Editor's Letter

How to Evaluate the Performance of Alternative Assets

Introduction

Last August, Warren Buffett collected $1 million on a bet he had made with Protégé Partners LLC almost ten years ago. Buffett had bet that the S&P 500 index would outperform a portfolio of hedge funds selected by Protégé Partners. A typical headline following the announcement that Buffett had won the bet was that "the S&P 500 index has outperformed hedge funds." Of course, it is a fact that since 2009 the S&P 500 index has outperformed the selected portfolio of hedge funds. However, the more important question is whether the S&P 500 index is the right benchmark for a hedge fund portfolio. This note provides a simple methodology for creating benchmarks for alternative assets (e.g., hedge funds, private equity, real assets, etc.). The idea is rather simple: We will attempt to create portfolios consisting of liquid traditional assets such that they will match some important characteristics of the targeted alternative assets. For instance, the portfolio of liquid assets will match the exposure of the hedge fund portfolio to two primary sources of risk -- equity risk and credit risk – while matching the volatility of the hedge fund portfolio.

In this note, we apply our methodology to a private equity index, a hedge fund index and two Bridgewater funds: Pure Alpha and All-Weather.

Why do Institutional Investors Allocate to Alternatives?

A few months ago, the CAIA Association gathered a group of asset allocators who manage large pools of capital for institutional investors to discuss recent developments in the alternative investment space. One of the first questions discussed was "why do you allocate to alternatives?" Several reasons were put forward with the most common ones being lack of correlation with traditional assets and low return volatility. In other words, these asset allocators were listing some of the characteristics desired for the alternative assets in their portfolios. Therefore, it seems that the right benchmark for an alternative asset class should match those desirable characteristics. Using this line of reasoning, the S&P 500 index is clearly the wrong benchmark for evaluating hedge funds as very few hedge fund strategies have the same exposure to equity risk that the S&P 500 index has.

For this note, we focus on three important characteristics of alternative assets:

1. Exposure to equity risk: this is measured by the beta of the alternative asset with respect to the S&P 500 Index.
2. Exposure to credit risk: this is measured by the beta of the alternative asset with respect to Barclay's Global High Yield Index.
3. Standalone risk: this is measured by the volatility of the return on the alternative asset.

The procedure presented here is flexible enough to allow investors to consider additional characteristics.

Illiquidity of Alternative Assets

Illiquidity is an important feature of alternative assets, and managing illiquidity risk is one of the major challenges faced by asset allocators. When it comes to performance evaluation and benchmarking, estimating the exposure of illiquid assets to changes in financial markets presents a different challenge. Because illiquid assets adjust slowly to changes in market conditions, the traditional approach to measuring an investment's exposure to risk will not work for illiquid assets as the traditional approach will underestimate the market exposure of illiquid investments. The proper approach is to consider the sensitivity of the alternative asset not only to current changes to market conditions but also its sensitivity to lagged market changes.

The following examples demonstrate this issue. Exhibit 1 shows the exposures of the CISDM Hedge Fund Index and Cambridge Associates Private Equity Index to contemporaneous as well as lagged changes in equity and credit markets:

	Contemporaneous Exposures	
1996-2017	Equity Beta	Credit Risk Beta
CISDM Hedge Fund Index	0.22	0.02
Cambridge Associates Private Equity Index	0.41	0.11
	Total Exposures	
	Equity Beta	Credit Risk Beta
CISDM Hedge Fund Index	0.28	0.07
Cambridge Associates Private Equity Index	0.72	0.01

Exhibit 1: Contemporaneous and Total Exposures of Hedge and Private Equity
Source: Author's calculations, CISDM and Bloomberg

We can see from the top panel that while the contemporaneous equity risk of the private equity index is only 0.41, the true total exposure of private equity to equity risk is almost twice as high at 0.72, indicating that the true equity risk of this asset class is similar to a 70/30 portfolio of equity/cash. Also, we can see that both the equity and credit risks of the hedge fund index increases slightly once the delayed reactions of hedge funds to changes in credit conditions are considered. Therefore, in constructing our benchmarks, we will attempt to match the total exposures of alternative asset classes to both equity and credit risks. Also, because of the delayed reaction of illiquid alternative assets to market conditions, their estimated volatilities need to be adjusted.

