TITULIZACIÓN EN SEGUROS

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“Risk comes from not knowing what you're doing.”

Warren Buffet
SECUORIZATION: BROAD VIEW
Literally, securitisation is a structured finance transaction whereby a company transforms on-balance sheet assets, sometimes illiquid assets, into tradable securities.

Principles of securitisation

- The company (ceding company or sponsor) either
  - Sells the assets to a Special Purpose Vehicle (SPV), or
  - Transfers the risks attached to the assets to the SPV, for example through a derivative.
- The SPV issues various classes of notes, each of them corresponding to a different layer of risk (tranches), most of the time rated by S&P, Moody’s or Fitch.
- The notes are sold to capital markets investors.

Different types of securitisation

- Cash securitisation => objective: mainly funding with an element of risk transfer.
- Synthetic securitisation => objective: risk transfer, and/or capital relief.
SECURIZATION

Applications

Main objective = funding

- PANEs securitisation
  - Pure funding, may additionally have some regulatory benefit depending on countries
- XXX/AXXX securitisation (US Life insurance)
  - Funding of redundant life reserves
- VIF securitisation (Life insurance)
  - Funding secured against the estimated future profits of a book of life business

Main objective = risk transfer

- P&C insurance:
  - Natural catastrophe bonds: transfer risk of severe losses due to natural catastrophe event
  - Adverse development cover: transfer the risk of adverse business development, e.g. loss ratio deviation
- Life insurance:
  - Extreme mortality bond: transfer risk of surge in mortality rate (pandemic, man made disaster...)
  - Longevity swap: transfer the risk of deviation in longevity vs. projections
Main Advantages of Securitization to Issuer

- Financial markets have significantly greater capacity than insurance markets
- Competitive pricing vs traditional reinsurance market
- Reduction of counterparty credit risk
- Increased diversification of protection sources
- Multi-year protection
- Provide additional source of funding

Main Advantages of Securitization to Investors

- Allow for direct investment in insurance related risks
- Asset class weakly correlated with financial markets offering a diversification opportunity for investors
- Attractive expected investment return, notably in a low interest rate environment
- Cat Bonds or other insurance securitizations show fewer incidents of default than corporate debt
CAT BOND
Cat bonds were first issued in the aftermath of Hurricane Andrew and the Northridge Earthquake in the mid-1990s, which resulted in massive shortage of reinsurance capacity, and the market has grown robustly since then. They are the best-known example of a broader class of insurance-linked securities (ILS).

Standard Cat bond structure:

Cat bonds are a standardized method of transferring insurance risk to the capital markets. The proceeds from the sale of the bond are invested in near risk-free assets to generate money market returns, which combined with an insurance company’s premium, allow the bond to pay a substantial spread over money market returns.

If no insurance events occur the investor enjoys the enhanced coupon for the term of the bond, typically three years, and receives the principal back at maturity. If one of the designated events occurs, all or part of the principal is transferred to the insurance company, the investor’s coupon payments cease or are reduced, and at maturity there is either zero, or a reduced amount of principal repaid.
On October 15th 2013 AXA successfully issued the largest European Wind catastrophe bonds transaction in euros so far (€350m) at historical low spread levels:

The class A catastrophe bonds initially provide a €185m protection, maturing in January 2017, against losses between €2.1bn and €3bn at a spread of 260bps
The class B catastrophe bonds initially provide a €165m protection, maturing in January 2018, against losses between €1.78bn and €3bn at a spread of 290bps.

Significant benefits achieved:

**Highly flexible protection**: Both classes provide protection for different risk levels and feature a new mechanism, “the variable reset”, that will enable AXA Global P&C to adjust the protection within a predetermined range of risk.

**Proactive management of transactions’ renewals**, with two classes offering multi-year protection on different maturities (3 and 4 years).

**Optimized issuance timing** allowing to achieve **very competitive spreads levels, significant volumes** and the introduction of the above innovative features.

**Significant costs savings** in comparison to previous transactions leading to structuring costs of 33bps vs 55bps for Calypso 2010 and 43bps for Calypso 2011.

**Very constructive cooperation and involvement among the various AXA teams** involved (AGPC, DCFG, DJC, GRM and DAF)
Cat bonds are **decorrelated from counterparty credit risk**, which make them particularly attractive to cover extreme events where credit strength of reinsurers becomes critical and **offer multi-year protection**.

