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Do capital markets have a role in making catastrophe insurance a new development tool?

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NATURAL DISASTERS HAVE TAKEN A HUMAN TOLL FOR CENTURIES. THEY HAVE ENGENDERED NUMEROUS MYTHS AND ARE PART OF WORLD HISTORY, WITNESS THE RUINS OF HERCULANUM AND POMPEI. OVER THE LAST FEW DECADES, HOWEVER, THE INCIDENCE OF NATURAL DISASTERS HAS STEADILY GROWN. THE FREQUENCY OF GREAT NATURAL DISASTERS ACROSS THE GLOBE DURING THE PERIOD 1950-2005 HAS RISEN FROM A MEAN LEVEL OF ABOUT TWO PER YEAR IN THE 1950S TO ABOUT SEVEN IN RECENT YEARS (SEE EXHIBIT 1). MOREOVER, THERE ARE STRONG INDICATIONS THAT THE FREQUENCY AND INTENSITY OF NATURAL DISASTERS MAY CONTINUE TO RISE.

25

Climate change and climate-related catastrophes

There is growing evidence that the increased severity of natural disasters also reflects the adverse effects of climate change. Closer scrutiny of differing trends in the various types of natural disasters in Exhibit 1 reveals that the increase in the overall frequency of natural disasters results largely from weather related disasters, such as windstorms, floods, and temperature extremes (e.g., heat wave, droughts, and wildfire). The incidence of natural disasters unrelated to weather (e.g., earthquakes, volcanic eruptions, and tsunamis) indeed exhibits little or no upward trend. If these trends are an indication of a causal relationship between climate change and frequency and intensity of natural disasters, their effects are likely to be compounded in the future with potentially severe adverse impact on economic development, and on the lives of millions of people in emerging economy countries.

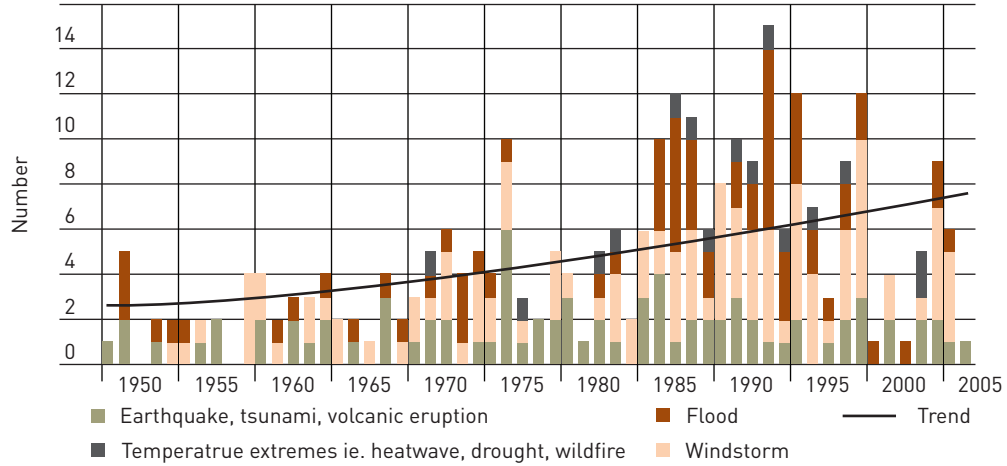
Economic consequences of natural disasters

Natural disasters caused US\$122bn in economic losses in 2004, and reached record levels in 2005 with US\$182bn in losses (see Exhibit 2). As the chart shows, there is a growing trend since the 1960s in both insured and overall losses.

Natural disasters can have ruinous consequences for emerging economies. In 1998, Hurricane Mitch generated uninsured losses in Honduras equal to 34% of GDP and 158% of government revenues. Turkey saw losses of US\$23bn (95% of which was uninsured) in the 1999 Izmit earthquake – equal to 5% of GDP and 21% of fiscal revenues. This situation is exacerbated by the growing severity of (increasingly frequent) disasters resulting from the growing concentration of assets and population in risk areas. Furthermore, evidence continues to accumulate that natural disasters impede growth in longer term economic development leading to increased poverty levels in emerging economy countries.

