Yes! It Really *Is* Gambling

by Robert Ingraham

On June 21, during an international webcast, Lyndon La-Rouche uttered the following comments:

> As a matter of fact, the great danger of a financial crash today, is that most people in what they call economics believe actually not in economics: They believe in gambling. It's called a financial system; it's a gambling system. And people understanding that, ever since Galileo came up with this idea about gambling as the basis of discovering how markets would work, everyone has tried to get a better statistical system for gambling. Like breaking the bank at Monte Carlo, making a killing at Las Vegas, probably one's own. And therefore, these guys who are running the financial world today, depend on the assumption that they've got a *"better system"*—as they used to have at the race tracks, a "better system" for handicapping the horses. And it would really handicap the bettor, in the end, as he found himself on the street without cash—and being pursued by his lenders.

> But what you've got today, as was typified in the calamity that occurred in August through October of 1998, was that the bettors now rely upon mathematics. And computers have helped them to do this: They can now bet faster, they can do mathematics faster than ever before, statistics faster than ever before. But they're all trying to find the best system of gambling. And they're all competing to get in on what they believe is the best system of gambling. The result is that, when all the gamblers come close to the same system of gambling against each other, but they're all gambling according to the same formula, what happens? They all go down together, in one big flop!

Is Mr. LaRouche exaggerating for effect? If you think that is the case, please consider the following chronology:

• In 1956, an engineer at Bell Labs in Murray Hill, N.J. published in the *Bell System Technical Journal,* an article titled, "A New Interpretation of Information Rate." The engineer's name was John Kelly, and the article, which was prepared with the help of another Bell engineer, Claude Shannon—famous today as one of the founders of Information Theory—posed the question of whether a mathematical formula could be devised to ensure success in betting on horse races. Kelly answered the question in the affirmative, and his solution, the **Kelly Formula** or **Kelly Criterion**, not only became the basis for several betting systems in Las Vegas and Atlantic City, but is also widely used today in financial options trading, where it is sometimes called the "geometric mean maximizing portfolio strategy." Use of the Kelly method, according to one options-trading authority, is intended to "maximize the value of the logarithm of wealth."

• In 1960, Claude Shannon introduced the Kelly Formula to a mathematics professor at MIT named Edward Thorp. Beginning in 1960, using an IBM Fortran 740 mainframe computer at MIT, Thorp programmed a statistical computer program to win at blackjack. In 1960 and 1961, Shannon and Thorp took several trips to Las Vegas to test their theories on blackjack and roulette. In 1961, Thorp presented his blackjack system in a paper, "Fortune's Formula," to the annual conference of the American Mathematical Association. Then in 1962, Thorp issued a public challenge to casino owners that he could beat their games, travelled to Reno, Nevada, and in two days, doubled his money playing blackjack. Later that year, Thorp published a more popularized version of his method and experiences in the best-selling book *Beat the Dealer*.

Shortly after these events, Edward Thorp relocated to the University of California at Irvine and began to investigate how to use his winning blackjack strategy to make money in financial investments. During the next ten years he became one of the pioneers in the emerging field of new "financial instruments," particularly after the opening of the Chicago Board of Options Exchange in 1973. In 1967, Thorp published a book on investment strategy titled *Beat the Market: A Scientific Stock Market System*. He presented the first, basic version of what would be later known as the famous **Black-Scholes Formula**. In 1969, Thorp opened Convertible Hedge Associates, described as the world's first market-neutral hedge fund. Later renamed Princeton Newport Partners (PNP), this hedge fund flourished until 1988, when it was raided and shut down as part of the U.S. government's racketeering case against Michael Milken/Drexel Burnham. Thorp survived, creating a new hedge fund, Edward O. Thorp and Associates, in Newport Beach, Calif., which exists to this day.

MIT professor Edward Thorp's 1961 statistical program for how to win at blackjack, led to a strategy for making money in "new financial investments." He later opened a hedge fund.

