CLIFFWATER LLC

Portfolio Diversification through Liquid Alternatives

April 21, 2014

Investors face a portfolio conundrum in managing the influence of equities in a traditional asset mix. Cash and bonds reduce risk but at a seemingly egregious forfeiture of return. Global diversification, a popular diversification technique a decade ago, has proved of limited usefulness as cross border correlations have risen to near one.

Alternative investments, popular among larger institutional investors for over two decades through private partnerships, are now increasingly available to smaller institutions and individuals through liquid mutual funds. The challenge among investors examining these "liquid alternatives" is to fully appreciate the range of alternative strategies and how best to fit them into a traditional portfolio.

In our report, we provide a top-down way to think about alternatives, dividing the universe into alpha-driven and beta-driven alternatives, which we believe is important in defining what alternatives have in common and their differences.

We then propose a portfolio construction solution that gives investors access to the overall diversification benefits from alternatives, but allows for customization as well. We believe that a core-satellite approach, which has worked well in other areas of portfolio management, has equal applicability to constructing a portfolio of liquid alternatives.

"Alternatives" is a term intended to capture a broad group of asset classes and investment strategies that offer a return stream that differs substantially from traditional stocks and bonds. Investors hope that by including an allocation to alternatives their portfolios will benefit from lower risk and/or higher return compared to what they would otherwise have experience from a traditional stock/bond portfolio.

"Liquid alternatives" refers to a subset of Alternatives that offer daily liquidity, typically through an open or closed-end 40-Act mutual fund or an ETF. Historically, most alternative investments were offered through semi-liquid or illiquid private partnerships to institutional investors. Only in the last several years, largely in reaction to the 2008 Financial Crisis, have liquid alternatives grabbed investor attention, and with it, a near explosion in alternative product offerings.

What Makes an Investment "Alternative?"

At its simplest, alternative is identified with any asset class or investment strategy that is *not* a diversified stock or bond portfolio, which have historically comprised most, if not all, of investors' portfolios. Differences that define an investment or fund as alternative can be found in security type, liquidity, strategy, objective, or a combination of these elements. For example, differences in liquidity and strategy define private equity as an alternative investment.[1] The objective of avoiding losses in down markets, as opposed to performance relative to an index, is the hallmark that puts hedge funds in the alternative class.[2] Commodity futures and CTAs are alternative by their security type and strategy.

[1] Private equity is illiquid, generally requiring a 10 year investment lock-up of capital, and its strategy is one of control and operational change, in contrast to traditional equity management which is non-control and passive with respect to corporate action, other than proxy voting.
[2] The use of short-selling and leverage are differences unique to hedge funds as well.

Less obvious are smaller asset classes or security types that technically might be grouped with stocks or bonds but which have sufficient unique or unfamiliar qualities that many investors might consider them to be alternative. These include REITS, MLPs, TIPS, and covered call strategies.

Correlation is the statistic most commonly used to identify alternative investments. Alternatives are investments whose returns have a low correlation with stock and bond portfolios. A low correlation means that returns produced by the alternative investment exhibit a pattern that is different from stocks and bonds, and therefore, if included, would serve to diversify the overall portfolio. The correlation statistic ranges from +1.0 to -1.0. A +1.0 correlation identifies two sets of returns that directionally follow each other perfectly, and therefore offer no diversification. A zero (0.0) correlation identifies two sets of returns that have absolutely no relationship with one another, and therefore offer great diversification. A correlation equal to -1.0 occurs when the two sets of returns move in perfect but opposite directions.

Cliffwater uses the correlation statistic as the defining test of whether a strategy or asset class is an alternative investment:

A strategy or asset class is "Alternative" if its correlation is equal to or less than 0.75.[3]

Our definition is based on the notion that alternatives should have low overlap with common stocks, the driver of a traditional portfolio. Correlation does not directly measure overlap but its mathematical square (ρ^2), also known as R-squared, measures overlap. More precisely expressed, R-square equals the proportion of risk found in one return stream that is explained by the index return stream. We selected a 0.75 correlation as our alternatives benchmark because its square (R-squared) equals 0.56 (56%), which approximately fits our notion of alternatives as producing a return stream different from stocks.

Our definition would include private equity, real estate, hedge funds, and most real assets as alternative. Emerging markets, small cap stocks, and high yield bonds are examples of investments that we would not include as alternatives.