Great ^{a/} natural disasters over 1950-2005 (number of events)

Exhibit 1

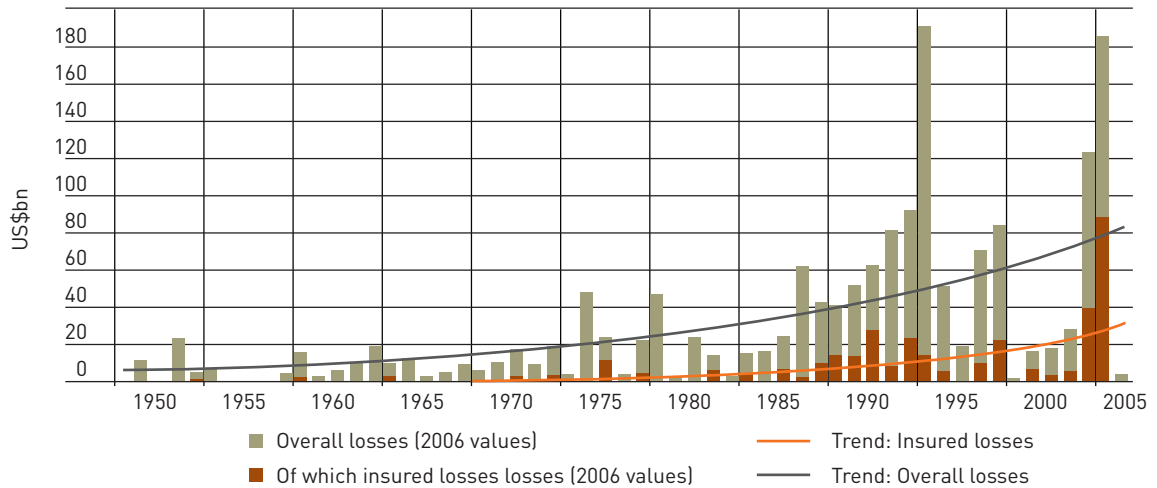


^{a/} "In line with United Nations definitions, natural catastrophes are classified as 'great' if the affected region's ability to help itself is clearly overstretched and supraregional or international assistance is required. As a rule, this is the case when there are thousands of fatalities, when hundreds of thousands of people are left homeless, or when overall losses – depending on the economic circumstances of the country concerned – and/or insured losses are of exceptional proportions."

Source: Topics Geo: Natural catastrophes 2006: Analysis, assessments, positions, Munich Re

Economic losses resulting from natural disasters

Exhibit 2



Source: Topics Geo: Natural catastrophes 2006: Analysis, assessments, positions, Munich Re

Natural disasters put substantial pressure on public finances in emerging economies, particularly in smaller economies. Governments face a smaller revenue base as economic activity is suppressed following a disaster (and tax collection may also be hindered), while there are increased pressures on public expenditure. Governments must devote resources for short term disaster relief operations, restore public infrastructure (roads, bridges, harbours, airports and government buildings), provide financial support to the weaker segments of the population, and often be called upon to restore damaged housing. Resources are often diverted from other important development programs and projects to fund disaster relief and recovery operations, which has a significant adverse impact on economic development.

Current state of global insurance markets

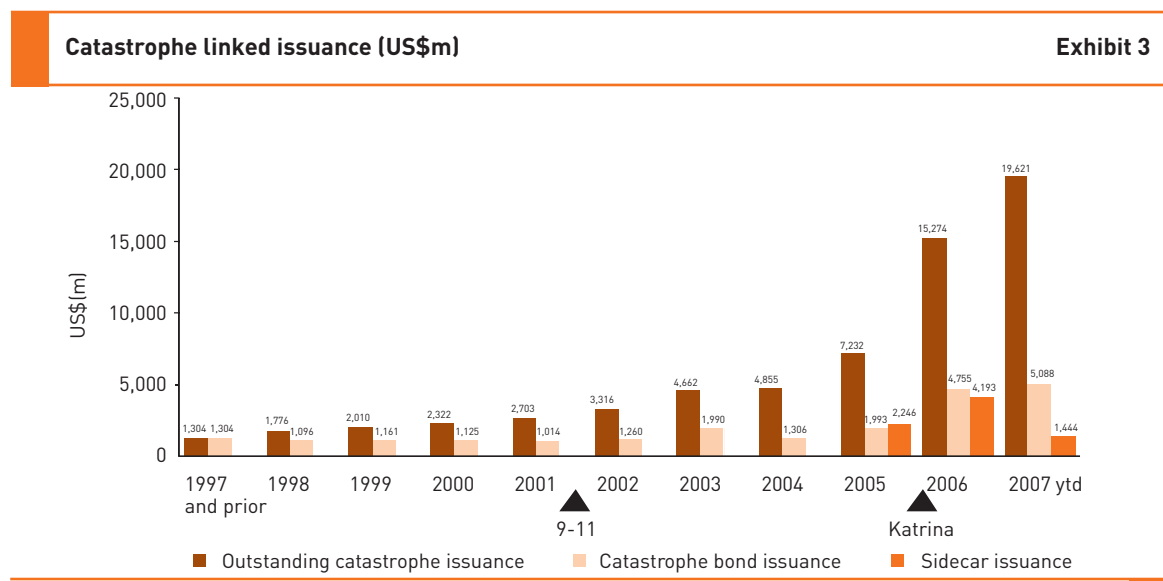
The very large risks of extreme catastrophic events are best mitigated by well-functioning insurance markets through risk diversification and reserves accumulation. Over the past two decades, there has been considerable growth in

the commercial catastrophe insurance industry. Despite increasing frequency and intensity of natural disasters, the growth in private catastrophe insurance has far surpassed growth in overall economic losses from natural disasters. However, insurance coverage has been largely concentrated in developed countries, with North America, Japan, and Western Europe accounting for the bulk of the market.

