Climate change adaptation and the insurance system

Insurance has always been seen as the ideal industry to lead the charge on mitigating climate change. However, **Mr Rade Musulin** of **Aon Benfield Analytics Asia Pacific** says the insurance system is ill-equipped to do so, and suggests how it can help instead in other aspects.

People involved in the ongoing debate on climate change often fall into the trap of pulling together several disparate pieces of valid information to draw what may be erroneous conclusions about the effect a changing climate may be having on losses from natural disasters.

For example, we observe increases in average global air and sea surface temperatures. We also observe a significant increase in losses, both economic and insured, from weather-related natural disasters. It is then easy to jump to the conclusion that changes in climate metrics are responsible for the observed increase in natural disaster losses.

In fact, what we may be observing is a spurious correlation, as factors other than a changing climate may be responsible for the observed increase in losses.

As insurance provides a significant source of funding for economic losses from natural disasters and is an important mechanism for sending economic signals about risk to policyholders, it is also easy to conclude that pricing of insurance products can be an effective vehicle for encouraging consumers to mitigate the effects of climate change.

Unfortunately, the time horizons of insurance pricing (one to two years) and that of possible climate change effects (decades or more) are poorly aligned.

Conclusions of a recent study for the NCCARF

These issues were examined in a study I recently co-authored entitled "Market-Based Mechanisms for Climate Change Adaptation (Assessing the potential for and limits to insurance and market based mechanisms for encouraging climate change adaptation)" for The National Climate Change Adaptation Research Facility (NCCARF) in Australia. Other contributors to the study were from Aon Benfield Analytics, Risk Frontiers at Macquarie University, and the Center for Science and Technology Policy Research, University of Colorado.

The study focused on factors driving observed increases in losses from natural disasters and whether the insurance system can be used to encourage climate change adaptation. I will discuss two parts of our work here:

- An updated review of the peer-reviewed scientific literature looking into the causes of the rising insurance or economic costs of natural disasters.
- A summary of various attempts by governments to get involved in the provision of natural catastrophe insurance and the degree to which these might be used to encourage climate change adaptation.

The key drivers of higher losses

A key finding of our review of peer-reviewed scientific literature was that the rising costs of natural disasters from extreme weather can be explained by growing concentrations of population and wealth in disaster-prone regions.

In some regions, such as Asia, insured losses are also increasing due to higher insurance penetration. At the moment, global climate change effects cannot be detected in the data. This is true across jurisdictions and for different perils.

The issue here is a "signal to noise" one. While one cannot say that climate change is having no effect on losses, the effect of population growth, wealth accumulation, higher insurance penetration, and resulting exposure increases in disaster-prone regions is so strong that it overwhelms other signals that may be present. And research on US tropical cyclones has shown that we may be several de-

cades to centuries away from being able to clearly detect an anthropogenic climate change signal in the economic or insured losses.

An evolution in building codes

Tackling the problem of increasing losses from natural disasters in rapidly developing places like Asia may require changes in the way building codes are developed. Generally speaking, the focus of building code design has been on life safety at the individual structure level. Mitigating economic losses or fostering community resilience has often not been a priority.

An alternative approach could supplement life safety requirements with consideration of aggregate economic costs of construction as measured by the expected risk adjusted cost of insuring the structures over their design lifetime.

Since insurance costs reflect both expected losses and risk concentration (eg locations of "peak risk" such as Florida have higher risk loadings), using an estimate of future insurance costs as a proxy for the economic benefits from alternative building practices would be a way of considering a structure's contribution to future economic losses from disasters when it was being designed.

Such an approach would factor in future risk concentrations, so that a structure designed to last 100 years in an area which may experience high exposure growth would be designed to a stricter standard than an identical one in a place without expectations of high growth. Had this approach been followed in Florida, for example, building codes may have been strengthened earlier, yielding a more resilient building stock and lower aggregate PML than was achieved by a focus on life safety.

Insurance system's ability to price for climate change

In addition to finding that currently observed increases in losses from natural disasters can be largely explained by demographics, we also found that the insurance sector, both public and private, may be ill suited to being the vehicle for sending appropriate price signals to the market for potential climate change effects. Insurance price signals can be distorted through government intervention and they only reflect potential changes in risk one to two years ahead.

In many countries private insurance systems have been augmented by government pools to provide coverage for losses from natural disasters in high risk zones.

Our study found that in none of the government disaster pools examined have premiums been truly risk-adjusted, which should not be surprising given that a primary justification for the creation of such pools is to fill gaps in coverage provided by private markets at what is deemed to be an affordable cost. This means that the price signal to engage in risk reducing behaviours for property owners insured by government pools may be diluted.

Even absent government pools that charge premiums below market levels, the insurance system itself may not be well positioned to send economic signals with regard to possible climate change effects.

The fundamental problem is one of time horizon. Buildings are designed for decades or even centuries of use, but insurance policies are usually issued (and priced for) a period of a year. If one assumes that conditions remain constant over the lifetime of a building, then differentials in insurance prices for various construction practices should provide appropriate incentives for stronger construction.

However, if the risk to the building is expected to change over time, as would be the case if climate change causes more frequent or severe weather events, insurance pricing today cannot be expected to properly reflect the expected exposure to loss of the building over its lifetime. This is why the insurance system has a limited role to play in sending economic signals about potential climate change effects which may only manifest themselves over decades or centuries.

Using insurance concepts in the climate change debate

Even though the insurance system itself may not be the most effective vehicle for encouraging climate change adaptation through the pricing of policies, insurance is about the financial management of uncertainty and the tools it employs to assess uncertainty may be more generally useful in reframing the debate over climate change.

Acknowledging that the potential for climate change represents uncertainty regarding future weather patterns or sea levels may help move us beyond the black and white debate anchored in the mutually exclusive "certainty" of the sceptics on the one hand and the proponents for dramatic societal action on the other towards a view of a range of possible future outcomes with various probabilities.

Thought of this way, the question of how much to invest in climate change adaptation could be framed as one about addressing the uncertainty in future outcomes rather than their certainty.

To the degree that uncertainty has a positive price - the more uncertain the outcome, the higher the premium required to replace this outcome with a more certain one - then some investment in adaptation and mitigation can be seen as a prudent hedge against the worst outcomes. The insurance industry has useful tools to price uncertainty, and reframing the climate change debate as an exercise in managing uncertainty may be helpful.

Conclusion

When considering how the insurance system may be able to facilitate climate change adaptation, it is inadvisable to look to trends in economic or insured losses to support arguments for or against climate change effects because demographic influences are so strong.

Further, it is not reasonable to expect insurance prices developed for one year policies to properly reflect possible climate change effects expected to emerge over decades, particularly when many countries have formed government pools for highly exposed risks which do not charge full risk adjusted rates.

However, insurance concepts may help with climate change adaptation in several ways. Pricing tools can be applied to help inform building code design with regard to economic costs of development under a range of future scenarios. And insurance concepts about managing a range of uncertain outcomes can provide a framework for thinking about the level of investment which is prudent to hedge against potential outcomes.

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