

Lottery Players/Stock Traders

Meir Statman

“Someone is going to win the lottery,” says an E*Trade advertisement. “Just not you.” Stock traders poke fun at lottery buyers, but the two have much in common. Indeed, the behavior of stock traders and lottery buyers teaches us much about our aspirations, thoughts, and emotions. That behavior also helps us answer many questions of finance, such as the construction of portfolios and the nature of the equity premium.

More than 50 years ago, Friedman and Savage (1948) noted that risk aversion and risk seeking share roles in our behavior: People who buy insurance policies often buy lottery tickets as well. Four years later, Markowitz wrote two papers that reflect two very different views of behavior. In one (1952b), he created the mean–variance framework; in the other (1952a), he extended Friedman and Savage’s insurance–lottery framework. People in the mean–variance framework, unlike people in the insurance–lottery framework, never buy lottery tickets; they are always risk averse, never risk seeking.

In a later article (1984) and a 2000 letter to the author, Markowitz noted the difference between the mean–variance framework and the insurance–lottery framework. The mean–variance framework *prescribes* behavior, whereas the insurance–lottery framework *describes* behavior. The mean–variance framework is built on the premise that risk-averse behavior, such as buying insurance, is wise but risk-seeking behavior, such as buying lottery tickets, is foolish. In contrast, the insurance–lottery framework is built on the premise that, whether foolish or wise, people do participate in lotteries, not only insurance. But on its way from 1952 to the present, Markowitz’s prescriptive mean–variance framework turned into a descriptive framework. Today’s financial theory is built on the premise that investors *are* always risk averse.

Risk seeking is easier to banish from financial theory than from our behavior. As Bernstein (1996) has noted, gambling draws more people than baseball parks or movie theaters, and gambling is also evident in the investment arena—and not just in the

behavior of day traders. We impoverish our understanding of investment behavior when we exclude risk seeking from our descriptions. We also impoverish our understanding of investment behavior when we exclude from it aspects such as hope, camaraderie, and fun. I include these aspects here as I describe the aspirations, thoughts, and emotions that animate investors.

Why Stock Trading and Lottery Tickets?

All lottery money comes from the pockets of lottery buyers. Some win, some lose, but the total amount that winners receive is less than the total amount that losers pay. The reason is that lottery administrators take some of the money for expenses and transfer some to state treasuries. Christiansen (1987) estimated that lottery winners receive, on average, only 49 cents of every dollar paid by all ticket buyers. So, the expected return of a lottery ticket is negative, a 51 percent loss. Lottery buying is a negative-sum game.

Stock trading also is a negative-sum game. But whereas the frame of lottery-ticket buying as a negative-sum game is transparent, the frame of stock trading as the same game is opaque. As Treynor (1995, originally 1971) noted, people confuse the *stock-holding* game with the *stock-trading* game. The stock-holding game is a positive-sum game; buyers of stocks can expect to receive, on average, more than they spend. The stock-trading game, however, is a negative-sum game. In the absence of trading costs, management fees, and expenses, stock traders can expect to match the returns of an index of all stocks. But after trading costs are considered, they can expect to lag that index. Indeed, Barber and Odean (2000a) found that not only do stock traders, on average, lag the market but that the magnitude of the lag increases with the amount of trading.

Lottery playing and stock trading are common in practice, but they are puzzles in standard financial theory. Lotteries are a puzzle because, according to standard financial theory, people are averse to risk; they are willing to take risks only on investments that offer sufficiently high expected returns. So, why do people buy lottery tickets that offer high

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risk with negative expected returns? Trading is a puzzle because, as Milgrom and Stokey (1982) noted, a trader's offer to trade should raise suspicion in fellow traders that the would-be trader has superior, perhaps inside, information. Rational traders should refuse to trade under such conditions, and no trading will take place. Kyle (1985) used liquidity traders to escape the no-trading trap: Liquidity traders have no information and trade only because they have too much or too little liquidity. Subrahmanyan (1991) showed, however, that rational liquidity traders would trade only baskets of stocks and avoid trades in individual stocks. So, if all traders are rational, who is trading individual stocks?