In 1973, Thorp received a letter from Fisher Black, in which Black expressed his admiration for Thorp's work. Black included in the letter a copy of the Black-Scholes Formula, which was about to be published. This letter began a friendship between Thorp and Black which lasted until the latter's death in 1995. Later that year, Thorp presented a paper, "Extensions of the Black-Scholes Option Model," at the annual conference of the International Statistical Institute in Vienna. Through the 1970s and '80s, Thorp continued to play a leading role in the initiation of new financial investment methods. In 1974, he developed the first mathematical solution to the American "put curve."[*] In 1979, Thorp and his team at PNP came up with the idea of "statistical arbitrage." According to Thorp, their intent was to "use the Brownian motion structure of stock prices to 'drain energy' (money) from the ceaselessly excessive fluctuations in stock prices." Thorp is still very much active today. In 1997, he presented a paper, "The Kelly Criterion in Blackjack, Sports Betting, and the Stock Market," to the Tenth International Conference on Gambling and Risk Taking, in Montreal; and, in 2003, the *Quantitative Finance Review* published a piece by him titled "A Perspective on Quantitative Finance: Models for Beating the Market."

• At a 1963 conference on computer science, held in Las Vegas, computer programer Harvey Dubner proposed a revision to the Thorp blackjack system, utilizing a method based on a "high-low" card count. Another computer programmer, Julian Braun, then played over 90 *million* simulated blackjack hands on an IBM 7044 computer until he had perfected Dubner's revisions to the Thorp system. Braun was an IBM engineer, with degrees in mathematics and physics. After leaving IBM in 1987, he became a day-trader in stocks and commodities.

In 1967, a revised version of *Beat the Dealer*, including the Thorp/Braun combined method, was published. This work has remained the basis for all blackjack winning strategies down to the present day.

The final development in successful blackjack strategy was the invention of team play, first by Ken Uston in the 1970s, and then, more spectacularly, by the MIT blackjack team in the 1990s. Uston, a *magna cum laude* graduate of Yale University, with an MBA from Harvard, was, by 1967, the vice president of the Pacific Stock Exchange in San Francisco. He quit his job to take up blackjack full-time. He was the first to utilize team play, which he described in his 1977 book, *The Big Player*. In the 1990s, using the Thorp/Braun system and Uston's team strategy, a group of MIT mathematics and physics undergraduates created the MIT Blackjack Club, and over a period of several years, won millions of dollars from the Las Vegas casinos. Their exploits were described in the 2002 book *Bringing Down the House—the Inside Story of Six MIT Students Who Took Vegas for Millions*.

The final figure in the field of blackjack worth mentioning is John Ferguson (a.k.a. Stanford Wong), who refined many of the betting methods of Thorp, Braun, and Uston. Ferguson, who holds a Ph.D. in economics from Stanford University, published *Professional Blackjack* in 1975, which to this day is considered the all-around best book on the topic.

• In 2001, Texas banker Andrew Beal travelled to Las Vegas for the express purpose of defeating the best professional poker players in the world. Beal's efforts, which continued for several years, are chronicled in the popular 2005 book *The Professor, the Banker and the Suicide King: Inside the Richest Poker Game of All Time*, by Michael Craig. Beal is the founder and president of the Dallas-based Beal Bank, which he created in 1988 on the wreckage of the Texas savings and loan industry. During the past 20 years, his bank has specialized in buying and selling "distressed properties," and, among other "investments," it provided some of the financial backing for Enron Corp. to move into the deregulated California energy market. By his own account, Beal spent thousands of hours writing and running computer programs in order to perfect a winning poker strategy. His poker games in Las Vegas still hold the record as the biggest high-stakes games of all time, where, in some games, there was as much as $30 million on the table. Beal is also an amateur mathematician and student of number theory. In 1997, the American Mathematical Society published a paper by Beal, "Beal's Conjecture," which purported to contain a solution to Fermat's Last Theorem.

• In 1981, a group of physics and mathematic students at the University of California at Santa Cruz formed a club

*In options trading, there are two types of contracts: 1) an option to buy a commodity at a future date, known as a "call" option, and 2) an option to sell a commmodity at a future date, known as a "put" option.

named the Dynamical Systems Collective, but popularly called the Chaos Club. They studied chaos theory, played around with fractals, and decided to devise a method to win money at the roulette tables in Las Vegas. Their adventures were recounted in the 2000 book *The Eudaemonic Pie*, by Thomas A. Bass. Then in 1992, the same group of now ex-students founded an investment firm, The Prediction Company, in Sante Fe, N.M. The idea for the company grew out of a series of conferences held between 1986 and 1991, where arguments centered around the view that financial markets were essentially stochastic (random, aimless) in nature, and that chaos theory provided the basis for predicting safe bets in chosen financial instruments. The seed money to create The Prediction Company came from David Weinberger, who began his career at Bell Labs, and went on to become a bond trader at Goldman Sachs. When Weinberger left Goldman Sachs, he was replaced by none other than Fisher Black, of Black-Scholes fame.

