

PART I

Chapter 3

Recent Trends in the Catastrophic Risk Insurance / Reinsurance Market

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Over the last years the insurance and reinsurance markets have been deeply affected by a series of non-correlated factors: the aftermath of the World Trade Center terrorist attacks, the increasing frequency and severity of natural disasters, major disruptions in financial markets and concerns related to liability uncertainty. Against this backdrop this chapter seeks to provide a synthesis of these issues and challenges and to consider their consequences on the insurance and reinsurance market for catastrophic risks coverage including terrorism risks and on the trends in the pricing of these contracts.

* Global Customer Relationships.

1. Setting the scene

Recent catastrophic events have reinforced the need for reinsurance and therefore show that insurance and reinsurance are inextricably linked so enabling the insurer to spread their local exposures around the global market by way of reinsurance. However, the reinsurance market has gone through many fluctuations over the last few years with record income and profits being announced by some while others have either dismantled their global networks or collapsed.

This has obviously led to confusion amongst the buyers of commercial insurance and reinsurance. Prices are approaching highs. While some prices are continuing to rise, some types of insurance, and therefore reinsurance, have become prohibitively expensive or even just not available. Just to consider one such area, that of the Pharmaceutical industry, some companies have got together to form their own mutual insurer. In addition, there are the examples of the Government supported Catastrophe Pools in California for earthquake and Florida for windstorm. Notwithstanding this increase in pricing, it is interesting to note that some of Europe's largest companies continue to report disappointing results.

This has been created by a combination of events. The World Trade Centre loss on 11th September, 2001 gave rise to the largest ever property loss to the insurance industry at around USD 40 billion. Most of this was covered by insurance. Shortly afterwards, the market had to also deal with a major collapse in the global investment market. The financial losses wreaked havoc on the asset side of insurers' balance sheets, extracting perhaps another USD 100 billion from the industry's accumulated wealth. This was to be followed by a third equally damaging factor, that of reserving.

It is well known that for certain types of insurance, that is the so-called liability classes, insurance companies cannot know with certainty the final cost of their product. This can take a number of years, even decades. Insurers try to calculate their best estimates of the loss and set money aside to cover the ultimate total. If for any factor, such as changes to the litigation environment or new risks emerging, the ultimate ends up as greater than the reserve, then insurers will make a loss.

It has become clear over the last couple of years that some, even many, insurers have seriously under-reserved, particularly for their US exposures. Classes such as Medical Malpractice and Directors and Officer's liability have been very poor. In addition, exposures to claims from asbestos related diseases have also risen disastrously. Major actuarial reviews are still investigating the potential size of the losses but there is no doubt that

provisions will have to be made for increase in reserves of billions of US Dollars for policies dating back to the 1950s.

Other major factors behind this “correction” in pricing and coverage are the reduction in investment income due to the worldwide lowering of interest rates together with a general realisation that the insurers seriously under-priced their products during this period.

2. Social, economic and environmental trends

As population and wealth concentrates in high risk areas, accurate exposure information is critical. In the US, it is as if every third person wants to live in an earthquake zone or in the path of a hurricane. According to the US Census, the three fastest growing states are California, Texas and Florida, which are expected to see population growth of 17.7m, 8.5m and 6.5 m respectively in the next three decades.

The international picture is similar. The United Nations forecasts that by 2015, half the world’s population will be concentrated in urban areas. Tokyo, considered to be the highest risk city in the world in terms of Natural catastrophe exposure, is expected to be the largest city with 27.2m inhabitants. Sao Paulo, Mexico City, New York and Mumbai are each likely to have populations exceeding 20m.

This concentration of people and wealth is increasing insurers’ exposure to major catastrophes and also potentially exacerbating the adverse effects of climate change. The expansion of major cities is changing the hazard. Cities create “heat islands” which may lead to more waves, severe storms, and flash floods. Research is still continuing into this area and it remains a hotly discussed subject.

Weather related events appear to be becoming more extreme. In autumn 2000, rainfall in England and Wales was the highest since records began. Unprecedented floodwaters rose in central Europe in August 2002. Temperature records were shattered in much of Europe and the Western US in July and August 2003, even as South African temperatures reached record lows. September 2003 saw Typhoon Maemi strike Korea. It was the strongest ever recorded there, and caused total damages of 4 trillion won (USD3.5 billion). Pusan, the country’s largest export port, was devastated.

Ostensibly smaller catastrophic events, such as severe thunderstorms and tornados, are demanding more attention from insurers. For example, a record 412 tornados – twice the previous high – cut across central US in May 2004. Insured losses were at least USD 1.55 billion. Only two years before, a series of severe thunderstorms across 16 states cost insurers around USD 1.7 billion. At the other end of the scale, the very largest catastrophes

can produce substantial losses across a portfolio, including in lines of business that are uncorrelated at lower levels, such as personal accident and workers' compensation, as the World Trade Centre disaster starkly showed.

