PART II

Chapter 11

Catastrophic Risk Securitization: Moody's Perspective

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Catastrophe bonds ("cat bonds") are structured finance instruments devised to transfer catastrophe risk to the capital markets. The bonds appeal both to sponsors and investors, and provide a general economic benefit as well, in that they help to distribute some of the financial risk associated with insurance payouts on major disasters.

The cat bond market has changed in the six years since Moody's issued its first cat bond rating, with the addition of new transaction structures, new perils and greater precision in the modeling techniques used to gauge disaster frequency and likely loss severity.

This chapter presents Moody's perspective on the rating of catastrophe bonds including transactions that include new perils and examines the different types of structures in terms of their characteristics, the types of perils covered, their duration and their loss-triggering mechanisms.

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1. Introduction

Catastrophe bonds or cat bonds were conceived as alternative risk transfer instruments for insurance and reinsurance companies to help them pass portions of their catastrophic risk exposure to the capital markets. The first cat bond rated by Moody's Investors Service was Residential Re Limited, issued in June 1997. Since then, Moody's has rated a little over 40 such transactions covering a large number of natural hazards in different regions of the world for a total of about $6.2 billion in rated securities.

Until 2002, issuance of cat bonds was somewhat stable at around $1 billion per year but this trend changed in 2003 with a 50% increase of rated notes for a total of about 1.8 billion spread over 13 transactions. As some cat bonds mature and new ones are issued, the distribution of covered perils changes from year to year, but U.S. hurricane and earthquake perils account for a significant share--over 50%--of the outstanding cat bond exposure at any time. In 2003, Swiss Re issued the first cat bond covering a peril not related to a natural hazard, Vita Capital Ltd., transferring the risk of catastrophic mortality. The potential impact of terrorist attacks was examined but was not significant.

It is interesting to note that, since its first cat bond rating, Moody's has not downgraded any of these securities nor has any Moody's-rated cat bond triggered losses to investors.

2. The Role of Cat Bonds in the Marketplace

Insurance and reinsurance companies are typical sponsors of cat bonds, using them to transfer catastrophic risks to the capital markets. Occasionally, large corporations issue cat bonds as an alternative source of risk financing and as part of their risk management strategies. However, even though there have been discussions about the possibility of issuing cat bonds sponsored by governments of earthquake-prone countries to provide coverage against extreme losses due to these events, this has not yet materialized.

In the marketplace, cat bonds appeal both to sponsors and investors and provide a general economic benefit as well. Sponsors benefit from the creation of alternative sources of risk financing that brings increased coverage capacity and more predictable prices since the capital markets have considerably larger capacity and greater scope for economic diversification than insurers and reinsurance companies. Investors benefit from the added portfolio diversity and attractive spreads. Society in general benefits in that

catastrophe-linked securities dilute the economic impact of the risk associated with large natural catastrophes.

3. Types of Cat Bonds

In general, cat bonds can be classified according to the number of perils they cover (*single-peril* and *multi-peril*), the risk period covered (single-year or multi-year), the type of losses they cover (*per event* or *aggregate*), and the mechanism that triggers losses to the investors (*first-event* or *second/third* event and p*arametric, index-based, modeled-losses* and *indemnity* triggers). Most cat bonds are of the first-event type, i.e., the securities are exposed to losses from the first qualifying event that occurs during the covered risk period. In contrast, for cat bonds of the second-event type, the securities become exposed to losses after the occurrence of a qualifying *triggering event* that activates the protection provided by the securities.

As for all structured finance securities rated by Moody's, the rating addresses the expected loss posed to investors relative to the promise of receiving the present value of all promised interest and principal payments. Potential losses to investors are tied to the occurrence of the natural perils covered during the specified risk period and according to defined triggering mechanisms as well as other secondary risks such as counterparty and sponsor credit risk.

The perils usually covered by cat bonds rated by Moody's include earthquakes and wind-related storms (hurricanes, typhoons and European windstorms). However, in 2003, Swiss Re issued Vita Capital Ltd., a cat bond rated by Moody's that covered a non-standard peril: catastrophic mortality in a pool of five countries, U.S., U.K., France, Switzerland and Italy.

