

THE **Art,**
Philosophy,
AND **Science**
OF **Data**

BY GERRY SMEDINGHOFF

A look at two books that examine the intersection of statistics, money, markets, chance, and human behavior.

The Wisdom of Crowds

James Surowiecki
Anchor Books (2004)

ONE TRUE INDICATOR OF SUCCESS is when you no longer bother to refer to your credentials. No one knows or cares whether Warren Buffett has a Ph.D. or if John Templeton happens to be a chartered financial analyst. And Ross Perot's title for the past two decades has been simply "The Texas Billionaire."

Someone who can *do* something, consistently and successfully, is infinitely more valuable than someone who only *knows* something. Actuaries generally occupy the realm of knowing rather than doing; thus their names on business cards are followed with a string of capital letters, which are of no interest to the general public.

Actuaries not only confine themselves to analyzing the past, which doesn't change, but they also have traditionally confined themselves to future contingencies that follow predictable trends. Mortality rates have decreased fairly consistently over the past century, except for the brief influenza epidemic in 1918. This makes for a relatively easy data set to analyze, and there's no indication this trend will change in the future.

Gold, oil, and the Dow Jones industrial average, on the other hand, have been wild roller-coaster rides over the same period and may be even more volatile in the coming decades. And what separates those who become actuaries from those who make their living trading in the financial markets is not intelligence but courage, mental discipline, historical perspective, and philosophical reflection.

The natural hard-wired tendency for the human mind is to project the current trend indefinitely into the future. Amusingly enough, the 1970 edition of the actuarial text *The Theory of Interest* was published with interest tables that ranged from ½ percent to 5 percent. With accelerating inflation over the next decade, these examples soon became outdated. The revised and updated 1991 edition was published with interest tables that ranged to a more realistic 12 percent. But these were rendered obsolete as interest rates eventually returned to levels not seen since the 1950s.

Just before the turn of the century, at the peak of the greatest bull market in history, most people were convinced they would be comfortably retired in a decade or so, just by holding on to shares of Enron, Netscape, Priceline, and Worldcom. In fact, it was so simple, even a group of little old ladies from Beardstown, Ill., could do it. And whenever the market would drop by more than a couple of percentage points, crowds of people would line up around the block, waiting for their brokerage office to open so they could buy on the weakness. That level of investor euphoria won't be seen for another generation.

So who should you believe: the career options trader surrounded

by mountains of data, analysis, and sophisticated financial models, who is preparing for a major crash? Or the crowd of your neighbors, who have taken out home equity loans to load up on tech stocks, based on the whimsical hearsay advice of some little old ladies and their tempting recipes?

The case for listening to your neighbors is made by James Surowiecki, a staff writer for *The New Yorker* and author of *The Wisdom of Crowds*, who clarifies this question before answering it. He classifies the bull market of the 1980s and 1990s as a mania, where the collective opinion of the crowd is always ultimately and disastrously wrong. But manias aside, he shows why the collective wisdom of the crowd is not only usually accurate but even more accurate than most of the experts.

The Wisdom of Crowds is amenable to the actuarial way of thinking, which is to collect and aggregate enough data until you get a consistently reliable answer. It opens with the 1906 story of how an elitist British scientist, Francis Galton, was amazed to discover that the collective wisdom of a randomly selected group of uneducated common folk at a county fair—defined as the average of their guesses of the weight of an ox about to be slaughtered (1,197 pounds)—was within one pound of its actual weight (1,198 pounds). Galton couldn't comprehend how such a motley collection of inferior



Get the right gear to reduce the Risk



ICRFS-PLUSTM

**Unique long-tail liability
Enterprise Risk Management System**

Changing the Face of Actuarial Solutions Forever!

ICRFS-PLUS™

Integrated System for Risk Information Management

ICRFS-PLUS™ is a long-tail liability Enterprise Risk Management system that is the key to a new innovative paradigm for measuring and managing long-tail liability risks. Information is held in a unique easy-to-use database. Data input, updating, reporting, monitoring and testing the adequacy of claims provisions are all done within one integrated system. Communication with other software or other databases can be automated using **COM** scripts.

