

## What Happens When Risk Takers Meet the Risk Averse?

Most people are risk averse. This natural tendency toward risk aversion creates a profit opportunity for those who with long time horizons and capital discipline. Over time one can profit from the investment decisions taken by those who are risk averse. This is not an arbitrage, nor a mispricing. It is simply an opportunity to create value from risk transfer.

### A Simple Example of Risk Transfer

One way of quantifying a person's risk aversion is by simply asking: How much would you be willing to give up in order to trade a gamble for a sure thing? For example, if we flip a coin and had a 50% probability of making \$1.25 on heads and a 50% probability of making \$0.75 on tails, (an expected payoff of \$1.00), what certain payment would you take today to walk away from this uncertain gamble? Would you take \$0.99, \$0.95, \$0.90? Let's pretend a poll of a large group of investors showed that the average person would accept a payment of \$0.94 today and give up the uncertain coin flip. We now have a sense of the aggregate risk aversion of the investor population.

In the coin flip, the expected return of this payoff is obviously \$1.00. If we paid \$0.94 to purchase the right to flip the coin, constrained our bet size, and kept enough money in reserve to cover our losses, over time we could generate positive expected returns with ever-shrinking standard deviation relative to the mean.

Figure I shows one sample of a simulation of the cumulative profit and loss of this strategy over 100 coin flips.



Figure I

This is not an arbitrage or guaranteed payout. The coin flipper's risk-aversion becomes our statistical reward. For each flip we buy, we expect to earn \$0.06 ( $= 50\% \times \$0.75 + 50\% \times \$1.25 - \$0.94$ ). The variance for one flip is 0.0625, The standard deviation is \$0.25 ( $=\sqrt{0.0625}$ ).

As we repeat the coin flip over and over, the standard deviation of our cumulative profit-and-loss shrinks relative to our cumulative expected return. For a single coin flip, our standard deviation (\$0.25) is 4 times our expected earnings (\$0.06). After 100 flips, the standard deviation shrinks to roughly 41% of our expected cumulative earnings, and after 1000 flips the standard deviation is only 13% of our expected earnings. Over time the expected gain becomes stronger relative to the variability with plenty of drawdowns along the way.

### **Applying This to The Real World of Investing**

The investing world does not have perfectly predictable odds like a coin flip. Nor can one repeat the coin flip many times in a short period.

In the real world, opportunities to profit from other people's desire to swap uncertainty for a surer thing at a good price occur randomly over time. We can't do thousands of trades all at once. However, we can do thousands of trades over time.

That's where the options market enters the picture. In the options market, there are thousands of propositions presented in the form of different strike prices, maturities and types of listed options. The S&P500 Index options market alone has around 10,000 different strike prices and maturities across calls and puts at any given moment.

At Lake Hill we continuously observe what option investors are willing to do to increase, reduce, or modify their risk. We don't look at the option prices in isolation, but rather we calculate the difference between the *market price* and what we perceive to be the *fair value* of options. This difference is called the Variance Risk Premium (VRP). VRP is not an arbitrage or a mispricing, and it does not present a sure payoff – it is the price of risk transfer.

Lake Hill's business generates expected returns by identifying opportunities with enough VRP (positive or negative) for us to take the other side of the trade. Basically, we try to buy the cheap options, sell the rich ones, and hedge out the risks that aren't worth taking. By taking the risk that other investors may not want or cannot afford, Lake Hill expects to generate profits over time. By hedging and diversifying our many bets, we reduce the variance of future earnings to levels far lower than the variance of any individual trade. The net result over time is a positive edge business with reduced variance. Although what we do at Lake Hill is more complex, it is crudely analogous to the person who pays \$0.94 in the coin flip example earlier.

## Your Investment Time Horizon Matters a Lot

This is all nice, but plenty can go wrong even when you have a positive expected return strategy. Managing capital is critical because drawdowns will happen and must be expected. Unfortunately, some investors bail out of positive expected return investments when they experience a drawdown. They do this because that don't have the patience or the time to wait for the signal to separate from the noise.

Most investors would love to achieve the long-term track record of Warren Buffet or George Soros. After the fact, we want Soros and Buffet, but could we really have handled the drawdowns?

Both Soros and Buffet had 30-year spans with average annual returns of over 30%. Nearly any sane person would take these track records ex-post. However, both had annual Sharpe ratios less than 1.0. Both experienced very high levels of volatility. Soros suffered some severe drawdowns, and his downside variability was higher than his upside variability. Many Investors who look ex-ante at their drawdowns and Sharpe ratios, today would pass. How can this be?

The inclination to forego a phenomenal investing strategy (e.g., Buffet or Soros) in favor of something less risky and less profitable results primarily from a mismatch of investing time horizons.

