Catastrophe Bonds

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March 2024
Risk transfer is a risk management technique by which risk is transferred to a third party at a certain cost.

Example: insurance, catastrophe bonds.

Party A → RISK, $$$ → Party B

Party B ← COVERAGE/PROTECTION ← Party A
A Catastrophe Bond (CAT Bond) is an insurance-like security whose potential payouts are secured through a bond issuance. The CAT Bond is an insurance-linked security that transfers a specific set of risks to the capital market.

This is typically a multi-year program.
Catastrophe Bond

Catastrophe bond & ILS risk capital issued & outstanding by year

Source: www.Artemis.bm Deal Directory
Catastrophe Bond

Why would a country want to get a CAT Bond?

- Protection against unforeseen catastrophic events
- Manage fiscal health
- Proceeds used for post-disaster relief and recovery

What can you use the proceeds for?

- General budget support. It is not tied to an actual asset.

Why is it labeled a bond?

- It is a bond because investors of the securities can trade these in the capital market.
Catastrophe Bond

Is it a form of debt?

- For the sponsor - No. It is an insurance-like security.
- You do not pay back the payout you receive

Why would investors purchase this?

- Relatively higher returns (compared to sovereign bond issuances)
- Diversifying nature (catastrophe risk is not related to economic/market risk)
Catastrophe Bond

**Process Flow**

- **Sponsor** – Entity whose risk/s is/are covered
- **Issuer** – Issues the CAT Bond
- **Special Purpose Vehicle** – Where CAT Bond proceeds are set aside
- **Investors** – Purchasers of the CAT Bond
Catastrophe Bond

Trigger Types and Structure

- **Indemnity** – Triggered based upon actual claims of sponsor
- **Modeled Loss** – Triggered based upon modeled results of sponsor portfolio
- **Parametric** – Triggered based on event parameters or an index-based parameters
- **Industry Loss Index** – Triggered based upon insured damaged for entire industry

- Trigger steps – Can structure a program that can be triggered at lower parameters.
- Can be CAT in a box/grid, nationwide, select area
Catastrophe Bond

Pricing

Sponsor → Premium or Risk Margin → Issuer → Special Purpose Vehicle → Investors

Coupon
- Premium
- Funding Margin

Issuer
# Catastrophe Bond Pricing

<table>
<thead>
<tr>
<th>Premium</th>
<th>Loss Multiple</th>
<th>Expected Loss</th>
<th>Funding Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium demanded by investors for the risk. Can be thought of as “Spread” for sovereign issuers. Typically a multiple against the expected loss.</td>
<td>Annual likelihood that the CAT Bond would be triggered expressed in %</td>
<td>Return on Collateral provided to the investors for placing their investment in a Special Purpose Vehicle</td>
<td></td>
</tr>
</tbody>
</table>
Catastrophe Bond

Pricing – Expected Loss and Return Periods

- Illustrates the average frequency of an event.
- The higher the number of years (denoted by X), the less frequent the event will occur.
- If multi-step trigger: the likelihood that the program will be fully exhausted in a given year

<table>
<thead>
<tr>
<th>Return Period (RP)</th>
<th>Computation ((1/X))</th>
<th>Annual Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-in-10 Years 10-Year RP</td>
<td>1/10 = 0.10</td>
<td>10.00%</td>
</tr>
<tr>
<td>1-in-20 Years 20-Year RP</td>
<td>1/20 = 0.05</td>
<td>5.00%</td>
</tr>
<tr>
<td>1-in-50 Years 50-Year RP</td>
<td>1/50 = 0.02</td>
<td>2.00%</td>
</tr>
<tr>
<td>1-in-100 Years 100-Year RP</td>
<td>1/100 = 0.01</td>
<td>1.00%</td>
</tr>
<tr>
<td>1-in-200 Years 200-Year RP</td>
<td>1/200 = 0.005</td>
<td>0.50%</td>
</tr>
<tr>
<td>1-in-500 Years 500-Year RP</td>
<td>1/500 = 0.02</td>
<td>0.20%</td>
</tr>
</tbody>
</table>
### Catastrophe Bond

#### Pricing – Expected Loss and Return Periods

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attachment Point</strong></td>
<td>Likelihood that the bond is triggered at the lowest trigger point (lower bound). The return period for the more frequent event.</td>
</tr>
<tr>
<td><strong>Exhaustion Point</strong></td>
<td>Likelihood that the bond would be triggered at the highest trigger point. The return period for the least frequent event.</td>
</tr>
<tr>
<td><strong>Expected Loss</strong></td>
<td>Likelihood that the bond would be fully exhausted within the year. This can be due to multiple smaller events. Computation varies based on trigger structure.</td>
</tr>
</tbody>
</table>
Catastrophe Bond