A successful cat bond issuance (large size and tight pricing) is key to **strengthen AXA Global P&C bargaining power** while negotiating with traditional reinsurers.

**Risk transfer recognition** under Solvency II frees up capacity for new business.

Since the end of 2012, markets have shown a strong demand for European Windstorm transactions as ILS investors need this **diversification to increase their investments in higher yield risk such as US winds deals or merely to ensure decorrelation with the global financial market**. Together with the low interest rate environment, it created a good momentum for AXA’s new issuance.

<table>
<thead>
<tr>
<th>Class A Layer</th>
<th>Class B Layer</th>
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<tbody>
<tr>
<td>Traditional Reinsurance</td>
<td>Traditional Reinsurance Year 1</td>
</tr>
<tr>
<td>Cat bond</td>
<td>Cat bond Year 1</td>
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<tr>
<td></td>
<td>Traditional Reinsurance Year 2**</td>
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<td></td>
<td>Cat Bond Year 2</td>
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Whereas absolute pricing levels of cat bonds and traditional reinsurance are historically low, the spread difference is more favorable to cat bonds than on previous transactions

* Net of Reinsurers CDS costs and CAT structuring costs

** Class B will mandatorily reset in Year 2 in the risk area of Calypso 2011
The new cat bonds benefit from the introduction of a new mechanism “the variable reset” which enables AXA to increase the risk parameters of its protection within a predetermined range. This mechanism will enable AXA Global P&C to absorb any structural increase in risk of the underlying portfolio and even permit AXA Global P&C to modify every year the position of the protection within the traditional reinsurance program. For Class B a mandatory reset has been set up in year 2 to drop the protection in the area of Calypso 2011 while providing transparency to the investors.

Risk metrics can evolve between an expected loss of [96;135]bps for Class A and between an expected loss of [175;250]bps for Class B following the mandatory reset in year 2. The attachment level shall never be less than the expected loss + 35bps and never be in excess of the expected loss + 70bps.

The spread to be paid to noteholders will change accordingly based on the formula Spread\_i = Spread\_i + 1.25*(El\_i – El\_i) and will therefore vary between [260;309] bps for Class A and between [361;455] bps.

### Illustration of a structuring innovation

**Variable Reset**

#### Year 1
- **Class B Notes**
  - €2.1bn
- **Class A Notes**
  - €1.8bn
- **Calypso 2011**
  - €3.0bn

#### Year 2 mandatory drop
- **Class B Notes**
  - €1.8bn
- **Class A Notes**
  - €1.7bn

#### Maximum flexibility*
- **Class B Notes**
  - €1.4bn

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*Hypothesis: The chart represents the classes position in extreme scenarios. Class A expected loss can move between 96bps and 135bps / Class B expected loss can move between 175bps and 250bps. For both classes, the attachment probability will never be less than the expected loss + 35bps and never exceed the expected loss + 70bps.*

**Spread formula:**

\[ \text{Spread}\_i = \text{Spread}\_i + 1.25*(\text{El}\_i – \text{El}\_i) \]

**Spread range:**

- Class A: [260;309] bps
- Class B: [361;455] bps
Since the launch of the project the ambition was to maximize the advantage we could take from favorable market conditions by achieving the largest transaction at the tightest price. The strategy designed by DCFG to meet that objective was the simultaneous launch of 2 classes sufficiently different (risk and maturity) to avoid cannibalization effects. AXA took this opportunity to renew in advance Calypso 2011 where cat bonds prices better compare with traditional reinsurance.

The tight agenda has permitted to ensure an execution well in advance of the traditional pipeline and thereby get full attention from the investor community.

A two days roadshow took place in Zurich and New York. The Global investor call was held on September 25th. This allowed to collect investors feedback on the structure and assess size and price constraints. General feedback was very good thanks to the transparency and robustness of the deal. Investors particularly appreciated the mandatory reset which reduces the range of risk in which Class B may evolve.

The chosen guidance [260 – 310]bps on the Class A and [290 – 340]bps on the Class B was built in accordance with the level observed on the secondary market but was considered aggressive as Groupama two months earlier printed at 275bp and was considered as the floor by the market. The volume announced was €100m for each class and the message delivered to investors was that the deal is price driven vs size, with however room for an upsize as the tight end of the guidance.

