

Against the Gods: the Remarkable Story of Risk

by Peter L. Bernstein

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A review by John Adams, University College London,
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Who dares wins - and also often loses, as investors in the channel tunnel have been discovering. But Bernstein puts the emphasis on winning: "higher risk should in time produce more wealth, but only for investors who can stand the heat."

The title of this book promises *the* story of risk. The story he tells, he tells very well, but it should be called *a* story of risk **with significant omissions**. The missing parts can best be described in terms of three categories of risk:

- directly perceived risk - climbing a tree, riding a bike, or driving a car to the channel tunnel,
- quantified risk - probabilistic estimates of failure, such as those made for new vaccines, bridges, or the reinforced concrete in the tunnel, and
- virtual risk - the scientists and statisticians don't know or cannot agree: the likelihood of a terrorist planting a bomb in the tunnel that will kill hundreds of people.

The management of the first category of risks has probably changed little since our ancestors climbed down from the trees. The particular dangers that we have to cope with are different - fierce animals have been replaced by cars. But we still respond to them intuitively in ways that have been programmed into us by evolution - we all duck if we see something about to hit us. The fact that, for this category, we are **all** risk managers, makes the official risk manager's job frustrating. If officialdom requires cars to be fitted with better brakes, we do not drive the same way as before and enjoy an extra margin of safety; we drive faster or start braking later. The potential safety benefit tends to get consumed as a performance benefit.

The management of virtual risks is guided by belief, conviction and superstition. These risks remain the realm of the gods. Like the computer programmer's virtual reality, they can be *real* - like those built into a simulator for training pilots - or completely imaginary - like space invaders. Virtual risks are products of the imagination that work upon the imagination. In the risk literature, such risks are usually labelled *uncertainties*. But we do not respond blankly to uncertainty; we impose meaning upon it - meaning that has no firm basis in science. And our responses continually change the world to which we are responding.

Whether associated with the stock market, global warming, mad cow disease, or the channel tunnel, virtual risks cannot be determined actuarially. They are inherently unknowable because they are the product of an infinitely reflexive regress. Investors, polluters, beef eaters, travellers, terrorists, and those responsible for security are all guessing about the responses of others, to their responses, to the responses of others ... At the time of writing it is not clear whether the recent fire in the channel tunnel was a result of accident or sabotage. But it is clear that

Eurotunnel's estimate that a fire that will kill 50 or more people will occur only once in 600,000 years is fatuous. When fully operational, on a busy weekend the tunnel could have more than 10,000 people in it at any one time; and what will happen in the tunnel will be a result of people - employees, ordinary travellers, and terrorists - behaving in unpredictable ways in response to the behaviour of the tunnel operators who are, in turn, trying to guess what they will do.

Against the Gods does not address the first category of risk and, a more important weakness, blurs the boundary between quantified and virtual risks. It is essentially the story of the achievements of the risk quantifiers and their success in displacing the gods. In chapter 1 Bernstein elevates these achievements to a defining role in history:

“The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that the future is more than the whim of the gods and that men and women are not passive before nature.”

In his conclusion this mastery becomes the shaper of *progress*:

“The central theme of this whole story is that the quantitative achievements of the heroes we have met shaped the trajectory of progress over the past 450 years - [these heroes] have transformed the perception of risk from chance of loss into opportunity for gain, from FATE and ORIGINAL DESIGN to sophisticated probability-based forecasts of the future, from helplessness to choice.”

Bernstein devotes considerable space to an inconclusive discussion of uncertainty. For coping with it he recommends the methods of his heroes: “under conditions of uncertainty, both rationality and measurement are essential to decision making.” But it is advice without practical content. If we don't know, we don't know. Sophisticated probability-based forecasts of the future are only as reliable as the assumptions upon which they are based. They are useful only to the extent that the past is a reliable guide to future. Bernstein argues that his heroes - Pascal, Gauss, Galton and Arrow to name but a few - have enlarged the domain of risk under scientific management, and reduced the domain of the gods. But the uncertainty within which we all live our lives remains *boundless*. The heroes appear merely to have shrunk infinity.

Or perhaps enlarged it? Might the increased command of science and technology over nature be illusory? Might pharmacologists and genetic engineers be creating new problems faster than they are solving old ones? Might the development of new financial instruments like derivatives - that appear to be beyond the comprehension of most of those dealing in them - be turning up the heat in the investors' kitchen? Such questions have no agreed answers. They lie in the realm of virtual risk.

The recent fire in the channel tunnel provides a topical test of the achievements, extolled in *Against the Gods*, of the risk quantifiers. Eurotunnel's *Safety Case* is a 295 page testament to the state of the art of quantified risk assessment. It concludes “It has therefore been possible to perform a deterministic safety analysis of the system and to use the potential risks which have been identified as the basis for Quantified Risk Assessment.” Although no one died, the physical damage, and the consequent disruption of the service, were not anticipated in this assessment.

All this said, Bernstein has written a fascinating book. *Against the Gods* is the most comprehensive history I have read of the attempt to bring the science of probability to bear on risk management - I abandoned my usual practice of bending over the corner of a page containing something quotable when I realised that I was about to double the thickness of the book. **But**, at its centre is an unresolved ambivalence; Bernstein is a risk enthusiast on the verge of losing his nerve. After more than 300 pages devoted to applauding the triumph of probability theory over the gods of ignorance and superstition, he closes with a quotation from Keynes quoting Locke: "God has afforded only the twilight, as I may say, of Probability, suitable, I presume, to that state of Mediocrity and Probationership He has been pleased to place us in here." It is an intriguing note on which to end a book devoted to the defence of hubris (the title of the book is a definition of hubris). Is it offered, one wonders, to propitiate Nemesis, who invariably punishes such presumption?

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John Adams
home phone/fax 0181 442 0306
UCL 0171 380 7777 ext 5505