

## Commentary

### The Real Cost of Fire in Australia

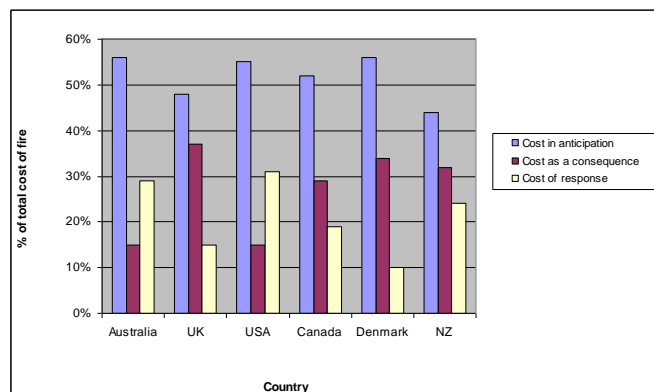
by Brian Ashe<sup>+</sup> and John McAneney<sup>++</sup>

The WFSC is pleased to include the following commentary from Dr Brian Ashe and Prof. John McAneney of Risk Frontiers Australia, an independent research centre sponsored by the insurance industry. This article is a brief review of the work conducted by Dr Ashe in the completion of his doctoral thesis concerning the cost of fire in Australia.

This article is an overview of my thesis titled *The Real Cost of Fire in Australia*.<sup>1</sup> It presents the main findings of the research, with a particular focus on international comparisons. The research was undertaken between 2004 and 2012.

Fire, an ever-present hazard in Australia, causes approximately 100 fatalities and over 3,000 injuries per annum. Significant resources are allocated to mitigate the risk. We estimate the total cost of fire in Australia for 2005 at AU\$12,000 million or 1.3 per cent of GDP. Comparable studies in the U.K., U.S., Canada, Denmark and New Zealand are reviewed and show that the cost in these countries ranges between 0.8 per cent and 2 per cent of GDP. Breaking the Australian total down into its component parts, we find that 57 per cent relates to costs in anticipation of fire, 29 per cent for response activities and that the remaining 14 per cent results from the consequences of fire. This estimate shows that the investment in mitigation (86 per cent of the total costs) is over five times the consequences (14 per cent) and raises questions as to whether the current system adopted in Australia is economically efficient.

**Figure 1: International comparison of the cost components**



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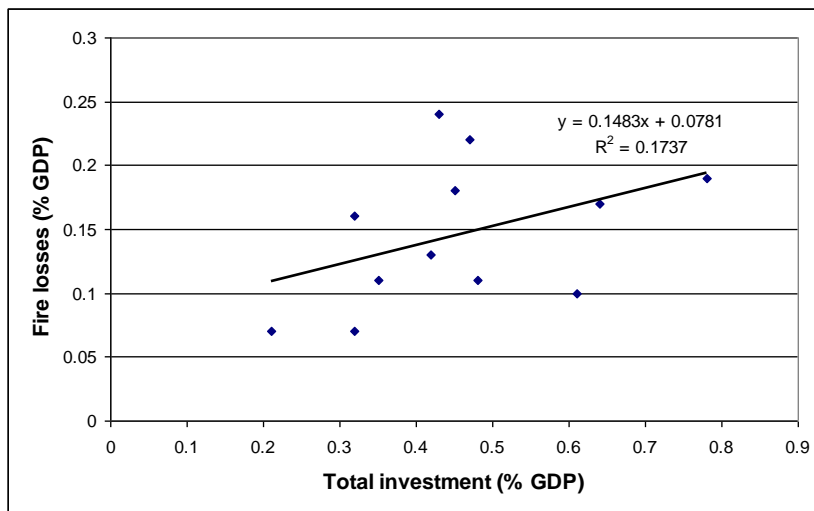
<sup>++</sup> Director, Risk Frontiers, Sydney, Australia.

<sup>1</sup> Ashe, B. (2012) *The Real Cost of Fire in Australia*, PhD thesis. Sydney, Australia: Faculty of Science, Macquarie University.

Figure 1 compares the breakdown of costs with the results of similar studies overseas. While it is important to acknowledge that different methodologies and definitions have been used in the various studies, the comparison is nonetheless useful in order to benchmark Australia against other countries.

Is the current investment strategy cost-effective? This question was approached in two ways: first, through a cross-sectional study of fire statistics from other developed countries and, secondly, through a structured expert judgement exercise. The former (see Figure 2) found no significant relationship between the level of investment and losses from fire, suggesting that other factors must be responsible for the observed inter-country variance in fire losses.

