CURRENT CHALLENGES IN
TERRORISM RISK SECURITIZATION

Gordon Woo (RMS)

Powerpoint Presentation
CURRENT CHALLENGES IN TERRORISM RISK SECURITIZATION

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CORPORATE BONDS WITH IMPLICIT TERRORISM RISK EXPOSURE

- Transport and Energy Infrastructure
- Food & Drink; Agriculture
- Pharmaceutical
- Construction; Real Estate
- Finance

December 1988
POSSIBILITIES OF TERRORISM RISK ARBITRAGE

- Search for terrorism risk portfolio with desirable counter-terrorism characteristics: superior security; or lower target attractiveness.

- Check for significant market risk over-pricing due to indiscriminate low-resolution bucketing of risks.

RMS has developed a global terrorism risk model to assist Montpelier Re with the insurance requirements of the US Overseas Private Investment Corporation.
SECURITIZATION MARKET RISK PRICING

Lower Natural Catastrophe Spread over LIBOR

400 b.p.

350 b.p.

Upper Natural Catastrophe Spread over LIBOR

500 b.p.

Cheaper Insurance Quotation

Risk with 1% Expected Loss

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## COMPARISON OF CATASTROPHE RISKS

<table>
<thead>
<tr>
<th>NATURAL CATASTROPHES</th>
<th>MAN-MADE CATASTROPHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Earthquakes</td>
<td>• Fraud, operational risk</td>
</tr>
<tr>
<td>• Hurricanes</td>
<td>• Terrorism</td>
</tr>
<tr>
<td>• Extra-tropical windstorms</td>
<td>• Pandemics</td>
</tr>
<tr>
<td>• Hailstorms</td>
<td>• Critical industrial accidents</td>
</tr>
</tbody>
</table>

Future securitizations might mix-and-match natural and man-made catastrophes, so diluting the terrorism component.
TERRORISM IS A CONTROL PROCESS

Hurricane Jeanne:
4th hurricane to strike Florida in the 2004 hurricane season.

Muhammed Naeem Noor Khan, Al Qaeda computer expert, arrested in Lahore on July 12, 2004.
ADVANTAGES OF MULTI-EVENT TRIGGERS

- High-quality insurance protection for multiple events may be hard to obtain.

- First trigger event provides a warning to investors.

- Bonds are investment grade, and are open for purchase by significantly more institutional investors than those that are lower-rated. There is a high demand for these bonds.

Mid-Niigata
Japan
Earthquake
M 6.8
October 23, 2004
GUIDELINES FOR TERRORISM
ALTERNATIVE RISK TRANSFER

➢ To deal with concerns over ambiguity in terrorism risk assessment, it helps if the loss of principal is contingent on two or more trigger events occurring.

➢ To deal with substitution from government to commercial targets, specific commercial targets should have security of the high level of major government buildings.
GOLDEN GOAL FINANCE LTD.

$260 million cancellation risk securitization for the 18\textsuperscript{th} FIFA World Cup\textsuperscript{TM} scheduled to be played in Germany in Summer 2006 providing financial cover of FIFA sponsorship earnings.

With this insurance cover, these earnings were subsequently also securitized.

AXA cancelled its cover for FIFA after 9/11; National Indemnity Company stepped in.
MORAL HAZARD

An issuer of a terrorism bond should not have any prospect of profiting from a terrorist act.

The amount payable in the event of cancellation would cover FIFA for loss of sponsorship earnings.

Note: contrast the DARPA Policy Analysis Market which suffered from the moral hazard of encouraging terrorism acts, such as assassination.
RISK ANALYSIS

Two key risk mitigation factors:

- If necessary, tournament matches can be relocated to other stadiums than those 12 designated in Germany.
- If the tournament cannot be completed in summer 2006, it can be postponed until 2007.

Also, the German government has provided FIFA with a guarantee of high security.
COMPARISON OF RISK ANALYSIS METHODS

- **NATURAL HAZARDS**
  - Dependent on knowledge of the underlying physical process.
  - Local hazard depends on site characteristics.
  - The recurrence of extreme events is based on a logical event tree analysis.
  - Model is calibrated against hazard historical experience data.

- **TERRORISM**
  - Dependent on knowledge of the terrorists’ modus operandi.
  - Local hazard depends crucially on security measures.
  - The recurrence of extreme events is based on a logical event tree analysis.
  - Model is calibrated against data on the global pattern of successful and interdicted terrorist attacks.
POST 9/11 TIGHTENING OF WORLD CUP SECURITY

France 1998
Ordinary security

- Informal vetting of stadium stewards.
- Regular police security around players from USA.
- Access to teams by hotel staff.
- Limited armed guard at matches.

