the credit market).

■ Some remarks on basis risk:

Basis risk is the risk that the quantum, timing or currency of the receipts from a given mitigation strategy fails to at least cover the indemnified losses of the sponsor, for the protected risks.

Two components:

Quantifiable risks:

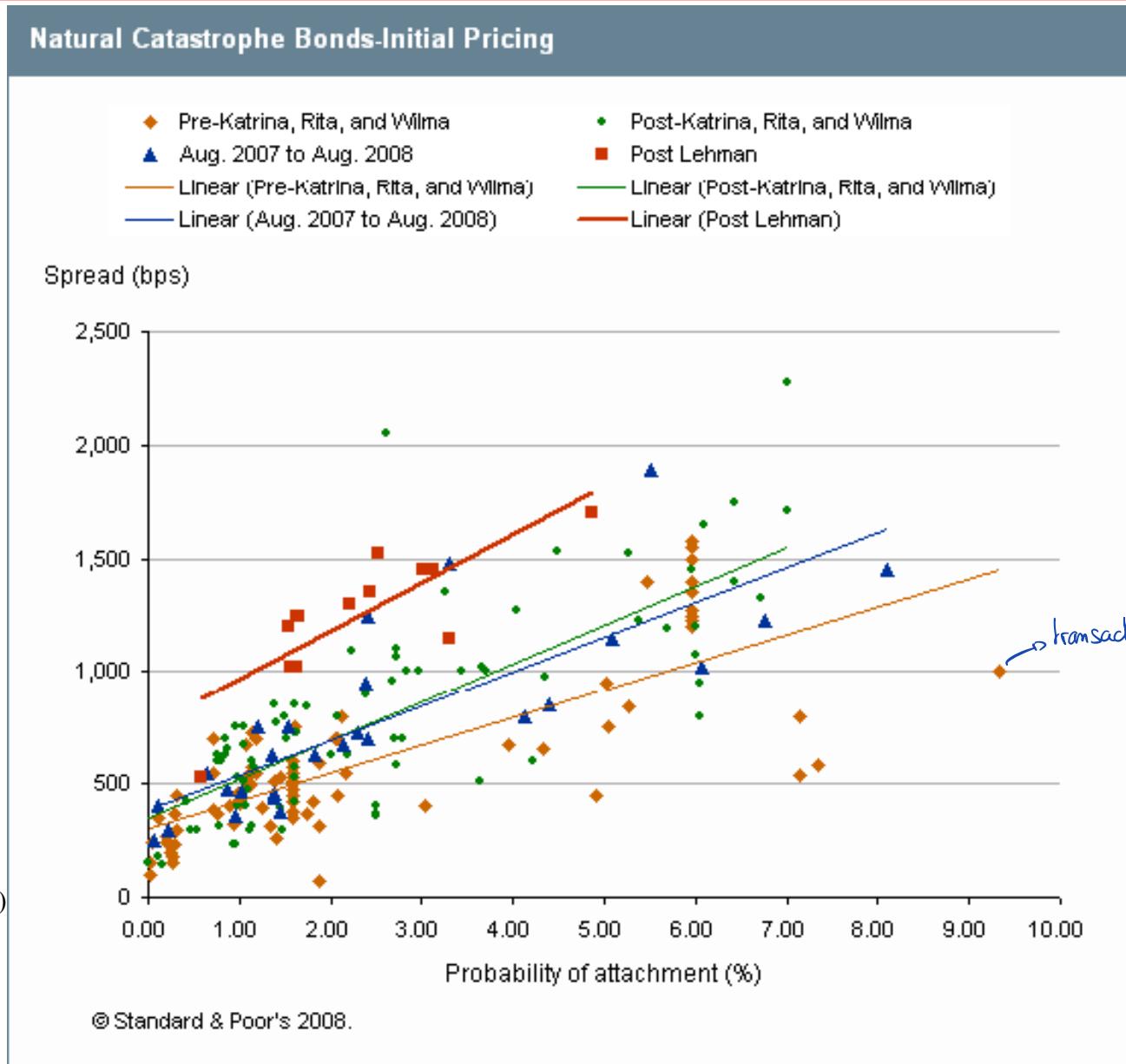
- Trigger risk
- Timing risk
- Currency risk

Unquantifiable risks:

