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CLIMATE CHANGE: IMPLICATIONS FOR THE (RE)INSURANCE INDUSTRY

Sofya Matteotti and Olga Nartova*

The impacts of climate change on the financial services industry, including insurance, are expected to be significant, but as yet its particular effects and the preparedness of the industry to respond are unknown. This article addresses primarily the role of the insurance industry, narrowing it down to reinsurance, in climate change adaptation. However, two other climate change response strategies – mitigation and communication – cannot be left out and the possible contributions of the industry to these strategies are considered. More in-depth research is needed in order to assess the extent to which the regulation of international trade in different financial services could foster adaptation of the industry to climate change. We conclude with the international framework perspective and argue that, in order to find a sound adaptation, solutions should be tailored to the needs, capacities and specificities of the region or country with the help of the (re)insurance industry expertise in risk assessment and risk management.

I INTRODUCTION

Climate change brings about a new set of major economic risks arising from changing weather patterns, extreme weather events and rising sea levels. The Intergovernmental Panel on Climate Change (IPCC) argues that adaptation to climate change is a necessary strategy to complement climate change mitigation efforts, since it has the potential to substantially reduce many of the

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adverse impacts of climate change and enhance beneficial impacts.[1] A viable adaptation solution that is rapidly gaining the support of countries and international donors is the transfer of risk to the global reinsurance and capital markets.

Extreme weather conditions will continue to cause major property damage and the question of who bears the costs is a serious issue for both companies and governments of developed and developing countries.[2] Numerous insurers are hoping the government will supplement private insurance for disaster recovery. In the United States, state governments are hoping for a federal insurance fund. The Alliance of Small Island States is advocating for a global public fund under the United Nations Framework Convention on Climate Change[3] (UNFCCC) to cover the costs of climate change.[4]

Historically, insurance policies have covered damage from serious weather events. However, climate change jeopardises economic viability of affordable policies and hence causes insurers to rethink their assumptions about the risks of extreme weather damage.[5] Understanding the role that insurance plays is essential to understanding several key issues about climate change, including incentives to encourage specific modes of behaviour and the importance of insurance products and services for other economic sectors.

The impacts of climate change on the financial services industry, including insurance, are expected to be significant, but as yet its particular effects and the preparedness of the industry to respond are unknown. More in-depth research is needed in order to assess the extent to which the regulation of international trade in different financial services could foster adaptation of the industry to climate change.

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1 See James J McCarthy and others (eds) *Climate Change 2001: Impacts, Adaptation and Vulnerability – Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, 2001) at ch 6. Adaptation is defined as an adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. See United Nations Framework Convention on Climate Change "Glossary of climate change acronyms" <www.unfccc.int>.

2 See for example Patricia Blazey and Paul Govind "Financial Adaptation Challenges for the Insurance Industry due to Climate Change" (2007) 4 MqJBL 15.

3 United Nations Framework Convention on Climate Change 1771 UNTS 107 (opened for signature 4 June 1992, entered into force 21 March 1994).

4 Virginia Haufler "Insurance and Reinsurance in a Changing Climate" in Henrik Selin and Stacy D VanDeveer (eds) *Changing Climates in North American Politics: Institutions, Policymaking, and Multilevel Governance* (MIT Press, Cambridge (Mass), 2009) 241 at 257.

5 Blazey and Govind, above n 2, at 17.

In this article, we primarily focus on the role of the insurance industry, narrowing it down to reinsurance, in climate change adaptation.[6] However, two other climate change response strategies – mitigation and communication – cannot be left out and the possible contributions of the industry to these strategies will be briefly described. This article discusses the following issues: the main question is the extent of the reinsurance industry's preparedness to provide services in the area of climate change. It is almost impossible for developing countries to cope with risks of climate change without international support. This leads to the question of how insurance companies might be encouraged to enter the market in both developing and least developed countries that will be most affected by climate change. Can international financing through the Adaptation Fund effectively serve the reinsurance function in these countries?[7] How does international donors' support affect the reinsurance industry?

These are all fundamental questions which we discuss, but do not purport to solve in this article. We start with a brief introduction to the scientific evidence of climate change and an overview of the recent major natural disasters worldwide. The article then outlines the foundations of the insurance industry, and its main actors and regulations. Throughout the article, we focus on the role of reinsurers as they are the final resort in the insurance chain.

The main part is devoted to the assessment of the insurance industry in the context of the three key response strategies: climate change mitigation, adaptation and communication. We go through the current proposals relating to how the industry can better serve the adaptation pillar.

