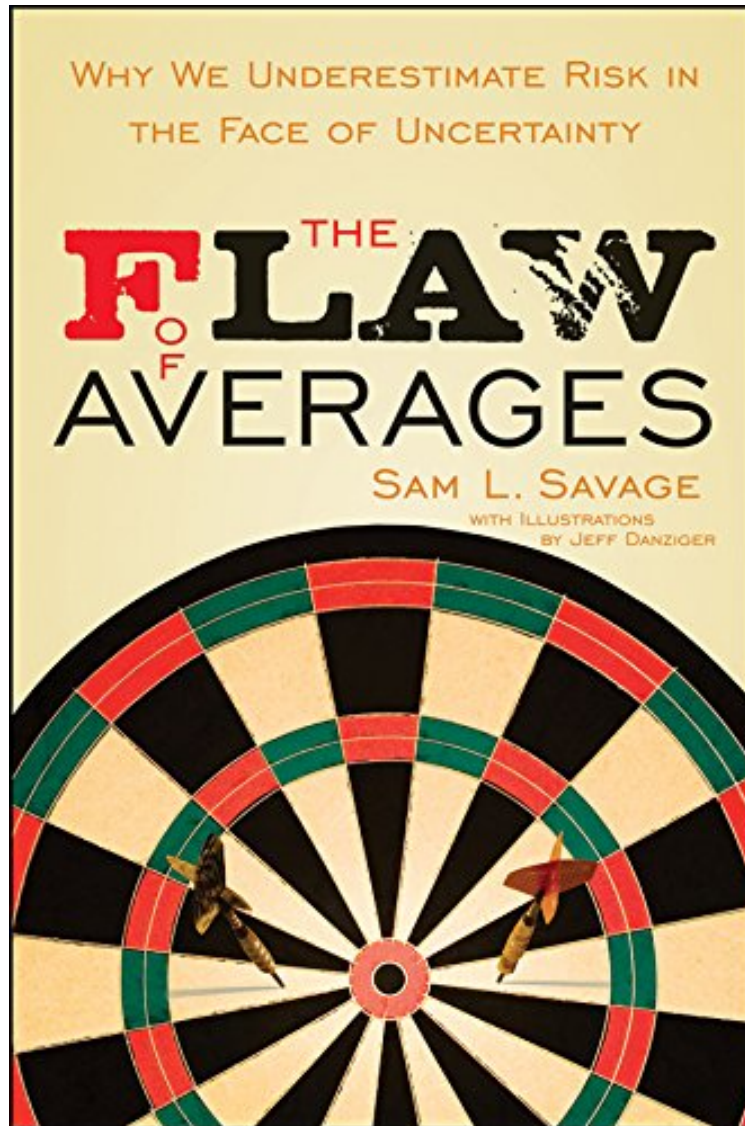


(Ebook free) The Flaw of Averages: Why We Underestimate Risk in the Face of Uncertainty

# The Flaw of Averages: Why We Underestimate Risk in the Face of Uncertainty

*Sam L. Savage*

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**Sam L. Savage : The Flaw of Averages: Why We Underestimate Risk in the Face of Uncertainty** before purchasing it in order to gauge whether or not it would be worth my time, and all praised The Flaw of Averages: Why We Underestimate Risk in the Face of Uncertainty:

1 of 1 people found the following review helpful. Easier way to learn statistics By Artephius (.I have been using basic statistics for over 30 years in my work as an Engineer. I enjoyed the author's attempt at explaining statistics in terms most people can understand. The whole book is based upon not using averages, but instead run a Monte Carlo