Black (1986) and Treynor offered two solutions to the trading puzzle. First, perhaps traders think that they are all above average; they may all think that they have superior information or skill. Second, perhaps traders simply like to trade. Friedman and Savage had offered a third solution in the context of lotteries. "Men will and do take great risks to distinguish themselves, even when they know what the risks are," they wrote (p. 299). Perhaps people trade stocks and buy lottery tickets because these games offer the only way of rising from the working class to the middle or the upper class.

We Think We're Above Average. According to a May 2001 Gallup/PaineWebber (2001) survey of individual investors, investors at that time expected, on average, that the stock market would provide a mean 10.3 percent return over the following 12 months. They expected that their *own* portfolios, however, would provide a mean 11.7 percent. Investors expected, on average, to be above average.

The unrealistic optimism that people display in the investment arena is similar to the unrealistic optimism they display in other arenas. Taylor and Brown (1988) reported that people expect higher-than-average satisfaction in their first jobs, higher-than-average salaries, and a higher-than-average likelihood of having gifted children. They also expect a lower-than-average likelihood of being a crime victim, having trouble finding a job, and becoming ill. Taylor and Brown commented:

In effect, most people seem to be saying "The future will be great, especially for me." Because everyone's future cannot be rosier than their peers, the extreme optimism that people display appears to be illusionary. (p. 197)

Moore, Kurtzberg, Fox, and Bazerman (1999) found in trading experiments that people overestimate the future performance of their investments relative to the market. This misestimation is a reflection of unrealistic optimism that is consistent with the Gallup/PaineWebber empirical findings.

They also found that people even overestimate the *past* performance of their own investments relative to the market. This finding is consistent with the finding of Goetzmann and Peles (1997) that a group of American Association of Individual Investors members overestimated their own investment performance by an average of 3.40 percent and overestimated their own performance relative to the market by 5.11 percent.

The belief that we are all above average is common, but promoters of both lotteries and trading find ways to bolster it. Clotfelter and Cook (1991) reported that 70 percent of lottery players displayed in advertisements were winners. The exaggerated proportion of lottery winners leads viewers to overestimate the likelihood of winning.

Promoters of mutual funds use similar methods. Consider, for example, an advertisement by the Strong group of mutual funds in the July 2000 issue of Kiplinger's *Personal Finance*. The advertisement features the performance of two growth and income funds—the Strong Blue Chip 100 Fund and the Strong Growth and Income Fund. The first fund earned a 37.00 percent return for the year ending March 31, 2000; the second earned 33.68 percent. But these two funds are not representative of the Strong family of funds. They are the ones with the highest returns among the nine growth and income funds listed on Strong's Web site.

Promoters of lotteries also use hindsight bias, our tendency to conclude that what actually happened was bound to happen, to bolster the belief that players will be winners. Clotfelter and Cook (1991) described a television advertisement for the Connecticut lottery showing an older man fishing in a lovely mountain lake. He says, "When I was younger, I suppose I could have done more to plan my future. But I didn't. Or I could've made some smart investments. But I didn't. Heck, I could have bought a \$1 Connecticut Lotto ticket, won a jackpot worth millions, and gotten a nice, big check every year for 20 years. And I did!"

Similarly, a television advertisement for online stock trading by Discover Brokerage shows a tow truck driver with the passenger whose car he is towing and on the seat between them, an issue of *Barron's*. The dialogue goes as follows:

Passenger: You read *Barron's*?

Driver: Oh, yeah, all the time. That's the one where they rate all the online brokers. I use Discover Brokerage. They've been *Barron's* top pick for the, like, last three years.

Passenger: You invest online?

Driver: Oh, yeah, big time. Well, last few years anyway. I'm retired now.