It is not by coincidence that we further focus on the developing and least developed countries. These countries have limited resources of their own available for climate change adaptation, and outside financial support may negatively affect the market.

We conclude with the international framework perspective and argue that in, order to find a sound adaptation, solutions should be tailored to the needs, capacities and specificities of the region or country with the help of the (re)insurance industry expertise in risk assessment and risk management. The question boils down to the international institutional framework that will design such solutions.

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6 Reinsurance is the mechanism by means of which a portion of primary insurance risks transfers to a secondary tier of insurers (reinsurers). See McCarthy and others, above n 1, at Annex B: Glossary of Terms.

7 The Adaptation Fund was established under the United Nations Framework on Climate Change to support the adaptation efforts in the most vulnerable developing countries that are parties to the Kyoto Protocol to the United Nations Framework Convention on Climate Change 2303 UNTS 148 (opened for signature 16 March 1998, entered into force 16 February 2005). For more on the specific funded projects, see <www.adaptation-fund.org>.

II UNCERTAINTIES AND COMPLEXITIES AROUND THE SCIENCE OF CLIMATE CHANGE

The IPCC estimated in its 2007 report that a doubling of carbon dioxide (CO_2) would result in a rise in temperatures of about three degrees Celsius, with a small possibility of a significantly higher figure.[8] This shows that there is still huge uncertainty regarding the scientific aspects of climate change and, therefore, considerable difficulty in properly assessing the risks.

Climate change results in unpredictable changes in the frequency, intensity, extent and duration of extreme weather events. These unpredictable factors, therefore, affect the mean, variance and shape of probability distributions that the reinsurance industry uses. According to the latest IPCC study, anthropogenic factors are thought to have influenced weather extremes, including levels of greenhouse gases. It is probable that these factors have caused an increase in the world's extreme minimum and maximum temperatures, as well extreme precipitation, coastal high water levels and the overall sea level. However, unreliable records, high levels of variability and an incomplete understanding of the effects of climate change on tropical cyclones mean it is very challenging for scientists to confidently link cyclone change to anthropogenic factors.[9] Many extreme weather events will continue to be the result of natural variability while others will result from an accumulation of natural events not connected to anthropogenic factors.[10]

Even assuming that climate change becomes increasingly pronounced, some experts contend that losses from catastrophes will actually result primarily from changes in populations and wealth.[11]

The insurance industry is designed to function in the realm of uncertainty. It addresses this by calculating risk assessment into premiums. Regardless of its nature or origin, climate change

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8 See for example Susan Solomon and others *Climate Change 2007: The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, 2007). Compare Andreas Schmittner of Oregon State University who, for example, puts the likely figure at 2.3 degrees Celsius, which is 0.5 degrees below the consensus figure, with 66 per cent certainty of it being between 1.7 and 2.6 degrees and an upper limit of 3.2 degrees: see generally Andreas Schmittner and others "Climate Sensitivity Estimated from Temperature Reconstructions of the Last Glacial Maximum" (2011) 334 Science 1385.

9 Christopher B Field and others (eds) *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge, 2012) at 1–19.

10 At 4.

11 Joanne Linnerooth-Bayer, Christoph Bals and Reinhard Mechler "Insurance as a part of a climate adaptation strategy" in Mike Hulme and Henry Neufeldt (eds) *Making Climate Change Work for Us: European Perspectives on Adaptation and Mitigation Strategies* (Cambridge University Press, Cambridge (UK), 2010) 340 at 344.

contributes to this complexity and creates additional burdens, but potentially also new opportunities for (re)insurers and governments alike.

III NATURAL DISASTERS: WHERE WE ARE TODAY

According to the 2011 World Economic Forum Report on Global Risks, more than 16 out of the 25 most costly insured catastrophes of the last 40 years have occurred within the last decade.[12] The first six months of 2011 were the most costly on record for insurance companies because of an unusually high number of natural disasters. Powerful earthquakes in New Zealand and Japan, and tornadoes and floods in the United States and Australia, contributed to losses of approximately USD 70 billion, five times the year-on-year average for the last 10 years and second only to the full year loss of 2005.[13]

The 2005 Hurricane Katrina, for example, caused severe damage that far exceeded that of the "9/11" terror attack, yet the New Orleans area that suffered did not receive similar governmental financial assistance.[14]

