



Alternative Investment Analyst Review

Editor's Letter: How to Evaluate the Performance of Alternative Assets

Hossein Kazemi

Alternative Premia, Alternative Price

Matthew Towsey, CAIA and Chris Walvoord, Aon Hewitt

What Rising Rates Mean for Hedge Fund Returns After Fees

Dan Covich, CAIA, Pavilion Alternatives Group

Private Equity: Manager Selection, Portfolio Construction, and Outperformance

Raymond Chan, Jeff Diehl, Miguel Gonzalo, and Tobias True, CAIA, Adam Street Partners

Asset Allocation in a Low Yield Environment

John Huss, Thomas Maloney, Zachary Mees, and Michael Mendelson, AQR Capital Management

Forecasting a Volatility Tsunami

Andrew Thrasher, Financial Enhancement Group

Alts Transparency: Finding the Right Balance

Paul Finlayson, Stuart Lawson, and Matt Smith, Northern Trust

Private Debt in an Institutional Portfolio

Sanjay Mistry and Tobias Ripka, Mercer Private Markets

De-Risking Concentrated Stock Positions

Tom Boczar and Nischal Pai, Intelligent Edge Advisors

The CAIA Endowment Investable Index

Hossein Kazemi, CAIA Association, and Kathryn Wilkens, CAIA, Pearl Quest

The MSCI Global Intel Report

Building Targeted Real Estate Portfolios,
MSCI Real Estate



Call for Articles

Article submissions for future issues of *Alternative Investment Analyst Review (AIAR)* are always welcome. Articles should cover a topic of interest to CAIA members and should be single-spaced. Additional information on submissions can be found at the end of this issue. Please e-mail your submission or any questions to:

AIAR@CAIA.org.

Chosen pieces will be featured in future issues of *AIAR*, archived on **CAIA.org**, and promoted throughout the CAIA community.

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:

1996-2017	Contemporaneous Exposures	
	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)	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
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)	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
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.

	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
Investment Class (1996-2017)				
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

	Annualized Mean (%)	Annualized Std Dev (%)	Adjusted Equity Exposure (Beta)	Adjusted Credit Exposure (Beta)
Investment Class (1996-2017)				
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 underperformed 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.

Hossein Kazemi

Editor

Table of Contents

Alternative Premia, Alternative Price 7

Matthew Towsey, CAIA and Chris Walvoord
Aon Hewitt

Alternative Risk Premia strategies have risen to prominence over the last few years, fueled by investors' desire for diversification and an advancing understanding over what should be categorized as alpha and beta. This paper makes the argument that these strategies can aid diversification within a portfolio and allow investors access to sources of return that are different from traditional equity and bonds, at a reasonable price point.

What Rising Rates Mean for Hedge Fund Returns After Fees 15

Dan Covich, CAIA
Pavilion Alternatives Group

Should interest rates begin to rise from historically low levels, it's paramount that investors understand the interaction of higher risk-free rates and performance fees on absolute return strategies. This paper explores that very relationship as hedge funds and active managers have the potential to capitalize on an environment of increased dispersion in global asset price movements.

Private Equity: Manager Selection, Portfolio Construction, and Outperformance 19

Raymond Chan, Jeff Diehl, Miguel Gonzalo, and Tobias True, CAIA
Adam Street Partners

As private equity has evolved as an asset class, investors have tried to determine the relationship between private equity, public equity, and leverage. A recent paper by L'Her et al. (2016) found that, in aggregate, private equity does not outperform its public market equivalent. In this paper, we examine several potential sources of private equity outperformance in order to determine private equity's potential to add value and produce risk adjusted returns.

Asset Allocation in a Low Yield Environment 27

John Huss, Thomas Maloney, Zachary Mees, and Michael Mendelson
AQR Capital Management

In 2016, bond yields fell to unprecedented low levels in major markets. This phenomenon challenged long-held assumptions about asset allocation. Many investors asked themselves whether holding very-low-yielding bonds was pointless, especially given expectations of future rises in yields. Does this exceptional environment demand exceptional action? We have long argued for strategic risk diversification across many return sources — including bonds — with, perhaps, modest tactical tilts. In this article we question the premises behind that preference in light of the current yield environment and conclude they are still sound.

Forecasting a Volatility Tsunami 38

Andrew Thrasher
Financial Enhancement Group

The empirical aim of this paper is motivated by the anecdotal belief among the professional and non-professional investment community, that a "low" reading in the CBOE Volatility Index (VIX) or large decline alone are ample reasons to believe that volatility will spike in the near future. While the Volatility Index can be a useful tool for investors and traders, it is often misinterpreted and poorly used. This paper will demonstrate that the dispersion of the Volatility Index acts as a better predictor of its future VIX spikes.

AIAR STAFF

Hossein Kazemi
Keith Black

Editors

Charles Alvarez
Content Director

Brittany Howard
Creative and Design

Nancy Perry
Publication Coordinator

CONTACT US

U.S.
+1 413 253 7373

Hong Kong
+852 3655 0568

Singapore
+65 6536 4241

Geneva
+41 (0)22 347 45 90

E-mail
aiar@caia.org

CAIA.org

FOLLOW US



Table of Contents

Alts Transparency: Finding the Right Balance 49

Paul Finlayson, Stuart Lawson, and Matt Smith

Northern Trust

Despite the dominance of transparency as a discussion topic over the last decade, market practices in alternative investing haven't changed as much as you might think. Even after the 2008 credit crisis illustrated the dangers of having large allocations to opaque, illiquid assets, the industry has struggled to reach accommodation on transparency. This paper focuses on why the lack of progress within this asset class and some approaches to potentially overcome this hurdle.

Private Debt in an Institutional Portfolio 55

Sanjay Mistry and Tobias Ripka

Mercer Private Markets

Over the last few years, institutional investors have been increasing allocations to return-seeking fixed income strategies and illiquid alternative assets. In doing so, the level of portfolio sophistication within both allocations has also been increasing and roles within the portfolio get more explicitly defined. This paper focuses on private debt; which as an asset class we believe is attractive on risk-adjusted grounds, which can play different roles in the portfolio context and directly plays into the financing void which has arisen post the global financial crisis.

De-Risking Concentrated Stock Positions 62

Tom Boczar and Nischal Pai

Intelligent Edge Advisors

Executives and employees of public companies often accumulate company stock over the course of their careers. As a result, they often find themselves owning or otherwise exposed to an amount of company stock that comprises the bulk of their net worth. Coupled with global stock markets hitting new peaks, interest rates ratcheting up, and risks seemingly lurking everywhere around the globe, prudence might suggest that investors should sell or otherwise divest of some or all of their highly appreciated shares. This paper explores a strategy that can add a desirable dimension to wealth planning and portfolio construction to investors with concentrated positions.

The CAIA Endowment Investable Index 76

Hossein Kazemi, *The CAIA Association*

and Kathryn Wilkens, *CAIA, Pearl Quest*

The MSCI Global Intel Report 79

Building Targeted Real Estate Portfolios

MSCI Real Estate



Alternative Premia, Alternative Price

Matthew Towsey, CAIA
Aon Hewitt

Chris Walvoord
Aon Hewitt

Key Points

- Alternative risk premia (ARP) consist of a range of strategies that offer a premium for either taking risks others do not wish to bear or for exploiting market anomalies.
- ARP have increased in popularity over the last few years with a spate of new product launches.
- ARP are a viable investment proposition for many investors, bringing diversification and added return potential to traditional portfolios.
- Not all implementations are created equal, and care must be taken when choosing a provider.
- We recommend investment in ARP products to those looking for alternative sources of return at reasonable fee levels.

Introduction

ARP strategies have risen to prominence over the last few years, fueled by investors' desire for diversification and an advancing understanding over what should be categorized as alpha and beta. We believe these strategies can aid diversification within a portfolio and allow investors access to sources of return that are different from traditional equity and bonds, at a reasonable price point.

In this paper we discuss:

- Evolution of ARP
- Defining ARP
- Overview of ARP strategies
- Role of ARP in portfolios

Evolution of ARP

The existence of the equity risk premium (excess return earned by investing in stocks above the risk-free rate) is widely accepted

by today's investor. Markowitz¹ was amongst the first to link investment return and risk and enabled the "risk premia" of different investments to be measured. This ability to measure the risk premia of different assets led to a realization amongst investors that not all investing was skill-based and there were gains to be generated by just investing in an index like the FTSE 100 or S&P 500. What had previously been thought of as alpha² was actually beta.³

As markets evolved, a plethora of indices sprung up across asset classes, allowing investors access to ever-more-exotic investment strategies with corresponding "exotic betas." During this period, we also witnessed the growth of the hedge fund industry, which usually charged both management and performance fees for what many claimed was alpha.⁴ These strategies promised and delivered outstanding returns through investing in an unconstrained manner across or within certain markets.

As hedge funds evolved, some market practitioners examined whether hedge fund strategies were in part also targeting risk premia and whether these could be extracted in a systematic manner. For example, was merger arbitrage a pure alpha strategy, or were the majority of the returns generated simply by taking deal risk? Perhaps returns could be generated by investing in all deals rather than trying to select the "best" ones. A few found success with this bottom-up approach, and the first ARP products were launched in the mid- to late 2000s with varying degrees of success.

At the same time as the first ARP products were appearing, a similar revolution was occurring in the equity long-only space. Here, "smart beta" or "factor-based investing"⁵ products were appearing that looked to capture the returns from well-known equity (and later fixed income) factors such as Value in a simple, transparent, rules-based manner. The main differences between smart beta and ARP are as follows:

1. Smart beta is concerned with long-only investing, whereas ARP are mainly implemented in a long/short manner.
2. Smart beta is concerned mainly with single-stock equity investing,⁶ whereas ARP strategies can be applied across all asset classes.

After the global financial crisis, interest in ARP generally fell away as equity markets surged. However, after the difficult markets

of 2011, interest in ARP was reignited and more ARP products came to market, at first launched by banks and soon after by asset managers. These offerings are generally characterized by lower fees than traditional hedge funds, exposure to a number of different risk premia, and high levels of transparency into the mechanics behind the various implementations.

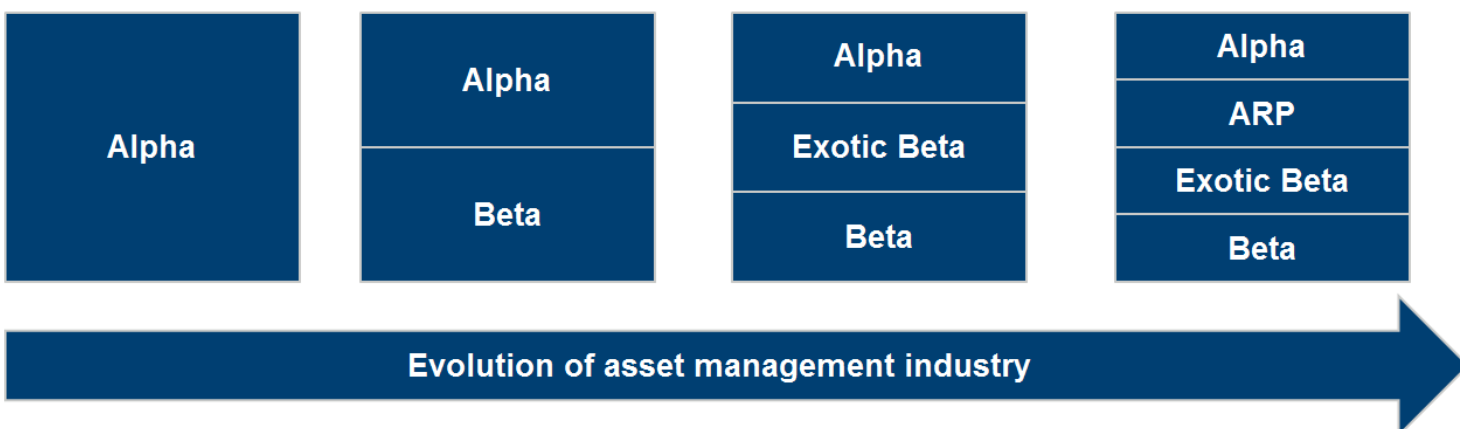
Defining ARP

There are a multitude of definitions of ARP. Broadly speaking, the definition breaks down as follows:

- The "alternative" part of the ARP definition can be thought of, in general terms, as an ability to go long or short and an ability to invest across asset classes.
- The term "risk premia" can be thought of in two ways:
 - First, as accepting a premium for taking on a risk that others do not wish to hold (i.e., providing insurance against tail risk to other market participants)
 - Second, other types of strategies better characterized as market anomalies⁷ than reward for bearing a well-defined risk

Let's delve further into the two ways to think of risk premia.

- **Providing insurance against tail risk:** An example would be a short volatility strategy, a simple expression of which would be selling straddles (appropriately hedged)⁸ on an index. In this case, the seller receives an option premium for bearing the risk of a large increase in volatility, which generally accompanies a large fall in the market. As with other forms of insurance, the strategies can be successful over the long term (which is why insurers exist!) but prone to large payouts when the insured event occurs (i.e. the market experiences a large fall).⁹
- **Market anomalies:** We believe the most obvious is momentum (or trend-following) across asset classes, which is included as a strategy in many risk premia products, but is not a reward for bearing a certain kind of risk and does not have a return distribution that is negatively skewed. There are several behavioral explanations as to why momentum, or trend-following is successful, and has proved to have been so over many years,¹⁰ but this strategy does not bear the hallmarks of



a risk premia strategy as just defined; it has a tendency to perform well in volatile periods and displays positive skew.

So there are two distinct explanations as to what qualifies as alternative risk premia. As a general rule, these strategies will also display the following characteristics:

- **Intuitive:** There must be a sound rationale as to why the premia exist. This can be a behavioral or economic explanation.
- **Well known:** There must be strong academic evidence of the existence of such premia and a conventional way of implementing them. However, some practitioners may employ a greater degree of sophistication than others.
- **Scalable:** The premia need to be sufficiently scalable and liquid so that they are a viable trading strategy and would not disappear due to trading costs.
- **Value add:** The premia need to have a positive expected return over time.
- **Persistent:** The premia need to demonstrate persistence over time and the ability to potentially persist in the future.

In the general lexicon, ARP strategies have come to mean strategies that display most, if not all of the five qualities above, whether they are a market anomaly or a reward for bearing risk. ARP products normally contain both types of investment opportunities—providing insurance and exploiting market anomalies. The reason for this is that the return profile of some market anomalies sits nicely alongside that of certain insurance premia, meaning a combination of the two can be a compelling proposition.

Overview of ARP Strategies

There have been a large number of product launches in this space over the last couple of years. These range from a customized approach, where an asset manager or bank will offer a menu of up to 100 risk premia to choose from, to products that feature five or more premia in a traditional fund format, where sizing of the individual premium is included as part of the package. Although there are a bewildering number of ARP strategies available, they generally fall into four buckets:

- Momentum
- Value
- Carry
- Other

The first three buckets can generally be applied across equities, fixed income, commodities, and currencies whilst the fourth generally encompasses risk premia strategies that are difficult to generalize and in some cases are asset class-specific. Examples of all can be found in the academic literature; however, in many cases the “devil is in the details” in terms of implementation. Most of the strategies would be executed through equities, futures and forwards.

Momentum¹¹

As an ARP strategy, momentum comes in two forms: time series and cross sectional. Time series momentum is commonly referred to as trend following, which is a strategy widely used within managed futures. This exploits the well-known anomaly that markets tend to trend. The second type, cross-sectional, looks at relative performance within an asset class, rather than absolute performance across asset classes.^{12,13} A number of behavioral explanations have been posited for why the momentum phenomenon exists, based mostly on investor under and overreaction, such as investors underreacting to short-term news and overreacting to long-term news.^{14,15}

Value¹⁶

Value strategies look to buy cheap assets and sell expensive assets. The origins of value investing date back to the early 1930s and are based on the work of Benjamin Graham and David Dodd, who noticed that after the Great Depression, many stocks seemed cheap compared to book value and created a strategy that looked to buy “cheap” stocks that displayed certain characteristics. Such a strategy proved successful, with Warren Buffett being a well-known advocate of such an approach. The value phenomenon has since been expanded to encompass other asset classes¹⁷—for example, in bonds an investor could go long bonds with the highest real yield (ex-ante cheap) and short bonds with the lowest real yield (ex-ante expensive).

Carry¹⁸

Carry strategies involve the search for yield and favor investing in high-yielding assets over low yielding assets regardless of valuations. Carry is the return derived merely from holding an asset, independent of any price movements, and is most well-known as a strategy exploited in currency markets, where investors buy high-yielding currencies or currencies that have high nominal interest rates and borrow in lower-yielding currencies. However, the strategy can be extended to other asset classes—for example, dividends could represent carry within stocks and the slope of the yield curve within fixed income.

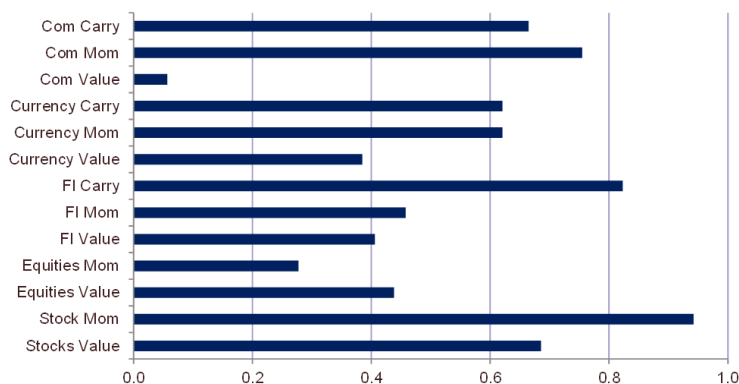
Other

There are a large number of potential risk premia strategies not covered by the first three categories. One example would be the short volatility strategy mentioned above, which could be extended across asset classes. There are also risk premia styles such as quality and size, which are long/short implementations of “smart beta” factors.

How Have the Various Strategies Performed

Most ARP products have quite short track records, as this is an investment style that has established itself only recently. As such, we use backtests for any meaningful performance analysis, with all the caveats that entails.¹⁹ As these strategies can be scaled up or down relatively easily (subject to capacity constraints) to meet a range of risk and return combinations, it appears more useful to examine the ratio of risk to return rather than the absolute level of return. Hence, the Sharpe ratio is used rather than nominal risk and return metrics.

Sharpe Ratios of Various ARP



Source: AQR, Aon Hewitt

Note: "Com" is short for "commodities." "Mom" is short for "momentum." Stocks represent single-name strategies whilst equities represent equity indices. Momentum represents cross-sectional rather than time series momentum.

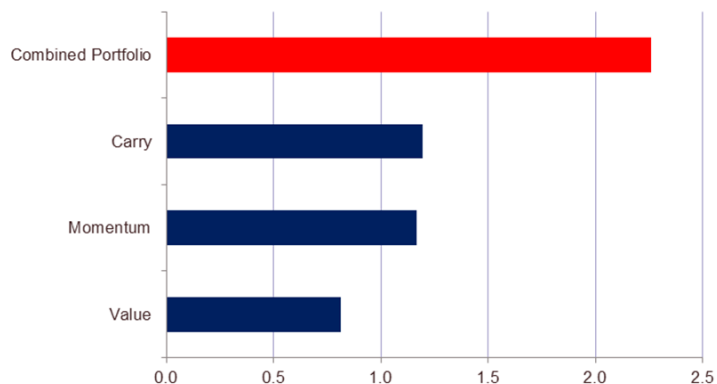
Strategy Sharpe Ratios

As can be seen from the above, individual Sharpe ratios of the strategies are positive for the period under review, spanning 26 years, ranging from 0.1 to more than 0.9. Some have achieved better risk-adjusted returns than others, but all of the strategies have added value over long periods of time.

Although strategies like those above are available on a stand-alone basis, increasingly asset managers are approaching the market with strategies that combine a number of the above premia in a single product. The main reason for this is the power of diversification at the ARP level, combining a number of strategies with low correlation, and a positive Sharpe ratio can create a portfolio with a much higher Sharpe ratio. The lower the correlation, the greater the increase in Sharpe ratio (all else being equal).

We can see from the below that the correlation between individual substrategies is low. In fact, the average pairwise correlation stands at 0.14. This means that creating a portfolio of these strategies should produce much higher risk-adjusted returns than individually allocating to any single strategy.²⁰ This is in fact what we find. Finally, we can take this one step further and create a portfolio that is diversified across asset classes and different premia.²¹

Sharpe Ratios of Various ARP Strategies and Portfolios



Source: AQR, Aon Hewitt

Here we can see how the combined portfolio had a much higher Sharpe ratio than the single-strategy portfolios, which in themselves exhibited higher Sharpe ratios than the underlying ARP. We can also view this using simpler risk metrics:

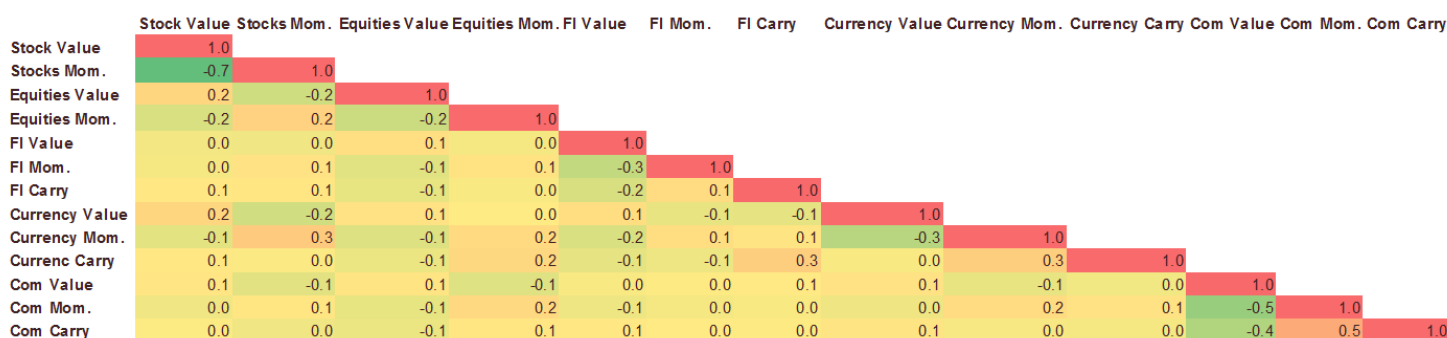
Annualised Excess Return (gross of fees and trading costs)	22.6%
Annualised Volatility	10.0%
Sharpe Ratio	2.3%

The simulation above does not account for trading costs, other fees (including management fees), market impact, and market constraints. However, if we put market constraints to one side (and there are managers running strategies such as those above with billions of dollars), we can have reasonably conservative estimates for both management fees (1% per annum ("p.a.") and trading costs (3% p.a.) for ARP strategies based on conversations with asset managers operating these types of strategies. Adjusting for these on a linear basis results in the following.

Annualised Excess Return (gross of fees and trading costs)	17.8%
Annualised Volatility	10.0%
Sharpe Ratio	1.8%

Although 'live' track records of these strategies are limited, there are reputable managers operating in this area with track records of one to five years. Realized Sharpe ratios have been between 0 and

Correlations period 1990 - March 2016



Source: AQR, Aon Hewitt

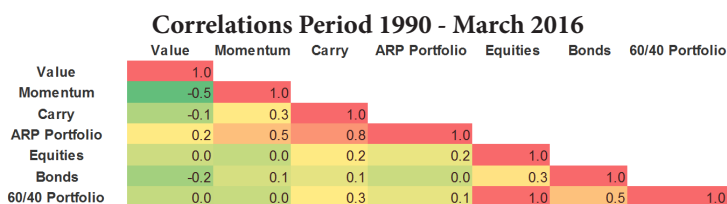
1.2 with annualized returns of 0% to 10% and realized annualized volatility of 5% to 10%. The difference between the simulation above and realized performance of managers could be attributed to real-life implementation constraints as well as uncertainty over historical costs/opportunities. Our view is that Sharpe ratios in the region of 0.5 – 1 are more realistic going forward than those in the historical backtests above.

Expected Excess Returns (net of estimated fees and trading costs)	3%-10%
Expected Volatility	6%-10%
Sharpe Ratio	0.5-1

Role of ARP in Portfolios

If the expected risk and return statistics are achieved by an ARP strategy, it would be a compelling addition to a traditional 60/40 portfolio,²² even with a moderate level of correlation. What we find is that the correlation of a traditional portfolio to the ARP portfolio described above is very low:

Taken together, the respectable expected returns of ARP portfolios coupled with the very low correlations to traditional allocations, you may conclude that the addition of such strategies could have an advantageous impact on a traditional portfolio:

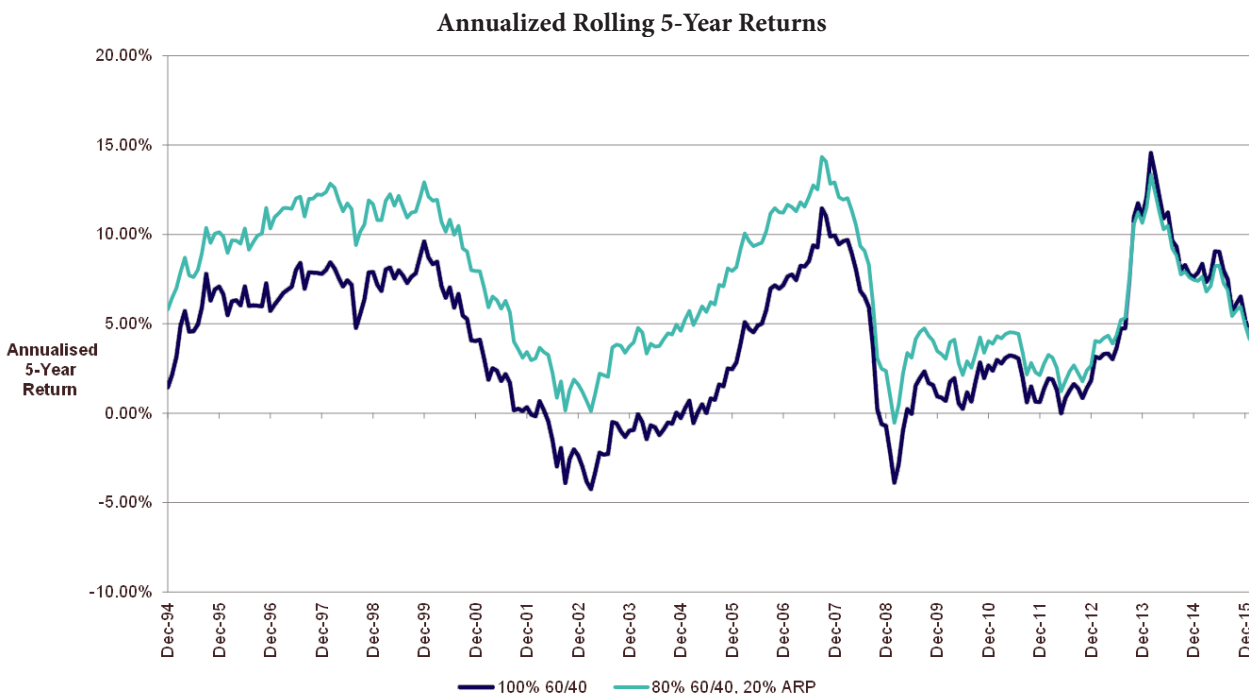


Source: AQR, Aon Hewitt

Although the below likely overestimates the improvement in outcome by utilizing ARP strategies, due to the inflated Sharpe Ratio, the low correlation of these strategies to traditional portfolios means that outcomes may still be significantly improved over many time frames using the more realistic expected risk and return metrics above (e.g. a Sharpe of 0.5-1).²³ It is interesting to note the convergence between the rolling five-year returns in recent times. We would attribute this to the solid performance from equity and bond markets that we have seen in recent years, which is unlikely to be sustained.

However, rather than just adding ARP strategies to traditional portfolios, we see a number of uses for these strategies:

1. For investors looking for diversification to traditional assets at an attractive price point, ARP could be a relevant option, to be considered alongside multi-asset funds. This could include investors who have previously been put off by the higher fees charged by hedge funds.
2. For investors looking to build out a hedge fund allocation, the core building blocks could initially be ARP funds. These could be supplemented and replaced with hedge fund managers who generate alpha over time, or a long-term core/satellite approach could be adopted, with the addition of hedge funds that exploit opportunities not targeted by ARP strategies. It should be noted that the correlation between hedge funds and ARP portfolios is generally low, as hedge funds can generate alpha and may be targeting one or two specific approaches rather than the multi-strategy approach of a typical ARP portfolio.



Source: AQR, Aon Hewitt. The chart above is net of a presumed management fee of 1% per annum for the ARP portfolio and net of estimated trading costs of 3% per annum for the ARP portfolio. It assumes costless exposure to the index strategies. The estimated management fee is based on our conversations with asset managers as are estimated transaction costs. These have been applied linearly at the portfolio level rather than the underlying strategy level and assume the ability to scale up or down at zero cost. As such, they are merely indicative.

3. Larger investors may wish to consider a principal component analysis²⁴ of their existing portfolios to identify certain ARP that may be underrepresented, and allocate to the relevant single sleeves accordingly.

As for the number of ARP funds an investor may wish to allocate to, that will depend on individual circumstances. Due to the inherent diversification with the funds, an allocation to one fund may be sufficient and should contain the governance burden of adding managers to the portfolio. We believe two or three managers is likely to be the optimal allocation, as we expect a significant degree of dispersion within this space, and there are enough nuances in approach from different managers to warrant such an approach. Finally, in terms of how much of a portfolio should be allocated to such strategies that would again depend on individual circumstances and risk/return objectives. However, it should be enough to make a difference²⁵ and may potentially come from traditional assets for those clients who do not have many diversifiers — or it may come from hedge funds for those who wish to rationalize their exposure or replace some of their hedge funds with ARP funds.

Further Considerations

Not all providers are equally equipped to provide a diversified portfolio of risk premia. Some of the details we would consider when looking at these providers are listed below:

Trading is not trivial

Trading costs for these strategies can be significant, depending on a number of factors. First, the underlying instruments being traded; as a general rule, equity-based strategies will usually be more expensive than futures-based strategies. Costs may also depend on the sophistication of both the trading platform and the trading strategy. The trading platform of the manager is important as it needs to be set up to trade large volumes of different instruments at low costs. The sophistication of the trading strategy can also increase or decrease costs. For example, more regular rebalancing will potentially increase costs; however, it may also mean the strategy is at all times more focused on the specific risk premia it is trying to isolate. A trade-off needs to be made, and previous experience in this space can help the decision-making process.

Strategy smorgasbord

We have only scratched the surface of the available universe of specific ARP. There are many others, which raises the question of how many should be included in a portfolio. Theoretically, continuing to add ARP with low correlation and positive Sharpe ratios to each other in a portfolio should continue to increase the Sharpe ratio of that portfolio, up to a point. However, we prefer to see managers sticking to strategies where they have some experience, expanding the universe only when they have performed appropriate research and have developed a robust strategy. We would prefer managers to target a small number of ARP effectively rather than offer a whole suite of completely generic ARP.

Devil is in the details

There is no standard implementation of the ARP strategies discussed above. The choice of parameters is at the discretion of the provider. Hence, the same strategy can have wildly different

outcomes depending on the construction. Although at face value many of the ARP appear relatively simple, on closer inspection there are a large number of choices to make when implementing a specific strategy. These choices are not only about how to implement specific strategies, but also about how to combine these strategies. For this reason, careful review of strategies and the available offerings is helpful when considering an investment in ARP.

Out-of-sample performance is limited

Most of the providers of ARP have launched diversified products only within the last few years, hence out-of-sample performance is limited. We have observed wide-ranging performance with net realized Sharpe ratios over the last few years, generally anywhere from 0 to above 1 on products that target 5% to 10% volatility. We believe this is more realistic than the backtested Sharpe ratios achieved in the above analysis, but is still compelling.

Strategy crowding

As this area grows in popularity, we believe further assets will flow into these strategies—particularly if they perform well and more providers begin to offer products. There is a question as to whether the strategies will continue to work as effectively in such a scenario. This is outside the scope of this paper and is an issue that should be revisited as the market grows.

Fees

ARP are not classified as alpha strategies and because of this, fees are lower than standard hedge fund fees. Typically, the fees for an ARP product featuring multiple premia would be from 0.7% per annum to 1% per annum management fee and 0% to 10% performance fee, with target volatilities of 6% to 10%. Higher volatility targets will generally command higher fees with the price point similar to multi-asset strategies on a unit risk basis.

Conclusion

Alternative risk premia strategies have exploded in popularity over the last few years driven by an increasing understanding of the demarcation between alpha and beta, and the potential for these strategies to add diversification to traditional portfolios. We are of the view that these strategies can offer sources of return that are different to traditional equities and bonds, at a price point that is appealing compared to hedge funds and competitive compared to actively managed long only and multi asset-strategies. As with other actively managed strategies, care must be taken in the evaluation and selection of these products.

Although these strategies do not provide alpha in the traditional sense, they do provide alternative sources of return, many that are not present in traditional portfolios. There are large discrepancies in implementation and strategy construction, and existing experience and platforms in trading systematic strategies can be an advantage. Going forward, we would expect relatively high performance dispersion within this space, closer to that seen in hedge funds than other actively managed strategies due to large variance in skillsets. Thus, while there is the potential to add significant value, we believe manager selection is critical to successful investing in this area.

