The development of complementary insurance capacity through Insurance Linked Securities (ILS)
### Development of a complementary insurance capacity

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ILS market development</td>
</tr>
<tr>
<td>2</td>
<td>The added value of SCOR as a Transformer</td>
</tr>
<tr>
<td>3</td>
<td>Key factors for further development</td>
</tr>
<tr>
<td>4</td>
<td>Opening New Horizons</td>
</tr>
<tr>
<td>5</td>
<td>Appendices</td>
</tr>
</tbody>
</table>
A piece of History

Creation of a complementary source of capacity

First ILS securitizations took place in the beginning of the 90’s

- Significant pressure on capacity in the non-life reinsurance market
- Development of securitization technics on other asset classes
- The first ILS instrument was introduced by CBOT in the aftermath of Hurricane Andrew in 1992 under a “catastrophe futures” form, followed by Nationwide in 1995 which issued 400 M$ contingent notes
- The most prominent form of ILS which is the CAT bond was introduced in 1994 by a reinsurer

ILS emerged thanks to specific offer and demand conditions

<table>
<thead>
<tr>
<th>Demand</th>
<th>Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why this mechanism was solicited?</td>
<td>What investors are looking for?</td>
</tr>
<tr>
<td>- Arbitrage of the cost of capital</td>
<td>- Decorrelation</td>
</tr>
<tr>
<td>- Answer to regulatory constraints</td>
<td>- Attractive risk/reward</td>
</tr>
<tr>
<td>- ERM constraints when risk &gt; risk appetite</td>
<td>- Standardized products &amp; large volume of capacity</td>
</tr>
<tr>
<td></td>
<td>- Cash flow predictability: once the event has happened, the settlement must be quick and straightforward</td>
</tr>
<tr>
<td></td>
<td>- Transparency of the exposure</td>
</tr>
<tr>
<td></td>
<td>- Liquidity</td>
</tr>
</tbody>
</table>
A CAT Bond is a financial instrument providing reinsurance cover to a sponsor (usually a reinsurer or insurer). The latter enters into a counterparty contract with a dedicated Special Purpose Entity (SPE) which will then issue bonds to note holders.

Typical cat bond structure

- Those fully collateralized multi-year covers can either be classified as reinsurance agreements or be considered financial derivatives. In the first case, the SPE will be a Special Purpose Reinsurance Vehicle (SPRV). In the second one, it will be merely a Special Purpose Vehicle (SPV).
Overview of ILS Instruments

A wide variety of instruments has been developed to transfer insurance risk to capital markets

Parametric based

Indemnity based

« Pure traditional » solutions

« Pure ILS » solutions

Traditional Reinsurance
- Not collateralized
- Indemnity based

Indemnity Securitization
- Not indexed based
- Maybe collateralized

Parametric Securitization
- Parametric index
- May be collateralized

Parameteric index & indemnity based
- May be collateralized

Industry Loss Warranty

P&C CAT bonds
- Extreme mortality bonds

EV Securitization
- XXX securitization
- Life settlement securitization
- P&C cat bonds
- Extreme mortality bonds

CAT Derivatives (OTC)
- Exchange-traded cat contracts
- Mortality / Longevity swaps
- Weather derivatives

Derivatives
- Parametric index
- May be collateralized
The Capital Markets point of view

ILS has progressively gained its status of zero-beta asset class generating more and more investors’ appetite

- An alternative investment opportunity
  - Highly profitable instruments: CAT bond indexes performed very well compared to S&P 500 and High yield indexes during 2008 crisis, despite direct impact of Lehman bankruptcy on some bonds
  - An alpha generating and zero-beta asset class: low correlation of CAT bond return and financial markets as shown below
  - A high Sharpe ratio asset class

![Graph showing the performance of Cat Bond Index, S&P 500 Index, and High Yield Index from 2001 to 2009.](source: SGI)
~20 years of cat bonds track record

A developing and maturing market

Source: SGPC
Investors’ appetite provides competitive multi-year cover offer

Source: SGPC
The pay-out of a CAT bond for a NAT CAT event is based on a trigger mechanism, among the four following:

- **Indemnity**: based on the ultimate net loss of the sponsor
- **Parametric**: depending only on the measured physical parameters of the event (e.g. earthquake magnitude, peak wind speed)
- **Modeled Loss**: based on the output of a CAT model fed with the measured physical parameters of the event and the covered portfolio characteristics
- **Industry Index**: based on a weighted combination of reported industry losses per line of business and/or area by a third agent (PERILS, PCS)

The market share of Industry Index-based CAT bond issuances is increasing in Europe.