**Figure 2: Relationship between investment in fire prevention and fire services and losses from fires in 12 countries**



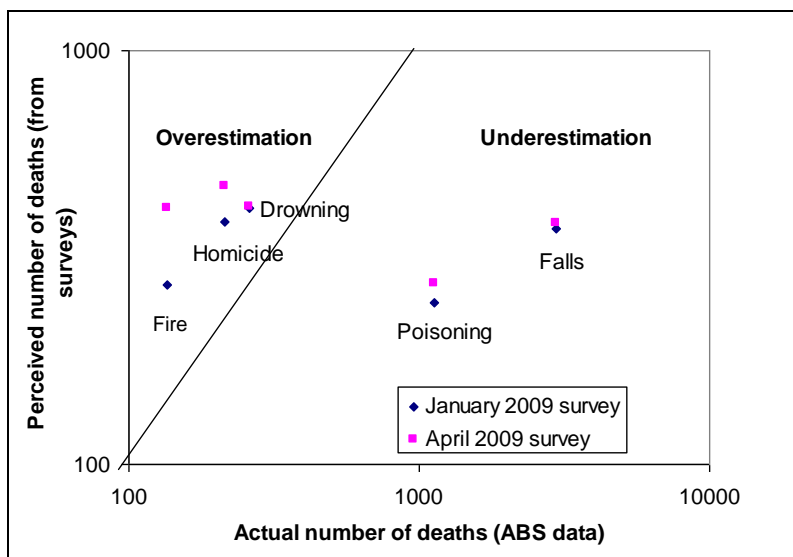
The respondents to the structured expert judgement exercise all perceived no net economic benefit would be achieved from increasing investments in prevention and response and most indicated net benefits from reducing this investment. The results of the expert judgement analysis, when considered alongside the equivocal international comparisons and fire service efficiency gains achieved in some parts of England and Wales,<sup>2</sup> raise doubts about whether the allocation of investments in mitigation and response in Australia is truly risk-informed.

Politicians are of course highly tuned to public opinion, and increasing funding for fire services after an extreme and tragic event will appeal to them as good politics. But while some may suggest that any over-investment that results is not of concern as long as the fire risk is kept low, compliance with costly government interventions affects the consumption of risk-reducing goods and services in the same way as a decline in wealth.

Over-investment may be explained by the perception of the public towards fire. We examined the public perception of the threat of fire by means of an online survey of 800 people in January 2009. The results showed that, on average, Australians significantly over-estimate the impact of fire, with fire-related deaths being perceived as being twice as high as the historical reality. A similar survey was undertaken in April 2009 following the 7 February 2009 Victorian bushfires following intense media interest and a death toll of 173. As anticipated, there was a marked increase in the public’s perception of fire consequences with the expectation of 3.5 times the historic average. At a more fundamental level the results raise questions as to how far public policy should be decided on the basis of physical reality *vis-à-vis* popular assessments of hazards. Figure 3 illustrates the results of both surveys in terms of perceived deaths versus actual deaths for a number of hazards.

<sup>2</sup> Audit Commission (2008) *Rising to the Challenge—Improving fire service efficiency*, ISBN: 1-86240-559-X. London: Audit Commission

**Figure 3: Relationship between perceived and actual numbers of deaths**



Australia’s fire fatality rate of 0.6 per 100,000 of population, already low by international standards, has proved resistant to increasing expenditure on fire management and protection. Following a concern that this expenditure might encompass a significant over-investment compared with the real risk, we then examined the regulatory cost of this investment, costs that are ultimately borne by individuals via taxes and/or higher prices for goods and services. Further, since poorer people on average have poorer health outcomes, it is possible this regulatory cost increases mortality. Adapting a model of Keeney<sup>3</sup> for the U.S. to Australian conditions, we determine the “regulatory” cost of a fatality to be between AU\$20 and AU\$50 million. The range reflects alternative ways in which these costs are distributed over the population. If we accept the results of an expert elicitation to imply an over-investment in fire prevention and management of AU\$2 billion, this excess is equivalent to between 40 and 100 *statistical* fatalities annually, figures that are of the same order as the annual number of actual fire fatalities (~114).<sup>4</sup> While there is no correct answer to how much taxpayers’ money should be devoted to protecting citizens from the threat of fire, it does seem as if the current system is over-indulgent. The methodology proposed here for fire risk is easily adapted to other areas of government investment and its consideration would ensure that there is some balance between government investments and desired outcomes.

Fire protection in an economic sense is both a public and private good in which government intervention will always play some role. Nonetheless this does not rule out complementary market-based approaches and these should be explored with a view to moving towards a more risk-informed fire system in the best interests of the Australian society. Theoretically, if the market drives the system, it should be more efficient and effective, with government rewarding achieved outcomes. Social Impact Bonds<sup>5</sup> provide a further mechanism for funding some of this private sector engagement.

The research concludes that with the assistance of more market-based approaches and an integrated fire risk management approach, the total cost of fire could be reduced to 1 per cent of the nation’s Gross Domestic Product, a saving of AU\$2 billion annually.

*This article was published by The International Association for the Study of Insurance Economics (The Geneva Association). Articles, documents and recent publications of the Association can be found on its website, at [www.genevaassociation.org](http://www.genevaassociation.org)*

<sup>3</sup> Keeney, R.L. (1997) “Estimating Fatalities Induced by the Economic Cost of Regulations”, *Journal of Risk and Uncertainty*, 14: 5-23.  
<sup>4</sup> Crompton, R. P., McAneney, K.J., Chen, K., Pielke Jr., R.A. and Haynes, K. (2010) “Influence of Location, Population and Climate on Building Damage and Fatalities due to Australian Bushfire 1925-2009”, *Weather, Climate and Society*, 2: 300-310.  
<sup>5</sup> Available at: [http://en.wikipedia.org/wiki/Social\\_impact\\_bond](http://en.wikipedia.org/wiki/Social_impact_bond).