Endnotes

1. "Portfolio Selection," Harry Markowitz, *The Journal of Finance*, Vol. 7, No. 1 (1952).
2. Alpha is a term used to denote manager skill.
3. Beta is a term used to denote the return available from the market; e.g., an investment in an S&P 500 tracker would have a beta of roughly 1 to the S&P 500 index.
4. The hedge fund industry grew from an estimated \$39 billion in 1990 to an estimated \$3.0 trillion in December 2016 (HFR).
5. "10 Insights on Rules-Based and Factor Investing," Aon Hewitt (2015).
6. More recently, attempts have been made to adapt the smart beta framework to fixed income investing.
7. Capital Fund Management, in particular, uses the market anomaly/insurance for risk illustration of Risk Premia. See "Risk Premium Investing—A Tale of Two Tails," CFM, 2015.
8. A straddle is the sale/purchase of a put and a call of the same strike. Such a strategy is not affected by changes in the price level of the index but is exposed to a change in volatility of the index. A short volatility strategy is profitable over time because investors are willing to overpay for market insurance.
9. Such strategies can be described as negatively skewed—they make regular and consistent small gains but can suffer large losses. Past performance is no guarantee of future results.
10. "Two Centuries of Trend Following," Capital Fund Management (2015); "A Century of Evidence on Trend-Following Investing," AQR (2014).
11. "Time Series Momentum," Moskowitz et al. (2011).
12. "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," Jegadeesh and Titman (1993).
13. For time series momentum, a security's own past return predicts its future return. For cross sectional momentum, a security's outperformance relative to peers predicts future relative outperformance ("Time Series Momentum," Moskowitz, Ooi and Pedersen (2010)).
14. "A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets," Hong and Stein (1999).
15. "The Disposition Effect and Underreaction to News," Frazzini (2006).
16. "Security Analysis," Graham and Dodd, 1934.
17. "Value and Momentum Everywhere," Asness, Moskowitz, and Pedersen (2013).
18. "Carry," Kojien et al. (2015).
19. The data for the following charts has been sourced from AQR, which manages a number of products within this space. The strategies shown do not represent all of the strategies that AQR manages. All data is shown from January 1990 through March 2016 except for FI Carry, Momentum, and Value, which is from February 1990 and Commodity Value, Momentum, and Carry, which is from May 1990. Momentum represents cross-sectional momentum strategies. All data presented is gross of fees and gross of trading costs. Any returns shown are excess of cash. Volatility has been normalised to 10% per annum for all strategies and combinations of strategies. Returns shown are a backtest and do not represent returns realised by any investor.
20. Taking this one step further, if strategies have a zero correlation to each other, the Sharpe ratio of a portfolio of such strategies will increase by the square root of the number of such strategies added. However, very few strategies are completely orthogonal to each other. See also Correlation and portfolio construction, Metolius Capital, 2013.
21. In this case, we will follow a naïve allocation of 33% to Carry, 33% to Momentum, and 33% to Value resulting in a portfolio of 13 different ARP. Carry, Momentum, and Value portfolios are equally weighted allocations to the relevant strategies above, rebalanced monthly.
22. The "traditional portfolio" is a 60/40 mix of equities and bonds, with equities represented by the MSCI World Index and bonds by the Barclays Global Aggregate Bond Index.
23. For reference, the 60/40 portfolio has a Sharpe ratio of approximately 0.4 over the period.
24. A principal component analysis will decompose the portfolio into the main set of factors that are driving its returns.
25. "Go Big or Go Home: A Case for an Evolution in Risk Taking," Mike Sebastian/Aon Hewitt, June 2012.

Author Bio



Matthew Towsey, CAIA, FCA, ACA
Aon Hewitt

Matthew serves as a Principal within Liquid Alternatives Manager Research at Aon Hewitt and is based in London. His research is focused on global macro, managed futures and other quantitative managers. His role includes sourcing, evaluating, conducting due diligence, and monitoring hedge funds on a global basis. Additionally he is involved in educating clients on various hedge fund strategies and implementing hedge funds within a wider portfolio.

Matthew joined in May 2011 from Fitzwilliam Asset Management, where he was a member of the Investment Committee running multi-strategy and commodity fund of hedge funds. Prior to that he was an Audit Supervisor at BDO, a large professional services firm. His role involved overseeing the audits of, and providing advice to, large to mid-sized companies in the property, mining and professional services arena.

Matthew graduated from University College London in 2001 with a first in Economics and Philosophy. He is a CAIA charterholder, an ACA charterholder and a Fellow of the ICAEW.



Chris Walvoord
Aon Hewitt

Chris leads Aon Hewitt's Global Liquid Alternatives Team within Global Investment Management. He oversees research and investment activities across a variety of liquid alternative strategies. His group is responsible for researching, recommending and monitoring managers for both advisory and delegated client portfolios.

Prior to joining AHIC in 2016, Chris was a portfolio manager and a member of the investment committee at William Blair. Chris was the lead PM for the custom hedge fund business at Blair which managed client specific portfolios for large institutional clients

William Blair entered the fund of hedge funds business by acquiring Guidance Capital, a fund of hedge funds firm founded in 2001, where Chris was one of five equity partners.

Prior to joining Guidance Capital, Chris managed an unconstrained bond strategy at the Northern Trust. Chris began his investment career in the Capital Markets Strategies Group at Nuveen. Prior to Nuveen Chris worked as an engineer in Motorola's Automotive Electronics Group.

Chris earned an M.B.A. degree in finance from The University of Chicago Booth School of Business, an M.S in Mechanical Engineering from the University of California Berkeley and a B.S. in Mechanical Engineering from the University of Illinois.



What Rising Rates Mean for Hedge Fund Returns After Fees

Dan Covich, CAIA
Pavilion Alternatives Group

Introduction

As we continue to migrate towards a world of higher short-term interest rates, hedge funds and other active managers have the potential to capitalize on an environment of increased dispersion in global asset price movements. We have already seen hedge fund alpha begin to improve in certain areas, despite a record level of assets under management (“AUM”) in the hedge fund space.

Hedge fund fee structures, if not aligned properly, have the potential to prevent investors from fully benefiting from increased alpha. Informed investors are mindful of the fact that fee structures vary across hedge funds, and there is no one agreed-upon standard for properly aligning incentives between fund managers and fund investors. Investors who pay keen attention to the economics of varying fee structures and select their investments accordingly can improve their returns, being sure that any increases in alpha are more

equally shared with both the fund manager and the fund investor.

How do interest rates interact with these incentives? Some investors argue that in a low-interest rate environment, the low return expectations of hedge funds are due to the resulting lower rebate that fund managers earn when shorting securities. The argument goes like this: as rates increase, hedge funds will start to perform better as the short rebate that investors receive when shorting securities increases. This may be true on an absolute basis, but hedge funds typically charge performance fees on total returns, and thus on this rebate, which acts very much like a cash-like security. So, higher interest rates may actually make it harder for hedge funds to outperform liquid markets, unless alpha improves.

As interest rates begin to rise from historically low levels, we should understand how the interaction of higher risk free rates and performance fees on absolute returns can

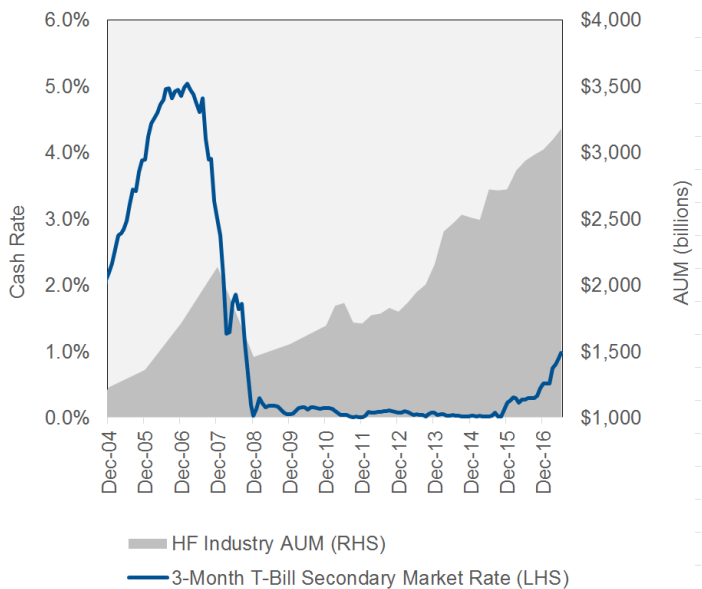


Exhibit 1: Cash Rates vs Hedge Fund Industry AUM (through Q2 2017)

Source: BarclayHedge, Federal Reserve

impact hedge fund performance, especially since AUM in the hedge fund space was 75% higher at the end of 2016 than it was a decade prior, a time when interest rates were substantially higher (see Exhibit 1).

Importance of cash yields

Hedge funds, like every investment, should be compared to a risk-free investment (e.g. “cash” or T-bills), since every investment should earn you this risk-free rate plus a risk premium. The return of a long/short equity hedge fund, for example, could be evaluated on an excess-of-cash basis. A market-neutral long/short equity fund that is 100% long SPY (S&P 500 ETF) and 100% short IVV (a different S&P 500 ETF) is remarkably similar to a cash investment: a cash-like rebate is earned on the short position, and the performance of the short position almost exactly offsets the performance of the long position. But most long/short equity managers charge a performance fee on the total return of the fund, usually 20%. In this example, the long/short equity fund is like a cash-yielding fund that only gives investors 80% of the cash yield and pays itself the other 20%.

This is not a big deal in a world of near-zero interest rates. However, it becomes a bigger deal as interest rates start to rise. The absolute returns of the short rebate will certainly go up, but a fund’s ability to outperform cash goes down on a net-of-fees basis.

Let us call this effect the “**performance fee drag from the cash rate.**” A hedge fund manager is no smarter because cash yields are higher, but can very well charge investors a higher fee for the higher returns that cash will provide.

Consider the following scenario: a portfolio manager takes an investor’s money, gives the investor the promise of steady returns, and charges a 20% fee on total performance (no management fee). Cash rates are 3% per year. At the end of the year, the manager earns 3%, charges a 20% performance fee (0.6%), and gives the investor 2.4%. The manager could say that it must have been smart, because the manager made the investor money, and thus the manager should get to keep some of that money. The investor

should say “Wait a minute. I could have put my money in cash and earned 3%, but you made me 2.4%. You underperformed.” To determine whether the manager’s fees were justified, the investor should look at the exposures the manager took in order to earn this return. Perhaps the manager put the investor’s money in cash in the first place, in which case the fees were clearly not justified (see Exhibit 2).

As cash rates increase, managers need to create more and more alpha in order to pay for the performance fee drag from the cash rate. While alpha may improve in the forward-looking environment, this performance fee arrangement shifts more of the alpha to the manager.

A more optimally-aligned fee model would require managers to outperform a cash hurdle before being paid performance fees. This would work well for market-neutral funds. For beta-oriented funds, a more optimally aligned fee model, would require managers to outperform a market-oriented benchmark before being paid performance fees (this is the case in the long-only space).

Beta-oriented funds and beta hurdles

The idea of market-oriented benchmarks for long-only funds is remarkably similar to the initial cash example. For long-only funds that charge performance fees, there is usually a market-based hurdle. Let’s consider a scenario where there are performance fees on all returns (see Exhibit 3 on the following page). For a long-only fund, a fund manager could take an investor’s money, charge a 10% performance fee, and invest it in the S&P 500. When the S&P goes up by 6%, the manager charges a 0.6% performance fee, and the investor receives 5.4%. By investing in the market, the manager knows that the portfolio is going to appreciate over time, even if the manager does not generate alpha. This is because the fund is earning a market risk premium. Yet, the manager still gets to charge investors 10% of that risk premium, regardless of the skill of the manager. In order for managers to outperform, they need to produce alpha that is 10% of the market risk premium and then some.

Consider a manager that earns +0.5% of alpha and generates a gross return of 6.5%. After fees, investors get 5.85%. Investors

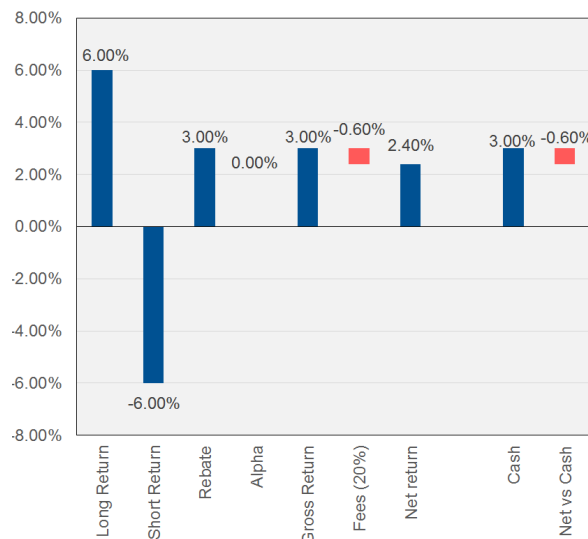


Exhibit 2: Market-neutral fund with no skill, low rates
Source: Pavilion Alternatives Group, LLC

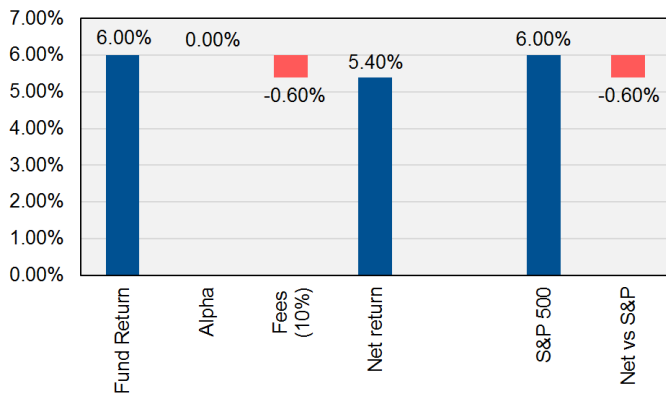


Exhibit 3: Equity fund with no skill vs S&P 500

Source: Pavilion Alternatives Group, LLC

should say to the manager “Wait a minute. I could have put my money in the S&P 500 and earned 6%, but you made me 5.85%. You were paid more than the value that was added.” (See Exhibit 4) The same rationale can be applied to the market-neutral hedge fund example with the exception that given the same level of skill, a manager that was outperforming cash net of fees in a low interest rate environment could eventually underperform cash. That is because the manager is being paid higher fees despite the same level of value added. The manager is better off, but the investor is worse off.

Funds that outperform in low-rate environments (20% performance fee)... (See Exhibit 5)....

generate higher fees as rates rise, and subsequently underperform, net of fees (see Exhibit 6):

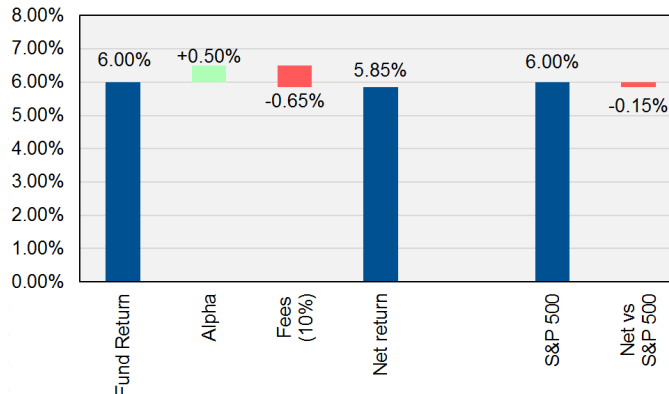


Exhibit 4: S&P fund with some skill vs S&P

Source: Pavilion Alternatives Group, LLC

There are a number of reasons why the traditional 2/20 fee model for hedge funds does not optimally align incentives with investors. There have been a number of attempts by industry professionals to solve some of these issues, such as including clawbacks to performance fees, the “1 or 30” framework, or reduced management fees. However, none of these address the economic giveaway that charging performance fees on beta (long-biased funds) or performance fees on cash (market-neutral funds) would create. In the recent environment, shifting to market-neutral strategies has reduced this giveaway, but the giveaway is poised to rise alongside cash rates. By implementing beta-oriented and/or cash hurdles, managers could be better aligned with investors. For example, if managers charged a higher performance fee of say 50% instead of 20% (not a current industry standard) over a cash-based hurdle, at minimum, investors could be better off (see Exhibit 7):

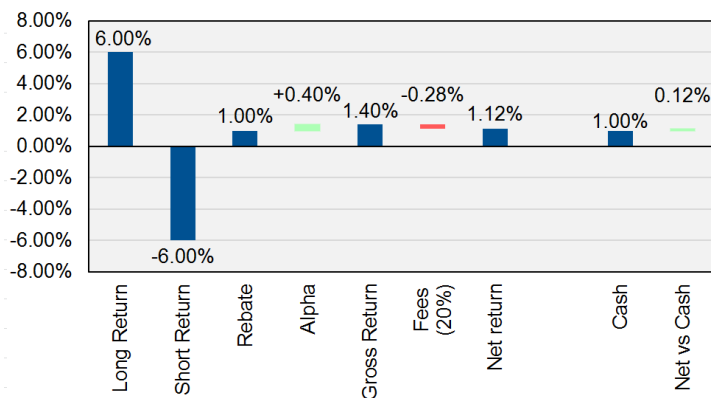


Exhibit 5: Market-neutral fund with some skill, low rates

Source: Pavilion Alternatives Group, LLC

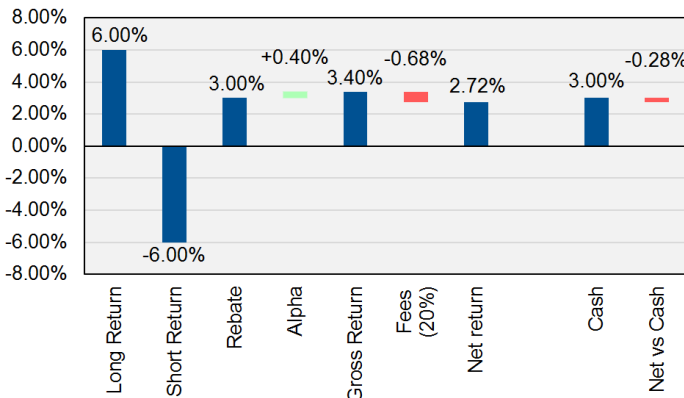


Exhibit 6: Market-neutral fund with some skill, high rates

Source: Pavilion Alternatives Group, LLC

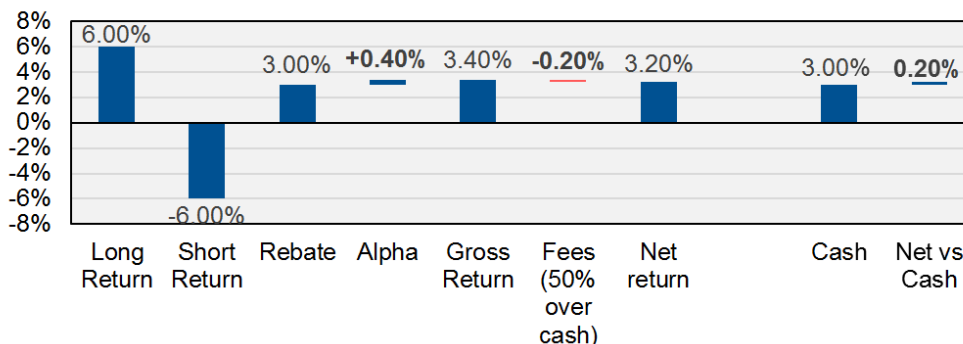


Exhibit 7: Market-neutral fund with some skill, high rates, cash hurdle

Source: Pavilion Alternatives Group, LLC

Conclusion

As interest rates begin to rise from historically low levels, investors should be cognizant that a performance fee on total performance creates a larger drag on a hedge fund's ability to outperform a mix of stocks and bonds that has similar exposures, risks, and objectives. This applies both to market-neutral funds as well as long biased funds. When calculating performance fees for managers, the argument for using a cash-oriented hurdle for hedge funds is a fundamentally similar argument to using a beta-oriented hurdle for long-only funds.

Investors should be mindful of the effect of the performance fee drag on cash rates when negotiating fees with managers, since the performance fee that managers charge on the rising risk-free portion of returns can be thought of as an increasing management fee. Doing so will allow investors to avoid a transfer of value from investors to investment managers in a rising rate environment, thus improving investors' ability to capture a larger share of excess returns. We do not think that this performance fee drag from cash is large enough to offset the potential increased alpha in the space, but implementing a cash-based hurdle would help maintain the economic split of excess returns between fund managers and investors.

Hedge funds have the potential to produce stronger returns in a rising rate environment, but investors who are keenly aware of the economics of underlying fee structures and their implications will be better able to select funds that share this outperformance more equally between fund managers and investors.

Author Bio



Dan Covich, CAIA, CFA, FRM
Pavilion Alternatives Group, LLC

Mr. Covich is an Associate Director on the Global Research and Analytics team at Pavilion Alternatives Group, LLC. He joined Pavilion in 2013 and has been in the financial services industry since 2006. Mr. Covich is responsible for assessing illiquid alternatives, private credit, hedge fund

strategies and investment opportunity sets for institutional clients through independent research, performance monitoring, and regular meetings and communications with portfolio managers and analysts. He is responsible for building and maintaining proprietary models across the research platform that calculate performance attribution for funds, monitor market and economic trends, and report on and optimize portfolios using risk, financial, and statistical measures. Prior to joining Pavilion, Mr. Covich worked as an investment strategist for the general account portfolios of the Allianz insurance companies in North America. Prior to this, he worked at Lehman Brothers and Barclays Capital as a portfolio analyst and risk consultant in the Index, Portfolio, and Risk Solutions team. Mr. Covich earned his B.S.B.A. in Finance and Accounting with a minor in Mathematics from Washington University in St. Louis.



Private Equity: Manager Selection, Portfolio Construction, and Outperformance

Raymond Chan
Adams Street Partners

Jeff Diehl
Adams Street Partners

Miguel Gonzalo
Adams Street Partners

Tobias True, CAIA
Adams Street Partners

For years as Private Equity (PE) has evolved as an asset class, investors have attempted to understand the relationship between private equity, public equity, and leverage. A skeptical view is that PE simply represents levered exposure to public equity, and that any outperformance relative to public markets is the result of additional risk that was taken in the form of leverage, size of underlying investments, liquidity, or something else. Most recently L'Her et al. (2016) found that when using a risk adjusted benchmark which represents the size, sector, and leverage of portfolio companies, in conjunction with using value-weighted (VW) returns, private equity does not outperform the public market equivalent in aggregate.

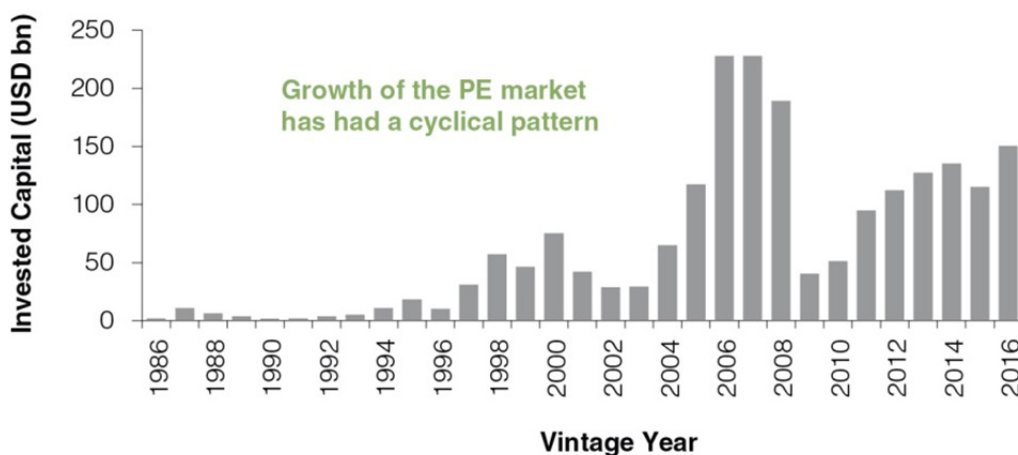
Despite the data limitations inherent in analyzing PE, the overall conclusion appears to be on point based on observation and intuition. For PE investors, simply buying “the market”¹ may not provide additional compensation beyond what is warranted by the risk that is

being taken. Despite the industry’s challenge in generating excess risk-adjusted returns, Adams Street Partners (ASP) believes that a manager can add value² to a PE program in a number of ways:

- Consistent capital deployment
- Successful manager selection
- Fundamental business and improvement in operations, as opposed to relying on the use of leverage or multiple expansion which are more subject to market temperament
- Portfolio diversification

This analysis will focus on the first three sources of added value. Portfolio diversification has been the subject of extensive work of ASP’s Advanced Analytics team and is dependent on the unique characteristics of an investment portfolio. It should be analyzed in a different framework and is a topic for separate analysis.

Exhibit 1: Total Invested Capital, Global Buyout Investments



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Consistent Capital Deployment

L'Her et al. cite the importance of using a value-weighted (VW) benchmark in order to most fairly measure the relative performance of PE. For the purpose of benchmarking this is no doubt the correct approach. The PE market (and segments within the PE market) is subject to fundraising and investment cycles which result in very different amounts of capital being raised every year. Years in which more capital is invested should carry more weight in a benchmark because they represent larger portions of the overall market.

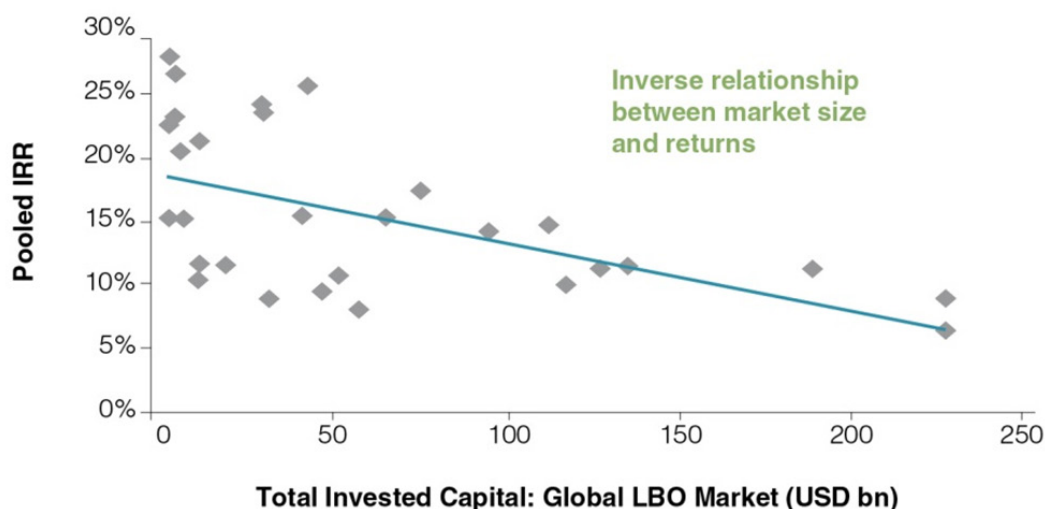
From an investment perspective, capital deployment that matches the overall level of fundraising in the market is a recipe for mediocrity at best, and regret in the worst case. Not only does this approach force returns to gravitate to the market, but it actually impedes performance on an absolute basis by leading to overinvestment during more competitive times. ASP has observed a consistent trend in which the amount of capital invested is inversely related to the returns that are ultimately generated.

The relationship is an intuitive result of the supply-demand dynamic within the universe of private equity investment opportunities. When more capital is being raised, deals are more competitive and close at higher valuations. This reduces the overall rate of return for investors. Additionally, PE fundraising cycles tend to follow credit cycles (see Exhibits 4 and 5 on the next page). Therefore, leverage is more predominant in years when more capital is raised and deals are more competitive, generally speaking. The implication is that investments at the top of the capital raising cycle probably come with more inherent risk in the form of leverage at the deal level.

An ideal strategy would be to only invest in the vintage years in which minimal capital is raised while avoiding the exuberant years altogether. However, this is not practical as the overall level of fundraising in the market is not predictable. PE investors require visibility for years in advance in order to best deploy capital.

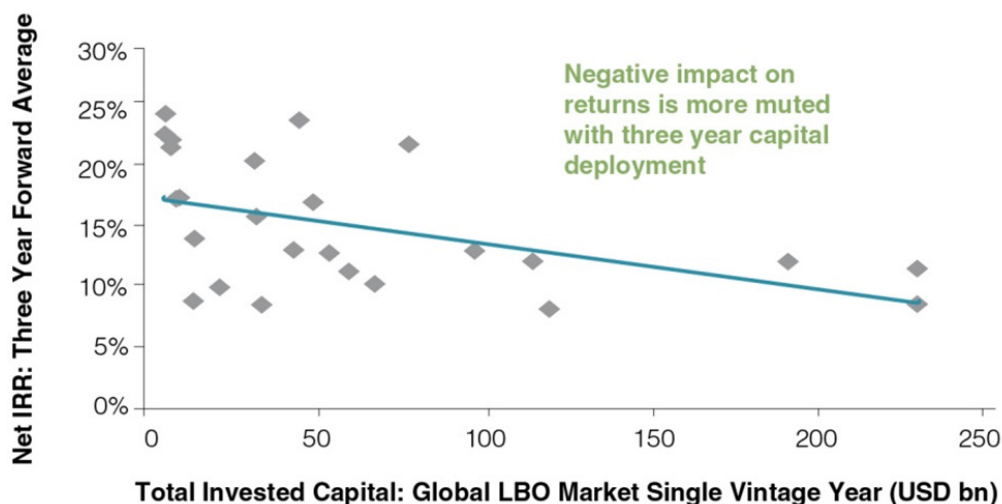
A more effective approach is to adopt a policy of consistent capital deployment across more than one vintage year. Consider a simple

Exhibit 2: Global Returns VS Invested Capital, by Vintage Year (1986-2014)



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 3: Global PE Three Year Average Returns VS Invested Capital, by Vintage Years (1988-2012)



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

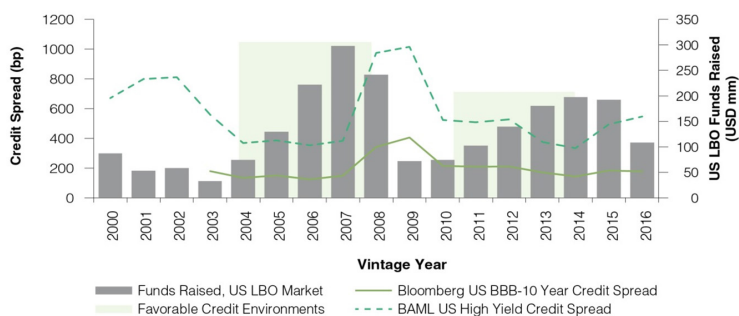
comparison of two investors, who invest the same amount of capital. One investor invests the full amount in a single vintage year while the other spreads out the investment over three vintage years. The historical returns that these investors would have generated are shown in Exhibits 6 and 7, respectively. The three year capital deployment strategy benefits from time diversification in that it delivers a similar average rate of return with a markedly lower dispersion of returns.

It should be noted that this investment policy may not be ideal for all investors, such as those with a greater risk appetite, other asset allocation considerations, or who intend to time the market for various reasons. But for ASP, and for other investors with a similar desire for generating consistent long term performance, disciplined capital deployment can be an important, persistent source of outperformance.

The same relationship is true on a public market-relative basis. Investor B realizes a similar average return relative to the MSCI ACWI, with outcomes that are less extreme:

In other words, investors should employ an equal weighted capital deployment plan while using a value weighted benchmark to fairly represent the performance of the market. For both practical and behavioral reasons, this is often easier said than done.

Exhibit 4: Fundraising Environment is Influenced by The State of The Credit Markets



Source: Pitchbook, Bloomberg, as of 12/31/2016

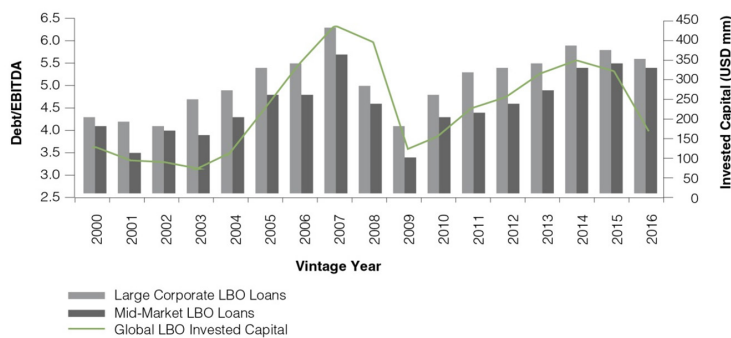
Manager Selection

Effective manager selection is important in any market, but this is especially true within the world of private equity where returns are disproportionately influenced by top tier funds. The impact of positive outliers causes the performance profile for the pool of all funds to have a positive skew. This is evident in the fact that the pooled mean return is typically higher than the median return (see Exhibit 8 on the next page).

Consequently, those investors who can at the margin identify a few more top performing funds while avoiding a few more bottom performing funds should generate a significantly stronger track record over time.

The second reason for the disproportionate impact of top performing funds is the illiquid nature of private equity. In contrast to most public markets, PE investors must commit capital to a closed end fund without the ability to efficiently buy or sell as the investment matures.⁴ In a public market setting, the ability of investors to move capital in and out as performance diverges tends to mitigate the distribution of returns relative to that of the

Exhibit 5: LBO Deal Leverage VS Fundraising



Source: S&P (Large Corporate LBO Loans and Mid-Market LBO Loans); Burgiss (Global LBO Invested Capital) as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 6: Single VS Three Year Capital Deployment Global Buyout Fund Investments

	Investor A: (Single Year Deployment)	Investor B: (Three Year Deployment)	Improvement
Min:	6.2%	8.3%	2.05%
Max:	27.7%	24.8%	-2.93%
Average:	15.4%	15.4%	-0.04%
St Dev:	6.3%	5.4%	-0.86%
Sharpe Ratio (rf=0%): [†]	2.45	2.82	0.38
Sharpe Ratio (rf=3%):	1.97	2.27	0.30

Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information. Data is from the vintage years 1986-2014. Standard Deviation and Sharpe Ratio were calculated based on the underlying data set from Burgiss.

