The Australian Journal of Agricultural and Resource Economics

Journal of the Australian Agricultural and Resource Economics Society

Australian Journal of Agricultural and Resource Economics, 60, pp. 552–553

Comment 2 on 'Risk and uncertainty' by Quiggin and Anderson

Brian Hardaker†

Quiggin and Anderson (2016) had little to say about subjectivity in risk matters. Hence, my remarks are given as below.

Risk is wholly imaginary. That is, because it is nearly always about something adverse that has not happened yet. There are important implications for how risk issues are investigated, implications that have often been ignored by Australian agricultural and resource economists (AREs). To my chagrin, looking back, I find I too have erred.

Clearly, historical frequencies can be a guide in assessing probabilities of future risks. Yet, the future is necessarily more uncertain than the past. The unexpected, even the unimaginable, may occur, causing a dramatic change to the pattern of past events. Using historical frequencies to analyse risk is to assume, too often implicitly, that the process of interest is a 'stationary stochastic system', which is seldom valid. Yet, there have been many published studies in AJARE and elsewhere based on such a flawed assumption. Minimally, AREs should consider whether it is safe to assume that the future risk will be just like the past variability. If there are trends observable in the historical data, of course it is important to account for them. Yet, even that is not always done. And if the historical data show evidence of 'jump-shifts', they should surely signal a need for more than a simple projection of trend. Ultimately, imagination must be switched on to make a careful subjective assessment of the probabilities applicable to the future. And what how that is done should be disclosed.

As I believe Savage (1954) would have argued, all probabilities about the future are unavoidably subjective, even if based on historical data. I suspect that most AREs were taught that a probability is the limit of a relative frequency ratio, which may explain why so many shy away from the subjective view. They may think it 'unscientific', yet the alternative of using inappropriate historical frequencies is often unsound and possibly deceptive.

A subjectivist view of probabilities for risk analysis raises questions about how to make better probability judgements. The many kinds of bias affecting such judgments have been extensively studied (e.g. Gardner 2008), yet much less is known about how to minimise bias. Kahneman (2011) has highlighted

† Brian Hardaker (email: j.brian.hardaker@gmail.com) is Emeritus Professor at the University of New England.

doi: 10.1111/1467-8489.12184

the need to use the slow, deliberative mode of thinking rather than the fast, affective mode for such tasks. Tetlock and Gardner (2015) have shown that some people are far better than others at probability assessment, and have listed tips on how to do better. AREs working on risk need to take note and build on these advances. A paradigm change is overdue (Hardaker and Lien 2010).

In contrast with the relative neglect of probability judgments, AREs have been much exercised about measuring attitudes to risk of farmers and other decision makers. This is the wrong priority. At least for relatively asset-rich Australian farmers, risk aversion matters far less than probabilities because, for the majority of farming decisions, risk premiums are low relative to expected values (Hardaker *et al*. 2015, p. 99–102).

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