Abstract: Insurance and Financial Market Issues Related to the Management of Large-Scale Disaster

The last few years have witnessed a number of large-scale disasters, both man-made, such as the terrorist attacks of 11 September 2001, and natural, such as the tropical storm Allison in 2001 in the US, the extensive flooding in large parts of Europe in summer 2002, the May 2003 earthquake in Algeria or the appearance of previously unknown infectious diseases. Both the frequency of such disasters and the magnitude of losses involved have tended to increase. This evolution brought home to OECD governments the realisation that risks of very large disasters or "mega-risks" have the potential for inflicting considerable damage on the vital systems and infrastructures upon which our societies and economies depend. Preparing to deal effectively with the hugely complex threats of the 21st century is a major challenge for decision makers in government and the private sector alike. Against this background, the OECD was asked to make a preliminary assessment of the impact of large-scale disasters and of the management of such disasters through brief sectoral notes. This article puts together three of these notes which focus on the impact of large-scale disasters on financial and insurance markets, insurers' management of large-scale disasters, and on compensation issues.

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Insurance and Financial Market Issues Related to the Management of Large-Scale Disasters*

I. Impact on insurance and financial markets

Impact on financial and insurance markets

The financial system and real activity are closely intertwined. When financial systems perform badly they can hold back real activity, while, when they perform well, they tend to facilitate faster growth.[1] But the causality also runs in the other direction. Financial market prices and trading volumes react to shocks affecting the real economy such as large-scale disasters, as these events have an impact on the value of existing assets. The last few years have witnessed a number of large-scale disasters, both man-made, such as the terrorist attacks of 11 September 2001 or natural, such as the tropical storm Allison in 2001 in the US, the extensive flooding in large parts of Europe in summer 2002. The financial market reaction in the case of the September 11 attacks was much more pronounced than in the case of some other large-scale disasters, judged by developments in equity market indices following the five largest catastrophes in terms of insured losses.[2] In the case of the September 11 attacks, the physical infrastructure of a major financial centre was directly affected. Following these attacks, equity market indices for all G-7 countries, with the exception of Japan, and a world-wide one all recorded negative excess returns. Negative market responses were often much less pronounced and limited to fewer countries in the case of other large-scale disasters. For example, winter storm D*aria* affecting several European countries in January 1990 did not seem to have had a noticeable adverse effect on equity market prices. Hurricane Andrew in August 1992 had an adverse effect on broad US equity market indices, but not on broad world or European-wide indices.

* This article was prepared by Sebastian Schich and Cécile Vignial, senior economists in the OECD Directorate for Financial and Enterprise Affairs. It consists of three notes, parts of which will be included in a wider study on various aspects of the management of large-scale disasters. This study is being coordinated by the OECD Futures Projects Unit. The appendix has been prepared by Flore-Anne Messy and Nina Paklina. The article and appendix have also benefited from the input of the OECD Insurance Committee.

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Among different sectors, market participants expected the insurance industry to be particularly hard hit by the fallout from the September 11 attacks. As a large amount of losses associated with the attacks was insured, insurance sector equity market indices recorded much larger declines than the broader indices in most markets. It is likely that this reflects the relatively large amount of *insured* losses.[3] A notable feature of the attacks was the accumulation of (insured) losses across a wide variety of insurance contracts: property, liability, business interruption, life, accident and health. While the final total costs for the insurance industry of the September 11 attacks are not yet precisely known, they are estimated to be between USD 40 and 50 billion, suggesting a need for recapitalisation.

As a general rule, when large-scale disasters deplete capacity in the industry, the subsequent pricing power apparent in premium hikes following such episodes encourages the entry of new capital in the insurance industry. This was what happened following the catastrophic events in the early 1990s. Specifically, in response to the apparent lack of capital and the high premiums for catastrophe reinsurance in the mid-1990s after hurricane Andrew and the Northridge earthquake, there was a large influx of capital, especially for catastrophe reinsurers. As a result, the capitalisation of the property-liability insurance in the United States steadily increased during the second half of the 1990s. However, more recently, less capital than might have been expected has been drawn into the sector, with a reported net figure of USD 45 billion, a figure that should be seen against the background of an estimated loss in capacity of USD 200 billion for the industry world-wide as a result of high liabilities, equity market declines and asset impairment more generally. So far, no major bankruptcies have occurred in the insurance industry in spite of the magnitude of the payments associated with the September 11 attacks and the losses associated with declining equity markets and asset impairment more generally. However, it has been suggested that the insurance industry may not be able to withstand another shock of a similar magnitude.

The September 11 attacks, as well as some earlier large-scale disasters, highlight the crucial role that a well-capitalised insurance sector plays for the proper functioning of the economy, as the economy's ability to reallocate risks through insurance is an essential precondition for its functioning. Insurance is a mechanism by which investors or consumers can transfer risk to other parties more capable of bearing it and thus can engage in activities that they otherwise would not if exposed to the risk. But if insurance cover is limited or available only at high prices, economic activity is adversely affected. Typically, such adverse effects could work through at least two channels. First, the lack of insurance prevents some economic activity from going forward. Indeed, a typical reaction of the insurance market following new catastrophes of unexpected magnitudes often consists of the initial withdrawal of insurance cover for the concerned risk class. Second, when new risks are priced, the higher cost of insurance cover makes economic activity more costly, possibly even resulting in misallocation of scarce resources.[4]

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How the shrinkage of insurance coverage exactly feeds through to economic activity and to which sectors of the economy depends on the type of insurance policies affected. Unlike previous significant catastrophes, where natural hazards mainly affected (personal) property, the terrorist attacks of September 11 had an effect on a variety of insurance classes, such as property damage, aviation liability, business interruption and life liability. As a result, many sectors have been affected and anecdotal evidence suggests that the shrinkage of insurance coverage had the strongest impact on aviation and transport, as well as on numerous other sectors such as manufacturing, energy, real estate and construction. For example, the debt financing for many real estate deals typically includes a stipulation that the project must carry sufficient insurance to protect the lender. If the borrower is unable to secure sufficient coverage, lenders may be unwilling to make the financing available. Indeed, according to the Bond Market Association, an amount equivalent to about 10 per cent of the commercial mortgage-backed securities market has been suspended or cancelled due to issues of terrorism insurance in the United States following the September 11 attacks. The commercial property market was significantly affected as commercial property and liability insurance rates not only received steep increases, but also became completely unavailable for "target" structures such as chemical and power plants and "iconic" office buildings. As a result of the lack of insurance coverage, construction of commercial properties dropped dramatically in the United States, as has been pointed out by the President of the United States.[5]

Challenges for markets and policy implications

Market behaviour

It is not clear whether large-scale disasters have a lasting effect on financial market behaviour. Effects on financial market prices and volumes beyond the short term are difficult to identify because these variables are influenced by a large number of different factors in a complex way. While it cannot be excluded that there are lingering effects of exogenous shocks such as large-scale disasters, one would expect them to decay over time. Typically, one would expect the effect of exogenous shocks on market behaviour to be more limited than that of shocks that are generated within the system, such as the stock market crash of 1987 or the LTCM crisis of 1998. Indeed, it appears that financial markets have continued to operate properly beyond the very short term period following disasters. For example, financial markets have generally played a useful role in channelling funds between different countries during the later reconstruction period. This facilitates the fiscal reaction to a large-scale disaster in the country affected and allows it to have recourse to international savings when domestic savings are insufficient to fund domestic investments, thus facilitating consumption smoothing

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over time. By contrast, in the case of the insurance market, a change in market behaviour following large-scale disasters is more noticeable. One important channel through which this generally occurs is the reduction in insurance capacity that is associated with the payment of claims for insured losses. To mitigate this effect, financial resources to withstand such shocks could be increased through greater involvement of the world-wide capital markets.

Market infrastructure

It appears that changes are occurring in the financial market infrastructure as market participants attempt to reduce the vulnerability of that infrastructure with respect to large-scale disasters and especially with respect to targeted terrorist attacks. Large-scale disasters highlight the risks associated with the *concentration* of the financial services industry in limited geographical areas that could be observed during the last decades. This has at least two aspects. First, the offices and staff of financial service providers, such as commercial and investment banks, insurers, brokers, dealers and exchanges are in many countries located in a limited area, often mainly in one city in the country. A high concentration of offices and staff in a limited area increases the vulnerability of the financial system to physical damages in that area. Second, because firms are physically concentrated in the same area, they generally tend to rely on the same telecommunications and information technology networks. Consequently, disruptions of those networks tend to affect a large number or even all participants. Against this background, the transaction cost advantages of concentration must be weighed against the disadvantage of greater vulnerability to (physical) shocks.

Policy measures

Crisis management plays a key role in helping to restore confidence and safeguard the financial system. In the case of the September 11 attacks, decisions taken by the Federal Reserve, other central banks and governments were essential in this respect, including the injection of large amounts of liquidity into the system, as well as regulatory forbearance and tailored support. As a result of all these policy actions, financial markets and institutions were able to continue to operate without any major disruption (See Box 1). Market participants seem to have viewed policy actions as timely and appropriate and the financial market response to the event was less pronounced than might otherwise have been expected.

Thus, one important policy lesson to be drawn is that the financial market reaction depends, among other things, on policy reaction.[6] The capacity of policy makers to react *swiftly* seems to be important, as the speed of the response was seen as key in restoring market confidence, contributing to a feeling among market

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Box 1. A case study: Financial markets and emergency policy responses to the September 11 attacks

The physical destruction resulting from the September 11 terrorist attacks deeply affected financial activities that were largely concentrated, together with the supporting information-technology and communication infrastructure, in Lower Manhattan. A very large number of offices and office equipment, as well as telephone lines and data communications lines were destroyed, with adverse effects on the payment systems. Although the core payment system continued to work, telecommunication and operational failures among major financial institutions led to significant liquidity bottlenecks for several days, as many firms were unable to meet their daily payment obligations through normal market arrangements. Several markets including the large and typically relatively liquid one for US government securities were affected. Many markets world-wide, even if not directly experiencing any major technical problems, were characterised by a "flight to quality", widening risk premia, increasing volatility and impairment of liquidity. Particularly noteworthy was the effect on a financial market segment where capital and insurance markets meet, *i.e.* the market for catastrophe bonds, in which there was a very large change in required returns after the attacks.

To mitigate the adverse effects on banks and prevent a significant disruption in the payment system in its jurisdiction, the Federal Reserve used its normal open market operations to inject record-setting levels of liquidity into the financial system during the days following September 11. Furthermore, the Federal Reserve also arranged large currency swaps with other central banks, which in turn lent US dollars to financial institutions in their jurisdictions that were in need of dollar liquidity. In the United States, various prudential requirements were eased in order to prevent and/or alleviate credit and liquidity disruptions and allow participants to complete transactions regardless of the sometimes significant, though temporary, balance sheet distortions that these might generate. In a number of jurisdictions, particularly in Europe, insurance supervisors amended or waived temporarily provisioning or accounting rules to prevent such rules from forcing insurance companies to sell equity in a declining market. Emergency measures were also taken by regulators and exchanges in the securities sector. While regulatory responses have differed across countries, intense communication has taken place. In the United States, equity markets were closed subsequently to the attacks for four days and most bond trading, including government securities trading, halted for two days. As well, trading in US securities on European markets was suspended and only resumed a week later.

participants that the pressures they faced were temporary. To enhance the capacity of financial authorities to react swiftly to sudden shocks, *contingency planning* by financial authorities is required. Contingency plans which specify how central banks can inject liquidity into the banking system have the potential to enhance

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the speed of such action and thus either prevent liquidity disruptions or at least mitigate their effects on the payment system. Contingency planning specifying how to adapt regulations or supervisory requirements in the case of an unusual and large-scale disaster could speed up responses as well as facilitating the maintaining of a level-playing field for private market actors. One important issue in the context of any contingency plan set up by public authorities is to what extent such plans should be made transparent beforehand.

Intense communication and co-operation between different policy, regulatory and supervisory authorities have facilitated crisis management in the case of the September 11 attacks. It is likely that the benefits to be derived from this type of international co-operation are the higher, the larger is the material impact associated with a disaster compared to the size of the economy and the more other countries are affected, either directly or indirectly. As discussed above, while the September 11 attacks targeted a specific area in the United States, the direct and indirect impact on financial and insurance markets was more widespread. Looking ahead, the benefits of international co-operation could be expected to be even higher if a disaster occurred that would have an even greater dimension than the September 11 attacks.