• Between 1975 and 1985, the Black-Scholes methodology revolutionized finance: Everyone adopted it. Earlier, in 1969, Myron Scholes had created new financial strategies which led to the development of hedge funds and index funds. In 1973, the Black-Scholes Formula was published in the *Journal of Political Economy*. The formula assumes that stock prices follow a "geometric Brownian motion with constant volatility." In 1973, the Chicago Board of Options Exchange opened options trading, based on the work of Black and others. In 1985, while working for Goldman Sachs, Fisher Black developed the "Black-Derman-Toy" model, which led to the rapid expansion of the derivatives market. Perhaps the most important figure in this circle, however, was neither Black nor Scholes, but their friend and collaborator, Robert Merton. Merton received a Ph.D. in economics from MIT in 1970. In 1973 he published a paper, "The Theory of Rational Options Pricing," in the *Bell Journal of Economics and Management*. Merton proposed a "stochastic calculus," which, according to him, allowed the behavior of option prices to be described in the language of classic probability theory. Merton went on to work at Solomon Brothers and to become a managing director at J.P. Morgan. He is often credited with opening the doors at Wall Street firms for finance and mathematics professors. In 1997, Merton and Scholes were awarded the Nobel Prize in Economics.

What About Reality?

In looking at the players and influences which created the current field of mathematical-finance, we find a remarkable confluence of game theory, information theory, chaos theory, and statistical probability theory. We also find, of course, the earlier paramount influences of Bertrand Russell, Norbert Wiener, and John von Neumann.

For those readers who still can't grasp what is wrong with the ideas of the individuals named above, here's a clue: First off, they simply ignore the real world; and secondly, nothing they write about or talk about has anything to do with physical economic processes. The methods they use to pump billions of dollars into financial "bets" every day are identical to, and in some cases, directly derived from, the daily activity of gamblers at Las Vegas. It really is simply betting. On the other hand, what the nation produces, the condition of its infrastructure, its energy needs, are of absolutely no concern whatsoever. In *Bringing Down the House*, one of the MIT blackjack students remarks to another, "We're not gambling; this is arbitrage." That's the mentality.

And, of course, it doesn't work. The whole idea of Thorp, Black, Merton, et al., is to create "risk-free" betting, by coming up with mathematical formulas which will always guarantee a profit. This insane idea, which is derived from a very old gambling method known as **Dutch Book**, is why you hear people say that derivatives have made the financial markets safer and more stable. It's the blind leading the blind. First off, as Mr. LaRouche pointed out in his June 21 address, use of the Black-Scholes and related methods is now universal. They're *all* using the same formulas. Picture what would happen if every blackjack player in a Las Vegas casino was part of the MIT blackjack team, and you should understand what is wrong with that picture. Second, they demand to set their own rules. As even Black and Scholes point out in their 1973 paper, the success of their formula depends on very specific criteria, e.g., a constant flow of cash at a risk-free interest rate (provided in the real world of 2007 by the yen carry trade), no transaction costs or taxes, the possibility to always sell a stock short, etc. In other words, they have constructed an artificial game, supposedly rigged to always win. A fantasy!

We have seen this before: Galileo Galilei (*Concerning an Investigation on Dice*, 1630), Giralamo Cardano (*Book on Games of Chance*, 1633), and Abraham de Moivre (*Doctrine of Chances*, 1718 [dedicated to Isaac Newton]), all examined the idea of using mathematical formulas to win at gambling. Their methods came into widespread use in 17th-Century Amsterdam, with the creation of speculative options trading. The result was the Tulip craze, and the South Sea and John Law bubbles.

In the real world, there are nearly 7 billion human beings, the vast majority of whom live in grinding poverty. The world desperately needs physical economic development, in the form of nuclear power, freshwater development, high-speed mass transit, health care, and industry. The lunatics of "mathematical finance" aren't going to provide any of this. Only the power of sovereign governments, working together, can do it. The hedge funds, the derivative markets, and all of their related betting systems should be shut down, their associated financial obligations wiped off the books, and the banking system should be tightly re-regulated. Once that is done, state-directed credit can be utilized to finance urgently needed physical economic development, and to make the world a better place for human beings.