A Catalogue of Alternative Investments

Our definition of alternatives allows for potentially hundreds of strategies and niche asset class. A useful way to think about alternatives is to split them into "alpha driven" and "beta driven" groupings, as we do in Exhibit 1. Our purpose is to source the underlying driver of low correlation.

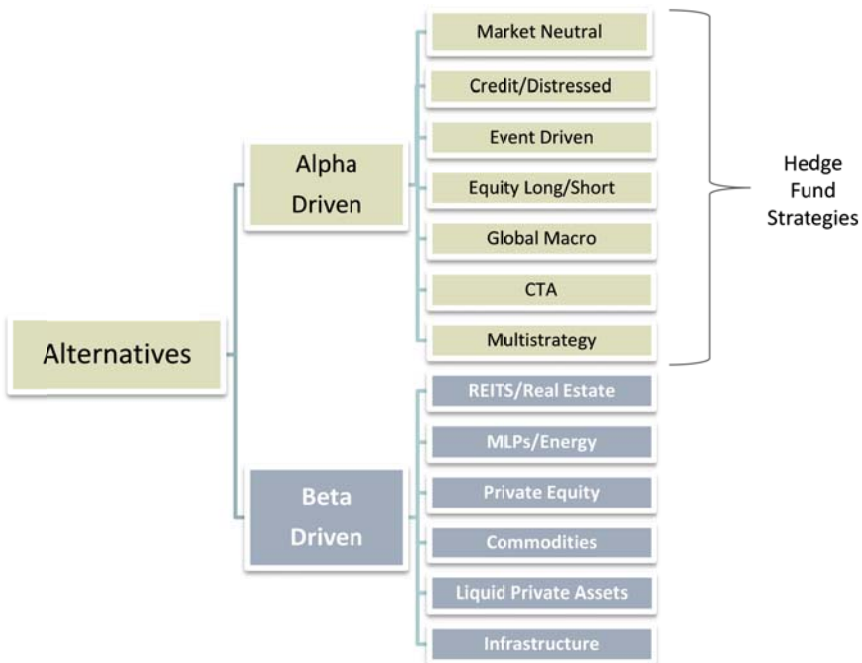
Alpha measures value-added returns produced by a manager's active decisions. By definition, it is uncorrelated with traditional index returns because it derives from idiosyncratic security risk which is not present in index returns.[4] Alpha driven alternatives have high alpha and low beta content and generally are structured as hedge funds. Hedge fund managers generate alpha primarily by utilizing traditional asset classes (i.e. equities, high yield, and Treasuries) in non-traditional ways, such as expressing an opinion regarding the direction of an asset class or security through long or short positions, or through leverage or hedging. The average individual hedge fund has a correlation equal to 0.45 when measured against equities.[5]

Alternative beta-driven investments refer to less well known asset classes whose returns are also less correlated to stock returns but the cause is primarily a difference in the type of beta return. Alpha is a

[3] We measure correlation against the nearest traditional asset class, which would be a stock index such as the MSCI ACWI (global) Index for most alternative investments but could be a bond index such as the Barclays Aggregate Index for fixed income strategies or asset classes.
[4] Idiosyncratic risk is also known as unsystematic risk, as opposed to systematic or beta risk.
[5] Hedge fund correlations increase as the number of funds increase because alpha risk declines from diversification while beta risk does not. This phenomenon also helps explain why hedge fund-of-funds performed poorly for many years as they over-diversified.

lower proportion of total risk for beta-driven alternatives and therefore has a smaller impact on correlation.[6] An examples, MLPs, commodity futures, and REITS are often considered alternative investments because their correlations to stocks are 0.50, 0.35, and 0.70, respectively. Individually, and collectively, these alternative beta asset classes help diversify the traditional 60%/40% stock/bond asset mix.