The September 11 attacks have highlighted the benefits to be had from private-public communication and co-operation in at least three aspects. First, there are constraints on the types of risks that can be insured, as well as on the magnitude of potential losses than can be transferred onto private insurance markets, which suggests some form of private-public co-operation. Second, intense communication between public authorities and private financial and insurance market participants has facilitated crisis management. Third, providing information about policy action to market participants has helped to reduce uncertainty, and thus to lower risk premiums and enhance market liquidity. Much of this has occurred on an ad hoc basis, so that an important question is to what extent such communication and co-operation should be formalised *ex ante*.

II. An insurance perspective on terrorism and other large-scale disaster management

Managing terrorism and other large-scale disasters: an increasingly challenging task calling for a strong involvement of the insurance sector

Since September 11, both governments and the private sector, including in particular insurers and reinsurers, have initiated a far-reaching reflection on the ways to cope with the threat of future catastrophes of comparable or even greater magnitude. To this end, drawing lessons from the management of other types of

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past disasters and sharing related information and experience at an international level appeared highly instructive: although terrorism risk is characterized by certain unique features, it raises challenges similar to those posed by other types of large-scale catastrophes, *i.e.*:

- a financial challenge: the compensation/reparation process after large scale disasters requires very large financial resources (this issue will be dealt with in the chapter on compensation);
- an operational challenge: large-scale disasters translate into a convergence of innumerable claims[7] that need to be filed, assessed, and compensated within a short time frame.

In both respects, the insurance sector can provide a key contribution[8]. Insurers and reinsurers are main players in the settlement of catastrophes. Their experience and expertise in risk assessment, claim management and compensation is well-known, while they increasingly play a crucial although less advertised role in the area of prevention. Besides, insurers may also be involved in the provision of emergency assistance. Lastly, the role of insurers tends to expand as a consequence of increasing awareness of risks and of the need to better protect populations against expanding risks. An obvious example of this trend is the recent introduction of a requirement to purchase insurance for certain types of large-scale disasters, which forced insurers to cover risks sometimes considered as uninsurable in the past.[9]

Nevertheless, the very characteristics of large-scale disasters – potential extreme magnitude, difficulties in assessing and pricing risks, etc. – raise a number of complex technical issues for insurers. Major catastrophes are often on the borderline of technical insurability. Insuring against disasters is all the more difficult in that the characteristics and nature of these risks are evolving fast.[10] Consequently, exchange of information on processes and techniques tested around the world to manage catastrophes becomes extremely important to optimise the role of the insurance sector therein.

Lessons to be drawn from the management of past disasters

Lessons to be drawn from the management of past catastrophes could be outlined through the following checklist.

Ex ante measures

The sophistication of insurers' risk forecasting techniques and preventive strategies will help them to fine-tune their pricing and compensation abilities, reducing the potential impact of disasters and sometimes minimizing the probability of catastrophe occurrence (for industrial pollution risks for instance).

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Improved risks assessment

Sufficient information on probability and magnitude of risks needs to be gathered in order to adequately price insurance contracts and to enable the constitution of sufficient provisions. The long experience of insurance experts in the evaluation/modelling of risks and in scenario building is a key asset in this respect. Although large-scale disasters as a whole are obviously more difficult to price than motor or other mass insurance risks, series of data on past natural catastrophes for instance are available which allow for estimation on trends and potential losses from future catastrophes. With new computer modelling techniques, based on geographical information systems (GIS) and hazard analysis, the available data can be enriched to improve claims forecasting. The major insurance and reinsurance companies have developed such state-of-the-art risk assessment, rating tools, and hazard maps for earthquakes, tropical cyclones, winter storms and floods. For terrorism risks, in the absence of a historical series of terrorism acts comparable in nature to those of September 11, insurers do not dispose of truly relevant information on probability and magnitude of risks, and modelling the occurrences of attacks appears as a highly complex exercise. Nevertheless, insurers endeavour to reassess their risk profile.[11] Coordination with highly specialized experts outside of the insurance sector, *e.g.* experts from intelligence agencies (in the same way as meteorological experts are consulted in regions exposed to specific natural disasters), has also proved helpful.

Risk assessment and modelling is obviously a crucial phase for which research and investment should be further promoted,[12] especially in the area of terrorism risk where the September 11 attacks have revealed the industry's unpreparedness. The sharing of information and research, and of risk assessment and modelling techniques, between companies and between private and public actors, including the academic community, should also be encouraged.

Preventive strategies

Preventing the occurrence of disasters/reducing their potential impact:

- Insurers play an increasing role in the "remodelling" of risks, in order to limit their client's exposure and their own. "In modern environmental insurance, professional risk-carriers have the knowledge and technical ability needed to actively intervene on the risk features during a new phase, which can be named: risk remodelling",[13] before the actual transfer of risk. This requires a careful evaluation and classification of the risk, comprehensive inspection of the property insured, evaluation of the adequacy of safety measures, protection systems and emergency plans, etc. Once the risk has been properly assessed, the risk carrier will cooperate with the prospective insured in order to reduce the risk and to enhance loss prevention strategies.

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- To complement risk remodelling strategies, premiums and deductible levels should be closely tied to the effective prevention efforts, to avoid moral hazard.
- The role of advice and education of policyholders by insurers should be further encouraged. Potential policyholders should also be made aware of the risks associated with insufficient insurance cover or lack of cover.
- Contingency planning and co-ordination among all those in charge of disaster relief should be organised ex-ante, and early warning systems should be further developed.

Preventing the disorganisation of insurance companies' claim settlement services:

To avoid disorganisation when a large amount of claims are lodged in a short period of time, the following precautions should be taken:

- design ex ante crises management structures;
- train people accordingly, allocate a precise role to key management in case of crisis;
- address problems like information system back-up or the possible need for the insurance company to operate from a different location, if the insurance company offices and operation have been affected by the disaster.

E*x-post management measures*[14]

The design of emergency procedures is a key step to enabling an efficient treatment of requests for assistance and claim flows.

Non financial crisis management

- Special arrangements should be designed, as particular events occur,[15] or under the form of a global standing body,[16] to help the insurance industry to co-ordinate its actions to ensure that the people affected by a disaster get rapid and effective support.
- Operational procedures should be defined,[17] *e.g.* setting up of a crisis task force – gathering representatives of emergency services (fire-fighters, doctors, etc.), of the insurance industry, and of the government,[18] – a toll-free telephone number,[19] special communication procedures, emergency assistance for victims for which insurers can be called to play a role (typically for short term accommodation assistance, or for the granting of additional living expenses for people forced out of homes).
- Post disaster reviews of performance should also be systematically conducted.

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Claim management

Monitoring the settlement procedures:[20]

- Operational procedures need to be defined, such as a special claims filing procedure (e.g. a common claims form for use by all companies[21]) or a special time limit for filing claims.[22]
- To make the compensation faster, certain exceptional settlement measures could be considered. In respect of property damage for instance, loss handling could be subject to a prioritization, applying the philosophy that "the worst comes first",[23] compensation could be granted without deductibles or depreciation coefficient, repairs could be made without appraisals for damage up to a certain amount,[24] and special rules could be established for payouts (*e.g.*, with companies agreeing to pay advances[25] of a specified standard amount).
- To ensure fairness and equity in treatment in respect of bodily injury, all examinations necessary to assess compensation amounts/appealing settlement amounts could be managed by a single body.

Differentiating between the treatment of property damage and bodily injury

Settlement procedures may need to take longer for bodily injury than for property damage. Also, claims in respect of bodily injury could be given priority, especially when the law imposes ceilings on cover.

Monitoring insurance fraud

Insurance fraud, which may develop because of the rapidity with which claims have to be settled, should be monitored and severely punished.

The role of governments

The role of the insurance sector in the management of large scale disasters should be supported by an adequate regulatory framework. Government action in this respect could in particular involve the efficient protection of the population at risk and the reduction of damages by means of mitigation regulations. Adequate legislation regarding for instance building and infrastructure safety or land use management and urban development[26] should be enforced, while tax and subsidy systems applicable in the insurance area should provide appropriate incentives for risk coverage, prevention and for the reduction of moral hazard.

More generally, governments should highlight the threat entailed by large-scale disasters and enhance risk awareness, while promoting an insurance culture among populations.

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III. Compensation issues

Compensation for terrorism and other large scale disasters: a growing concern for the insurance industry and the state[27]

Who should compensate victims of large-scale disasters? Who can indemnify extreme loss amounts at short notice?

Major catastrophes raise a critical financial challenge. This concern is all the more worrying in that the magnitude and the impact of such disasters have increased markedly over the past 30 years. Natural catastrophes are an example of a rapidly evolving threat: due to a conjunction of factors, including global warming and urban development in areas exposed to unfavourable natural conditions, insured losses from natural disasters have increased 15-fold since 1960. Similarly, the September 11 attacks, which entailed losses of about USD 40 billion, are an obvious illustration of the change in the magnitude of terrorism risk, and have raised the spectre of possible future "mega-terrorism" attacks.

Cover against such disasters can be sought from three main parties: the (re)insurance industry, governments, and the financial markets. Their respective contribution is however subject to various constraints.

Can the private sector cope?

The insurance, and ultimately the reinsurance, sector support most of the costs of large-scale disasters. However, insurability is not infinite: technical and financial criteria define its boundaries.

Private insurance capacity is limited

The capacity of national insurance markets, even backed by international reinsurance, is finite[28], and the insurance sector may therefore not be able to cover any compensation requests without endangering its financial stability. In 2001, the total capital and reserves of the world's non-life insurance and reinsurance industry were estimated to be about USD500 billion, of which only about USD130 billion can be considered available to cover large potential commercial risks[29]. Hence the September 11 losses were within the capacity of the insurance industry but another similar sized loss would severely test its financial resources. Reinsurers would be the most threatened, as they accept the largest losses, often on a non-proportional risk sharing basis. For instance, they will eventually bear an estimated 70% of the total insured loss amount entailed by the September 11 attacks.

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Insurance of large-scale disasters suffers inter alia from difficulties encountered in the mutualisation of risk exposure. Natural catastrophes risks, and to some extent terrorism risks, fail to meet the mutuality condition which allows the law of large numbers to apply efficiently. Not only are losses very large and infrequent, but also risks are highly correlated, and the incidence of loss is often concentrated in particular geographic areas or aimed at high profile targets, entailing an important anti-selection phenomenon and limiting the community of insured and the premium base.

Private cover may not always be available

Faced with fast-evolving disaster risks, hardly predictable in their nature, magnitude and frequency, insurers may decide to adopt a prudent stand and at least temporarily exclude them altogether from their cover as uninsurable. This was for instance the reaction of most reinsurers, followed by the insurance industry, after the heavy losses incurred on 11 September, which resulted in a drastic capacity shortage.

Private cover may not always be affordable

Affordability is a key issue for the insurance against earthquake, flood or other natural catastrophe risks, as for the insurance of terrorism risks. Due to lack of sufficient information on the characteristics of future disasters needed to calculate an "actuarially fair premium", insurance prices tend to rise considerably. This in turn may discourage consumers to seek insurance cover, which may simply be unaffordable for some of them. Such phenomenon was observed after the World Trade Center (WTC) attacks, when the drastic restriction of cover was accompanied by a very substantial rise in the level of premium.

The penetration of large-scale disaster insurance is often limited

Unaffordable premiums, anti-selection, but also the lack of awareness of the risks incurred limit insurance penetration. Only part of losses is therefore borne by the insurance sector after a disaster. Because of the low market penetration and strict limits on flood cover in certain regions, the insurance industry faced a total insured loss estimated at USD3 billion[30] after the summer 2002 floods in Europe – only about 10-20 per cent of global economic losses.[31] These gaps in insurance cover entail substantial negative economic effects.

Is state backing a relevant solution?

There is a clear rationale for government involvement in the compensation of large-scale disasters: the potential magnitude of risks and their technical characteristics which may not match insurability criteria may result in market failure.[32]

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Besides, political and social consequences of large scale disasters as well as the threat of major disruption in key economic sectors and related spill-over effects may lead governments to intervene. Lastly, it should be underlined that state backing has often proven to be a key condition of private player's involvement above certain levels of risk exposure.

Such state involvement can take several forms, from regulation promoting the development of private coverage to the provision of reinsurance of last resort, loans, or free compensation of losses.

While States are usually closely involved in the compensation process after a disaster for the above-mentioned reasons, the setting up of longer-term arrangements based on government support may also appear justified under certain conditions. It raises a number of issues however, that should not be underestimated. In particular, the fear of possible "crowding out effects" for the private sector that could discourage the adaptation of insurance markets is a strong deterrent. Also, direct compensation of certain types of disasters or losses implies complex budgetary trade-off and possible competition distortion. Several OECD countries have therefore opted for a temporary state involvement, which usefulness is regularly reassessed.