Insurance appears to be the most natural of risk finance for the huge potential downside of catastrophes, provided that such insurance is available and does not come at a prohibitive cost. Insurance premiums are ultimately driven by the risk taking capacity available on a global basis. The global reinsurance industry has long been the ultimate risk carrier, although with a limited capital base and few opportunities to diversify or transfer highly concentrated catastrophic risk. This situation could change as capital markets have started to offer credible alternatives.

How capital markets can expand insurance coverage

The market for catastrophe insurance linked instruments, the most important of which are cat bonds,¹ has been gradually but steadily expanding over the last two decades.



Source: Goldman Sachs

The cat bond market was launched in the nineties as re-insurers looked for alternatives to using their own balance sheets to cover their natural catastrophe exposures. About US\$19bn of cat bonds are currently outstanding (see Exhibit 3). Cat bonds are issued in sizes ranging from US\$10m-US\$600m with an average size of around US\$100m, and in maturities between one and 10 years with an average maturity of about three years. Primary insurance companies, reinsurance companies, government agencies and other entities have used catastrophe bonds to transfer risk to the capital markets. Outstanding cat bonds have largely provided cover against natural disasters in the US, Western Europe, Japan, Taiwan, Australia and, more recently, Mexico.

The Mexico cat bond

In March 2006, Mexico issued US\$160m of three-year maturity cat bonds to provide cover against earthquake risk. The bonds act like an insurance policy for the Mexican government. Investors paid an amount of US\$160m into a collateral trust fund, which was invested in high grade securities. If an earthquake of specified threshold intensity occurs in designated areas of the country within the life of the bond, the government will be able to draw from these funds. If no earthquake of the threshold intensity occurs during the life of the bond, the principal of the bond will be returned to the investors along with LIBOR + 200bps interest. This is the first and only time so far that an emerging market country has issued a cat bond.

How catastrophe linked securities markets expand insurance capacity

The development of markets for catastrophe-linked instruments answers multiple needs, starting with the need of global re-insurers for risk management tools. The traditional business model that global reinsurance companies have relied upon may have indeed reached its limits over the past 10 years. Half of the 10 most costly disasters for world insurance occurred in 2004-2005 with an aggregate insurance loss of US\$91bn. Katrina alone represented US\$45bn.² It is estimated that re-insurers took half of these losses,³ leading to a dramatic upward reassessment of insurance premiums in 2006. Overall, re-insurers appear constrained in terms of risk capital and would expand their business if they could actively manage the risk on their balance sheets.

At the same time, institutional investors worldwide are showing a growing appetite for diversified and high-yielding risk. The investor base for catastrophe risk has now expanded beyond the community of catastrophe risk-specialised hedge funds – or ‘cat funds’ – to include re-insurers, insurance companies and money managers. This may well be the driving force that recently propelled catastrophe bond issuance to new heights (US\$15bn outstanding in 2006 and US\$19bn for the first half of 2007 against US\$7bn in 2004). As the range of products available to investors continues to expand,⁴ the catastrophe bond format appears to offer greater flexibility. The introduction of CDO technology in 2007, that offers layers of catastrophe risk in a familiar tranch form with associated ratings, could help further broaden the investor base.

Capital market investors have the potential to significantly expand the risk taking capacity of re-insurers. One figure helps to illustrate this point. The brokerage firm Guy Carpenter reports that, in spite of the very severe 2004-2005 losses, the overall level of capital⁵ in the global reinsurance industry increased from around US\$250bn at the end of 2002 to around US\$400bn in December 2005. This was largely due to new capital provided by capital market investors in Bermuda-based reinsurance companies and/or side-cars.

Catastrophe risk markets have much room for growth and can still be considered as young markets. Prior to the strong 2006-2007 growth, the consultancy firm of Tillinghast reported that only an estimated US\$0.4bn-US\$1.6bn of losses due to Katrina (out of a US\$39.9bn-US\$54.6bn total) was absorbed by capital markets.

Why emerging economies lack adequate catastrophe insurance coverage

The most compelling factor remains the unanswered needs of those currently deprived of natural disaster insurance, namely the majority of disaster-prone developing countries. Historically, donors and international financial institutions (IFIs) have provided the needed assistance albeit ex-post, after a disaster event has occurred.