Exhibit 1: Cliffwater Alternatives Catalogue



A Diversified "Core" Alternatives Portfolio

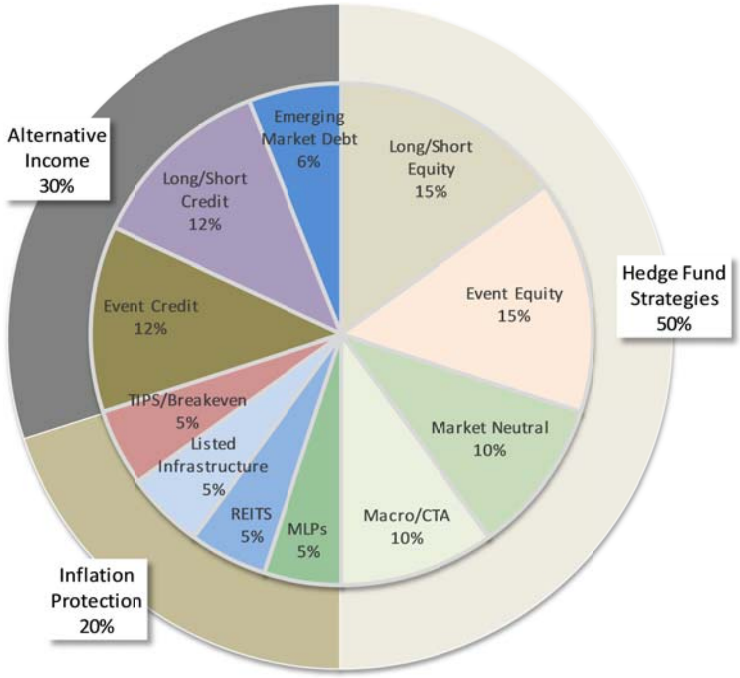
Many investors and advisors struggle with selecting from the seemingly overwhelming variety of alternative investments and integrating them into a traditional stock and bond portfolio. The answer depends largely on the investor's objective. We begin with perhaps the most common investor objective when considering alternatives, which is to lower overall portfolio risk without sacrificing long term return, if possible. We also restrict the portfolio to only those alternatives that offer daily liquidity, either through a 40 Act mutual fund or an exchange-traded fund (ETF).

We answer this question through a two-step process. Our first step is to identify an optimal mix of alternative investments and the second step is to determine the optimal allocation to the alternatives portfolio.[7]

Exhibit 2 describes a *core* alternatives portfolio, which we define as having bandwidth across the spectrum of alpha and beta-driven alternative investments.

[6] We agree with those who argue that private equity also has a high representation of alpha in returns, justifying their fees.
[7] Ideally, both the composition and allocation to alternatives is solved simultaneously in a portfolio optimization. We separate the decisions here to facilitate understanding. In practice, final portfolios do not differ materially when solving step-wise versus simultaneously.

Exhibit 2: Core Liquid Alternatives Portfolio



One-half the core alternatives portfolio is comprised of alpha-driven hedge funds, each representing one of the major hedge fund strategies: equity long/short, event-driven, market neutral, and macro.[8]

Another 20% of the portfolio is comprised of alternative investments that protect against unexpected inflation, also known as "real assets." These beta driven alternatives diversify the traditional 60%/40% stock/bond mix precisely because they have performed well during inflationary periods, when stocks and bonds have performed poorly.

Credit-oriented hedge funds comprise the final 30% of the core alternatives portfolio. Credit investments per se are not generally considered alternative investments, but when overseen by hedge fund managers who can short duration or credit risk in their portfolios when appropriate, these credit driven hedge funds become diversifiers. We call this segment "alternative income" because the three sleeves – event-credit, long/short credit, and long/short emerging market debt – all offer significant current cash flow that is not today found in the traditional 60%/40% stock/bond asset mix.

Our recommended portfolio in Exhibit 2 is heavily weighted to hedge fund strategies when compared to the distribution of mutual fund assets across alternative investments today. Hedge fund strategies represent just 23% ($267 billion) of total alternative mutual fund assets. Real assets, or alternative beta-driven mutual funds, represent 41% and alternative income funds comprise 36% of total alternative mutual fund assets.[9] We believe the current smaller mutual fund asset levels represented by hedge fund strategies will change with increased interest by investors and hedge fund managers alike.