Financial markets: a viable alternative?

Recourse to the financial market is another potential solution to capacity deficit. Given the concern about the enormous and increasing financial losses caused by large-scale disasters in recent years, and their possible consequences on insurers' and states' finances, the idea of transferring some of these risks to capital markets – representing USD29 trillion at the end of the first quarter of 2003 – raised growing interest.[33] As demonstrated in Figure 1, financial markets can contribute to extend financial capacity through many channels. Besides, they have a particularly interesting role in the specific case of catastrophic risks as an alternative to traditional insurance markets via the issuance of catastrophic bonds.[34] The market for CAT bonds emerged from the times of capacity shortage which followed hurricane Andrew in 1992. The hardening of commercial insurance market and shrinkage of capacity due to the fall in financial markets in the recent past and consequences of the WTC attacks was seen as a promising environment for such insurance-linked securities. After September 11, it was also thought that terrorism bonds could be issued along the same lines to solve terrorism insurance capacity shortage.

However, contrary to expectations, CAT bond issuance has reached a plateau and now remains rather flat with an average annual issuance volume of about USD1 billion since 1997, while CAT bond prices remain somewhat higher than conventional reinsurance products. Regarding terrorism, terrorism risk securitisation has not had the kick-start anticipated from the hardening of the conventional market, and many obstacles still prevent its development. In particular, the structuring of such securities is still expensive, while investors are reluctant to buy a product, of

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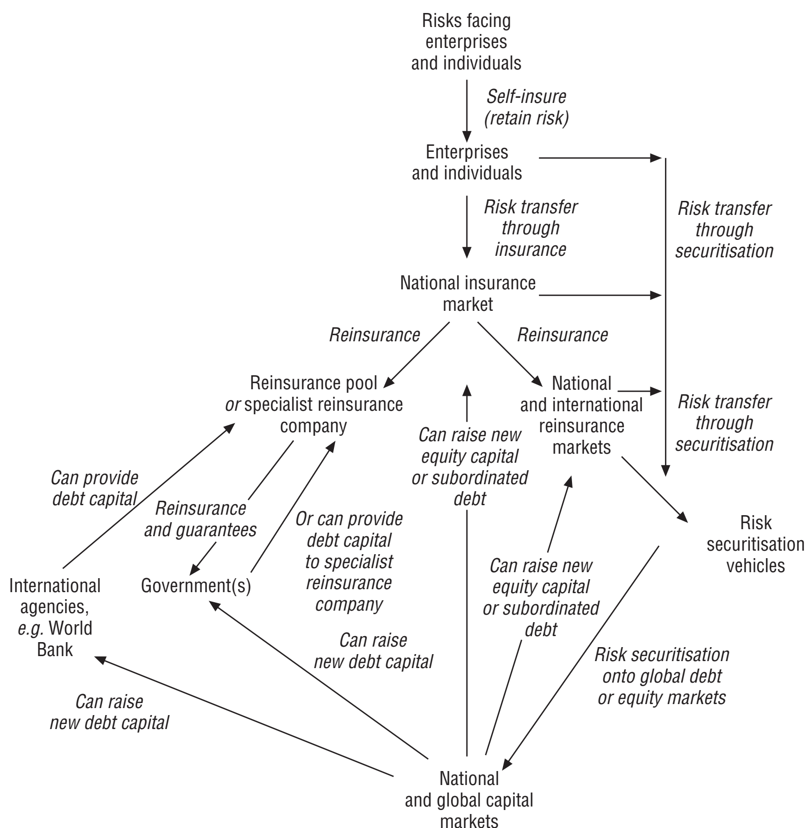
Figure 1. **Risk Sharing Networks**



Source: Dickinson, G. *Insurability Challenges for Large Terrorism and Natural Catastrope Risks* (unpublished manuscript), OECD, 2002.

which the underlying risk is highly complex, as in the case of terrorism. Therefore, the first transfer of terrorism risk to capital markets only occurred in September 2003, with USD260m of "cancellation bonds" issued by the FIFA to insure against terrorism-related property damage at the occasion of the 2006 Football World Cup.[35] While promising, securitisation of catastrophic risks only provides a marginal solution to traditional market capacity problems for the time being.

Lessons to be drawn from the compensation process of past catastrophes

Although States will continue to be called upon in the compensation process of large-scale disasters, the private (re)insurance sector is more and more solicited

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to carry part of the financial burden. Private capacity building is essential, and should alleviate the role of the State in the long-run. Meanwhile, private-public partnership through catastrophe compensation schemes appears to be an efficient solution to finance the costs entailed by catastrophic events.

Private capacity building

Insurers have traditionally tended to find innovative solutions to stretch the limits of their capacity when faced with losses of unexpected magnitude. Such endeavours translate into capacity building through capital injection in the concerned branches of activities or through the creation of new ventures.[36] It could also materialise in the setting up of private pools. This type of risk-sharing agreement is a typical answer to limited capacity in the insurance sector, traditionally organised along re- and co- insurance arrangements. In Austria or Russia, private pools have been set up to help in compensating terrorism risks. Similarly, in Switzerland, an entirely private scheme created in the early 1950s' is devoted to the compensation of natural catastrophes.

Private capacity building can be efficiently supported by a wide array of legislative measures, initiating for instance tax incentives to large-scale disaster provisioning, specific forbearance measures, changes in accounting of assets, special levies on insurance premiums, or compulsory insurance for specific types of large-scale disasters. Developing insurers' ability to compensate for disasters also entails the curtailing of their liability. For environmental pollution for instance, liability law should be designed in order for the exposure of insurers to be as predictable and manageable as possible; it should in particular be non retro-active and stable to allow a fair degree of confidence of suppliers.

Private-public partnership and the setting up of catastrophe compensation schemes

In many developed countries exposed to specific large-scale disasters, the creation of specific compensation schemes based on a private-public partnership has emerged as a necessity to cope with the financial consequences of large-scale disasters[37] (see annex 1 on large-scale disaster compensation schemes and annex 2 focusing on the special case of terrorism risk compensation). Such schemes have been motivated by the "need for specific, highly specialised treatment for technical-actuarial, financial and management aspects" of extraordinary risks,[38] most often in the realm of a disaster. The design of such schemes will reflect market specificities, exposure to risks, as well as technical and policy (in particular as far as they reflect the degree of intended State participation) choices, regarding the scope of coverage targeted and the modalities of financing.

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Scope of cover

Perils covered: catastrophe schemes are either:

- devoted to one type of disaster: *e.g.* flood compensation scheme in Australia, Denmark, the Netherlands or Poland; or terrorism compensation schemes in all countries where they exist except in Spain, or
- covering a variety of disasters to which the country may be particularly exposed: *e.g.* scheme covering various natural disasters, like in France, Iceland, Japan, Mexico, New-Zealand, Norway or Switzerland; schemes covering both natural and technological catastrophes like in Belgium; scheme covering both natural perils and "acts with social repercussions" (terrorism, rebellion, riots, etc) as the Spanish Consortio. While less flexible, schemes encompassing various types of perils may allow a greater mutualisation of risks.

Geographical coverage: schemes may cover a single region (*e.g.* California or Florida), national states, or several states (the first initiative in this respect is the European Union solidarity fund, created in 2002).

Triggers: in order to avoid as far as possible gaps in coverage or legal prosecutions, triggering events should be defined as unambiguously as possible. Governmental certification of triggering acts or losses entailed, before compensation could be claimed – as for terrorism acts in the US or natural catastrophes in France or Turkey[39] – may help in this respect, but it may also involve delays and political bias.[40]

Type of losses/insurance lines covered: country options – specific focus on infrastructures/farmers/ low-income victims/residential vs commercial properties – may reflect trade offs necessitated by the limited financial capacity of the scheme, as well as policy choices;

Optional or mandatory insurance: compensation schemes often entail an obligation to purchase insurance, in order to avoid anti-selection, optimize the mutualisation of risks and broaden the insurance penetration and the capacity of the scheme[41]. For instance, France, Iceland, Norway, Spain and Switzerland have all introduced compulsory insurance against natural disasters. Consequently, penetration is very high in these countries (95 to 98 per cent of homes in France[42]).[43]

Financing of the programme

The role of the State varies substantially between the various national schemes, from targeted schemes like the Mexican FODEN against natural disasters for instance, that is entirely funded and managed by the government, to several compensation mechanisms (in Belgium for natural and technological perils, Spain or the Netherlands for floods) where the State has a subsidiary role and covers risks that are not commercially insured, or to most terrorism compensation

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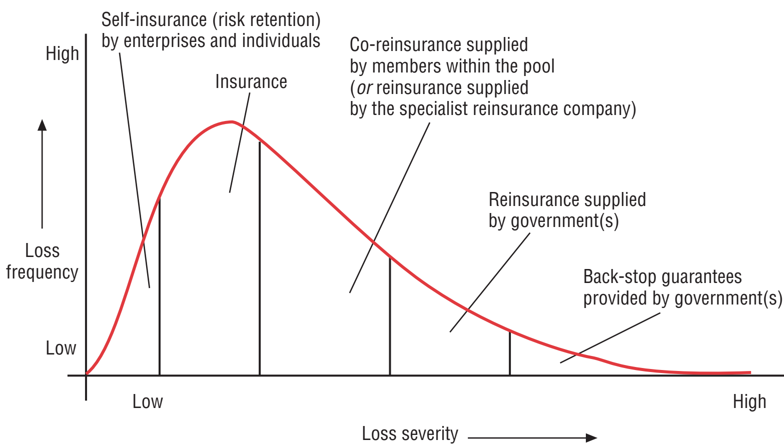
schemes where States have a supplementary role and typically intervene above very high amounts of losses or as a last resort reinsurer, adding a top cover to multi-layer risk-sharing mechanisms (involvement of the various stake-holders according to loss frequency and severity in such schemes is illustrated in Figure 2).

Compensation of mega risks

Mega risks refer to risks exceeding the current financial capacity of the insurance industry and the government of a given country – *i.e.* the industry capacity and the State ability or willingness to indemnify losses without endangering the national economic stability. Scenarios built, for instance, on the basis of new-style terrorism risks, be it from physical attacks, from possible biological or chemical attacks or from a systematic undermining of computer systems or a large-scale industrial or technological catastrophe, by far exceed the compensation capacity of small OECD countries. Adequate financial response for such risks may only be provided via an international mechanism involving states as last resort capacity,[44] and possibly the financial markets in the future.

There is clearly no ideal risk sharing model to cover large-scale disasters, since each scheme should adapt to the specificities of the national market and to pre-determined policy goals. However, decision-makers should consider several

Figure 2. **Multi-layer risk sharing mechanism**



Source: Dickinson, G. *Insurability Challenges for Large Terrorism and Natural Catastrope Risks* (unpublished manuscript), OECD, 2002.

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underlying principles, which have been *inter alia* highlighted by the working group on UK Pool Re's reform, and mainly:

- separate the short-term needs from long-term challenges;
- allow for flexibility since the characteristics of major disasters may evolve over time, as may insurance techniques and willingness of States to be involved in compensation;
- adopt a balanced approach between the role assigned respectively to the insurance industry, financial markets and the State, to avoid discouraging the private sector from adapting to these risks, and
- properly assess the negative externalities stemming from insufficient large-scale disaster coverage for the rest of the economy.