Passenger: You're retired?
Driver: I don't need to do this; I just like helping people.
Passenger: (*noticing picture of island near the rearview mirror*) Vacation spot?
Driver: Actually, it's a picture of my house.
Passenger: It's an island.
Driver: Well, technically it's a country. (*pause*) Weird thing about owning your own country, though, you have to name it.

Lottery promoters encourage players to be overconfident of their "skills." Clotfelter and Cook (1991) described a lottery advertisement that instructed viewers to bet the numbers on the uniforms of their favorite sports heroes: "This is how our winner of \$10.7 million did it." Similarly, trading promoters encourage traders to be overconfident of their skills. A television advertisement for Suretrade, an online broker, shows a sequence of people who say:

"We don't keep ourselves at a safe distance."
"We don't have blind faith."
"We read."
"We listen."
"We learn."
"We plan to retire rich."

And then, an announcer concludes,

"Suretrade.com, the smart tool for smart investors."

Members of investment clubs, like lottery players and online traders, have formulas for winning. Woolley (2000) described the members of the Beehive investment club, which bought shares of Uno Restaurant after a member served its pizza at a club meeting. The members concluded that the pizza was great, and the stock was cheap. Trading formulas bring to investment clubs more losses, however, than gains. Barber and Odean (2000b) found that, on average, the returns of investment clubs lag the returns of the market.

We Have Aspirations. All people have aspirations. About the appeal of lottery tickets, Pope (1983) wrote that people "can dream from age nineteen to ninety-nine that they will become millionaires after the next drawing" (p. 156). Some people who aspire to be millionaires can expect to reach their aspirations through steady contributions to IRAs and 410(k) accounts. But for others, stock trading and lottery playing offer the only chances.

For example, "Betting on the Market," a PBS *Frontline* program of 1997, showed "Sharon" and "Russ," a young couple who own a carpet store. Sharon and Russ have no pension plan, and almost all their savings are in the stock market. They watch CNBC constantly and trade frequently. "We are trying to make some aggressive money very

quickly," says Sharon. "Russ works hard; it's almost demeaning that he works this physically hard. It should be more mental." Sharon and Russ live in a modest house, but they have high aspirations. "This is our dream house . . .," Sharon says while pointing to blueprints of a fancy house. "We look at it when we are off to work in the morning and when we come home tired. . . . Isn't it beautiful?"

Clotfelter and Cook (1989) quoted a lottery player who lived in a poor neighborhood on Chicago's West Side and had aspirations that exceeded his resources. "I've dug so many holes for myself over the years that, realistically, winning the lottery may be my only ticket out" (p. 75).

Brenner and Brenner (1987) found that poor people are overrepresented among lottery players and so are people whose realized wealth is significantly lower than their aspiration levels because of illness, accident, or loss of a job. The people whom Brenner and Brenner described are people in the "domain of losses," people whose wealth is short of their aspiration levels. Kahneman and Tversky (1979) found that people in the domain of losses accept gambles that they reject when they are in the "domain of gains." People in the domain of losses are people who have, in the language of the Chicago lottery player, "dug so many holes" for themselves that they gamble because they want a "ticket out" of poverty, not because they like risk.

Some people who suffer declines in their financial positions turn to the lottery; others turn to day trading. Simon and Browning (2000) told the following story of David Gleitman, a 46-year-old podiatrist. In the late 1980s, Gleitman was earning about \$200,000 a year from his medical practice, but that was before insurance companies reduced to \$800 the reimbursement for surgeries that once commanded \$4,000. In 2000, Gleitman was suffering the complaints of patients about \$10 copayments for toenail clipping. Annual income from his medical practice had declined to less than a quarter of its past \$200,000—not only because of lower insurance reimbursements but also because he was devoting less time to his practice. Gleitman was spending most of his time trading stocks online, using margin. The March/April 2000 plunge in the market cost him roughly \$1 million, or close to 80 percent of his portfolio's value.

Shortly after the North American Securities Administrators Association (1999) reported that 70 percent of day traders lose money, cartoonist Tony Auth captured well the link between day trading and lotteries. In the cartoon, a government employee is speaking:

"This is terrible!!