Faced with these changes, mathematicians and modellers are developing sophisticated new portfolio analysis tools. Some can measure the probable impact of a mega-catastrophe on an insurer's whole account, others the risk of loss accumulation in a personal accident portfolio arising from an earthquake that destroys a convention centre. Such tools reinforce the increasingly technical approach to catastrophe underwriting, which should check competitive price cuts, and facilitate alternative forms of risk transfer, which should help to limit extreme price rises.

3. How has demand been affected by recent events?

Taking into account the comments made in the first two sections, there is no doubt that the demand for insurance, and in particular catastrophe insurance, is strong and growing. Some data relating to 2003 will illustrate this development.

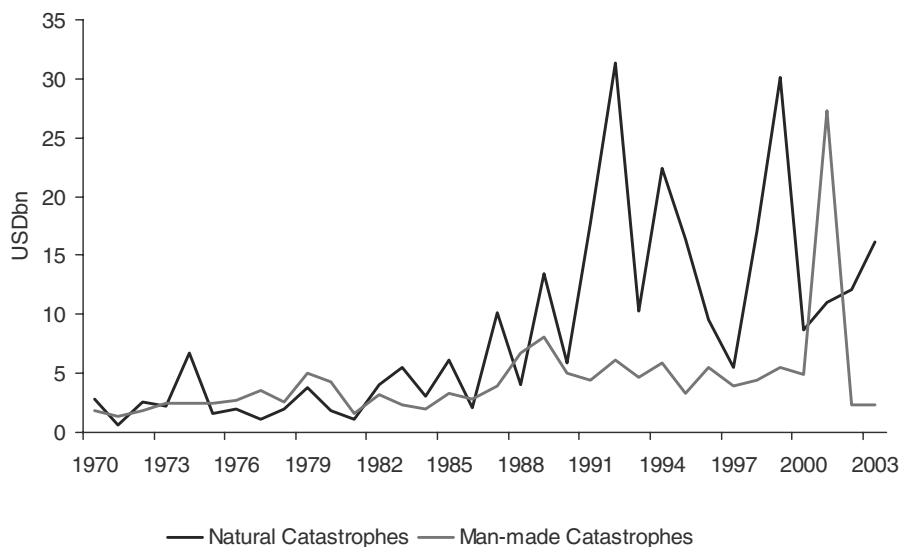
There were 51,500 deaths from natural catastrophes, with 8,000 from man-made catastrophes

Total losses were USD 70 billion of which USD 16.2 billion was insured Property losses caused by nature and USD 2.3 billion was caused by man-made disasters

This is, of course, only the latest in a series of continuing expensive years for the insurance industry since 1987 and, as we now know, is continued into 2004 with the series of Hurricanes to hit the Caribbean and the south-eastern states of America. This would seem to indicate an increase in extreme weather events consistent with predictions of a warmer climate.

Whilst it is reasonable to say that the World Trade Centre disaster had an eye opening effect on the consciousness of the world with regard to "man made" scenarios, the current data does not seem to indicate an increase in the quantum of loss to be carried by the insurance industry.

However, we remain extremely vulnerable to man made disasters, whether by accident or to effect threats for political purposes. There have been a number of examples if this in the recent past such as the power outages that hit the US, UK, Denmark and Italy, the arson attack on the subway in the South Korean city of Taegu or the poisonous gas leak in the Chinese province of Sichuan.

Figure 3.1

Source: Swiss Re sigma 2/2004

4. What are the factors affecting whether supply meets demand?

So, what effect has this had on the market's ability to respond to these crises? Notwithstanding, the culmination of all the scenarios listed above, the market does seem to a large extent to have survived and even to have moved forward slightly. There has always been a reasonable balance of power between suppliers and demanders and shifts in this power base, through competition or legislation, have led to the so-called cycle in market terms and conditions.

As rates have increased as a direct and necessary result of the recent years, then this has created, whether real or imaginary, an illusion of potential profit. As the insurance industry is, on the whole, an easy market to enter, very quickly new competition is attracted. The new entrants have only to satisfy reasonably forgiving financial and legal requirements to set up. Some tax efficient zones around the world have particularly aided this such as Bermuda and Dublin to name but two.

The new entrants need to be able to acquire business and therefore market share. While, initially, this will be at the new attractive pricing, very quickly, the competition will force prices down.

In the past, this has led to prices being forced down below that which is sustainable causing the withdrawals and company failures as mentioned earlier.

As the insurance industry has been increasingly more transparent, especially to the Rating Agencies who are becoming more disillusioned at this perceived lack of discipline and are therefore recommending to the shareholders to insist on a business model that can deliver value in a more consistent way than even before. Insurance companies cannot rely on factors that have helped them in the past such as investment income but rather need to demonstrate clearly how they are going to perform over the long term.