Catastrophes that occur throughout the world influence the financial condition of the reinsurance market. Interestingly, the global reinsurance industry was not greatly exposed to losses from the Fukushima disaster. Nuclear risks are typically publicly insured and the semi-public Japan Earthquake Reinsurance Company is expected to struggle to cover the as yet unknown final costs, of which it will bear the bulk of the burden, in combination with governmental financial support.[15]

Figure 1 below reflects the catastrophic losses that have affected the (re)insurance industry in the period from the first quarter of 2010 to the second quarter of 2011.[16]

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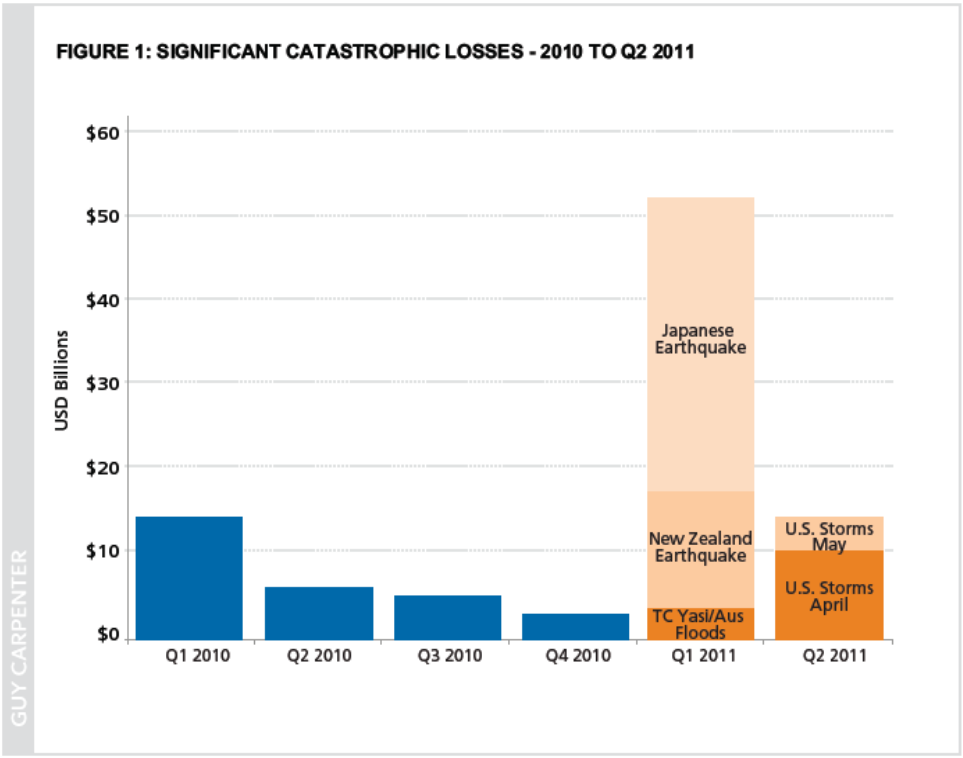
12 See generally Kristel Van der Elst and Nicholas Davis (eds) *Global Risks 2011: An Initiative of the Risk Response Network* (6th ed, World Economic Forum, 2011).

13 Guy Carpenter "World Catastrophe Reinsurance Market Review" (2011) <www.guycarp.com> at 2.

14 Carpenter, above n 13.

15 "Reinsurance after Japan's quake: When nature attacks" *The Economist* (online ed, 17 March 2011).

16 Carpenter, above n 13.



A complete understanding of the nature and scope of the risks is difficult because of a proclivity to underestimate the risk of extreme weather events and rely on government handouts for financial protection.[17]

Manifestations of climate change, such as increasingly powerful hurricanes and the frequency of wildfires after drought, may have an impact on the legal framework.[18] Climate change will potentially dramatically increase the exposure of the insurance industry, which will have to carefully devise new policies accordingly. One of the main challenges is to avoid situations where insurers take over new risks by subsidising old risks with new premiums.

Risk assessment and risk management as a core feature of effective adaptation, consisting both of risk prevention and risk transfer, constitute the basis of a well-functioning insurance industry.

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17 Carpenter, above n 13, at 17.

18 Isa Lang "Wrestling with an Elephant: A Selected Bibliography and Resource Guide on Global Climate Change" (2008) 100 Law Libr J 675 at 703, referring to Christina Ross, Evan Mills and Sean B Hecht "Limiting Liability in the Greenhouse: Insurance Risk-management Strategies in the Context of Global Climate Change: Liability and the Allocation of Risk" (2007) 26 Stan Envtl LJ 251.

