

Appendix C:

National forecasting methodology

The forecasts provided in Section 2 are based on the historical frequency and severity of natural disasters in Australia. The process applied to generate the forecasts of insured losses can be summarised into the following steps:

1. Data on natural disaster events was gathered from the Insurance Council of Australia's database of natural disasters (ICA, 2013)
2. For each state, the historical data was first used to identify the distribution of number of natural disaster events each year
3. For the forecast period the number of natural disaster events per year was then simulated from this historical distribution. This gave a total number of events to be simulated for each state for each year of the forecast period
4. Each natural disaster event was then simulated using a bootstrapping procedure. This involved randomly selecting a historical event from the ICA database and incorporating some additional random variation in severity of the event to represent tail risk not captured in historical data
5. The bootstrapping procedure was carried out 1000 times to provide a reliable estimate of both the distribution of natural disaster costs that could be expected as well as the average annual natural disaster cost in each state
6. The resulting simulated costs were then indexed to account for growth in the number of households and increases in the value of housing stock. This index was constructed from Australian Bureau of Statistics (ABS) population growth forecasts (ABS catalogue number 3236.0) as well as extrapolating trends in ABS data on housing value (ABS catalogue number 4102.0). It was assumed that growth rates for the value of housing in each state converged in the long run towards the national average.

To obtain predictions of total economic costs, the multipliers for different natural disaster types reported by the Bureau of Transport Economics (2001) were applied to the insured loss data. To ensure the relevance of these multipliers, they were checked against our estimates of the relationship between insured costs and total economic costs in Section 4.

In order to forecast the costs to government, the effects of historical disaster costs on the level of NDRRA expenditure was analysed. It was found that each dollar of insured natural disaster costs generally led to around 32c of Australian Government expenditure in the year following the natural disaster, 22c in the next year and 13c in the third year. The use of the funding rules set out in the NDRRA determination allowed for total government costs to be estimated and to be apportioned between the Australian Government and the states.