[†]Sharpe Ratio is a commonly used metric which measures the excess return per unit of risk. In this case it is calculated as the ratio of Average IRR less the risk-free rate, divided by the standard deviation of returns.

Exhibit 7: K&S PME And Capital Deployment^{3‡}

	Investor A: (Single Year Deployment)	Investor B: (Three Year Deployment)	Investor C: (Five Year Deployment)
Average:	1.25	1.25	1.24
Worst:	1.01	1.04	1.06
Best:	1.61	1.53	1.47
St Dev:	0.18	0.15	0.14

Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information. K&S PME is for MCSI ACWI Total Returns Index.

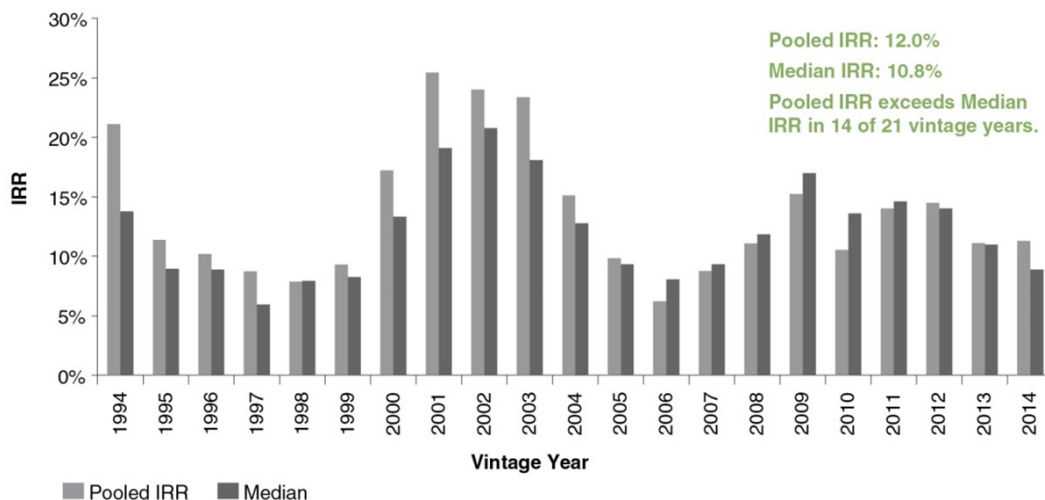
[‡]K&S PME represents the ratio of the future value of fund distributions and NAV, grown at the rate of return of the public market index, to the future value of fund capital calls grown at the same rate of return. Values greater than 1.0 indicate outperformance relative to the public market whereas values less than 1.0 indicate underperformance.

PE market, which has more distinct winners and losers at either extreme. This relationship of private markets featuring a greater dispersion of returns across managers relative to public markets was first recognized in David Swenson's book *Pioneering Portfolio Management* (2000), which cited the inter-quartile range of Buyouts to be more than four times the range for International Equity managers.

Considering the long time horizon of PE, the compounding effect of this return distribution is even more powerful. To illustrate this point, we compare the returns of two hypothetical investors who by definition are able to select managers of a certain quality level ahead of time.

An investor who was able to consistently select and access top quartile managers every year, from 1994 to 2014, would have compounded the initial investment by a factor of 140x. The importance of identifying top tier managers at the margin is shown by the outperformance of the pooled return versus the median return: an investor who earned the pooled IRR every year over this time period compounded wealth by a factor of 13x versus 10x for the median case (37% more wealth). In other words, a process of randomly selecting managers every year (assuming equal investment amounts) would have underperformed significantly.

Exhibit 8: K&S PME And Capital Deployment^{3‡}



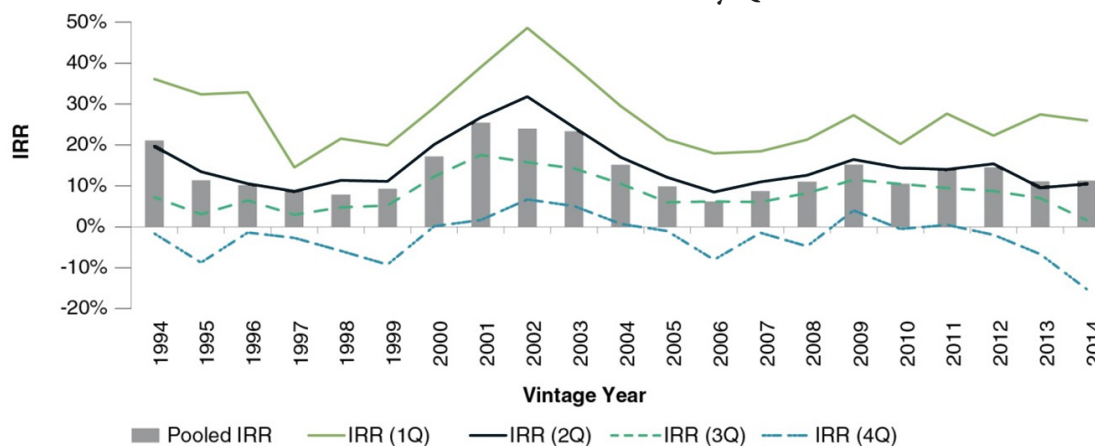
Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 9: Pooled IRR, Global LBO: Vintage Years 1987-2014

1st Quartile	2nd Quartile	Pooled IRR	3rd Quartile	4th Quartile
29.2%	14.1%	11.4%	7.4%	-3.9%

Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 10: Global LBO Returns by Quartile



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Of course it is not realistic for an investor to expect to consistently select managers in the top quartile every year, but this data illustrates the importance of being right more often than being wrong. The difference between delivering alpha versus simply "buying the market" comes from the ability to identify a few top performing funds and avoid a few bottom performing funds over time. In order to reap the benefits of effective manager selection in this regard, it is important that capital is deployed in consistent amounts across funds. Consistent allocation is a critical component of ASP's investment process.

This disparity in absolute returns is also true in terms of returns relative to public markets. Using the same set of global buyout funds from vintage years 1994-2014 (Exhibit 12), an investor who simply "bought the market" and earned the pooled rate of return for this set of funds would have outperformed the MSCI ACWI by 13% on an IRR basis. L'Her and others would argue

that this outperformance was actually much lower if not zero after adjusting for risk.

It is worth noting that the average K&S PME's are higher than the pooled numbers, which further demonstrates the benefits to disciplined capital deployment.

Value Creation

L'Her et. al. cite leverage as a key factor explaining outperformance of PE versus public markets. Once leverage is accounted for by leveraging up the public index benchmark, the PE market is found to perform in-line with public markets of comparable risk. In other words, the PE market outperforms on the aggregate because managers take additional risk in the form of leverage beyond what is represented in the public markets. While this finding is not surprising, like the other findings it reflects the PE market as a whole and suggests that investment selection is critical. Empirical

Exhibit 11: Wealth Index, Global LBO Fund Investments by Vintage Year (1994-2014)

1st Quartile Funds	2nd Quartile Funds	Pooled Return	Median Return	3rd Quartile Funds	4th Quartile Funds
151.6x	19.0x	14.3x	11.0x	5.3x	0.6x

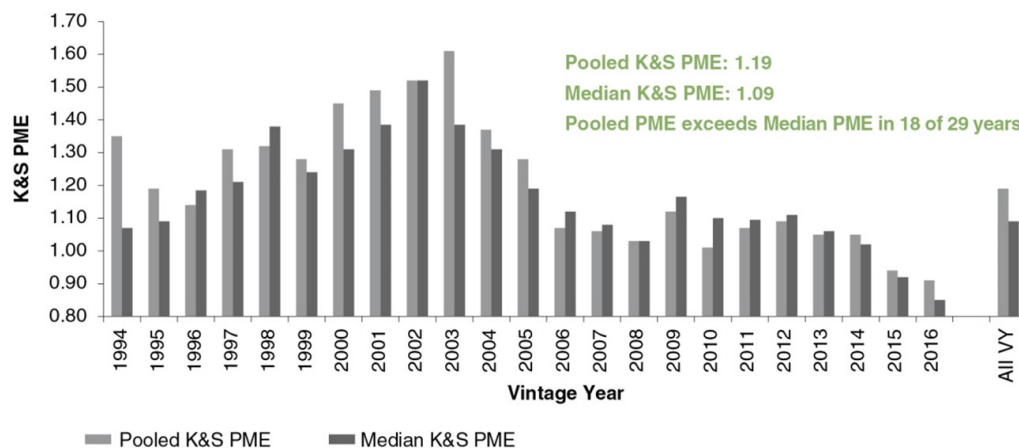
Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 12: Global LBO Fund: K&S PME (MSCI ACWI)

	Top Quartile Cutoff	Median	Bottom Quartile Cutoff
Average by VY	1.46	1.19	0.94
Pooled (1988-2014)	1.38	1.13	0.93

Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 13: Global LBO Funds Returns Relative to MSCI ACWI



Source: Burgiss, as of 12/31/2016. See "Notes to Performance: Burgiss Data" on page 25 for important information.

Exhibit 14: Net Debt/Enterprise Value⁶

ASP Portfolio All Time Periods (Pooled)	ASP Portfolio 12/31/2015 (Value Weighted)	ASP Portfolio 12/31/2015 (Equal Weighted)	L'Her et. al Market Estimate
0.44	0.38	0.31	0.55

Source: Adams Street Partners as of 12/31/2015

evidence shows that it is possible to outperform while using less leverage than the market. There are two underlying reasons.

First, value can be created through sources other than leverage. This includes improvement in fundamentals, such as revenue growth and margin improvements. Changing market conditions, reflected in changes of valuation multiples, are another driver of gains and losses. While leverage is important and useful, it introduces additional risk as well. Leverage can be a driver of excess returns when market conditions allow; however, reliance on leverage alone is not a sustainable investment strategy. This philosophy is evident in the leverage ratios of ASP's buyout fund portfolio⁵ relative to the estimate of market leverage from L'Her et al.

By using significantly less leverage than the market while continuing to outperform the PME over time, ASP has shown that sources of return other than leverage can deliver superior returns. In fact, it is possible that companies with dimmer prospects for value creation through fundamentals are inclined to have additional leverage. Thus the overall market leverage (estimated at 0.55) could be a reflection of managers leveraging up companies that would otherwise struggle to provide the required rate of return to investors.

A second reason behind the gap in performance between levered and unlevered returns identified in the paper is that leverage is probably a proxy for fund size. Overall, larger funds invest in larger companies and tend to use more leverage relative to smaller funds. This occurs for a number of reasons including differing company risk profiles and the availability of leverage for different borrowers, but ASP has found it to be true for the market as a whole. ASP's portfolio of buyout investments reflects this

phenomenon as well, as evident in the portfolio's smaller company size and lower degree of leverage.

In conclusion, ASP is in agreement with the data which suggests that investors cannot expect to outperform public markets, on a risk adjusted basis, by simply buying the PE market. Disciplined capital deployment, manager selection, and prudent use of leverage are necessary.

Endnotes

1. In the absence of a perfect market benchmark, we represent a strategy that buys "the market" as one which invests at random across the spectrum of possible PE investments, without any tactical element such as market timing, manager selection, or any investment constraints on strategy, geography, vintage years, etc.
2. Adams Street Partners defines "value" as outperforming public markets and improving investor utility.
3. K&S PME defined as: Kaplan & Schoar (2005), "Private Equity Performance: Returns, Persistence and Capital Flows."
4. A secondary market does exist but it is not always cost efficient for every investor.
5. Buyout investments only.
6. ASP data is drawn from ASP's Core Portfolios' primary investments in US and non-US private equity funds across various subclasses which include: venture capital, buyouts, mezzanine and special situation funds. Exhibit 14 show composite company-level data provided by the applicable underlying general partners. Data is subject to availability as reported by the general partners in response to ASP inquiries. The data presented here covers all

time periods, but predominantly represents 2013-2016 as a result of data availability. Data is not available for 100% of the portfolio, but does represent what ASP considers to be a meaningful and representative sample. “Core Portfolios” are funds and separate accounts (excluding special mandate funds and non-discretionary separate accounts) of which Adams Street Partners is the general partner, manager or investment adviser (as applicable) and for which Adams Street Partners makes discretionary investments in private equity funds. Core Portfolios include separate accounts no longer with Adams Street Partners.

References

Swensen, David F., *Pioneering Portfolio Management: An Unconventional Approach to Institutional Investment*. New York: Simon & Schuster, Inc, 2000. Print.

L’Her, Jean-François, et al., “A Bottom-Up Approach to the Risk-Adjusted Performance of the Buyout Fund Market.” *Financial Analysts Journal* Volume 72, Number 4 (2016). Print.

Kaplan, Steve and Schoar, Antoinette. “Private Equity Performance: Returns, Persistence and Capital Flows.” *Journal of Finance* 60 (August 2005). Print.

Notes to Performance: Burgiss data

The Burgiss data presented here includes a global set of funds which are invested on a primary basis in venture capital, buyout, and other strategies and excludes secondary investments. Numbers are subject to updates by Burgiss. Burgiss is a recognized source of private equity data, and the Burgiss Manager Universe includes funds representing the full range of private capital strategies; it may not include all private equity funds and may include some funds which have investment focuses that Adams Street Partners does not invest in. Calculations prepared by Adams Street Partners using Burgiss data, sourced on May 2017. IRRs are net of fees, carried interest and expenses paid by the funds.

Important Considerations

This summary information regarding Adams Street Partners (the “Summary”) has been provided to the recipient on a confidential and limited basis. This Summary is not investment advice or an offer or sale of any security or investment product or investment advice. Offerings are made only pursuant to a private offering memorandum containing important information. Statements in this Summary are made as of the date of this Summary unless stated otherwise, and there is no implication that the information contained herein is correct as of any time subsequent to such date. There can be no assurance that targets set forth in the Summary will be attained.

The recipient agrees not to copy, reproduce or distribute the Summary, in whole or in part, to any person or party (including any employee of the recipient other than an employee directly involved in monitoring or evaluating funds) without the prior written consent of Adams Street Partners.

Authors' Bios



Raymond Chan, CFA, FRM
Adams Street Partners

As a Partner and Head of Risk Management and Advanced Analytics, Ray is responsible for developing the advanced analytics and risk management framework and methodology utilized in Adams Street’s portfolio construction process to achieve successful risk/return outcomes for our

clients. In this capacity, Ray also oversees the Firm’s Performance Reporting function.

Prior to joining Adams Street Partners, Ray served as the Managing Director/Head of Investment Capabilities at UBS Global Asset Management. In his eleven-year tenure with UBS, he was responsible for managing a global team that was involved with the research, design and implementation of quantitative and technological solutions that support asset allocation and risk analysis portfolio decision processes.

Ray is a member of the GIPS Private Equity Working Group of the CFA Institute, which reviews and makes recommendations concerning standards for reporting performance in the private equity asset class. He is also a Director and Research Council member for the Institute for Private Capital (IPC) at UNC Kenan-Flagler Business School.

Ray is a member of the Adams Street Partners Operating Committee and the Portfolio Construction Committee, the CFA Institute, the CFA Society of Chicago and the Global Association of Risk Professionals.



Jeffrey Diehl
Adams Street Partners

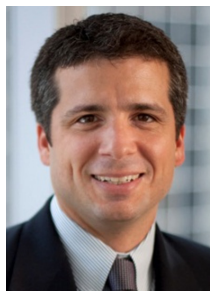
Jeff is the Managing Partner and Head of Investments at Adams Street. He is responsible for each of Adams Street’s investment teams, including their processes and strategies. As a member of our Venture/Growth Team, Jeff invests in venture and growth-oriented companies in the software,

IT-enabled business services and consumer internet/media sectors.

Jeff serves on the Boards of Directors of Apto, BoomTown, cbanc Network, LogRhythm, Paylocity (NASDAQ: PCTY), Peerless Network, Q2ebanking (NYSE: QTWO) and Sympoz. He is a Board Observer at Dolex, SnagAJob and Spiceworks. His past investment include AMWINS (bought by New Mountain), Ancestry.com (NASDAQ: ACOM), CBeyond (NASDAQ: CBEY), Borderfree (NASDAQ: BRDR), Gevity HR (NASDAQ: GVHR), MagicJack (NASDAQ: CALL), MxLogic (bought by McAfee), Stratavia (bought by Hewlett-Packard), TrendKite, TurnKey, and TicketsNow (bought by Ticketmaster).

Before joining in 2000, Jeff served as a Principal for The Parthenon Group, a Boston-based strategy consulting and principal investing firm with Bain Consulting roots.

Jeff is the Chair of Adams Street Partner's Portfolio Construction Committee, a member of the firm's Executive Committee, and has served on the firm's Strategic Advisory Committee for the last six years.



Miguel Gonzalo, CFA
Adams Street Partners

As a Partner and Head of Investment Strategy, Miguel combines our bottom up investment research with top down forward-looking views in order to construct portfolios that meet our clients' objectives. Miguel collaborates with investors to formulate strategies that leverage Adams

Street Partners' global capabilities.

Miguel has worked closely with investors in the management of their portfolios, including the development and ongoing monitoring of their private equity programs since 2000. He is actively involved in the portfolio construction and ongoing monitoring of the various fund of funds programs and separate accounts. In addition, he maintains relationships with investment consultants to ensure continuity with client objectives.

Prior to joining the Private Equity Group in 2000, Miguel was Head of the Performance Analysis Group in the Asset Allocation/Currency Group of Brinson Partners where he oversaw the design and management of the Firm's performance attribution and analytics systems.

Miguel is a member of the Adams Street Partners Portfolio Construction Committee, the CFA Society of Chicago and the CFA Institute.



Tobias True, CAIA, CFA, FRM
Adams Street Partners

Toby is responsible for applying the Firm's advanced analytical capabilities to support activities related to performance attribution and portfolio risk management utilized in the firm's investor relations and investment processes.

Prior to joining Adams Street Partners, Toby served as a Vice President and Risk Specialist with MSCI Barra and as an Analyst with Bloomberg L.P. His experience includes working closely with clients to implement customized risk models and develop performance attribution analyses to enhance portfolio construction decisions.

Toby is a member of the Adams Street Partners Portfolio Construction Committee, the CFA Institute, the CFA Society of Chicago and the Global Association of Risk Professionals.



Asset Allocation in a Low Yield Environment

Michael Mendelson
AQR Capital Management

John Huss
AQR Capital Management

Thomas Maloney
AQR Capital Management

Zachary Mees
AQR Capital Management

Executive Summary

In 2016, bond yields fell to unprecedented low levels in major markets — below zero, in some cases. This phenomenon challenged long-held assumptions about asset allocation. Many investors asked themselves whether holding very-low-yielding bonds was pointless, especially given expectations of future rises in yields.

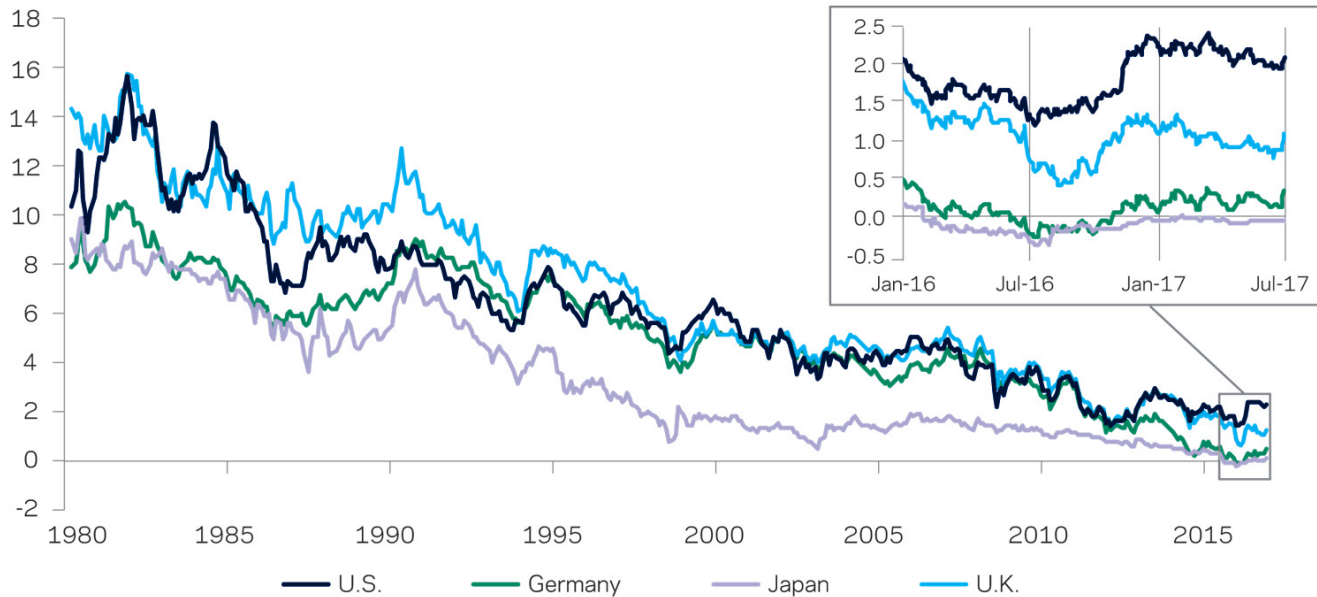
Does this exceptional environment demand exceptional action? We have long argued for strategic risk diversification across many return sources — including bonds — with, perhaps, modest tactical tilts. In this article we question the premises behind that preference in light of the current yield environment and find that they are still sound. Specifically, we argue that:

1. For asset allocation decisions, what matters is expected return *in excess of the investor's risk-free rate*, not expected total return. Expected total return

matters more broadly, of course, but asset allocation decisions only act directly on excess returns.

2. Mechanically and empirically, positive long term excess returns in bond markets are not generated by high (or low) yield levels but rather the average upward slope of yield curves.
3. Some measures of expected excess returns *are* low relative to history for bonds, as well as for equities. But tactical timing has an unimpressive track record, especially when based solely on valuation, and humility is therefore warranted in sizing tactical tilts. Even in a low yield environment, there are plausible scenarios where yields could go much lower.
4. While bonds should not be considered risk-reducing hedges, evidence does suggest they can remain useful

Exhibit 1: Nominal 10-Year Bond Yields for Four Developed Markets 1980-2017



Source: AQR, Bloomberg. For illustrative purposes only. Please read important disclosures at the end of this document.

diversifiers in many market environments. Investors should be cautious about forgoing potential diversification benefits, both within bond portfolios and across asset classes.

Unexplored Territory for Bond Yields

Nominal 10-year bond yields in a few major developed markets dropped below zero in 2016, though they have since rebounded slightly (see Exhibit 1). The events of 2016 contradicted a basic assumption about financial markets; in the past, most investors, including us, assumed the lower bound on nominal yields would be somewhere very close to zero. Very low interest rates raise important questions — for bond investors, but also for investors in equities and other assets. Are the near- zero or negative yields we observe just a short-term aberration? Do they imply that owning bonds, or at least some bonds, is pointless or a guaranteed loss? Can yields only go up from here or is it possible for yields to go even lower? In the following pages, we examine the implications of this peculiar situation for asset allocators.

Do Low Yields = Low Expected Returns for Bonds?

It's a common assumption that over a long period, a bond's yield is equal to its expected return. So, if yields are zero or less, the total return on bonds should be no better. Despite this being roughly true,¹ yield levels are astonishingly not as relevant for asset allocation as you might think! To demonstrate why, we first need to separate investment returns into two parts:

$$\text{Total Return} = \text{Risk-Free Rate} + \text{Excess Return}$$

The above formula is just a tautology, but it's crucial to understanding the implications of the current environment. The risk-free rate, as its name suggests, is what you get as basic compensation merely for *saving* (rather than *consuming*), but it does not include the return on taking risk. Excess return, on the other hand, is the return for taking the risk associated with

investing, and also potentially the return on investment insight or acumen. Since excess return is the only part of the equation which differs among assets, it is also the key consideration when allocating among them. The immediate implication is that, all else equal, if either the risk-free rate or excess returns are particularly low, then it's likely that the total return on the asset will be low as well. In a world of exceptionally low risk-free rates, whatever the return for risk-taking might be, the return for taking no risk (i.e., the return for saving) is so low that the sum of the two, the total return, is starting at a disadvantage. This applies equally to all investments, including equities.

One important note on the risk-free rate: investors can only earn the risk-free rate of their home currency. When investing in an asset denominated in a foreign currency, the investor either hedges the currency risk, thereby transparently earning interest at a rate close to their home currency risk-free rate, or the investor doesn't hedge and any increase (or decrease) in expected return is accompanied by currency risk (and thus not risk-free); either way, the investor's risk-free return is the same — it's the risk-free rate of their home currency.

Exhibit 2 on the next page shows headline 10-year yields for six major bond markets (dark blue) as well as the effective yield for a hedged U.S.-based investor (light blue). As you can see, the hedged U.S. investor's yield can be dramatically different from the yield earned by a local investor in each market. Indeed, for U.S., U.K., Canadian, or Australian investors, the effective yields earned on hedged 10-year bonds are clearly above zero for bonds from all G6 markets. Unfortunately, for investors domiciled in the Eurozone and Japan, expected total returns on global bonds are currently lower because euro and yen risk-free rates are lower. These investors need to start with lower total return expectations than their American or British peers because their risk-free rate is lower.

Exhibit 2: 10-Year Bond Yields for Six Developed Markets in a Hedged U.S. Investor's Portfolio



Source: AQR, Bloomberg. Yields as of December 31, 2016. Major government 10-year bond yields for G6 countries. The difference between hedged U.S. and local yields reflects the market implied short-term (3-month) interest rate differential between the U.S. dollar and the foreign currency, which is based largely on the difference in actual local risk-free rates, and also on relative supply and demand, deviating from covered interest rate parity. Deviations currently favor hedged U.S. investors and have in practice become more common since 2008, and may raise or lower currency-hedged yields, depending on the country. For illustrative purposes only. Please read important disclosures at the end of this document.

Exhibit 3: Average Yield vs. Average Subsequent 10-Year Stock and Bond Local Total Return

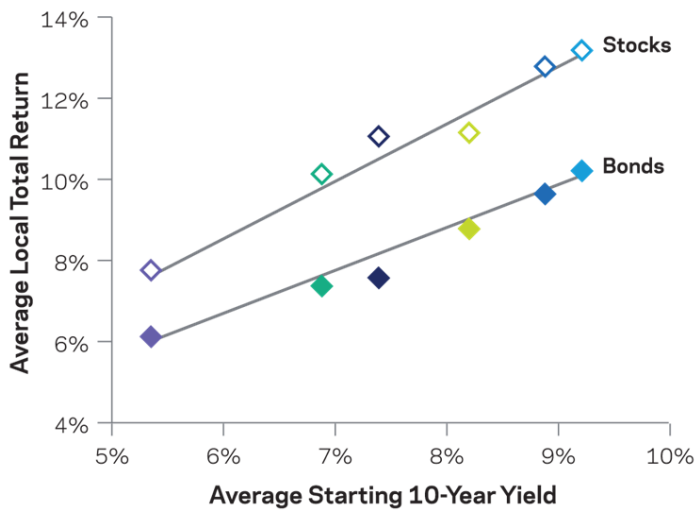
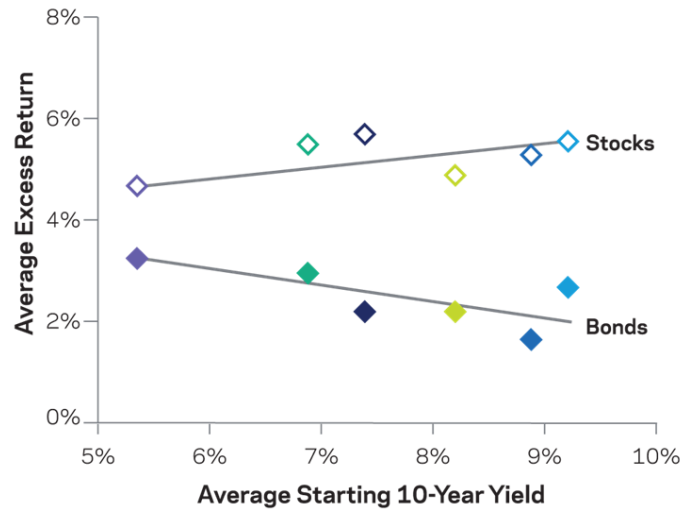


Exhibit 4: Average Yield vs. Average Subsequent 10-Year Stock and Bond Excess Return



Legend: Japan (purple diamond), Germany (green diamond), United States (dark blue diamond), Canada (yellow diamond), Australia (light blue diamond), United Kingdom (cyan diamond)

Source: AQR, Global Financial Data, DataStream, MSCI, Ibbotson, Bloomberg. January 1966 – December 2016. Government 10-year bond returns for G6 countries are defined as DataStream 10-Year Total Return indices and, prior to DataStream availability, Global Financial Data Total Return indices. Equity returns for G6 countries are defined as MSCI Total Return indices and, prior to MSCI availability, Global Financial Data Total Return indices, except for the U.S. which is defined as the S&P 500 Total Return and is sourced from Ibbotson prior to Bloomberg availability. Returns are excess of local currency Global Financial Data T-Bill Total Return indices. For illustrative purposes only. Please read important disclosures at the end of this document.

The Relationship between Yield Levels and Returns

In Exhibit 3 we use 50 years of data to compare the average level of 10-year bond yields to average subsequent 10-year stock and bond local total returns for six developed markets. We find a strong positive relationship.

This relationship is consistent with most investors' intuition, but interestingly it is the same for both stocks and bonds. Note also that these are the local total returns earned by six different investors each investing in their home country.

What about a single investor investing across all six markets? Excess return and the investor's own risk-free rate drive total returns in that case, since allocating to foreign markets does not, for better or worse, allow you to earn the risk-free return of those markets.² Furthermore, you can't do anything about your own risk-free rate; your investment decisions don't affect it, you just have to accept it. When we compare yield levels to subsequent excess returns across markets, we find a far weaker (actually non-existent or even backwards) relationship (Exhibit 4).

What is driving the difference between how excess returns and total returns are related to yield levels? The differences between the two figures are the differences in the average risk-free rates of these six markets. For instance, Japan has not only had the lowest average 10-year yield, but also the lowest risk-free rate. Over this 50-year period, a U.S. investor in Japanese bonds earned the U.S. risk-free rate plus the relatively healthy Japanese bond excess return, realizing a very different return outcome than a Japanese investor who earned the same excess return but a lower total return. This data reaffirms most investors' intuition that lower yields result in lower local total returns, and we also find the same is true for stocks. While it is nice to gain total return insight, when

that insight doesn't translate to excess returns, it isn't helpful in making asset allocation decisions, since asset allocation decisions affect only excess returns.

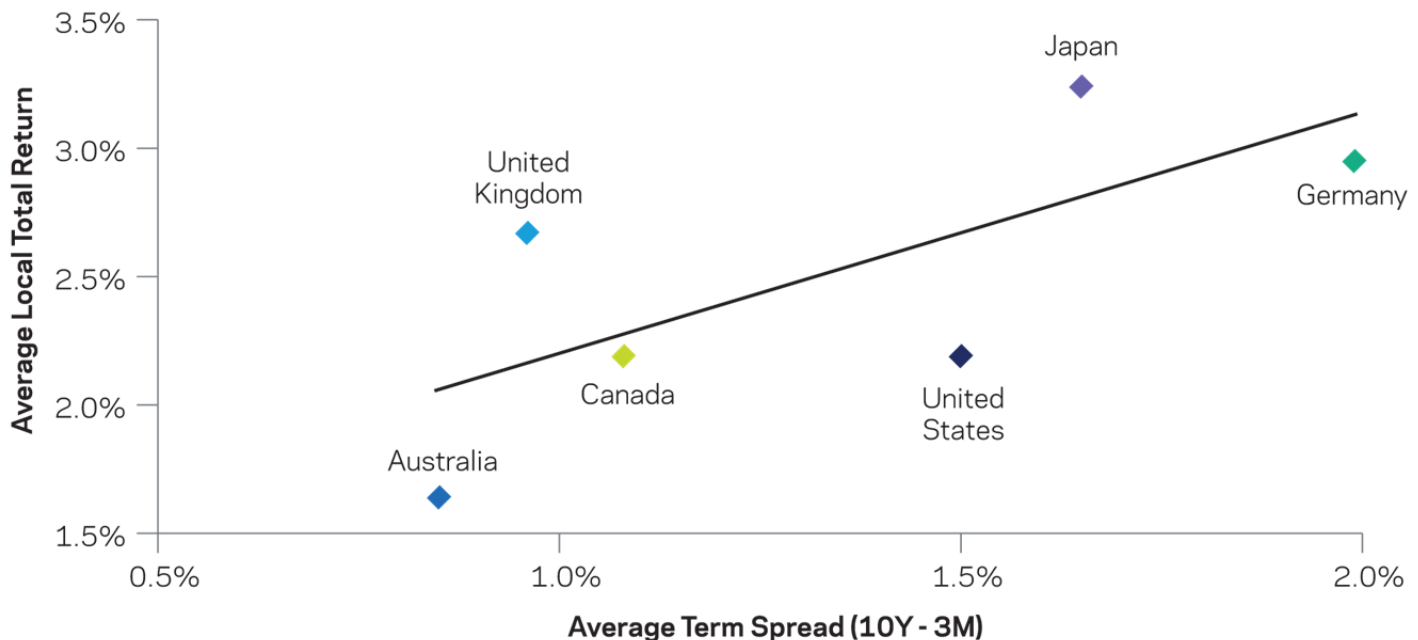
We've shown that markets with lower average yield levels have not delivered lower excess returns. It follows that recent low yields don't mechanically imply a low Sharpe ratio (and hence reduced allocation) for fixed income.³ But, if yield levels aren't the source of excess returns for bonds, what is?

