BEYOND SELECTION:

How should you size each slice of your portfolio pie?

PART THREE IN THE BEHAVIORAL FINANCE SERIES

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Position sizing–or how best to allocate capital among the investments in one's portfolio–can be one of the most important aspects of achieving long-term investing goals. At Alger, we believe the best way to size positions is to follow a systematic process. In this paper, we discuss ways to implement practical strategies that may reduce behavioral errors and help improve investment outcomes in a statistically valid way.

Position Sizing Can Be a Challenge

The vast majority of investing literature deals with what to buy or which investments will have the best returns. However, decisions beyond security or fund selection may be more important to returns than many investors believe. Of course selection is important, but how exactly should an investor size those investments within a portfolio?

Many investors may not use an adequate framework to address the question of how to size positions within a portfolio. Even portfolios consisting of investments with high probabilities of success can yield surprisingly poor results if they are not sized correctly, based on academic studies.

One such study was done by Victor Haghani and Richard Dewey.[1] They gave more than 60 individuals with finance backgrounds the opportunity to bet real money on a virtual coin flip that was programmed to land 60% of the time on heads and 40% on tails. As a result, the participants could win or lose on any given flip. The subjects were given $25 and could choose how much to wager on a coin flip, so if they bet $10 on heads, for example, and it came up tails, they would have lost $10. One might expect to earn a lot of money in this experiment given the favorable odds and the ability to place approximately 300 bets over the half hour allotted for the experiment.

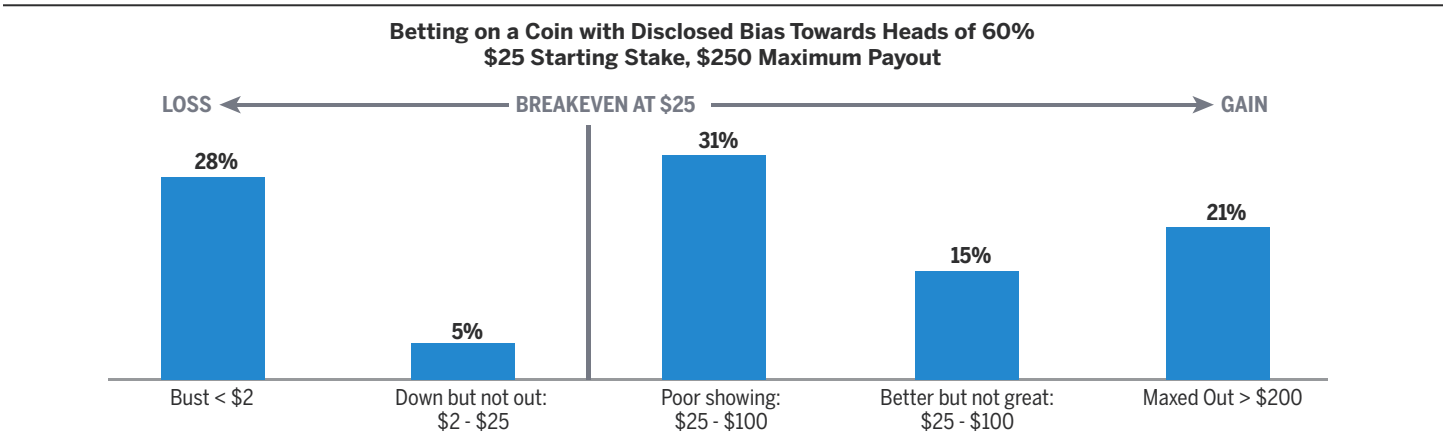
The results of the study, however, were disappointing (see Figure 1). While predictive modeling suggests that nearly everyone should have theoretically earned the maximum payout of $250 if they had a proper sizing framework, only 21% of participants actually achieved the highest return. Even worse, one-third of participants lost money despite the favorable odds.

So, what went wrong?

