Chapter 13

Securing Investment - Insurance Revisited

Insurance pricing and availability has a **major influence on business investment** decisions and behaviour. Currently, a number of disincentives work against the adequate pricing of disaster risk: on the one hand, expensive premiums may make investment unattractive; on the other hand, overly low premiums can exacerbate the **discounting of future risk**, potentially resulting in the creation of new disaster risk.

In rapidly growing economies, particularly in Asia, insurance penetration is spreading faster than disaster risks are being reduced. The **over-supply of capital** through insurance-linked securities may also distort risk pricing. It also generates fiscal risks when **premiums are not risk-based** and public sector institutions with limited experience of the insurance market are involved.

13.1 Creating an enabling environment for effective insurance

Insurance can potentially play an important role in disaster risk reduction, but only where the enabling environment allows for appropriate pricing and coverage. Governments and insurance companies are yet to take full advantage of this potential.

Insurance pricing and availability has a major influence on business investment decisions and behaviour. Unless assets such as factories and other facilities can be insured, businesses cannot obtain loans and other forms of finance. Expensive premiums may make the investment unattractive, making the business look elsewhere. Conversely, however, when premiums are too low, businesses may be encouraged to overly discount the risks and invest in hazard-exposed areas, accumulating disaster risks for themselves and creating wider risks and costs.

Insurance is one of the main financial tools for households and companies to strengthen their disaster resilience. This is achieved by spreading the risk of exceptional disaster loss among a large number of policyholders and over a long time. Insurers compensate disaster damages in return for the premiums each insurance buyer paid ex-ante, in accordance with the agreed contract. Although few financial institutions undertake an overall assessment of disaster risk, most require insurance coverage as a condition for providing loans to businesses. This chapter will discuss how insurance can be a useful financial tool for businesses and individuals to strengthen their resilience, competitiveness and sustainability.

Although the details of insurance coverage vary widely, insurance rarely guarantees business continuity or protects businesses from the wider impacts of disaster. Insurance can provide protection from asset loss and even supply chain interruption, but does not compensate for wider effects like low employee morale, increased absenteeism, stress or unrest, low productivity, declining customer demand and goodwill, and other impacts (Kataria and Zerjav, 2012). In other words, insurance is not a substitute for sound risk-based investment decisions.

Additionally, the insurance required when applying for a loan does not necessarily cover all hazards, resulting in limited payouts to affected households or businesses and even countries, in the case of national catastrophe insurance. For example, in Australia, an 'insurance gap' exists whereby different definitions of flood by insurers limited the insurance payout after the 2010–2011 floods, and brought confusion and frustration among insurance buyers (World Bank, 2011).

Similarly, when governments insure their sovereign risk, instruments such as catastrophe bonds may be effective in avoiding short-term welfare losses and reinforcing macroeconomic stability, but generate no net income. If, following a disaster, income

declines in the long term, the primary gains from the smoothing obtained from reinsurance, contingency loans and catastrophe bonds are obtained by delaying losses (Hsiang and Jina, 2012). Insurance alone and in itself, in other words, does not enable disaster-affected countries to catch up and cannot substitute for investments in risk reduction (Hamdan, 2012).

In principle, insurance should also act as a powerful incentive for disaster risk reduction. An insurance premium should represent the economic value of risk, which in a perfect market would equal the expected loss plus transaction costs (Galegatti et al., 2008). However, perfect markets do not exist and whether owing to an inadequate or inaccurate assessment of risks or to government intervention in the market, insurance premiums do not necessarily reflect a realistic pricing of risk (Nguyen, 2012).

Classic problems surrounding insurance include moral hazard and adverse selection[i] , both related with information asymmetry in the market (Galegatti et al., 2008). If insurance pricing reflects real risk, insurance can facilitate risk reduction investments, for example, as in the case of the California Earthquake insurance (see Box 13.1 below). When lower premiums are set, for example, for earthquake-resistant properties, this provides an incentive to invest in retrofitting and earthquake-resistant design, thus avoiding moral hazard and adverse selection.

Although risks in developed markets, such as Europe, Japan and the United States of America, are modelled with precision by the commercial risk modelling industry, this is often not the case in new and emerging insurance markets. At the same time, although sophisticated risk models enable the insurance and reinsurance industry to calculate premiums, data from these actuarial models are rarely available to those who purchase insurance policies, generating information asymmetry. The accuracy of loss estimates and the translation of those into premiums cannot be easily verified by the insurance buyers. Developments of public disaster databases and risk models have the potential to start to bridge this information asymmetry (see Chapter 15 for examples).