Many questions remain, however, about how the insurance industry can respond to the need for risk management options against the backdrop of increased risk and uncertainty, especially in developing countries. No doubt, however, an integrated approach is necessary to ensure the financing of risk assessment and the implementation of risk prevention, reduction and transfer solutions to help those most vulnerable to climate change.

IV RISK TRANSFER OPTIONS

There are a number of alternative risk transfer options, including market payments, transfer to a reinsurer, catastrophe bonds (without interest and above market return if a specified event does not happen),[19] and contingent credit (requiring a pre-event fee to secure a specified post-event annuity). According to the World Economic Forum's Global Agenda Council on the Mitigation of Natural Disasters, alternative risk transfer options "offer innovative financial solutions to meet the growing needs of financial coverage of catastrophic risks and permit investors to play a more direct role in that sphere."[20] Such arrangements of pooling and transferring the risk can work separately or be combined.[21] Another promising financial innovation is used in the agricultural sector, namely weather-index based micro-insurance for subsistence farmers in countries where traditional insurance is unavailable or still unaffordable. The successful examples that are used on the micro-level already exist and will be presented later in this article.

V REGULATION OF THE (RE)INSURANCE INDUSTRY

The insurance industry is one of the wealthiest in the world. According to the recent study conducted by Swiss Re, the global direct premiums amounted to USD 4,597 billion (made up of approximately 57 per cent life insurance and 43 per cent non-life insurance premiums) in 2011.[22]

Insurance and reinsurance – primary and secondary insurance – are very similar industries based on similar mechanisms (through underwriting, investment, claims, control over expenses and the reinsurance (and for reinsurers, retrocession) programme), which impact on one another and their respective policyholders. Governmental regulation at all levels covers the initial right of establishment, risk types, consumer protection and specific contracts, including reinsurance. For this

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19 Over 160 catastrophe bonds have been issued by companies, international organisations and governments to protect them against predefined risks of natural disasters, terror attacks and other such disasters: see Van der Elst and Davis, above n 12, at 49.

20 Van der Elst and Davis, above n 12, at 49.

21 Linnerooth-Bayer, Bals and Mechler, above n 11, at 342.

22 Swiss Reinsurance Company Limited "World insurance in 2011 Swiss Re Sigma Study 3/2012" (2012) <www.swissre.com> at 8.

reason a unified regulatory apparatus for both types of insurance across a jurisdiction makes sense,[23] but some differences exist due to the fact that direct insurers are more heavily regulated than the reinsurers. The main reason for this is that reinsurance industry is considered to be more highly expert and does not directly involve final consumers.[24]

The effects of insurance and reinsurance contracts are often similar, although reinsurance contracts often contain exceptions and special clauses to spread risk that are not permitted in insurance contracts. Not only do reinsurers insure insurers, they also insure other reinsurers (as retrocessionaires), therefore making an accurate assessment of their financial positions a complex task.[25]

As Virginia Haufler correctly stresses "… most of the interesting changes with regard to insurance and climate change primarily reflect the relationships among US direct insurers, US regulators, and international reinsurers."[26] Reinsurers primarily represented by European companies are not bound by the pricing regulations introduced in the United States.

European (re)insurers now actively try to account for climate risk in their estimates, while most firms in the United States do not consider climate change a major threat to their businesses. In contrast to the partnering of major European reinsurance firms with international organisations, the United States insurance industry has resisted a proactive and progressive approach to climate change, preferring to let the federal government take the lead.[27] However, United States insurance is regulated at the state level and so far only in Massachusetts have regulators allowed insurance firms to follow their European counterparts and base their prices on climate prediction models.[28] Such fragmented regulations hinder not just effective cooperation between the states, but also explain the lack of a common approach at the federal level to integrate the new risks posed by climate change. This lack can be overcome by utilising the rules of world trade.

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23 KPMG "European Commission Study into the methodologies for prudential supervision of reinsurance with a view to the possible establishment of an EU framework" (2002) European Commission <www.ec.europa.eu> at 7.

24 For more on the regulatory differences in various jurisdictions, see generally KPMG, above n 23.

25 At 9.

26 Haufler, above n 4, at 246.

27 At 244.

28 At 253 citing Evan Mills, Richard J Roth and Eugene Lecomte "Availability and Affordability of Insurance under Climate Change: A Growing Challenge for the U.S." (2005) Ceres <www.ceres.org>.