simulation using probabilities. I know of one famous case where using averages caused a famous person to look like a fool. If you study the long-term annual returns of the US stock market, you will find an average return of about 10% with 1 sigma of about 20%. These annual returns fit a normal distribution pretty well (unlike daily returns which fit a logarithmic distribution better). Very few people have been able to invest and beat the general 10% average return of the US stock market. Peter Lynch, of the Fidelity Magellan fund, was one of these few people. I think he beat the SP 500 stock index average for about 15 years straight, before retiring. In an article in the September 1995 issue of Worth magazine, Lynch was quoted as saying that retirees can easily annually withdraw 7% from their portfolio. Apparently Lynch was not aware that a year earlier, in 1994, William Bengen used one of the first personal computers to run a simulation to determine the maximum percentage of a portfolio that a retiree could annually withdraw. He found that 4% was the maximum, not the 7% that Lynch suggested. Why did Lynch, a very smart investor, get it so wrong? Using average returns does not account for the variability in annual stock market returns. If the retiree experiences a few bad years of stock market returns during the first few years of retirement, there is not enough time for the portfolio to recover. Retirees that use a 7% withdrawal rate have about a 50% chance of outliving their retirement portfolio. Another famous person that focused on average returns and apparently did no meaningful simulations was Dick Fuld, CEO of Lehman Brothers when it went bankrupt in the Fall of 2008. I saw Fuld testify at Congressional hearings where he lamented that he did not know what went wrong, and he was sorry he had hurt so many employees and investors. While he was testifying, I did some mental math. Fuld had Lehman leveraged at a 33 to 1 ratio. This means a 3% drop in real estate prices causes the mortgage scheme to collapse. I was aware that in the 1990s, California real estate prices had dropped by at least 10%, so a 3% drop was very possible. After Fuld finished testifying, a Professor testified next. He repeated the 33:1 leverage, then stated what I had been thinking just a few minutes before. He said a 3% drop in real estate prices would sink Lehman. The Professor speculated that the \$600 million in salary Fuld had been paid the couple years before the collapse may have clouded his judgment. All-in-all, this book will be enlightening to those people who are not aware of the importance of understanding the dramatic impact that variability of inputs can have on outputs.

0 of 0 people found the following review helpful. One of those books... By Tim Acker "The Flaw of Averages" is one of those books that I keep handy and re-read at least once every year. It is at the same time entertaining and profound. Sam Savage's style is mischievous, irreverent and subversive (imagine the Mad Magazine version of statistics and probability for dummies). That alone keeps you turning the pages. If that were not enough, the subject matter (an approach to incorporating uncertainty into so many facets of human endeavor) has had probably the most profound impact on my world view, particularly in my professional life, of just about any learning that I've undertaken. I know it sounds like hyperbole, but I cannot praise it enough. There are some stretches of tough sledding to be sure, and the book is heavily geared towards probability management in the world of financial analysis. It would be great if now, four years after its initial release Savage would follow up with a sequel that shows the application of probability management to other domains. The difficulty in translating the principles of probability management to other endeavors is likely one of the greatest impediments to wider adoption and application, and I can think of no one better able to make those principles accessible than Sam Savage, based on how well he did it in the "Flaw of Averages."

Who should read and re-read this book? I'd like to say everyone who invests for their retirement, who reads the newspaper or watches the news on TV, who uses healthcare, who plugs into processes at work. In short, if you've ever uttered the words, "Give me a number..." you should read "Flaw of Averages."

7 of 7 people found the following review helpful. Easy, delightful read ... targeted to MBAs, decision-makers By Susan Katz I found this to be an easy, delightful read. I think the book is best directed to business professionals or decision-makers with a firm grasp of MBA-like coursework who need to rethink some aspect of their decision-making. For me, that means some rethinking how I make sales forecasts demographic projections ... and perhaps more importantly, how I communicate those forecasts to broader audiences of decision-makers. That is no easy task, and the book gave me some direction on how to help my clients. However, I have two major problems with the book (or, perhaps more correctly, this approach). My first issue. Monte Carlo simulations are not within the grasp of most business decision-makers -- conceptually, time-wise, tool-wise. That means the simulations are left up to specialists, who frequently are removed from the business or are far too young to make seasoned judgments. That formula is just as bad (if not more so) as forecasting point estimates. My second issue. These simulations depend upon specifying distributions, which are frequently assumptions themselves. Frankly, I would rather prep a range of different forecasts with point estimates that my clients I understand grasp, than prep a forecast based on distributional assumptions that are WAGs (wild a\*\* guesses). The distributions are one of the black-boxes in this approach, and one of inputs most likely to be misunderstood. When you don't know the variability and its distributional form, it's GIGO. Forecasting points you know, understand can communicate is better than forecasting distributions that are unknown, guessed, or too uncertain. The approach is not the holy grail, and it can be dangerous in the wrong hands. But this book can inform enlighten. I should be a must-read for any quantitatively oriented MBA. Put it on your reading list. 4\*

A must-read for anyone who makes business decisions that have a major financial impact. As the recent collapse on Wall Street shows, we are often ill-equipped to deal with uncertainty and risk. Yet every day we base our personal and

business plans on uncertainties, whether they be next month's sales, next year's costs, or tomorrow's stock price. In *The Flaw of Averages*, Sam Savage—known for his creative exposition of difficult subjects—describes common avoidable mistakes in assessing risk in the face of uncertainty. Along the way, he shows why plans based on average assumptions are wrong, on average, in areas as diverse as healthcare, accounting, the War on Terror, and climate change. In his chapter on Sex and the Central Limit Theorem, he bravely grasps the literary third rail of gender differences. Instead of statistical jargon, Savage presents complex concepts in plain English. In addition, a tightly integrated web site contains numerous animations and simulations to further connect the seat of the reader's intellect to the seat of their pants. The Flaw of Averages typically results when someone plugs a single number into a spreadsheet to represent an uncertain future quantity. Savage finishes the book with a discussion of the emerging field of Probability Management, which cures this problem through a new technology that can pack thousands of numbers into a single spreadsheet cell.