Box 13.1 National and regional insurance mechanisms in the United States of America

The US National Flood Insurance Programme (NFIP) provides subsidised flood protection insurance to properties located in designated special flood hazard areas. In addition, the government was not allowed to purchase reinsurance. As a result, it had accumulated debts of US$17.8 billion by 2007. Legislation requires the NFIP to offer subsidised premiums even to homes that suffer repetitive losses, thus decreasing or negating risk reduction investment for those properties and resulting in an estimated 25–30 percent of claims paid for repetitive losses.

In addition, policy-holders often stop paying their insurance and instead rely on the government's relief support as soon as mortgage lenders, who are supposed to control this, have transferred their account to capital markets and thus lose oversight. In such cases, debt-based private ownership—in this case, housing at risk of flood damage—once again increases public liabilities. The government recognised this problem and in June 2012, passed legislation that will phase out NFIP subsidies on properties with repetitive losses, introduce minimum deductibles as well as allow for a rezoning of areas to correspond more closely to new risk assessments, all which are expected to avoid moral hazard and have positive impacts on risk reduction investment.

In contrast, the California Earthquake Authority has proven a successful public-private partnership (PPP), where risk-based pricing and cost-effective structures have ensured a solvent programme that offers affordable premiums. Actuarially sound methods were used while benefitting from government reinsurance and support. Recently, the adoption of a building code for retrofitting existing structures is trying to link with lower insurance premium offers to lower the cost of insurance in general.

In doing so, a double incentive for insurance purchase and risk mitigation strategies would be created that would ultimately benefit the insurance market, the insured and government budgets.

(Source: Orie in Orie and Stahel, 2012)

Governments are critical determinants of the role that insurance markets can play in managing disaster risk. Their interpretation of the social contract of the society they govern shapes the landscape of risk financing and risk management. To develop the insurance market, many governments play the role of regulator, framing how the market works, acts as reinsurer and, in some cases, directly sells insurance to citizens and companies. The latter has the potential to distort premiums, for example, when insurance is subsidised to increase penetration rates. Underpriced premiums that do not reflect risk levels do not provide incentives to invest in disaster risk reduction. When, in addition, governments act as insurers of last resort, this may encourage moral hazard and perverse incentives in favour of investment in hazard-exposed areas (Nguyen, 2012). In addition, it exposes governments and ultimately taxpayers to losses, as in the case of the US National Flood Insurance Programme (NFIP), outlined in Box 13.1.

But there are also other successful insurance products where the premium does not directly reflect expected loss. For example, in the case of parametric insurance, the payout from insurance companies is related to the scale of a predetermined event, such as the severity of a storm and not to the scale of the loss. Insurers can instantly calculate total payout amount after the trigger event and do not have to evaluate individual loss claims. Parametric insurance gives the insured incentives to invest in risk reduction, given that if losses are reduced they still receive the same payout. It also lets the insured decide how much risk they want to transfer.

If comprehensive risk, exposure and vulnerability models do not exist, as is often the case in many low and middle-income countries, parametric insurance may be easier to implement than conventional insurance. However, it still requires investment in the infrastructure to monitor hazard levels in a way that can produce credible and transparent estimates of the severity of each event. This investment is a prerequisite for the expansion of insurance penetration in low-income economies.

Regional approaches to disaster insurance can offer a solution by pooling not only risks but also resources across a greater area and number of actors. For example, in south-eastern Europe, the South Eastern Europe and Caucasus Catastrophe Risk Insurance Facility (SEEC CRIF) provides homeowners, farmers, enterprises and governments with access

Box 13.2 Catastrophe insurance in China

China's insurance penetration is still comparatively low, particularly outside the agricultural sector. This is despite almost two decades of rapid economic growth, usually associated with significant growth in the insurance market (Ranger and Williamson, 2011). Earthquake insurance penetration is only 3 percent across China (Wang et al., 2009) and with typhoons and floods rises to only 5 percent (Swiss Re., 2008). Consequently, insured losses are usually low even following major disasters. After the Huaije and Yangtze River flooding in 2007, insurance claims only amounted to 6 percent of total estimated loss. And during the Wenchuan Earthquake in 2008, payouts made by the insurance industry only equalled about 1 percent of total losses (Lloyds, 2012).