VI ROLE OF THE (RE)INSURANCE FOR CLIMATE CHANGE ADAPTATION

In 1992, Jeremy Leggett, of Greenpeace International, was one of the first people to make the link between insurance losses and global warming.[29] In 1994, Munich Re, the world's largest reinsurance company, which had developed research and statistics for disasters in the 1970s, advocated for governments to stabilise greenhouse gas emissions and honour their commitments made at the United Nations Conference on Environment and Development in Rio de Janeiro.[30]

As suggested by the IPCC Report and Stern Review, insurance can play an important role in sharing risk and facilitating adaptation and thus limiting the impact of climate disasters that occur.[31] Moreover, in some cases, for example high-impact, low probability events, insurance and other risk transfer mechanisms may represent a cost-effective response.

VII ROLE OF THE (RE)INSURANCE FOR CLIMATE CHANGE MITIGATION

Another field where the insurance industry might make a contribution is climate change mitigation. The insurance sector is one of the world's largest institutional investors and climate change will impact its decisions on where to invest, for example in reducing carbon emissions or in alternative sources of energy.[32]

It is interesting to observe that the main profits of the reinsurance industry consist of returns from investments rather than underwriting income.[33] Due to their active participation in the capital markets, the division between banking and reinsurance becomes less visible. Moreover, as noted in the Stern Review, rising costs of extreme weather events would potentially have a big impact on global financial markets in general through higher costs of insurance.[34]

Some economists argue that preventing losses through disaster risk reduction will often be more cost-effective than coping with them through loss-based insurance instruments. It has become evident that in the context of climate change, insurance is not suitable for all situations (for example, very slow-onset impacts such as the rise in the sea level, that are guaranteed to take place) and often covers only extreme events.

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29 Haufler, above n 4, at 247.

30 At 250.

31 Nicholas Stern *The Economics of Climate Change: The Stern Review* (Cambridge University Press, Cambridge, 2007) available at <www.siteresources.worldbank.org>.

32 Haufler, above n 4, at 242.

33 At 254.

34 See generally Stern, above n 31.

VIII ROLE OF (RE)INSURANCE FOR CLIMATE CHANGE COMMUNICATION

Climate change communication is an essential ingredient in informing citizens and mobilising the political process.[35] Its most important component is risk communication to keep society informed about the level of potential risks and availability of insurance solutions. Here, governments and the international community can make the best of the expertise accumulated in the insurance industry.

IX CURRENT PROPOSALS FOR REFORM OF THE INSURANCE SYSTEM

The insurance industry has begun factoring in the impact of climate change in its premiums to reflect the influence of global warming on production and the value of assets. Such insurance, in turn, could be used as security against loans.

Kristin Kuntz-Duriseti suggests combining economic analysis with the precautionary principles of insurance premiums, hedging strategies and the inclusion of low probability events in risk assessments in order to address the uncertainty in the interaction of human and environmental systems.[36]

Peter Hoeppe and Eugene Gurenko propose insurance-based climate risk financing mechanisms at the country level.[37] By paying a fixed insurance premium that can be a small fraction of the potential economic loss, countries can cap the amount of their fiscal loss, greatly reduce the uncertainty of national budgetary outcomes due to natural disasters and increase the speed of their post-disaster economic recovery.

Joanne Linnerooth-Bayer and Reinhard Mechler recommend a two-tier climate insurance strategy to ensure developing countries meet the intent of Article 4.8 of the UNFCCC by enabling the establishment of public-private instruments that are affordable and encourage environmentally friendly behaviour, as well as a disaster relief fund for risk responsible countries.[38] This strategy

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35 Philipp Aerni and others "Climate Change and International Law: Exploring the Linkages Between Human Rights, Environment, Trade and Investment" (2010) 53 Germ Yrbk Intl L 139 at 158. See also Thomas Cottier "Confidence-Building for Global Challenges: The Experience of International Economic Law and Relations" in Ruth Greenspan Bell and others *Building International Climate Cooperation: Lessons from the weapons and trade regimes for achieving international climate goals* (World Resources Institute, Washington (DC), 2012) 177.

36 See generally Kristin Kuntz-Duriseti "Evaluating the economic value of the precautionary principle: using cost benefit analysis to place a value on precaution" (2004) 7 Environmental Science and Policy 291.

37 Peter Hoeppe and Eugene N Gurenko "Scientific and economic rationales for innovative climate insurance solutions" (2006) 6 Climate Policy 607 at 607–620.

38 Article 4.8 calls parties to give full consideration to actions necessary under the Convention, including actions related to funding, insurance and the transfer of technology to meet the specific needs and concerns

would be based on the success of donor supported insurance schemes already operating in some countries.

