



the consilient observer

applying cross-discipline frameworks to investing

The Babe Ruth Effect: Frequency versus Magnitude

“In the real world there is no ‘easy way’ to assure a financial profit. At least, it is gratifying to rationalize that we would rather lose intelligently than win ignorantly.”

Richard A. Epstein

The Theory of Gambling and Statistical Logic

Batting with the Babe

A well-known and very successful portfolio manager recently told us a story that initially sounded incongruous. He explained that he was one of roughly 20 portfolio managers running money for a company. The company’s treasurer, dismayed with the aggregate performance of his active managers, decided to evaluate each manager’s decision process in an effort to weed out the poor performers. The treasurer figured that even a random process would result in a portfolio of stocks with roughly one-half outperforming the benchmark (in this case the S&P 500) and the other half underperforming it. So he measured each portfolio based on what *percentage* of its stocks beat the market.

The portfolio manager found himself in an unusual position. While his total portfolio performance was among the best in the group, he was among the worst based on this batting average. After having fired all of the other “poor” performing managers, the treasurer called a meeting with this portfolio manager to sort out the divergence between the good performance and the “bad” batting average.

The portfolio manager’s explanation for the discrepancy underscores a lesson inherent in any probabilistic exercise: *the frequency of correctness does not matter; it is the magnitude of correctness that matters*. Say that you own four stocks, and that three of the stocks go down a bit but the fourth rises substantially. The portfolio will perform well even as the majority of the stocks decline.

Building a portfolio that can deliver superior performance requires that you evaluate each investment using expected value analysis. What is striking is that the leading thinkers across varied fields—including horse betting, casino gambling, and investing—all emphasize the same point.¹ We call it the Babe Ruth effect: even though Ruth struck out a lot, he was one of baseball’s greatest hitters.

The reason that the lesson about expected value is universal is that all probabilistic exercises have similar features. Internalizing this lesson, on the other hand, is difficult because it runs against human nature in a very fundamental way. While it’s not hard to show the flaw in the treasurer’s logic, it’s easy to sympathize with his thinking.

The Downside of Hard Wiring

In 1979, Daniel Kahneman and Amos Tversky outlined prospect theory, which identifies economic behaviors that are inconsistent with rational decision-making.² One of the most significant insights from the theory is that people exhibit significant aversion to losses when making choices between risky outcomes, no matter how small the stakes. In fact, Kahneman and Tversky found that a loss has about *two and a half times* the impact of a gain of the same size. In other words, people feel a lot worse about losses of a given size than they feel good about a gain of a similar magnitude.

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This behavioral fact means that people are a lot happier when they are right frequently. What’s interesting is that being right frequently is not necessarily consistent with an investment portfolio that outperforms its benchmark (as the story above illustrates). The *percentage* of stocks that go up in a portfolio does not determine its performance, it is the dollar change in the portfolio. A few stocks going up or down dramatically will often have a much greater impact on portfolio performance than the batting average.

Bulls, Bears and Odds

In his wonderful book, *Fooled by Randomness*, Nassim Taleb relates an anecdote that beautifully drives home the expected value message.³ In a meeting with his fellow traders, a colleague asked Taleb about his view of the market. He responded that he thought there was a high probability that the market would go up slightly over the next week. Pressed further, he assigned a 70% probability to the up move. Someone in the meeting then noted that Taleb was short a large quantity of S&P 500 futures—a bet that the market would go down—seemingly in contrast to his “bullish” outlook. Taleb then explained his position in expected value terms. He clarified his thought process with the following table:

Event	Probability	Outcome	Expected value
Market goes up	70%	+1%	+0.7%
Market goes down	30%	-10%	-3.0%
Total	100%		-2.3%

In this case, the most *probable* outcome is that the market goes up. But the expected value is negative, because the outcomes are asymmetric.⁴ Now think about it in terms of stocks. Stocks are sometimes priced for perfection. Even if the company makes or slightly exceeds its numbers the majority of the time (frequency), the price doesn’t rise much. But if the company misses its numbers, the downside to the shares is dramatic. The satisfactory result has a high frequency, but the expected value is negative.

Now consider the downtrodden stock. The majority of the time it disappoints, nudging the stock somewhat lower. But a positive result leads to a sharp upside move. Here, the probability favors a poor result, but the expected value is favorable.

Investors must constantly look past frequencies and consider expected value. As it turns out, this is how the best performers think in all probabilistic fields. Yet in many ways it is unnatural: investors want their stocks to go up, not down. Indeed, the main practical result of prospect theory is that investors tend to sell their winners too early (satisfying the desire to be right) and hold their losers too long (in the hope that they don’t have to take a loss). We now turn to three leading practitioners in separate probabilistic fields: investing, pari-mutuel betting, and black jack.