Insurance regulation can trigger growth in insurance markets, but there are also other types of public policies and regulatory mechanisms that can result in increasing demand and facilitate the effective capital markets required for insurance to operate (Ranger and Surminski, 2011). In China, although public policy is seen as a means to promote insurance in the agricultural sector, no similar approach exists to support development of insurance for the property sector. However, this may change in the coming years owing to continued and growing urbanisation—today, more than 44 percent of the country's population lies in urban areas (Kamal-Chaoui et al., 2009). In 2010, industrial and service sectors accounted for 89 percent of total GDP[iii], which means that public policies on insurance and reinsurance as part of overall risk governance arrangements can be expected to change.

(Source: Surminski in Orie and Stahel, 2012)

Box 13.3 The Christchurch insurance crisis and lessons for the future

The two major earthquakes that hit New Zealand in September 2010 and in February 2011 generated insurance losses of an estimated US$17 billion. These losses were a combination of payouts through the country's public residential insurance, the Earthquake Commission (EQC), losses to the commercial sector and losses to residential properties in excess of the EQC, covered by private insurers. The EQC alone faced more than 310,000 claims, with each of the two events drawing the highest number of claims by far in the EQC's 65-year history. The second largest insurer in the country—AMI, with 85,000 policyholders in Christchurch alone—had to be bailed out by the government with an estimated US$800 million. Insurance claims could not be paid in a timely manner, creating a bottleneck for residents' relocation to safer areas. Therefore, a programme was initiated by the government, in partnership with the insurance sector, in which 80 percent of residents in high-risk areas were allowed to not only sell their land but also to hand over the insurance claim.

Following the two earthquakes, zoning policies and building regulations were revised, including a decision to abandon selected suburbs and depopulate the severely affected and densely built-up central business district of Christchurch. Moreover, the insurance industry announced several important changes, including incapacity to pay out (AMI) and the termination of insurance policies (Ansvar Insurance). As a result, the EQC premiums trebled from early 2012 onwards to reduce the insurance policy's cash shortfall and begin to rebuild its reserves. A major concern, however, is that new earthquakes may hit New Zealand in the coming years, repeating the country's experience between 1929 and 1942, when a series of seven major earthquakes struck.

(Source: Muir-Wood, 2012; IRP, 2012; Canterbury Earthquake Recovery Authority (http://cera.govt.nz/))

to affordable catastrophe and weather risk insurance (World Bank and UNISDR, 2010). This regional risk pooling mechanisms is the result of a successful cooperation between a private reinsurer, national governments and international organisations, which continue to support countries to enact appropriate regulatory and policy reforms to enable increasing insurance coverage[ii].

Historically, one of the main drivers of growth in the non-life insurance market has been increasing income per capita (Feyen et al., 2011; Enz, 2000; Zheng et al., 2008). But it is not the only determinant of how insurance penetration develops within a country. Public policy and regulated insurance markets have proven to be another strong driver towards increasing insurance coverage in countries with limited penetration (Hussels et al., 2005) and may become the main factor of new regulatory responses to climate change (Ranger and Surminski, 2011).

History shows that insurance contributes to disaster risk reduction only in countries with a mature risk management culture (Muir-Wood in Orie and Stahel, 2012). The Netherlands provides a good example. Investments made in hazard mitigation since the early 17th century now mean that flood mortality is 500 times lower than during the Middle Ages (Van Baars and Van Kempen, 2009).

Until recently, Dutch citizens could not legally purchase flood insurance, which forced the government to ensure flood risk protection levels (Orie and Stahel, 2012). Although this legal barrier has been removed, flood insurance is still not widely available. Discussions to develop a public-private partnership (PPP) for insurance coverage were halted in 2010 as a result of the economic crisis and tightening fiscal space (Ibid.).

In rapidly growing economies, particularly in Asia, insurance penetration is spreading faster than disaster risks are being reduced (Muir-Wood in Orie and Stahel, 2012). This practice increases exposure of the insurance industry to high and growing losses, even if existing risks are accurately modelled, which may not always be the case. In these countries, low insurance pricing, aimed at increasing market penetration or attracting investment, may not encourage risk-averse investment.

On the contrary it may stimulate increased business investment and hence accelerate the accumulation of disaster risk. It also generates fiscal risks when premiums are not risk-based and public sector institutions with limited experience of the insurance market are involved (Orie and Stahel, 2012.). In China, as Box 13.2 shows, insurance penetration in the property sector is still very low.