The Term Premium as the Source of Excess Return

Bond excess returns are comprised of two parts: the term premium and capital gains/losses from unexpected changes in yields. The term premium is the excess return bond investors expect to earn for taking duration risk - that is for holding a long-term asset whose price can rise and fall with yield levels, rather than just buying a near-riskless asset like a 3-month Treasury bill.

The term premium itself has a (positive) average level but may also vary over time and across markets. How do we observe and measure the average term premium given its variation? We start by recognizing that the slope of the yield curve (difference between long-term and short-term yields) reflects some combination of the term premium and the expected future path of short rates. Over the long term, we expect changes in short rates to average out to zero.⁴ So our estimate of the long-term average term premium is just the long-term average slope of the yield curve. Exhibit 5 compares the average slope of the yield curve (10-year yield minus 3-month yield) to subsequent 10-year excess return on bonds across countries; we observe a strong positive relationship. In other words, bonds' positive long-term excess returns (their risk premium) originate from the average upward slope of yield curves, not the level of yields.

Exhibit 5: Average Yield Spread vs. Subsequent 10-Year Bond Excess Return



Source: AQR, Global Financial Data (GFD), DataStream, MSCI, Ibbotson, Bloomberg. January 1966 – December 2016. Average yield slope is the average monthly difference between local 10-year yields and local 3-month yields. See Exhibit 3 for additional source information. For illustrative purposes only. Please read important disclosures at the end of this document.

In the previous section we explained that there is no mechanical relationship that would cause low yield levels to impair bonds' ability to generate excess returns. Both our economic intuition and empirical studies imply that a structurally flat or inverted yield curve over the long term would reduce expected excess returns.

While the average slope of the yield curve explains average excess returns, year-on-year volatility is driven almost entirely by changes in the level of interest rates. Exhibit 6 shows the average level and time variation of these two components for U.S. Treasuries since 1954. Changes in yields have contributed almost nothing to average excess returns (as we would expect since these yield changes have averaged out to about zero), but they have driven almost all the volatility (blue bar).

Since we can identify the source of the long-term positive excess returns associated with the term premium, you might expect that we can easily identify and profit from its variation through time. Unfortunately, estimating the time-varying component of the term premium — the basis of a tactical view — is difficult, and any forecasting power is easily overwhelmed by unexpected changes in yields. In other words, timing bond markets is hard. But evidence suggests that the yield curve slope does have some ability to predict future excess returns. Notably, this simple measure of “carry” is more effective on paper as a tactical timing indicator than popular measures of valuation such as the real bond yield (the nominal yield minus expected inflation over the corresponding period).⁵

How Reliable Are Carry and Value Signals?

Exhibit 7 on the following page shows both measures for U.S. Treasuries since 1930. At the end of 2016, real bond yield (0.2%, 7th percentile) is near historical lows while slope (2.0%, 63rd

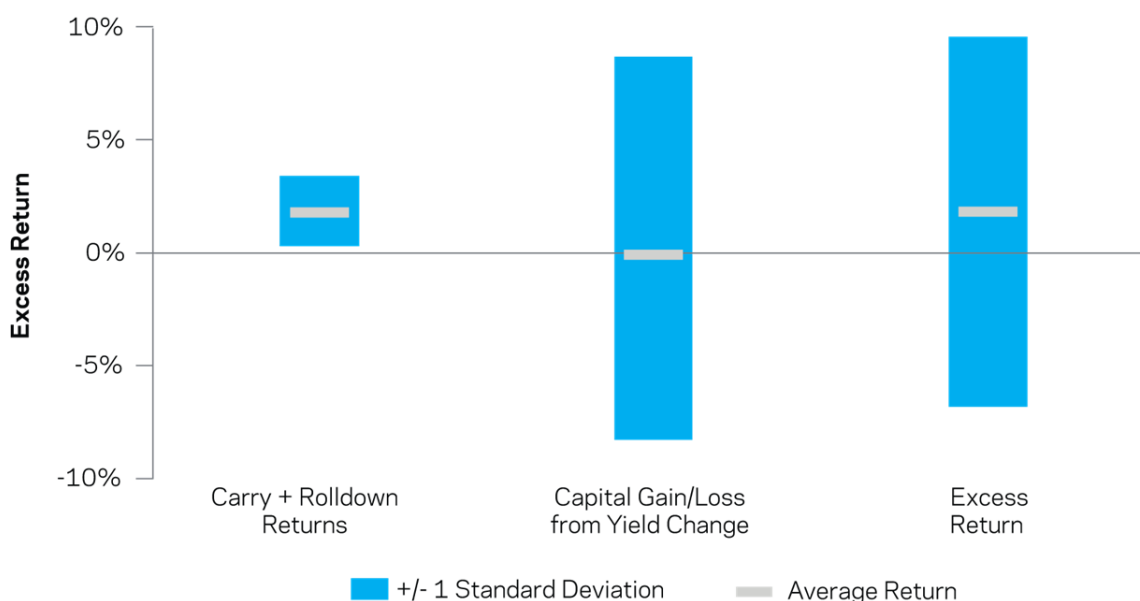
percentile) is above average. While “best guess” estimates of medium-term expected bond returns should account for both real yield levels and slope,⁶ Exhibit 7 shows that both indicators are fairly weakly related to subsequent near-term excess returns. Real bond yield levels that are high or low compared to their own history have often preceded the opposite return outcome, and an inverted yield curve (the most bearish carry signal) has often been followed by strong returns.

While a time series chart gives some historical perspective, it's hard to ascertain how much confidence we should have in these signals. To get a clearer picture, in Exhibits 8 and 9, both on the following page, we use box plots⁷ to compare the distribution of realized 1-year excess return outcomes for different quintiles of starting yield curve steepness and real bond yield. The full sample, denoted by the green box in both exhibits, shows that the majority of 1-year outcomes (the middle 80%) fall between -5% and +10% with an average annual excess return of about +2%.

When sorting return outcomes by the slope of the yield curve we do find that the average subsequent excess return increases with steepness, confirming our economic intuition. However, we also see that only the quintiles at the two extremes have averages meaningfully different from the full sample average. Furthermore, the majority of the realized outcomes across the quintiles (the blue boxes) fall in ranges which largely overlap across the quintiles. Even taking this historical study at face value (the many potential pitfalls of any study on trading signals being outside the scope of this paper), the results indicate that current yield curve slope may contain useful information on future excess returns, but uncertainty still dominates future outcomes.

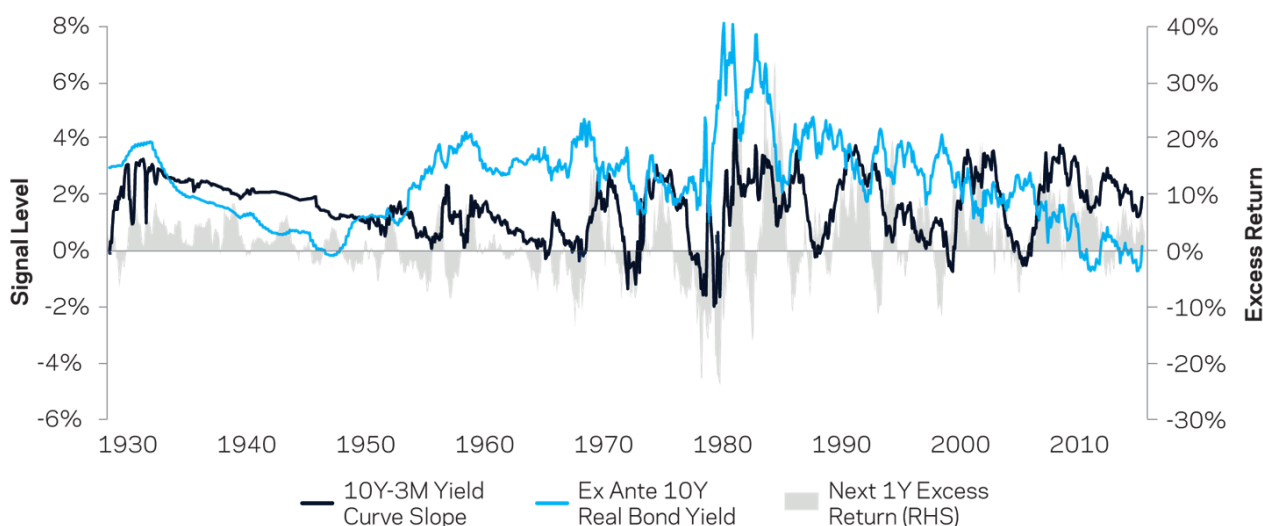
The story is similar when we sort return outcomes on starting real bond yield. On average, top quintile real yields have been

Exhibit 6: Decomposition of U.S. 10-Year Treasury Excess Return



Source: AQR, Bloomberg, Federal Reserve Economic Data. January 1954 – December 2016. Carry and rolldown returns are based on curve steepness and duration, capital gain/losses are based on changes in yields and average duration over the time period. The risk-free rate is assumed to be the U.S. 3-month T-Bill. For illustrative purposes only. Please read important disclosures at the end of this document.

Exhibit 7: U.S. Treasury Slope, Real Yield and Subsequent Excess Returns 1930 – 2016



Source: AQR, Bloomberg, Kozicki-Tinsley (2006), Federal Reserve Bank of Philadelphia, Blue Chip Economic Indicators, Consensus Economics. Real bond yield is 10-year real Treasury yield over 10-year inflation forecast as in *Expected Returns* (Ilmanen, 2011), with no rolldown added. Yield Curve Slope is 10-year Treasury yield minus 3-month Treasury bill yield. For illustrative purposes only. Please read important disclosures at the end of this document.

associated with higher one- year excess returns, though there is no discernable relationship across the other four quintiles. The overlapping range of realized outcomes across the quintiles again tells us that whatever the level of real yields, subsequent excess returns can vary greatly. Once again, the data makes only a modest case for using real yields as a signal for timing bonds.

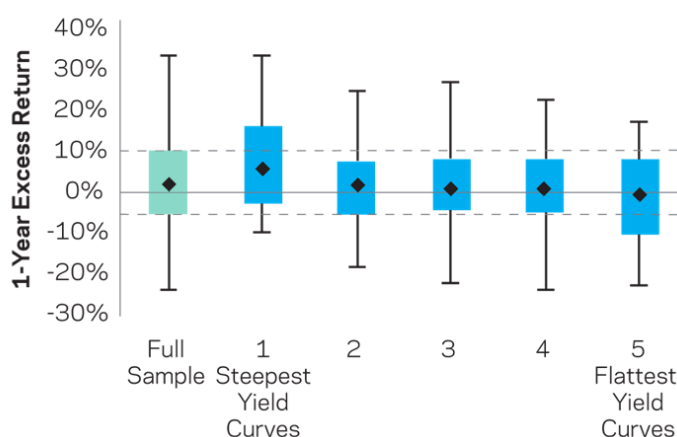
Of course, there are myriad potential market timing signals beyond curve slope or real bond yield (momentum being another well-known candidate),⁸ but our goal in this section was not to discredit or discourage all market timing strategies. Rather, we hoped to illustrate that humility has historically been warranted

when attempting to tactically time bond markets, even when including insights on the source of bonds' strategic returns. We ask in the next section whether the current environment is a special case that might warrant a more confident tactical view.

Tactical Views in the Current Environment: Can Yields Only Go Up?

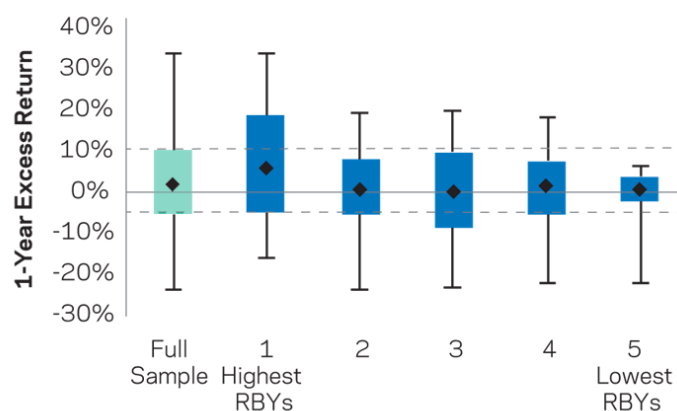
So far we've shown that nothing about the current yield environment contradicts the ability of bonds to continue to provide, on average, a risk premium (an excess return for taking risk). We've also documented the challenges of using estimates of

Exhibit 8: U.S. Treasury Excess Returns Sorted by Yield Curve Slope



◆ Average Excess Return ■ 10th to 90th Percentile | Range of Outcomes

Exhibit 9: U.S. Treasury Excess Returns Sorted by Real Bond Yield



Source: AQR, Bloomberg, Kozicki-Tinsley (2006), Federal Reserve Bank of Philadelphia, Blue Chip Economic Indicators, Consensus Economics. See Exhibit 7 for additional sourcing information. For illustrative purposes only. Please read important disclosures at the end of this document. For illustrative purposes only. Please read important disclosures at the end of this document.

a time-varying term premium to profitably time bond markets. But isn't the current environment a special case? If there is a lower bound on yields somewhere near zero, prices of the lowest-yielding bonds can only fall. Surely, then, a more aggressive underweight is called for? Over the last several years as central banks in many countries continued to push interest rates lower and lower, many (including us) thought that it was reasonable to assume that yields could not go negative. The obvious reason for this is that paper money would provide an arbitrage; everyone could just hold cash in physical form rather than electronically. However, what we and many others have come to realize is that this "arbitrage" isn't practical in the real world. The zero lower bound is challenged by storage issues, transportation and transactional difficulties, and the ability and willingness of authorities to exacerbate these. At least three countries (Sweden, Denmark and Switzerland) have been able keep their interest rates materially below zero, which has contributed at times to a large stock of bonds with negative yields. At this point, we don't know where the lower bound on rates is located.

Another perspective on our newfound uncertainty on the lower bound for interest rates is the amount central banks have historically had to cut them in order to combat recessions. In past recessions, when unhindered by proximity to a perceived lower bound, central banks have had to cut rates by an average of 5%⁹ in order to stabilize economic growth and inflation. With Federal Reserve policy rates expected to peak below 3%¹⁰ before the next easing cycle (and other central banks jealously eyeing such rates from below), it is quite possible that negative interest rates might be a feature of future central bank policy both in the U.S. and abroad in the event of an economic downturn (they would likely employ other stimulative tools as well).

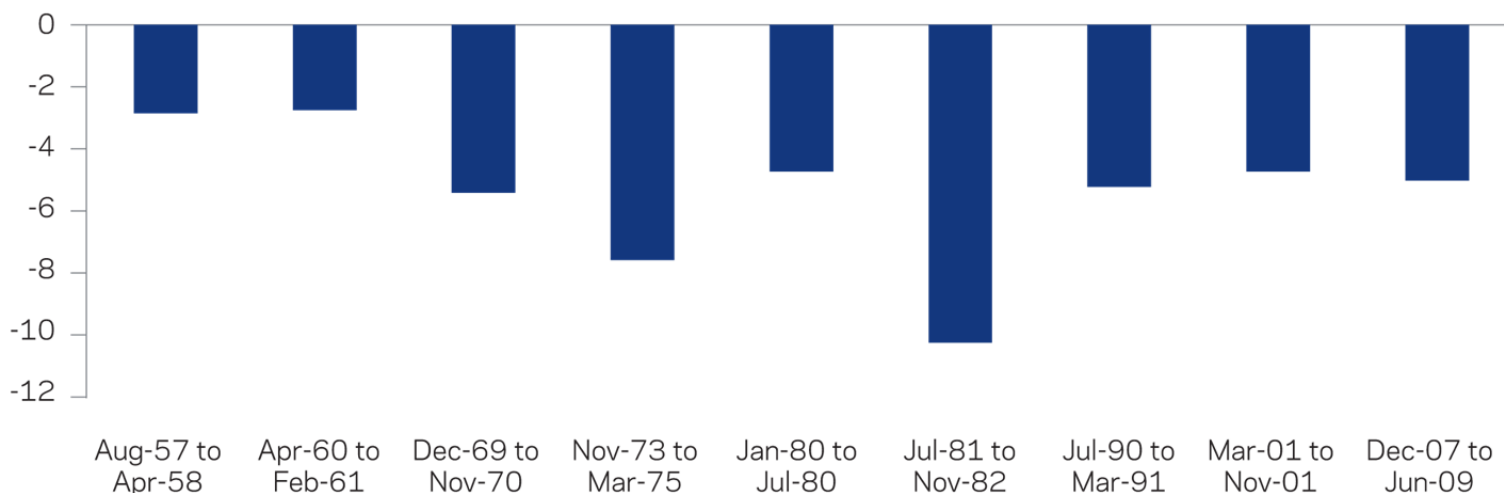
Depending on what economic scenario materializes in the coming years, we could see very different outcomes for yields. An improvement in labor markets and wages as central bank stimulus begins to work, or an increase in inflation as commodity prices recover, could lead to the higher yields many expect.¹¹ Alternatively, a movement towards recession or a continuation of below-trend growth and inflation across developed and emerging markets could keep yields low or even push them lower. In Exhibit 10, we observe that in each of the nine U.S. recessions since the data begins in 1954, the amount of easing required to stabilize the economy would result in a meaningfully negative fed funds rate in every instance, if begun from today's levels.

Note that we are not predicting a further significant fall in yields. We are simply acknowledging the possibility.¹² In short, we do not believe the current environment has caused yield changes to become suddenly easier to predict. The failure in recent years of valuation-driven models to accurately predict the prolonged bull market in bonds is an obvious example of the continued challenge.

Of course, just because predicting yield changes remains difficult does not mean tactical signals must be ignored entirely. When applying modest tactical tilts to a strategic base, there is a diversification benefit from combining multiple signals which is similar to the diversification benefit from allocating to multiple asset classes. Some bond market signals were bullish at the end of 2016 (e.g., 12-month trends in most markets), some were neutral (carry factors, since yield curves are close to average steepness), and others were bearish (negative short-term trends in most countries and longer-term valuation measures).

Even if all these different signals were in agreement, we would still favor only a modest tilt away from the strategic base. The size of

Exhibit 10: Fed Fund Rate Cuts in Last 9 Recession



Source: Federal Reserve, *the Federal Reserve's Monetary Policy Toolkit: Past, Present, and Future*. David Reifschneider (2016), "Gauging the ability of the FOMC to Respond to Future Recessions," *Finance and Economics Discussion Series 2016-068* (Washington: Board of Governors of the Federal Reserve System, August) Note: For recessions prior to 1990, the total amount of easing is the difference between the maximum and the minimum monthly average of the effective fed funds rate in the period extending from six months prior to the start of the recession to six months after it ends. For the last three recessions, the periods of continuous reduction in the intended federal funds rate are June 1990 to Sept. 1992, Dec. 2000 to Jan. 2002, and Aug. 2007 to Dec. 2008. For illustrative purposes only. Please read important disclosures at the end of this document.

the tilt should depend both on the conviction in the view and on how much diversification the investment provides. We turn to this topic of diversification in our final section.

When Yields Are Low, Can Bonds Still Be Diversifying in a Portfolio?

We have explained why we think yields could conceivably move up or down even from low levels. It follows that bonds can still be useful diversifiers. However, to address the question of diversification more directly, we can observe the historical correlation of bonds to other asset classes across a range of yield change environments.

First, it is important to note that we do not consider bonds to be a “hedging asset”. That is, we don’t need bonds to exhibit negative correlation with other asset classes to add value as a diversifier (although in recent years they have indeed acted as valuable safe havens, negatively correlated to equity markets, especially in difficult environments). Rather we expect the correlation between bonds and other asset classes to average about zero — which is plenty diversifying (and consistent with long-term historical averages — substantial negative correlations are not the norm).

In Exhibit 11 we can see that over the past 70 years the average correlations between bonds and both stocks and commodities have indeed been close to zero. Furthermore, we see that for various definitions and phases of rising rates environments, equity-bond correlations are modestly higher but remain low in absolute terms (about 0.2 in both secular and rapidly rising rate periods). None of this means, of course, that in the next cycle we won’t see significantly positive correlations (which would reduce — but not eliminate — the diversification benefit of a meaningful allocation to bonds within a portfolio), but the long-term evidence shows low correlations between bonds and other asset classes tend to persist across interest rate environments.

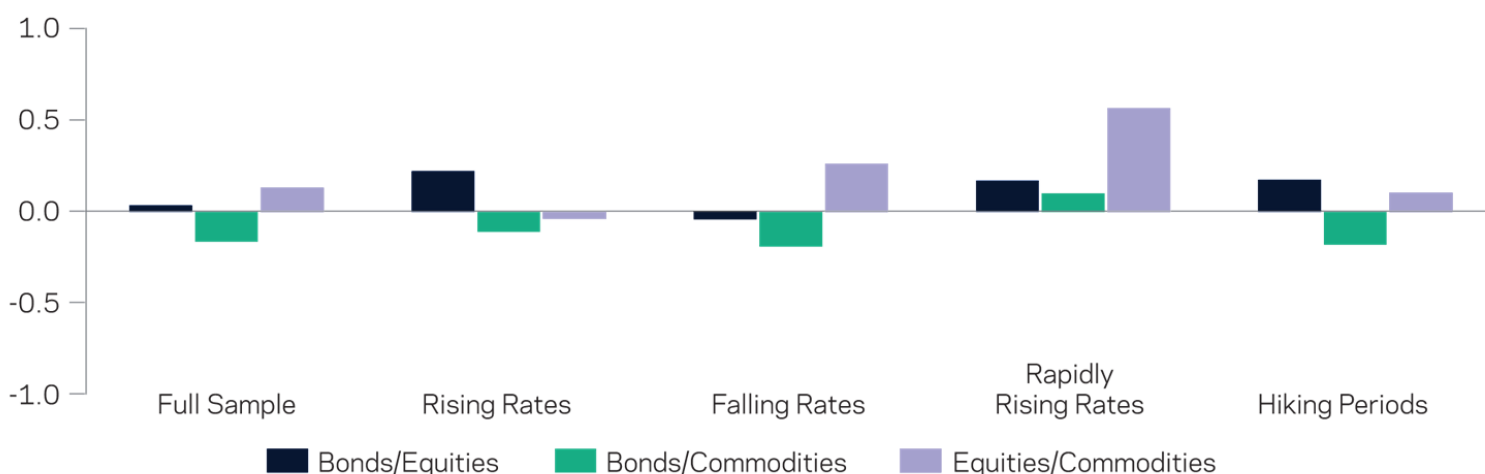
Conclusion

We think key parts of the current environment are often misunderstood — specifically the difference between the return on savings via the risk-free rate and what we earn from the risky portion of our investments, excess returns. We have demonstrated that low yields don’t mechanically imply a low risk premium or low excess returns. We’ve shown that the risk premium for bonds, the term premium, has been related to yield curve slope rather than to yield level. We also have reason to believe yields can still move in either direction, and could potentially go negative again in certain environments. Finally, we’ve shown evidence that bonds have been diversifying to stocks and commodities, even in rising rate environments.

Predicting the variation in excess returns (yield changes and term premium) is still a difficult task. Even though we do think we have useful tactical signals for making predictions about future returns, we believe that no tactical signal is powerful enough to warrant wholesale changes to a well-balanced strategic asset allocation.

Low risk-free rates are a material headwind to investors’ total returns, regardless of asset allocation. We say this because today’s risk-free rates affect more than just bonds and investors can’t do much about them. The decisions we do make, particularly on asset allocation, affect only excess returns, about which the low yield environment says little. Our conclusion then is that the odd environment that prevailed in 2016 and persists in 2017 does not contradict the strategic case to maintain a diversified asset allocation. Rather, it highlights the continued need for investors to diversify across more traditional and alternative return sources and size those return sources so they matter in their portfolio.

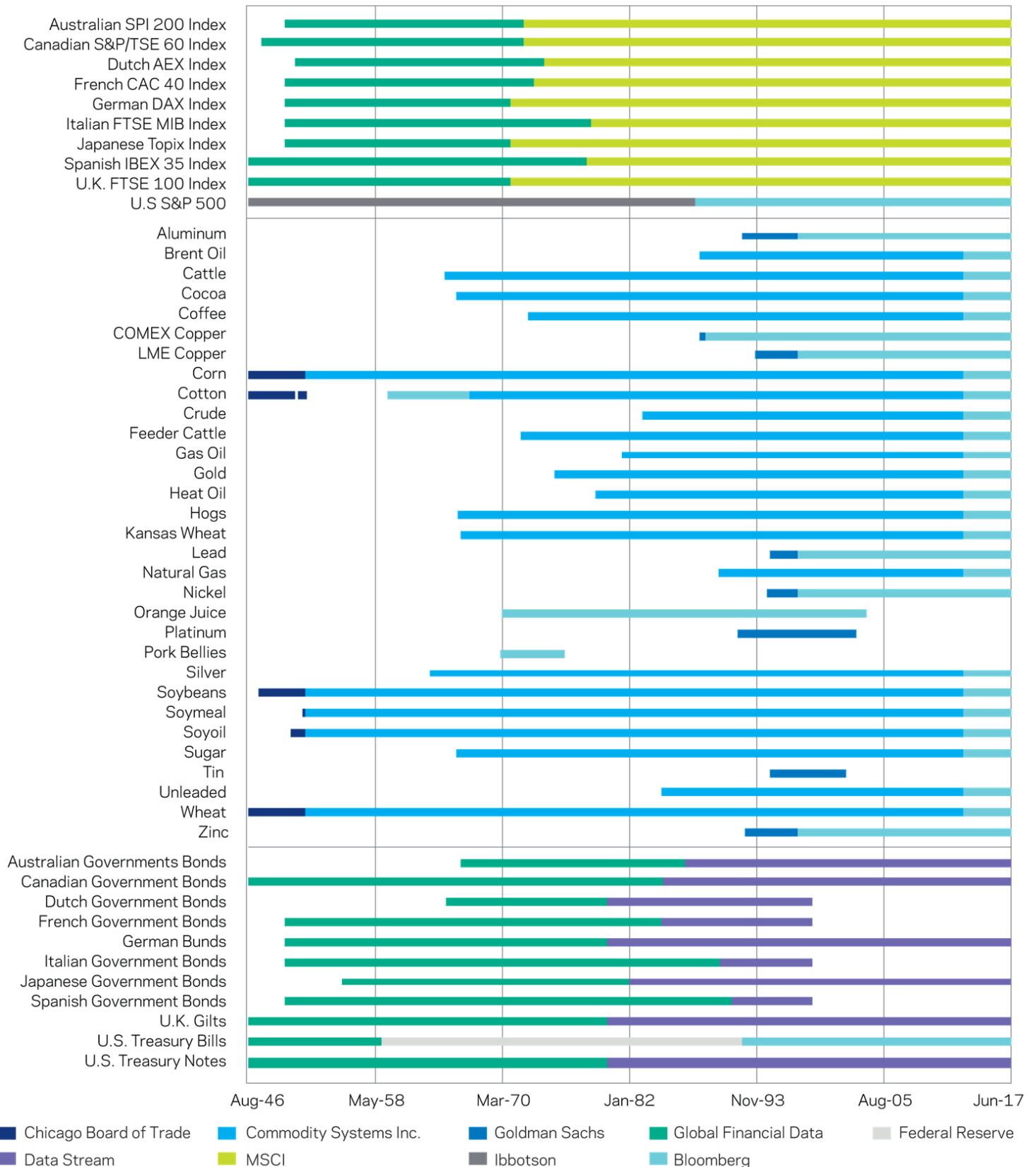
Exhibit 11: Asset Class Correlations in Different Environments 1946-2016



Source: AQR, Bloomberg, Federal Reserve Economic Data. Equities are GDP-weighted among available developed market large-cap indices. Bonds are GDP-weighted among available developed market 10-year government bonds. Commodities are equal-weighted among available commodity futures. Please see the Appendix for greater construction detail. Rising rates period is defined as May 1953 through September 1981. Falling rates period is defined as October 1981 through September 2016. Rapidly rising rates period is defined as October 1979 through September 1981. Hiking periods historical data is based on the effective fed funds rate, target fed funds rate, discount rate, and published records of intended policy actions. For illustrative purposes only. Please read important disclosures at the end of this document.

Appendix

GDP-weighted global equities, GDP-weighted global government bonds, and equal-weighted commodities, as shown in Exhibit 11, are based on the following data availability and sources.



Endnotes

1. Yield is approximately equal to nominal holding-period return (but not necessarily real return) for a hold-to-maturity investor.
2. There is some evidence that holding unhedged short-term debt in foreign currencies with higher risk-free rates has been a profitable trade on average, but this is not the same as accessing another market's risk-free rate (as it is certainly not risk-free).
3. There are some scenarios where the risk-free rate could influence asset allocation. For example, an investor with a total return objective may feel compelled to hold a sub-optimal allocation when the risk-free rate is low.
4. To be precise, we are assuming that market participants' expected changes in short rates averages out to zero. In so much as investors overestimated future rate increases on average, both the slope of the curve and excess returns would increase, but due to beneficial unexpected yield changes rather than a larger risk premium. In any case, the average shape of the curve (rather than the yield level) would be the explanatory factor for bond excess returns.
5. See for example Ilmanen (2011). The real bond yield is commonly used as a measure of valuation as it adjusts the nominal yield at each point in time by inflation expectations at that time.
6. See AQR *Alternative Thinking*, Q1 2017: "Capital Market Assumptions for Major Asset Classes." At very long horizons, starting yields matter less as future reinvestment yields dominate.
7. These plots show information about the distribution of return outcomes over the full sample (green box) and for different quintiles of the signal (blue boxes). The solid box denotes the middle 80% of each distribution, the diamond indicates the median, and the whiskers are the extreme maximum and minimum outcomes.
8. See also Asness, Ilmanen and Maloney (2016), which documents disappointing long-term performance for timing both equity and bond markets based on valuation measures in particular.
9. Agarwal, Ruchir, and Miles Kimball. "Enabling Deeper Negative Rates by Managing the Side Effects of a Zero Paper Currency Interest Rate Policy." www.brookings.edu/wp-content/uploads/2016/05/Managing-Side-Effects-of-Neg-Rates-20160606-Brookings-20-min.pdf.
10. Bloomberg. FOMC median members long-term prediction for the Fed Funds target rate.
11. But note that with the cushion of an upward-sloping yield curve, rising yields do not necessarily mean negative bond returns.
12. At the time of writing, the Federal Reserve continues to communicate an expectation of gradual interest rate increases. A change in this policy in either direction would likely affect bond yields.

References

1. Ilmanen, Antti, "Capital Market Assumptions for Major Asset Classes," *AQR Alternative Thinking*, Q1 (2017).
2. Asness, Cliff, Antti Ilmanen, and Thomas Maloney, "Market Timing: Sin a Little," *The Journal of Investment Management* 15, No. 3, (2017): 23–40.
3. Hurst, B., M. Mendelson, and Y. Ooi, "Can Risk Parity Outperform If Yields Rise?," AQR whitepaper, 2013.
4. Ilmanen, Antti. *Expected Returns*, Wiley, 2011.

Disclaimer

This document has been provided to you solely for information purposes and does not constitute an offer or solicitation of an offer or any advice or recommendation to purchase any securities or other financial instruments and may not be construed as such. The factual information set forth herein has been obtained or derived from sources believed by the author and AQR Capital Management, LLC ("AQR") to be reliable but it is not necessarily all-inclusive and is not guaranteed as to its accuracy and is not to be regarded as a representation or warranty, express or implied, as to the information's accuracy or completeness, nor should the attached information serve as the basis of any investment decision. This document is intended exclusively for the use of the person to whom it has been delivered by AQR, and it is not to be reproduced or redistributed to any other person. The information set forth herein has been provided to you as secondary information and should not be the primary source for any investment or allocation decision. Past performance is not a guarantee of future performance.

This document is not research and should not be treated as research. This document does not represent valuation judgments with respect to any financial instrument, issuer, security or sector that may be described or referenced herein and does not represent a formal or official view of AQR.

The views expressed reflect the current views as of the date hereof and neither the author nor AQR undertakes to advise you of any changes in the views expressed herein. It should not be assumed that the author or AQR will make investment recommendations in the future that are consistent with the views expressed herein, or use any or all of the techniques or methods of analysis described herein in managing client accounts. AQR and its affiliates may have positions (long or short) or engage in securities transactions that are not consistent with the information and views expressed in this document.

The information in this document may contain projections or other forward-looking statements regarding future events, targets, forecasts or expectations regarding the strategies described herein, and is only current as of the date indicated. There is no assurance that such events or targets will be achieved, and may be significantly different from that shown here. The information in this document, including statements concerning financial market trends, is based on current market conditions, which will fluctuate and may be superseded by subsequent market events or for other reasons. Performance of all cited indices is calculated on a total return basis with dividends reinvested.