Pricing – Expected Loss and Return Periods

Catastrophe bonds & ILS risk capital outstanding by expected loss

- 8%+
- 0% - 0.49%
- 0.5% - 0.99%
- 1% - 1.49%
- 1.5% - 1.99%
- 2% - 2.99%
- 3% - 3.99%
- 4% - 5.99%
- 6% - 7.99%
- 8%+

Source: www.Artemis.bm Deal Directory
Catastrophe Bond

Pricing – Loss Multiple

- The multiple required by investors to partake in the security. This value is multiplied to the expected loss to arrive at the premium.

Source: www.Artanis.bm Deal Directory
Catastrophe Bond

Pricing – Computing the Premium

\[
\begin{align*}
\text{EXPECTED LOSS} & \times \text{LOSS MULTIPLE} = \text{PREMIUM RATE} \\
3.00\% \times 2.00 & = 6.00\%
\end{align*}
\]
Market and Issuance Considerations

- Concentration of your risk in the market – Are you a diversifier? Are there a lot of that risk in the market?
  - Market often saturated with US and Japan risks.
- Pipeline – Are you competing for the supply?
- Market Appetite – Is market willing to take on that risk?
- Peril – Is it a peril you are vulnerable to?

Source: www.Artemis.bm Deal Directory
Philippine Experience

Strategic Policy Goals

**NATIONAL LEVEL**

To maintain **sound fiscal health** at the national government level, necessary to support long term rehabilitation and reconstruction needs.

**LOCAL LEVEL**

To develop sustainable financing mechanisms for local government units, necessary to **provide immediate liquidity** at the onset of a disaster.

**INDIVIDUAL LEVEL**

To **reduce the impact on the poorest and most vulnerable** and **prevent them from falling into a cycle of poverty**, while also shielding the near-poor from slipping back into poverty.
Philippine Experience

Rationale: Retaining all risks would divert funds from key government programs, while transferring all risks would be too costly for government.
### What is the Philippine CAT Bond?
The Philippine CAT Bond is an insurance-linked security that transfers the Philippines’ typhoon and earthquake risk to the capital market.

### Does it count towards the Philippines’ debt?
No. For the Philippines, the CAT bond is a risk transfer instrument and not a debt.

### Why get a CAT Bond?
- **Tap investors in the Capital Market**
- **Minimize counterparty risk** because payout is secured in an SPV

### What does it cover?
- Provides coverage against **typhoons (USD 125 Million)** and **earthquakes (USD 75 million)** for a period of **3 years**
Philippine Experience

Key Features

● NOT a bond issuance by ROP
● Provide immediate liquidity post disaster
● Based on Emergency Modeled Loss
● Serves as an **additional layer of financial protection** for government to cover losses arising **from more severe disaster events**
● Payout for budget support

Coverage

● Nationwide coverage
● Coverage against typhoons (USD 150 Mn) and earthquakes (USD 75 Mn)
● Coverage from November 2019 – December 2022 (3Y)
Philippine Experience

Program Structure
● 3-step trigger structure:
  ○ 1-in-19 year, 5.26% annual probability
    (partial payout)
  ○ 1-in-40 year, 2.50% annual probability
    (partial payout)
  ○ 1-in-100 year, 1% annual probability
    (full payout)

Funding Source
● BTr excess income

Triggering Event
● Triggered in 2022: Typhoon Odette,
  Payout of USD 52.5 Mn
Philippine Process

1. Assess legal and regulatory regime
2. Secure Budget
3. Secure Presidential Special Authority
4. Issue a Joint Memorandum Circular
5. Conduct pre-marketing activities
6. Apply for MAS Grant
7. Develop structure
8. Engage World Bank
9. Issuance
10. Continuous Budgeting and Implementation
Legal and Regulatory Framework

- Issuance of a Joint Memorandum Circular
- Presidential Special Authority

Budget

- BTr excess income
- BTr regular budget for succeeding years

Monetary Authority of Singapore Grant

- Insurance-Linked Security Grant Scheme
- Up to SGD 2 Million
- Compliance with structure minimum requirements
### Philippine Experience

