



Benchmarking with Integrity

Benchmarking is an increasingly frustrating topic in the asset management industry today. The style-box or single asset class strategies (such as active large-cap U.S. equity) have few logical, but straightforward options (the S&P 500 Index). Accurate and thoughtful benchmarking has become more difficult and more important as managed ETF strategies have exploded in popularity.

Why do benchmarks exist?

In 2012 ten hurricanes originated in the Atlantic Ocean. Whether it was a particularly active year is difficult to know without any prior knowledge of the frequency of hurricanes. Historical data provides us with a sense as to the relative activity level of the 2012 hurricane season; since 1970, there have been six hurricanes per year on average. Since 1970 there have only been five years with ten or more hurricanes, making 2012 a very active season.

Benchmarks play the role of historical data in the hurricane example, allowing investors, financial advisors and other interested parties to put portfolio manager performance into context. Benchmarks are the bedrock that makes thoughtful investment evaluation and selection possible.

What makes a good benchmark?

Finding the best benchmark for a strategy requires answering the following two questions:

1. What are the target outcomes of the strategy?
2. What is the most commonly used passive approach to achieving these outcomes?

These two simple questions can be used to identify the benchmark that is most powerful in separating good manager performance from bad. The questions are effective because they identify the context for

how the strategy fits within the end investor's portfolio and as a result identify the most effective, passive alternative for the investor's dollars.

In the next section, we apply this methodology to a generic defensive U.S. large-cap equity strategy.

Working Definition: A Hypothetical, Defensive U.S. Large-Cap Equity Strategy

The common value-proposition of a defensive U.S. large-cap equity strategy is high upside-capture of the S&P 500 Index's gains and low exposure to its losses. The execution typically involves individual equities or ETFs for the long exposure -- or "beta" exposure -- and a tactical component to go-to-cash, or use options and/or futures for downside protection.

A simple, rules-based example of this would be a strategy that invests in the SPDR S&P 500 ETF SPY when SPY is above its twelve-month moving average and invests in cash otherwise. In our experience, Defensive U.S. Large-Cap Equity strategies tend to be benchmarked to the S&P 500.

The following chart shows annual performance of this strategy vs. SPY since 2007, ignoring taxes, transaction costs and other expenses to demonstrate performance going in, through, and out of the most recent recession.

EXAMPLE RETURNS

| Year | SPY | Defensive Equity |
|-----------------------|--------|------------------|
| 2007 | 5.2% | 5.2% |
| 2008 | -36.8% | 0.0% |
| 2009 | 26.3% | 13.9% |
| 2010 | 15.1% | -1.2% |
| 2011 | 1.9% | -1.9% |
| 2012 | 16.0% | 10.9% |
| 2013 (through August) | 16.0% | 16.0% |
| Total return | 32.5% | 49.4% |

In the one down year, the strategy out-performs significantly, going to cash and protecting capital during the global credit crisis. In the other six years, the strategy has underperforms by an average of 626 basis points (bps) per year (with a standard deviation of 669 bps). Is this strategy doing its job or not? Many would probably say yes since it is flat in 2008 and has delivered a total return of 49.4% versus 32.5% for SPY.

Consider if SPY returned 10% annually for the next five years and the Defensive Equity strategy continued to underperform by 626bps per year in up markets. Would the strategy still be considered a success?

EXAMPLE RETURNS WITH HYPOTHETICAL CONTINUED BULL MARKET

| Year | SPY | Defensive Equity |
|------|--------|------------------|
| 2007 | 5.2% | 5.2% |
| 2008 | -36.8% | 0.0% |
| 2009 | 26.3% | 13.9% |



| | | |
|--------------|--------|-------|
| 2010 | 15.1% | -1.2% |
| 2011 | 1.9% | -1.9% |
| 2012 | 16.0% | 10.9% |
| 2013 | 16.0% | 16.0% |
| 2014 | 10.0% | 3.7% |
| 2015 | 10.0% | 3.7% |
| 2016 | 10.0% | 3.7% |
| 2017 | 10.0% | 3.7% |
| 2018 | 10.0% | 3.7% |
| Total return | 113.4% | 79.5% |

The strategy now under-performs SPY by 33.9% on a total return basis. Is the strategy all of the sudden unsuccessful even though it continues to perform exactly as it had from 2007 to 2013? The answer to this question is unclear. Investors cannot expect to get a high degree of downside protection without sacrificing anything on the upside, yet under-performing year after year can be trying. The comparison to SPY provides us with no context as to whether the 626bps of under-performance in up markets is good, bad or downright ugly.

We need a better benchmark. Let's turn to our two questions for guidance as to what that better benchmark is.