There are a number of specific reasons why most emerging countries have not set up adequate ex-ante risk financing policies, which can be analysed in terms of a possible market failure of private insurance.

Historically assistance provided by donors and IFIs

While international donors usually provide funds in the aftermath of natural disasters, this humanitarian aid offsets a very small fraction of countries' disaster losses. Over 1987-1989, international donors provided less than 5% of total economic losses sustained by emerging market economies. While this share has increased somewhat since then, donors still provided only about 10% of losses in 2003.⁶

Another source for meeting the post-disaster funding gap in emerging market economies are concessionary and non-concessionary loans from IFIs, including the World Bank, International Monetary Fund (IMF) and regional development banks. Indeed, emergency disaster recovery and reconstruction loans have become a significant part of the loan portfolios of IFIs.

'Market failure' of private insurance

There are several reasons why private insurance markets do not always provide effective coverage for less developed economies.

- **High and volatile premiums.** The catastrophe insurance industry deals with low-probability high-severity risks. A single event may generate extreme losses, significantly deplete the industry's capital and temporarily disrupt the market. Global re-insurers allocate an estimated US\$60bn of their total risk capital to catastrophic risk, a small amount compared to the US\$20bn loss events that have become more frequent since the early nineties. Because new capital faces additional uncertainty – particularly if an event deviates significantly from past trends – reinsurers require higher returns. There is clear evidence that catastrophe reinsurance premiums are volatile and tend to spike after a major catastrophe.

- **Moral hazard.** The widely held perception that disaster relief and recovery costs will be covered by donors and development banks weakens countries' incentives to buy insurance and to engage in pro-active ex ante country level disaster risk management programs. This particular form of moral hazard has been coined 'the Samaritan Dilemma'. The World Bank has created a global facility⁷ to encourage a more balanced approach, and ex ante risk-financing is intrinsic to this program.
- **Barriers to entry.** Many developing countries face high initial costs to build the expertise and the organisation, including regulatory capacity, needed to achieve country-wide catastrophe insurance coverage. Risk modeling implies numerous areas of expertise and significant costs of data collection. Barriers to entry exist on the reinsurer side as well for a range of reasons, including a lack of potential business volume to support initial investment.

The way forward: a multilateral approach to catalyse access through capital markets

Affordability of insurance premiums by emerging economy countries remains the biggest barrier to expansion of insurance coverage. Another could be an insufficient awareness of the importance of catastrophe risk financing programs and available instruments. IFIs could play a role in raising awareness among their client countries and work with them to overcome various market gaps to access available catastrophe insurance coverage. This could help ensure that risk financing mechanisms along with risk mitigation programs are part of an overall country risk management strategy. Recently, the World Bank has helped execute and intermediate a catastrophe swap which transferred the hurricane and earthquake risks of a group of 15 Caribbean countries to the financial markets. New techniques such as parametric insurance and the new capacity brought to the realm of catastrophe reinsurance by capital markets may provide a unique opportunity.

Today, climate change poses a new challenge to development through the growing incidence of weather-related catastrophes and the resulting human toll. Although governments have become increasingly aware of the need for ex ante risk management, insurance solutions come at a cost. Risk financing policies either require a strong political will or can be deferred all too easily. At the same time, global reinsurance is undergoing a radical change, as capital markets bring new capital, new technology and increased competition to the arena of natural disaster insurance. World markets with their high liquidity and widespread investor desire for yield and diversification seem to have only started to transfer catastrophe risk globally to an immense and unexploited catastrophe reinsurance capacity. So, there is a compelling conjunction: a development challenge, and a market innovation, just taking-off, but which may well be the solution. This calls for multilateral approaches in which the IFIs could play a decisive role by using their convening power to broker insurance solutions for their partner countries.

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Note:

1. Other, less prominent, capital market instruments are cat swaps and sidecars.
2. Disasters were hurricanes Katrina (US\$45bn), Ivan (US\$12bn), Rita (US\$10bn), Wilma (US\$8bn) and Charley (US\$8bn).
3. Source: Tillinghast
4. Investors may also choose to create their own reinsurance companies (generally incorporated in Bermuda) to have direct 'equity' exposure. This has generally been the decision made by hedge funds. Another popular choice for hedge funds was to participate as an equity investor in a reinsurance company or 'side-car' run by a re-insurer who also invested a portion of the capital.
5. As measured by Shareholders' funds. Source: Guy Carpenter September 2006.
6. *Climate Change and Insurance: Disaster Risk Financing in Developing Countries* edited by Eugene N. Gurenko.
7. Global Facility for Disaster Reduction and Recovery.



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