Innovative Technology for Evaluating **Economic Capital** and Supporting **Solvency II**

To evaluate **Economic Capital**, you need tools that allow you to measure the true volatility and inter-relationships inherent in your long-tail liabilities. **Capital allocation** by line of business is based on a composite model for multiple lines of business that you identify, which encapsulates those inherent properties. From this model, you can compute forecast probability distributions by accident period, calendar period and the aggregate, for each line of business and the aggregate of all the lines.

For the purpose of **Solvency II**, the database facilitates the understanding of the significant long-tail liability risks of the enterprise in a quantifiable and integrated manner. It is effortless to navigate the database so that each actuary has access to the same information with just a few mouse clicks.

Unparalleled Knowledge and Information at Your Fingertips

ICRFS-PLUS™ encapsulates a unique collection of knowledge and applications - including pricing future underwriting years (high severity/low frequency) and design of optimal outward and inward reinsurance - that Insureware has developed over many years of modelling portfolios using this innovative, scientific tool. Unique eSupport is in the form of models, which give a compact description of the information found in the data and assumptions for the future. These models allow you to immediately generate all that you need - for example, graphical depictions of models, probability distributions for future payment streams and Value-at-Risk tables.

Head Office

Prof. Ben Zehnirith
Insureware Pty Ltd
Suite 6 & 7, 40-44 St Kilda Rd,
St Kilda 3182 Victoria Australia
Telephone: +61 3 9533 6333
benzehnirith@insureware.com

London Office

Dean Dwonczyk BSc (FIA)
Insureware Pty Ltd
120 Fenchurch Street
London EC3M 5BP UK
Telephone: +44 20 7929 1177
deandwoczyk@insureware.com

US Representative

Robert Eramo ACAS
President
RSA Inc.
New York
Telephone: +1 917-873-7835
eramo@rasny.com

Canadian Representative

Bruce Paterson FCAS
Paterson Martin
280 Ellis Avenue
Toronto ON M6S 2X2
Telephone: +1 416 767 7641
bruce.paterson@patersonmartin.com



genetic stock could be so precise in its aggregate opinion.

Surowiecki's insightful answer is that, unlike bull market manias, the crowd is almost always collectively wiser than an individual expert, provided four conditions hold:

- **Diversity:** Each person adds private information or bias.
- **Independence:** People form their opinions independently.
- **Decentralization:** People draw on their own specialized knowledge.
- **Aggregation:** A mechanism exists to turn private judgments into a collective decision.

Or, to put this in the terms of the popular television quiz show *Who Wants to Be a Millionaire?* if you're stumped by a question—and you have a choice of calling an individual expert or asking the audience (crowd)—you're almost always better off asking the crowd, provided the above four conditions hold.

This is why Google is the world's most successful website and search engine. When you do a search on Google, you're not tapping into the wisdom of any single expert, although this is what you're trying to do. All you're doing is taking a poll of the collective wisdom of websites on the Internet that resemble or match your request. In fact, the results Google returns to you don't resemble wisdom but popularity. And the thesis of Surowiecki's *Wisdom of Crowds* is how often a popularity contest can actually be more wise than popular.

Surowiecki proceeds to develop his book around three classes of problems that crowds solve very well, documented with historical case studies and explained by robust economic theories:

- **Cognition problems**, which have a distinct correct answer, such as the weight of the ox or how long the latest Mideast peace treaty will last;
- **Coordination problems**, which require large groups of people to coordinate their behavior, knowing that everyone else is trying to do the same thing, such as traffic congestion and markets of buyers and sellers;
- **Cooperation problems**, or market failures, where each person's narrow self-interest would normally prevent him from cooperating with others, such as paying taxes for national defense or pollution control.

Crowds cease to be wise when one or more of the four conditions—diversity, independence, decentralization, and aggregation—fail to hold. Surowiecki devotes a chapter of the book to the causes and effects of manias, particularly in the markets, whose bias is exacerbated by prohibitions against short-selling.

"The stock market, on the whole, is made up of people who think that stock prices are going up," Surowiecki writes, "[and] it's not always obvious to the people inside a bubble that that's where they are."