All these factors are driving a fundamental shift in the way insurers and reinsurers operate. The market has shifted towards a more “banking” type thought process and senior positions are now often held by professionals from this area. Capital Allocation tools are becoming “de rigour” and a much greater awareness of price versus risk assumed is demanded. Investment income assumptions play a diminished role in this.

The way business is transacted seems to be fundamentally changing. The old style relationships in the guise of “continuity” which have always existed are not being allowed to have the same influence. Quarterly accounting and greater shareholder awareness and demand for technical profitability will not allow this. It could well mean the death knell for the old cyclical pricing trend.

Since 2002, profits have been healthy and combined ratios have been low for most of the companies which did not require enormous reserve additions. The new entrants have performed well and have not had to lower prices to enter the market. The technical underwriting approach seems to be more consistent and moves to tighten various terms and conditions such as unlimited covers are a major move forward to protect the value given to shareholders and ultimately therefore to providing a steadier market place.

The insurance and reinsurance cycle will never be totally removed as market forces will always play some part in the renewal negotiations. However, there is clear optimism for a more stable and predictable market in the future. This can only be in the consumers’ best interests.

5. Pricing and availability of cover

Very rarely has history showed that some level of cover was unavailable. In general, supply has always been able to meet demand albeit on a limited basis. Even in the early 1990s, following a sequence of major catastrophic losses in different years from 1998 onwards and in different

classes and different countries, the market was able to supply some level of cover.

At this time, the insurance market had relied on the reinsurance market to supply a cheap and all-encompassing style of cover, while the reinsurance market correspondingly relied on an equally “forgiving” retrocessional market. With inadequate pricing and very low levels of retention, the market effectively imploded giving rise to the death of the now infamous “spiral” market.

Over the next year or so, as the retrocession market evaporated, the reinsurance market took time to evaluate its position and inevitably, available capacity dropped dramatically to its lowest ever level as against demand. At this time, demand massively exceeded supply.

Other examples of this scenario were firstly, during the mid 1980s when US liability coverage was temporarily unavailable due to legislation which amended retroactively and introduced joint and several liability. Secondly, after the September 11th attacks, airline terrorism coverage was practically unavailable.

However, it is clear that these scenarios were only temporary and that very quickly solutions emerged to solve the problem. This has been a major feature of the insurance market and continues strongly today.

When supply is only equal to or less than the demand, then the market goes through a period of heavy price rises. This is in fact common with a number of other industries and as yet has not given customers or government agencies any reason to intervene. Of course, market forces, as explained above, take effect.

However, the 9/11 attacks with its unexpected and massive aggregations did not cause industry meltdown and therefore it would appear the systemic risk is not as high as was originally thought. There is no doubt though that PMLs on California quake (USD 80 billion +) and some terrorist scenarios are much higher than the 9/11 loss. Modelling of natural catastrophe scenarios has, in recent years, typically failed to predict the scale and/or frequency of major event losses e.g Hurricanes Lothar and Martin in Europe and the recent US hurricanes. It is encouraging to know that all of these events have been well within the capital base of the industry.

6. Terrorism and insurance

The International Olympic Committee’s decision to purchase insurance coverage for the first time for the Athens Olympics was hardly surprising given the perceived additional threat from terrorist attacks. That the

USD170mn global placement, including disruption or cancellation due to terrorism, was completed successfully, illustrates how far the market for terrorism coverage has developed since 9/11.

A mix of commercial and government response to terrorism risk has emerged since 9/11; new insurance pools were established in France, Germany, Austria and Switzerland while the coverage offered by the UK's Pool Re was extended. Like the UK, Spain already had a state insurance facility, the CCS (Consortio de Compensacion de Seguros), which covered the losses caused by the Madrid bombings. In Australia the Terrorism Insurance Act 2003 set up a scheme to replace terrorism insurance coverage for commercial property and business interruption. Insurance companies are able to reinsure the risk of claims for eligible terrorism losses through the ARPC (Australian Reinsurance Pool Corporation).

In the USA, the Terrorism Risk Insurance Act (TRIA) was enacted in November 2002. The Act requires US insurers to 'make available' the coverage specified by TRIA for the first two years of the programme, i.e. 2003 and 2004. The Act covers three years only and its expiry in 2005 had caused uncertainty in the US market, but in June this year a bill was introduced in the US House of Congress which would extend the federal backstop provisions of TRIA, under which the government would recompense insurers for 90% of terrorism related losses above a deductible, until the end of 2007. The US Treasury also confirmed that it would require insurers to offer terrorism insurance to commercial customers on the same basis as other risk for a further twelve months until the end of 2005. Under the new bill, the overall US insurance industry retention level will continue to increase year on year, reaching US\$20bn in 2007.