"More and more of our citizens are becoming addicted to 'day trading'. They all think they'll get rich, but 70 percent of them lose money.

"As they go further into debt, they run up huge credit card debt, always thinking they're one trade away from hitting the jackpot.

"It's so stupid! They should cut out all this day-trading nonsense.

"And play the state lotteries."

We Have Emotions. Hope and fear may be the strongest emotions that drive lottery players and stock traders, but regret is not far behind. Regret is the pain we feel when we find, too late, that a different choice would have led to a better outcome. Aversion to the pain of regret affects our choices. For example, Bar-Hillel and Neter (1996) found in experiments that people are more reluctant to exchange lottery tickets than other items, such as pens. They attribute the reluctance to aversion to regret; how would you feel if "your" lottery ticket won in the hands of someone else?

Lottery promoters capitalize on the aversion to regret when they encourage lottery buyers to keep on buying. "Don't let your number win without you," says a lottery slogan Clotfelter and Cook (1991) noted. They also noted a Missouri lottery advertisement that plays on the same aversion: A lottery ticket blows out of a farmer's hand into a nearby cow pasture. Several days later, the farmer sees one of his cows riding in the back seat of a luxurious stretch limo. We see the farmer's pain of regret when he realizes that his cow won the jackpot that would have been his.

Aversion to regret also plays an important role in trading behavior. In particular, it underlies the reluctance to realize losses, as described by Shefrin and Statman (1985). Aversion to regret is bad for stockbrokers because investors who hold on to losing stocks do not trade. Aversion to regret is good, however, for poorly performing mutual funds. McGough and Siconolfi (1997) described investors in the Steadman mutual funds who continued to hold on to Steadman shares bought 20 years ago. The shares registered paper losses and the losses were likely to deepen (because the Steadman funds had expense ratios of 25 percent a year), but still, these investors held on. As one Steadman investor explained, he "never wanted to sell it at a loss."

We Like to Play. "Casino visitors," wrote Goodman (2000), "find themselves part of a welcoming community with one thing on its collective mind." Camaraderie, he added, is what we see in the busloads of anticipation that roll up to the casinos every morning and what we hear in the cheers when the dealer goes bust against the whole

blackjack table. "It is not just the joy of winning," concluded Goodman, "but winning as part of a team."

The camaraderie of investment clubs is much like the camaraderie of casinos. "I'd just moved to Chicago and was really missing my women friends," said one Beehive investment club member to Woolley. "The club replaced that."

Camaraderie is the rule in casinos even at many games in which players compete against one another, such as poker, because the players are united in action. "After a couple of shift changes," wrote Goodman, "players and dealers are on first name basis." Camaraderie is also the rule in the trading rooms that bring day traders together. Although day traders compete with one another, they also cheer one another and even lend money to one another.

But the poker table is not always cheerful, and neither is the trading room; tension often brings testiness. The testiness of the day-trading room was carried to the extreme when, tragically, Mark Barton killed nine of his fellow day traders one day in 1999.

Casino gambling and stock trading are attractive even when practiced alone, without the camaraderie. They allow players or traders to find what Csikszentmihalyi (1997) called "flow experiences." For example, consider a skier going down the slope:

[Y]our full attention is focused on the movements of your body, the position of your skis, the air whistling past your face, and the snowshrouded trees running by. . . . The run is so perfect that all you want is for it to last forever, to immerse yourself completely in the experience." (pp. 28–29)

Flow comes when high challenge meets high skill. It is the experience of an athlete "in the zone," a slot machine player pulling the lever, or a day trader enthralled by the flickering colors of the monitor.

Stock traders and lottery players can choose among games that promise the experience of flow. Lottery designers offer lotteries with different prize structures, different levels of complexity, and different "play values." A game with high play value is a game that provides the sense that skill is exercised. Lotteries that allow players to pick their own numbers offer more play value than lotteries in which numbers are assigned. Similarly, the wide array of stocks, bonds, options, and mutual funds, as well as the wide array of securities advice and research tools, enhances the play value of securities trading. Illusion of control (Langer 1975) leads people to act as if they have control in situations that are, in fact, determined by chance. The illusion of control leads lottery players to believe that their

chosen numbers have better odds than random numbers, and it leads stock traders to believe that their chosen stocks have better odds than stocks chosen by darts thrown at stock tables.