From OTC to OTB

Warren Buffett, undoubtedly one of the 20th century’s best investors, says that smarts and talent are like a motor’s horsepower, but that the motor’s *output* depends on rationality. “A lot of people start out with a 400-horsepower motor but only get 100 horsepower of output,” he said. “It’s way better to have a 200-horsepower motor and get it all into output.”⁵ And one of the keys is to consider all investment opportunities in terms of expected value. As Buffett’s partner Charlie Munger notes, “one of the advantages of a fellow like Buffett is that he automatically thinks in terms of decision trees.”⁶ Says Buffett, “Take the probability of loss times the amount of possible loss from the probability of gain times the amount of possible gain. That is what we’re trying to do. It’s imperfect, but that’s what it’s all about.”⁷

Naturally, coming up with likely outcomes and appropriate probabilities is not an easy task. But the discipline of the process compels an investor to think through how various changes in expectations for value triggers—sales, costs, and investments—affect shareholder value, as well as the likelihood of various outcomes. Such an exercise also helps overcome the risk aversion pitfall.⁸

The expected value mindset is by no means limited to investing. A recently published book, *Bet with the Best*, offers various strategies for pari-mutuel bettors. Steven Crist, CEO, editor and publisher of *Daily Racing Form*, shows the return on investment, including the track’s take, of a hypothetical race with four horses. To summarize the lesson, he writes, “The point of this exercise is to illustrate that even a horse with a very high likelihood of winning can be either a very good or a very bad bet, and that the difference between the two is determined by only one thing: the odds.” So a horse with a 50% probability of winning can be either a good or bad bet based on the payoff, and the same

holds true of a 10-1 shot. He is saying, in plain words, it is not the frequency of winning that matters, but the frequency times the magnitude of the payoff.⁹

Crist also solicits a confession from his readers, “Now ask yourself: Do you really think this way when you’re handicapping? Or do you find horses you ‘like’ and hope for the best on price? Most honest players admit they follow the latter path.” Replace the word “handicapping” with “investing” and “horses” with “stocks” and Crist could be talking about the stock market.

Yet another domain where expected value thinking is pertinent is black jack, as Edward Thorp’s best-selling book, *Beat the Dealer*, shows. In black jack, the payoffs are set, and the player’s principal task is to assess the probability of drawing a favorable hand. Thorp showed how to count cards in order to identify when the probabilities of a winning hand tilt in player’s favor. When the odds favor the player, the ideal strategy is to increase the bet (effectively increasing the payout). Thorp notes that even under ideal circumstances, favorable situations only arise 9.8% of the time; the house has the advantage the other 90.2%.¹⁰

So we see that the leading thinkers in these three domains—all probabilistic exercises—converge on the same approach. We also know that in these activities, the vast majority of the participants don’t think through expected value as explicitly as they should. That we are risk adverse and avoid losses compounds the challenge for stock investors, because we shun situations where the probability of upside may be low but the expected value is attractive.

A Useful Analogy

Long-term success in any of these probabilistic exercises shares some common features.

We summarize four of them:

- *Focus.* Professional gamblers do not play a multitude of games—they don’t stroll into a casino and play a little black jack, a little craps, a spend a little time on the slot machine. They focus on a specific game and learn the ins and outs. Similarly, most investors must define a circle of competence—areas of relative expertise. Seeking a competitive edge across a spectrum of industries and companies is a challenge, to say the least. Most great investors stick to their circle of competence.
- *Lots of situations.* Players of probabilistic games must examine lots of situations, because the “market” price is usually pretty accurate. Investors, too, must evaluate lots of situations and gather lots of information. For example, the very successful president and CEO of Geico’s capital operations, Lou Simpson, tries to read 5-8 hours a day, and trades very infrequently.
- *Limited opportunities.* As Thorp notes in *Beat the Dealer*, even when you know what you’re doing and play under ideal circumstances, the odds still favor you less than 10% of the time. And rarely does anyone play under ideal circumstances. The message for investors is even when you are competent, favorable situations—where you have a clear-cut variant perception vis-à-vis the market—don’t appear very often.
- *Ante.* In the casino, you must bet every time to play. Ideally, you can bet a small amount when the odds are poor and a large sum when the odds are favorable, but you must ante to play the game. In investing, on the other hand, you need not participate when you perceive the expected value as unattractive, and you can bet aggressively when a situation appears attractive (within the constraints of an investment policy, naturally). In this way, investing is much more favorable than other games of probability.

Constantly thinking in expected value terms requires discipline and is somewhat unnatural. But the leading thinkers and practitioners from somewhat varied fields have converged on the same formula: focus not on the frequency of correctness, but on the magnitude of correctness.

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¹ We are not equating investing to gambling. In fact, long-term investing is really the opposite of gambling. In gambling, the more you play the greater the odds that you lose. In investing, the longer you invest, the greater the odds that you generate positive returns.

² Daniel Kahneman and Amos Tversky, “Prospect Theory: An Analysis of Decision Under Risk” *Econometrica*, 47: 263-291 (1979).

³ Nassim Nicholas Taleb, *Foiled By Randomness: The Hidden Role of Chance in Markets and in Life* (New York: Texere, 2001), pp. 87-88.

⁴ Taleb points out that well-known investor Jim Rogers avoids options because “90 percent of all options expire as losses.” Rogers is confusing frequency with how much money is made on average.

⁵ Brent Schlender, “The Bill & Warren Show,” *Fortune* (July 20, 1998).

⁶ Charlie Munger, “A Lesson on Elementary, Worldly Wisdom As It Relates to Investment Management & Business” *Outstanding Investor Digest*, May 5, 1995, p. 50.

⁷ Berkshire Hathaway Annual Meeting, 1989.

⁸ Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing* (Boston: Harvard Business School Press, 2001), pp. 105-108.

⁹ *Bet With the Best* (New York: Daily Racing Forum, 2001), pp. 63-64.

¹⁰ Edward O. Thorp, *Beat the Dealer* (New York: Vintage Books, 1966), pp. 56-57.

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