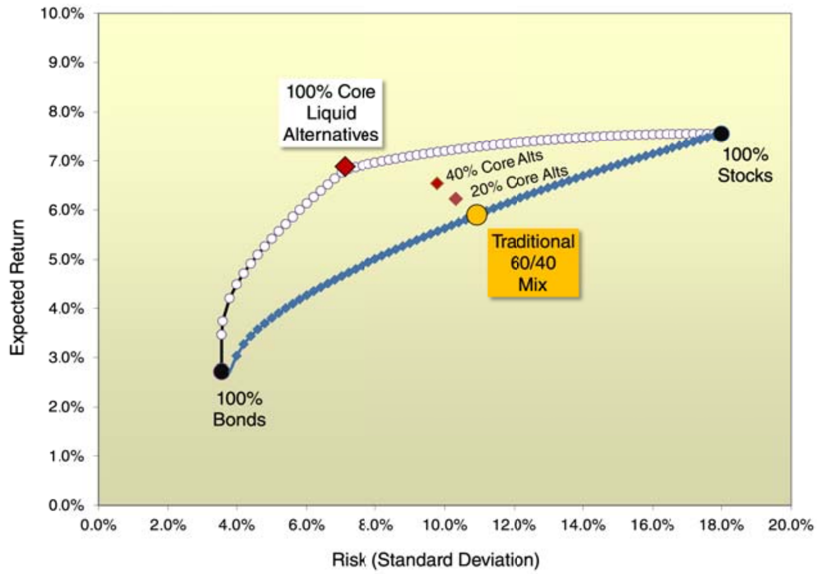
The Right Allocation to Liquid Alternatives

Having identified a core liquid alternatives portfolio, the second step is determining how much of a total portfolio to allocate to alternatives.

[8] Weights are based upon Cliffwater long term assessment of individual strategy return and risk.
[9] Cliffwater compiles and categorizes alternative mutual funds based upon Bloomberg data.

Exhibit 3 displays two "efficient frontiers." The first, colored in blue, shows the expected portfolio return and risk combinations available by altering the mix of stocks and bonds. Stocks[10] alone have an expected long term return equal to 7.55% with a risk equal to 18.00%, as reported in the table. Bonds[11] alone have an expected return equal to 2.40% with a risk equal to 4.00%. The traditional 60% stock, 40% bond portfolio (hereafter, the "60/40 portfolio") is identified on the efficient frontier. Its expected return equals 5.90%, with a risk equal to 10.92%. The ratio of expected return to risk for the 60/40 portfolio equals 0.52, which is frequently referred to as the risk-adjusted return.[12]

Exhibit 3: Expected Portfolio Return and Risk with and without Alternatives



	Expected Return	Expected Risk	Return /Risk
60/40 Portfolio	5.90%	10.92%	0.54
Core Alternatives	6.88%	7.10%	0.97
100% Stocks	7.55%	18.00%	0.42
100% Bonds	2.40%	4.00%	0.60
50% Stock/30% Bond/20% Alts	6.22%	10.32%	0.60
40% Stock/20% Bond/40% Alts	6.54%	9.78%	0.67

The core alternatives portfolio has an expected return equal to 6.88% and an expected risk equal to 7.10%. These forecasts fit the commonly held notion that alternatives broadly offer equity-like returns at a much lower level of risk. Because of the lower risk, the alternatives portfolio has almost twice the risk-adjusted return, 0.97, compared to the 60/40 portfolio.

The efficient frontier with the core alternatives portfolio, represented by the white line, shows higher levels of expected return at each level of risk, compared to portfolio combinations of only stocks and bonds. Investor can improve returns significantly by making significant allocations to alternatives. This is the

[10] Stocks are represented by the MSCI ACWI Index, a global stock index. Expected returns are geometric and come from the Cliffwater Second Quarter 2014 Asset Allocation Report.

[11] Bonds are represented by the Barclays Aggregate Index, an investment grade U.S. bond index. Expected returns are geometric and come from the Cliffwater Second Quarter 2014 Asset Allocation Report.

[12] The risk-adjusted return calculation gives equal weight to return and risk. Investor preferences for return or risk may differ and more customized measures may be appropriate.

reason colleges and universities, perhaps the most sophisticated and unencumbered institutional investors, today allocate over 53% of their endowment assets to alternative investments.[13]

We identify in Exhibit 3 two portfolios that combine the 60/40 portfolio with 20% and 40% allocations to the core alternatives portfolio. The first has allocations of 50%, 30%, and 20% to stocks, bonds, and alternatives, respectively. Importantly, expected portfolio return increases 32 basis points over the 60/40 portfolio *and* risk is reduced from 10.92% to 10.32%.

The second portfolio represents a 40% allocation to alternatives. The 40%, 20%, and 40% allocations to stocks, bonds, and alternatives, respectively, result in a 64 basis point addition to return plus a reduction in risk from 10.92% to 9.78%.

Our analysis demonstrates clear and significant benefits to adding alternatives to a traditional investment portfolio. While there is no one answer to the "right" allocation to alternatives, investors interested in strong risk-adjusted returns should consider allocating a meaningful proportion of their portfolio to a core alternatives portfolio.