4. Type of Loss Triggers

As indicated before, there are four types of triggers used to determine losses to the holders of cat bonds: parametric, loss index, modeled-losses and indemnity triggers. Over time there has been a shift in the type of transactions brought to market. The early stages of the cat bond market were dominated by indemnity transactions whereas parametric transactions tend to be more prevalent nowadays.

Each of these trigger carries varying degrees of basis risk and moral hazard. *Basis risk* is defined as the potential difference between actual losses in the sponsor's portfolio of assets in the event of a covered natural hazard and the losses predicted by the catastrophe modeling analysis. *Moral*

hazard is the chance that some insureds or other parties will intentionally cause a loss or increase loss severity in order to collect payments that otherwise they would not be entitled to receive.

4.1. Parametric Losses

In parametric transactions, losses to the cat bond holders are triggered when a parameter that defines the peril covered exceeds a certain threshold. Losses to the securities are a function of the value of the parameter selected. For example, in an earthquake-linked transaction, the triggering parameter is normally its magnitude. However, there has been an evolution in the definition of the parametric triggers, with recent transactions using more elaborate definitions in an attempt to correlate better with actual losses in the covered portfolio of assets.

4.2. Modeled Portfolio Losses

In the case of modeled portfolio loss transactions, losses are based on a model analysis of a representative portfolio of assets exposed to the peril covered that acts as a proxy to the sponsor's exposure in their book of business. Typically, the version of the catastrophe model and the input data representing the portfolio used in the original analysis are kept in escrow to be used in case of an event. After the occurrence of a covered event (such as hurricane or earthquake), the modeling firm will use the event parameters as inputs to their model and evaluate the losses to this pre-defined portfolio.

The losses resulting from this analysis are not actual losses attributable to the event, but only an estimated value as calculated by their model. Principal reductions to the securities are directly proportional to the output losses of the model between the specified lower to upper bound thresholds.

4.3. Index Losses

In index-based loss transactions, losses to investors in the securities are tied to industry-wide losses caused by qualified events. The value of the total insurance losses resulting from a natural catastrophe is generally assessed by using the PCS Index or other similar indexes. The selected index is used as a proxy to determine the actual losses sustained by the sponsor and the pay-out structure is defined in terms of the values of the index. The objective is for the bond reimbursements to the sponsor (losses to the principal amount) to be highly correlated with the actual sponsor losses.

This type of transaction is the preferred choice when the sponsor's book of business does not contain very detailed data, but is representative of the total industry exposure, as is the case for many reinsurers' portfolios.

4.4. Indemnity Losses

In certain cases, the cat bond is structured such that losses to the principal amount of the notes are tied directly to the actual insurance payments made by the sponsor as a result of insurance claims filed by those insureds that have experience losses due to the occurrence of a natural peril covered by the bond. Usually, such indemnity deals include provisions to extend the maturity of the securities to allow for the development of the claim process and a better assessment of the final losses.

In this type of transactions, the sponsor is completely indemnified for its losses and is not exposed to any basis risk. Indemnity loss transactions were popular in the early stages of the development of this asset class but have apparently fallen out of favor.

5. Moody's Rating Approach

Moody's ratings of cat bonds address the ultimate cash receipt of all required interest and principal payments as provided by the governing documents of a transaction. The ratings are based on the expected loss posed to the holders of the securities relative to the promise of receiving the present value of such payments. The ratings are derived primarily from our analyses of the likelihood of occurrence of the perils relevant to the transaction during the risk period defined, and the severity of losses to investors resulting from such events. In addition, our review considers the credit strength of the parties involved (swap counterparty, sponsor and others, if applicable) and the effectiveness of the documentation in conveying the risks that are intended to be transferred.

