Government Responsibilities in respect of Flood Insurance

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Australian insurers are developing programmes that will eventually see most residential properties insured against riverine flood. In the wake of natural disasters, insurance payouts will often provide well over half the funds needed to get communities back on their feet. Insurance works by spreading individual and independent risks over a portfolio of policy holders. This notion works well for risks like theft and motor accidents, but is problematic where risks are highly correlated in space and time as is the case for severe flooding. Insurers deal with this circumstance by insuring themselves with international reinsurers who work on the principle that natural catastrophes in different parts of the world are uncorrelated. Such global diversification allows reinsurers to confer to direct insurers the same assurance that insurers offer their policy holders. Our paper will outline the principles of insurance and insurability. It will then pose questions as to how government might respond where insurers assess some risks as uninsurable. It will briefly consider policy options that might avoid some overseas scenarios where interference by governments in the marketplace has proven disastrous. In the authors’ view, a key paradigm is that premiums should reflect actual risks in order that there be a market signal to incentivise homeowners, town planners and government decision makers to reduce the risk of flood damage.

Introduction

Globally losses from natural disasters have been growing as a result of increases in population, wealth and inflation (e.g. Pielke and Landsea, 1998; Pielke et al., 2008; Crompton and McAneney, 2008; Barredo, 2009). Moreover there is a legacy of poor land planning decisions by individuals and governments that have resulted in concentrations of risk in hazard-prone places. Contemporaneously, new technology is allowing insurers to assess risk in more sophisticated ways than was hitherto possible and in this country we are now seeing Home & Contents insurance include coverage for riverine flood for the first time on a large scale. To this end, insurers are using databases like the National Flood Information Database (NFID) (Leigh et al., 2010) of geo-located street address information to assess risk on a property-by-property basis. We argue that this process is irreversible because companies that do not invest in the necessary technology to make risk-informed choices will inevitably find themselves underwriting a disproportionate amount of the worst risks. Thus they will have little choice but to adopt the technology or withdraw from the market. Inevitably this will mean that some of the worst risks, i.e. properties prone to flooding with an Annual Return Interval of less than 20 years, say, will find it hard to get affordable insurance.

How to deal with these worst risks is the main focus of this paper. Kunreuther and Michel-Kerjan (2009) have examined this issue and argue from two general principles:

*Insurance premiums should be based on risk in order to provide signals to individuals as to the hazards they face and encourage them to engage in cost-effective mitigation measures to reduce their vulnerability to catastrophes.*
Any special treatment given to homeowners currently residing in hazard-prone areas (i.e. low-income, uninsured or inadequately insured homeowners) should come from general public funding, not through insurance premium subsidies.

The first of these principles states that premiums should reflect actual risks and the second deals with equity and affordability issues.

Insurance Coverage for Natural Hazards

Traditionally insurance coverage is purchased by individuals, firms and companies as a form of financial protection from the risk of loss. A homeowner is happy to pay a relatively small amount each year compared to the value of his or her home to safeguard against the small likelihood of being exposed to the full financial burden of replacing it, if it were to be destroyed in a fire, for example. The insurer accepts this risk for a fee, the premium, and by selling insurance policies to a large number of homeowners it can reduce the coefficient of variation of its claims. This works on the principle that these policy risks are independent. In other words, the likelihood that a house at location X will be destroyed by a fire is uncorrelated to the likelihood that this will also happen to another house at location Y somewhere else in Australia. The mathematics of this reduction in the insurer’s risk is described by the Central Limit Theorem.

Natural disasters are examples of “low frequency, high consequence” events and violate the principle of independence. When a large flood occurs, large numbers of houses in the same area will be affected all at once. The geographic footprint of the flood can be enormous and the losses are all highly correlated; they are no longer independent of one another. To deal with these circumstances, insurers transfer this catastrophe risk to international reinsurers, such as Swiss Re and Munich Re, to name two of the largest, who also play the Central Limit Theorem but this time on a global scale. They work on the principle that a hurricane making landfall in Florida is uncorrelated with an earthquake in New Zealand or to a hailstorm in Sydney. This geographical diversification of risk allows them to reduce the volatility of their losses. Of the $1.6 billion in claims paid out after the 1999 Sydney hailstorm, 90% of the money came from reinsurers. Crompton and McAneney (2008) estimate that if a similar event were to occur in 2006, the insurance bill would be around $3.3 billion. And this is by no means the largest catastrophe loss possible.

In general, insurance (or reinsurance) can only be offered if an insurer can assess the probability of the event occurring and the likely losses it will face given such an event. In this way it is able to set premiums at prices that provide a competitive return at an assumed level of risk.

The need to quantify the risk associated with natural hazard events has seen the development of catastrophe loss models. These models view risk as a function of hazard, exposure – assets at risk, their sums insured and spatial distribution – and the vulnerability of these assets to the particular hazard. The models output catalogues of simulated event losses that can be ranked to estimate the Annual Return Interval (ARI) of each loss or its approximate inverse, the Annual Exceedance Probability (AEP). The purpose of the National Flood Information Database (NFID) is to allow insurers to assess risk to residential properties prone to riverine flood. Natural Catastrophe loss models,
such as Risk Frontiers’ stochastic FloodAUS model, then allow them to price their portfolio risk and help determine how much reinsurance to purchase in order to protect the company in the case of a large event loss, such as a repeat of the 1867 flood on the Hawkesbury-Nepean system or Tropical Cyclone Wanda in 1974.