Source: SGPC
Non-US perils attract more and more investors

Strong appetite for diversification in European perils over the last years

Source: SGPC
## Development of a complementary insurance capacity

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ILS market development</td>
</tr>
<tr>
<td>2</td>
<td>The added value of SCOR as a Transformer</td>
</tr>
<tr>
<td>3</td>
<td>Key factors for further development</td>
</tr>
<tr>
<td>4</td>
<td>Opening New Horizons</td>
</tr>
<tr>
<td>5</td>
<td>Appendices</td>
</tr>
</tbody>
</table>
SCOR can facilitate the access to ILS for its clients through a Transformer role

The added value of SCOR as a Transformer

- Cedents can consider an ILS issuance as too complex and can be interested in transferring the basis risk to SCOR
- In a Transformer deal, SCOR provides additional market capacity by arranging a CAT bond issuance on behalf of its cedent: SCOR accepts the risk through a reinsurance agreement and then retrocedes it to the capital markets by issuing a CAT bond
- Favorited CAT bond triggers for these fronting deals will be Modeled Loss and Industry Index mechanisms
- The subsequent chart details the features of a Transformer role
SCOR provides the capacity to cover Basis Risk

Basis Risk management

- The potential discrepancy between the payment received on behalf of the CAT bond structure (P) and the payment SCOR owes to the cedent (I) following the occurrence of a claim is called basis risk

\[
\text{Basis risk} = P - I
\]

- Cedents are often interested, in the case of an ILS cover, in transferring the basis risk to SCOR
- SCOR has developed an expertise in analyzing potential basis risk occurrence and in basis risk minimization technics
- This is achieved through an optimization of the trigger parameters by SCOR in order to tailor the bond payout to each specific deal and best mirror the indemnity payments
- For instance, in the case of an Industry Index structure, the weights assigned to each area and line of business in the weighted sum formula will be determined to best reflect the cedent's specificities and market shares per line of business/area
SCOR can provide the capacity to collateralize the reinsurance agreement based on cut-through mechanism

Collateral offer based on cut-through mechanism

In some deals, an assignment of collateral to the benefit of the cedent can be set up. This “cut-through” mechanism ensures the cedent to be granted the access to the CAT bond payments even in the case of the default of the sponsor.

The cedent benefits from all the advantages of the CAT bond – large capacity, fully collateralized, multi-year cover, with reinstatement option - while being reinsured on an indemnity basis thanks to the full basis risk cover.
Development of a complementary insurance capacity

1. ILS market development
2. The added value of SCOR as a Transformer
3. Key factors for further development
4. Opening New Horizons
5. Appendices
Where do Insurance and Financial Markets meet?

Key factors for further development

<table>
<thead>
<tr>
<th>P&amp;C</th>
<th>DEMAND</th>
<th>OFFER</th>
<th>Transferability to the capital market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property CAT (xs)</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Property Non CAT</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Casualty</td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Specialities</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Life</td>
<td>DEMAND</td>
<td>OFFER</td>
<td>Transferability to the capital market</td>
</tr>
<tr>
<td>Longevity</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Long term care</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Mortality</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>
Market Transparency and Standardization

Towards more generic and attractive products

- **Mitigation of moral hazard**
  The development of non-indemnity triggers favors market transparency and arouses investors’ community appetite

- **Collateral and credit risk management**
  Enhancing innovative safe structures of which all parties involved take advantage

- **Enhancing risk modeling**
  CAT modeling agencies shall provide reliable risk assessment

- **Upgrading the ILS market**
  Standardizing ILS and increasing liquidity on secondary market for a more efficient pricing and execution capacity
Basis Risk Management

Promoting the development of industry indices

- Sponsors and cedents favor industry indices-based triggers that enable transparency and a refined tailoring of the CAT bond payout formula for basis risk minimization.

- Enhancing data quality and reliability is key both for investors and cedents.

- The PERILS initiative, launched in 2009, has given Europe an independent organization providing both market-wide exposure and event loss data related to natural catastrophe perils.
  - It has largely facilitated the development of new risk transfer products based on industry loss (CAT Bonds and ILWs).
  - 61% of YTD CAT bond issuance volume in Q3 and Q4 2011 is based on a PERILS-industry index trigger.

- Northern Africa would benefit from the development of a similar initiative.

### YTD 2011 Q3 and Q4 transactions using PERILS

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Closing Date</th>
<th>Issuer</th>
<th>Perils</th>
<th>Covered Area</th>
<th>Trigger</th>
<th>Size</th>
<th>Investors’ appetite</th>
<th>Term (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swiss Re</td>
<td>Nov-2011</td>
<td>Successor X</td>
<td>Hurricane &amp; Windstorm</td>
<td>USA &amp; Europe</td>
<td>Industry Loss</td>
<td>50M$</td>
<td>Total placement up-sized +33%</td>
<td>4</td>
</tr>
<tr>
<td>Munich Re</td>
<td>Oct-2011</td>
<td>Queen Street IV Capital</td>
<td>Hurricane &amp; Windstorm</td>
<td>USA &amp; Europe</td>
<td>Industry Loss</td>
<td>100M$</td>
<td>Up-sized +33%</td>
<td>3.25</td>
</tr>
<tr>
<td>AXA</td>
<td>Oct-2011</td>
<td>Calypso Capital</td>
<td>Windstorm</td>
<td>Europe</td>
<td>Industry Loss</td>
<td>180M€</td>
<td>Up-sized +80% Spread -35bps / initial average guidance</td>
<td>3</td>
</tr>
<tr>
<td>Munich Re</td>
<td>Jul-2011</td>
<td>Queen Street III Capital</td>
<td>Windstorm</td>
<td>Europe</td>
<td>Industry Loss</td>
<td>150M$</td>
<td>Up-sized +200% Spread -100bps / initial average guidance</td>
<td>3</td>
</tr>
</tbody>
</table>
Development of a complementary insurance capacity