One of the problems is that having a good probability of success can be undone by betting too much of one's capital. For example, betting everything on one flip and losing leaves one unable to play in the future and potentially reap additional rewards over subsequent periods. Unfortunately, about 30% of participants did bet their entire balance on one flip, causing them to have suboptimal results.

Other participants bet erratically—too small and then too big—making it clear that they lacked a consistent framework for decision-making.

Figure 1: **Summary of Coin Flipper Performance**



Source: Victor Haghani and Richard Dewey, "Rational Decision Making under Uncertainty: Observed Betting Patterns on a Biased Coin," Journal of Portfolio Management, Spring 2017.

What would a more consistent framework look like? One long-standing framework is the Kelly Criterion, which is a formula to help investors calculate the optimal size of a position within their portfolio. Using the Kelly Criterion for the coin-flip example of 2*P-1, where P is the probability of winning, would have suggested an optimal bet of 20% of one's funds (2* 60% -1) for each bet.

In fact, a simulation that the study's authors conducted indicated a 95% probability of hitting the $250 maximum payout if one were to bet 20% on each flip in a systematic way.

As such, if one were to follow the Kelly Criterion for the coin flipping example, the amount bet would increase as one's balance grew and vice versa. Applying this idea to investing, should investors allocate more to a stock as it goes up and less as it declines?

Not necessarily. In investing, there are no consistent odds of winning like that which is built into the artificial structure of the coin flipping exercise. Investing is variable, with upside and downside changing dynamically with stock prices, whereas it is fixed in the coin flipping example.[2]

If equity investors believe their win-loss ratio or upside/downside has improved as a result of a decline in the stock, fund, or index, it may be rational of them to increase the position. While a 10% drawdown in one's balance would suggest a 10% smaller wager would be appropriate according to the simple Kelly Criterion, that decline may be more than offset in equity investing by the increase in the win-loss ratio.[3]

The Kelly Criterion has many fans among professional investors, such as Warren Buffett and Charlie Munger, and Bill Gross. However, updating win-loss ratios in real time using valuation and fundamental analysis may be impractical for many investors. Acknowledging the difficulty in applying these types of analyses, we believe many investors may want to choose to utilize a simpler process for sizing investments in their portfolios.

A Real-World Solution?

Morningstar estimates that the average investor in volatile sector mutual funds & ETFs under-performed the actual returns of those funds by approximately 150bps annually in the 10 years ending 2024. Morningstar's analysis suggests that much of the underperformance was due to investors buying or increasing positions after strong performance or vice versa.[4]

What would be a better strategy? Morningstar has previously estimated that dollar-cost averaging or investing a fixed amount on a regular basis such that more shares are purchased as an investment declines in value and fewer shares purchased as the investment appreciates, may have improved returns and eliminated the investor underperformance.

Conclusion

At Alger, we believe that simply finding a good investment for a portfolio is not enough. Investors may do well to think beyond selection and focus on the importance of sizing. Sizing positions with respect to probability of success and upside/downside may help optimize a portfolio. Position sizes that are too large risk crippling a portfolio if a low probability event occurs while not sizing aggressively enough may waste favorable opportunities. Utilizing a disciplined framework may go a long way in limiting behavioral errors and capitalizing on fundamentally favorable investments.

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[1] Source: "Rational Decision Making under Uncertainty: Observed Betting Patterns on a Biased Coin," Victor Haghani and Richard Dewey, Journal of Portfolio Management, Spring 2017.

[2] For situations where upside and downside are not the same, the formula for the Kelly Criterion is a bit more complex: the optimal sizing equals the winning probability minus the quotient of the losing probability divided by the win-loss ratio. The "win-loss ratio" is the upside divided by downside return potential.

[3] When win-loss ratios are not static, as may be the case in equities, investors may want to use the Merton Rule. This formula determines the ideal position size by dividing a stock's excess return (expected return minus the risk-free rate) by its variance. This result can then be scaled down based on personal risk aversion.

[4] Source: Morningstar Mind the Gap 2025.

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