#### Monetary Authority of Singapore Grant

<table>
<thead>
<tr>
<th>Condition</th>
<th>ROP Cat Bond Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal amount of at least SGD 50M or its equivalent in another currency</td>
<td>ROP Cat Bond principal amount is USD 225M</td>
</tr>
<tr>
<td>Non-redeemable tenure of at least 3 years</td>
<td>ROP Cat Bond had a 3 year tenor</td>
</tr>
<tr>
<td>Bond is to be listed on SGX</td>
<td>ROP CAT Bond listed on SGX in November 2019</td>
</tr>
<tr>
<td>More than 20% of total costs incurred in issuing the bond is attributable to companies in SG</td>
<td>Per confirmation of WB, more than 80% of the total expenses will be attributable to Singapore affiliated companies.</td>
</tr>
</tbody>
</table>
Philippine Experience

Process Flow

Philippines (BTr) -> Derivative Contract

World Bank

Capital-at-Risk Notes Facility

Investors

- Why World Bank?
  - Experience and expertise in issuing a CAT Bond
  - Take advantage of WB AAA Rating
### Philippine Experience

#### Pricing

<table>
<thead>
<tr>
<th></th>
<th>EARTHQUAKE</th>
<th>TROPICAL CYCLONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Expected Loss</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Risk Margin</td>
<td>5.50%</td>
<td>5.65%</td>
</tr>
<tr>
<td>Loss Multiple</td>
<td>1.83</td>
<td>1.88</td>
</tr>
</tbody>
</table>
Philippine Experience

Pricing – Loss Multiple

PH risk regarded as a **diversifier** in the CAT Bond market

Achieved **tighter pricing** compared to peers and market average
**Philippine Experience**

**Pricing – Computing the Premium**

\[
\text{Expected Loss} \times \text{Loss Multiple} = \text{Premium Rate}
\]

- Expected Loss: 3.00%
- Loss Multiple: 1.83
- Premium Rate: 5.50%
### Philippine Experience

#### Structure

<table>
<thead>
<tr>
<th>Trigger Structure and Corresponding Payouts</th>
<th>EARTHQUAKE</th>
<th>TROPICAL CYCLONE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35% Payout (USD 26.25M): 1-in-19 Years (modeled loss of PhP 11.1 billion similar to 1990 Luzon)</td>
<td>35% Payout (USD 52.5M): 1-in-19 Years (modeled loss of PhP 40.64 billion similar to Typhoon Yolanda)</td>
</tr>
<tr>
<td></td>
<td>70% Payout (USD 52.5 million): 1-in-40 Years (modeled loss of PhP 28.92 billion)</td>
<td>70% Payout (USD 105 million): 1-in-40 Years (modeled loss of PhP 81.06 billion)</td>
</tr>
<tr>
<td></td>
<td>100% Payout (USD 75 million): 1-in-100 Years (modeled loss of PhP 115.78 billion)</td>
<td>100% Payout (USD 150 million): 1-in-100 Years (modeled loss of PhP 152.71 billion)</td>
</tr>
</tbody>
</table>
Philippine Experience

Structure

1-in-19 Y Event
35% Payout

1-in-40 Y Event
70% Payout

1-in-100 Y Event
100% Payout
Triggering the Bond - Calculation

1. Earthquake happens
2. Request for calculation: Up to 14 calendar days
3. Calculation date: Up to 10 business days
4. Event report: minimum 5 business days
5. Payout to BTr: Assuming notes are triggered
Example scenario:
Year 1: A Haiyan-like (1-in-19) typhoon happens (A)
Year 2: A typhoon stronger than Haiyan happens. For illustration purposes, let us assume a 1-in-40 year type of typhoon (B)
Year 3: Another Haiyan-like typhoon happens (C)

(A) will trigger 35% of your payout ($70M). From that triggering event onwards, you will only pay the premium for the $230M.
(B) will then trigger 70% of your payout. But, since the total payout for typhoons can only be $200M and you triggered $70M, you will only trigger $130M (instead of $140M).
(C) will not trigger anything as your typhoon coverage was already fully paid out.
Philippine Experience

1st Asian Sovereign-sponsored CAT Bond
1st CAT Bond listed in the Singapore Exchange (SGX)
1st CAT Bond listed in an Asian Exchange
MAS ILS Grant Recipient
2019 Best Catastrophe-linked Bond (Asian Asset Award)
Philippine Experience

Challenges

- BUDGETARY CONSTRAINTS
- LEGAL AND REGULATORY FRAMEWORKS
- TECHNICAL EXPERTISE
Thank you!