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Notes

1. See *e.g.* Leahy, M., S. Schich, G. Wehinger, F. Pelgrin and T. Thorgeirsson, "Contributions of Financial Systems to Growth in OECD Countries", OECD *Economics Department Working Paper* No. 280, 2001.
2. A list of the largest most costly large-scale disasters in terms of losses insured is made available by Sigma. See Swiss Re, *Sigma*, No. 2/2003, "Natural catastrophes and man-made disasters in 2002: high flood loss burden".
3. In this context, note that in the case of the Kobe earthquake in Japan in 1995, the proportion of insured losses was relatively low and that the event figures only 10th among the major large-scale disasters in terms of losses insured. It is feasible that the relative share of insured as compared to non-insured losses has implications for relative equity market valuations, as the latter may reflect expectations about burden sharing.
4. See for a discussion "The Economic Consequences of Terrorism", OECD *Economic Outlook* 2002/1, June 2002.
5. "President Calls on Senate to Act on Terrorism Insurance Legislation", Remarks by the President to Business Leaders, White House press release, 8 April 2002.
6. These issues are discussed by the *Task Force on Extreme Events* of the *Joint Forum*.
7. 78 000 claims were lodged after the AZF plant explosion in France for instance.
8. It is precisely to cope with unpredictable large losses, originally in the maritime transport area, that insurance was created.
9. Natural catastrophes were traditionally considered as uninsurable in France until the 1982 law, which made insurance cover against such perils compulsory.
10. The 11 September attacks highlighted the change in the nature of terrorism risk. Such risk, considered until that date as marginal and generally covered at no additional cost, turned out to be an incommensurable threat on all nations necessitating important changes in insurers' risk management techniques.
11. Sometimes, insurers are assisted by new models such as those developed by Eqecat, RMS (Risk Management Solutions) or AIR, that are based on extensive data related to possible exposure to terrorism risks in the US.
12. This could be done at company or sector level: pollution insurance pools established in various countries not only to aggregate capacity, but also to develop new products and share information, statistics, and experience, is an experiment that could be extended to other countries/insurance lines.
13. See A.Monti, *Environmental Risks and Insurance: A Comparative Analysis of the Role of Insurance in the Management of Environment-related Risks*, OECD, 2003.

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14. Some of these measures may be taken by insurers on a contractual basis, while others may need to be confirmed by legislative acts. In France, the 30 July 2003 law n° 2003-699 30 relative to the prevention of technological and natural disasters is a codification of lessons drawn from the AZF disaster.
15. E.*g*. a number of operational procedures were defined and stipulated in a formal agreement after the explosion of the AZF plant in Toulouse – the largest industrial disaster ever to have occurred in France. A special committee was created convening at regular intervals all the parties concerned by management of the claims (insurers, representatives of the victims, Total Final Elf, the prefecture, the city of Toulouse, lawyers, etc.).
16. Like the Insurance Disaster Response Organisation or IDRO in Australia, created in March 2000: IDRO's primary mission is to help the insurance industry to co-ordinate its actions with government agencies and emergency services to ensure that the people affected by a disaster get rapid and effective support and to provide them with a single point of contact. IDRO is essentially a partnership of insurers, re-insurers, insurance brokers, and loss-adjusters. In Canada, the Insurance Bureau of Canada's Claim Emergency Response Plan, created following the 1979 Mississauga rail-crisis and the violent hail storm that struck Calgary in 1981 answers to the very same objectives.
17. These may depend on the level of emergency. Emergency levels have been rated in three categories in Canada, depending on the seriousness of the damage, to allow the fine-tuning of emergency procedures accordingly.
18. The ACT Bushfire recovery Taskforce had for instance been set up after the major forest fires that ravaged the Canberra region in January 2003. It was financed on public funds.
19. In the wake of the power outage of 14-15 August 2003 in the United States, the New York Insurance Dept activated a toll-free hotline to assist New Yorkers whose property and businesses were affected by the power failure. See I*mpact of the recent power blackout and hurricane* I*sabel on the financial sector*, Office of Public Affairs, October 20, 2003.
20. In the Netherlands, the insurers' association has drawn up a disaster scenario which contains *inter alia* rules concerning the joint management of claims processes by all insurers concerned.
21. Many operational initiatives can help policyholders with claims lodging, such as the mobile "Help van" deployed by one large Australian insurer after the Canberra bush fires to assist policyholders with additional claim support and immediate claim assessment.
22. In France, insurers have to compensate policyholders within three months in case of natural disasters. Three weeks after the Canberra Bushfires, insurers had already paid out 54 millions dollars in claims.
23. As suggested by the Claim Emergency Response Plan in Canada.
24. Such measures were for instance enforced in France after the AZF explosion.
25. On December 8th, several insurers had already committed to pay advances after the early December 2003 floods in South West France, even before the Government had issued the decrees on natural catastrophe situation. L*es Échos*, 8 December 2003.
26. In Turkey, strict standards have been imposed on new construction work since 2000 to minimise potential damage from earthquakes. Similarly, in France, the National Fund for Prevention of Major Natural Catastrophes created by the 2.2.1995 law, allows the expropriation of properties threatened by natural perils endangering human lives.
27. At the occasion of the Ministerial Meeting held on 15-16 May 2002, OECD ministers recognised the adverse effects of the shrinkage of affordable insurance cover for terrorism risks

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and mandated the OECD to develop policy analysis and recommendations on how to define and cover terrorism risks and to assess the respective roles of the insurance industry, financial markets and governments, including for the coverage of "mega-terrorism" risks. The OECD Insurance Committee is currently working on the implementation of this mandate. It did as well address the issue of the indemnification of large-scale disasters.

28. This limit is set by the available capital that the global insurance and reinsurance sector holds and can gain quick access to, as well as the pattern of future prices after a large loss.
29. The conclusions of certain other research are somehow more optimistic. "Estimating capacity using insurer financial statement data, we find that the (US) industry could adequately fund a $100 billion event" – even if "such an event would cause numerous insolvencies and severely destabilize insurance markets", say David Cummins, Neil Doherty and Anita Lo in "Can insurers pay for the big one? Measuring the capacity of the insurance market to respond to catastrophic losses", *Journal of Banking & Finance* 26, 2002, 557-583.
30. *Hazard review of the year* 2002, Guy Carpenter, January 30, 2003.
31. *Annual Review* : *Natural Catastrophes* 2002, Munich Re, 2003
32. For instance in Sweden, a majority of insurance companies do not cover potentially considerable damages caused by dam breaks, according to the prevailing idea that such cover can only be provided by the State.
33. *Catastrophe insurance risks*: *status of efforts to securitize national catastrophe and terrorism risk*, GAO, September 2003.
34. CAT bonds enable insurers to transfer catastrophic risks to capital markets through a bond issue. "In a typical CAT bond structure, an insurer issues an interest-bearing bond to the capital markets. The payments received are turned over to a special purpose vehicle (SPV), which then issues a conventional reinsurance policy to the insurer. Typically, the funds held by the SPV are given to the insurer if the bond's specified event is triggered, the interest payments usually cease at this point". "The picture of ART", *Sigma* n°1/2003, Swiss Re, 2003.
35. "*Risky business*", The Economist, 4 December 2003.
36. Within six months of the 11th September tragedy, several private operators were ready to come back on the insurance market and take advantage of a potentially highly profitable niche. A further USD20 billion of new capital was attracted into the non-life insurance sector, with USD10 billion in Bermuda, from new company formations or capital raised by existing insurers and reinsurers.
37. About one half of OECD countries have established compensation mechanisms devoted to major catastrophes. Some countries have several schemes to cover different types of disasters. The main large-scale disaster compensation schemes in OECD countries are the following: Australia: Federal flood recovery fund (2000), Commonwealth flood assistance package for central and Northern NSW and Southern Queenland, Natural disaster relief arrangement; Belgium: Natural disaster and major technological risks compensation fund (Fond des calamités naturelles et des risques technologiques majeurs) (1990); Denmark: Storm council (stormradet) (1991); France: National disaster compensation scheme (CAT NAT) (1982); National guarantee fund for disasters affection agriculture (Fonds national de garantie des calamites agricoles) (1964); Iceland: Incelandic emergency insurance organisation (1975); Japan: Japanese earthquake reinsurance Co Ltd (JER) (1966); Mexico: National fund for natural disasters (FONDEN) (1996); Netherlands: the calamities compensation act (WTS) (1998); New Zealand: earthquake

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commission (EQC) (1994), Natural disaster funds; Norway: National fund for natural disaster assistance (Statens naturskadefond) (1961), Norwegian pool of natural perils (Norsk naturskadepool) (1980); Poland: National programme for restoration and modernisation; Spain: Consorcio de compensacion de seguros (1954); Switzerland: Swiss Elemental Pool (1953); Turkey: Turkish catastrophe insurance pool (2000); United States: National flood insurance programme (1968), California earthquake authority (1996), Florida hurricane catastrophe fund (1993), Hawaii hurricane relief fund (1993); European Union: European union solidarity fund (2002).

38. The Consortio de Compensacion de Seguros, Economic Ministry, Spain.
39. Except for earthquakes.
40. These reasons were invoked in Spain to abandon the certification requirement.
41. As highlighted in former OECD studies (see in particular M.Fontaine and H.de Rodes: Mandatory insurance in OECD countries, in I*nsurance regulation and supervision in* OECD *countries*, 1997) , governments typically require the purchase of insurance with respect to three types of potential loss-causing activities: those whose severity could be particularly great with a large number of innocent persons being harmed because of a single event, those whose frequency is sufficiently great to affect large numbers of innocent people independently, and those that are judged to be inherently dangerous. The first case refers to large-scale disasters.
42. *Source*: INSEE 1999.
43. The fact that insurance is compulsory entails an obligation for the insured to be covered against certain types of risks, but it does not systematically entail an obligation for insurers to join existing compensation schemes. However, when the insurer joins a pool or scheme, it is usually required that his entire portfolio of risks in the area concerned (flood, terrorism…) is included in the pooling mechanism to avoid anti-selection.
44. A comparable scheme has already been created for losses resulting from the peaceful use of nuclear energy, which can be compensated through the mechanism foreseen by the Paris convention and Brussels supplementary convention.

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Annex 1

Large-scale disaster compensation schemes in selected countries

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
Australia[1] Federal Flood Recovery Fund	2000	This Fund is separated from the Commonwealth Flood Assistance Package and is additional to Federal assistance under the Natural Disaster Relief Arrangements. The access to the Fund was extended to the communities on the New South Wales north coast that were severely flooded in January to March 2001. The Federal Government established this fund in November 2000 to provide extra support to the rural and regional communities in the severely flood affected areas of central and northern New South Wales and southern Queensland.	Floods	
Australia Commonwealth Flood Assistance Package for Central and Northern NSW and Southern Queensland		This assistance is provided in addition to the existing Natural Disaster Relief Arrangements. The package is targeted at cotton, cereal and horticulture enterprises that suffered from excessive rainfall and floods. It provided four different assistance packages depending on the specific assistance requirements of the enterprise: income support, crop planting grants, interest rate subsidies and grants to small and medium-sized business.	Floods	

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deductibles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
Help financial counselling organisations to meet the extra demand for services from farmers and other business owners, assist the rebuilding of damaged water and sewage services and help voluntary community sports organisations to repair their grounds and facilities.				USD 10 million	Government funded Applications for funding closed on 30 June 2001.	Publicly Managed
Assistance for activities such as repairing roads and public facilities, and ensuring people's emergency household needs are met.				Government provided USD 151.7 million in funding over 2000-01 for flood assistance.	Funded through government departments: Agriculture, Forestry and Fisheries; Transport and Regional Services.	Publicly Managed

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Country	Year of creation	Scope of coverage		
		Main characteristics	**Perils covered**	**Triggers**
Australia Natural Disaster Relief Arrangements (NDRA)		Under this program, the Commonwealth provides funding assistance to States and Territories aimed at alleviating the financial burden associated with the provision of natural disaster relief payments and infrastructure restoration. The Commonwealth financial assistance is provided only after a natural disaster has occurred. Relief measures include: grants for relief of 'personal hardship and distress'; concessional interest rate loans to farmers, small business operators and voluntary non-profit bodies to replace damaged assets; payment to restore or replace essential public assets; payments for providing financial and psychological counselling to persons affected by natural disaster.	Bush fires; cyclones; earthquakes; floods; storms; storm surge; landslide (Arrangements do not apply to disasters caused by people or accidents).	
Belgium Fonds des calamités naturelles et des risques technologiques majeurs	1990	The Fund covers the losses that are not covered by insurance companies.	Extreme events	
Denmark Storm Council Stormrådet	1991	The government-backed scheme covers the losses resulting from the floods caused by see overflowing.	Floods resulting from the high see level	

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deductibles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
Personal and commercial property (especially targeted at farmers, small businesses, non-profit bodies); public assets.			In the case of minor disaster scale (AUD 200.000), the NDRA will provide half of the State and Territory expenses incurred in providing personal relief; In case the expenditure on relief measures exceeds 0.225% to 0.4% of State or Territory revenue, the NDRA reimburses ¾ of expenditure.		Government funded	Publicly managed
					Publicly/ Privately Funded. Insurance and reinsurance companies pay monthly contribution of 1% of premiums collected and 10% of annual results after tax.	Publicly managed
All property insured against fire is automatically covered by the scheme.		Deductibles on personal property: 5% of loss (min 5000 DKK) and deductibles on commercial property and secondary household: 10% of loss (min 10000 DKK).			The governmental program is funded through tax of 20 DKK on every fire insurance policy, except for vehicle insurance (once per year).	Publicly managed