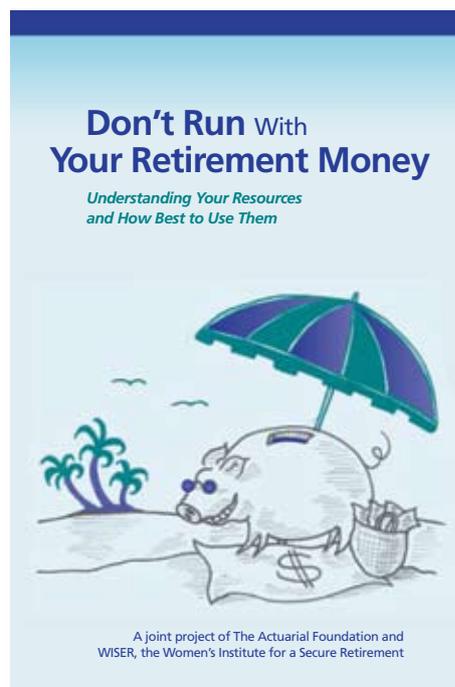
The meteoric rise of Enron, Netscape, Priceline, and Worldcom in the bubble-mania of the 1990s was driven not by the aggregation of diverse, independent, decentralized opinions about the future profitability of these companies. People were buying them simply because everyone else was. They bought with the reassurance that markets always go up. And all you have to do is "buy and hold" to get rich and retire comfortably.

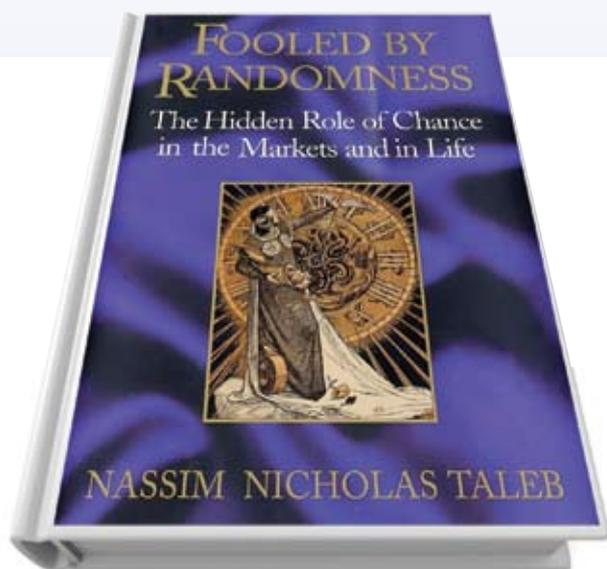
Conserving Retirement Resources

When they retire, many people are put in the position of having to manage the largest amount of money they will ever see at one time. Since that money has to see them through retirement, this is often the most important financial decision of their lives.

To provide guidance, the Woman's Institute for a Secure Retirement (WISER) and the Actuarial Foundation have developed a new consumer guide, *Don't Run With Your Retirement Money: Understanding Your Resources and How Best to Use Them*. Available free online, the guide lists resources for retirement income and discusses how to figure out how much money will be needed in retirement, dealing with lump-sum distributions, and the impact of drawing down assets during retirement. The guide also contains practical information on annuities, self-managed investing, and accounting for taxes.

To download a free copy of the booklet, go to www.actuarialfoundation.org/consumer/wiserlumpsumFinal.pdf.





Fooled by Randomness

Nassim Nicholas Taleb
Texere Press (2001)

BETTING AGAINST THE CROWD IS NASSIM TALEB, an options trader and author of *Fooled by Randomness*, who sees little evidence of any collective wisdom of the masses, primarily because he has a long and profitable career betting against them. Taleb's mathematical rigor is on par with most actuaries, but he doesn't have much use for the actuarial way of thinking.

While Taleb relies on Monte Carlo simulations, *Fooled by Randomness* doesn't contain any mathematical formulae. Rather, it's a carefully woven tapestry of Left Bank philosophical references to André Breton, Auguste Comte, Jacques Derrida, George Hegel, Friedrich Hayek, John Stuart Mill, Jacques Monod, Karl Popper, and Paul Valéry.

Fooled by Randomness is also based on the moral of a simple story: An eccentric tycoon hands you a revolver with a bullet in one chamber and challenges you to one round of Russian roulette. He offers you \$10 million if you survive. Taleb notes that anyone who accepts this offer and wins \$10 million will be euphoric over his success, become an overnight media celebrity, and probably try to convince you that this is the best path to wealth and happiness.