Christoph Bals, Koko Warner and Sonja Butzengeiger envisage a scheme whereby countries affected by climate change can get insurance to cover defined, country-specific risks, merely outlining a way to indemnify countries that are likely to suffer most from global climate change and considering what the key design elements would be.[39]

Andrew Dlugolecki and Erik Hoekstra[40] emphasise that about 80 per cent of climate disaster-related losses are uninsured as a result of lack of awareness, a lack of data, misperception of risk and the government's preparedness to intervene. Their solution is public-private partnerships, whereby the public sector seeks to reduce risk where it can and provide assistance for high risk areas while regulating the market for other risks. The private sector competitively covers lower risk areas and provides consultancy and administrative services. Thus, they contend that catastrophe insurance must be based on estimating and administering risk at national or local levels.

Weather events threaten everyone in a particular region at the same time, making mutual risk sharing at the international level more worthwhile than at the regional level.[41] However, the insurance solution is not always the right one. A single global insurance mechanism, that could be managed by the UNFCCC, might be less effective than countries or regions using risk transfer mechanisms as part of their adaptation strategy, if appropriate to their situation. In other words, tailored solutions for specific regions seem to be more promising than the allocation of a proportion from the international Adaptation Fund. International support should rather focus on enabling exposed poor communities, micro and small enterprises, and governments to access incentive compatible insurance and avoid distorting market prices and crowding out private capital. Therefore, the proposal of Dlugolecki and Hoekstra to promote public-private partnerships seems to be a promising one as it offers governmental financial support in situations where private insurance does not work (for example, through mandatory insurance), but leaves other risks to be covered by the private sector.

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of developing country parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures: Joanne Linnerooth-Bayer and Reinhard Mechler "Insurance for assisting adaptation to climate change in developing countries: a proposed strategy" (2006) 6 Climate Policy 621 at 621–636.

39 Christoph Bals, Koko Warner and Sonja Butzengeiger "Insuring the uninsurable: design options for a climate change funding mechanism" (2006) 6 Climate Policy 637 at 637–647.

40 Andrew Dlugolecki and Erik Hoekstra "The role of the private market in catastrophe insurance" (2006) 6 Climate Policy 648 at 648–657.

41 See generally Solomon and others, above n 8.

X THE DEVELOPING COUNTRIES' PERSPECTIVE

Levels of exposure and vulnerability vary between regions and countries, but similarly affect coastal settlements including islands and megadeltas, and mountain regions: "Rapid urbanization and the growth of megacities, especially in developing countries, have led to the emergence of highly vulnerable urban communities, particularly through informal settlements and inadequate land management."[42]

Wealthy developed countries are more able to deal with the effects of climate change. Low-lying Holland, for example, is more concerned about river than coastal flooding and can relatively easily afford the estimated EUR 1–2 billion per year cost of prevention.[43]

Poorer countries are typically more dependent on farming than wealthy ones, which places them at greater risk from climate change, even though they have fewer financial resources to deal with it: "Crops are sensitive to changes in patterns of rainfall and peak temperature, as well as to average temperature and precipitation; so are the pests and diseases that attack them."[44]

Pamela Cox, the World Bank's Vice-President for Latin America and the Caribbean, emphasises how it is often hard for the governments of poor countries to justify spending scarce resources on climate change prevention instead of on more immediate requirements.[45] Poor countries often have their insurance premiums paid for by donors. This was the case with Haiti in 2010, which actually purchased more hurricane than earthquake insurance prior to the powerful earthquake that struck there.[46] This was possible under the Caribbean Catastrophe Risk Insurance Facility (CCRIF) that was tailored as a public-private partnership in 2007 for 16 Caribbean governments to limit their financial exposure to hurricanes and earthquakes: "By pooling the risks of its members, CCRIF serves as a risk aggregator and can provide insurance coverage at a comparatively low premium for otherwise mostly uninsured catastrophe risks borne by sovereigns."[47] As noted in the Statement of the Global Insurance Industry, this example "… illustrates that dialogue between governments and insurers can create tailored, institutionally light and flexible solutions for particular regions."[48]

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42 Field and others, above n 9, at 8.

43 "Adapting to climate change: Facing the consequences" *The Economist* (online ed, 25 November 2010).

44 "Adapting to climate change: Facing the consequences", above n 43.

45 "Catastrophe insurance: When calamity strikes" *The Economist* (online ed, 21 January 2010).