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
France[2] National Disaster Compensation Scheme (CAT NAT)	1982	The CAT NAT is based on both private insurance and an ultimate state-guaranteed public reinsurance (Caisse Centrale de Réassurance (CCR)). The scheme provides a compulsory natural disaster extension on all property damage policies bought on insurance market. A uniform surcharge on all private insurance contracts, which is fixed by the law, is paid for natural disasters. Federal reinsurance is available from CCR to cover unusually large losses, backed by government guarantee. Wind is not covered by reinsurance from CCR.	Natural disasters: earthquake; flood; earth slides, hailstorm, avalanche, tidal waves (tsunami), dryness, etc. (wind and fire are not covered by CAT NAT) The state decides whether an event falls within the scope of a natural disaster.	Scheme covers insurable losses when the state of disaster is declared by inter-ministerial decree.
France Fonds national de garantie des calamités agricoles	1964	The Fund covers damage to agricultural exploitations.	Floods, drought, storms, hail, illness	
Iceland Icelandic Emergency Insurance Organisation	1975	Insurance companies that insure property against fire are required to collect a tariff along their premiums and return the tariff to the Icelandic Emergency Insurance Organisation.	Volcanic eruptions, earthquakes, earth slides, avalanches; floods	

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deducti-bles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
Covers losses for both individual and commercial property. Operating losses resulting from natural disasters are covered when included in property damage contracts.	Compulsory natural disaster extension on all property damage policies purchased on the voluntary market.	Deductibles for dwelling and vehicles: represent around 380 EUR; for business assets: 10% of the amount of direct damage and business interruption of 3 working days.	Unlimited coverage due to state guarantee provided by CCR.		The government program is funded through tax on non-life insurance premiums (12% of total personal, professional and agriculture property damage insurance premiums and 6% of total motor insurance premiums).	Primary disaster coverage is offered and managed by private insurance companies. The CCR is a publicly managed entity.
Crops, ground; livestock					Public	Publicly managed
All property and contents insured against fire are automatically insured against direct losses resulting from natural disasters.	Compulsory	5% of each loss Min ISK 40.000 (personal property)	Limits related to individual fire policy		Government funded	Publicly managed

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
Japan The Japan Earthquake Reinsurance Co., Ltd. (JER)	1966	In Japan, earthquake insurance is offered in principle on a supplementary basis by private insurers as a part of fire insurance policies. All earthquake insurance of residential property written by insurers is reinsured by the JER. The funds of the JER are composed of the contingency reserve funds constituted by earthquake insurance premiums collected by private insurance companies. The government reinsures part of the earthquake insurance underwritten by the JER. The JER also reinsures its own liabilities to private companies through proportion allocation. In case of earthquakes and related natural catastrophe events, losses are shared by the insurers, the JER and the government according to the total cost of damage.	Earthquake, volcanic eruptions and any resulting tidal waves (tsunami).	
Mexico National Fund for Natural Disasters (FONDEN)	1996	The Mexican government assigns budgetary funds for disaster relief and reconstruction efforts by placing them in the Fund for Natural Disasters.	Various natural disasters: floods; earthquakes, etc.	

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deductibles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
Covers damage to residential property (residential buildings and/or movables for living households).	Compulsory purchase of reinsurance from the fund by primary carriers for household risks.	Amount of damage to the main structural part below 3% of the actual value of the dwelling; the damage to floor space being burnt or washed away below 20% of the total floor space; and the damage caused by floods below the floor level or below 45 cm deep from the ground level.	Maximum compensation ranges between 30% to 50% of the insured amounts and is limited to JPY 50 million for buildings for residential use and JPY 10 million for movables for living	Maximum contribution to the JER is fixed each year by the Diet (parliament) in order to limit the total commitment. Cap amount of the scheme is JPY 4500 billion per event, while the share of the government for this amount is JPY 3752.67 billion and of insurance companies is JPY 747.33 billion.	Premiums of the Earthquake Insurance on Dwelling Risks are reserved and funded for the payment.	Privately managed based on the special law.
The FONDEN offers relief for the repair of uninsured infrastructure, immediate assistance to restore the productivity of framers and relief to low-income victims of disasters.				350 million USD	Publicly funded	Publicly managed

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
Netherlands The Calamities Compensation Act (WTS)	1998	Under certain circumstances, the State pays compensation for loss or damage which can not be (commercially) insured.	Floods and other natural disasters	Floods caused by certain intensity of rainfall and earthquakes of a magnitude of 4 on Richter Scale trigger the application of the Act.
New Zealand Earthquake Commission (EQC) Natural Disaster Fund	1994[3]	All residential property owners who buy fire insurance from private insurance companies automatically acquire EQCover, the Commission's geological disaster insurance cover. EQCover premiums are added to the cost of the fire insurance and passed to EQC by the insurance company. EQC's, administration of the natural disaster insurance scheme involves: collecting premiums via insurance companies; processing and meeting claims by insured people; administrating the disaster fund; organising reinsurance as a potential supplement to the fund; accounting to its shareholder (the Government). EQC administrates the Natural Disaster Fund, comprising capital and reserves.	Earthquake; tsunami; landslide; storms floods volcanic eruption; and fire caused by any of these	
Norway National Fund for Natural Disaster Assistance (Statens Naturskadefond)	1961	The fund was established with the aim to compensate damage caused by natural perils and to contribute to protective measures against such perils. The Fund compensates damage on property that is not possible to insure against fire.	Floods, storms, tempest, earthquakes; avalanches; volcanic eruptions and tidal waves	

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deductibles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
Buildings, household property and inventory	Mandatory government program		Up to a maximum of 450 million EUR per year		Publicly funded	Publicly managed
Residential property	Mandatory government program applicable to every residential fire insurance policy written by private insurance companies.	EQCover pays 99% of every claim over NZD20.000 (NZD 200 is deducted) EQCover pays 90% of every claim over NZD5.000 (NZD 500 is deducted).	Dwellings are insured up to max. of NZD 100.000 and personal effects up to NZD 20.000. Government guarantees that fund will meet all its obligations.	4 billion USD[4]	The premium paid to the private insurance company includes the premium for EQCover. The private insurance company then transmits the EQCover to the Earthquake Commission.	Publicly managed. The Commission is a Crown Entity, own by the Government and controlled by the Board of Commissioners.
Roads, bridges, battlements, farmland, crops, forest areas.		Deductible is NOK4 000 per incident.	The maximum compensation is limited to NOK 405.000.		Publicly Financed	Publicly Managed

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Country	Year of creation	Scope of coverage		
		Main characteristics	**Perils covered**	**Triggers**
Norway Norwegian Pool of Natural Perils (Norsk Naturskadepool (NP))	1980	Any non-life insurance company that compensates loss or damage due to natural perils is a member of the Pool. The Pool settles the compensation for loss or damage resulting from natural catastrophes between the companies and arranges reinsurance cover for Norwegian natural disaster insurance. The natural disaster insurance premium is collected by all companies at the same rate on the fire insurance amounts and specified as a separate item in the policy. Liaison Committee between the NP and the Government Natural Disaster Fund is responsible for dealing with matters in which the parties have common interest.	Floods, storms, tempest, earthquakes; avalanches; volcanic eruptions and tidal waves	Personal and commercial property
Poland National Programme for Restoration and Modernisation		The programme covers damages caused by floods to individual, commercial and local community property. This is a governmental compensation scheme.	Floods	
The Slovak Republic		Creation of a State Fund for compensation of uninsurable agricultural losses is under consideration by the Slovak government[5].		

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deducti-bles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
	Cover for natural perils are compulsory in property policies.	Deductible is NOK4 000 per inci-dent	Occurrence limit per disas-ter : NOK7.0 billion		Private 0.17% of insured sums of fire poli-cies.	Privately managed The Pool General Manager is the Norwe-gian Finan-cial Services Association
					Public	Financed by State budget, local com-munity budget, PHARE – “Restoration program“

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
Spain Consorcio de Compensacion de Seguros (CCS)	1954	The CCS is a public business institution providing 'extraordinary risks' insurance: coverage against natural disasters and other risks with social repercussions (terrorism, riots, etc.) Consorcio indemnifies claims made as a result of extraordinary events that occur and cause injuries and damage to people and assets in Spain. C.C.S. plays a subsidiary role to the insurance market under two circumstances: direct insurer : (i) if the risk is not covered by insurance industry; (ii) guarantee fund: if risk is covered, but the private insurer is unable to meet his commitments due to bankruptcy or insolvency.	Natural Phenomena: Earthquakes; tsunamis; tidal waters; extraordinary floods; volcanic eruptions; atypical cyclonic storms; falling astral bodies and aerolites. Political and Social occurrence: Terrorism; riots and civil commotion; acts of armed forces in times of peace; rebellion and sedition.	
Switzerland Swiss Elemental Pool (SEP)	1953	The Swiss Elemental Pool is pooling of private insurance companies for better distribution of the risk among insurers associated with natural disasters.	High water; flood; storms; hail; avalanche; snow pressure, falling rocks and stones; landslide.	

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deductibles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
Personal injuries and direct material losses for people and goods located in Spain and caused by events occurred in Spain. Personal injuries having taken place abroad are covered if the policy holder has their residence in Spain.	Extraordinary risk coverage is compulsorily included in all fire and natural perils, motor and railway vehicles and other property damage policies (theft, glass breaking, machinery breakdown, etc.) and in persons' accident policies. The Consorcio's surcharge is automatically included in the base policy's premiums, even if the basic policy covers the extraordinary risk.	For property damage only, a deductible of generally fixed at 10% of the claim (it may be as high as 15% for very large amount of capital). The deductible should not exceed of 1% insured nor be less than EUR 150 25.	Unlimited coverage (state guarantee). Indemnification limits for personal injuries and for material and direct losses are those fixed in the policies as sums insured. Loss of profits is not covered at present. An amendment has been passed by law in order to cover loss of profits, and it will be in force when the government could prepare the legal application.		Financed by insured persons by means of a surcharge (a rate applied on insured sums) appearing in the premium receipt of the ordinary policy. The rate can range from 0.09 per mille for housing to 0.34 per mille for special civil works. Insurance of persons: flat rate of 0.0096 per mille, except for special cases. Surcharges are collected by insurance undertakings (together with their premiums) and credited to Consorcio on monthly basis. The insurance companies retain a commission of 5%.	The CCS is a public entity with its own legal personality, its own assets and full capacity to act. It is managed by a Board of Directors with equal public and private sector composition.
			Replacement value with limits accordingly to event: Buildings : CHF 20 million Content: CHF 20 million		Privately	Privately managed

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
Turkey The Turkish Catastrophe Insurance Pool (TCIP)	2000	The Turkish Government initiated a compulsory insurance scheme with intention to provide an adequate level of coverage at affordable rates, and to reduce the losses resulting from earthquakes to the national economy. The scheme covers all residential dwellings that fall within municipality boundaries. The TCIP was set up as a separate state-owned legal entity, managed by a Board. Local insurance companies and their agencies are carrying out distribution of the TCIP policies and marketing function as well as claims assessments are performed by independent private loss adjusters. Claims are directly paid by the TCIP. Additional coverage may be purchased from private insurers.	Earthquake, plus fire, explosion and landslide following earthquake.	
United States National Flood Insurance Program (NFIP)	1968	The National Flood Insurance Program administrated by the Federal Emergency Management Agency (FEMA), an independent Federal agency, is the main provider of residential flood insurance and underwrites commercial flood insurance in vulnerable areas where private commercial insurance is almost unavailable. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Flood insurance under the NFIP is sold to owners of property located in NFIP communities through two mechanisms: (1) through insurance agents and brokers who deal directly with FEMA; and (2) through private insurance companies. 95% of all policies are written through private insurers. These 86 private insurance companies issue policies and adjust flood claims in their own names under the NFIP. These insurers receive an expense allowance and remit premium income in excess of this allowance to the Federal Government. FEMA pays losses, and sets the rates, coverage limitations, and eligibility requirements.	Damage caused by floods (rivers flooding, erosion and/or subsidence caused by flooding), any necessary cleaning up of property.	The NFIP provides federally-backed basic insurance coverage against the floods only to eligible communities (currently 20 000 communities) where the flood risk has been assessed and floodplain management measures have been enforced to reduce future flood damage.