Non-Core "Satellite" Liquid Alternatives Portfolios

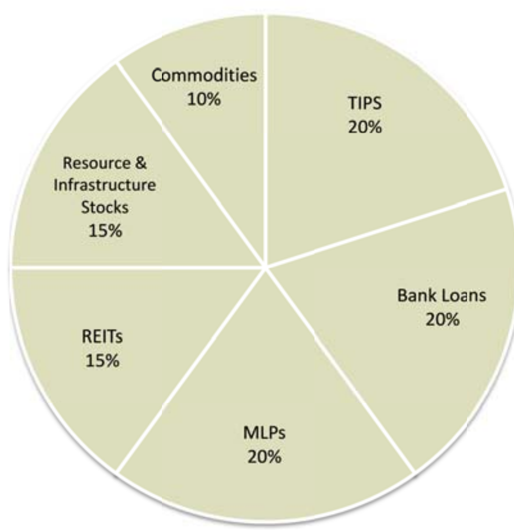
Investors can, and often do, draw from the range of available alternatives to create bespoke "satellite" applications to solve special purpose objectives. Three of the more common non-core liquid alternatives portfolios are:

– *Inflation-protection alternatives portfolio*

  Our November 2013 research report, "Inflation Protection through a Diversified Liquid Real Assets Portfolio," presents a detailed analysis of alternative asset classes that provide protection against rising unexpected inflation, a scenario that seems far away today but one that could present serious risks to a traditional portfolio. Inflation is also a risk that can appear quickly, especially because so many of the necessary conditions for inflation – debt, money supply, low interest rates – exist in the market today.

  Exhibit 4 provides Cliffwater's mix of beta-driven alternatives that together provide an optimal hedge to unexpected inflation while maintaining an attractive risk-adjusted return.

Exhibit 4: Cliffwater Inflation Protection Portfolio



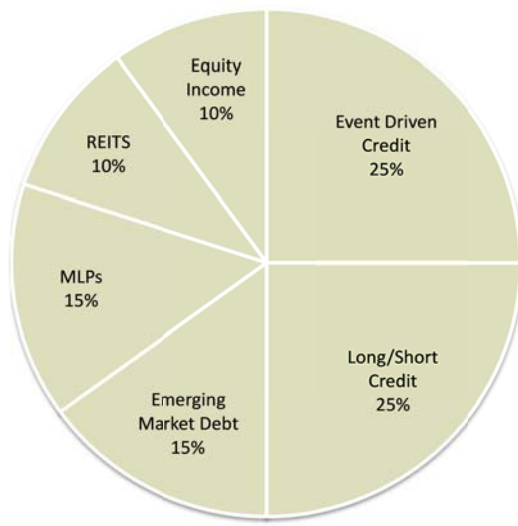
[13] "2013 NACUBO – Commonfund Study of Endowments"

– *Alternative income portfolio*

Both individual and institutional investors have a preference for immediate cash flow to meet their liability or expenditure needs. Too often, investors select a single source for income, such as high yield bonds, that may offer immediate needs but are vulnerable to risks in income (defaults) or principal. Several types of alternative investments provide high yields, and capital gains in some instances, that when combined into an alternative income portfolio can provide a more steady and diversified source of income and reduced risk of capital loss as well.

Exhibit 5 shows Cliffwater's mix of alpha and beta-driven alternatives that together provide a more stable source of current income than any individual asset type.

Exhibit 5: Cliffwater Alternative Income Portfolio



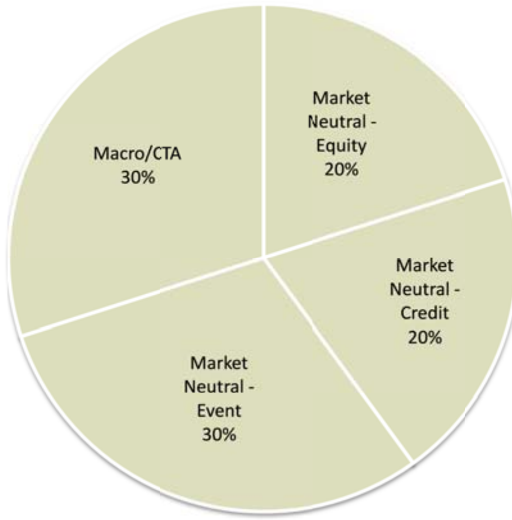
At current market conditions the alternative income portfolio in Exhibit 5 would be expected to provide a cash yield equal to 5.15%.