The methodology followed by Moody's to assess the risk to investors has been discussed in some detail in two Special Reports published by Moody's[1]. Our rating approach entails the following steps: (i) assessing the promise to investors; (ii) examining potential loss scenarios and their associated probabilities; (iii) calculating expected losses; (iv) comparing the expected losses for the cat bond to those of a set of benchmark notes.

5.1. Assessing the Promise

Each transaction's promise to the investors generally involves the return of principal at a certain specified date (assuming that no losses have occurred) and interest payments through the tenor of the notes. To assess the promise Moody's reviews the terms of the transactions as specified in the indenture and other transaction documents. The definition of the promise to which we rate includes the amounts that are due to the investors, i.e. the return of principal and the amount of the interest payments, as well

as the definition of when those payments will be received, i.e. the final maturity of the notes and the conditions under which this date can be extended by the issuer and the frequency of the interest payments.

Investors in these securities are exposed to potential losses to both their principal and the promised interest payments. However, the promise of receiving their interest payments may contain additional elements of risk that Moody's incorporates in the analysis. For instance, it is usual for these types of transactions to split the interest payments in two parts: (i) a coupon that is guaranteed for a given period (usually a year) and equal to LIBOR times the outstanding balance of the notes at the end of the previous period; and (ii) a coupon that is variable and equal to the promised spread times the balance of the notes at the time of payment. If an event that results in losses to the principal amount takes place between two payment dates, the investor will receive the guaranteed portion of the coupon (the LIBOR portion) but will receive the spread portion corresponding only to the remaining principal after losses are paid to the sponsor. Moody's normally includes the interest payments along with the principal payments in the definition of the promise. This becomes more relevant for multi-year deals since in case of a loss at the beginning of the transaction, the investors will not only lose a portion of their principal, but also the corresponding interest payments for the remaining life of the deal.

5.2. Examining the Loss Scenarios

The evaluation of loss scenarios is tied to the results obtained from risk models developed by established catastrophe modeling consulting companies. For cat bonds covering perils associated with natural hazards (earthquake, hurricane), the risk analyses have been exclusively based on the cat models from three modeling firms: Applied Insurance Research (AIR) based in Boston, MA; EQE International, Inc. (EQECAT), and Risk Management Solutions, Inc. (RMS), the last two based in California. The risk analysis for the cat bond covering the catastrophic mortality peril was done by Milliman USA, an actuarial consulting firm based in Chicago.

Moody's will independently evaluate the models used by the catastrophe-modeling firms and to lend comfort to our understanding of the consultant's work, Moody's usually develops simplified models to verify the adequacy of the models employed to support the analysis of the transaction. Earthquake hazard in California and U.S. hurricane hazard are two models that have been extensively reviewed for all three of the modeling firms.

The results of the modeling analysis conducted by these consulting firms are normally expressed as the annual probability of loss exceedance corresponding to the particular peril considered. Generally, the models used

to obtain these results are based on a probabilistic description of the natural phenomena (the hazard analysis), the performance of the assets in the book of business (the portfolio modeling and the vulnerability analysis), and the financial losses resulting from the convolution of both (the loss analysis). In the case of parametric transactions, the modeling is circumscribed only to the hazard analysis. The analysis is based on the simulation of specified scenarios and the results weighted by their corresponding probability of occurrence.

In addition to the analysis performed by the catastrophe-modeling firm, Moody's will routinely require the analysis of modeling scenarios that stress relevant assumptions in the corresponding model. To define the stress scenarios Moody's examines the validity of the modeling assumptions made and the uncertainty associated with the parameter estimates. The results of those analyses are usually incorporated in the prospectus distributed by the sponsor to investors and, expressed as *stressed probability of exceedance curves*, also used by Moody's in its own modeling of the transaction to estimate expected losses. The purpose of stressing some of the assumptions and/or parameters of the catastrophe model is to examine the robustness of the modeling results (and hence of the ratings) relative to the modeling assumptions.