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deductibles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
Damage to residential property	Starting from 2000, earthquake insurance is compulsory for residential dwellings that fall within municipality boundaries.	Deductible is 2% over sum insured.	Dwellings are insured up to maximum of approximately USD $50 000. No coverage is provided for contents. Cover in excess of the TCIP (>USD 50 000) could be obtained from private insurers.	USD 1 billion. Additional capacity is purchased as more business is written.	Financed by premiums, borrowing facility, and reinsurance. Transfers much of the risk to international reinsurance	Managed by the TCIP Management Board consisting of members from public and private sectors and academic community. Operational management has been contracted out to a private company.
Residential and to certain extend to commercial property	Voluntary	Deductible is around USD 500	The coverage provided by the NFIP is limited for residential property to a structure value of USD 250 000		Government funded	Publicly managed

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
United States California Earthquake Authority (CEA)	1996[6]	The CEA was established by California legislation to make basic earthquake insurance both available to consumers and financially viable to insurers. Under the plan, policy-holders of participating insurers purchase earthquake coverage form the CEA. Participating insurers transfer their California residential earthquake exposure to the CEA on a voluntary basis.	Earthquake perils	
United States Florida Hurricane Catastrophe Fund (FHCF)	1993	The FHCF, a state run catastrophe reinsurance program is designed to encourage to write hurricane risk for residential and commercial structures on the Florida market place. All authorised insurers in Florida that write policies in Florida are required to enter into reimbursement contracts with the state.	Peril of windstorm during a hurricane	The FHCF provides coverage only for a hurricane declared by the National Hurricane Centre.

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deductibles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
The CEA policy provides coverage for earthquake perils for structural damage to the dwellings, but not for damage for other structures as pools, fences, driveways and detached garages. Insurance is also written for tenants as well as condominium or cooperative unit owners.	California legislation compels to provide earthquake insurance with every homeowners policy.	15% of the dwelling insured amount is deducted from the loss; Tenants: USD750 is deducted; condominium or cooperative, real property , USD3 750 deducted; personal property, USD 750 deducted; loss assessment, USD3 750 deducted for USD 25 000 and USD 7 500 deducted for USD 50 000 limit	Contents and additional living expenses are capped at relatively low levels (dwelling contents coverage is limited to USD 5 000 and loss of use USD 1 500; tenants: personal property limit USD 5 000; Condominium or cooperative units: real property limit: USD 25 000, personal property and loss of use same as dwelling or tenants).	USD 7.6 billion	Privately financed via policyholder premiums, contributions from and assessments on participating insurers, returns on invested funds, borrowed funds, and reinsurance.	Publicly managed state agency
Residential and commercial property	Contributions to the Fund are compulsory for the primary underwriters of residential and commercial property.		Limit capacity to the sum of its assets – USD 3.1 billion in funds and borrowing capacity of USD 7.9 billion.[7]		The Fund is financed by residential property insurers operating in the state based on their exposure to hurricane loss. Insurers must pay an annual reimbursement premium to the FHCF based on an actuarial formula.	

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
United States Hawaii Hurricane Relief Fund (HHRF)	1993	The HHRF provided property insurance windstorm coverage for hurricane damage. For customers of insurers which would no longer offer the coverage, the fund provided hurricane insurance directly via a separate policy issued to the customers.	Peril of wind-storm during a hurricane	The FHCF provides coverage only for a hurricane declared by the National Weather Service.
European Union European Union Solidarity Fund (Supranational structure)	2002	Following the disaster floods that hit Central Europe in 2002, a new instrument was created for granting emergency aid to the Member States and applicant countries in the event of a major disaster. The Fund is focused on providing immediate financial assistance to the countries and the regions such as: restoration of important infrastructures and plants in the fields of energy supply, water supply and sewage treatment, communication, transport, health and education; provision of emergency shelters and mobilisation of emergency services to meet needs of affected population; safeguarding of protective installations and measures for immediate protection of the cultural heritage and clean up the damaged areas. The long-term reconstruction of the affected sectors of economy and business will be left to other instruments.	All major disaster	Fund covers the losses resulting from an event that causes damages over 3 billion EUR or which represents more that 0,6% of the GDP of the state concerned. Under exceptional circumstances a disaster that affects a substantial part of the region's or the state's population shall also be considered as eligible to the fund.

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deducti-bles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
	Voluntary participation	Deducti-bles: 1% to 5% of the insured sum	Cover limited to USD 750.000 for private risk USD 500 000 for commercial risk	The HHRF had ability to cover claims from storm generating USD 2.2 billion in insured residential damage.	Privately The HHRF is funded from three sources: persons requir-ing hurricane coverage pay premiums to insurance companies; insurance companies doing business in Hawaii pay assessments based on the amount of business con-ducted in the State; persons who recorded a mortgage pay a special mort-gage recording fee (SMRF).	The HHRF stopped issuing new policies in 2000 as a result of improved market con-ditions.
				Maximum annual budget of EUR 1 billion	Public	Public

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Country	Year of creation	Scope of coverage		
		Main characteristics	Perils covered	Triggers
The International Oil Pollution Compensation Fund (IOPF) 1992[8] Inter-governmental organisation	1992	The 1992 Fund provides compensation, if a pollution incident occurs involving an oil tanker, to governments or other authorities which have incurred costs for clean-up operations or measures to prevent or minimise pollution damage and to private bodies or individuals who have suffered damage as a result of the pollution. The flag of the tanker and the ownership of the oil do not affect the right to compensation. The ship-owner has to have insurance if the tanker is carrying more than 2000 tonnes of oil in bulk as cargo.	Pollution damage	

Notes:

1. Australia has also put a standing body—the Insurance Disaster Response Organisation (IDRO)—in place since March 2000, with the primary mission of helping the insurance industry to co-ordinate its actions to ensure that the people affected by a disaster get rapid and effective support.
2. A new law on “Prevention of technologic and natural risks and restoration of the damages” has been recently adopted in France (30 July 2003). The bill aims to reinforce the protection of population and to improve the compensation of victims in case of catastrophes.
3. The creation of the EQC in New Zealand in 1994 replaced the previous Earthquake and War damage Claims Commission, which had been in existence since the Second World War.
4. At exchange rates of 21 August 2002, a New Zealand dollar was worth about $0.47 in the United States.
5. Several state grants of increasing amount (323 mil. SKK in 1998, up to 5,9 bill. SKK in 2000) were offered for the compensation of agricultural claims resulting from natural catastrophes. In 2000, the state grant was meant to enable:

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		Financing of the program				
Type of losses covered	**Voluntary/ Compulsory**	**Deductibles**	**Maximum compensation**	**Global capacity**	**Source of Funding**	**Publicly/ Privately Managed**
			The maximum payable by the 1992 Fund for one incident is 135 million Special Drawing Rights (SDRs) less the compensation paid by the ship-owner (around USD 92 000). The compensation of the ship-owner depends on the size of the tanker. Under the 1992 regime, the maximum paid by the ship-owner for a small ship is 3 million SDRs (USD4 million). The maximum for a large ship is 59.7 million SDRs (USD79.2 million).	The compensa-tion capacities of the 1992 fund have been raised from EUR171.5 million to EUR 1 billion by 2004.	Mostly privately funded. The Fund is financed by contributions levied on any person who has received in one calendar year more than 150000 tonnes of crude oil and heavy fuel oil. The levy of contributions is based on reports of oil receipts.	The Fund is governed by the Assembly of the 1992 Fund (with representatives of all 1992 Fund Member States) which have adopted Internal and Financial Regulations.

-- a partial coverage (20% maximum) of the premiums for insurance against losses caused by crop hail and/or hurricane

-- the compensation of catastrophic damages to plant production (up to 20% of losses) or the partial coverage of loan interest from a bank credit (maximum 10 % of loan interest points).

Such compensation is however seen as insufficient, while the volume of written premium for insurance of catastrophic losses decreased sharply in the last few years (of 20% between 1999 and 2000).

6. The California Earthquake Authority replaced the California Residential Earthquake Recovery Fund created in 1991.

7. Data of 1999

8. The International Oil Pollution Compensation Fund 1992 replaces the IOPF 1971. The compensation limits of the 1971 Fund had become too low to cover the cost of oil spills. The 1971 Fund Convention (which created the 1971 Fund) therefore had to be amended to get higher compensation limits. Due to a number of denunciations of the 1971 Fund Convention, this Convention ceased to be in force on 24 May 2002, but the 1971 Fund will continue to deal with a number of incidents which occurred in 1971 Fund Member States before that date.

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Annex 2

Terrorism risk compensation schemes in selected countries

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1. Insurance coverage of terrorism risks

	Exclusion of terrorism risks	Type of insurance coverage Private/public scheme optional/mandatory insurance stand-alone or standard policy	Reinsurance coverage
Australia	From July 2003 the Terrorism Insurance legislation overrides terrorism exclusions in policies for commercial property, business interruption and public liability arising from damage to commercial property. Coverage is compulsory.	The Australian Government operates the Australian Reinsurance Pool Corporation that provides terrorism reinsurance for insurers writing the affected lines of business.	A pool of reinsurer and insurers backed up by the Commonwealth was created in fall 2002 to cover and reinsure terrorism risks and started its operation on 1st July 2003 (see following table).
Austria	Since June 2001, exclusion of general policy conditions for property loss and damage insurance contracts. No exclusion for accident and life insurance.	Insurance cover against terrorism is generally private, facultative and conditional except for commercial passenger and third party liability for aviation and other mandatory "no default liability", like railways where such cover is mandatory.	A pool was established by insurers and reinsurers with no guarantee from the state for the time being (see following table).
Canada	Exclusions have been introduced, except in fire insurance policy for which terrorism risks have to be covered.	Terrorism coverage is generally provided by commercial insurance firms in a conventional, competitive environment. There are only a few exceptions to this general rule, including some sectors/ players that self-insure (*e.g.* governments, private utility services) and the nuclear energy sector, which is insured through a mix of private insurance (up to CAD 75 million) and public backstop (above CAD 75, and up to CAD 1 billion).	No specific regulation.
Czech Republic	Standard exclusion.	No specific cover.	

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	Exclusion of terrorism risks	Type of insurance coverage Private/public scheme optional/mandatory insurance stand-alone or standard policy	Reinsurance coverage
France	Exclusion for bodily damage and liability insurance. No exclusion for property damage law 9/9/1986.	It is mandatory for insurers to cover terrorism risks as part of the global cover for property damage but not for liability. Bodily injury are covered by a state scheme (see following table).	On December 20th 2001, a specific but facultative pool (GAREAT) reinsured by the state was created to cover property damages resulting from terrorist events (see following table).
Germany	In general, the cover against terrorism risk is included in fire and business interruption policies. No exclusion from non- life and TPL insurance (except concerning aviation TPL insurance).	In general, coverage by the direct insurers in fire and business interruption policies is limited to an insured value of EUR 25 million.	Above the EUR 25 million threshold up to the maximum liability per risk of EUR 1.5 billion there is a special insurer: Extremus Versicherungs-AG started business on 1 November 2002 to cover terrorism costs.
Greece	No exclusion.	Insurance is private, facultative and conditional. The cover is included in fire insurance contract.	Individual reinsurance treaty.
Hungary	Exclusion from current life/ accident private insurance.	Insurance against injuries is covered through the social security system.	No specific regulation, reinsurance coverage against terrorism risk is scarcely provided.
Iceland	No exclusion.		
Italy	The coverage of terrorism risks depends on the contract. This coverage is typically excluded in non life classes unless it is expressly envisaged under a special contract clause while it is generally envisaged in life classes and classes concerning personal risks (accident, sickness), unless where specifically excluded.	Insurance is private, facultative and global (not provided as a stand-alone cover).	No specific regulation.

	Exclusion of terrorism risks	Type of insurance coverage Private/public scheme optional/mandatory insurance stand-alone or standard policy	Reinsurance coverage
Japan	No exclusion (except commercial property insurance policies whose insured amount exceeds a certain threshold).	In general, non-life insurance products cover terrorism risk. However, commercial property insurance policies whose insured amount exceeds a certain threshold are excluded.	No specific regulation.
Korea	Exclusion from non-life policies except if a specific clause is signed. Life insurance covers the death caused by terrorism acts.		No reinsurance for non-life contracts. No specific regulation for life contracts.
Netherlands	No exclusion except for nuclear accident (a specific scheme is devoted to the compensation of such accident). Only the six forms of acts of war as referred to in Article 64(2) of the Insurance Business Supervision Act 1993 are excluded.	It is not mandatory to provide terrorism insurance.	A specific Reinsurance Company dedicated to the coverage of terrorism risks started its activities on 1 July 2003. (see following tables).
Norway		Insurance is private, facultative and conditional upon other insurance cover.	No specific regulation at present (see following table).
Poland	Standard exclusion.	Insurance cover against terrorism is voluntary and conditional.	No specific regulation.
Portugal	No specific exclusion.	Terrorism coverage is currently available as an extension of the policies. However, insurance companies are trying to separate terrorism risks from the basic coverage and studying a "stand alone" cover. This coverage is always limited to the sum insured, a deductible and a percentage of replacement is applied in most cases.	No legal limitations upon terrorism risks reinsurance.

