Building financial resilience – the role of risk transfer for sovereign disaster risk management

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Abstract – Every year natural catastrophes cause massive human and financial losses around the world. Economic costs of natural catastrophes have clearly increased in the last two decades. The first priority for decision makers is to reduce risk to save human lives and to reduce potential damage to properties and infrastructure. Prevention, mitigation and risk avoidance are the most important priorities for disaster management. But not all risks can be avoided, so preparing for disasters is indispensable. Financial strategies for disaster risk management are necessary to ensure that individuals, businesses and governments have the financial resources necessary to deal with the adverse financial and economic consequences of disasters. Financial preparedness is a critical component of sovereign disaster risk management as it enables the critical funding of disaster response, recovery and reconstruction. Insurance instruments which help countries cope with financial needs resulting from natural disasters have received increasing attention in recent years. Moreover, new, innovative approaches have been developed around the world to secure contingent funding before an event happens. By putting a price tag on risks, insurance also incentivizes prevention measures and provides a basis to compare costs and benefits of different measures. This article will focus on why financial resilience is a critical component of sovereign disaster risk management, what role risk transfer mechanisms can play – with a particular emphasis on sovereign risk transfer solutions – and what is needed for an integrated country risk management approach which includes financing considerations.

Keywords – disaster risk financing, sovereign risk financing, disaster insurance, financial resilience, integrated disaster risk management

1. Background

The statistics are alarming: Earthquakes, droughts, floods, storms and other natural catastrophes impact over 500 million people every single year. Over half of the world’s population lives in regions highly exposed to extreme weather and natural disasters. Because of the increased concentration of people in cities with the related business activity, the humanitarian and economic costs to society can be high. 2013 saw 158 major natural disasters around the globe in which over 20,000 people lost their lives or went missing. Typhoon Haiyan in the Philippines and the flooding in Uttarakhand in India were just two of them. Economic losses from these disasters amounted to USD 140 billion. For the insurance and reinsurance industry, the financial burden was relatively low with insured losses of “only” USD 45 billion, or about one third. This has been the average level over the past two decades¹. The fact that only about one third of the losses are covered by insurance means that households, businesses and governments bear the brunt of these losses themselves.

The economic cost of natural catastrophes has increased markedly. In the 1980s, inflation-adjusted costs were on average about USD 25 billion, in the 1990s this increased to USD 95 billion per year. In the last ten years, economic damage reached an annual, inflation-adjusted average of USD 130 billion².

¹Swiss Re, sigma no. 1/2014
²Swiss Re, sigma database
There are a number of reasons for the increasing losses:

- An increase in the number of catastrophic events since 1970.
- Rapid urbanization. For the first time in history more people live in cities than in rural areas. Many of the growing cities are located in high-risk coastal or flood prone areas.
- Failure of infrastructure construction to keep pace with rate of urbanization.
- People and assets have become increasingly concentrated in urban conurbations, often in disaster-prone regions. In emerging economies, rapid urban expansion has outpaced the construction/establishment of infrastructure and impact reduction measures such as coastal defences, improved building codes, land-use zoning and planning, improved early-warning systems and disaster preparedness, and response and recovery procedures.
- Increased vulnerability of assets and goods. Today’s productive processes are more complex, involving assets and inputs with overall higher economic value. The destruction of productive assets in a disaster event can therefore entail a higher overall financial loss than previously. With the interconnectedness of the global economy, the costs of global and interdependent supply chains breaking down can be severe.
- Environmental degradation. Factors such as soil degradation, deforestation and changes in land-use can heighten the impact of extreme weather events.

2. Addressing the financial protection gap

A large part of the economic costs of disasters are not insured. On average, over the last twenty years only about 30% of these losses were covered by insurance. We call this gap between insured losses and total losses the financial protection gap. As these losses are not covered by insurance, they largely fall back on households, businesses and the government. The public sector not only has to shoulder the cost of relief and recovery, but also has to pay for the reconstruction of public infrastructure. And when individuals and firms are underinsured, which is generally the case in many developing economies, the government is often expected to support private rebuilding efforts by providing transfer payments as well. The consequences are wide-ranging, from slower economic growth, shortfalls in tax revenues and the loss of hard-won development gains.

As the long-term trend points to rising economic and insured losses, the financial impact on governments’ budgets becomes ever more acute: evacuation measures, emergency health care, clean water and sanitation, ensuring food supply and restoring infrastructure all cost money.