Many insurers in various markets are now providing increased capacity for terrorism risks within their general property covers, although coverage remains much more restricted than pre-WTC. The market for stand alone terrorism cover, which was pioneered by Lloyd's and a few large US and Bermudian insurers, has become cheaper as more capacity and competition has entered the market. While exceptional risks like the Olympics are priced at a substantial premium to the norm, the problem of identifying an appropriate base level for more typical terrorism exposures has raised concerns on pricing, with some analysts highlighting the lack of historical data on which to price such exposures.

However, buyers with more mundane exposures still tend to see the coverage on offer as too costly and general demand for terrorism coverage remains lower than expected in most markets. Luxembourg-based Special Risk & Reinsurance, which was set up in April 2002 by six major reinsurers to provide commercial terrorism coverage, announced in March 2003 that it

had closed to new business, citing the increased availability of terrorism cover in the commercial market and the emergence of government backed schemes as the main reasons for its closure. In the US, take up of terrorism coverage has increased but remains low despite decreasing rates. At the end of last year only one in three US companies were buying terrorism coverage despite a substantial fall in rates. US businesses with total insured property values between USD500 mn and USD1 bn are most likely to purchase terrorism insurance. Of these firms, 39.7% obtain terrorism insurance, compared to only 18.2% of those with insured values below USD100 mn. The sector with the highest level of terrorism insurance is energy companies, with more than 40% buying coverage¹.

However, buyers' lack of enthusiasm for terrorism coverage could prove misplaced, as recent analyses suggest that the financial impact of future terrorist attacks could dwarf the estimated US\$40bn loss generated by 9/11. For example, Risk Management Solutions (RMS)² estimates that a major anthrax attack in a US city killing more than 100,00 people could generate an insured loss of nearly US\$55bn to life, accident, health, and workers compensation (re)insurers alone, excluding related property losses. A recent study by Tillinghast³ also concluded that the private workers compensation industry does not have the capital to cover a major terrorism loss, which could reach US\$90bn, as against only US\$30bn in workers compensation insurers' capital.

In general, reinsurers have remained averse to taking on such catastrophic terrorism exposures. Some have resorted to alternative methods of risk transfer. In December 2003 Swiss Re announced the first ever insurance linked security relating to life insurance risk, which provides contingent capital of up to US\$400mn in certain extreme mortality risk scenarios, including nuclear, chemical and biological attacks.

An assessment of the greatest risks currently facing the USA by Risk & Insurance⁴ concluded that a cyber attack on corporate America and a conventional terrorist bomb attack on Chicago's transport system ranked in the top ten, and the US insurance industry has highlighted certain plausible terrorist attack scenarios which could cost over US\$250bn, far exceeding the industry's total capacity.

Rating agencies too are taking the threat of terrorism losses seriously. This year A M Best introduced a supplemental rating questionnaire which requires (re)insurers to give details of their projected aggregate exposure to terrorist attacks including modelling of losses for various terrorist attack scenarios.

For (re)insurers, the challenge is how to answer such questions. In the absence of the historical data available on natural catastrophes it is difficult

to apply the modelling techniques used to predict and price catastrophe risk. While some terrorism models try to provide a return period for terrorist events and any losses, others focus more on quantifying the likely impact of an attack rather its probability, such as Benfield's EXPECT⁵ (EXPosure Evaluation and Control Tool), which enables insurers to monitor concentrations of terrorism risk in their property portfolios.

While commercial capacity now appears adequate to meet relatively low levels of demand in most markets, most industry observers continue to see commercial capacity as inadequate for catastrophic terrorism exposures. It seems likely that government involvement in providing backing for commercial schemes and in augmenting excluded coverage will continue to be a key aspect of terrorism insurance.

Notes

1. Marketwatch: Property Terrorism Insurance 2004, Marsh, May 2004.
2. The Impact of Catastrophes on Workers Compensation, Life and Health Insurance, RMS.
3. Workers' Compensation Terrorism Reinsurance Pool Feasibility Study, Tillinghast, February 2004.
4. Risk & Insurance, Today's 10 Greatest Risks, April 15 2004.
5. For more information on EXPECT please visit [WWW. BenfieldGroup.Com](http://WWW.BenfieldGroup.Com) or contact Benfield ReMetrics Software Team on +44 207 578 7425.

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)*.

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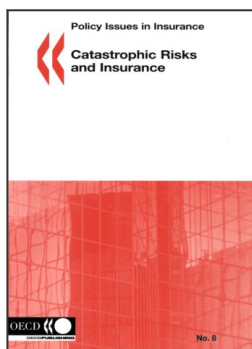
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* Background Note of Mr Kawachimaru's presentation (NIPPONKOA Insurance Company Ltd), based on *Governmental Earthquake Insurance System in Japan*, from *Earthquake Insurance in Japan*, written and published in March 2003 by Non-Life Insurance Rating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



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