Authors' Bios



Michael A. Mendelson
AQR Capital Management

Michael is portfolio manager of AQR's risk parity strategies and a member of both the firm's strategic planning and risk committees. Prior to AQR, Michael was a managing director at Goldman Sachs & Co., where he founded the quantitative trading group. He has been a member of the Managed Funds Association's board of

directors and Chairman of its Trading and Markets Committee and is currently Chairman of its Government Affairs Committee. Michael earned an S.B. in mathematics, an S.B. in management, an S.B. in chemical engineering and an S.M. in chemical engineering, all from the Massachusetts Institute of Technology, and an M.B.A. from the University of California at Los Angeles.



John J. Huss
AQR Capital Management

John is a senior researcher on AQR's Global Asset Allocation team and a portfolio manager for the firm's Alternative Total Return strategies. In these roles, he manages macroeconomic and portfolio construction research for Risk Parity and other asset allocation strategies. Prior to rejoining AQR, where he first worked from 2004 to 2008,

he was a vice president in RBC's Global Arbitrage and Trading division and a systematic portfolio manager for Tudor Investment Corp. John earned an S.B. in mathematics from the Massachusetts Institute of Technology.



Thomas S. Maloney
AQR Capital Management

Thomas is a member of the Portfolio Solutions Group, where he focuses on conducting investment research and using AQR's capabilities to enhance client portfolios. He contributes to white papers, engages clients on topics such as capturing alternative sources of return, and strategic asset allocation. He is co-author of

several published articles, including "Exploring Macroeconomic Sensitivities" (JoPM) and "Understanding Style Premia" (JOI). Prior to AQR, he was a senior quantitative analyst and portfolio manager at Brevan Howard Asset Management, specializing in quantitative macro strategies and portfolio construction. Thomas earned an M.Phys. in physics with first-class honors from the University of Oxford.



Zachary Mees, CFA
AQR Capital Management

Zachary is a product specialist on AQR's Global Asset Allocation team focused primarily on the firm's Alternative Total Return strategies. In this role, he monitors portfolio performance, reviews accounts with clients, and presents risk parity strategies to investors. Prior to AQR, he was an asset allocation and risk analyst

at The Ford Foundation. Zach earned a B.S. in engineering management from the University of Arizona and an M.S. in quantitative finance from Fordham University.

We thank Gregor Andrade, Jordan Brooks, Antti Ilmanen and Chris Palazzolo for helpful comments and suggestions.



Forecasting a Volatility Tsunami

Andrew Thrasher
Financial Enhancement Group

Introduction

According to the United Kingdom's National Oceanography Centre, tsunami waves can be as much as 125 miles in length and have resulted in some of the deadliest natural disasters in history. Fortunately, scientists have discovered warning signs of these massive waves, which are believed to be caused by shifts in the earth's tectonic plates. One of the visible signs of a forthcoming tsunami is the receding of water from a coast line, exposing the ocean floor. This is often referred to as "the calm before the storm." The same type of activity can also be found in financial markets, specifically when analyzing the CBOE Volatility Index (VIX). It is often believed that when volatility gets to a "low" level the likelihood of a spike increases. However, as this paper will show, there is a more optimal tsunami-like condition that takes place within the markets, providing a better indication of potential future equity market loss and Volatility Index increase.

Great importance is found in the study of market volatility due to the historically negative correlation the Volatility Index has had to U.S. equities. By knowing the warning signs of a tsunami wave of volatility, professional and non-professional traders can better prepare their portfolios for potential downside risks as well as have the opportunity to profit from advances in volatility and/or declines in equities.

The popularity of volatility trading has seen steady growth to over \$4 billion with more than 30 index-listed Exchange Traded Products. Drimus and Farkas (2012) note that "the average daily volume for VIX options in 2011 has almost doubled compared to 2010 and is nearly 20 times larger than in the year of their launch, 2006." We can also see the increase in interest surrounding the Volatility Index by looking at trends in online searches with regards to low levels within the VIX. As of September 20th, 2016 there were 423,000 Google search results for "low VIX" and 4,610 results for

“historic low volatility.” Few investors would deny the importance of volatility when it comes to the evaluation of financial markets.

In this paper the author will provide a brief literature review concerning the history of the Volatility Index, important prior studies surrounding the topic of volatility followed by a discussion of alternative, yet ultimately suboptimal, methods of predicting large swings in the VIX. The paper will conclude with the description, analysis, and results based on the author’s proposed methodology for forecasting outsized spikes within the VIX Index and how this approach may be used from a portfolio management standpoint to help investors better prepare based on the “calm before the storm.”

Those that believe in the adage of buy-and-hold investing often mention that missing the ten or twenty best trading days has a substantially negative impact on a portfolio’s overall return. They then in turn reject the idea of attempting to avoid the worst days in the market and active management as a whole. However, as Gire (2005) wrote in an article for the Journal of Financial Planning, the best and the worst days are often very close in time to one another. Specifically, 50% of the worst and best days were no more than 12 days apart. Looking at the bull market in the S&P 500 between 1984 and 1998, the Index rose an annualized 17.89%. Gire found that by missing the ten best days the annualized return fell to 14.24%, the statistic often cited by the passive investing advocates. Missing the ten worst days increased the return to 24.17% and missing both best and worst days produced an annualized return of 20.31%, with lower overall portfolio gyrations. With the negative correlation between the Volatility Index and the S&P 500, by having an ability to forecast large spikes in the VIX the author proposes the ability to potentially curtail an investor’s exposure to some of the worst performing days within the equity market.

History of the Volatility Index

To better research, test, and analyze a financial instrument, it’s important to understand its history and purpose. The CBOE Volatility Index was originally created by Robert E. Whaley, Professor of Finance at The Owen Graduate School of Management at Vanderbilt University. The Index was first written about by Whaley in his paper, “Derivatives on Market Volatility: Hedging Tools Long Overdue” in 1993 in The Journal of Derivatives. Whaley (1993) wrote, “The Chicago Board of Options Exchange Market Volatility Index (ticker symbol VIX), which is based on the implied volatilities of eight different OEX option series, represents a market’s consensus forecast for stock market volatility over the next thirty calendar days.”

Whaley believed the Volatility Index served two functions; first, to provide a tool to analyze “market anxiety” and second, to be used as an index that could be used to price futures and options contracts. The initial function helped give the VIX its nickname of being the “fear gauge” which aids to provide a narrative explanation for why the Index can have such large and quick spikes as investor emotions flow through their trading terminals.

The Chicago Board of Options Exchange (CBOE) eventually launched Volatility Index (VIX) futures and options in 2004 and 2006, respectively. The VIX in its current form, according to

the CBOE, “measures the level of expected volatility of the S&P 500 Index over the next 30 days that is implied in the bid/ask quotations of SPX options.”

Literature Review

Comparing Rising & Falling Volatility Environments

It is often stated in the financial markets community that volatility is mean-reverting, meaning that like objects affected by gravity – what goes up must come down. Many market professionals attempt to take advantage of the rising and falling trends within the volatility market by echoing Warren Buffett’s famous quote, “Buy when there’s blood in the streets,” using an elevated reading in the Volatility Index as their measuring stick for the level of figurative blood flowing down Wall Street. However, as Zakamunlin (2006) states, the median and average duration for rising and falling Volatility are not equal. In fact, Zakamunlin found that the timespan for declines in volatility surpass the length of rising volatility by a factor of 1.4 and the resulting impact on equity markets is asymmetric, with a perceived over-reaction to rising volatility compared to declining volatility. This is important, as it tells us that there is less time for an investor to react to rising volatility than there is to react after volatility has already spiked. Thus, the resulting impact on stock prices is disproportionately biased with stocks declining in value more than they rise in value during environments of increasing and decreasing volatility, respectively.

Using Volatility to Predict Equity Returns

Much attention has been paid to the creation of investment strategies based on capturing the perceived favorable risk situation of elevated readings from the Volatility Index. Cipollini and Manzini (2007) concluded that when implied volatility is elevated, a clear signal can be discerned for forecasting future three-month S&P 500 returns contrasted to when volatility is low. When evaluating the Volatility Index’s forecasting ability when at low levels, their research notes that, “On the contrary, at low levels of implied volatility the model is less effective.” Cipollini and Manzini’s work shows that there may be a degree of predictability when the VIX is elevated but that the same level of forecasting power diminishes when analyzing low readings in the Volatility Index. In a study conducted by Giot (2002), the Volatility Index is categorized into percentiles based on its value and modeled against the forward-looking returns for the S&P 100 Index for 1-, 5-, 20-, and 60-day periods. When looking at the tenth percentile (equal to 12.76 on the Volatility Index), which includes a sample size of 414 observations, the 20-day mean return was found to be 1.06%, however Giot observed the standard deviation of 2.18, and the minimum and maximum returns ranged from -6.83% to 5.3%. While Giot demonstrates a relationship between volatility and forward equity returns, the research also diminishes the confidence that can be had in the directional forecasting power of returns within intermediate time periods for the underlying equity index. We can take from this that while a low reading within the VIX has shown some value in predicting future volatility, the forecasting of the degree and severity of the predicted move is less reliable, as it has a suboptimal degree of variance.

Data Used

For purposes of crafting the methodology and charts used within this paper, data was obtained from several credible sources. CBOE Volatility Index data has been acquired from StockCharts.com, which curates its data from the NYSE, NASDAQ, and TSX exchanges. Data for the CBOE VIX of the VIX was obtained through a data request submitted directly to the Chicago Board Options Exchange.

Volatility Spikes

While some degree of gyrations in stock prices is considered normal and acceptable by most of the investment management community, large swings in price are what catch many investors off guard. It's these "fat tail" events that keep investors up at night, which are often accompanied by sudden spikes found in the Volatility Index. Fortunately, many of these spikes can be forecasted; however, first we must address what a "spike" is. While the parameters of defining a "spike" can vary, this author will use a 30% advance in closing price to a high achieved within a five-trading day period. Chart 1 shows the Volatility Index between May 22, 2006 and June 29, 2016. Marked on the chart are instances where the VIX has risen by at least 30% (from close to the highest high) in a five-day period when a previous 30+% advance had not occurred in the prior ten trading days. There have been 70 such occurrences of these spikes in the above-mentioned time period.

While previous studies have been conducted on forecasting future volatility, through a search on the SSRN it does not appear published analysis has been conducted specifically on forecasting

spikes in volatility. From an asset management perspective, whether the reader is a professional or non-professional, a volatility spike, and with it a decline in stocks, impact on an equity portfolio is a more frequent risk than that of a bear market. Historically, the S&P 500 averages four 5% declines every year but we've only had 28 bear markets (20% or more decline from peak to trough) since the 1920s.

Methods of Volatility Forecasting

The traditional thought process that low volatility precedes higher volatility, a topic Whaley addresses in his 2008 paper, stating that, "Volatility tends to follow a mean-reverting process: when VIX is high, it tends to be pulled back down to its long-run mean, and, when VIX is too low, it tends to be pulled back up" is true, in a general sense, although this concept does not act as the best predictor of quick spikes in the VIX. Chart 2 (next page) provides an example of this, as it shows the occurrences where the daily close of the Volatility Index is at a four-week low. The four-week period is not based on optimization but was chosen as an example time period of roughly one month. What can also be observed is the large sample size that is produced, with 100 signals in the roughly ten-year period. The author realizes that by expanding the four-week time window, the sample size would lessen but the same basic result would still be reached – a greater sample size of occurrences than of previously-defined spikes in the VIX. The trouble this causes for the investor is an over-reaction each time volatility reaches a new four week low, as the VIX many times continues its trend lower, not resulting in a spike higher. This shows that simply because the VIX has fallen to a multi-week low, it does not necessitate a forthcoming spike within the underlying Index.

Chart 1: Spikes of 30+% in the Volatility Index, daily data

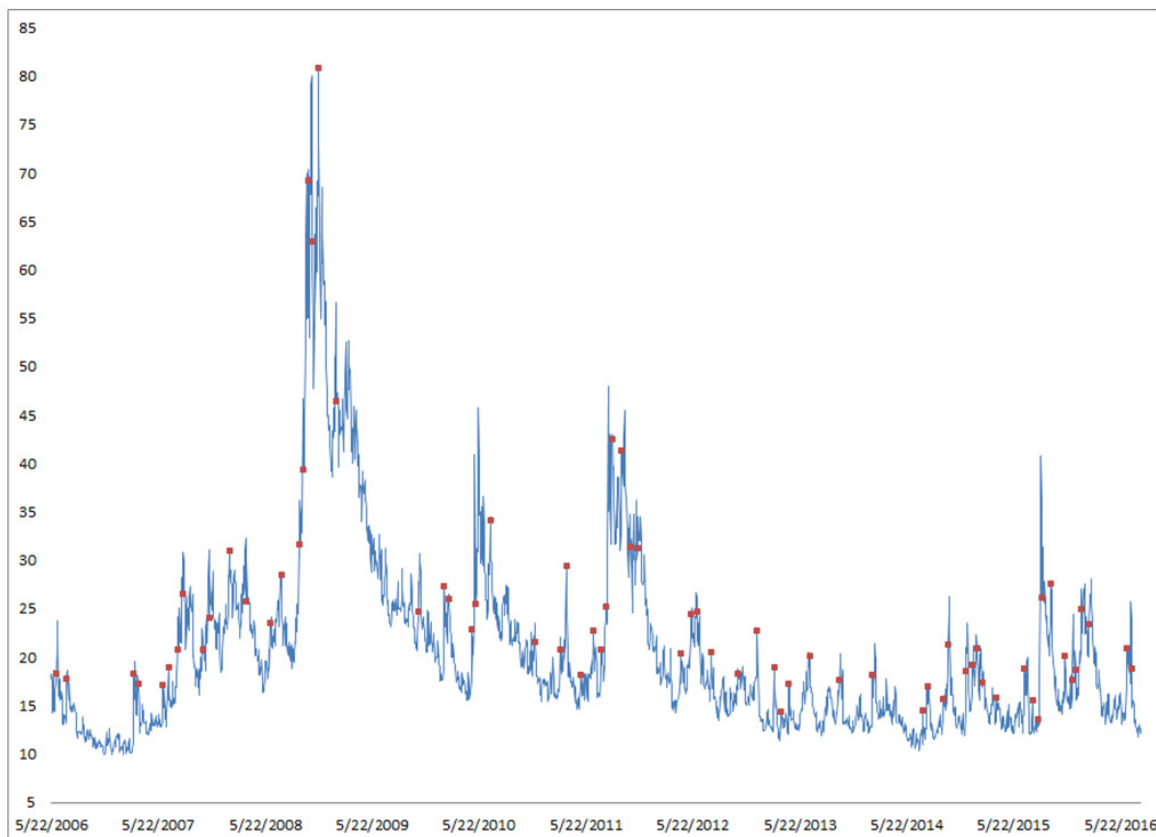


Chart 2: Lowest Volatility Index close in four weeks, daily data

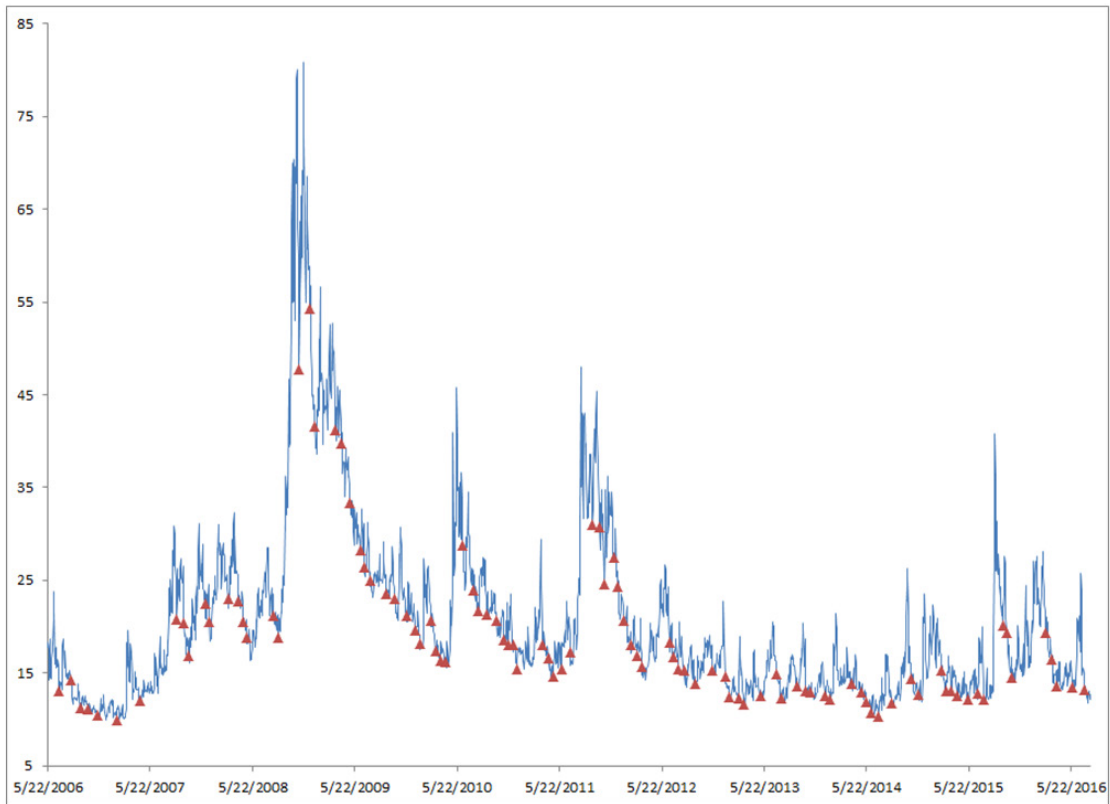
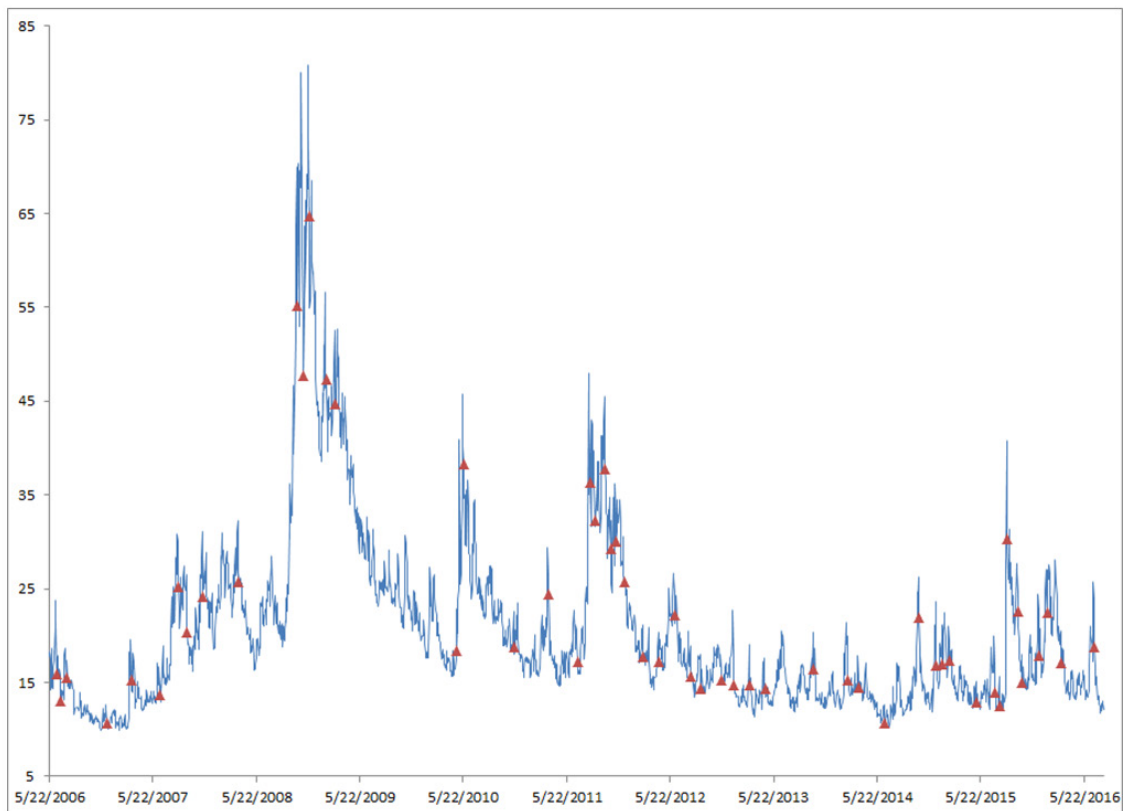


Chart 3: 15+% decline in three days in the Volatility Index, daily data



One could also argue that because of the nature for the Volatility Index to mean-revert, that volatility becomes overly-discounted after a large decline, which is reason enough that it should then spike higher. This can be measured by looking for instances where the VIX has fallen by at least 15% in a three-day period, as shown by markers in Chart 3 (previous page). While forgiving the occurrences that take place immediately after a spike within the VIX, looking at periods where volatility has fallen by a large amount in a short period of time increases the predictability of future large increases in the Volatility Index. However, while the sample size decreases to 53, there are still quite a few occurrences that produce false-signals in preceding VIX spikes. It is of this author's opinion that neither of these methods (a four-week low or 15+% decline), provide an optimal warning to an investor of a heightened risk of forthcoming elevated volatility.

Volatility Dispersion Methodology

J.M. Hurst was one of the early adopters of trading bands according to his book *The Profit Magic of Stock Transaction Timing*, drawing envelopes around price and a specified Moving Average. According to John Bollinger, CFA, CMT, Marc Chaikin was next to improve upon the practice of using bands within trading, using a fixed percentage around the 21-day moving average. Ultimately, in the 1980s, Bollinger built upon the work of Hurst and Chaikin by shifting the outer bands to incorporate volatility of the underlying market or security through the use

of standard deviation above and below the 20-period moving average. Bollinger chose to use a 20-period moving average as "it is descriptive of the intermediate-term trend."¹² Bollinger notes that by applying analysis to the width of the bands, "a sharp expansion in volatility usually occurs in the very near future." This idea of narrowing bands as a measure of contraction in the dispersion of a security is the topic this paper will focus on going forward.

While financial markets are never at complete rest per se, the closest they come is by trading in a very narrow range. This range can be observed in several ways, whether using Bollinger Bands®, an average true range indicator, or by simply calculating the standard deviation of price. Just as the seas become calm and the tide pulls back from the shore before the striking of a violent tsunami, the movement of the VIX often declines, sending the index's dispersion to extremely low levels prior to the Index spiking higher. Chart 4 shows the CBOE Volatility Index and its 20-day standard deviation. While it is outside the scope of this paper, the lookback period used for the standard deviation could be optimized to better suit the timeframe and risk appetite of the investor; however, this author has chosen a period of 20 days in accordance with the timeframe used by Bollinger for his Bollinger Bands. While the VIX and its 20-day standard deviation move in lock-step with one another, additional forecasting ability can be achieved by applying further analysis to the dispersion measurement.

Chart 4: The Volatility Index and 20-day standard deviation, daily data

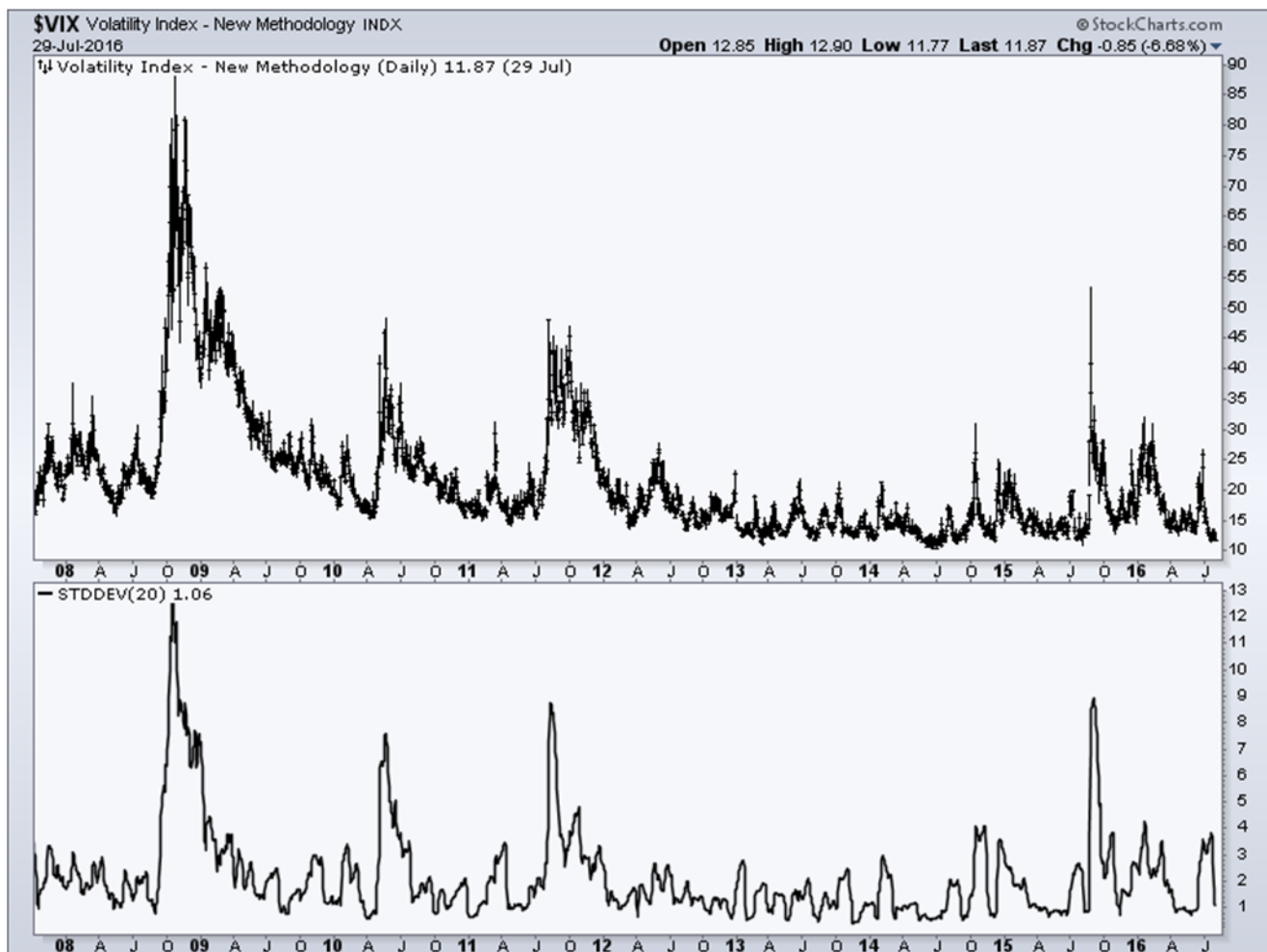
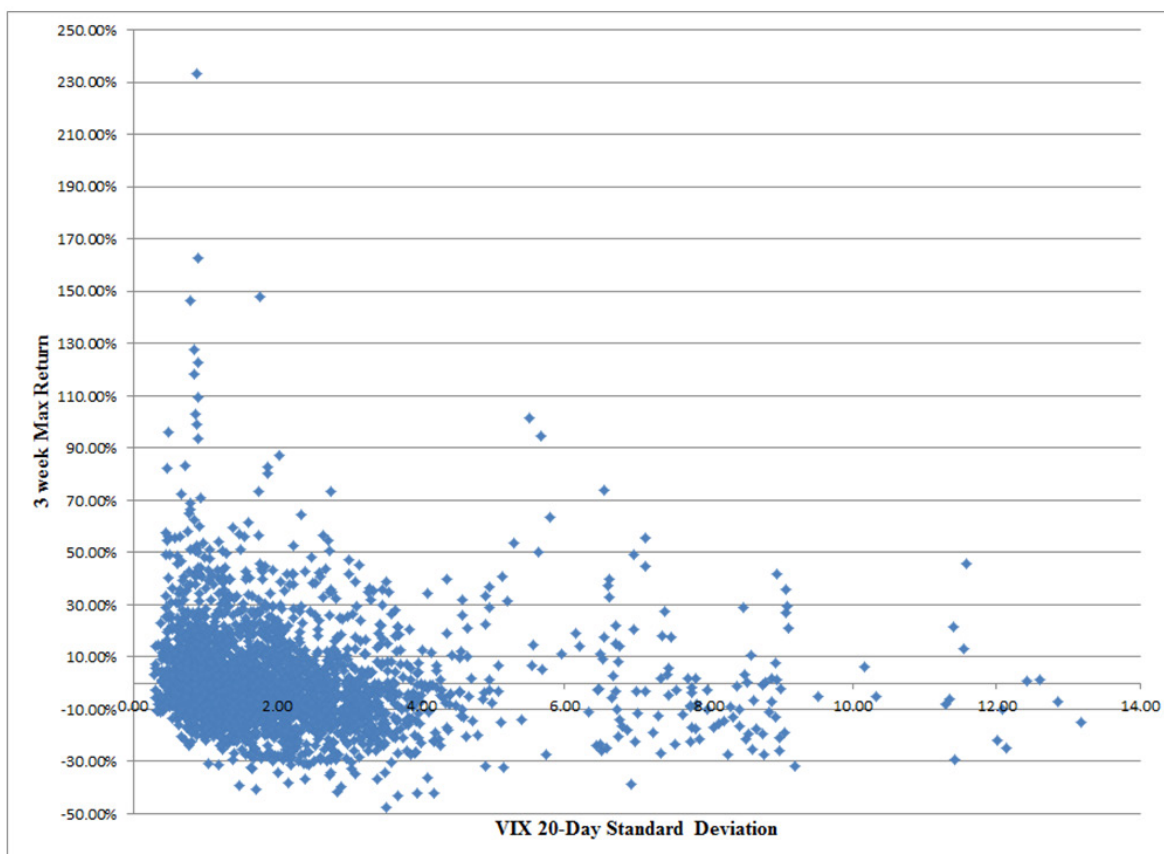


Chart 5: Scatter plot of the 20-day standard deviation and 3-week maximum change, daily data



In order to find an appropriate threshold with forecasting spikes in the Volatility Index, the daily standard deviation readings were ranked by percentile for the time period of May 2006 through June 2016. As a result, the fifteenth percentile allowed a sizable sample size of 373 to be obtained. The fifteenth percentile standard deviation during the above-mentioned timeframe for the Volatility Index is 0.86. Chart 5 shows the scatter plot of the data observed for the 20-day standard deviation for the VIX and the resulting three-week maximum change in the Index, which was calculated by using the highest high in the subsequent fifteen trading days for each data point. By looking at the maximum change in the VIX we can begin to see that the largest spikes within a three-week period occur when price dispersion is extremely low; while the three-week maximum change in the VIX diminishes the larger the dispersion becomes.

To provide a graphical representation of the threshold being met, Chart 6 on the following page shows the daily Volatility Index marked with occurrences of standard deviation being at or below 0.86 when a prior reading of at or below 0.86 has not occurred during the prior ten trading days. The ten-day lookback is used to avoid clusters of occurrences and to better show the initial signal of the threshold being met, which leaves 52 signals in the sample. The sample size with the standard deviation threshold diminishes significantly compared to the previously mentioned prediction method of the VIX being at a four-week low as well as improved foreshadowing of eventual spikes in volatility compared to 15+% declines in the VIX.

A spike was defined previously as a rise of 30+% in a five-day period. Chart 7 on the following page displays volatility spikes but also includes the standard deviation signal markers to show that the majority of spikes that have taken place in the Index occur after the dispersion of the VIX has fallen below the specified threshold. In fact, based on this ten-year data period, very few instances of the threshold being met were not followed by a 30+% spike in volatility. As the seas become calm and the tide pulls back in the ocean before a massive wave, so too does volatility's dispersion narrow before an eventual spike higher. While not every defined spike is preceded with volatility's standard deviation declining to a low level, only a handful of signals are not followed by large increases in VIX readings. In other words, not every spike follows a signal but nearly every signal is followed by a spike.

Because standard deviation is essentially a measure of volatility in-and-of-itself, by using it to analyze the VIX we are in essence evaluating the volatility of the Volatility Index. Fortunately, the CBOE also has created a tool for measuring the volatility of the Volatility Index, called the VIX of the VIX (VVIX). This type of tool can be useful as the scope of this paper is focused on not just forecasting future volatility but specifically spikes in volatility, which can be improved by the incorporation of VVIX.