The Right Benchmarks

As stated previously, we are going to construct 4 different benchmarks covering Cambridge Associates Private Equity Index, CISDM Hedge Fund Index, Bridgewater Pure Alpha Fund, and Bridgewater All-Weather Fund. Consider the information provided in Exhibit 2 below (note that reported volatility and exposures of alternative assets are adjusted to reflect their illiquidity. See page 375 of the CAIA Level II book).

Investment Class (1996-2017)	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
Cambridge Associates US Private Equity	13.61	14.51	0.72	0.01
CISDM EW Hedge Fund USD	8.51	9.61	0.28	0.07
Bridgewater Pure Alpha Strat 12% Vol	9.09	8.67	-0.01	0.05
Bridgewater All Weather 12% Strategy	8.42	11.51	-0.04	0.63
S&P 500 Index	9.35	15.00	1.00	
Barclay's Global High Yield Index	8.55	9.94		1.00

Investment Class (2009-2017)	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
Cambridge Associates US Private Equity	13.32	7.64	0.62	0.09
CISDM EW Hedge Fund USD	6.93	7.41	0.24	0.38
Bridgewater Pure Alpha Strat 12% Vol	6.10	9.47	-0.09	-0.09
Bridgewater All Weather 12% Strategy	9.35	11.22	-0.09	0.36
S&P 500 Index	14.98	13.48	1.00	
Barclay's Global High Yield Index	12.72	8.69		1.00

Exhibit 2: Performance and Characteristics of Asset Classes
Source: Author's calculations, CISDM and Bloomberg

The top panel presents the performance of four alternative investments along with those of the S&P 500 Index and Barclay's Global High Yield (BGHY) Index from 1996-2017. The best performing asset class during this period was private equity followed by the S&P 500. The results are somewhat different for the 2009-2017 period as the S&P 500 was the best performing asset class. The question addressed in this note is whether a pure equity index or a pure credit index (or any other single index) can serve as the proper benchmark for these and other alternative investments. We argue that the answer is no. We can see how different the S&P 500 index is when its important characteristics are compared to those of alternative assets. For example, the volatility, as well as the equity and credit exposures of the hedge fund index, are significantly different from those of the S&P 500 Index after adjusting for their illiquidity or the BGHY Index. Therefore, we propose a methodology to use traditional asset classes to construct benchmarks that have the same characteristics as those of the alternative asset that is being evaluated.

We will use the following indices of traditional asset classes to construct our benchmarks. They represent broad sources of risk and return in financial markets, and liquid ETFs representing them are available.

MSCI Emerging Mkts	BBgBarc Global High Yield	Russell 1000 Value	Russell 1000 Growth	Russell 2000	S&P GSCI	BBgBarc Treasury 20+ Yr	BBgBarc 1-5 Yr Treasury	DJ US Biotech Index	S&P 500

Exhibit 3: List of Traditional Asset Classes

We will use portfolios of these assets to construct two different portfolios for each alternative asset class, one matching the alternative asset's characteristics since 1996 and one matching them since 2009. These two periods were selected to see if there were substantial changes since the global financial crisis. Exhibit 4 presents the results of our benchmarking for private equity:

Investment Class (1996-2017)	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
Cambridge Associates US Private Equity	13.61	14.51	0.72	0.01
Benchmark Portfolio	10.18	14.51	0.72	0.01
Investment Class (2009-2017)				
Cambridge Associates US Private Equity	13.32	7.64	0.62	0.09
Benchmark Portfolio	8.77	7.64	0.50	0.09

Exhibit 4: Benchmarking of Private Equity
Source: Author's calculations, CISDM and Bloomberg

The results reported above are quite interesting. First, we can see that portfolios of traditional asset classes can match the important characteristics of private equity. The exception is the equity exposure of the private equity index during the 2009-2017 period. In a sense, we can create clones of the private equity asset class using liquid traditional asset classes. Second, the portfolio of traditional asset classes underperforms private equity by a large margin for both periods. It is important to note that while the S&P 500 outperformed private equity for the 2009-2017 period, it was a poor match for private equity. Once portfolios matching private equity's characteristics were created, it is seen that private equity provided significant value during both periods.