Defensive U.S. Large-Cap Equity Strategy: Target Outcome

Defensive U.S. Large-Cap Equity strategies can be thought of as consisting of two distinct pieces:

1. A long position in U.S. large cap equities
2. An insurance policy that hopefully pays off when the market declines in order to offset those losses

Just as home, auto or life insurance policies require premiums, investors in Defensive U.S. Large-Cap Equity strategies pay a "premium," in the form of reduced upside capture, for the downside market protection they deliver. From this perspective, shopping for the ideal strategy is like shopping for an insurance policy: we want the policy that offers the optimal benefit (downside protection) to cost (under-performance in up markets) trade-off.

Defensive U.S. Large-Cap Equity Strategy: Alternative Passive Strategy

Investors can passively add this insurance policy to their equity portfolios through positions in S&P 500 put options. While options strategies may be difficult for many advisors to implement due to disclosure issues and client aversion to derivatives, they still provide the most apt comparison from a cost basis.

For purposes of this discussion, we will consider the following implementation of this type of passive strategy:

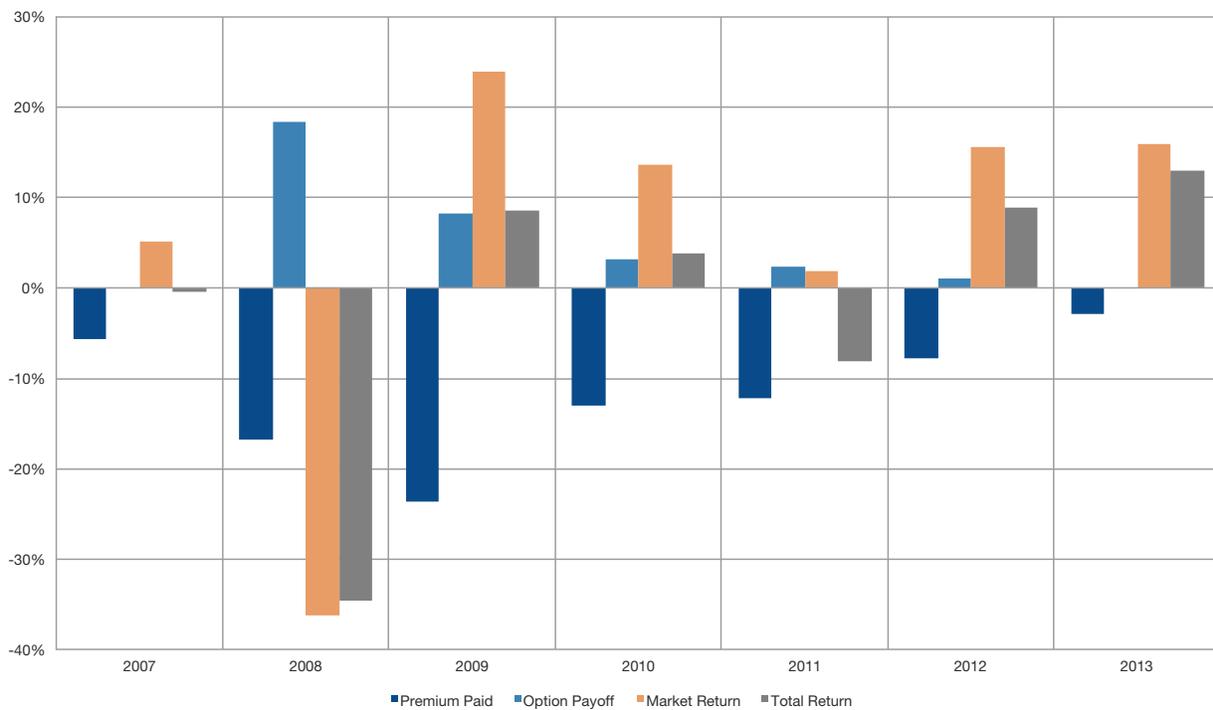
1. Buy SPY
2. Each month, purchase 1-month put options struck 5% out of the money ("OTM")



A rough backtest of this strategy illustrates that it is infeasible due to the high premiums paid for the put options. An investor that invested \$1,000,000 in this hedged strategy on 12/31/2006 would have \$829,656 on 8/30/2013. Alternatively, an investor who bought SPY at the end of 2006 without the hedge would have \$1,325,035 on 8/30/2013 (4.3% annualized return vs. -2.8% annualized return for the hedged strategy)¹.

The following chart separates the overall performance of this hedged strategy into the contribution of each of three contributing factors: option premiums, option payoffs and market returns.