46 "Catastrophe insurance: When calamity strikes", above n 45.

47 See generally about the the Caribbean Catastrophe Risk Insurance Facility at <www.ccrif.org>. See also the recent Implementation Completion and Results Report (ICR) on CCRIF's performance published by the World Bank on September 2012 at <www.ccrif.org>.

48 United Nations Environment Programme Finance Initiative "Global insurance industry statement on adapting to climate change in developing countries" <www.unepfi.org>.

Another two examples of effective risk management solutions can be observed in Northern Ethiopia and Mongolia.[49] Horn of Africa Risk Transfer for Adaptation (HARITA) is an insurance scheme applied in some communities in Ethiopia that combines climate change mitigation measures and crop insurance for farmers.[50] Underwritten by a local company, and reinsured by a global reinsurer, it uses a rainfall index as a basis for calculating the compensation for farmers (that are able to pay the premiums through labour) growing the Ethiopian three staple grain crops in case of drought. These examples show that insurance might be a sound mechanism to manage the risks, if properly designed, and also potentially to achieve international equity. On the other hand, climate insurance is not easily available without some public intervention and support. However, certain eligibility criteria would be required to ensure fair applicability and effectiveness.[51]

Outside aid and premium subsidies can have negative effects, obscuring price signals and thus weakening incentives for prevention, while prolonging exposure by temporarily safeguarding high risk locations and occupations. Critics also argue that reinsurance for small farmers, for example, can exclude a useful role for the private market, although proponents contend that the market frequently fails to give accurate price signals anyway.[52] Moreover, other risks should be taken into consideration, including the risk of creating unstable insurance systems because donor institutions do not always have the capacity to make long term commitments, and the risk that specific private companies could be unfairly advantaged over others. Recognising these disadvantages, the European Commission, amongst many governments and bodies, is moving away from relief towards prevention policies for climate related disasters.[53]

XI INTERNATIONAL NEGOTIATIONS ON RISK REDUCTION AND INSURANCE INSTRUMENTS

Multiple proposals concerning disaster risk reduction and insurance instruments were circulated during the UNFCCC negotiations prior to the 15th Conference of the Parties in Copenhagen (COP15).[54] In 2008, the Swiss government re-emphasised the need for a multilateral prevention and

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49 Global AgRisk Incorporated "Projects" <www.globalagrisk.com>.

50 Coco McCabe "Weather insurance offers Ethiopian farmers hope – despite drought" (14 October 2009) Oxfam America <www.oxfamamerica.org>.

51 Ian Burtona and Gary Yoheb "Insurance for Climate Change: Opportunities for Public-Private Partnership Initiatives to Share Losses and Promote Adaptation" (2003) United Nations Framework Convention on Climate Change <www.unfccc.int>.

52 Linnerooth-Bayer, Bals and Mechler, above n 11, at 341.

53 Linnerooth-Bayer, Bals and Mechler, above n 11, at 341.

54 See Koko Warner and Andreas Spiegel, "Climate change and emerging markets: the role of the insurance industry in climate risk management" in The Geneva Association *The insurance industry and climate change – Contribution to the global debate* (The Geneva Association, Geneva, 2009) 83.

insurance fund, which the Alliance of Small Island States and the Munich Climate Insurance Initiative followed up, ahead of the Copenhagen summit, with two propositions that the international community should make available funds and transfer mechanisms for the most vulnerable countries.[55]

The Munich Climate Insurance Initiative proposal included two aspects: prevention and insurance. Prevention covers support for cost-effectively preventing and reducing low-level weather risks, such as repetitious dry seasons and heavy rains. Insurance covers the remaining medium and high-level risks that cannot be prevented. Medium-level risks, such as a one-in-50-year return period event, would be covered by a public-private climate insurance assistance facility for vulnerable communities, which could include micro-insurance for agriculture or risk pooling, as well as a reinsurance from the global market climate insurance pool to cover pre-defined high risks, at no cost to beneficiary countries.[56]

Insurance has been mentioned in each milestone document that has come out of international negotiations on climate change: the 1992 UNFCC Convention (Article 4.8); the 1997 Kyoto Protocol (Article 3.14)[57]; and the 2007 Bali Action Plan.[58] The Cancun Agreements mentioned insurance as a climate change related disaster risk reduction strategy, the use of which should be enhanced at the local, national, sub-regional and regional levels.[59] Also, invited parties and relevant organisations were asked to express their views on the following issues:[60]

- possible development of a climate risk insurance facility to address impacts associated with severe weather events;

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55 Koko Warner and Andreas Spiegel, "Climate change and emerging markets: the role of the insurance industry in climate risk management", above n 54, at 83.