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	Exclusion of terrorism risks	Type of insurance coverage Private/public scheme optional/mandatory insurance stand-alone or standard policy	Reinsurance coverage
Slovak Republic	Most insurance companies do not take any special measures or policy actions as regard to exclusions related to terrorist attacks in the general policy wordings. However, some insurance companies have introduced amendments to the general policy conditions excluding terrorism attacks from global coverage.	No specific pool, government scheme or state mechanism.	Reinsurance is performed by foreign reinsurers in Slovakia. The 9/11 events have involved the reassessment and closer examination of these reinsurance treaties concluded with foreign companies. As regards to terrorism risks coverage some changes were introduced in reinsurance treaties and co-operation between insurers and (especially renowned) reinsurers was intensified. Insurers reported that the following changes were expected: • an increase of the written premium ceded to the reinsurer; • a decrease of the amount of the commission set up by the reinsurance contracts; • a tightening in the evaluation of the risks which should be reinsured. These changes are directly reflected in the increase of insurance rates premium per policy (covering terrorism risks).
Singapore	No exclusion from motor, workmen's compensation and public liability insurance contracts. Exclusion from business risk insurance contracts. Specific exclusion clauses for credit insurance and individual travel accident policies.	Terrorism cover is not provided as a stand-alone cover. The terrorism cover follows that of the main policy. No separate rating for the terrorism risks cover; if applicable, it is included as part of the main policy premium rate.	Reinsurance of terrorism risks is included in global policies. A reinsurance back-up scheme is being studied by the Singapore's government (see following table).

	Exclusion of terrorism risks	Type of insurance coverage Private/public scheme optional/mandatory insurance stand-alone or standard policy	Reinsurance coverage
Spain	No automatic exclusion.	Two types of state coverage for terrorism risks: *a*) For bodily and material damages (Ministry of the Interiror). *b*) Insurance coverage for personal injuries and material losses: the Consorcio de Compensación de Seguros (CCS) covers extraordinary risks (including terrorism) if insurers choose to exclude it from their policies (see following table).	See following table for the details on the insurance reinsurance of terrorism risks through the CCS.
Sweden	For consumer insurance policies, many insurers still make no exclusions for terrorism risks. Exceptions are, however, in some cases made regarding damage caused by biological, chemical or nuclear substances related to terrorist acts, as well as assault and accident coverage if the injuries occur in connection with such acts. For business insurance, there are considerable exclusions (property losses, business interruption losses, liability losses). Some damages are not covered at all, whereas in other cases the coverage is limited to a certain amount for each injured party. Moreover, business insurance policies often include suspension clauses in order to quickly limit the coverage.	It is not mandatory to cover terrorism risk for insurers. Terrorism coverage may be either conditional upon existing insurance or "stand alone" cover.	No specific regulation.

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	Exclusion of terrorism risks	Type of insurance coverage Private/public scheme optional/mandatory insurance stand-alone or standard policy	Reinsurance coverage
Switzerland	No exclusion from property or special insurance coverage. Transport insurance excludes from its coverage damages resulting from events related to political or social motives. For personal insurance (life, accident, sickness), war and terrorism risks are covered except if a particular exclusion clause is specified.	Specific insurance contracts may cover events related to political or social motives for transport activities.	No specific regulation (market solutions have been set up see following table).
Turkey	Terrorism coverage is given in the fire, theft, hail, greenhouse and comprehensive motor insurance policies in the form of an allied peril. It is provided through a specific "strike, lockout, riot, civil commotion and terrorism clause" attached to the main coverage.	Except the State Guarantee for third party liability for events stemming from terrorist activities in aviation insurance, terrorism coverage is provided by private insurance firms and it is optional. The benefit is limited (sum insured); and there is a deductible.	No specific regulation.
United Kingdom	The extent of cover available for risks relating to terrorism varies depending on the insurance contract concerned.	The UK government has recently been involved in the provision of reinsurance for terrorism risks in the Pool Re arrangements covering commercial property damage and consequent business interruption under the Reinsurance (Acts of Terrorism) Act 1993 and in the Troika arrangements covering third party war and terrorism liability of the UK aviation industry.	Further information on the Pool Re arrangements is in the following table.

	Exclusion of terrorism risks	Type of insurance coverage Private/public scheme optional/mandatory insurance stand-alone or standard policy	Reinsurance coverage
United States	State-approved exclusions for international acts of terrorism were voided when the new law on the federal program of November 2002 was signed into law by President Bush in December (see following table). However, an exclusion could be reinstated either through an agreement between the insurer and the policyholder, or if the policyholder does not wish to pay the premium for terrorism coverage.		A federal back-up for terrorism risks was established by new federal legislation in November 2002 (see following table).

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2. Mix private/ public arrangements to cover terrorism risks

2.1 *Mix schemes developed in OECD countries*

	Organisation and financing of the scheme/ pool	Risks and type of policies covered
Australia A *specific Scheme* including an Insurer pool backed up by a Commonwealth Government indemnity was set up for 1st July 2003.	A new 4-layer scheme has been established since 1st July 2003: • the *first layer* consist in the retention of AUD 10 million per event of the losses by the insurance industry, but with the retention of each individual insurer capped at AUD 1 million per year; • the *second layer* is a pool of approximately AUD 300 million, to be funded by premiums collected from property owners over 3 to 4 years; • the *third layer* is a commercial loan facility of AUD 1 bn underwritten by the Commonwealth; • the *fourth layer* is a commonwealth Government indemnity for up to AUD 9 bn. *Conditions*: All insurers licensed by APRA will be required to include terrorism risk cover for the classes of insurance covered by the scheme. They will be able, but not obliged, to reinsure their terrorism risk exposure with the proposed Scheme. Insurers liabilities are limited to the funds available from the scheme. *Financing*: premiums collected from insureds will be paid by insurers to the Scheme in order to fund the pool and to repay any loan required in the event claims exceed the resources of the pool. Premiums will depend on the risk of insured properties and facilities, and cost from around 2% to a maximum of 12% of the related property insurance premiums.	Risk cover would be for any terrorist event, as defined in legislation, except events involving damage from nuclear causes. The Scheme will cover insurance for *commercial property*. It will also extend to *business interruption* risk policies associated with those properties that are insured, and public liability policies. Insurance company exposures in relation to their underwriting of certain States' and Territories' compulsory workers compensation and compulsory third party motor vehicles schemes may be included subject to discussion with State and territory governments. Private residential property will be excluded, since market cover is becoming available in this area. Coverage will be available for Commonwealth and State business enterprises and Commonwealth-owned airports leased commercially. Coverage will extend throughout all States and Territories, together with offshore facilities, providing that premiums are collected.

	Organisation and financing of the scheme/ pool	Risks and type of policies covered
Australia (*cont.*)	*Organisation*: the Commonwealth will establish a statutory authority to oversee investment of the pool fund, negotiate the Commonwealth facility, the bank credit facility and agreements with insurance companies to collect funds and to process claims. *Duration*: once commercial insurance and re-insurance markets begin to re-emerge, the company will begin to wind-up its operations. In accordance, the insurance market capacity will be assessed every two years.	
Austria *Insurer and reinsurer Pool* created in 2002, with no state guarantee for the time being	As a consequence of the 11/09 events, insurers agreed on setting up a mixed co- and reinsurance pool open to insurers and reinsurers doing business in Austria: • the pool offers coverage without deductibles; • a first *layer up to an aggregate limit per year of* EUR 50 *million* will be borne by direct insurers according to their market share; • the *second layer up to* EUR 150 *million* will be underwritten by international reinsurers	The cover for terror risks includes *all lines of property business* except transport insurance, with cover limit of EUR 5 million per single event and per year. A further EUR 20 million cover is available for an additional premium. The cover is limited to terror risks within Austrian territory.
France A *Pool* of insurers and reinsurers, GAREAT (Gestion de l'Assurance et de la Réassurance des Risques Attentats et Actes de terrorisme) reinsured by the *Caisse Centrale de Réassurance* (CCR) was created in December 2001.	The scheme features 4 layers gradually triggered according to the size of the annual losses arising from terrorist events: An *annual amount* EUR 0-250*million*: is first borne by the direct insurers; • *An annual amount* EUR 250*ml-1bn* is borne by the pool of insurers and reinsurers called GAREAT, which has been settled to cover terrorism attacks. Every insurer or reinsurer providing cover on the French market can enter the pool on a voluntary basis. In order to avoid adverse selection, each insurer member of this arrangement has to include all the policies potentially covered by the pool.	• The *pool* (GAREAT) is designed to insure and co-reinsure *damage to property* caused by acts of terrorism and terrorist attacks. The pool covers *businesses, local governments, very large buildings and technical risks whose insured value exceeds* EUR 6 *million*. Third party liability insurance is excluded from the pool. The CCR reinsures the consequences of terrorism attacks on *property damages, excluding third party liability insurance*.

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	Organisation and financing of the scheme/ pool	Risks and type of policies covered
France (*cont.*)	• *From* EUR 1 *bn*-1.5 *bn*, the CCR which is a state-own enterprise under specific government guarantee (see article L. 431-10 of the Insurance code) will provide a financial reinsurance arrangement. • *Above* EUR 1.5 *billion aggregated losses for a year*, the CCR reinsures the pool without limitation. Rate premiums of policies covering terrorism risks are not limited and depend on the insurance value of the property. The cover granted by the CCR is charged to the GAREAT. This arrangement has been implemented for one year.	The Pool and CCR exclude acts of war, acts of hostility, the riots and popular movements.
Compensation guarantee funds for victims of terrorist acts	A specific guarantee fund for the victims of terrorism acts and other offences was created in 1986. The fund covers **bodily injuries** and is aimed at providing compensation for the injured victims or for the death for all persons on French territory.	
Germany A specific insurer Extremus Versicherungs-AG started in November 2002 to cover terrorism risks in property area.	The coverage of terrorism is organised around three layers: • *The first two layers up to* EUR 3 *bn* are provided by the private insurance sector through a specific insurance company in the legal form of a stock corporation (no pool solution) called Extremus AG which will purchase as a reinsurance policyholder the capacity of EUR 3 bn. The first layer will cover losses from EUR 0 to EUR 1.5 bn and be written by direct insurers, reinsurers and brokers operating in Germany. The second layer is to be purchased in the international reinsurance market. • *The third layer* is a guarantee provided by the Federal government on top of the capacity of EUR 3 *bn to the extent of* EUR 10 *bn* for the moment only until the end of 2005. The state is obliged to pay only if and to the extent that the loss per insured event or as a yearly aggregate exceed EUR 3 bn; *only policies with an insured amount of more than* EUR 25 *million are taken into account in this calculation*. *Duration*: The State limits its involvement to 3 years.	• This arrangement covers insurance for industrial and commercial risks located in Germany from non life contracts (fire, business interruption, engineering insurance). The cover applies to large risks with an insured value of *more than* EUR 25 million. • direct insurers and reinsurers separately provide adequate capacity for risks up to the insured amount of EUR 25 million and in life, health accident and third-party insurance.