The CBOE summarizes VVIX as “an indicator of the expected volatility of the 30-day forward price of the VIX. This volatility drives nearby VIX option prices.” Park (2015) notes that the VVIX acts as a better measurement of tail risk due to the VIX options market having larger trading volume, a lower bid-ask

Chart 6: Volatility Index with standard deviation signal markers, daily data

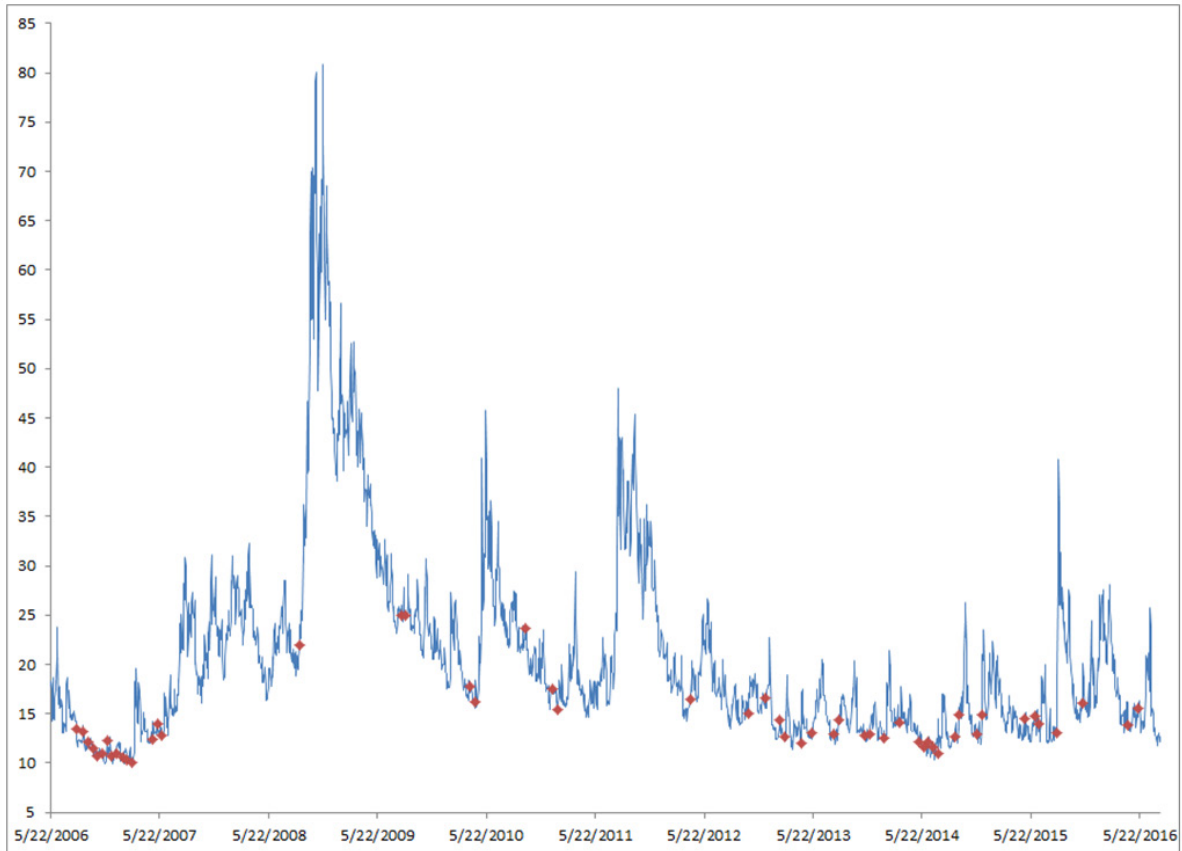


Chart 7: Volatility Index with standard deviation and spike signal markers, daily data

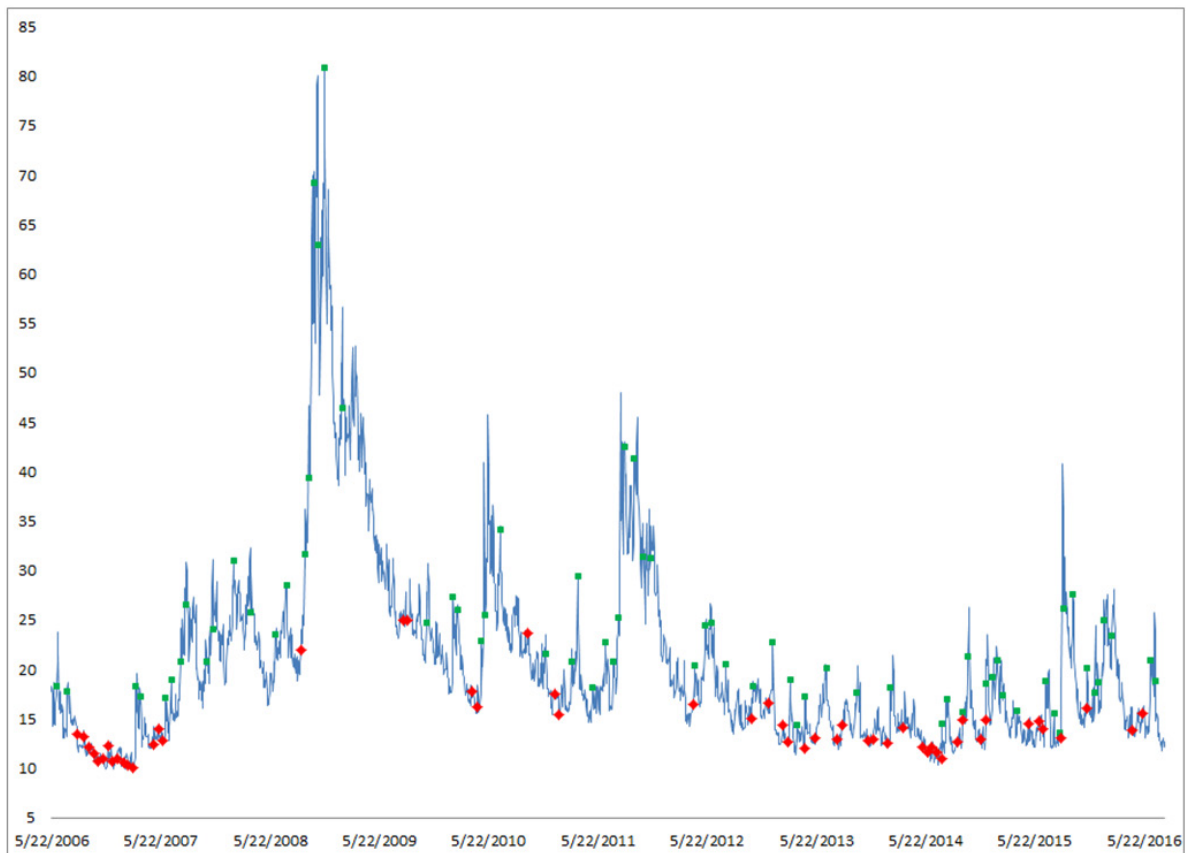
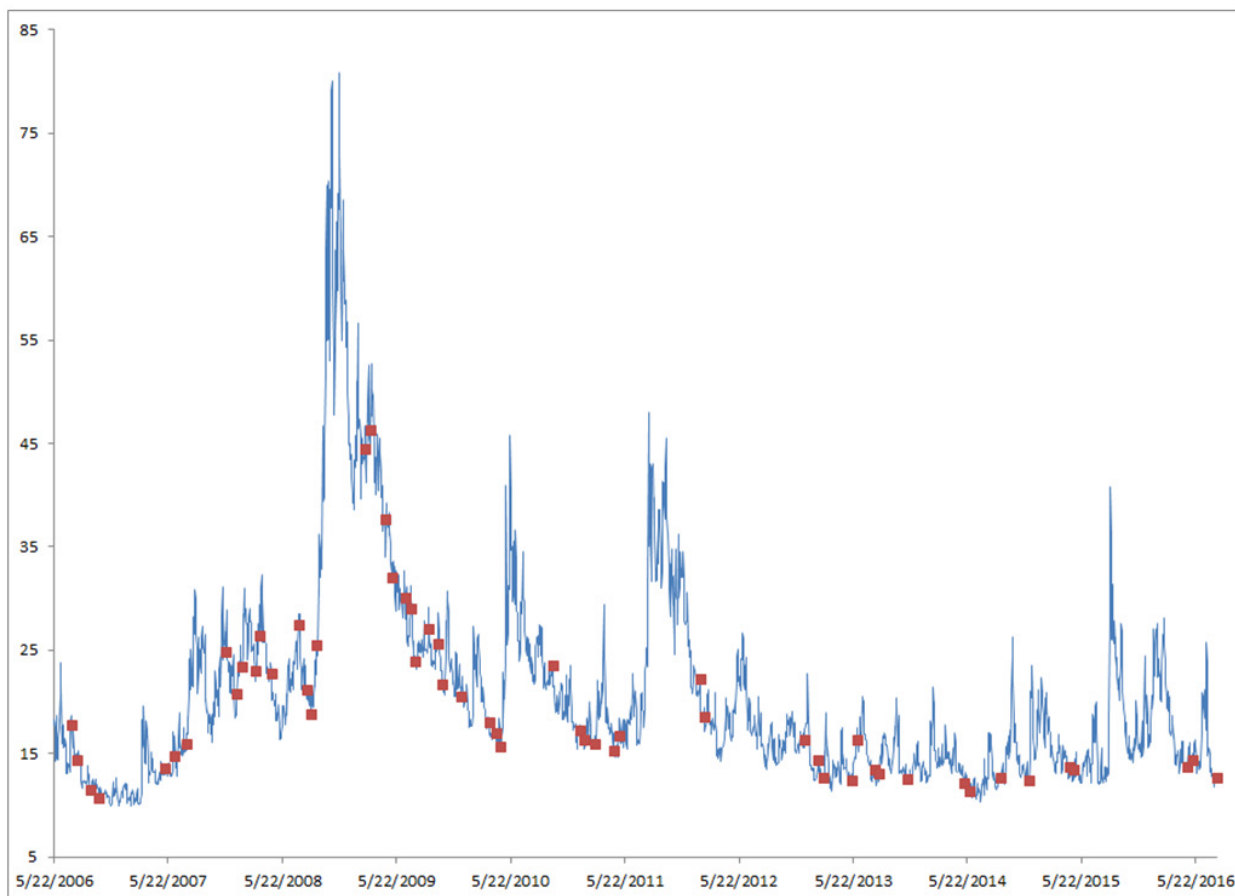


Chart 8: Volatility Index with VVIX standard deviation signal markers, daily data



spread, and more liquidity compared to the S&P 500 options market. This allows for the capability to be potentially more accurate with the forecasting ability of volatility's dispersion.

By applying the same level of analysis to the VVIX as we did with the VIX we can find the fifteenth percentile 20-day standard deviation for the VIX of the VIX is 3.16. Chart 8 plots the Volatility Index with markers notating the instances when VVIX standard deviation is at or below 3.16. Similar to the previously discussed dispersion of the VIX, the dispersion for the VVIX has a small sample size of 54 over the studied time period. However, similar to the suboptimal method of using large declines in the VIX as a predictor of future spikes, the VVIX dispersion threshold has many false-signals that are now followed by volatility spikes.

In order to continue to improve upon the idea that volatility dispersion is an optimal predictor of future VIX spikes, a simple system can be created using both the VIX and VVIX. This is accomplished by testing when both the VIX and the VVIX have readings of their respective 20-day standard deviation at or below their defined thresholds. Chart 9 on the following page shows where the combination of the two signals (red square markers) is met as well as just the VIX signal (green triangle markers) in order to show the differences and overlap of the two methods. As to be expected, the sample size decreases when the two volatility measurements thresholds are combined into a single signal. While the VIX alone produces more triggers of low dispersion, it appears

the combination of the VIX and VVIX are timelier in their production of a signal before spikes within the Volatility Index.

Up to this point only a visual representation of the signals has been shown, but next we shall look at the numerical changes that occur in the VIX following the methods previously discussed in this paper along with the superior method outlined in the section above.

Table 1 on the next page shows the three week change in the VIX, utilizing the maximum and minimum average and median. We can see that the previously discussed methods of using a low in the VIX (lowest close in four weeks) and large declines (15+% decline in three days) do not produce an 'edge' over the average three week change in all VIX readings. However, we do see a much larger maximum and smaller minimum when using the VIX, VVIX, and combined signal.

In fact, the VIX signal has an average three-week maximum that is 54% greater than that of the large VIX drop with the minimum change being smaller by 49%. Not only does the VIX rise on average by a greater degree for the VIX, VVIX, and combined signal, the VIX declines less after a signal has been produced as well. This increase in 'edge', with the previously discussed decrease in sample sizes produces a more manageable signal generation with more accurate forecasting ability than the discussed alternative methods of VIX spike forecasting.

Chart 9: Volatility Index with VIX and combined signal markers, daily data

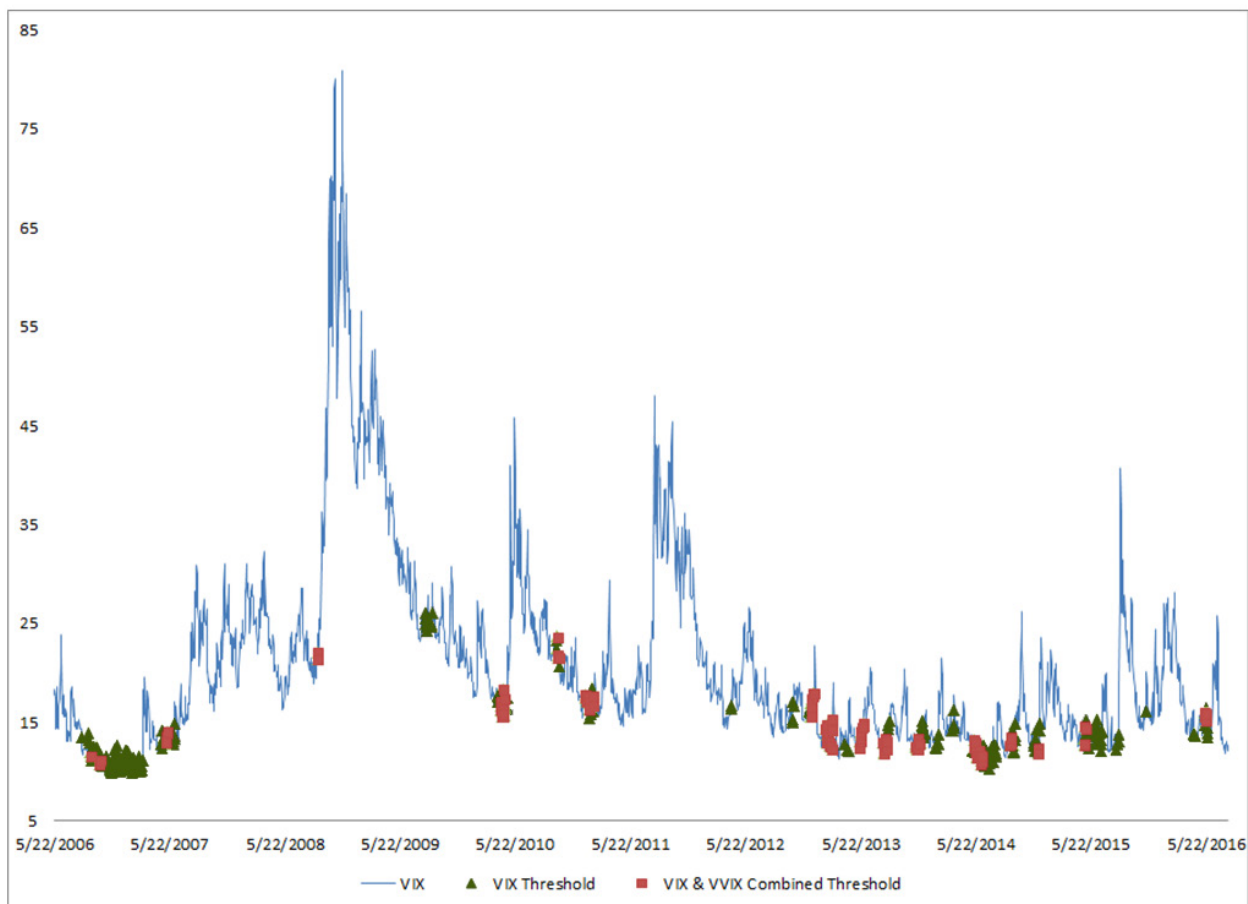


Table 1: Maximum and minimum change is calculated using the highest high and lowest low relative to the close VIX reading on the day of signal over the subsequent fifteen trading days, daily data

Method	Average Maximum Three Week Change	Median Maximum Three Week Change	Average Minimum Three Week Change	Median Minimum Three Week Change
VIX Signal	34.30%	23.01%	-8.67%	-8.74%
VVIX Signal	27.21%	15.93%	-10.71%	-10.06%
Combined Signal	27.53%	14.95%	-10.45%	-9.76%
4 Week Low				
VIX	24.94%	20.13%	-9.26%	-7.85%
Large VIX Drop	22.27%	16.13%	-17.07%	-15.81%
All VIX	25.76%	17.71%	-14.07%	-12.87%

Conclusion

This paper provides an argument for using the dispersion of the VIX, through the use of a 20-day standard deviation as a superior tool in forecasting spikes within the Volatility Index. While not every trader has a specific focus on the Volatility Index within their own respective trading styles or strategies, Munenzon (2010) shows that the VIX has important implications for return expectations for many different asset classes such as bonds, commodities, and real estate. Although the Volatility Index itself cannot be bought or sold directly, by knowing how to properly evaluate volatility, an investor can better prepare his or her portfolio, whether from a standpoint of defense (raising cash, decreasing beta, etc.) or offense (initiating a trading position to capitalize on the expected rise in volatility through the use of ETNs, futures and/or options). With Charts 6 through 9, it has been shown that the evaluation of the dispersion within the VIX and VVIX act as accurate barometers for future large advances in the Index. Table 1 provides evidence that the VIX rises more and declines less after a signal has been established through dispersion analysis over more commonly used methods applied to volatility. While the scope of this paper is not to create a standalone investment strategy, the concept discussed within can be taken and utilized in a broad scope of investment paradigms and timeframes.

It is believed by the investment community that by having the VIX at relatively low levels or following large declines, its nature to mean-revert would carry the Index immediately higher, snapping like a rubber band to elevated levels. This line of thinking produces signals with sample sizes much greater than most traders would likely be able to act upon or monitor, and as Table 1 shows, forecasts on average, sub-par future changes within the VIX. While the parameters used within this paper to analyze the dispersion of the Volatility Index were not optimized, the author believes further research can be done to better hone the forecasting ability of analysis when the VIX and VVIX trade in narrow ranges prior to spikes in the underlying Index.

With relative confidence, the author believes dispersion of price, as measured by the daily standard deviation of the VIX and VVIX acts as a more accurate and timely method of forecasting spikes, as defined in this paper, in the Volatility Index. This method provides an early warning signal of a potential oncoming "volatility tsunami" that can have large negative implications for an investment portfolio and allows for the potential to profit from the rising tide of the VIX.

Endnotes

1. See National Oceanography Centre 2011
2. See Whaley 2013
3. See Gire 2005
4. See Whaley 2008
5. See CBOE 2016
6. See Zakamunlin 2006
7. See Cipollini & Manzini 2007
8. See Giot 2002

9. Stockcharts.com
10. See Hulbert 2016
11. See Whaley 2008
12. See Bollinger
13. See CBOE
14. See Park 2015

References

1. Bollinger, John. "Bollinger's Brainstorm." Bollinger Bands. Bollinger Capital Management, Inc., n.d. Web. 12 Oct. 2016. <<http://www.bollingerbands.com/services/bb/>>.
2. CBOE Volatility Index FAQs, Chicago Board of Options Exchange, n.d. Web. 4 Nov. 2016. <<http://www.cboe.com/micro/vix/faq.aspx#1>>.
3. CBOE VVIXSM Index, Chicago Board of Options Exchange, n.d. Web. 4 Nov. 2016. <<http://www.cboe.com/micro/vvix/>>.
4. Cipollini, Alessandro Paolo Luigi and Manzini, Antonio, "Can the VIX Signal Market's Direction? An Asymmetric Dynamic Strategy" (April 2007). Available at SSRN: <https://ssrn.com/abstract=996384> or <http://dx.doi.org/10.2139/ssrn.996384>
5. Data and Ticker Symbols, StockCharts.com, Web. 4 Nov. 2016. <<http://stockcharts.com/docs/doku.php?id=data>>.
6. Drimus, Gabriel G. and Farkas, Walter, "Local Volatility of Volatility for the VIX Market" (December 10, 2011). Review of Derivatives Research, 16(3), 267-293, (2013). Available at SSRN: <https://ssrn.com/abstract=1970547> or <http://dx.doi.org/10.2139/ssrn.1970547>
7. Giot, Pierre, "Implied Volatility Indices as Leading Indicators of Stock Index Returns?" (September 2002). CORE Discussion Paper No. 2002/50. Available at SSRN: <https://ssrn.com/abstract=371461> or <http://dx.doi.org/10.2139/ssrn.371461>
8. Gire, Paul J. (2005) "Missing the Ten Best," *Journal of Financial Planning*.
9. "How a Tsunami Wave Works," National Oceanography Centre, 11 Mar. 2011. Web. 27 Oct. 2016. <<http://noc.ac.uk/news/how-tsunami-wave-works>>.
10. Hulbert, Mark. "Bear Markets Can Be Shorter Than You Think." *The Wall Street Journal*, 06 Mar. 2016. Web. 08 Oct. 2016. <<http://www.wsj.com/articles/bear-markets-can-be-shorter-than-you-think-1457321010>>.
11. Munenzon, Mikhail, "20 Years of VIX: Fear, Greed and Implications for Alternative Investment Strategies" (April 29, 2010). Available at SSRN: <https://ssrn.com/abstract=1597904> or <http://dx.doi.org/10.2139/ssrn.1597904>
12. Park, Yang-Ho, "Volatility-of-Volatility and Tail Risk Hedging Returns" (May 18, 2015). *Journal of Financial Markets, Forthcoming*. Available at SSRN: <https://ssrn.com/abstract=2236158> or <http://dx.doi.org/10.2139/ssrn.2236158>
13. Whaley, R. E., "Derivatives on market volatility: Hedging tools long overdue," *Journal of Derivatives* 1 (Fall 1993), 71-84.

14. Whaley, R. E. (2009). "Understanding the VIX." *The Journal of Portfolio Management*, 35(3), 98-105. doi:10.3905/jpm.2009.35.3.098

15. Whaley, Robert E., "Trading Volatility: At What Cost?" (May 6, 2013). Available at SSRN: <https://ssrn.com/abstract=2261387> or <http://dx.doi.org/10.2139/ssrn.2261387>

16. Zakamulin, Valeriy, "Abnormal Stock Market Returns Around Peaks in VIX: The Evidence of Investor Overreaction?" (May 1, 2016). Available at SSRN: <https://ssrn.com/abstract=2773134> or <http://dx.doi.org/10.2139/ssrn.2773134>

Author Bio



Andrew Thrasher, CMT
Financial Enhancement Group, LLC

Andrew Thrasher, CMT holds a bachelor's degree from Purdue University as well as the Chartered Market Technician (CMT) designation from the Market Technicians Association. Mr. Thrasher serves as the Portfolio Manager for the Financial Enhancement Group, LLC, a wealth management firm in Indianapolis, Indiana

which works with high net-worth families and several corporate pension plans. Mr. Thrasher manages one tactical strategy, co-manages five asset allocations strategies, and one alternative strategy. Through the use of individual stocks and Exchange Traded Funds (ETFs) Mr. Thrasher builds and manages portfolios while managing risk through the use of several proprietary investment models.



ALTS Transparency: Finding the Right Balance

Paul Finlayson
Northern Trust

Stuart Lawson
Northern Trust

Matt Smith
Northern Trust

Despite the dominance of transparency as a discussion topic over the last decade, market practices in alternative investing haven't changed as much as you might think. Even after the 2008 credit crisis illustrated the dangers of having large allocations to opaque, illiquid assets, the industry has struggled to reach accommodation on transparency. The lack of progress is due more to the nature of alternative investments and the very real hurdles to providing and using transparency than an unwillingness to seek common ground.

A survey Northern Trust conducted in 2017 with The Economist Intelligence Unit confirmed that transparency remains a top priority among alternative investors. Yet, in the absence of any standards in market practice, investors continue to work through bilateral agreements, side letters and other arrangements to get what they need. While this ad hoc practice might work for some, a more focused industry-wide approach could have benefits for everyone involved and remove some of the complexity from the process.

So how does the industry move toward more holistic improvements to market practice and transparency? Based on our experience serving both clients that invest in and clients that manage alternative strategies, we believe better market practices start with three things:

1. A more nuanced conversation about transparency.
2. A more strategic approach to managing transparency requirements.
3. A more collaborative partnership between the buy and sell sides.

Taking a More Nuanced View of Transparency

When asked if they'd like more transparency into their alternatives portfolio, the majority of investors will offer a reflexive, "Yes. Of course we want to have a better understanding of our investments." But transparency comes in many flavors, each of which presents different

opportunities and challenges depending on the type of investment and the priorities of both investor and manager. If you take the time to dig deeper, you quickly realize that achieving “more transparency” is far from simple.

To start with, “transparency” is a broad term that means many things (see “Evaluating Transparency,” below). When you’re talking about transparency, what are you really talking about? Insight into holdings? A better understanding of valuations? A good place to start, for both investors and managers, is to evaluate the different types of transparency and how important they are to your organization and your stakeholders.

Next, consider the tradeoffs you’re willing to make related to each type of transparency you’re seeking. Investors might ask:

- What is transparency worth to you? Will you trade performance for transparency if the cost of being more transparent affects returns? If so, how much?
- Are you getting value from transparency? Do you have the systems and skills to derive meaningful insight from your data?
- Are you willing to pay more for the operational costs associated with transparency?

Managers face similar questions:

- How far will you go to accommodate the requirements of large investors?
- What are the risks of public disclosure of fund data, such as a Freedom of Information Act (FOIA) request that requires public funds to disclose details regarding their investments?
- Are you willing to walk away from a large investor to protect intellectual capital?

These questions are worth considering when weighing the tradeoffs involved.

Evaluating Transparency

TYPE	INVESTOR RATIONALE	CURRENT INDUSTRY PRACTICE
 Holdings	Risk exposure analysis	Hedge funds more problematic than private equity and real estate
 Valuations	Need to demonstrate reliability	Hedge fund pricing less problematic than real estate and private equity appraisals
 Fees	Ability to quantify and verify fee impacts	Reasonability checks using best available data
 Operational	Controls and independent verification vital to due diligence	Controls documents and onsite audits
 Liquidity	Cash management and ability to exit	Best guess from available data

Treating Transparency Strategically

Putting time, effort and intellectual capital into developing policies – compliance, liquidity, cash management, valuation practices, data strategy – to govern your business is routine. But do you apply similar discipline to the question of transparency?

Our experience has been that few organizations treat transparency strategically. But instilling the same discipline to your transparency efforts as you do to other aspects of your business will reap dividends. To do this, consider developing a transparency “tool kit” to facilitate decision-making and consistency across your organization. The tool kit should consist of agreed standards, processes and controls to govern how you assess transparency and how you use the information once you receive it.

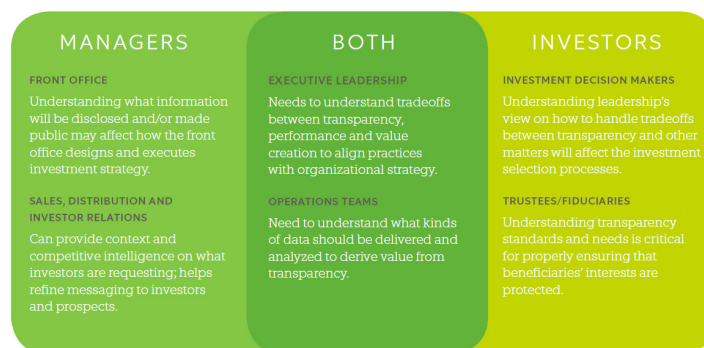
While your tool kit should reflect your unique requirements, the overall process of developing it typically would include the following steps:

1. Identify Stakeholders

While transparency is critical for risk management, decisions around transparency practices actually affect a much broader swath of an organization, as you can see in Exhibit 1.

As the chief financial officer (CFO) from a large fund-of-funds manager pointed out, investors “want to make sure they are good stewards to their end investors and that they can rely on us to help them fulfill that obligation.” Taking a broader view and incorporating appropriate stakeholders will help you build a better and more flexible tool kit.

Exhibit 1: Beyond Risk Management - Stakeholders in Transparency Practices



2. Prioritize Types of Transparency

As we discussed earlier, there are many types of transparency. It’s important to weigh your needs as they relate to the various types so that you have a clear understanding of what’s important to your organization. As a manager, providing some types of transparency may be an important part of your strategy (as may be the case for funds focused on environmental, social and governance [ESG] strategies). Providing other types might constrain your potential returns (as in the case of valuations for a private equity fund).

As an investor, regulation dictates some of your transparency needs. Other types of transparency may have higher and lower priority. Knowing which are crucial, and what you’re willing to exchange for that transparency, will make the conversations more

effective. As Kathleen Olin, chief compliance officer at Indus Capital Partners, explained, “The most productive conversations we have about transparency are those where investors are crystal clear about their ultimate aims and goals.”

3. Rank Key Questions and Build Your Tool kit

Once you’ve identified stakeholders and prioritized the types of transparency you need, you’re ready to begin actually developing your tool kit. As with all strategies, your plan should revolve around what you want to achieve. The insight you gain by refining what you mean by “transparency” and what tradeoffs you’re willing to make to achieve it can help you specify your transparency-related goals.

From here, a list of strategic questions emerges. The specific questions on your list will depend in large part on what you want to achieve related to transparency. Some questions that may be more universal include:

For Managers

- What “industry standard” levels of transparency do our peers provide?
- What regulatory requirements might apply to us or to our investors?
- What types and depth of transparency are we willing to provide out of the box vs. value added?
- What guidelines should we follow when negotiating transparency in exchange for other concessions, such as longer lockups, minimum investment size or higher management fees? Who has final say on negotiations?
- How will we communicate with investors who are asking for transparency we cannot or will not provide? What can or will we share with them to explain our reasoning?
- What are our operational processes for compiling/delivering transparency data to investors?

For Investors

- What’s the minimum acceptable level of transparency in an investment?
- Who certifies that an investment meets transparency standards?
- What’s the process for exempting an investment from transparency standards?
- Who negotiates transparency with managers, and what are our standards around side letters, separate accounts and other transparency mechanisms?
- How do pre- and post-investment assessments of transparency differ?
- What processes, controls and/or systems need to be in place to make use of the transparency we receive?

Answering such questions will lead you to a set of practices that can help you consistently manage transparency demands in concert with your broader organizational strategy and goals. Having executive sponsorship when sharing these new practices

across your organization can help create awareness and promote compliance with the new policies.

Creative Thinking Can Bridge the Gap

Be aware of assumptions you make when building your transparency tool kit. Just because you’ve always done something one way, doesn’t mean it’s the only possible solution. A willingness to consider different ways to accomplish your goals might make it easier to find common ground.

As an example, it’s natural to assume that transparency means the data is delivered to the investor’s offices and housed on the investor’s servers. But in some circumstances, the manager may not feel comfortable sending data because it no longer has control over how that data is used.

Jane Buchan, chief executive officer at PAAMCO, says they have found a way to allow investors access to the data they want without giving up control by challenging the assumption that data must be delivered to investors to be useful.

“We allow our investors to come on site to our offices and inspect almost anything within reason,” Buchan says. “We feel there’s no reason why an investor shouldn’t be able to see – or even conduct tests on – a portfolio while they’re here. It satisfies the investor’s need without the managers worrying about the data getting into the wrong hands.”

This is just one example of how what could be a barrier to transparency can be overcome with creative thinking.

By being aware of and deliberately challenging certain assumptions, you may be able to identify creative solutions to other transparency issues you’re facing.

4. Establish Practices for Review

Today’s solutions can quickly become tomorrow’s challenges if you’re not deliberate about taking stock and adjusting your strategy. You should regularly review your transparency tool kit – at least annually. This allows you to assess changes in market practice, review organizational strategy, and test and confirm controls and procedures. In particular, you’ll want to be sure to account for:

- Trends in capital structure and fund design and their effect on transparency;
- Evolving investor expectations and needs in response to market volatility, regulatory demands, thought leaders and other factors; and
- Fintech innovation and how to properly address the opportunities and challenges created by disruptive technologies such as blockchain and artificial intelligence.

Regardless of how you design your process, deliberate review and adjustment are essential to making sure your actions remain aligned with your long-term strategic goals.

Forging a Partnership Between Investors And Managers

Alternatives are different from other asset classes. Traditional equity and fixed income assets are transactional and can be bought or sold more or less on demand. Alternative investments,

on the other hand, are complex long-term commitments, and both investor and manager enter into a relationship more akin to a joint venture than a transactional investment. If the parties understand one another and have complementary objectives, the fund is more likely to succeed. If both parties think about their relationship in a different light and approach their interactions as a partnership, finding consensus on transparency may be easier.

The Challenges of Standardization

Many organizations have attempted to create standardization around transparency in alternatives investing, especially in the wake of the liquidity crisis in 2009:

The buy-side advocacy firm, Institutional Limited Partners Association (ILPA) advocated for the standardization of capital call, distribution and valuation information as far back as 2005.

Open Protocol Enabling Risk Aggregation (OPERA) advocates for standards for the hedge fund industry, aimed at standardizing data and formats for providing risk and exposure data to investors.

The National Council of Real Estate Investment Fiduciaries (NCREIF), National Association of Real Estate Investment Trusts (NAREIT) and the International Property Databank (MSCI IPD) have all issued similar calls for the real estate sector.

The International Private Equity and Venture (IPEV) Capital Standards Group put forth a principle-based approach for completeness of statements rather than rule-based standardized templates.

The Standards Board for Alternative Investments (SBAI) advocates for a framework of transparency, integrity and good governance to improve the alternative investment industry.

“There’s a lot of variance in terms of mission and scope across groups,” says PAAMCO’s Jane Buchan. “Some are very narrowly focused on one or two issues, while others are taking a broader perspective.” Given how numerous and how varied industry groups are, investors and managers both should evaluate their priorities and focus their time, money and efforts coordinating with groups that best represent their long-range goals.

Despite these challenges, many in the industry see a broader benefit in efforts to increase transparency into alternative investments. As the fund-of-funds CFO we spoke with pointed out, “To gain widespread adoptions, these organizations need to ensure that the volume of information requested is commensurate with its use. In other words, do the majority of users require the information? Managers are generally willing to provide additional information, but having to provide massive amounts of quarterly information in multiple formats is not sustainable for many small to mid-sized managers.”