The funding of these costs historically has only been arranged after an event: by re-allocating budget, selling state assets, through debt financing or by raising taxes. The disadvantages of such ex-post financing strategies are manifold:

- they take time to arrange
- they may jeopardize investment plans or
- debt financing might not be possible or only at high costs

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<sup>1</sup> Swiss Re, sigma No. 1/2014

<sup>2</sup> This may in part be due to more comprehensive and inclusive reporting of disaster events and associated losses, in parallel with heightened public awareness of disasters and their consequences.

<sup>3</sup> Swiss Re, Closing the financial gap
• debt levels may become unsustainably high
• raising taxes puts another burden on the population already affected by the disaster
• donor support is highly uncertain

In a nutshell; it is highly uncertain if and at what cost ex-post financing tools are available.

Empirical studies have shown that major natural catastrophes are harmful for economic growth in addition to causing human suffering and broader destruction. In addition, those macroeconomic costs are higher when insurance penetration is low. Insurance can therefore play an important role in mitigating the macroeconomic costs arising from major natural catastrophes.

3. Ex ante risk financing: a wide range of insurance solutions

3.1. Different approaches for different needs

Financial preparedness therefore is essential to make funding available quickly for disaster response, recovery and reconstruction and to ensure that individuals, businesses and governments have the resources necessary to manage the economic consequences of disasters. Ex-ante arrangements, providing certainty that funds will be quickly available, enable governments to prevent the affected areas from suffering societal and economic collapse. Governments and city/regional officials are increasingly interested to explore risk transfer through insurance and alternative risk financing solutions. Insurance often presents the most cost-effective way of dealing with the financial risks posed by low-probability, high-severity events.

There are different approaches for governments to close the financial protection gap through insurance. Some countries put the emphasis on facilitating and promoting insurance solutions for homeowners and businesses to reduce government’s liabilities for disaster relief funding; others directly insure the government’s exposure. It is not an either/or decision, each instrument fulfills a different need and they can also complement each other.

A variety of innovative public-private risk transfer partnerships have been implemented over the past few years and these can act as models for many other countries yet to embark on ex-ante risk financing strategies.

3.2. Sovereign risk transfer solutions

Mexico is considered a pioneer in transferring risk through public-private partnerships. Faced with natural perils from storms over the Atlantic and the Pacific to earthquakes, Mexico has been hit by several large events in the last few decades. As early as the 1990s, the Mexican government identified disaster risk reduction as a national priority, creating the Fund for Natural Disasters (FONDEN) in 1999 to improve its financial preparedness for natural disasters. With the intention of helping smooth the impact of payouts on the national budget, Mexico arranged for the first parametric EQ risk transfer scheme already in 2006 to cover some of the governments’ disaster relief expenses. In 2009, it concluded the Multi-Cat transaction - renewed and extended in 2012 - , which uses so-called catastrophe bonds to transfer earthquake and hurricane risks to capital markets. These instruments provide the Mexican government with rapid access to natural disaster protection from the capital markets in the event of a major disaster.

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*Goetz, von Dahlen, Saxena, Unmitigated disasters? New evidence on the macroeconomic cost of natural catastrophes
*G20/Gov’t of Mexico/World Bank, Improving the Assessment of Disaster Risks to Strengthen Financial Resilience
Mexico’s financial strategy for managing the costs of disasters at the Federal level has three main components:

a. a risk retention vehicle (FONDEN) that allows to budget for the costs produced by the most frequent types of disasters,

b. a reinsurance program that leverages budget funds in order to purchase a layer of cover that provides funds unrelated to the public finances when severe deviations of disaster frequency arise, and

c. a parametric triggered layer of cover that provides immediate emergency funds if a major and severe disaster occurs.

**Uruguay** is another country, which uses risk transfer to help reduce the government’s financial exposure \(^9\). Weather risk has increasingly become a burden to the Government of Uruguay. Uruguay relies largely on rainfall for its hydroelectric plants to produce enough electricity and dry conditions can lead to increased energy importation at uncertain costs. In a 2012 drought, this climate variability pushed the government into a deficit when Uruguay had to buy electricity on the international spot market. To help lower this financial exposure, Uruguay has entered into a landmark weather risk transaction. It uses rainfall data and oil prices for settlement, and provides the government compensation for the combined risk of drought conditions and an increase in the price of energy. A major source of budget uncertainty each year is thereby reduced \(^10\).

In three different parts of the world, a number of countries have come together to create so-called sovereign risk pools and to jointly transfer the risk to the international re/insurance and capital markets.