Complexity of lottery games is a disadvantage in attracting new players because learning new games takes time and effort. But complexity is useful in maintaining the interest of players who are bored with old games. Similarly, the complexity of hedge funds is a disadvantage in attracting investment neophytes but an allure to investors bored with mutual funds.

Although high challenge brings flow when skills are high, it brings anxiety when skills are low. Anxiety was what Gleitman felt when the stock market plunge obliterated most of his portfolio; Simon and Browning described him as shivering as he tucked his nine-year-old into bed.

Portfolio and Security Design

Risk-averse people can be expected to buy insurance policies, whereas risk-seeking people can be expected to buy lottery tickets. But why do people buy both? Friedman and Savage answered the question by noting that people buy lottery tickets because they aspire to reach a higher social class whereas they buy insurance as protection against a fall into a lower social class.

Markowitz (1952b) clarified the Friedman-Savage framework by noting that people aspire to move up from their *current* social class. So, people with \$10,000 might accept lottery-like odds in the hope of winning \$1 million, and people with \$1 million might accept lottery-like odds in the hope of winning \$100 million. Kahneman and Tversky extended the work of Friedman and Savage and Markowitz into prospect theory. Prospect theory describes the behavior of people who accept lottery-like odds when their lives are below their levels of aspiration but reject such odds when they are above their levels of aspiration.

The framework established by Friedman and Savage, Markowitz (1952b), and Kahneman and Tversky is a keystone in Shefrin and Statman's (2000) behavioral portfolio theory. In behavioral portfolio theory, people act as if they are made up of many "doers," each with a different goal and attitude toward risk. In the simple version, people of the theory have two doers—a "downside protection" doer whose goal is to avoid poverty and an "upside potential" doer whose goal is a shot at riches.

The prototypical security for the downside protection doer is an equity participation note. Investors who buy an equity participation note for \$10 are assured of receiving their \$10 in five years

even if the market index falls. Investors will receive more, however—say, \$15—if the index rises 50 percent or higher by the note's maturity. The aspect of a floor in an equity participation note, ensuring that investors will at least get their money back, satisfies the goal of downside protection.

The prototypical security for the upside potential doer is a lottery ticket. The floor of the lottery ticket is zero; buyers are highly likely to lose all their lottery money. But lottery buyers have a chance to reach even multimillion dollar levels of upside.

Lottery tickets are best for upside potential doers with high aspirations and little money—for example, the man in Chicago who had dug so many holes for himself that a lottery ticket provided his only chance to get out. Upside potential doers with more money and lower aspirations can meet their needs through call options, however, and those with even lower aspirations can buy stocks.

The Equity Premium

Glassman and Hassett (1999) argued that stock prices would soar once people understood that the long-term risk of stocks is no higher than the long-term risk of bonds. On that day, the expected return of stocks would be equal to that of bonds and the equity premium would be zero. For their part, financial economists doubt that the day of a zero equity premium is near. Welch (2000) surveyed 226 academic financial economists and found that they expect an arithmetic equity premium of 7 percent over 10- and 30-year horizons.

The equity premium depends on people's attitudes toward risk as much as it depends on the level of risk. In particular, the equity premium depends on the weight that people place on their upside potential goals relative to the weight they place on their downside protection goals. The equity premium might turn negative if many people were to place great weight on their upside potential goals. Indeed, preferred securities in such situations are like lotteries.