**Distortionary Government Behaviour**

In Australia, insurers may charge the risk premium that they feel is appropriate; the government does not get involved in setting prices directly and instead, correctly in our view, relies on competition between companies to result in fair premiums. The role of government is restricted to providing regulation by way of the Australian Prudential Regulation Authority that is aimed at insuring that insurers have sufficient capital and reinsurance to pay out claims with a high degree of confidence.

The intervention by Government in premium setting can result in large market distortions. In Florida, for example, politicians are often elected on the promise of keeping insurance premiums low. As a result, most national insurance companies have set up limited companies in Florida in order to ring fence the parent companies from large hurricane losses. The largest insurer, State Farm, has stated that it will be withdrawing from the state over the next two years after having its application to increase premiums rejected by the state’s Insurance Commissioner. The company had asked for a 47% increase in premiums and the Insurance Commissioner allowed them 8%. As a result up to 930,000 home and condominium policy holders will need to find new insurance providers because State Farm believes that it will not be able to recover a fair return for the risk it is accepting.

State Farm is but one example where government interference in the market has violated Kunreuther and Michel-Kerjan’s (2009) principle that premiums should reflect actual risk. If premiums are unrealistically low there is little incentive for policy holders to adopt mitigation measures or for local government to impose sensible land planning regulations.

Governments should also not interfere in the pricing of policies through either excessive taxes or subsidising people to live in vulnerable areas. Instead their focus should be on zoning and well-enforced building codes. Victoria provides an example of excessive taxation through its setting of the Fire Services Levy. In the case of a commercial business in rural Victoria, for example, the increase in the effective premium is 126% arising from a combination of the fire levy (84%), Goods and Services Tax (10%) and stamp duty (10%). A $100 risk premium becomes $226.64 after taxes are imposed. So although the Victorian Government does not directly set premiums, they indirectly affect demand through a punitive tax systems. The level of non-insurance amongst victims of the 2009 Victorian bushfires was around 30% compared with about 96% over the entire country (Karl Sullivan, ICA, pers. com.). It seems likely that the levies contributed to this higher than average level of non-insurance. The situation is similar in Tasmania and New South Wales.

Already there are areas in Australia that are uninsurable for various reasons, for example, properties affected by saltwater erosion on the Collaroy / Narrabeen stretch of coastline in Sydney. In the case of riverine flood, NFID allows insurers to engineer their portfolios in ways to avoid the worst risks, those where the true actuarial risk likely
exceeds the willingness of homeowners to pay. For example, if a home was flooded on average every 10 years, with an average claim each time of $100,000, then the insurance premium must exceed $10,000 per annum even without accounting for the cost of managing claims and cost of capital. Inevitably, properties such as these will become uninsurable and this raises questions as to how should the government deal with these in a way that is both fair and equitable but also encourages mitigation and responsible building practices?

One example of government policy with unintended consequences has been termed the Samaritan’s dilemma. This is the reduced economic incentive to undertake mitigating measures (for example, cleaning out gutters to reduce fire risk) when we know that post-disaster aid by governments is never far away (Buchanan, 1975; Coate, 1995). Another example is the adoption of public programs or government insurance pools (where insurance companies will not offer protection) that encourages people to not only remain in vulnerable areas but also to move into them. The Texas Windstorm Insurance Association (TWIA) is one example of this.

Kunreuther and Michel-Kerjan (2009) recommend that any compensation afforded residents in high risk areas and faced with unaffordable policy premiums should be provided for in the form of a voucher to ensure the issues of affordability and equity are dealt with. This voucher would be provided by the State or Federal Governments and would only be able to be spent on insurance with the amount available determined by means testing of incomes and the insurance premium they are charged. It should only ever apply to people already residing in extreme hazard-prone areas. People who later decide to move into the area would need to be charged market premiums reflecting the real risk.

Another possibility is that after a large flood, residents are paid once only to move to other areas outside of the flood plain. This is the exact opposite of Kevin Rudd’s promise to rebuild fire-affected towns in the 2009 Victorian fires “brick by brick.” We have relocated towns off floodplains in Australia in the past, but have been reluctant to do so in recent history (Keys, 2009).

**Conclusions**

In this paper we have outlined the principles underpinning insurance and reinsurance, and shown examples of how the interference of government can lead to the influences that affect both its supply and price. We introduced two policy concepts developed to help create economic and sustainable strategies for dealing with increased financial losses as a result of natural disasters. We believe that these policies should be adopted as guiding principles in Australia to help promote the adoption of effective mitigation strategies. Homeowners should pay a premium that reflects the real risk to property. And if one is already residing in a hazard-prone zone then any subsidies should come from general public funding and not as insurance premium subsidies.

It is now abundantly clear, that increasing losses in natural disasters result from increased numbers of people living and working in vulnerable areas. And because of increasing wealth, these people have on average more to lose than did their parents or grandparents. Abating these rising costs will require difficult policy decisions and choices that we have thus far been reluctant to face. To paraphrase an article in the Washington Post advocating sensible land planning policies: “of course, this would violate two
fundamental American (read Australian) principles: one the freedom for any American to live where he wants, and two, for the government to bail him out when something goes wrong.”

References