Korea-Japan 2002
Overwhelming

- Careful identity checks on stadium officials.
- SWAT Team protect US players.
- US players inaccessible to the public in their hotel.
- Special armed forces present at matches, and thousands of police.
Event-trees are widely used in Probabilistic Risk Analyses for critical industrial facilities. These address human factors.
In 1958, one of the world’s most famous clubs, Manchester United, lost most of its players in an air crash at Munich, where they had played a European Cup match. Despite this tragedy, the club continued in the tournament - which was not interrupted.

‘I had no players, but I had a job to do’.

Jimmy Murphy, Manchester United coach, after the air disaster
2003 FIFA Women’s football tournament was switched to USA from China because of SARS.

2003 FIFA Youth football tournament in UAE was postponed from the Spring to Winter because of the Iraq war.

2003 FIFA Confederations Cup Final was played as a tribute to the Cameroon star Marc-Vivian Foe who suffered heart failure during the semi-final.
## MITIGATION OF RISK DUE TO THE OPTION OF PLAYING IN 2007

<table>
<thead>
<tr>
<th>Chance of there being No Will to continue in 2007:</th>
<th>0.5</th>
<th>0.25</th>
<th>0.1</th>
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</table>

<table>
<thead>
<tr>
<th>Best estimate of probability of World Cup incompletion:</th>
<th>0.05%</th>
<th>0.02%</th>
<th>0.01%</th>
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</table>

<table>
<thead>
<tr>
<th>Extreme estimate of probability Of World Cup incompletion:</th>
<th>0.37%</th>
<th>0.19%</th>
<th>0.08%</th>
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</table>

Coupon Spread over LIBOR = 150 b.p.
UEFA was not insured for the cancellation risk.

As with FIFA, it relied on very high (NATO) military security, and the possibility of relocating and rescheduling the tournament.

Securitization would have been a viable option.
ATHENS OLYMPICS 2004

For the first time in Olympic history, IOC bought cancellation insurance for the 2004 Athens Olympics.

$170 million insurance coverage was obtained at a rate of 4%.

Given this competitive insurance offer, securitization would not have been less expensive.
In December 2003, Swiss Re transferred $400 million of extreme mortality risk to the capital markets.

The structure of this innovative securitization is based on a Mortality Index, which is weighted by country, age and gender.

The trigger threshold is a 30% increase in mortality above the baseline 2002 level.

Risk analysis by Millman USA
Ratings: A3 Moody’s; A+ S&P
### VITA CAPITAL: MORTALITY INDEX WEIGHTS

**Key population group:** US middle-aged men

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Index Weight</th>
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<tbody>
<tr>
<td>20-24</td>
<td>1%</td>
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<tr>
<td>25-29</td>
<td>5</td>
</tr>
<tr>
<td>30-34</td>
<td>12.5</td>
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<tr>
<td>35-39</td>
<td>20</td>
</tr>
<tr>
<td>40-44</td>
<td>20</td>
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<td>45-49</td>
<td>16</td>
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<tr>
<td>70-74</td>
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<tr>
<td>75-79</td>
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<table>
<thead>
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<th>Country</th>
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<td>USA</td>
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<td>France</td>
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<td>Switzerland</td>
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<tr>
<td>Italy</td>
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<table>
<thead>
<tr>
<th>Gender</th>
<th>Index Weight</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>65%</td>
</tr>
<tr>
<td>Female</td>
<td>35</td>
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</table>
INFLUENZA PANDEMICs

The process by which an influenza virus mutates to evade immune systems is called antigenic variation.

Every few years, an antigenic drift causes epidemics, but every few decades an antigenic shift causes pandemics.

The most recent influenza pandemics occurred in: 1889; 1918; 1957; and 1968.

More died in the 1918 global pandemic than in the Great War - about 30% of the US population were infected. Assuming a 35% infection rate in a future pandemic, the CDC estimate several hundred thousand excess deaths in the USA.
FACT SHEET ON
WEAPONS OF MASS DESTRUCTION

✓ Documents and videotapes on WMD have been found in the Al Qaeda training camps in Afghanistan.

✓ Information on anthrax was on the computer of Khalid Sheikh Mohammed, arrested in March 2003.

✓ It is theoretically possible to kill hundreds of thousands using WMD, but the necessary technology and personnel are well beyond the current capability of terrorist organizations.

✓ The doomsday scenario of a nuclear detonation in a major US city has been guarded against by the CIA ever since the start of the Cold War.
CONCLUSIONS

- It is possible for extreme man-made catastrophe risks to be securitized.
- Such deals can achieve investment grade ratings.
- There is an investor demand for certain bonds exposed to terrorism risk.
- Spreads have been similar to those for natural hazards. [e.g. Vita Capital spread is consistent with Morton Lane’s catastrophe bond pricing model].