Next, we create two portfolios matching the characteristics of the hedge fund index. The results are presented in Exhibit 5.

Investment Class (1996-2017)	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
CISDM EW Hedge Fund USD	8.51	9.61	0.28	0.07
Benchmark Portfolio	7.29	9.61	0.28	0.07
Investment Class (2009-2017)				
CISDM EW Hedge Fund USD	6.93	7.41	0.24	0.38
Benchmark Portfolio	6.67	7.41	0.24	0.38

Exhibit 5: Benchmarking of Hedge Funds
Source: Author's calculations, CISDM and Bloomberg

The results for hedge funds are somewhat better because we can match every characteristic of the hedge fund index. We reported in Exhibit 3 that the hedge fund index has significantly underperformed the S&P 500 Index since 2009. However, once we create a portfolio that matches its important characteristics, we see that the hedge fund index performed slightly better than its clone. Low volatility and low exposure to equity markets matter.

Investment Class (1996-2017)	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
Bridgewater Pure Alpha Strat 12% Vol	9.09	8.67	-0.01	0.05
Benchmark Portfolio	9.26	8.67	-0.01	0.05
Investment Class (2009-2017)				
Bridgewater Pure Alpha Strat 12% Vol	6.10	9.47	-0.09	-0.09
Benchmark Portfolio	4.59	9.47	-0.09	-0.09

Investment Class (1996-2017)	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
Bridgewater All Weather 12% Strategy	8.42	11.51	-0.04	0.63
Benchmark Portfolio	5.20	11.51	-0.04	0.63
Investment Class (2009-2017)				
Bridgewater All Weather 12% Strategy	9.35	11.22	-0.09	0.36
Benchmark Portfolio	4.41	11.22	-0.09	0.36

Exhibit 6: Benchmarking of Bridgewater Funds
Source: Author's calculations, CISDM and Bloomberg

Finally, Exhibit 6 presents our benchmarking results for two Bridgewater funds.

The top panel of Exhibit 6 shows that one can construct a portfolio of traditional asset classes that matches important characteristics of the Pure Alpha Strategy for both periods. We can see that since 1996 the fund has underperformed our benchmark. On the other hand, the fund has outperformed its benchmark since 2009.

The bottom panel of Exhibit 6 displays the same results for the All-Weather Strategy. It shows that the All-Weather Strategy has significantly outperformed our benchmark. These results show the danger of using a single traditional index to measure the performance of alternative assets. While the All-Weather fund has significantly unperformed the S&P 500 index since 2009, the underperformance disappears once proper adjustments for volatility and various risk exposures are made.

Asset allocators who are interested in implementing this approach should follow these steps:

1. Identify the investment characteristics that are important to you. We have focused on volatility, equity, and credit exposures in this note. Other characteristics such as maximum drawdown or exposure to currency and interest rate changes may be considered as well. However, it is crucial to limit the number of characteristics because if several features are to be matched, then one will have to use a large set of traditional asset classes, which could result in poor out-of-sample performance.
2. Identify the traditional asset classes that would be used to create the benchmark. We have focused on a fixed set of assets. This need not be the case. One can use a different set of traditional assets to benchmark different alternative assets. For example, a credit strategy may use a broader set of credit oriented traditional assets and fewer equity oriented ones.
3. Use an optimization package (e.g., Excel's Solver) to calculate the optimal weights of the portfolio by maximizing the explanatory power of the important sources of risk subject to various constraints (e.g., volatility and risk exposures).
4. Change the benchmark's construction only when there are significant changes in market conditions. Most alternative assets are actively managed. Therefore, a fixed benchmark is unlikely to serve as the right measure of performance in the long-run. We suggest that once a benchmark is constructed, the asset allocators should continue to use it until there are significant changes in the characteristics of the alternative investment or in the market environment.

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