Lottery-like pyramid schemes were the preferred security in Albania in 1996. As Jarvis (2000) noted, about two-thirds of Albanians invested in pyramid schemes, and the value of the schemes' liabilities amounted to almost half the country's GDP. Albanians moved their money out of the downside protection accounts into the upside potential accounts by selling their houses and livestock to invest in the schemes. Tirana in the fall of 1996, wrote Jarvis, "smelled like a slaughterhouse, as farmers drove their animals to market to invest the proceeds in the pyramid schemes." The collapse of the schemes threw Albania into chaos. Some 2,000 people were killed in the violence that followed.

Aspirations were the drivers of the Albanian pyramid schemes, drivers made stronger by Albania's decline into desperate poverty following the 1991 transition from communist rule. Poverty deepened at the end of 1995 as income from smuggling was eliminated when the United Nations lifted sanctions against Yugoslavia.

The aspiration for upside potential probably blinded many Albanians to the fact that they were buying risky securities with negative risk premiums. This fact is true for many lottery players in other countries. Some Albanians, like some lottery players, probably understood that they were buying securities with negative risk premiums, but they saw no other hope of reaching their aspirations.

Aspiration for upside potential can drive down the risk premiums of rich countries just as it drives down the risk premiums of poor countries. Consider the United States, where swift technological and societal changes once made some middle-class people feel as poor as Albanians relative to dot-com millionaires. Such people allocate increasing proportions of their portfolios to the upside potential goal and choose lottery-like securities. Their collective action can drive down the risk premium, even making it negative.

Public Attitudes and Government Regulation

The shooting rampage of Mark Barton, the Atlanta day trader, kindled much discussion about day trading. "These people are not investors," said Roberto Bontempo, an associate professor of management at Columbia University's business school, in an interview with Buckman and Simon (1999):

Calling this investment is totally missing the point. . . . It's a casino, and to be surprised when greedy desperate people lose all their money, and then snap, I mean, who are we kidding? Why should we be surprised by that? (p. C1)

As Bernstein noted, gambling in casinos or trading rooms is usually regarded as a vice, whereas insurance is regarded as a virtue. Gambling behavior raises two concerns—a concern that gamblers might hurt society and a concern that gamblers might hurt themselves.

Malkiel (1999) distinguished the risk that day traders take upon themselves from the risk that they impose on markets and the economy. He saw little reason for concern about any risk to society from day traders:

[T]he amount of day trading is small relative to the clout of institutional investors, and it is not credible to argue that this activity poses systemic risks for our markets or our economy.

Other commentators, however, have argued that the behavior of day traders and other risk takers can destabilize markets and the economy. These commentators are particularly concerned about the effects of leverage and derivatives, and they often point to the sad experience of Long-Term Capital Management (Lowenstein 2000).

The second concern—that gamblers might hurt themselves—is paternalistic. Although debates on the limits of paternalism continue, society has exercised various degrees of paternalism for centuries. A report by Fact Research (1976) describes the attempts of the Christian church to limit gambling since the early days of Christianity as follows:

Gambling was forbidden to early Christians, but an evasion of the code continued for centuries, extending often to the clergy itself. Constantinople, the seat of the Church, was also the 12th Century gambling capital of the world. (p. 5)

The poor are the main targets of paternalistic concerns, perhaps for good reason. According to Clotfelter and Cook (1989), the poor in the United States spend more than their fair share of money on lottery tickets. Clotfelter and Cook reported that Maryland adults with annual incomes less than \$10,000 spent an average of \$380 on lottery tickets in 1984 and that the top 20 percent of lottery buyers in that group spent an average of \$1,693. Tragedies make it easy to turn paternalistic impulses into regulatory action. For example, the stock market crash of 1929 led to the 1934 Securities Exchange Act and the establishment of the SEC in the United States. The Dickenson Report, which formed part of the deliberations leading up to the 1934 Act, said:

It must always be recognized that the average man has an inherent instinct for gambling in some form or other. It has been recognized as a social evil, always inveighed against since early times. No method of combating it has ever been completely successful. (Ellenberger and Mahar 1973)

Less restrictive methods for combating gambling include disclosure of information about its risk. Disclosure was the guiding principle of the 1934 Act, but many states had enacted more restrictive "Blue Sky" laws long before 1934. (Blue Sky laws prohibit investments that regulators deem too risky.) The tragedy of Barton's actions prompted the *New York Times* to publish an editorial titled "Day Traders as Gamblers" (2000). The writer came down on the side of disclosure as a remedy for excessive risk taking: "[T]he regulators cannot stop foolish customers from gambling their money away."