Recent catastrophes such as the Christchurch, New Zealand, earthquakes and Thailand flooding also have forced the insurance market to reconsider how to price intensive risks and to review their engagement in the market based on principles of insurability[iv]. Major disasters can lead to insurance pricing being revised and availability constrained. In Christchurch, a number of devastating earthquakes in 2010 and 2011 led to a thorough review of the country's insurance policies and land-zoning regulations (Box 13.3; Muir-Wood, 2012).

In another example, insured losses from the Thailand floods were estimated between US$15.2 billion (Aon Benfield, 2012a) and US$18 billion (Orie and Stahel, 2012). Subsequently, insurers and reinsurers have revised their risk ratings, and significant increases in the price of insurance and reduction of coverage are expected (Aon Benfield 2012a; Box 13.4). This could result in a potentially negative effect on foreign direct investment for Thailand but may discourage business investment in flood prone areas.

PPPs have the potential to greatly improve coverage and functioning of insurance markets. For example, in Norway, mortgage lenders are legally obliged to require that property owners purchase fire insur-

Box 13.4 The role of insurance in private investment promotion and business continuity

About 65–70 percent of insurance losses suffered in Thailand were borne by Japanese insurance companies through local subsidiaries, joint ventures or direct presence in the country (Courbage et al., 2012). Many of these had already paid out large amounts owing to the Great East Japan Earthquake and tsunami (Aon Benfield, 2012b). In spite of significant reinsurance, the three largest property insurance companies announced that their net loss owing to the flood was expected to be as high as US$5.1 billion as of mid-February 2012.

As a consequence, private insurers and reinsurers began to restrain flood coverage and charge higher premiums owing to the high risk of the country. This created challenges for Japanese companies with facilities in Thailand. As a result, the Japan External Trade Organization (JETRO) and Japanese business association requested the Thai Government to establish a public reinsurance fund to restore business confidence by providing flood insurance and reinsurance[v]. The Thai Government set up the National Catastrophe Insurance Fund in March 2012. However, if insurance pricing does not reflect risk levels, this may encourage rather than discourage increased disaster risk in the country. With the new Fund, these risks are now in effect owned by the Government of Thailand.

(Source: JETRO[vi])

Box 13.5 Mexico's MultiCat catastrophe bond

MultiCat Mexico 2009—catastrophic bonds to transfer earthquake and hurricane risks in Mexico to capital markets—was a product of a formal PPP. Swiss Re, one of the world's largest reinsurance companies, acted as co-lead manager and joint book-runner, drawing on its experience in providing insurance in emerging markets. The Mexican Government constructed the Fund for Natural Disasters (FONDEN) and an accompanying loss estimation model (R-FONDEN) to financially and technically underpin the MultiCat transaction. The partnership can be also indirect. According to Swiss Re, the public sector and the insurance industry are 'implicit partners' (Swiss Re, 2011b).

(Source: UNISDR)

ance, which is again legally mandated to accompany natural peril coverage (Orie and Stahel, 2012). Private insurance companies that wish to sell these policies are legally required to join an insurance pool called the Norwegian Natural Perils Pool (NNPP). The premium rate is the same for all insurance buyers, as stipulated by the Pool Board that represents all participating companies. The government manages the NNPP, provides reinsurance, and regulates the payout (Orie and Stahel, 2012). To avoid moral hazard potentially associated with a universal premium rate, insurance companies are allowed to reduce or waive indemnity if the insured cannot show that appropriate measures were taken to reduce the risk of loss (Ibid.).