SPY Hedged with OTM Puts: Performance Attribution



| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|----------------|-------|--------|-------|-------|-------|-------|-------|
| SPY - Hedged | -0.4% | -34.6% | 8.5% | 3.8% | -8.1% | 9.0% | 12.9% |
| SPY - No Hedge | 5.2% | -36.8% | 26.3% | 15.1% | 1.9% | 16.0% | 16.0% |

A few interesting points to consider in this example:

¹ For simplicity, we make a number of assumptions to backtest the options related strategies presented instead of using actual option pricing data. To price a given option, we start with VIX and add a 10% implied volatility premium for 5% OTM puts and a 10% implied volatility discount for OTM calls. So if VIX is currently at 15.0, we would use an implied volatility of 16.5 for our OTM puts and 13.5 for our OTM calls. We use one-month Treasury bill rates for the risk-free rate. We assume that trades occur on the last trading day in each month.



1. By employing 1-month put options, we are paying option premiums twelve times a year. It may be more cost effective to implement with 1-year options instead of rolling 1-month. Whether or not this is the case depends on the volatility term structure, skew, strikes being considered for the 1-month and 1-year options and other current market conditions. For example, using SPY option pricing data at the time of writing, it would cost approximately 2.3% annually to utilize 1-month options struck 5% OTM compared to 1.8% annually for 1-year options struck 20% OTM. Note that the strike prices for the options were chosen because 5% OTM 1-month options provide roughly the same amount of downside protection as 20% OTM 1-year options².

There are other practical considerations when evaluating these two approaches. The downside of using 1-month options is that investors are only limiting their loss each month. Hypothetically, the investor could experience the maximum loss every month during the course of a year, possibly leading to a larger loss than desired. For example, with 5% OTM options, the investor could lose 5% each month or 60% in a year, excluding option premiums. The downside of using 1-year options is that there may be a need to put on new positions following market rallies to maintain the same level of protection. A simple example can illustrate this issue. Assume the market starts the year at 100 and an investor wants to ensure that he never experiences a drawdown greater than 20%. Therefore, he buys a put option struck at 80. If the market rallies to 120 during the first half of the year, then the investor has a decision to make. He could either do nothing and risk a 33% drawdown all the way back to 80 if the market crashes before the end of the year or he can sell his current put and buy a new put struck at 96, 20% below the current market price.

2. Part of the reason that the put hedge performs so poorly is that in practice options have an unfortunate feature: they tend to be most expensive when they are most needed. In January 2007, a 1-month 5% OTM option cost approximately 5bps. In October 2008, that same option cost 485bps. The affect of this negative correlation between equity returns and volatility can be so severe that it can completely wipe out the capital protection benefit of holding the options. For example, the 1-month put hedging strategy lost 34.6% in 2008, only 2.2% better than SPY³.

We need to amend this passive strategy to get closer to what an investor would actually employ in a portfolio. The easiest fix is to sell out of the money call options to offset the cost of buying the put options.

Our benchmark strategy is now:

1. Buy SPY
2. Each month, purchase 1-month put options struck 5% OTM
3. Each month, sell 1-month call options struck 5% OTM

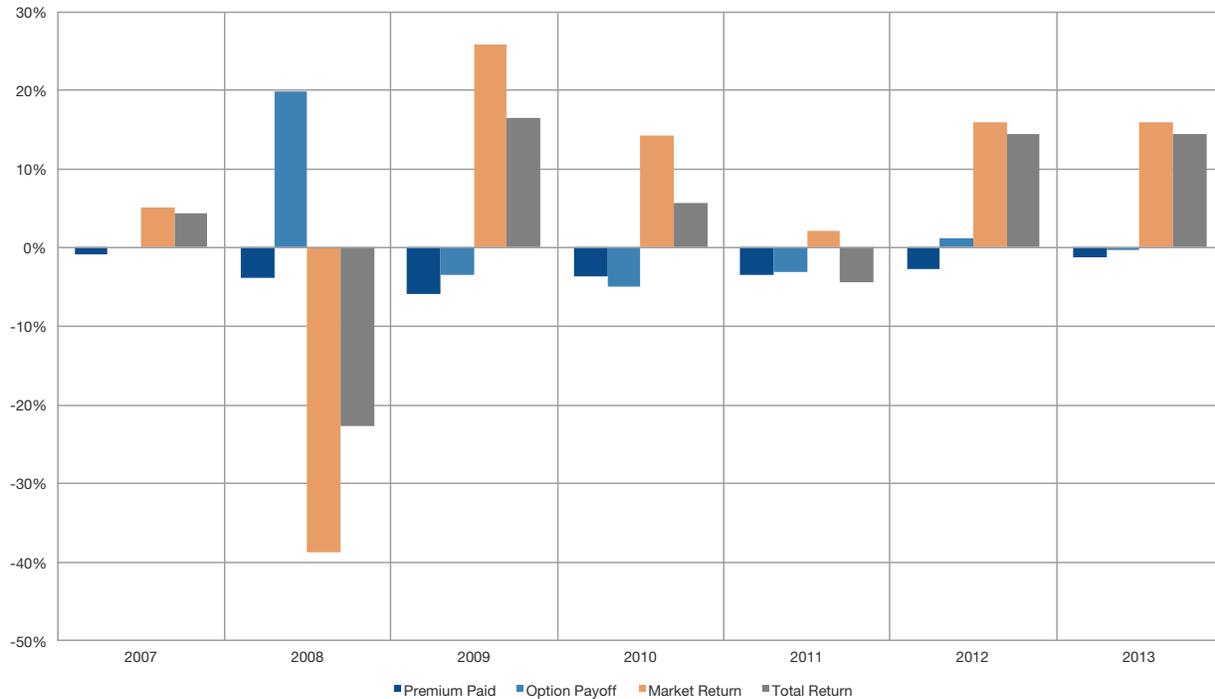
² The derivation of this conclusion is outside the scope of this paper. Feel free to reach out to us if you are curious about this statement.