5.3. Calculating Expected Losses

The expected loss, EL, is defined as the weighted average of the losses, adjusted for the relevant stresses, across all possible scenarios considered in the analysis and is expressed as a percentage of the promised amount due to investors. To calculate the average we assign a probability to the occurrence of each scenario considered so that the EL will be the sum of the losses to investors for each scenario weighted by the probability of that scenario occurring.

The promise to investors is generally the repayment of principal at the maturity of the notes and interest payments at each payment date. The present value of the promised cash flows assumes that no losses have occurred and discounting them by the risk-free interest rate considered (usually LIBOR). If losses occur during the life of the cat bond, then the investors will receive an amount that is smaller than the promise. Thus, the present value of the actual cash flows considers the likelihood of occurrence of principal payments and the corresponding reduced interest payments discounted by the risk-free interest rate. The loss to the noteholders is calculated as the ratio between the present value of the amounts that the investor actually receives and the present value of the amount promised.

As indicated above, this computation is performed for all possible scenarios defined by Moody's, each characterized by its probability of occurrence. The EL is calculated as the weighted-average of all such scenarios and the average duration of the cat bond is calculated directly from the actual cash flows. The EL and the average duration of the cat bond are then used to estimate the rating.

5.4. Comparing the Expected Losses to the Benchmarks

Once the EL for the cat bond has been established, the final step is to associate a letter rating with this quantity. This is accomplished by way of a benchmarking procedure, where the cat bond's expected loss is compared to those corresponding to conventional bullet bonds of the same duration, assigning the rating of the bond that matches it most closely.

6. Type of Perils and Geographic Regions Covered

Since 1977 and until 2003, all cat bonds rated by Moody's have covered essentially two types of natural hazards: earthquakes and windstorms (hurricanes, typhoons and European windstorms). In terms of geographical distribution, they have covered earthquakes in the U.S. and Japan with a single transaction covering earthquake risk in a European country (Mediterranean Re), windstorms in several European countries, hurricanes in the continental U.S. and Hawaii, and Japanese typhoons.

It is interesting to compare the distribution by peril of the coverage provided by cat bonds with actual losses sustained by the insurance industry in the last 20 years. This comparison indicates a significant correlation between actual loss experience and disintermediation of catastrophe risk through the cat bond market, especially for the hurricane peril in the U.S. Using data not adjusted for inflation, the distribution of catastrophe losses is dominated by losses attributable to U.S. hurricanes including Hawaii (about 37% of the total), followed by European windstorms (about 29%), U.S. earthquakes (18.5%), typhoons in Japan (12%) and earthquakes in Japan (about 3.5%).

In the last few years there has been a shift in the distribution of cat bonds according to the types of triggers used to determine losses to the notes. Indemnity-type transactions were dominant until five years ago. In recent years, we have seen an increase in parametric type transactions. As indicated earlier, the use of parametric triggers results in simpler transactions that include no basis risk to investors, as well as the elimination of moral hazard. The increased popularity of parametric-trigger transactions is likely attributable to these factors and also to the fact that they provide greater transparency to investors in the capital markets.

In 2003, a U.S. $400 million cat bond[2] was issued to cover the risk of excess population mortality in five countries, covering a risk period of 4 years. This transaction was structured as a parametric transaction, i.e., principal payments to the sponsor are triggered when a defined parameter, the c*ombined mortality index value,* exceeds some pre-established triggers. The risk analysis was performed by Milliman U.S.A., and following Moody's general approach, their model was reviewed and its results compared with Moody's in-house model. To account for uncertainties in the modeling, Moody's requested that the modeling firm rerun their analysis considering alternative scenarios including an epidemic/pandemic outbreak and terrorist acts involving nuclear and biological weapon attacks.

A second transaction covering non-traditional perils was also issued in 2003, a risk-transfer transaction covering losses to FIFA for the cancellation or postponement of the 2006 World Cup in Germany[3]. Among the potential scenarios that could result in cancellation or postponement of the matches include natural or manmade disasters such as civil unrest or terrorist attack.