In addressing paternalistic concern about the well-being of the gamblers themselves, Garber (2000) quoted Schama (1987) on the propaganda

drive of the Dutch ruling elite to eliminate tulip gambling in the 17th century:

To the humanist oligarchs, the tulip mania had violated all their most sacred tenets: moderation, prudence, discretion, right reason and reciprocity between effort and reward. (p. 36)

Perhaps another element of the desire to restrain gamblers is rooted in envy of the upstart and a desire of the ruling elite to keep its high relative position in society. Garber noted that the "safe" areas of economic activity into which the Dutch ruling elite were trying to channel speculative proclivities were precisely those areas controlled by the elite themselves.

Conclusion

Stock trading, like lottery playing, is a negative-sum game. On average, people lose. So, why do people trade stocks and buy lottery tickets? This article answered this question by focusing on our common aspirations, thoughts, and emotions.

"I've dug so many holes for myself over the years that, realistically, winning the lottery may be my only ticket out," says a lottery player living in a poor neighborhood. "We are trying to make some aggressive money very quickly," says a stock trader who lives in a modest house but has blueprints of a fancy one. Some people who aspire to move up in life can expect to attain their aspirations through steady contributions to retirement accounts, but others have only the avenues of stock trading and lottery buying.

Not only do lotteries and trading have great appeal on their own, but promoters have learned to magnify that appeal by playing on our thoughts and emotions. Lottery players in advertisements are mostly winners, even though most real lottery players are losers. Mutual funds in advertisements are mostly winners, even though most mutual funds lag index funds in real life.

More than a half-century ago, Friedman and Savage wrote that real people hope a lottery ticket will lift them into a higher social class while they trust that an insurance contract will protect them from falling into a lower social class. Friedman and Savage assigned equal roles to lottery tickets and insurance contracts in their insurance-lottery framework. Shortly afterward, Markowitz (1952a, 1952b) took us to a fork in the road: In one direction, Markowitz extended the insurance-lottery framework, assigning to lotteries a role as big as the role

of insurance in investors' portfolios. In the other direction, the mean-variance framework, Markowitz (1952a) assigned lotteries no role at all.

Markowitz offered the mean-variance framework as a *prescription* for wise investment behavior, not as a *description* of actual investment behavior. He noted in a letter:

[T]he fiduciary should not gamble; that is, the fiduciary who is responsible for serious amounts of other people's money (e.g., retirement money) should not incur risk without demanding reward.

But he also noted that the insurance-lottery framework describes actual investment behavior:

On the other hand, individuals do buy lottery tickets . . . and do buy insurance against the major losses.

Markowitz's prescriptive mean-variance framework was turned into a descriptive framework on its way from 1952 to our time. Today's financial theory is built on the premise that investors *are* always risk averse. But if so, why do investors trade stocks and all sorts of people buy lottery tickets?

The time has come to return the mean-variance framework to its role as a prescriptive framework and adopt the insurance-lottery framework as the descriptive framework. Some have done so. Markowitz built on the lottery insurance-lottery framework, as did Kahneman and Tversky in developing prospect theory and Shefrin and Statman (2000) in developing behavioral portfolio theory. But more is needed.

Perhaps, the time has also come to question the role of the mean-variance framework as a prescriptive framework. Yes, the fiduciary who is responsible for other people's money should not gamble. But fiduciaries can be unwise not only by being risk seeking but also by being too risk averse. Moreover, is engaging in some risk-seeking behavior really unwise? Remember Pope's buyers of lottery tickets who, no matter how old, can dream that they will become millionaires after the next drawing. Is it wise to extinguish dreams that sell for a dollar?

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