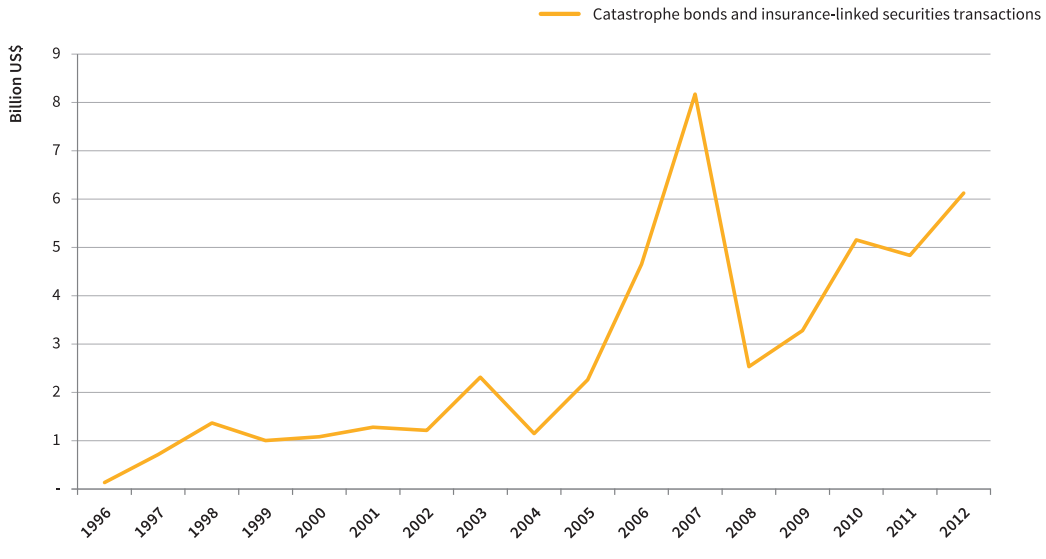
PPPs, as in the Norwegian case, can ensure high solvency, high penetration rates, and high amounts of accumulated capital reserves. They can also encourage risk-sensitive investment behaviour for businesses. However, care should be taken to maintain appropriate levels of competition among insurance companies, with the public sector focusing on facilitating and regulating the development of insurance markets based on sound risk assessments and providing an enabling environment for investments in risk reduction. Moreover, it is in the interest of national governments to use strong partnerships with the insurance sector to bolster its own financial liquidity and ensure fiscal stability during major disasters (see Box 13.5 and Chapter 5 of this report).

13.2 Risk for sale: insurance-linked securities

Financial markets are now increasing the supply of capital to the insurance industry through insurance-linked securities and similar financial products. This increases competition and the choice of insurance products available to manage disaster risks. However, these advantages may be undermined if asset managers and catastrophe bond issuers favour short-term gains in bond prices over the more sustainable long-term returns derived from potentially more realistic risk analysis.

The capital market around insurance and reinsurance has grown rapidly over recent years (Figure

Figure 13.1 Growth in the catastrophe bonds and insurance-linked securities market, 1996-2012



(Source: UNISDR, based on Artemis Catastrophe Bond & Insurance-Linked Securities Deal Directory[ix])

13.1) —now one of the few markets with a net inflow of funds[vii]. In the first quarter of 2012, for example, the issuance of catastrophe bonds[viii] reached a record level, driven by an 'excess supply of capital' for which investment opportunities have to be found (Aon Benfield, 2012d). The growing interest in these and other insurance-linked securities is expected to increase further (WCMA, 2012).

This market growth is neither driven by disaster risk reduction objectives nor directly requires that insured or reinsured parties reduce or manage their risks. The demand-side incentive comes from pension funds and institutional asset managers who seek to diversify their investment portfolios with alternative products that have uncorrelated risks and yields[x]. The incentive for the insurance industry includes the spreading of disaster risk over a wider capital base through a diversity of securities and other financial products. This extra capacity is especially attractive considering increased need to cover intensive risk. The multi-year fixed price capacity also makes investment planning of insurance companies more sound and easy compared with the usual annual term coverage of reinsurance (WEF, 2008).

The use of capital markets is not limited to insurers seeking alternatives for reinsurance. To smooth catastrophic risk, some countries issue catastrophe bonds instead of purchasing insurance, as shown in the Mexico example. In addition, companies such as Tokyo Disney, Universal Studio and Electricité de France have sponsored catastrophe-linked securities (OECD, 2011).

Despite significant insurance losses in recent years, the insurance-linked securities market remains strong as most contracts to date cover wind events in the United States of America rather than Asian earthquakes, floods and tsunamis (Aon Benfield, 2012a; WCMA, 2012). However, this may change with an increasing flow of capital into securities covering other regions and new hazards, and for which reliable catastrophe models are only now being developed.

Catastrophe bonds have been diversified in line with increasing investment trends (WEF, 2008). Their indices and premiums are based on detailed industry catastrophe models and risk assessments, which are regularly revised and updated, sometimes, as Box 13.6 shows, in real time. However, this risk information is very difficult for potential investors to

Box 13.6 Pricing risk in real time – lessons from Hurricanes Irene and Gustav

Insurance-linked securities are traded not just before or after disasters happen, but also during events. In such cases, the pricing of risk, via the pricing of securities, takes on a dynamic that is directly based on the evolution of the hazard event. For example, when Hurricane Irene was categorised as a Category 3 storm in August 2011, the prices of several catastrophe bonds fell by 30–50 percent. Once Irene was downgraded to a Category 1 storm and then subsided, prices quickly rebounded.