A logic tree approach was used in both cases to asses the risk of terrorist attacks and their effect on each of these transactions. In both cases, the likelihood of occurrence combined with the impact of potential attacks was not significant in the assessment of the expected losses to potential cat bond investors. In the Golden Goal transaction, it was clear to Moody's (as well as to anyone familiar with a World Cup event) that it is reasonable to expect that in almost all instances the desire to continue the event will be strong and the event will be completed. As a matter of fact, both the host nation and FIFA have huge political and financial incentives to push forward with the event under almost any circumstance. On the other hand, the Vita Capital transaction was not structured specifically to transfer the risk of extreme mortality due to terrorist attacks and consistently, the analysis showed that even in the most conservative scenarios, such events did not have a large impact on the expected losses to noteholders.

Although there has not been a proposal to issue a cat bond covering exclusively the peril of terrorist attacks and the losses associated with them, it seems difficult at this stage to considering rating such a transaction due to the uncertainties involved in assessing the likelihood of occurrence of such attacks.

7. Monitoring Cat Bonds Ratings

As part of its rating process, Moody's continues to monitor the cat bonds' outstanding ratings until their legal maturity or until the notes are withdrawn by the issuer. This monitoring is performed to maintain the accuracy of the current ratings of the notes and it involves updating the

expected losses to investors. This updating is done at least once a year to asses either the effect of seasoning of the transaction (the effect of the passage of time), the effect of a reset of the attachment and exhaustion points (modeled-losses cat bonds), the occurrence of a triggering event (second-event cat bonds) or the accumulation of covered losses that are eroding the first-loss layer (aggregate loss cat bonds). The expected loss analysis is also updated when new notes are issued within a cat bond program.

7.1. What Would it Take to Downgrade a Cat Bond?

Moody's would consider downgrading a cat bond only under certain circumstances. Certain perils occur without previous warnings, like earthquakes and, thus, losses to holders of cat bonds could be triggered instantaneously. Parametric cat bonds that cover earthquakes are in this category; a potential downgrade would happen only after investors had already incurred in losses.

On the other hand, cat bonds that cover perils that occur with some level of warning, like hurricanes, may be more likely to be put on watch for downgrade. Naturally, a downgrade could only happen after the hurricane has made landfall and the severity of losses has been established. Consider the recent Hurricane Frances that threatened the east coast of Florida; it was originally classified as a category 4 storm but eventually made landfall as a category 2 storm. A rating action to the affected cat bonds in anticipation of large losses would have been premature, as history confirmed.

A different situation could be faced in the case of a second-event or third-event cat bonds because, after the occurrence of a triggering event, the likelihood that investors would experience losses increases and, therefore, its current rating may not reflect this increased risk to investors. Under such circumstances, a downgrade of the securities could be warranted. In fact, Moody's has recently put on watch for downgrade a cat bond that covers earthquake and typhoon perils in Japan due to the occurrence of an earthquake that may turn out to be a triggering first-event for the transaction.

7.2. The Hurricane Swarm of 2004

The official hurricane season in the North Atlantic runs from June 1 to November 15, with the most intense activity occurring between August and September (a little more than 60% of all hurricanes that make landfall do so during this period of time).

The intensity of the 2004 hurricane season was expected to be above average, according to the August 1st prediction from the National Oceanic and Atmospheric Administration (NOAA), and the actual results confirmed

this prediction. Four hurricanes of significant intensity hit Florida during August and September, causing as much as $25 billion in insured losses: Charley, a category 3 hurricane when it made its first landfall near Cayo Costa, Fla.; Ivan, a category 3 storm that made its first landfall near Gulf Shores, Ala.; Frances, a category 2 hurricane when it made landfall near Sewall's Point, Fla.; and Jeanne, a category 3 hurricane that made landfall near Stuart, Fla., which was very close to the spot Frances hit. Not since 1851 have four hurricanes hit Florida in a single season.

The current estimates of losses to the insurance industry ranges between $18 billion and $25 billion, distributed among Charley ($6 billion to $8 billion), Ivan ($4 billion to $6 billion), Frances ($4 billion to $5 billion) and Jeanne ($4 billion to $6 billion).