Thus another true indicator of success is someone who not only can succeed but succeeds repeatedly, in both good times and bad. Someone who is quick to react, retains his composure, and refuses to panic. Almost anyone can become a trader. A handful of traders can become wildly successful on the scale of a \$10 million windfall profit. But only a select few can be successful for decades that span both bull and bear markets.

Scattered throughout the book are examples of multi-millionaire über-traders, whose several years of wild success were wiped

out in a matter of weeks, or even days. One high-yield trader he calls "John" amassed a personal net worth of \$16 million by earning \$250 million for his employers over a seven-year period, only to lose more than \$600 million within a few days.

Nassim Taleb, however, is not a career options trader. Rather, he classifies himself as a lifelong philosopher of science, who happens to trade for a living. He has devoted his life to the epistemological question of philosophy, which is: "How do we know that we know something?" His mentor, Karl Popper, claimed the answer was "never," because there are only two types of theorems: those that can be proven false and those that have not yet been proven false.

The philosopher John Stuart Mill called this the "Black Swan" problem, contending that no amount of observations of white swans can allow the inference that all swans are white. But the observation of a single black swan is sufficient to refute that conclusion. Taleb applies this philosophy lesson to trading by noting the statement that "the markets never go down by more than 20 percent in any given three-month period" is meaningless, even if you can verify it.

The fall of traders such as John happens mostly because they ignore the possibility of the existence of a black swan. They build their portfolio models on the foundation that markets never go down by more than 20 percent in any three-month period or the yen will never go below 100 to the dollar. Herein lie the courage and discipline of longtime professional traders: They know to never say, "The yen will never go below 100 to the dollar," but rather, "How will you [the trader] react when it does?"

John was completely ignorant of history and philosophy. His problem was that he was just a professional trader. And nearly all professional traders come and go, rise and fall, like women's fashions. One day, suddenly, without warning, they're escorted off the trading floor by security guards, never to be seen or heard from again.

But throughout his seven-year ride to glory, fame, and wealth, John aped all the sophisticated behaviors of successful traders that made him a hero among, and the envy of, his peers. He bought a mansion, exotic European sports cars, and a season pass to the opera. He collected fine art, drank vintage wines, and dressed in the latest fashions.

But all that was behind this façade was the awkward awareness that he ought to say "hors d'oeuvres" instead of "horse devours." Like the status-conscious, fast-talking wheeler-dealer Rex Mottram in Evelyn Waugh's novel *Brideshead Revisited*, "he wasn't a complete human being at all. He was a tiny bit of one, unnaturally developed... a sort of primitive savage... something absolutely modern and up-to-date that only this ghastly age could produce."

Nassim Taleb doesn't just study markets. He studies history, the history of markets, philosophy, the history of philosophy, and the history of the philosophy of markets. The result of his lifelong study is a decidedly stoic outlook on financial markets. He concludes that bears drop like flies when the markets rally, and bulls get slaughtered when they crash. The ones who survived were option buyers, because they could buy insurance against disasters.

He describes his trading philosophy as follows: "I try to benefit

from rare events, events that do not tend to repeat themselves frequently, but, accordingly, present a large payoff when they occur... I believe that rare events are not fairly valued, and the rarer the event, the more undervalued it will be in price."

Rare events of the 1990s, such as the collapse of the Mexican peso, Russian ruble and high-yield bonds abruptly ended the careers of many wildly successful über-traders. But they made Taleb a comfortably successful philosopher of science, who trades for a living. The über-traders, along with the rest of corporate America who endured the collapse of their 401(k) accounts, habitually find themselves starting their sentences with words such as, "If it weren't for the crash, I'd be..." Yet seasoned traders such as Taleb, who know the history of markets, know that crashes are normal. And failing to plan for a crash in the markets is even more foolish than driving without a seat belt.

Amassing more data makes actuaries comfortable. Evidence of an established trend makes them even more comfortable. Taleb has the opposite view. When others around him feel confident, he starts to get nervous. And when the accumulated data show a consistent, established trend, Taleb knows the run is about to end, usually in an abrupt and dramatic manner.