This underscores the need for a broader cross-functional discussion between the buy and sell sides to arrive at mutually agreeable and supportable practices if the industry hopes to define a workable standard.

Because we support both investors and managers around the globe, we see the complexity and subtlety on both sides of the transparency discussion. While we don’t presume to know the best way to solve these issues, we do believe that the path forward involves reframing the conversation. Rather than talking about transparency within silos (managers with other managers; investors with other investors), we need to have industry dialogue that reaches across these barriers and involves all parties in an industry-neutral setting. And it’s important that these conversations include the people involved in generating or using the data, who may have a more intimate understanding of the complexities involved than their firms’ executives likely do.

Starting the conversation with a more nuanced view of transparency, and a clear understanding both of your own and the other party’s needs can help managers and investors align objectives. Armed with a deeper understanding of the challenges faced by your “partner” in the investment relationship can help you reach a solution that is palatable to you both.

Many of the professionals we spoke to, on both the buy side and the sell side, spoke to the benefits they see to this cooperative approach. The CFO of a large private equity firm explained that in his experience, deeper conversations are important. “Having a conversation to understand the basis of a request allows us to provide the most useful information to the investor.”

The existence of these legitimate barriers to transparency is one of the main barriers to reaching an industry consensus today. For example, managers may face challenges in providing the requested transparency because of the complexity of the data needed, or the potential damage providing the information might cause them. These issues are not easily overcome and can make delivering transparency more costly than either party may want.

Convergence as a Driver of Complexity

Transparency isn’t the only trend shaping the alternatives landscape. For several years we’ve seen a trend towards convergence among alternative managers, including:

- Managers diversifying products to include a combination of hedge, private equity, real estate, and infrastructure strategies.
- Strategies that include tangible assets alongside listed securities, derivatives, currencies, etc.
- The adoption of more complex capital structures.

While a separate trend, convergence has an impact on transparency discussions. The inclusion of more varied strategies, structures, and underlying securities in alternative funds make it more important for investors to understand their exposures. At the same time, more complex holdings make it more difficult for managers to systematically pull, consolidate and deliver transparency data.

Investors, conversely, have legitimate data needs for risk management, stress testing and due diligence, but the variance in data formats and the systems and talent requirements needed to normalize and get value out of the data present their own layer of expense and complexity.

To help facilitate a better understanding of the challenges each group faces related to transparency, we have outlined some of the key issues in the illustration on the opposite page.



Holdings

Investors Say

- I can't have "black holes" in my portfolio. I need to understand exposures and allocations for risk and stress testing.

PE, RE, Infrastructure GPs Say

- We provide complete information on underlying holdings in our statements.
- Our investments don't lend themselves to traditional risk and exposure analytics.

Hedge Funds Say

- Sharing my positions compromises my IP
- Regulatory reporting already strains my ops teams, I can't provide this in every investor's requested format too.
- Investors who want holdings transparency can set up a separately managed account.



Valuations

- I need confidence in valuation practices to satisfy audit requirements.
- I need to understand valuations to support ASC 820/ IFRS 13 reporting.
- I can't assess risk unless I have holdings AND valuations.

- Public disclosure of valuations and methodologies may cap the maximum sale value of our assets.
- If valuation calculations are public, it could hurt an eventual IPO.

- We share our pricing policy with investors as standard practice.
- We're open to discussing valuation practices, but valuing specific assets leads to holdings, and we need to protect our intellectual property.



Fees

- I need detail to confirm that assessed fees match legal documents.
- Fee detail is essential for assessing value creation.

- The complexity of fee rebates makes investor-level disclosures a challenge.
- We need to choose the best providers; I can't do that if I have investors who are primarily concerned with costs.
- If fees are made public via FOIA request, it opens us up to reputational risk and regulatory scrutiny.

- Gross vs. net returns are listed on investor statements.
- Providing detailed fee calculations for every investor is an operational challenge.



Operational

- I need to demonstrate that I've done my due diligence on controls.
- I need to be able to see and understand a manager's processes to be comfortable with an investment.

- Our business is different; it's not "apples to apples" with other fund types, and so investors may not understand that our controls are adequate.
- We issue an annual SOC1-type report; on-site due diligence places a lot of strain on our team and impedes focus.

- Due diligence visits are a standard process; we work with our administrator to make sure investors have what they need.



Liquidity

- I need to understand liquidity details to manage cash flows and meet obligations.
- I have to be able to forecast market liquidity to plan for volatility or unforeseen events.

- We provide information on capital calls as fast as possible, but sometimes investment opportunities arise quickly.
- We have a lot of bi-lateral agreements with individual investors; providing detail to each one is a logistical challenge.

- Lockups are essential for our strategy; shorter lockups can affect performance.
- Terms and conditions are detailed in the subscription documentation and in agreed side letters.

Barriers to Transparency: Some High, Some Low

Sometimes investors and managers can easily find common ground on transparency because the barriers to providing the requested information are low, and the benefits for both sides are higher. For example, investors focused on ESG criteria are likely to have a strong desire for transparency into a fund's underlying holdings. Managers of ESG strategies often recognize that offering that holdings transparency is a compelling product feature and are more likely to do so.

In other situations, the balance may be harder to achieve. It's easy to understand why an investor would want transparency into valuation practices, and many managers have made an effort to provide them with the relevant valuations for their funds. But some investors still are looking for more – often information about the methods used to generate those valuations or some type of independent verification that the valuations are sound. But what if disclosing details about valuations (and making those valuations subject to FOIA requests) effectively puts a cap on the asset price, limiting the manager's ability to sell assets at a higher price? What if disclosure affects the price of an initial public offering (IPO)? In these scenarios, transparency may work against both the manager's and the investor's long-term interests.

As the CFO of a fund-of-funds manager told us, "We believe managers have a duty to provide investors with as much transparency as possible. But we also understand that this can cause material impacts to their operations if information, such as the manager's valuation of a company, becomes public. In our experience, most managers are able to strike a balance so that we have the information we need and their sensitive information is not compromised."

Moving Toward Consensus and Better Practice

No "magic bullet" exists that fully meets the needs and objectives of all parties at all times. Especially when it comes to transparency, compromise between individual investors and their managers will remain important. However, when we look at the issue of transparency in its entirety, we do believe it's possible for the industry to move toward better practices and consensus around key issues.

The first step involves taking a more deliberate and nuanced approach to transparency discussions among all parties. It may require both sides to better define what transparency means to them specifically, and what tradeoffs they're willing to make in exchange for achieving it. Taking a more strategic approach to transparency may also help provide a better framework for making these decisions, and ensuring that the information received or provided is as logistically manageable as it is strategically valuable. And finally, it involves moving the relationship between investors and managers toward more of a partnership approach, in which the partners gain a better understanding of the needs and challenges of their fellows.

As the chief operating officer of a large corporation said, summing up their experience on getting the transparency they need, "If you know what you need, can have a knowledgeable staff member articulate it to the manager clearly, and show some patience and empathy, you will get what is needed."

Authors' Bios



Paul Finlayson, CPM
Northern Trust

Paul is a Senior Vice President at Northern Trust, leading the development of investment reporting and analysis services for institutional clients and family offices. Paul's career has included extensive work in product development, risk and performance analysis, consulting, and investment policy development, in addition to authoring numerous articles and white papers. Paul is a member of the research counsel of the Institution for Private Capital. He holds a Bachelors degree from DePaul University and is a Certified Product Management Professional.



Stuart Lawson, CPM
Northern Trust

Stuart is a Senior Vice President, responsible for leading product development of alternative investment management solutions. Based in Guernsey, his career includes service as Chairman of Northern Trust (Guernsey) Limited, directorship positions at several companies base in the Channel Islands, and a number of roles in accounting, fund administration, finance, risk and executive leadership with Northern Trust's Guernsey office. Stuart is a Fellow of the Chartered Institute of Certified Accountants, holds an honours degree in Social and Environmental Studies from London Metropolitan University and is a Certified Product Management Professional.



Matt Smith
Northern Trust

Matt is a Vice President with Northern Trust, responsible for leading the development of private equity fund administration and accounting services for North American clients. Matt's career at Northern Trust has included roles in operations, business development, client onboarding and management. Prior to Northern Trust Matt held senior roles in operations and consulting with a number of private equity firms. Matt holds a bachelors degree from Brigham Young University and an MBA from the University of Oxford.



Private Debt in an Institutional Portfolio

Sanjay Mistry

Mercer Private Markets

Tobias Ripka

Mercer Private Markets

Background

Over the last few years, institutional investors have been increasing allocations to return-seeking fixed income strategies and illiquid alternative assets. In doing so, the level of portfolio sophistication within both allocations has also been increasing and roles within the portfolio get more explicitly defined. Some investors are looking for higher yield, some for more diversification and some taking opportunistic positions resulting from market dislocations. Consistent with this development, one of the investment opportunities that Mercer has highlighted over the years has been private debt; as an asset class that we believe is attractive on risk-adjusted grounds, which can play different roles in the portfolio context and directly plays into the financing void which has arisen post the global financial crisis. Private debt is similar to a loan in that it is capital provided (as an investment) to an entity in exchange for interest (and possibly

other payments) and the return of the original principal at a defined point in the future. The debt is typically secured and has various protections/covenants in place. The debt is also not widely held, and is customised to the borrower's requirements, thus rendering it illiquid. We note Private debt strategies investments have existed for a number of years, but were for a long time the preserve of a minority of investors of whom banks were the most significant. Today, private debt is an asset class increasingly considered by a broad range of institutional investors.

Although we see private debt as, first and foremost, a return opportunity, a degree of diversification with more traditional credit exposures can also be expected. Private debt encompasses corporate debt, real estate debt and infrastructure debt, as well as some opportunistic credit strategies. For each form of debt, exposure could be via senior loans or subordinated/mezzanine loans. Issuers may be investment grade, but on the whole the private

debt market is sub-investment grade and similar in some regards to the syndicated/bank loan and high yield markets, but typically with higher yields, additional return sources and different market dynamics.

Introduction and Classification

The attractiveness of the private debt market is often linked to the aftermath of the global financial crisis, overleveraged banks, shrinking balance sheets, and the impact of international banking regulation on banks' lending activity. While there is a positive tailwind from the changed market dynamics (particularly in Europe), we believe there is a strategic role for private debt in institutional portfolios.

With the long-term nature of liabilities, pension funds and other institutional investors are in a position to offer liquidity to the market and thereby realise an illiquidity premium. Considering the attractive return potential of private debt, it is one manner in which investors can diversify from equities and yet maintain a similar level of expected return.

Depending on how a private debt portfolio is constructed, it could qualify for different allocation categories in an institutional portfolio. Private debt portfolios are typically seen as a complement to existing return-seeking fixed income allocations, also called "growth-oriented fixed income". Subordinated (and some senior) private debt strategies with significant equity upside might also qualify as a complement in the private equity allocation or investors might implement this as a broader

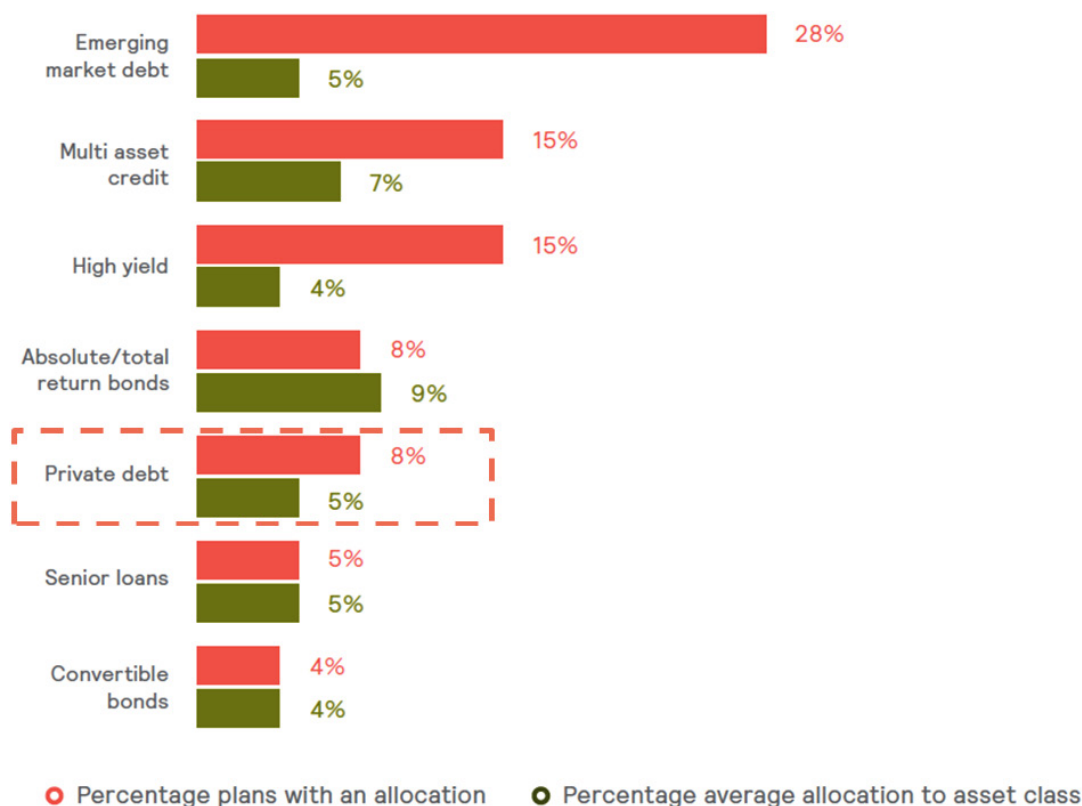
private markets allocation (across private equity, private debt, infrastructure and other real assets).

While the institutional interest in private debt is steadily growing, the proportion of European institutional investors with a private debt allocation is still relatively low, based on Mercer's Asset Allocation Survey 2015. Within the "growth-oriented fixed income" allocation private debt is competing with a broad set of fixed income categories but in particular with high yield bonds and senior loans (referring to syndicated, senior, bank loans) as more liquid options in the leveraged finance sector. The allocations are, however, not far behind the proportion invested in private equity (which is not shown in Exhibit 1 but stands at approximately 11% with an allocation and at an average of approximately 5%).

The table in exhibit 2 shows that private debt offers several advantages over high yield (incl. floating rate, lower mark-to-market volatility) or senior bank loans (incl. higher returns, prepayment protection) and also often stronger covenants and better information/monitoring rights. This comes however at the price of lower liquidity, access via closed-ended funds, and the need for more resource-intensive implementation and monitoring processes.

In an environment of low yields, extended equity bull markets and where many assets (across equity and fixed income markets) remain volatile and sensitive to market sentiment, we believe it is worth exploring a private debt allocation in more detail.

Exhibit 1: Strategic Allocation to Growth-oriented Fixed Income*



*Growth-oriented fixed income is a category, which includes fixed income assets and strategies expected to generate returns in excess of government bonds and investment grade credit.

Source: Mercer

Exhibit 2: Private Debt vs. High Yield Bonds vs. Senior Bank Loans

Characteristic	Private Debt	High Yield Bonds	Senior Bank Loans
Instrument	Loans (kind of contract)	Bonds (securities)	Loans (kind of contract)
Coupon structure	Mainly floating (Libor + X%) (US Mezzanine often fixed rate)	Fixed rate (Y%)	Floating (Libor + Z%)
Prepayment option	Yes, often with penalties for the borrower	No	Yes
Arranged by	Investment Managers	Banks	Banks
Liquidity	Low	Moderate	Low to moderate
Strategy	Active sourcing, then Buy and Hold	Active portfolio management	Active portfolio management
Typical positions per fund/portfolio	15-30	80-120	100-150
Market volatility	Low	High	Moderate
Typical target return (2015)	Senior 6-8%, Unitranche 8-11%, Mezzanine 11-16%	4.5-6.5%	4.0-5.5%
Recovery in default	Depending on seniority, but typically secured	Low (unsecured)	High (senior secured)
Sources of return	<ul style="list-style-type: none"> • Libor • Credit spread • Credit research (avoiding defaults) • Illiquidity premium • Arrangement fee 	<ul style="list-style-type: none"> • Credit spreads/coupon • Credit research (avoiding defaults) • Upgrades/price moves • Interest rate risk 	<ul style="list-style-type: none"> • Libor • Credit spread • Credit research (avoiding defaults)
Implementation	Typically investment in Limited Partnership	Typically segregated account or institutional pooled funds	Typically segregated account or institutional pooled funds

Source: Mercer

Private debt can be classified into a number of different sub-categories. The three most common methods are by seniority in the capital structure (senior, subordinated, unitranche), the type of lending transaction (corporate, infrastructure or real estate) and geography (North America, Europe, Asia/Emerging Markets). This allows the defining of expected target returns; although exceptions might apply for specialist/niche strategies.

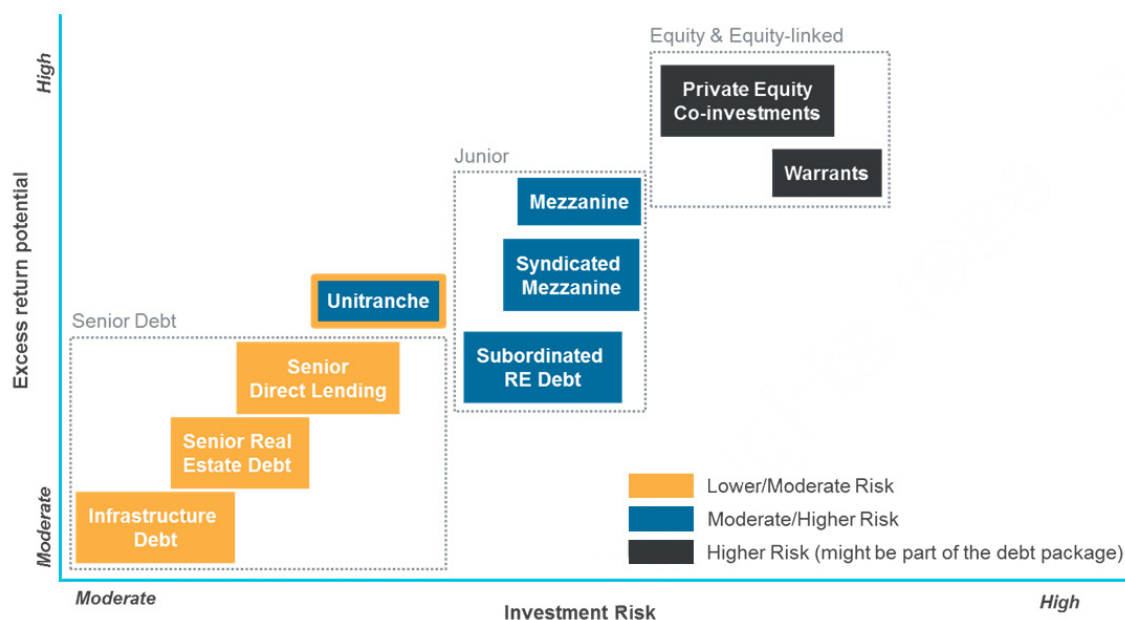
The broad private debt universe allows investors (who have some tolerance for illiquidity) to structure a portfolio that meets their individual risk/return objectives, to realise an illiquidity premium and to benefit from further diversification.

Implementing a Private Debt Allocation

Compared to traditional asset classes and most other growth-fixed income categories, the private debt implementation process looks different and operates more in line with the implementation of private equity allocations. Private debt funds are typically less diversified (by number of positions) than senior bank loan funds so it is in the hands of investors to ensure adequate portfolio diversification exists.

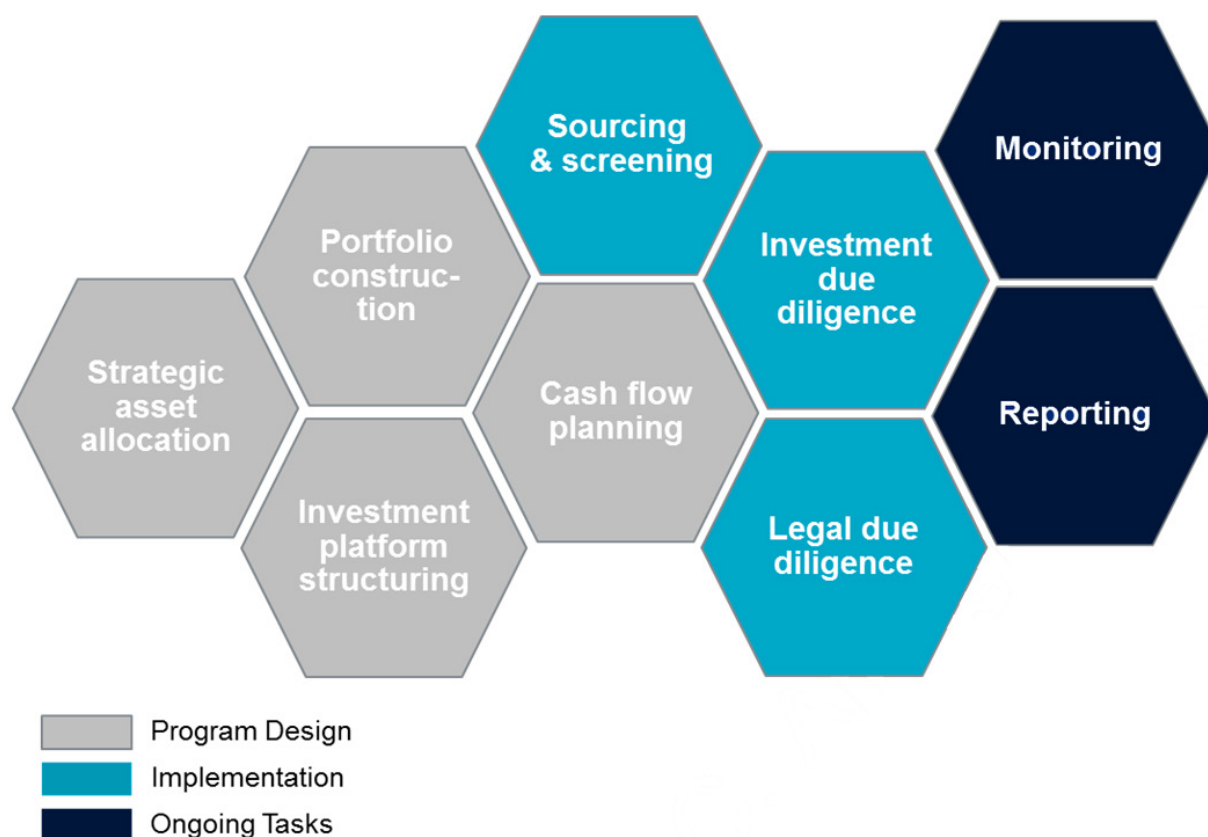
Private debt managers only accept new monies during their fund-raising periods and then call/invest the committed capital over the following years. Therefore, it will take time to allocate capital

Exhibit 3: Private Debt Risk/Return Levels by Category



Source: Mercer

Exhibit 4: Private Debt Investment Process



Source: Mercer

to a set of high quality managers, and it will take additional time until they have invested the committed amount (i.e. a high quality private debt portfolio cannot be invested overnight).

These factors have to be reflected in investors' strategic allocation planning and investment process. Many steps of the process are actually linked and should be considered in the overall context.

Program Design

Strategic asset allocation process

For many institutional investors, it can be challenging to consider new asset classes in their strategic asset allocation (SAA) process. While the SAA process is typically beta driven, when allocating to private debt investors should also be mindful of the implementation and portfolio construction considerations and the impact it can have on the SAA. We believe this is also true for other asset classes that have a significant part of the return influenced by alpha. This is because the risk levels of selected strategies can vary significantly between managers depending on their investment style.

As for other private markets, there is not one right, straightforward way to include private debt in the SAA process. The challenge is that three simple inputs (return, risk, correlation to other asset classes) have to be set to describe a complex asset class that doesn't have reliable, observable monthly return data to derive a return pattern. Additionally, institutional investors have to decide whether the risk assumption should reflect the fundamental risk (typically used) or the expected, visible mark-

to-market volatility (which is typically quite low and represents an accounting perspective).

The SAA assumptions have a strategic nature (10+ year horizon) and represent the expected market performance. The assumptions therefore only hold for diversified private debt portfolios. Exposure to one manager with a portfolio of 15-30 loans bears material idiosyncratic risk, and this would not be an optimal approach to implement a strategic allocation.

The selected strategic return assumption is a key input, which will guide the portfolio construction and investment process at the next stages. A main consideration here is whether the focus should be on a steady yield with moderate risk (mainly senior private debt) or on higher growth potential and equity upside with an increased risk profile (focus on subordinated debt or opportunistic senior strategies).

To justify the implementation effort and to generate a meaningful contribution to the total portfolio, target allocations between 5% and 10% appear reasonable. Investors should, however, be mindful that it will typically take around 3-5 years to build up a robust private debt allocation; ongoing investments then have to be made to keep that allocation at the targeted level.

Portfolio construction and investment platform structuring

Once an allocation level is set, investors have to think about constructing an optimal portfolio structure to meet their targets. As for other asset classes, diversification is key to managing periods of market stress and surviving extreme events. We

generally argue for a well-diversified portfolio. In the private debt case, several investor specifics must also be considered:

- Category: Corporates vs. real estate vs. infrastructure
- Seniority: Senior vs. unitranche/mixed vs. subordinated
- Region: Europe vs. North America vs. Global
- Currency: Often linked to regional allocation
- Managers: Optimal number and consideration of managers' fundraising schedules
- Deals: Number of, and diversification across, underlying deals
- Time: Diversification by vintage year
- Market: Opportunities and outlook

Category & Seniority: Both are linked to the investor's targeted return. Infrastructure debt and real estate debt have on average lower target returns (typically in line with their lower risk). Senior debt fits moderate return expectations while subordinated strategies target returns closer to/higher than equities. The recent development of the unitranche segment in Europe or a mix of senior/subordinated funds allow for a more balanced portfolio profile. Investors should consider the actual investment universe early in the process. The numbers of available debt providers globally vary significantly across categories. There is a large universe of corporate private debt managers, while the universe is smaller for real estate debt and infrastructure debt.

Region & Currency: Both are linked as most managers do not offer currency hedged share classes. It is therefore often the investor's responsibility to seek a hedging solution or alternatively accept the currency risk. North America and Europe are the two major markets; while North America is deeper and more institutionalized, Europe is evolving at impressive speed. Both markets have their own dynamics and are generally worth combining as different economic cycles drive asset values and default rates over time.

Managers & Deals: The spread of outcomes between top quartile and bottom quartile managers in the private debt universe can be high. This can be driven by different risk/return profiles, but also the quality of the managers (deal sourcing and credit analysis capabilities). Therefore extensive manager due diligence is key to understanding the actual strategy profile and quality of the manager. In any case, diversification by number of managers/strategies should be a core principle when building a private debt programme. Even for lower risk private debt programmes the impact of defaults can be material given the concentrated portfolios (often in the range of 15-30 underlying deals). Spreading exposure across individual loans is the most important way of controlling the asymmetric return profile of single deals (loans have capped upside, but the potential risk of a full write off).

Time & Market Opportunities: Individual managers typically operate closed-ended fund structures, coming to market every two to four years. Building a private debt programme with regular commitments is an approach designed to target specific top managers as they come to market. This is the best way to access

top managers whilst diversifying across deals, tilting the portfolio towards opportunities or the target allocation. Vintage year exposure ensures diversification by time and is also integral to reaching a stable private debt allocation. It also helps to overcome single disappointing years with low deal activity, tight pricing or increased number of defaults; factors which influence returns but can only be measured with hindsight.

Cash flow planning

Cash flow and commitment planning is important when building a strategic private debt allocation. It facilitates structured diversification across vintage years (allowing for expected capital calls and distributions), stronger ability to allocate to high quality managers, and also to tilt the portfolio towards attractive markets. Regularly committing to private debt will also enable investors to maintain a steady target allocation to the asset class. If a commitment is only made to private debt every couple of years the overall amount invested in private debt will go through peaks and troughs, and the investor may rarely be at a point where the overall target allocation is reached.

Implementation

Fund Sourcing and Due Diligence

A thorough due diligence process is one of the most important elements of the private debt investment process. Unlike in the traditional fixed income world, there is no reference benchmark managers aim to replicate and the concentrated portfolios increase credit risk and the impact of single defaults. The outcome of private debt strategies will therefore vary significantly depending on the strategy profile (investment universe, concentration, subordination, etc.) but also credit analysis skills, default protection or restructuring experience of the managers. A detailed due diligence exercise should disclose whether lower performance results are consistent with lower levels of investment risk, weak implementation or excessive costs (for example, traditional senior loans should yield lower returns than mezzanine portfolios).

A thorough manager due diligence process should cover several dimensions. For example, strategy profile, experience of the investment team, resources, sourcing capabilities, credit expertise, track record, current opportunity set, attractiveness of fund terms and legal/tax aspects.

If the strategy passes the initial strategy review, the next objective is to figure out if the manager is able to deliver the target return and also if it is well positioned against peers in that market segment. Those details are covered in the actual due diligence process, which should combine a qualitative and quantitative assessment. The focus should always be the specific fund/strategy; established firms might offer mediocre/weak strategies, move into new segments or offer unattractive fund terms.

One key element assessing the quality of a private debt strategy is the experience of the investment team. Important to consider is that direct lending is a relatively young segment in Europe and therefore not many managers will tick the box for a 10+ year performance track record. The focus should therefore be on adequate experience across the team –often a mix of direct

lending experience, mezzanine investing, levered finance and credit analysis backgrounds. As sourcing attractive deals is an important element of any successful strategy, there should be members on the team that can demonstrate a strong deal sourcing network (with access to non-competitive opportunities) and have actual experience structuring and underwriting deals.

With the growing universe and increasing competition in the market, the sourcing network is a critical differentiator. While on paper the deal sources appear similar across managers, the true quality can be quite different. Strong sourcing capabilities require resources and an adequate team size is an imperative; local people on the ground or native speakers can provide a competitive edge. The actual breadth and quality of deal channels can further be verified by reviewing the deal history on a case by case basis (deal source – sponsor, advisor, bank etc.; number of different counterparties, primary vs. secondary opportunities, role in each transaction – lead, co-lead, follower; attractiveness of negotiated terms, pre-payment protection, leverage, defaults, recovery ratios, etc.). If the firm/strategy history is short and the overall setup nevertheless looks attractive, one might look at the personal track record of selected senior people or related activities (e.g. mezzanine or smaller senior loan transactions).

Credit expertise (main focus for senior) and operational experience (esp. for deals with significant equity exposure or higher restructuring risk) are also highly important. Most credit reviews follow a similar blueprint across most private debt managers – in particular for sponsored deals (deal team reviews due diligence package, discussion with the investment committee at several stages, building of models, stress testing, benchmarking vs. industry peers, background checks, etc.). Differentiation is thus the area of focus.

For managers with a longer history, track records of the predecessor funds summarise all elements in a few numbers (IRRs, multiples, gross and net). Drilling down historical results (e.g. income vs. capital gains, defaults, recoveries) on a single deal basis provides a good understanding of strengths and weaknesses of a strategy/team.

The difference between gross and net results is a good starting point to review the cost and compensation structure. A fair combination of components in the proposed cost structure (management fees, carried interest, adequate hurdle rates) is key to make a good strategy an attractive investment net of fees.

Of further relevance are GP/team commitments, investor rights (no fault provision, a strong key person clause), investment limits and the fund structure in general. Incentive structures and items like carry distribution within the investment team are often linked to the firm/team stability. This is another important layer of analysis considering the longer lock-up period of private debt funds.

Additionally, a legal/tax due diligence is important considering the nature of the closed-ended funds (typically Limited Partnerships). This is a country- and even investor-specific analysis and should typically be performed in cooperation with a local legal advisor reflecting investor's individual tax and regulatory framework.

Ongoing Tasks

Monitoring and Reporting

This should be familiar to most institutional investors and would be expected to cover similar issues investors seek to address for the other asset classes in the portfolio. Such issues include changes with the manager, updates to the fund terms, performance issues, reporting and meeting regulatory requirements.

Unfortunately, our experience shows that this is not as easy for investors to undertake when it comes to private markets, including private debt. Monitoring is long term, time-consuming and often requires investor's to invest more time and resources than initially expected. We often find that private markets measurement and accounting systems might not interface with the reporting systems used for the traditional portfolio holdings. While experienced investors should have the know-how and budget to manage post-investment issues, newer investors may struggle or require assistance.

Going Forward

Private debt investing by institutions has witnessed tremendous growth since 2008 and continues to accelerate. What was once an opportunistic play has become a viable longer term choice for investors as part of the SAA process. However, the allocation needs to be made in a thoughtful manner, recognising the nuances of this asset class and requires more investor resources relative to traditional markets.

As the private debt market continues to grow and managers gain experience, choices will increase, and investors will become more familiar with the private debt market. We thus believe the window for private debt investing will continue to open wider over time, as will the need for increased resources and expertise, for both the implementation and monitoring of the allocation.

It is our view that for investors to succeed in the private debt market, they need to ensure they cover the range of options in the market, establishing clear implementation plans with appropriate diversification, have expertise or support to undertake extensive due diligence and relationships to gain access to high quality managers. Only then will investors ensure their risk-adjusted performance is truly rewarding.

Important Notices

References to Mercer shall be construed to include Mercer LLC and/or its associated companies.

© 2016 Mercer LLC. All rights reserved.

This contains confidential and proprietary information of Mercer and is intended for the exclusive use of the parties to whom it was provided by Mercer. Its content may not be modified, sold or otherwise provided, in whole or in part, to any other person or entity, without Mercer's prior written permission.