However extreme the outcome of the current hurricane season, the insurance industry appeared better prepared to withstand the losses resulting from all these events. The experience of Hurricane Andrew in 1992 resulted in the imposition of higher deductibles for homeowners by insurance companies. In addition, insurers became more selective of the risks they were willing to underwrite and they also transferred a larger portion of their potential losses to the Florida Hurricane Catastrophe Fund, thus reducing the losses that would be absorbed by the industry. Since most cat bonds tend to cover per-event losses of a catastrophic nature and not aggregate losses, loss of principal to investors in these securities should occur following rare *single* events, consistent with the ratings of the securities. As part of Moody's risk modeling analysis, it is customary to assess the potential losses to cat bond noteholders resulting from the historically largest events. Such analysis reveals that even a repeat of hurricane Andrew would not trigger losses to any outstanding cat bond. As the hurricane season unfolded in 2004, none of the hurricanes included in this recent swarm produced losses close to the level associated with Hurricane Andrew and, thus, the expectation that any cat bond would trigger losses to investors was very low at the time. Thus, Moody's did not contemplate downgrading any of the outstanding cat bonds covering per-event hurricane losses as the storms were approaching land.

Other types of cat bonds—second-event or third-event notes--could be more susceptible to downgrades due to the occurrence of an event swarm. As discussed above, only after the triggering event occurs is that security exposed to losses due to a new event. None of the outstanding cat bonds of this type could have been affected by the hurricane swarm of 2004 in Florida.

7.3. What to Expect in the Future?

If there is something that investors should remember from the experience of the swarm of hurricanes that hit the U.S. this year, it is that cat bonds are devised to cover the occurrence of large but extremely rare losses due to natural hazards. Even an extraordinary occurrence like four significant hurricanes hitting the U.S. coast did not result in losses to investors in any of the outstanding cat bonds covering these perils.

Conclusion

The use of catastrophe bonds as an alternative risk transfer mechanism is well established in the insurance and reinsurance fields. The capital markets have also become familiar with these types of transactions and some investment management firms and institutional investors include them regularly in their portfolios. Investors are attracted to catastrophe bonds for the opportunity to diversify into a new asset class that has virtually no correlation with overall market performance -suggesting that cat bonds are effectively "zero-beta" assets.

Cat bonds offer an alternative to traditional insurance and reinsurance to provide coverage against catastrophe risk and these securities have reached a certain degree of acceptance in the market. We find that market participants are more familiar than a few years back with the modeling assumptions and the methodologies used by the three modeling firms to develop their models. Cat bonds continue to evolve and adapt to become simpler and more attractive to investors in the capital markets.

The cat bond market continues to explore potential new products, which could include coverage for the usual perils but in different geographic locations around the world, as well as completely new perils.

Notes

1 "Moody's Approach to the Rating of Catastrophe-Linked Notes", Moody's Special Comment, Sept. 1997;

"Moody's Approach to Rating Catastrophe Bonds Updated", Moody's Rating Methodology, January 2004.

2 "Vita Capital Ltd. – a Catastrophe Bond Linked to Catastrophic Mortality", Moody's New Issue Report, January 2004.

3 Golden Goal Finance Ltd. – Fédération Internationale de Football Association ABS Risk Transfer Switzerland/Germany", Moody's Pre-Sale Report, September 2003.

Annex 1

List of Speakers and Presentations at the Conference*

Session 1 - Insurability of catastrophic risks

- Economics of catastrophe risk insurance, *Christian Gollier (University of Toulouse).*
- Insurability of terrorism risk: challenges and perspectives, *Howard Kunreuther and Erwann Michel-Kerjan (Wharton School, University of Pennsylvania).*
- Industrial, technological and other catastrophes, *Christian Lahnstein (Munich Re).*
- Recent trends in the catastrophe risk insurance/reinsurance market, *Patrick Murphy O'Connor (Benfield).*
- Role of the reinsurance industry in the management of weather related risks, *Peter Zimmerli (Swiss Re).*
- Issues and options in the management of terrorism risk through insurance, *Robert Reville (Rand Corporation).*
- Current state of the coverage for war and terrorism risks - including NBC - in the aviation sector, *Eugene Hoeven (IATA)*
- Free market solutions for terrorism risks coverage, *Ben Garston (MAP Underwriting and Lloyd's Terrorism Panel).*

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* Power point presentations summarising papers included in this publication as well as other presentations made at the conference are available on the OECD Insurance homepage: http://www.oecd.org/daf/insurance.