Books opened rapidly, with a €90m lead order from LGT at the tight end of the guidance on both classes, which permitted to create the momentum in the book and to converge pricing to the low end of the guidance and in particular attract the Fermat order which was decisive for the upsize of the deal.

On the back of a circa €380m book, the deal was upsized to €350m and the guidance confirmed at 260bps for Class A and 290bps for Class B. The strategy not to tighten more the spreads has been privileged to ensure an optimized transaction size as the trade off between tightening the guidance and the risk of losing orders was not beneficial. Almost all orders where confirmed and the transaction closed at €350m with a final book of €384m.
Final book size: EUR 384.01m
Allocation was limited to €350m to keep a sufficient buffer in order to limit execution risk.

**Geographic split:**
The execution of this cat bonds has shown the return of Swiss investors which were missing in 2011 and in particular LGT who came for the lead order at €90m across both classes.

US investors are the ones missing on this transaction and in particular Nephila with a weak order (€10m vs €65m in 2011), which however was in line with their participation in other recent deals.

**Investor split:**
A great amount (7%) of Money Managers were attracted by the level of the yield vs what they can get on the interest rate market and have entered the transaction (2% for Calypso 2010 and 0% for Calypso 2011).

Most of investors remains however ILS dedicated funds (80%)

The amount of reinsurer remains limited (7% vs 23% for Calypso 2010)

4 names (LGT, Fermat, CSAM, Elementum) represents 62% of the order book.
LONGEVITY RISK
**Longevity Risk**

Questions for the future

- **Potential accelerators for improvement**
  - Fewer smokers and drinkers
  - Increased focus on disease detection and prevention
  - Medical breakthroughs on cancer and other diseases

- **Newly observed trends countering longevity**
  - Stressful life conditions (urban concentration, hectic pace of life, individualistic lifestyles / loneliness…)
  - Economic crisis if prolonged (wealth and education correlated with higher life expectancy)
  - Obesity (34% of US population aged 20+ is obese, 68% overweight, obesity increasing among children)
  - Reemergence of diseases once eradicated (e.g. malaria, dengue fever), mutation (cross-species transmission) or resistance to drugs previously effective

- **Emerging risks**
  - Pollution: established evidence of higher mortality rates in polluted areas
  - Climate change: food chain disruptions, difficulties in accessing water supplies, global warming…
  - Cell phones: no clear link to date b/w use of cell phones and cancer frequency

**The trend observed over the past 50 years could well change**
Longevity Risk
Market Capacity and Appetite

- **Insurers/Reinsurers**
  - **Business diversification** – potential for “natural hedge” between mortality / longevity risks
  - **Solvency II** might also encourage offloading longevity risk for insurers/reinsurers having an unbalanced risk profile
  - The insurance industry’s **capital capacity may be limited** to absorb demand (pensions not currently subject to Solvency II)

- **Capital Markets Investors**
  - Potential **diversification** of portfolios with an **uncorrelated risk**
  - Several **barriers** exist to increasing investor appetite
    - Lack of **standardization** and transparency
    - Poor **knowledge** of longevity risk and lack of consensus on future trends
    - **Long-term** risk
    - Lack of **liquidity**
Longevity Risk
Options to externalize

**Bulk Annuities**

- **Full transfer of all risks** including financial risks to the buyer (e.g. pension fund obligations transferred to the insurer)
  - **Buy-out**: the purchase of individual annuities for members of the pension scheme where each annuity forms a single policy between the member and the insurance company
  - **Buy-in**: the purchase of a bulk annuity held by the trustee of the pension scheme as an investment of the scheme – the relationship between the member and the scheme does not change
  - **Synthetic buy-in**: Combination of an asset swap and longevity swap to replicate the risk transfer of a buy-in

**Longevity Swaps**

- Fixed payments made by the party wishing to **hedge** their longevity risk in exchange for floating payments based on the evolution of underlying mortality
  - **Indemnity** – mortality based on the hedged portfolio itself
  - **Index** – mortality based on a mortality index independent of the hedged portfolio
# Longevity Risk