– *Absolute return portfolio*

Our third satellite alternatives portfolio is called absolute return because its primary objective is to generate a return stream void of losses. Loss prevention is almost impossible to achieve, except by holding cash, because returns that are naturally positive over time carry with them market (beta) risks that can cause short term losses. This is true for all sources of beta, traditional and alternative.

Therefore, an absolute return portfolio draws almost exclusively from alpha-driven hedge fund strategies that have no or very small beta risk. Global macro, managed futures, and market neutral hedge fund strategies are examples of investments that have very limited market beta. Exhibit 6 provides Cliffwater's mix of strategies for an absolute return portfolio, which is void of the beta-driven alternative investments found in the earlier alternative portfolios.

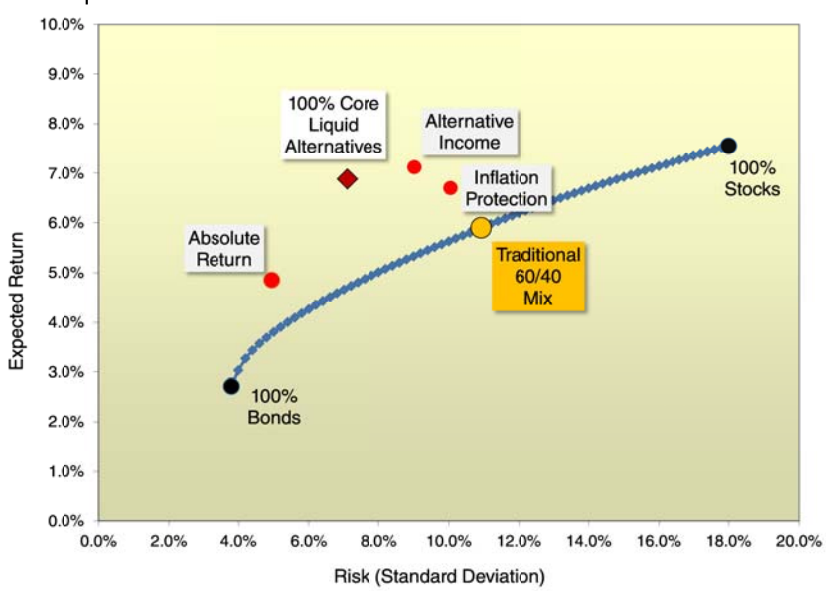
Exhibit 6: Cliffwater Absolute Return Portfolio



The designation "market neutral" means that the equity, credit, or event investment strategy explicitly balances long and short positions so that there is no net positive or negative exposure to the market. This style of management eliminates market risk, and consequently potential drawdowns, but also long term market returns. What remain are the alpha-driven returns produced by manager security selection and timing decisions.

Exhibit 7 expands on the return and risk graph in Exhibit 3 by adding the three satellite alternative portfolios.

Exhibit 7: Expected Portfolio Return and Risk for Core and Satellite Alternatives Portfolios



	Expected Return	Expected Risk	Return /Risk
60/40 Portfolio	5.90%	10.92%	0.54
Core Alternatives	6.88%	7.10%	0.97
100% Stocks	7.55%	18.00%	0.42
100% Bonds	2.40%	4.00%	0.60
Inflation Protection	6.70%	10.05%	0.67
Alternative Income	7.12%	9.03%	0.79
Absolute Return	4.85%	4.95%	0.98

Like the Core Alternatives portfolio, each of the satellite alternatives portfolios offers a better risk-adjusted return compared to any combination of stocks and bonds. Investors with individual preferences for income, inflation-protection, or safety, might consider combining the satellite absolute return, alternative income, or inflation-protection portfolios with the core alternatives portfolio for their alternatives allocation within their overall portfolio.

Conclusion

Investors have few good choices among traditional asset classes to diversify their stock and bond portfolios. Alternative investments, on the other hand, offer strong diversification potential, lowering risk measurably without sacrificing return.

However, selecting from the broad range of alternatives can be a challenge, even for the experienced investor. We recommend a multi-alternative, multi-manager approach that maximizes the diversification potential from the various alternative assets and strategies. We also recognize that investor preferences differ, and bespoke satellite alternatives portfolios, such as income-oriented or real asset, might be more appropriate alternative investments either alone or in conjunction with a core alternatives portfolio.

Stephen Nesbitt
CEO
Cliffwater LLC
snesbitt@cliffwater.com