- Improving insurability and affordability: the role of insurance in hazard identification, risk assessment, risk prevention and mitigation for industrial/chemical accidents, *Satyananda Mishra, IAS, Disaster Management Institute, Bhopal - Government of Madhya Pradesh, India).*

Session 2 - Financial market solutions to manage catastrophic risks

- International financing solutions to catastrophic risk exposures, *Torben Juul Andersen (Copenhagen Business School).*
- The use of risk linked securities to manage catastrophic risks, including terrorism, *Christian Mumenthaler (Swiss Re).*
- Current challenges in terrorism risk securitization, *Gordon Woo (RMS).*
- Financing catastrophic risks in non-OECD countries: challenges and perspectives*, Reinhard Mechler (IIASA).*
- Current market trends for catastrophe bonds and risk kinked securities, *Christopher McGhee (MMC Securities, Guy Carpenter).*
- The potential for new risk transfer instruments to cover terrorism risks, *Michele David (The Bond Market Association).*
- Rating agency's perspective on catastrophe bonds and risk linked securities, *Rodrigo Araya (Moody's).*

Session 3 - Role of governments and development of public-private partnerships for catastrophe risk management

- Role of governments in natural catastrophe risk management and financing in OECD countries, *Paul K. Freeman (University of Denver).*
- Catastrophe insurance programs in emerging countries: field experience, *Eugene Gurenko (World Bank, Financial Sector Operations and Policy Department).*
- Potential role for governments in terrorism coverage, *Dwight Jaffee (Haas School of Business, UC Berkeley).*
- Public-private partnerships to cover terrorism risks in OECD countries, *John Cooke (International Economic Relations Consultant, London).*

- Role of the US government in the prevention and mitigation of terrorism risks, *Robert Liscouski (Infrastructure Protection Office, Department of Homeland Security, USA).*
- Disaster risk management policy in Japan, *Kazuhiro Kawachimaru (NIPPONKOA Insurance Company Ltd).*
- The Spanish experience in the management of extraordinary risks, including terrorism, *Ignacio Machetti (Consorcio de Compensación de Seguros).*
- A stakeholder approach for developing a public-private partnership: the Hungarian case*, Reinhard Mechler (IIASA).*
- Disaster risk management policy in China, *Yuanchang Zheng and Jianguo Mu (Department of Disaster and Social Relief, Ministry of Civil Affairs).*
- The French experience in natural catastrophe risk management, *Suzanne Vallet (Caisse Centrale de Réassurance).*
- Earthquake risk management policy in Indonesia, *Werner Bugl (PT Asuransi, MAIPARK Indonesia).*
- Disaster risk management policy in Mexico, *Carlos Bayo Martinez (FONDEN).*
- Disaster risk management policy in the Philippines, *Ronald I. Flores (Department of National Defense, Office of Civil Defense, National Disasters Coordinating Council).*
- Disaster management in India, *D. Madan (Under Secretary, National Disaster Management Division, Ministry of Home Affairs, Government of India).*
- Management of extraordinary risks, including terrorism, in India: achievements and perspectives, *C. S. Rao (Indian Insurance Regulatory and Development Authority).*

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* Background Note of Mr Kawachimaru's presentation (NIPPONKOA Insurance Company Ltd), based on *Governmental Earthquake Insurance System in Japan*, from *Earthquake Insurance in Japan*, written and published in March 2003 by Non-Life Insurance Rating Organization of Japan.