In the late 1980s, the industry shifted full force to universal life insurance with optimistic account illustrations based on the same environment of high market-interest rates that prompted the update to the *Theory of Interest* textbook noted above. When long-term interest rates collapsed in the 1990s, many of the nation's largest insurers agreed to pay billions in class-action lawsuits to disgruntled policyholders. And at the end of the recent bull market in 1999, a survey of more than 300 of the largest defined benefit pension plans showed them to be 129 percent funded. Three years later, they were only 81 percent funded, as companies began to queue up to dump their unfunded pension liabilities onto the PBGC.

Taleb also ignores the news. Because daily news represents useless noise, while long-term history is real information. The wisdom of the crowd, or at least of the print, radio, and television media that pander to it, is that markets go up or down each day depending on the latest statements by the chairman of the Federal Reserve, the unemployment rate, the trade deficit, new housing starts, consumer confidence, or long-term interest rates. But if you bothered to do a detailed study of the past two or three decades, plotting any of these "indicators" along with the stock market, you'll find no correlation. Or, in the case of the trade deficit, a near-perfect negative correlation.

Robert Prechter, author of *Elliott Wave Principle* (1979), also an expert in the history of the philosophy of markets, flatly states that "news is of no value" when attempting to predict the markets. He eloquently proves this in his essay "The Stock Market Is Not Physics," which appeared in the May/June 2004 edition of his newsletter, *The Elliott Wave Theorist*.

Prechter reproduces graphs of the stock markets around the time of catastrophic events, such as the assassination of President Kennedy, the New York City blackouts, and the attack on the World Trade Center (but without the dates along the x-axis), and challeng-

es readers to identify when these dramatic events occurred merely by looking at the "market reactions." Not only does he convince readers that they can't isolate market reactions to these catastrophic events, but he also shows how an investor with advance knowledge of the next day's news would most likely lose money betting on the downside.

Both Surowiecki's and Taleb's books dissect the abrupt collapse in 1998 of Long-Term Capital Management (LTCM), a hedge fund run by two Nobel Prize winners, Robert Merton and Myron Scholes. Surowiecki's analysis points out two technical flaws in LTCM's model—as if they could have been avoided with enough foresight: It was highly leveraged, and its investments were highly illiquid. He praises LTCM for being right over the long term and attributes its demise to John Maynard Keynes' maxim that "the markets can be wrong longer than you can stay solvent."

Taleb lives by the trader's maxim that says, "The markets are never wrong; you are," and unceremoniously puts Merton and Scholes into the same class as the arrogant, uncouth ignoramus John, who never saw a black swan and thus concluded they don't exist. "Somehow they thought they could scientifically 'measure' their risks. They made absolutely no allowance in the LTCM episode for the possibility of their not understanding markets and their methods being wrong... Instead [of learning from their mistakes] they complain about the behavior of their counterparts in the market who pounced on them like vultures, thus exacerbating their downfall."

Like John, Merton and Scholes lack the mental discipline, historical perspective, and philosophical reflection to be successful traders. Taleb surmises: "When will John recover from the ordeal? Probably never. This is not because John lost money. Losing money is something good traders are accustomed to. It is because he blew up; he lost more than he planned to lose. His personal confidence was wiped out. But there is another reason John will probably never recover. The reason is John was never a trader in the first place. He was one of those people who happened to be there when it [the bull market in high-yield bonds] all happened."

Nassim Taleb prefers the humility of George Soros, who "walks around telling whoever has the patience to listen to him that he is fallible. My lesson from Soros is to start every meeting at my trading boutique by convincing everyone that we are a bunch of idiots who know nothing and are mistake prone but happen to be endowed with the rare privilege of knowing it."

As credentials go, James Surowiecki doesn't list any, while Nassim Taleb has a Ph.D. from the University of Paris Dauphine and an M.B.A. from Wharton. Both will admit that "Nobel Laureate" is as elite as credentials come. And both also know that, as they now say on Wall Street, "A Nobel Prize and 50 cents will get you a cup of coffee."

GERRY SMEDINGHOFF is the director of actuarial services for TriWest Healthcare Alliance in Phoenix. He is a frequent speaker on actuarial and economic issues, and his writings have appeared in the *Washington Post*, *Las Vegas Review-Journal*, *Skydiving*, *Vital Speeches of the Day*, *Contingencies*, and Society of Actuaries publications.