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ILS market development</td>
</tr>
<tr>
<td>2</td>
<td>The added value of SCOR as a Transformer</td>
</tr>
<tr>
<td>3</td>
<td>Key factors for further development</td>
</tr>
<tr>
<td>4</td>
<td>Opening New Horizons</td>
</tr>
<tr>
<td>5</td>
<td>Appendices</td>
</tr>
</tbody>
</table>
ILS Tomorrow

**ILS will progressively gain momentum**

- More transparency and standardization
  - Standard and very detailed exposure databases
  - Improved modeling with the use of standard third party stochastic models
  - Simplification and creation of transparent insured risk with market indices such as PCS & PERILS
  - Standardization of the reinsurance products
  - New perception of risks, updated modeling and increased pricing for CAT (especially outside US)

- Strong recent inflows in specialized ILS funds underline the strong potential of ILS capacity

- The advent of a favorable regulatory framework recognizing the efficiency of the risk transfer as well as the safety of the collateral structures
  - Meeting increasingly demanding Solvency requirements
  - Mitigating credit risk

- Progressive democratization of ILS solutions: opportunity for small cedents to transfer risk to the markets

- ILS emerge as a true complementary source of reinsurance
Looking back at the history of finance: a turn in asset management

- Capital Asset Pricing Management (CAPM) theory
- Switching from expensive alpha-generating and costly structures to beta-oriented and more cost-efficient investment strategies and products: ETF, trackers

In that respect, reinsurance industry will continue to favor risk management expertise and clients relationship franchise but a similar turn could occur

Looking forward, Reinsurance capacity is likely to be a combination of traditional offer and ILS capacity which today stands at 10% market share but could rapidly reach 15 to 20 % market share in the years to come
Development of a complementary insurance capacity

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ILS market development</td>
</tr>
<tr>
<td>2</td>
<td>The added value of SCOR as a Transformer</td>
</tr>
<tr>
<td>3</td>
<td>Key factors for further development</td>
</tr>
<tr>
<td>4</td>
<td>Opening New Horizons</td>
</tr>
<tr>
<td>5</td>
<td>Appendices</td>
</tr>
</tbody>
</table>
CAT Bond Market Figures and Trends

Source: SGPC
CAT Bond Market Figures and Trends

Source: SGPC
Noticeable CAT bond market features and evolutions over the last years

- Strong appetite for diversification in European perils, especially Euro Wind
- Current strong investors' appetite has driven prices to all-time low multiples
- Multi-year covers have become largely predominant
- While indemnity triggers are a benchmark in US, Europe is trending towards a strong development of PERILS-based industry index triggers
- RMS has not participated in any (Non-Life) CAT bond issuance in 2011 yet
- Ireland has proven to be a competitive place for SPV incorporation
- Average Expected Loss is stable around 250bps
Damaging Earthquakes 1900-2010 – Indexed Economic Losses
‘Great’ NAT CAT Events 1950-2010
Industry-Loss Warranties (ILW)

Key features

- ILWs are private reinsurance or derivative transactions covering losses arising from a natural catastrophe.

- They usually comprise a hybrid trigger:
  - An index of the total industry loss
  - The ultimate net loss of the counterparty buying protection

- The market trades between $5bn and $7bn of limit per year.
Life Securitization

A wide variety of products

- Three categories of Life ILS coexist on the market:
  - **Mortality and Longevity Bonds**
    Those securities are very similar to CAT bonds in the sense that they are designed to provide a cover on a peak «catastrophe» risk (e.g. pandemic protection). The trigger is usually based on a tailored mortality/longevity index
  - **Monetisation of Embedded Value, known as Value-In-Force Structures (VIF)**
    These ILS were set up to improve capital management. The expected future profits of the sponsor are monetized and sold to investors, enabling the sponsor to convert an intangible asset (the EV) into proceeds that can be directly invested in new business
  - **Financing Transactions (XXX)**
    These transactions do not transfer insurance risk to the capital markets; they aim at funding the redundant or excess reserves US life insurers have to establish under Regulations XXX and AXXX. The goal is to reduce the cost of capital by raising debt capital to support the business