Thus, while risk modelling underpins the pricing of insurance-linked securities, trading is reactive to real events and on a real-time basis. So-called Live CAT Bonds have now been developed where trading takes place while the event, usually a hurricane, develops. Such Live CAT Bonds are commonly industry loss warranties, i.e. insurance products where payout is triggered by a predefined loss limit across an entire industry rather than an individual company's loss.

During Hurricane Gustav in 2008, US$9 million Live CAT Bonds were made available based on a new real-time hurricane index, through contracts between reinsurers and investment banks, hedge funds, etc.

The real-time aspect of the hurricane index and because it is fungible enabled the issuer to settle trades within three business days of hurricane landfall. Although this meant a cash-flow benefit to clients on both sides of the process, the simplicity of the index trigger may imply that risk levels may have been underestimated or not correctly priced, encouraging risk-increasing investment behaviour.

(Source: UNISDR, based on Aon Benfield, 2012d and[xii])

comprehend and is rarely disclosed to them [xi] owing to over the counter transactions of products (see Chapter 12). There are, however, signs of change, with information being provided to investors at a higher level of disaggregation (Aon Benfield, 2012d).

In February 2011, leading catastrophe modeller Risk Management Solutions (RMS) released a new version of its US hurricane risk model that significantly revised upwards the probability of hurricane risk. As a result, several US hurricane catastrophe bonds priced using the RMS model were downgraded as concerns of their profitability in light of the new model's results grew. Bond issuers began pricing new bonds on the risk models of competitor AIR Worldwide (AIR), which estimated lower probabilities (Aon Benfield, 2012d).

This highlights the tendency of asset managers and bond issuers to favour short-term gains in catastrophe bond prices over the more sustainable long-term returns derived from potentially more realistic risk analysis. RMS has since been forced to market its revised model in a more comprehensive 'Resilient Risk Management' strategy that raises awareness about exposure not only to hurricanes and earthquakes but to uncertainties in the catastrophe models (Ibid.).

Leading risk modellers, including AIR, are now committing to provide longer-term risk analysis in addition to medium-term perspectives on potential losses by improving the use of historical data and future projections in their risk models. Several industry leaders have highlighted the need to make explicit the uncertainties associated with commercial risk models available in the market (Aon Benfield, 2012d) to facilitate a more accurate pricing of risk.

The development of capital markets for insurance-linked securities is desirable considering that increased competition within and between the market and reinsurance companies would bring better product quality and affordability for insurance coverage. However, to increase investors and expand market size in a way that does not increase disaster risk, asymmetric information problems must be overcome by collecting and disseminating risk and loss information. Institutional infrastructure, such as accounting or solvency rules, also needs to be developed.

Note

i Moral hazard is a case where insurance buyers become less risk adverse owing to the coverage purchased. Adverse selection arises when risk–seekers are more likely to buy insurance than risk-averse individuals, potentially hiding real levels of risk.

ii The regional approach was initiated with support from the Global Environment Facility, the Swiss government, UNISDR and the World Bank.

iii http://www.economywatch.com/world_economy/china/structure-of-economy.html

iv When assessing risks, any insurer or reinsurer must take into account the fundamental principles and limitations of insurability. Insurability is not a strict formula, but rather a set of basic criteria that must be fulfilled in order for a risk to be insurable. Disregarding these constraints ultimately jeopardises the (re)insurer's solvency and its ability to honour its policy obligations. However, the strict criteria required for insurability can mean that certain exposures may remain uninsurable. Some basic principles considered include randomness of the event, quantifiable events and losses, mutuality of risk, and economic viability. For more information see: http://media.swissre.com/documents/The_Essential_Guide_to_Reinsurance_EN.pdf

v http://www.jetro.go.jp/world/asia/th/biznews/4f7d27132e248

vi http://www.jetro.go.jp/world/asia/th/biznews/4f7d27132e248

vii Luca Albertinie, CEO, Leadenhall Capital Partners LLP in Aon Benfield 2012a: p.42; and http://www.artemis.bm/deal_directory

viii Catastrophe bonds are high yield bonds that contain a provision which may cause the principal or interest payments to be delayed or lost to investors in the event of a specified loss such as a hurricane or earthquake (OECD, 2011).

ix http://www.artemis.bm/deal_directory

x Niklaus Hilti, Head of Insurance Linked Securities, Credit Suisse Asset Management in Aon Benfield 2012a:p45.

xi http://www.riskandinsurance.com/story.jsp?storyId=124326385

xii http://www.riskandinsurance.com/story.jsp?storyId=124326385