- Data risk
- Model risk

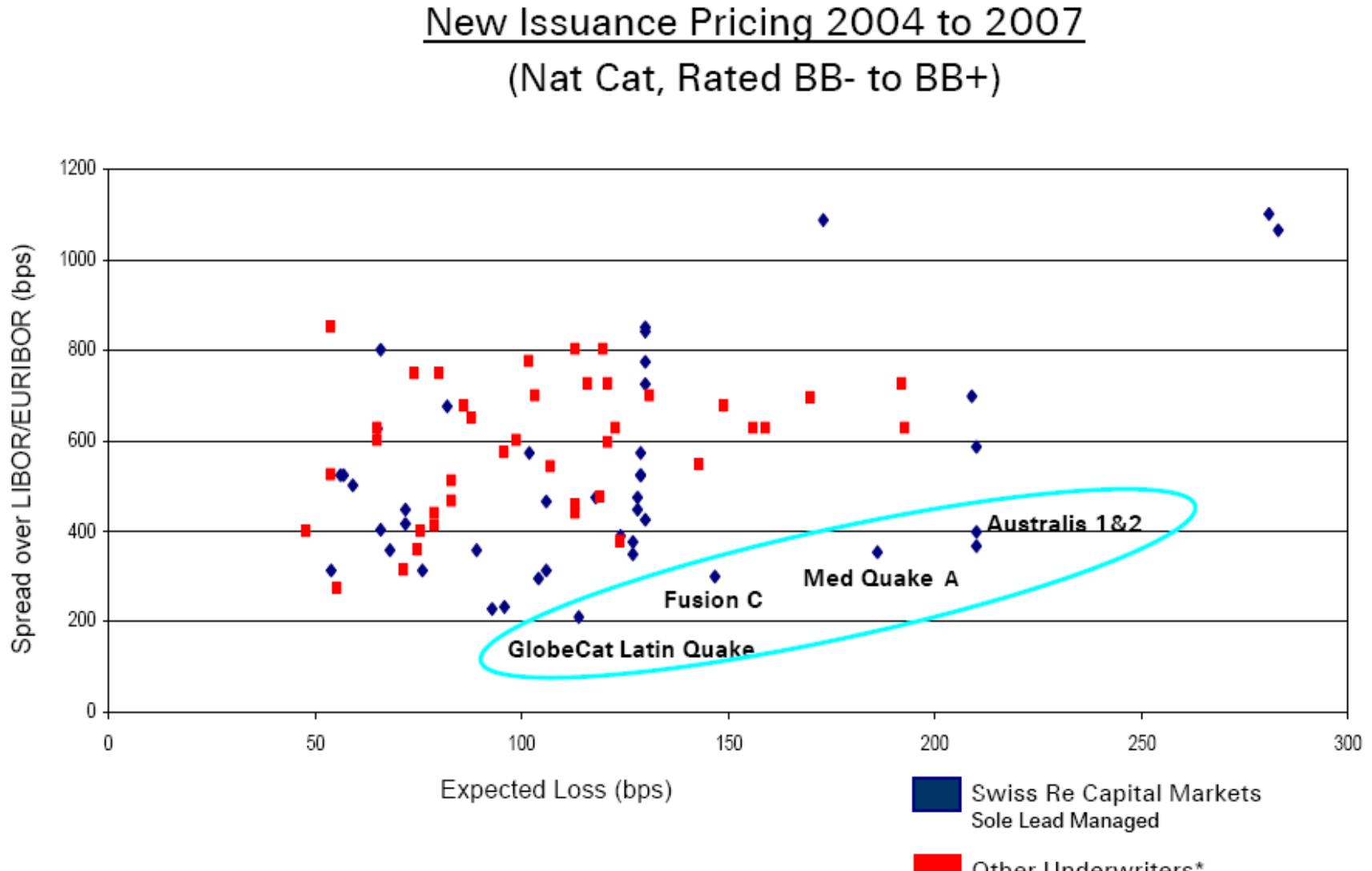
Challenges for the ILS market

- Some remarks on cat-bond pricing: impact of events



Challenges for the ILS market

Impact of dedicated investors (diversification effect)



Challenges for the ILS market

- New frontiers: longevity risk
 - Many drivers to transfer the risk: growing burden for current holders, key business risk and finite capacity of traditional buyers
 - Some transactions (swaps)

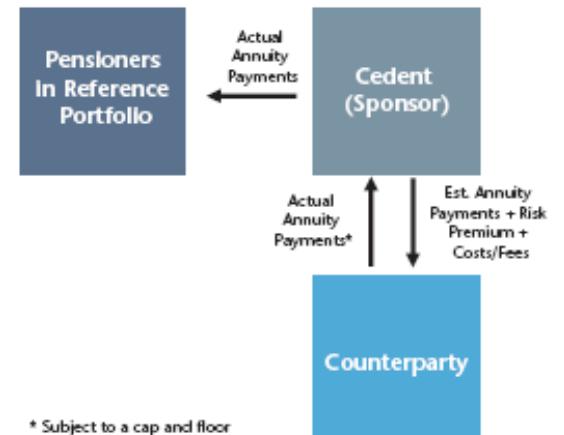
RECENT LONGEVITY SWAP DEALS

Sponsor	Issuance Year	Value (\$ MM)*
Canada Life	2008	990
Lucida	2008	195
Norwich Union	2009	689
Babcock	2009	755
Total		2,629

* Transactions in non-US Dollar currencies were converted to US Dollars based on prevailing rates at time of issuance.

Source: Aon Benfield Securities

STRUCTURAL PREMISE OF LONGEVITY SWAP



* Subject to a cap and floor

Source: Aon Benfield Securities

- Specific challenges
 - One-way market
 - Data (basis risk, cohort effect...)
 - Models
 - LT
 - Related risks (liquidity, inflation, credit risk...)
- Post-reading: P. Barrieu, H. Bensusan, N. El Karoui, C. Hillairet, S. Loisel, C. Ravanelli, Y. Salhi, **Understanding, modelling and managing longevity risk: key issues and main challenges** (2010), to appear in Scandinavian Actuarial Journal 42

To know more....