To show why this happens we created two hypothetical investment strategies. The first strategy is the High-Return/Negative-Skew Strategy. The second strategy is the High-Sharpe/Zero-Skew Strategy. Here are their characteristics:

Strategy	High-Risk / Neg.Skew	High-Sharpe / 0-Skew
Annual Drift	12.0%	6.0%
Annual StdDev pre-shock	8.0%	3.0%
Annual Prob. of Shock	10.0%	0.0%
Shock Size (1-day return)	-20.0%	0.0%
Expected Annual Return	10.0%	6.0%
Expected Annual Std Dev	10.3%	3.0%
Sharpe	0.97	2.0
Skew of Daily Returns	-12.2	0.0

Figure 2

The High-Risk strategy has a Sharpe of just under 1.0 and is also extremely negatively skewed due to the higher occurrence of shock events. The High-Sharpe strategy has a 2.0 Sharpe and an annual expected return of 6%.

Figure 3 shows the probability that the High-Risk Strategy outperforms the High-Sharpe Strategy over a certain number of days. After 1-year, the probability that the High-Risk strategy has a higher return is over 68%. After 4-years, 76%. After 10-years, 83%.

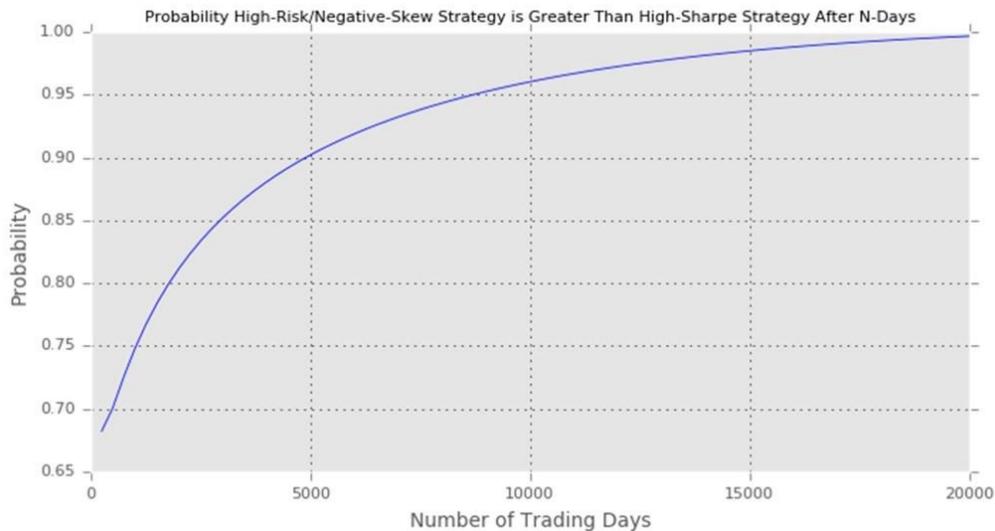


Figure 3

After 30 years (7560 days) - the length of the long-term track record of Buffet and Soros, the High-Risk strategy has a 95% probability of outperforming the High-Sharpe strategy. Just as in our coin flip example, the standard deviation of the strategy shrinks relative to the expected return.

It is perfectly understandable that some investors will choose to receive \$0.94 instead of the long term expected payout of \$1. Some investors have shorter term horizons that require a steadier and lower volatility return profile. For example, a corporate pension that is approaching fully funded status may recognize that they can't afford to endure a short-term drawdown. This creates an opportunity for long-term investors that is willing to transfer risk and pocket the additional \$0.06 of expected payout.

University endowments, family offices, and life-insurance companies may have investment horizons that span decades. These types of investors can take advantage of their ability to generate higher long-term wealth by taking risks that shorter time horizon investors cannot or will not shoulder. If they have the willingness to stick with a riskier strategy in the short-term and avoid heading for the exits during drawdowns, they will be rewarded with higher expected returns and lower expected variability in the long-term.

## Summary

- Some investors are willing to trade risky outcomes for more certain outcomes. They are risk averse.
- Some risk averse behavior can adversely affect longer term wealth creation. There is opportunity for the risk taker to profit from this tendency.
- Averting or transferring risk can also be a perfectly rational thing to do, but just as with risk taking, you must be disciplined in what choices you make so as to not transfer too much excess opportunity to risk taking counterparties.
- A successful risk taker must be diversified, have strong capital management, and patience. Diversification means having many independent opportunities with positive expected value. Capital management means correctly sizing your "bet". Patience means allowing enough time for the expected profit to separate from the noise.
- Misaligning your time-horizon and the time-horizon of an investment strategy can force poor decisions and result in subpar performance. Investors with longer time horizons can take advantage of opportunities created by shorter-term, more risk-averse investors.

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