**The Caribbean Catastrophe Risk Insurance Pool (CCRIF)** \(^11\) has been the first of such kind of a sovereign risk pool and is owned and operated by 16 Caribbean governments. It is structured to pay out quickly in case of serious disaster, using parametric insurance instruments, such as strength of earthquakes, wind speeds, or rainfall serious disaster, using parametric insurance instruments, or establish contingency reserves to purchase a layer of cover that provides funds unrelated to the public finances when severe deviations of disaster frequency arise, and that they provide immediate emergency funds if a major and severe disaster occurs.

**The Pacific Islands countries**, with a combined population of almost 10 million people, are highly exposed to natural disasters. Through the Pacific catastrophe risk insurance pilot, six of the Pacific Islands countries including Cook Islands, Marshall Islands, Samoa, Solomon Islands, Tonga and Vanuatu, have arranged protection against earthquake, tsunami and tropical cyclone risks from the global re/insurance market. Launched in 2013, the programme assists the governments of the Pacific Islands to transfer catastrophic risk and provide emergency funds for disaster relief efforts. Tonga was the first country to benefit from a payout \(^14\). On 11 January 2014, the category 5 Cyclone Ian swept across the island of Tonga killing one person, displacing thousands and causing tremendous devastation to crops and infrastructure. Hundreds of families in several communities were affected by the cyclone, which destroyed homes and critical functions such as health centers and schools. According to reports, up to 75 percent of the buildings have been damaged in some parts of Ha’apai, as well as power and communication networks. Funds received under the scheme allowed the government to meet the most urgent needs to repair and rebuild Tonga in the following days and weeks \(^15\).

**The African Risk Capacity** is the latest such regional risk pool. It helps African governments manage climate-related disaster risks in a better way by moving from post-disaster aid to pre-event risk management. Its first sovereign insurance programme was launched in May 2014, offering initially five African governments to cover some of their disaster relief expenses related to drought through innovative weather-index insurance. Senegal, Mauretania, Niger, Kenya and Mozambique are among the first five countries which have joined this African Risk Capacity insurance program \(^16\).

These examples provide the necessary evidence that the mechanisms of sovereign risk transfer work, and that they can help pave the way from short term relief and recovery to long term growth. However, it’s still a small number of countries which benefit from such ex-ante risk transfer mechanisms.

### 3.3. Benefits of sovereign risk transfer

A common aspect of such sovereign risk transfer schemes is that they are based on so-called parametric or index insurance. Unlike traditional insurance, parametric insur-

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\(^9\) G20/Gov’t of Mexico/World Bank, Improving the Assessment of Disaster Risks to Strengthen Financial Resilience

\(^10\) Swiss Re, www.swissre.com/global_partnerships/Largest_energy_risk_transfer_project_completed_for_Uruguay.html


\(^12\) Sixteen governments are currently members of CCRIF: Anguilla, Antigua & Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago and the Turks & Caicos Islands. CCRIF was developed under the technical leadership of the World Bank and with a grant from the Government of Japan. It was capitalised through contributions to a multi-donor Trust Fund by the Government of Canada, the European Union, the World Bank and others.

\(^13\) Swiss Re, www.swissre.com/about_us/global_partnerships/cciif_improving_climate_resilience_in_the_Caribbean.html

\(^14\) The Caribbean Cat Risk Insurance Facility (CCRIF), http://www.cccrf.org/content/about-us


\(^16\) Swiss Re, www.swissre.com/global_partnerships/Tonga_first_to_benefit_from_Pacific_Risk_Insurance_payout.html

\(^17\) African Risk Capacity, www.africanriskcapacity.org(10/10/2014)
ance instruments use a model to calculate the payout of the insurance policy. This payout model aims to closely mirror the actual damage on the ground and enables a much more rapid payment, since no assessment of the actual damage is required after the event. In the case of parametric insurance, the payout is triggered by a measure such as the strength of an earthquake or the air pressure experienced during a hurricane. Parametric insurance does not require loss adjusters to tally damage after a catastrophe occurs, a process that can take months or even years and which can delay a payout. The speed of payout is one of the significant advantages of this type of transaction: a parametric trigger is transparent, both for the insured and for investors, and it means that loss events can be handled faster and more efficiently than with other kinds of insurance-based solutions. The disadvantage is that the payout received may deviate from the actual loss incurred (so-called basis risk). For example, the pre-agreed insured amount of USD 400m is paid, but basis risk means if losses are 425m it is insufficient, but if losses are 375m it is generous. However, without any insurance cover in place, the risk holder bears a 100% of the risk and hence this approximation is valuable and pragmatic to get liquidity quickly.