	Organisation and financing of the scheme/ pool	Risks and type of policies covered
Netherlands Private reinsurance company with limited capacity: the *Terrorism Risk Reinsurance Company* (TRRC) started its activities on 1 July 2003.	The TRRC is a private reinsurance company established to reinsure terrorism risks in the Netherlands. It has a relatively small equity and is owned by a foundation established by members of the Association of insures. The overall capacity of the scheme is limited to EUR 1 bn per year divided into four layers: • *The first layer* represents the insurance retention (franchise) of EUR 7.5 million per year for the market as a whole, or 2.5% of the gross premium, minimum EUR 50 000 (per participant, per year); • In t*he second layer* the participating insurers will provide a capacity in the TRRC up to EUR 400 million per year. For the operation of this first layer of EUR 400 million, the claims – after the first threshold is reached- will be added and allocated among the participants according to their market share. The market share will be measured by share in the total gross premium income. • *The third layer* is covered by international reinsurers: they will provide a minimum of EUR 400 million in the aggregate of the first 2 layers (*e.g.* up to EUR 800million); • *The fourth layer* is represented by the Dutch State which reinsures the scheme in excess of the three other layers EUR 200 million (*e.g.* up to EUR 1 bn). Participants to the TRRC will secure the liabilities of the company by way of guarantees. The guarantee of each participant to the TRRC will be based on its gross premium income. Participation to this scheme is not mandatory; however, the vast majority of insurance companies (representing 93% of the total premium income) has joined the initiative (situation on 1 January 2004).	Coverage: risks to be reinsured by the TRRC are all policies, all classes of business, underwritten by original reinsureds. Non-life insurance contracts insofar as they pertain to risks situated in the Netherlands,. Life insurance contracts insofar as they are entered into with a policyholder whose regular residence is in the Netherlands, or, if the policyholder is a legal entity, with the establishment of the legal entity to which the insurance contracts pertains, whose registered office is in the Netherlands. Exception: The TRRC shall however not provide cover for: • aviation hull and aircraft liability; • any liability to pay compensation arising in connection with a nuclear accident within the context of the Nuclear Accident Liability Act and for which, pursuant to the said act or the underlying treaties a right to compensation exists, *e.g.* with the Dutch Pool for Insurance of Nuclear Perils; • Insurance Polices which expressly include terrorism as a named peril. In addition, for any insurance pertaining to: • loss of damage to immovable property and/ or the contents thereof; • consequential loss due to loss of damage to immovable property and/or the contents thereof, the limit of indemnity shall not exceed EUR 75 million in respect of any one insured location per annum for all participating insurers, irrespective of the number of policies issued.

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	Organisation and financing of the scheme/ pool	Risks and type of policies covered
Spain The *Consorció de Compensación de Seguros* (CCS) was created in 1941 and was finally given a permanent status in 1954 to cover extraordinary risks, including terrorism risks.	The CCS is a public business institution providing "extraordinary risks" insurence. The private market normally may cover the risks. However the CCS plays a subsidiary role to the insurance market under two circumstances: • direct insurer: if the risk is not covered in the insurance policy; • guarantee funds: if the risk is covered, but the private insurer is unable to meet his commitments because it has been declared bankrupt or is insolvent. The CCS benefits from the government guarantee but has never had to use it. If private insurers decide not to cover extraordinary risks directly in their policies they must include an "extraordinary risk cover clause" and along with their premiums, collect a surcharge for the CCS (for which the insurers receive a fee of 5% of the sums received, as compensation for their activity) which they pay to the CCS. The CCS directly manages and pays claims on the basis of the ordinary policy, *i.e.* securing the same properties for the same insured capitals contracted with the private insurer in the ordinary policy. In the indemnification amount the Consorcio applies a franchise (only for property losses): generally 10% of the amount of the loss. It should not exceed 1% of the sum insured nor be less than EUR 150.25.	Extraordinary risks covered by the CCS, include *natural phenomena* (earthquake, seaquakes, volcanic eruption, extraordinary floods, atypical cyclone storm and falling spatial objects and meteorites) and *acts with social repercussions including terrorism* (rebellion, insurrection, riots, civil commotion and acts or actions of the armed forces or security services in peacetime). • The cover clause must be incorporated into personal accident policies some types of property policies. The CCS does not cover terrorism risks in life insurance policies (except if it includes accidents coverage) or those for civil liability or loss of profits. However to solve the short supply of insurance offered by the private companies operating in the industry following the 11th September events, the Union Española de Aseguradores y Reaseguradores (Spanish Union of Insurers and Reinsurers, UNESPA) had reached an agreement with the CCS whereby the latter temporarily accept to reinsure *lost profits* risk subject to no ceiling, under certain agreed terms, and only for terrorism risks (not for the rest of the extraordinary risk). It is a mixed agreement: quota share reinsurance, surplus reinsurance and excess loss reinsurance. The agreement signed calls for participation in the sum insured at a given minimum rate, depending on the amount involved by the private insurers, which may cede the rest to the CCS. The ceding company's participation would be nil for sums insured of over EUR 9.1 million.

	Organisation and financing of the scheme/ pool	Risks and type of policies covered
Spain (*cont.*)		The agreement reached is expected to be in effect only temporarily, until the CCS amends its by-laws to include such risks in its extraordinary coverage portfolio, for every risks covered by the system. This amendment has been passed by law and it will be in force when the Government could prepare the legal application.
State compensation for personal and material damage	A system of indemnification and compensation for expenses charged to the state was created in December 1996. Act N 13/96 provides for state compensation of **personal and material damage** caused by terrorism acts under certain conditions (Bodily and material damages are granted provided they are not already covered by other insurance). Moreover Act N 32/1999 established a system under which the State guarantees the right of those affected to civil liability indemnification or compensation, with the State subrogating in the situation of those bound to pay indemnifications.	
United Kingdom The Pool Re scheme was originally set up in 1993.	Pool Re was set up in 1993 to ensure that terrorism insurance would continue to be available for commercial property damage and consequent business interruption in Great Britain following withdrawal of insurers from provision. Pool Re provides reinsurance for these risks to primary insurers, subject to a loss retention by the insurer per event combined with an annual aggregate loss retention limit. Pool Re's Retrocession Agreement with HM Treasury provides funding for Pool Re in the event that it exhausts all its financial resources following claim payments. Pool Re is required to pay a premium for this protection to HM Treasury. Reforms to the Pool Re arrangements were announced in July 2002. Further details of the arrangements can be found in HM Treasury Press Notice 73/02 at *www.hm-treasury.gov.uk*.	Pool Re provides cover for damage to commercial property and consequent business interruption resulting from acts of terrorism as defined in the Reinsurance (Acts of Terrorism) Act 1993. Cover has been extended from acts of terrorism resulting in fire and explosion to "all risks" subject to the exclusion of war risks and losses arising from damage to computers or systems caused by hacking, virus or denial of service attack.

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	Organisation and financing of the scheme/ pool	Risks and type of policies covered
United States A program of *federal reinsurance* to cover terrorism risks was enacted by the Congress in November 2002 and signed into law by President Bush in December.	The federal government is responsible for paying 90% of each covered insurer's primary losses above that insurer's annual deductible. Each insurer's annual deductible is based on a comparison of that insurer's covered losses in that year to its direct earned premium for lines of business covered by the program in the prior year. The amount of each insurance company's deductible (*i.e.* retention) scales upward each year of the program (2002: up to 1% of the prior year's earned premium; 2003: 7%; 2004: 4%; 2005: 15%); The program has an annual cap. Losses in excess of USD 100 billion are not covered by insurers or the federal government under the new program. *Financing*: Policyholders surcharges are mandated for any differences underneath an annual aggregate loss figure and the total amount of insurer loss payments (deductibles plus their 10% quota share).	The program is limited to acts of *international terrorism* (domestic terrorism is not covered). To be covered by the program an act must cause at least USD 5*milllion damages*. The program only provides coverage for *commercial lines* of insurance, with certain specific exclusions (crop insurance, mortgage guarantee, monoline financial guaranty, medical malpractice, the national flood insurance program, life and health insurance). *Business interruption*, *surety insurance*, *excess lines* are also covered for terrorist acts. *Workers' compensation* is covered – not only for terrorist acts, but also for acts of war. War is not covered for any other line of coverage. *Civil liability*: a federal clause of action is created for all personal injury, property damage and death actions arising out of, or related to, a terrorist act. The federal cause of actions pre-empts state causes of action. Federal funds may not be used to pay punitive damage awards.

	Organisation and financing of the scheme/ pool	Risks and type of policies covered
United States (*cont.*)	The industry aggregate loss figures used to determine whether or not there will be a surcharge are USD 10 bn in 2003, USD 12.5 bn in 2004, and USD 15 bn in 2005. Surcharges above the annual numbers, up to the program limit of USD 100 bn, are at Treasury's discretion. The decision about whether to impose such surcharges would be based on economic conditions. *Conditions*: All licensed primary commercial insurers are covered, as well as surplus lines companies, state workers' compensation funds and all residual market mechanisms to the extent they write a covered line. Insurers must make terrorism coverage available during the program's first two years in the following way: to the extent that a policy otherwise covers a particular type of loss, the insurer must make coverage available for that type of loss if it occurs as the result of a terrorist act. *Duration*: The program should only last for three years until 2005.	

Source: OECD.

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2.2 *Specific schemes in non-member countries*

	Organisation of the scheme	Risks and policies covered
Israel Property Tax and Compensation Fund (PTCF)	Terrorism is excluded from standard property policies but the private insurance markets grants cover by separate endorsement. Reinsurance coverage is provided by catastrophe excess of loss treaties. In addition, the state of Israel has created a specific fund. The fund is financed through government property taxation and premiums for additional state coverage. Although not explicitly stated, general tax revenues stand behind the primary funding sources.	The fund provides coverage for property casualty and health life insurance for victims of politically motivated violence (including terrorism).
South Africa The South Africa Special Risks Insurance Association (SASRIA) was created in 1979 in the wake of Soweto riots.	The SASRIA is a tax-exempt insurance company in the form of an incorporated not-for-profit association reinsured by the government on last resort. Until now the government has never intervened. SASRIA also utilises the international reinsurance market to protect part of its exposure. The purchase of SASRIA coverage is voluntary in addition of covers provided by conventional insurers. SASRIA is financed through its premiums whose rates are determined on a commercial basis. The Government does not perceive a premium in respect of its reinsurance role.	From January 1987, SASRIA took over all liability for riot cover, thus removing the ambiguity that existed when SASRIA covered "political" riots and the companies insured "non political" riot. Cover also includes terrorism risks. SASRIA has a monopoly in South Africa for this type of cover.
Sri Lanka The riot fund was set up in 1983	The government sponsors a riot fund. The fund cover is limited to SRL 30 million (approximately USD 300 000) per risk, per location, and subject to a 10% deductible	The fund covers riots and terrorism.

Source: OECD.

2.3. *Schemes currently under discussion in some* OECD *member and non-member countries*

	Overview of the market/government proposals to cover terrorism events
Japan	The General Insurance Association of Japan has been studying possible ways to deal with terrorism risks using experience in other countries.
Singapour	The General Insurance Association of Singapore (GIAS) has commissioned the services of a consultant to study the feasibility of forming a pool to cover terrorism risks in Singapore. The study, which is still in progress, proposes the Government to stand in as the reinsurer of last resort.
Switzerland	Swiss market solution foresees terrorism exclusion for commercial/industrial property policies with a TSI (Total Sum Insured) superior to CHF10 million each for contents, buildings and business interruption. Clients may "buy back" the exclusion, and insurers have created a facility to cover such risks up to maximum TSI of CHF 100 million each with a 10% deductible, minimum CHF 50 000, maximum CHF 500 000 each. Some highly exposed occupancies are excluded. The facility started on 1st September 2003 and provides for an event limit of CHF 300 million, sublimited to CHF 150 million per insured (3*CHF 50 Million).

Source: OECD.

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Résumé : Problèmes posés aux marchés de l'assurance et des capitaux par la gestion de catastrophes de grande ampleur

Ces dernières années auront été marquées par un certain nombre de catastrophes de grande ampleur, aussi bien d'origine humaine, comme les attentats terroristes du 11 septembre 2001, que d'origine naturelle comme le cyclone Allison en 2001 aux États-Unis, les grandes inondations dans de vastes zones de l'Europe durant l'été 2002, le tremblement de terre de mai 2003 en Algérie ou l'apparition de maladies infectieuses précédemment inconnues. La fréquence de ces catastrophes comme l'ampleur des dommages subis ont tendance à s'accroître. Cette évolution a amené les gouvernements des pays de l'OCDE à prendre conscience que des risques de catastrophes majeures ou « méga-risques » pouvaient infliger des dommages considérables à des dispositifs et infrastructures essentiels dont dépendent nos sociétés et nos économies. Savoir prendre des dispositions pour parer efficacement aux menaces extrêmement complexes du XXIe siècle est l'un des grands défis qui attendent les décideurs des secteurs public et privé. Dans ce contexte, l'OCDE a été chargée de procéder à une évaluation préliminaire de l'impact des catastrophes de grande ampleur et de la gestion de ces catastrophes au moyen de brèves notes sectorielles. Cet article réunit trois de ces notes qui portent sur l'impact des catastrophes de grande ampleur sur les marchés des capitaux et de l'assurance, la gestion par les assureurs de ces catastrophes et les questions d'indemnisation.

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Légendes :

. . *Donnée non disponible* $ *dollar des États-Unis*

– *Néant*

Les chiffres ayant été arrondis, leurs sommes ne correspondent pas toujours aux totaux

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