56 Nicola Ranger, Swenja Surminski and Nick Silver "SBI Work Programme on Loss and Damage, Submission by the Grantham Research Institute on Climate Change and the Environment & The Centre for Climate Change Economics and Policy" (2011) United Nations Framework Convention on Climate Change <http://unfccc.int> at 17.

57 Article 3.14 calls parties to consider the establishment of funding, insurance and transfer of technology measures.

58 This calls the international community to consider risk management and risk reduction strategies, including risk sharing and transfer mechanisms such as insurance: Conference of the Parties to the United Nations Framework Convention on Climate Change *Report of the Parties on its thirteenth session held in Bali from 3 December to 14 December 2007* FCCC/CP/2007/6/Add1 (2008).

59 Conference of the Parties to the United Nations Framework Convention on Climate Change *Report of the Conference of the Parties on its sixteenth session held in Cancun from 29 November to 10 December 2010* FCCC/CP/2010/&/Add1 (2011) at [14(e)].

60 At [28].

- options for risk management and reduction, risk sharing and transfer mechanisms such as insurance, including options for micro-insurance, and resilience building, including through economic diversification; and,
- engagement of stakeholders with relevant specialised expertise.

Climate change is a global issue that impacts the policies and strategies of all nations. It is essential that a collective approach is taken within the international negotiations process, even though individual states will fashion their own responses matched to specific risks.[61] As mentioned above, relevant insurance might be easier and more affordable for developed countries, since such schemes as mandatory governmental (re)insurance could guarantee some economic stability and manage climate change related risks. A more sophisticated approach is needed for developing and least developed countries. Regulatory incentives should be created for foreign insurance service providers to operate in these markets. There is a clear need for cooperation in developing an effective and coherent response system with a proper institutional framework.

XII CONCLUSION

Both market incentives and regulatory action are needed for effective policy change.[62] Well-designed insurance schemes can provide incentives for behaviour that reduces climate disaster risk and, therefore, should not be thought of as an alternative to prevention and other adaptation measures.[63]

Insurance is just one part of broader risk management. Subsidies at the national and international level have a proclivity to distort price signals, encourage poor adaptation and exclude private insurance. However, it may be necessary to allow insurance to play a role for the benefit of vulnerable people in developing countries.[64] There is an apparent opportunity for developing countries to utilise insurance and related financial instruments which provide security against droughts, floods and tropical cyclones to reduce vulnerability to climate change risks. New financial risk management options are one means for developing countries to safeguard national economies and investments against climate risk.

We suggest that insurance must be a central factor in evolving climate change strategies and regulation, providing governments with the potential to optimise partnerships with the insurance industry to tackle climate change and to ensure proper regulation for the financial stability of the industry.[65] However, although effective in lessening the long-term effects of climate change related

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61 Blazey and Govind, above n 2, at 18.

62 Haufler, above n 4, at 257.

63 Linnerooth-Bayer, Bals and Mechler, above n 11, at 341.

64 At 342.

65 Blazey and Govind, above n 2, at 17.

risks of poverty and development, insurance is not a fix-all adaptation option, because insurance is rarely suitable for climate risks that are slow to develop or for which other measures are required, such as rising sea levels and ocean acidification or desertification. Also, in the absence of government or donor support, private insurance is too expensive for governments and households, especially invulnerable regions where the opportunity cost of private risk-financing instruments is too high.

To date, reinsurers have avoided employing significant capital and underwriting expertise to produce micro-insurance schemes, although they are taking on board the lower probability/high-consequence aspects of numerous recent public-private initiatives, such as in Ethiopia.[66] This position seems to be due to the uncertainty regarding the international regime and lack of institutional lead that should come from the UNFCCC process and utilise the technical expertise of the reinsurance industry to design specific private-public solutions for a concrete vulnerable region or country.[67]

Looking at this problem through the lens of international trade regulation, there is potential to evaluate the level of liberalisation, market access and adverse effects of the heavily government subsidised catastrophic risk insurance programmes. Also, the current status of (re)insurance services liberalisation and level of commitments that developed and developing countries undertake should be assessed, and the changes that happened on the ground after liberalisation should be traced.

66 Linnerooth-Bayer, Bals and Mechler, above n 11, at 341.

67 Blazey and Govind, above n 2, at 16.