³ Again, we use our simplifying assumptions from footnote 1 in calculating option prices.



Now, our hypothetical investor would end the December 2006 to August 2013 period with \$1,241,463, much better than the \$829,656 result when employing put options only. Being able to partially offset the cost of downside protection by giving up some upside results in a significantly better outcome, as summarized by the following performance attribution.

SPY Hedged with Option Collar: Performance Attribution



| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|----------------|------|--------|-------|-------|-------|-------|-------|
| SPY - Hedged | 4.3% | -22.8% | 16.5% | 5.7% | -4.4% | 14.4% | 14.5% |
| SPY - No Hedge | 5.2% | -36.8% | 26.3% | 15.1% | 1.9% | 16.0% | 16.0% |

This permanently collared equity position can now be used to better evaluate our Defensive U.S. Large Cap Equity strategy.

Utilizing Our Advanced Benchmark to Evaluate the Defensive Equity Strategy

DEFENSIVE EQUITY RETURNS VS. ADVANCED BENCHMARK

| Year | Benchmark (Long SPY + collar) | Defensive Equity |
|------|-------------------------------|------------------|
| 2007 | 4.3% | 5.2% |

| | | |
|-----------------------|--------|-------|
| 2008 | -22.8% | 0.0% |
| 2009 | 16.5% | 13.9% |
| 2010 | 5.7% | -1.2% |
| 2011 | -4.4% | -1.9% |
| 2012 | 14.4% | 10.9% |
| 2013 (through August) | 14.5% | 16.0% |
| Total return | 24.1% | 49.4% |

We can now evaluate the strategy in a much less ambiguous way. The Defensive Equity strategy outperforms significantly in 2008 (flat vs. down 22.8%), but performs a bit worse in up years (626bps of annual under-performance in up years vs. 492bps of annual under-performance for the benchmark). With better context, we can now postulate that the Defensive Equity strategy provides more downside protection, but at a slightly higher cost. We could have never graduated to this more granular level of analysis without our advanced benchmark.

Going back to our insurance metaphor, the Defensive Equity strategy provides more comprehensive coverage, but at a slightly higher cost⁴. With this thesis, the investor can make an educated decision as to which option is best depending on their situation and preferences, just as a retiree may decide on a low deductible, comprehensive health insurance plan while a recent college graduate may opt for higher deductible policy that only protects against catastrophic injury.

Conclusion

The problem of accurate benchmarking extends beyond defensive solutions; as investors eschew benchmark-centric investments for more flexible, outcome-oriented solutions, traditional benchmarks become less relevant. Benchmarks are critical for identifying how a strategy can fit within a traditional asset allocation framework as well as providing a means for quantifying the value added of the portfolio manager.

Without an evolution in benchmarking practices, new strategy offerings cannot be properly contextualized. As more complex offerings come into the market, we believe that simple, rule-based tactical strategies can actually serve as benchmarks themselves. For example, active U.S. defensive equity solutions can be compared to the defensive equity strategy outlined in this paper.

In the meantime, we believe investors must educate themselves on alternative benchmarks and it is critical for strategists to transparently provide these alternatives.

⁴ We ignore the rather important detail that anyone considering the Defensive Equity strategy must have a view on how consistently the manager of the strategy will be able to deliver capital protection in markets like that of 2008.



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