## Types

<table>
<thead>
<tr>
<th>Pricing</th>
<th>Indemnity Based</th>
<th>Index Based</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✓ Due Diligence required on portfolio</td>
<td>✓ Independent of hedged portfolio</td>
</tr>
<tr>
<td></td>
<td>✓ Complex pricing</td>
<td>✓ Fast execution</td>
</tr>
<tr>
<td></td>
<td>✓ Longer to implement</td>
<td>✓ Less Costly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hedging Strategy</th>
<th>Indemnity Based</th>
<th>Index Based</th>
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</thead>
<tbody>
<tr>
<td>✓ Straightforward using a single swap</td>
<td></td>
<td>✓ Potentially complex</td>
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<table>
<thead>
<tr>
<th>Investor Appeal</th>
<th>Indemnity Based</th>
<th>Index Based</th>
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</thead>
<tbody>
<tr>
<td>✓ Not liquid</td>
<td></td>
<td>✓ More transparent</td>
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<tr>
<td>✓ Long term commitment</td>
<td></td>
<td>✓ Flexibility on duration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ More liquidity potential</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Indemnity Based</th>
<th>Index Based</th>
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<tbody>
<tr>
<td>✓ Complete coverage of longevity risk of hedged portfolio</td>
<td></td>
<td>✓ Basis risk (demographic, sampling, structural)</td>
</tr>
</tbody>
</table>
Longevity Risk
pros and cons

What they are...

- **Indemnity risk covers**
  - Full cover of longevity risk in portfolio
  - Locked-in solution for extended time period
  - Appealing to reinsurers (value in data collection and treatment), not that attractive to capital market investors (time and expertise required)

- **Index-based swaps: a solution to the limited capacity of the reinsurance market**
  - Lower price than indemnity transactions
  - Time saved avoiding discussion on legal terms
  - A diversifying asset to capital market investors

What they are not

- **A perfect solution**
  - Indemnity deals can be expensive and administratively burdensome
  - Index-based swaps might entail basis risk between portfolio and reference populations

- **A cover-up for inadequate provisions**
  - Covers compensate for deviations in future mortality trends, not shortfalls stemming from past misestimation (changes in best-estimate)

- **An easy way out**
  - Thorough cost/benefit analysis required before deciding to cede the risk

- AXA’s risk / return assessment performed along four dimensions:
  - Earnings (stat / IFRS), Value (AFR, IRR), Solvency (coverage) and Liquidity
  - Structure of the risk cover must be aligned with company’s internal measure of longevity exposure to ensure maximum efficiency
  - Both covers are effective risk management tools in a Solvency II world
Longevity Risk
Example AXA UK 207-2010 Swap

Background
- Issue with UK With-profits business (ALM, liability measure, P&L volatility, poor risk-adjusted return...)
- Objectives for deal:
  - Centralize in a single dedicated company all AXA UK annuity portfolios (operational efficiencies)
  - Release capital via ISPV legal structure (capital management)
  - Secure longevity hedge (risk management)
  - Seize corporate bond market liquidity premium (optimize returns)

AXA Annuity Company
- A three-phase setup spanning over 2007 – 2010 to externalize £5bn of reserves
Longevity Risk

Example AXA UK 207-2010 Swap

**Swap structure**
- Classic payoff exchanging predetermined cash flows against actual benefit payments

**Scope of deal**
- Annuities in-payment only
- Longevity risk only
- Excludes inflation risk on indexed annuities & operational risks

- Hedging 95% annuities in-payment

- If internal model longevity scenario was to be experienced, AXA would recover up to £800m from swap
Longevity Risk
Market Capacity and Appetite

- **Rationale for attractive pricing**
  - Natural hedge for UK mortality books of some reinsurers
  - Different views on longevity risk
  - Margins hidden in data, experience studies and reserving assumptions

- **Price of deal**
  - Initial price talks varied from 3.0% to 4.5% of best estimate cash flows
  - Deal executed on very attractive pricing terms for each tranche, at 1.2% for Phases 1&2, and 1.6% for Phase 3

- **A burdensome process**
  - Indemnity type transaction
    - Due diligence: cleaning of data, historical death identification…
    - Premium reset
  - Legally binding for 45 years
    - in 15 years deviation in longevity is measured
    - cash flows then paid for next 30 years… no escape from payment
  - Time spent:
    - > 200 hours of conf calls with AXA UK / Group reinsurance & legal teams, reinsurers and their lawyers
    - > 2,500 emails exchanged
    - > 25 draft versions of a 217 pages’ agreement
Thanks for your attention
Questions??

redefining / standards