The benefits of sovereign risk transfer as opposed to traditional ex-post financing are manifold:

- Guaranteed access to required funds for recovery, up to agreed cover limits
- Diversified funding to cope with financial consequences of natural catastrophes
- Speedy delivery, especially with innovative instruments such as parametric solutions
- Budget planning certainty (steady premiums vs highly volatile disaster expenses)
- No payback obligation (in contrast to debt financing)
- Reduction of a country’s contingent liabilities to acceptable levels (positive implications for sovereign rating and currency)
- Reduced stress in crisis situation to divert own funds from other projects to affected areas
- Price tag on risks allows comparing cost-benefits of different prevention measures

3.4. Insuring homeowners: insurance pools and microinsurance solutions

Another approach to relieve governments’ budgets of the contingent liabilities related to natural disasters is to promote insurance solutions for homeowners.

The possibilities of introducing natural disaster insurance for homeowners are as varied as the disaster management strategies of different countries. There is no single ideal or universally applicable solution for homeowner’s disaster insurance. Each country must find and adapt a model that best fits its exposures, existing insurance market infrastructure, institutional set-up and political acceptability. The solutions in place in different countries range from comprehensive compulsory natural disaster covers offered by government-sponsored insurance entities (like in France or Spain) to privately organized voluntary disaster insurance products (like in Germany). As an illustration, the two neighbouring countries of Switzerland and Germany have very different systems: Switzerland has obligatory disaster insurance, covering 9 perils, which is partly offered by state insurers, partly offered by private insurers. Germany on the other hand has a voluntary disaster (flood) insurance offered by private insurers.

Certainly, a very good example of a disaster insurance scheme set-up rather recently is the Turkish Catastrophe Insurance Pool. Following the devastating earthquake in the Marmara Sea in 1999, Turkey has invested massively in prevention, strengthened coordinated emergency response and introduced an insurance scheme which today serves as a model for many countries. It is one of the most successful specialized earthquake insurance pools in the world, providing risk-based disaster insurance for homeowners. With close to 7 million policies sold, it has become one of the largest catastrophe insurance pools in the world. It also serves as a model for many countries in terms of a successful public-private partnership.

Another new initiative is the recently established natural catastrophe insurance facility in South Eastern Europe, called Europa Re. Owned by the participating governments and supported by several international and donor organizations it has started to offer earthquake, flood and agricultural insurance to homeowners and smallholders in Serbia, Macedonia and Albania in 2014.

The number of uninsured people at the bottom of the pyramid world-wide is estimated to be 4 billion. Many of them live in conditions that leave them particularly vulnerable to natural disasters such as heavy rain, wind, or earthquakes. Very few of them have financial reserves to recover from disasters or access to financial instruments, yet such access could fundamentally change the prospects of many households in vulnerable communities and increase their resilience.

The Bangladesh meso-level flood insurance pilot is a good example of how disaster insurance solutions can also be tailored to low-income families. Bangladesh is a flood-prone country and suffers from large-scale flooding periodically. It is one of the primary reasons for widespread poverty, because of the related high death tolls and illnesses and because it renders many people homeless, with no income and no food. People rely on government aid, NGOs, MFIs and other agencies. Over the last decades, the Bangladesh government, together with international agencies and local partners, has been working on building structural solutions to counter the losses caused by floods, as well as finding protection for residents of the river basin against catastrophic floods. These include traditional ap-
proaches like construction and raising of river embankments, construction of flood protection shelters, and food and medical stores. The dependence on ex-post disaster risk financing mechanisms causes unforeseen pressure on budgets of government and meso-level agencies with limited funds. This situation creates uncertainty regarding budgetary allocations, delays in relief provision and disincentives for risk mitigation strategies among communities. In recent years, an innovative meso-level flood index insurance pilot project has been launched in Bangladesh by donor organizations in close collaboration with the private sector. The pilot scheme covers 1660 families from 14 villages and uses model-generated flood data for payout calculation. If a catastrophic flood occurs (according to pre-defined criteria), the programme will provide cash relief to households through local organizations.

4. Linking prevention and risk transfer: quantifying and pricing risks

The benefit of insurance mechanisms for disaster financing goes beyond the pure funding aspect. Insurance puts a price tag on risk and thereby also promotes the right incentives to invest in prevention measures. Appropriate investments in prevention keep insurance affordable. Thus, risk prevention and risk transfer are mutually reinforcing.

