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Against the Gods: The Remarkable Story of Risk by Peter L. Bernstein. 1996. New York: John Wiley & Sons.

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In *Against the Gods: The Remarkable Story of Risk*, Peter Bernstein presents the reader with an easy to read and often entertaining introduction to the history and theory behind financial risk analysis. The first half of the book is devoted to the development of statistics and utility theory. As Bernstein walks the reader through the history of probability, he brings to life not only the theories being developed, but also the colorful lives of some of the major figures involved, such as Cardano, Pascal, Fermat and several members of the Bernoulli family. Those who use statistics on a daily basis will find the book offers a rich and interesting history behind statistical methods that are otherwise cold and impersonal.

In the second half of the book, Bernstein presents the reader with the theory that underlies financial risk analysis. Written in the same historical style as the first half, the second half of the book focuses on issues such as incomplete information, case selection, utility theory, and the appropriateness of quantitative analysis to estimating future events. These standard issues of probability theory are presented in a highly approachable manner. The non-statistician will find these chapters helpful. Those who already understand the material will find Bernstein's handling of it remarkably refreshing.

A major issue with the book is the depiction of risk. Bernstein explains that, "The word "risk" derives from the early Italian *riscare*, which means "to dare." In this sense, risk is a choice rather than a fate. The actions we dare to take, which depend on how free we are to make choices, are what the story of risk is all about." (p. 8) Risk is consistently presented as something to be embraced, rather than something to be avoided. Risk is also depicted as a highly personal decision made in pursuit of financial gain, as opposed to a highly social—or indeed, societal—necessary evil to be shared. In his discussion of utility theory, for example, Bernstein notes that different people have different levels of risk tolerance, "And that's a good thing," he explains, since, "If everyone valued every risk in precisely the same way, many risky opportunities would be passed up...Without the venturesome, the world would turn a lot more slowly. Think of what life would be like if everyone were phobic about lightning, flying in airplanes, or investing in start-up companies. We are indeed fortunate that human beings differ in their appetite for risk." (p. 105) The wise risk-taking financial entrepreneurs are the heroes in this book. Indeed, after a discussion of how Bernoulli assimilated methods of financial risk assessment, Bernstein declares that, "Risk is no longer something to be faced; risk has become a set of opportunities open to choice." (p. 110)

While it is certainly true that one version of risk is the educated gamble (in fact, the reader learns that probability theory has its roots there), it is also true that many risks are not opportunities open to choice, but rather perils that one hopes to avoid but cannot. This takes us out of the realm of the investor and into the world of insurance. In the contemporary economy of health care, for example, purchasing insurance is not so much about the *utility* received as much as the *necessity* of owning it. Once we

begin to think of risk in terms of losses to be avoided rather than gains to be made, a highly different set of implications about the place of society in the life of the individual emerge. Those using the book in a course on risk can turn this into an opportunity for discussing various definitions of the term.

A central theme of the book is the question of when quantitative analysis is appropriate. Bernstein states up front that, "The issue boils down to one's view about the extent to which the past determines the future. We cannot quantify the future, because it is an unknown, but we have learned how to use numbers to scrutinize what happened in the past. But to what degree should we rely on the patterns of the past to tell us what the future will be like? Which matters more when facing a risk, the facts as we see them or our subjective belief in what lies hidden in the void of time? Is risk management a science or an art? Can we even tell for certain precisely where the dividing line between the two approaches lies?" (p. 6) The fact that Bernstein chose to handle these questions at all is admirable, given that it is often elided over in statistics courses where time is precious and the material to be covered is vast. In courses where the instructor finds little time to discuss this important issue, the book may serve as a useful supplement to the statistical material.

Finally, the book imparts upon the reader a clear understanding of scientific progress by repeatedly pointing out that knowledge does not simply march forward, unfolding in a rational, logical manner. Instead, humans are often bound not only by paradigms, but also by the limits of a poorly designed numerical system, in the case of the Romans, or by the uses to which they want to apply their knowledge. Once statistics moved beyond the world of gambling, for example, new demands for statistics led to new discoveries. Much of this, of course, was brought to our attention long ago through the works of Thomas Kuhn, but Bernstein does it in a book that far more approachable to the lay reader.

Against the Gods certainly has a bias towards the financial world, but to his credit, Bernstein makes no effort to hide this fact. The book is lucid and dotted with so many interesting tidbits that it keeps the reader engaged. As long as the instructor ensures that other definitions of risk (and their implications) are discussed, the book should lend itself nicely to courses on statistics, risk, and its assessment.