From the Inside Flap Despite all its promise, the Information Age is also laden with a dizzying array of technological, economic, and political uncertainties. While the electronic spreadsheet brought the power of business modeling to tens of millions, in so doing, it also paved the way for an epidemic of what Sam Savage calls the Flaw of Averages. This set of systematic errors occurs in all types of business and scientific endeavors when smart people focus on single average values in the face of uncertainty and risk, and it is an accessory to the economic catastrophe that culminated in 2008. The Flaw of Averages also ensures that plans based on averages of such uncertainties as customer demand, completion time, and interest rate are below projection, behind schedule, and beyond budget. In his book, Savage draws on recent breakthroughs in technology, along with new data structures and management protocols, to offer an approach to curing the Flaw of Averages. Savage begins by providing a basis for intuitively grasping and visualizing risk and uncertainty, using simple everyday props such as game-board spinners and dice. He refers to such statistical jargon as standard deviation and covariance as Red Words, and instead uses straightforward, everyday language throughout the book. He does not assume any statistical background on the part of the reader, but claims that for those with extensive training in the field, the first section of the book will repair the damage. He then describes how risk and uncertainty are handled in the field of finance, where the Flaw of Averages was first systematically conquered by Modern Portfolio Theory. Savage describes how the recent economic turmoil was caused in part by clinging blindly to this early work while not adhering to its fundamental principles. He then shows how these principles still form an excellent foundation for managing uncertainty and risk in other areas of industry and government, and provides examples in supply chain management, project portfolios, national defense, healthcare, climate change, and even sex. In the book's final section, Savage reveals current developments in the emerging field of Probability Management—a path towards increased transparency and a potential cure for the Flaw of Averages. Finally, the book includes a Red Word Glossary that defines statistical terms in plain English to assist readers in defending themselves against those wielding technical mumbo jumbo. The goal of *The Flaw of Averages* is to help you make better judgments involving uncertainty and risk, both when you have the leisure to deliberate, and, more importantly, when you don't. Its approach of a more transparent representation of uncertainty is helping people and some big companies to make better decisions today.

From the Back Cover "Statistical uncertainties are pervasive in decisions we make every day in business, government, and our personal lives. Sam Savage's lively and engaging book gives any interested reader the insight and the tools to deal effectively with those uncertainties. I highly recommend *The Flaw of Averages*." —William J. Perry, former U.S. Secretary of Defense "Enterprise analysis under uncertainty has long been an academic ideal. . . . In this profound and entertaining book, Professor Savage shows how to make all this practical, practicable, and comprehensible . . . the Distribution String . . . represents a major breakthrough in the communication of risk and uncertainty." —Harry Markowitz, Nobel Laureate in Economics "This is a book written for laymen with enough interesting insights to engage even the most scholarly professional." —Douglas Hubbard, author of *How to Measure Anything* "Sam Savage is the Edward Tufte of risk." —Matthew Raphaelson, Executive Vice President, Wells Fargo

**A GROUND-BREAKING MUST-READ FOR ANYONE WHO MAKES BUSINESS DECISIONS IN THE FACE OF UNCERTAINTY**

In *The Flaw of Averages*, Sam Savage—known for his creative exposition of difficult subjects—describes common avoidable mistakes in assessing risk in the face of uncertainty. He explains why plans based on average assumptions are wrong, on average, in areas as diverse as finance, healthcare, accounting, the war on terror, and climate change. Savage refers to anachronistic statistical jargon as Red Words, which he defines as things that may not be uttered in a single bar. Instead, he presents complex concepts in plain English (Green Words), backed up by interactive simulations at [www.FlawofAverages.com](http://www.FlawofAverages.com), which connect the seat of the intellect to the seat of the pants. Savage also presents the emerging field of Probability Management aimed at curing the Flaw of Averages through more transparent communication of uncertainty and risk. Savage argues that this is a problem that must be solved if we are to improve the stability of our economy, and that we cannot repeat the recent mistakes of applying "steam era" statistics to "information age" risks.

About the Author Sam L. Savage is a Consulting Professor of Management Science and Engineering at Stanford University, and a Fellow of the