For policymakers and disaster planners, the aim of saving lives and reducing human suffering through risk prevention measures is of course the most important priority. One of the biggest challenges policymakers face is how to identify the most cost-effective ways to prevent, mitigate and reduce risks with limited resources. Insurers’ risk models are a helpful tool in this effort. They allow risks to be quantified and thus priced. This allows policymakers to compare the costs and benefits of different risk reduction measures and make more informed choices about those measures that promise to yield the biggest loss reductions.

Such an approach is at the heart of the Economics of Climate Adaptation (ECA) methodology. It considers not only the disaster risk posed to society from today’s climate, but also the impact of climate change and the expected future value of economic development.

Climate adaptation is an integral part of disaster risk reduction and goes hand in hand with sustainable development planning. The ECA approach presents a strong case for immediate action. It shows that well-targeted, early investments in infrastructure, technology, capacity, behaviours or risk transfer measures are likely to be cheaper and more effective than complex disaster relief efforts after the event. By combining risk prevention and risk transfer measures as part of a comprehensive risk management strategy, local and national decision-makers will make their communities more resilient to climate change and better prepared for disaster risks without compromising future adaptive capacity. In so doing, adaptation not only helps societies secure development gains already made, but it also ensures that any future growth is sustainable.

5. Integrated risk management: the role of a chief risk officer

As explained earlier, financial risk transfer should be part of any comprehensive country risk management strategy. An integrated approach enables governments to set priorities and determine the most appropriate course of action to protect society from the financial costs of catastrophic events.

An integrated risk management process should include a thorough analysis of the risk landscape, including environmental, political, social and health aspects. Integrated risk management enables political and public sector decision-makers to determine their priorities in advance and protect communities from the financial costs of peak risks. These large risks not only emanate from natural catastrophes but also from man-made disasters such as terrorism as well as from pandemics and unanticipated longevity, the phenomenon of people living longer than originally projected and therefore creating pension cost liabilities.

A comprehensive country risk management approach allows governments to minimize risks wherever possible and transfer the costs where necessary. Risk mitigation and risk transfer must go hand in hand. Building physical defences such as dams or sea walls may be expensive in the short term, but they deliver important economic benefits over the long run. Not only do such investments save human lives and keep the physical damage to a minimum, but they also make insurance affordable for a wider community.

In practical terms, an integrated risk management approach demands a high degree of coordination among relevant public and private entities. The OECD calls for a whole-of-society approach to engage all stakeholders in strengthening resilience. A central coordinating figure at government level – a Chief Risk Officer (CRO) – would usefully be appointed to head up such efforts. The task of the CRO is to monitor the entire risk landscape facing their country through an integrated risk management process, set priorities and coordinate actions to minimize the human and economic impact of unforeseen disaster events. A Country Risk Officer could lend weight to the process of systematic risk management and give it a public face.

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²¹Desai K.R., Meso-level flood index insurance pilot in Sirajganj, Bangladesh
²²Swiss Re, Weathering climate change
²³Economics of Climate Adaptation Working Group
²⁴OECD, Boosting resilience through innovative risk governance
²⁵Swiss Re, Country risk management: making societies more resilient
6. Conclusions

Risk prevention and mitigation strategies must be the first priority in managing natural disasters. But no organization or country can fully insulate itself against extreme events. Transferring catastrophic risk must therefore be a key element in the financial strategy of every disaster-prone country or region to enable and sustain growth. The G20 and OECD have recognized "financial resilience is a critical component of disaster management"²⁶ because the immediate availability of funds to finance the necessary disaster response and recovery is critical to take appropriate action, not only for individuals and businesses, but also for governments.

It is of utmost priority for the Post-2015 Framework for Disaster Risk Reduction to recognize financial resilience as crucial effective disaster management and the role different insurance instruments can play.

There is little awareness among decision makers, disaster management authorities and potentially affected households, businesses and governments about the role insurance instruments can play. Financial education and training for disaster management specialists is important: equally public finance specialists need to be more aware of disaster risks and exposures. What is needed is a more joined-up effort between finance and disaster management disciplines.

References


The Caribbean Cat Risk Insurance Facility (CCRIF), http://www.ccrif.org/content/about-us (10 October 2014)


²⁶G20/OECD, Disaster Risk Assessment and Risk Financing
Citation