The findings, ratings and/or opinions expressed herein are the intellectual property of Mercer and are subject to change without notice. They are not intended to convey any guarantees as to the future performance of the investment products, asset classes or capital markets discussed. Past performance does not guarantee future results. Mercer's ratings do not constitute individualized investment advice.

Information contained herein has been obtained from a range of third party sources. While the information is believed to be reliable, Mercer has not sought to verify it independently. As such, Mercer makes no representations or warranties as to the accuracy of the information presented and takes no responsibility or liability (including for indirect, consequential or incidental damages), for any error, omission or inaccuracy in the data supplied by any third party.

This does not constitute an offer or a solicitation of an offer to buy or sell securities, commodities and/or any other financial instruments or products or constitute a solicitation on behalf of any of the investment managers, their affiliates, products or strategies that Mercer may evaluate or recommend.

Authors' Bios



Sanjay Mistry, IMC
Mercer Private Markets

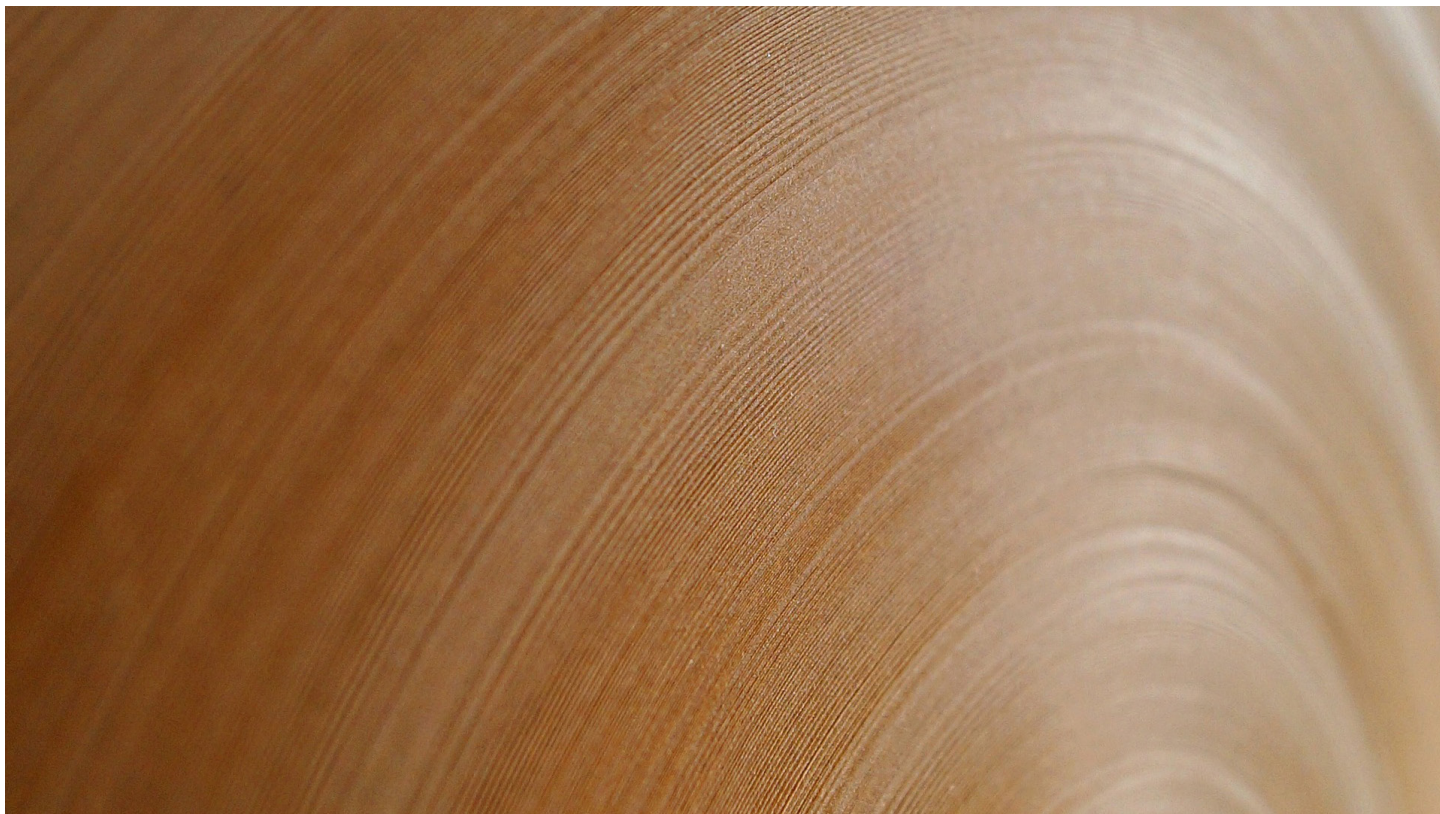
Sanjay Mistry is a senior member of Mercer Private Markets ("MPM"), a specialist unit within Mercer's Wealth business and has been leading MPM's efforts in the area of private debt since 2009 and sits on the MPM Investment Committee. Based in London, he invests as a portfolio manager in private debt and private equity on a primary, secondary and co-investment basis on behalf of MPM's discretionary funds and delegated clients as well as advising across the full range of private market investment activities for MPM's advisory clients. He began working on private markets portfolios and covering the European private markets industry in 1999. Over the years he has worked with numerous institutional investors, globally, building their private markets allocations, assisting with fund selection, portfolio construction and implementation of such investments and has produced numerous white papers on private markets. Sanjay also sits on a number of LP Advisory Boards on behalf of MPM and MPM clients.

Sanjay has over nineteen years of experience within the investment industry, beginning his career with Mercer in 1998 originally in a wider investment consulting role advising multi-billion \$ Government Funds, Pan European endowments and multi-national corporate pension plans. Sanjay graduated from City University with a first class honours Bachelor of Science in actuarial science. He is a member of the Institute of Actuaries and holds the IMC.



Tobias Ripka, CFA, FRM
Mercer Private Markets

Tobias Ripka is a Principal within Mercer's Wealth business. He is the Alternative Investments Leader in Germany and a member of Mercer's Private Markets group. He started to work at Mercer in 2005; over the years he has been advising many clients on investment strategy, portfolio construction, and implementation topics with a particular focus on alternative investments. He was further a member of Mercer's Alternatives Research Boutique responsible for researching private debt and other alternative investment strategies. Tobias holds a master-level degree in business administration from the Justus-Liebig-University Giessen, Germany. He is a CFA Charterholder and also a certified Financial Risk Manager, and completed the private equity post-graduate program at the European Business School, Germany.



De-Risking Concentrated Stock Positions

Tom Boczar
Intelligent Edge Advisors

Nischal Pai
Intelligent Edge Advisors

Executives and employees of public companies often accumulate company stock over the course of their careers. Company stock can be acquired through grants, as well as stock-linked compensation such as restricted stock, restricted stock units, stock appreciation rights, incentive stock options, non-qualified stock options and employee stock purchase plans. Although the number is declining, many employers offer their own public company stock as one of the investment options in their defined contribution retirement plans, and encourage company stock ownership by plan participants— as of 2015, the largest 100 DC plans of public companies held just over \$200 billion in company stock, or 18% of total plan assets.¹ It's also not unusual for senior management of public companies to establish company policy to adhere to the recommendations of the influential corporate governance and proxy voting firms such as ISS and Glass Lewis, which recommend that senior executives retain ownership of a stated minimum amount

of company stock. For instance, as of 2014, 41% of Fortune 500 companies required their CEOs to retain company stock until they had accumulated an amount equal to five times their base salary, and 40% required a multiple of six.² And of course, company “insiders”³ are subject to securities laws and regulations that place additional significant limitations and restrictions on if, when, and how much company stock they can sell. As a result, public company executives, employees, and retirees often find themselves owning or otherwise exposed to an amount of company stock that comprises the bulk of their net worth.

Of course, investors often obtain their concentrated positions through other means. Some acquire their positions through inheritance or gift. Others secure stock through a liquidity event borne out of entrepreneurial success. Additionally, some investors embrace a fundamental research-driven, long-term, buy and hold strategy to accumulate their huge gains.

With global stock markets hitting new peaks, interest rates ratcheting up, and risks seemingly lurking everywhere around the globe, prudence might suggest that investors should sell or otherwise divest of some or all of their highly appreciated shares. In fact, many executives, investors and trusts with highly appreciated stock positions heed this advice and do diversify out of some portion of their positions over time using outright sales, as well as other tools such as exchange funds,⁴ equity derivatives,⁵ and charitable remainder trusts.⁶

But most are reluctant to diversify out of their positions entirely, and for a variety of reasons. Some find the dividend yield on their stock attractive relative to current fixed-income yields. Many feel a strong emotional connection to the stock because they helped build the business, spent their career there, or received their shares from a loved one who had a close relationship to the company. Others face restrictions on selling their shares, constrained by either securities laws or contractual provisions, such as post-IPO lock-up agreements, merger agreements, and employment contracts. For many, tax and estate planning considerations are presenting an increasingly powerful deterrent to selling their stock outright.

Tax and estate planning considerations

Even those investors who seem the most pre-disposed to sell their shares tend to freeze like deer in headlights when they learn the all-in tax expense of selling their shares, and realize its potential impact on their net worth.

For instance, for those in the highest marginal federal income tax bracket in the U.S., long-term capital gains are currently taxed at 20 percent, and are also subject to the 3.8 percent federal Medicare surtax, for an all-in federal tax rate of 23.8% (nearly 60% higher than its still recent low of 15%).⁷ In the U.S., long-term capital gains are also subject to state tax in most states. According to The Tax Foundation, in 2016 43 of the 50 states levied a tax on capital gains, averaging just over 6 percent for taxpayers in the highest marginal brackets, resulting in an average all-in, combined federal and state capital gains tax rate of almost 30%.

Investors from many countries other than the US are similarly exposed to significant capital gains tax rates. For instance, according to The Tax Foundation⁸, the capital gains tax rate is 34.4% in France, 28% in the UK, 27% in Spain, 26% in Italy, 25% in Germany and Israel, 24.5% in Australia, 22.6% in Canada and 20.3% in Japan.

Many individuals and families with highly appreciated positions--especially those who believe that more upside remains in the stock--are often reluctant to trigger an immediate income tax expense of this size.

This is especially so in the US, where investors must consider the possibility that, upon the current shareholder's death, the shares received by his/her estate or beneficiary(ies) will qualify to receive an adjusted tax-cost basis equal to the fair market value of the stock.⁹ The "step-up" in basis, unique to the US tax system, offers investors both an opportunity and incentive to maintain ownership of their shares until death in order to eliminate the capital gains tax on their accrued gains.

The prospect of the step-up in basis, combined with what most believe is a currently generous estate tax exemption (set at nearly \$11 million for a married couple in 2017), has caused many investors and financial advisors to ask themselves, with good reason, "is it better to sell now and incur a sizeable capital gains tax -- or wait until death to avoid paying the capital gains tax and the estate tax as well?"¹⁰

The inclination or pre-disposition of many US investors to sell highly appreciated shares prior to 2013, in order to "lock-in" the then historically low capital gains rate of 15%, has long since dissipated in today's higher tax rate environment. Today, investors and their advisors are more thoughtfully considering and employing tax-cost-basis management and preservation strategies (due to the increased value of the step-up in basis upon death) as part of the tax and estate planning process. And with President Trump in office, a Republican-controlled Congress, and the possibility of tax reform still "in the air" (which might include a reduction in the capital gains tax rate, as well as the elimination of the estate tax and possibly the step-up in tax-cost-basis at death), many investors with appreciated stock are more apt to take a "wait and see" approach until this tax ambiguity is sorted out. In doing so, they continue to benefit from any future appreciation, and are able to defer -- and potentially eliminate -- the capital gains tax on their shares. The downside, of course, is that they remain exposed to the idiosyncratic risks of their stocks.

Creation of substantial wealth

Another reason some investors continue to own their company stock positions is simply because they remain bullish on their stock. It's done well for them, they believe they have a solid understanding of the stock, and they are confident that it will appreciate further. They may view its upside potential as a means of not only securing a comfortable retirement for themselves, but also building a legacy for the next generation.

Along these lines, it's important to note that completely diversifying out of a concentrated position is not necessarily the best course of action for all investors who hold appreciated company stock. Investment strategies which entail building and/or retaining single-stock concentrations are often looked upon skeptically by proponents of the Efficient Market Hypothesis and/or Modern Portfolio Theory (MPT), both of which are based upon the premise that the stock market is efficient (i.e., that investors can't "beat the market") and that diversification is the essential ingredient for successful long-term investing. Diversification is, without question, a worthy and critical goal. However, diversification can sometimes be overdone--as with the many investors and advisors who've shifted almost entirely into passive investment strategies--index mutual funds and index exchange traded funds--in recent years, often with little thought given to what exactly the investment into those passive strategies is intended to accomplish. While this method of diversification can satisfy an investor's goal of wealth preservation, this practice can actually prevent certain investors from pursuing all of their investment objectives, such as creating sufficient wealth to guard against longevity risk or to pass a substantial amount of money onto their heirs, thereby leading to less than optimal outcomes. Here's why.

Biggest Losers

50 Worst-Performing S&P 500 Stocks from 2006 - 2016

Major “household” names that had catastrophic losses over a 5-year period – ranging from 78% to 100%

Company Name	% Decline	Company Name	% Decline
1. Alpha Natural Resources Inc.	-100	26. Countrywide Financial Corp.	-88
2. RadioShack Corp.	-100	27. SuperValu Inc.	-87
3. Ambac Financial Group Inc.	-100	28. Sprint Nextel Corp.	-87
4. Lehman Brothers Holdings Inc.	-99	29. Freeport-McMoRan Inc.	-86
5. Peabody Energy Corp.	-99	30. AK Steel Holding Corp.	-86
6. Circuit City Stores Inc.	-99	31. United States Steel Corp.	-86
7. Washington Mutual	-99	32. Merrill Lynch & Co Inc.	-84
8. Freddie Mac	-98	33. Avon Products Inc.	-84
9. Cliffs Natural Resources Inc.	-98	34. Wachovia Corp.	-84
10. Fannie Mae	-97	35. Monster Worldwide Inc.	-83
11. Eastman Kodak Co.	-97	36. CONSOL Energy Inc.	-83
12. E-Trade Financial Corporation	-96	37. MBIA Inc.	-83
13. MEMC Electronic Materials Inc.	-96	38. KB Home	-82
14. American International Group	-96	39. Apollo Education Group, Inc.	-82
15. Office Depot Inc.	-94	40. Regions Financial Corp.	-81
16. Bear Stearns Companies Inc.	-93	41. Sears Holdings Corp.	-81
17. MGIC Investment Corp.	-93	42. Southwestern Energy Co.	-81
18. Dynegy Inc.	-92	43. Bank of America Corp.	-81
19. Caesars Entertainment Corp.	-92	44. Chesapeake Energy Corp.	-80
20. Clear Channel	-90	45. PulteGroup Inc.	-80
21. National City Corp.	-90	46. Liz Claiborne Inc.	-79
22. Citigroup	-89	47. Terex Corp.	-79
23. Santander Holdings USA Inc.	-89	48. J. C. Penney Company, Inc.	-79
24. Denbury Resources Inc.	-89	49. Genworth Financial Inc.	-79
25. OfficeMax Inc.	-89	50. Centex Corp.	-78

Source: Standard & Poor’s “Total Shareholder Return” Data

Within a goals-based wealth planning framework, which has been almost universally adopted by the wealth management community and is used by many investors and their financial advisors, the purpose of investing is to create wealth that’s commensurate with an investor’s future spending needs and desires. Most financial advisors recommend to their clients with concentrated stock positions that their primary objective should be to diversify out of their stock positions in a timely manner. This is often accomplished by the outright sale of some shares, and the subsequent investment of the after-tax proceeds into a broadly diversified portfolio of stocks, such as passive index mutual funds or index ETFs. In the US, this is also sometimes accomplished through the use of an exchange fund.¹¹ Indexing (and other broad diversification strategies) are intended help preserve investors’ standard of living by delivering market-level returns, and belong in their mental “market risk” bucket. On the other hand, investment strategies with the potential to generate sizeable wealth and substantially improve investors’ standard of living have a higher risk/reward profile, and belong in investors’ mental “aspirational risk” bucket.

Along these lines, many investors agree that substantial aspirational wealth cannot be generated through indexing and other strategies that rely on broad diversification, but they are loathe to simply “give up” on their goal of creating aspirational wealth. That said, owning a concentrated stock position or concentrated stock portfolio is one investment strategy that can potentially produce substantial wealth. Investors who already own company stock that they understand and continue to believe in,

and who are pursuing the creation of aspirational wealth as one of their investment objectives, might wish to consider retaining an allocation of company stock within their aspirational risk bucket. It’s worth noting that advocates of concentrated stock investing point out that there is considerable empirical evidence found in academic studies in support of concentrated portfolios’ outperformance.¹²

As an alternative to allocating all (or nearly all) of their investable assets to index investing, investors might employ indexing strategies for most (i.e., perhaps 80-90%) of their investable assets, and allocate a portion (i.e., perhaps 10-20%) to concentrated stock ownership. The downside, of course, is that investors remain exposed to their company-specific risk. Many investors with concentrated stock positions do this intuitively in that they diversify out of their positions over time using outright sales and the other tools mentioned above. However, they typically retain a significant portion of their concentrated positions as core, long-term holding that’s left unhedged and remains a major risk exposure relative to their net worth.

Reconciling the risks and rewards of single stock positions

Indeed, holding a concentrated position for a long-term period without protection is probably riskier than most investors realize. The “Biggest Losers” chart above depicts the 50 worst performing stocks in the S&P 500 Index from 2006-2016. Each of these household names experienced a catastrophic loss ranging from 78 percent to 100 percent. According to J.P. Morgan, since 1980, approximately 320 stocks were removed from the S&P 500 Index

due to “business distress.”¹³ And according to Goldman Sachs, over the past 30 years, 25% of the stocks in the Russell 1000 Index (representing about 90% of the investable U.S. equity market) suffered a permanent loss of capital (i.e., lost more than 75% of their value and did not recover to 50% of their original value within the last 30 year period as of December 2015).¹⁴

That said, if the idiosyncratic risk associated with a concentrated stock position can be significantly diminished, continuing to hold a portion of the position could be an attractive and prudent investment strategy for those funds that investors wish to allocate to potentially build substantial aspirational wealth. This could be particularly appealing to those investors worried about outliving their retirement savings, and interested in mitigating their longevity risk.

Along these lines, ideally, investors holding highly appreciated stock that they don’t wish to currently sell would ideally like to:

- Preserve unrealized gains at an affordable cost
- Retain all upside potential, including dividends
- Defer the capital gains tax, and avoid other adverse tax outcomes
- Potentially eliminate the capital gains tax through a step-up in tax-cost-basis at death (in the US)
- Avoid a reportable event for securities law purposes (if a company insider)

Traditional single-stock risk management approaches

The availability of liquid public capital markets makes it possible for many investors who hold highly appreciated positions in publicly-traded stock to use equity-based derivatives to help manage the risk of their positions. In fact, for decades investors have used) equity derivatives (such as puts, calls, collars, forward contracts, and permutations thereof) to manage single-stock risk. Investors can use puts and collars to implement both strategic and tactical hedging programs.

Put option protection

Strategic hedging involves having the single-stock position continuously hedged and entails regularly buying put options to protect it. However, put options can be quite expensive,¹⁵ and very few investors employ this strategy for a long-term period; most conclude it simply isn’t cost-effective. Tactical hedging, on the other hand, involves opportunistically purchasing put options to hedge the single-stock position when it’s perceived that the stock price is in danger of dropping precipitously. Tactical hedging with put options can be cost-effective, but only if the investor is able to properly time his entry (buying puts) and exit (selling puts) of the hedge. Therefore, it’s not at all surprising that, in practice, many investment professionals find this extremely difficult to accomplish.

Equity collar protection

Having concluded that the cost drag of regularly purchasing put options to protect a single-stock position over a longer term period of time, even in a period of upward price momentum, is too expensive, and that the tactical use of put options is very

difficult to properly time, what’s an investor to do? To lessen the upfront cost of purchasing puts, some investors consider selling call options (with a strike price above the market price of the stock) to partially or fully finance the purchase of the puts (with a strike price at or more typically below the market price of the stock). The combination of long puts and short calls to hedge a single-stock position is commonly known as an “equity collar.”

Unfortunately, as is the case with puts, most investors who evaluate long-term, strategic hedging with collars conclude that collars are too costly (i.e., involving the forfeiture of a substantial portion of the upside potential associated with regularly selling call options over a long-term period of time),¹⁶ and most investors who consider tactical hedging with collars conclude that, in practice, timing the entry and exit of the collar is much easier said than done.

Other traditional single-stock protection strategies

A prepaid variable forward (PVF)¹⁷ can be used to hedge (and also monetize, if that’s desired) an appreciated stock position; however, an investor using a PVF faces the same challenges as described above for collars (i.e., they are expensive due to the forfeiture of a significant portion of the upside potential associated with regularly selling the embedded call options over a long-term period of time to fund the purchase of the embedded put options). An exchange fund could be used, but an exchange fund isn’t a hedge; rather, it’s a tax-deferred exchange of a single stock for an interest in a fund (a fund which is 20% leveraged with debt), comprised of a diversified portfolio of stocks (contributed by investors who wish to dispose of their stocks) and commercial real estate. Therefore, this approach appeals to investors who wish to eliminate their single-stock exposure in a tax-efficient manner and, instead, invest in a diversified portfolio of stocks and investment real estate.

Other challenges with traditional approaches

Beyond the expense and timing issues associated with the traditional approaches, investors find it difficult to make regular and consistent use of these tools and strategies due to a number of other factors:

- Using equity derivatives to manage single-stock risk can be tax-inefficient. For instance, in the US, generally, 1) gains are taxed as short-term capital gains (effectively converting what would have been long-term capital gain on the appreciated shares into short-term capital gain on the derivative); 2) losses aren’t currently deductible (instead they are added to the tax-cost-basis of the hedged shares, meaning those losses will never be utilized if the investor holds the shares to achieve the step-up in basis; the result is simply less tax forgiven at death); and 3) any dividends received while a stock is hedged are taxed as ordinary income instead of long-term capital gain.¹⁸
- The shares being hedged must be pledged to, and held in custody with, the derivative dealer.
- As such, the owner can’t sell the shares until the hedge matures or is otherwise terminated.¹⁹
- The investor can be exposed to the credit risk of a single dealer counterparty.

- Investors are exposed to such counterparty risk if an over-the-counter (OTC) equity derivative is used, which is often the case due to the greater tax-efficiency and customization that's possible with OTC equity derivatives (versus exchange-traded derivatives).
- The pricing of OTC derivatives (as opposed to exchange-traded derivatives) is inherently not a fully transparent process. Derivatives are complex financial instruments with many moving parts and can sometimes be difficult to understand, even for professional investors and advisors. Considerable effort should be undertaken to assure that full price discovery is achieved.

As a result, many investors with concentrated stock positions are currently holding their shares unhedged, because they are unable or unwilling to diversify out of the positions entirely (given the tax consequence of doing so, or any of the other reasons discussed above), and they cannot justify the cost of rolling puts or collars over an extended period of time in order to reduce their downside risk.

Enter stock protection funds

The convergence of asset management, on the one hand, and risk pooling and insurance on the other, is catalyzing the creation of non-traditional solutions to financial challenges that have long perplexed financial advisors and investors, including single-stock concentration risk management. That said, a non-traditional approach—called a Stock Protection Fund (“Protection Fund”)—has recently been developed,²⁰ which allows investors to mitigate their specific company risk over a longer time period (that is, five years or more) and in a more cost-effective and tax-efficient manner than they otherwise would be able to achieve using the traditional tools. Investors can continue to own their single-stock positions to benefit from continued price appreciation and dividend growth, and yet, at the same time, obtain the benefit of diversification and the reduction of downside risk similar to that achieved through a mutual fund or exchange-traded fund. Protection Funds can be helpful to investors who, for whatever reason, wish to keep some or all of their company stock position as a core, long-term holding, as it enables them to affordably preserve their unrealized gains and keep all of their stock's upside potential.²¹

Participating investors, who each own a different stock in a different industry, contribute a modest amount of cash into a fund that's invested, conservatively, in government bonds. After a period of several years, the fund is liquidated and the cash is used to reimburse each of the investors whose designated stock has declined in value (on a total return basis). The Protection Fund methodology is rooted in the principles of modern portfolio theory (“MPT”) and risk pooling and insurance, and enables investors to diversify or mutualize—and therefore substantially reduce—a stock's downside risk, while retaining its full upside potential and all dividend income.

Risk pooling makes it possible to cost-effectively spread similar financial risk evenly amongst participants in a self-funded plan designed to protect against catastrophic loss.

MPT reveals that over time there will be substantial dispersion in individual stock performance. That is, with respect to portfolio construction, as securities are added to the portfolio, the standard

deviation of the portfolio declines. An important question is: How many stocks are required to reduce the level of diversifiable risk in equity portfolios? Much research has been done to answer this decades-old question. Most of these studies focus on the US markets.²²

The pioneering paper by Evans and Archer (1968) was the first study to evaluate the reduction in portfolio risk as portfolio size increased. Since then, although no definitive conclusion has been reached, the consensus among both investors and academics is that, in the US market, to achieve diversification, about 20 equal-sized and well-diversified stocks are necessary, and further increases in the number of holdings do not produce any significant additional risk reduction.²³

There have also been a number of studies of non-U.S. markets.²⁴ A fairly recent paper by Alexeev and Tapon²⁵ details perhaps the most extensive study of developed markets, and its findings are consistent with those of the above-referenced studies of the US and non-US markets, in that the portfolio size to achieve a 90% reduction in diversifiable stock risk was 23 stocks in the US, 21 in the UK, 19 in Japan, 25 in Canada and 24 in Australia.

Based on the relatively consistent findings of the studies of the US and non-US developed markets, the authors believe it is reasonable to assume that, for purposes of this paper, in the developed markets, 20 equal-sized, well-diversified stocks will achieve most of the benefits of diversification, and further increases in the number of holdings will not produce significant additional risk reduction.²⁶

That said, in such portfolios, over a period of time there will be a substantial dispersion in individual stock performance. Some stocks in the portfolio will outperform achieving large gains, most will perform in line with the market and some will underperform, losing substantial value. After a period of years, the dispersion of the total returns of a diversified 20-stock portfolio will bear resemblance to a normal or bell curve, with the big winners reflected on the right tail, the inline performers in the middle of the curve and the big losers on the left tail.

A Protection Fund combines these key elements of MPT with the concept of a risk-sharing cash pool to eliminate or substantially truncate left tail risk. By integrating these principles, Protection Funds provide downside protection akin to that of at-the-money or slightly out-of-the-money, European-style put options, but at a fraction of the cost.²⁷

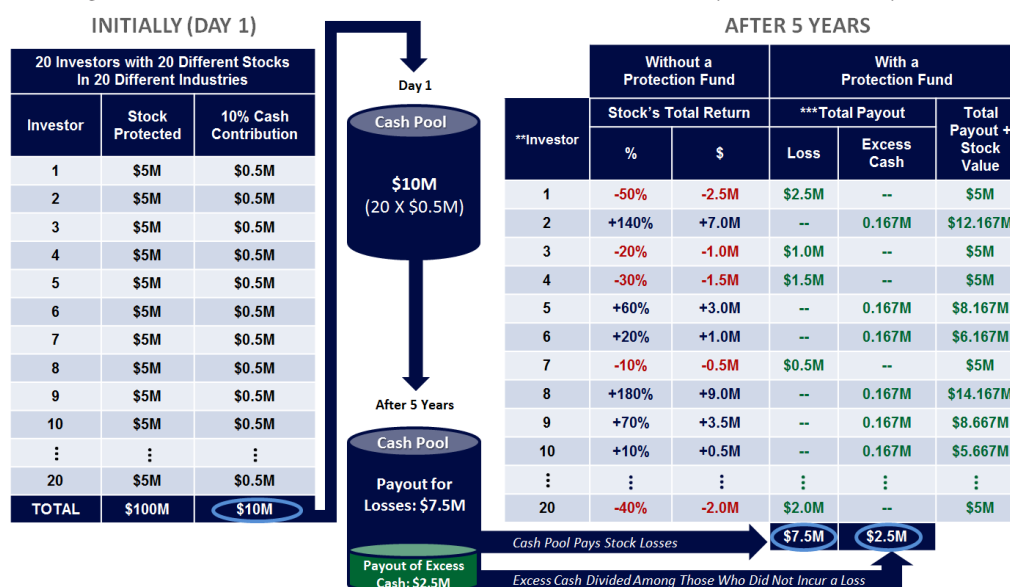
Mechanics and economics

“The Mechanics and Economics” chart on the next page depicts how Protection Funds work. In this example, 20 investors, each owning a different stock in a different industry and each protecting the same notional amount of stock contribute cash (not their shares, which are not touched) equal to 10 percent of the notional value²⁸ into a Protection Fund, which will terminate in five years. The cash is invested solely in U.S. government bonds that mature on or just prior to the date the Fund terminates.

Upon termination, the cash proceeds are distributed to those investors whose stock lost value on a total return basis. Losses are paid until the cash is depleted. If, as in our example, the cash pool exceeds total losses (i.e., approximately a 70% probability based on extensive back-testing²⁹), all losses will have been eliminated,

The Mechanics and Economics

Showing a Cash Contribution of 2% per annum or \$0.5 Million Paid Up-Front by 20 Investors – Each Protecting a \$5 Million Stock Position for 5 Years
 ...Resulting in a Maximum Stock Loss of 0% (i.e. All Losses are Fully Reimbursed by the Cash Pool)*



* Gross of Protection Fund fees

**Assumes Investors 11-19 have positive total returns

***Assumes the annual cost of operating the Protection Fund is fully paid for by the interest income generated by the Cash Pool

and the excess cash is returned to the investors. If total losses exceed the cash pool (i.e., approximately a 30% probability based on extensive back-testing³⁰), large losses are substantially reduced.

More specifically, upon termination of the Fund, the largest loss incurred among the group of 20 investors' individual stocks is first identified. Using funds in the cash pool, this loss is reduced (that is, reimbursed) to the level of the second largest loss incurred among the other 19 stocks. Next, these two losses are reduced to the level of the third largest loss among the other 18 stocks, and so on. This process, which can be visualized as a "reverse waterfall" or "rising tide" methodology, continues until either all losses have been reimbursed or the cash pool has been depleted.³¹ The largest remaining loss at this point defines the "maximum stock loss" for all investors incurring losses (which is stated as a percentage of the beginning notional amount of protected stock

value). To illustrate, if the maximum stock loss was 15 percent, an investor whose stock lost 80 percent of its value would receive reimbursement from the cash pool reducing his loss from 80 percent to 15 percent. This can be thought of as akin to an out-of-the-money put option struck at 85% of the notional value of stock protected. If the maximum stock loss was 0 percent (i.e., all losses are reimbursed and analogous to an at-the-money put option struck at 100% of the notional value of stock protected), the investor's stock loss of 80 percent would be fully reimbursed by the cash pool. In the example in "The Mechanics and Economics" chart, the maximum stock loss is zero.

Backtesting the methodology

The "Backtesting 5-Year Stock Protection Funds" chart above depicts the results of extensive historical backtesting of this methodology. The assumptions used were:

Backtesting 5-Year Stock Protection Funds

Historical Backtesting from December 31, 1972, to December 31, 2016 – Cash Contribution of 2% per year (payable up-front) of the Protected Stock Position for a Term of 5-Years

Based on 8 million data points – 400,000 random computer simulations using 1972 - 2016 S&P 500 database (10,000 simulations per 5-year period and 20 stocks per simulation)

	Percentage of Investors Losing 60% or More		Percentage of Investors Losing 30% or More		Average Size of Investor's Loss (%)	
	Without Protection Funds	With Protection Funds*	Without Protection Funds	With Protection Funds*	Without Protection Funds	With Protection Funds*
Average of All 5-Year Periods 1972 - 2016	4.6%	0.0%	10.9%	1.6%	-35%	-5%

Backtesting uses historical market data in an effort to model historical performance and confirm value of a particular strategy. The results above are NOT actual results. Actual results could differ significantly from the theoretical results presented. For actual results, please see "Actual Performance Results: 5-Year Stock Protection Fund" chart below.

- 20 S&P 500 Index stocks are associated with each Protection Fund;
- The stocks are randomly selected;
- Each of the 20 stocks is in a different industry, each with a different Global Industry Classification Standard (GICS) Industry code;
- The amount of protected stock value is the same for each investor;
- The term of each Protection Fund is 5-years;
- An up-front cash contribution equal to 10% (2% per annum) of protected value is made;
- The period tested is 1972 to 2016
- Based on 8 million data points: 400,000 random computer simulations using 1972 to 2016 S&P 500 Index database; and
- 10,000 simulations per 5-year period and 20 stocks per simulation.

For stocks held during a 5-year period, the use of a Protection Fund reduced the average stock loss from 35 percent to 5 percent, representing more than an 85 percent reduction in downside risk. The risk of a catastrophic stock loss greater than 60 percent was virtually eliminated, from a frequency of 4.6 percent to 0 percent. And, the risk of a loss greater than 30 percent was reduced from a frequency of 10.9 percent to just 1.6 percent, a reduction of more than 85 percent.

The “Risk Transformation” chart below provides a graphic depiction of the back-testing results.

These test results appear to validate the risk mitigation efficacy of the Stock Protection Fund methodology in that both the

frequency and amount of losses were greatly reduced, or stated another way, left tail risk was substantially truncated.

Actual audited performance results

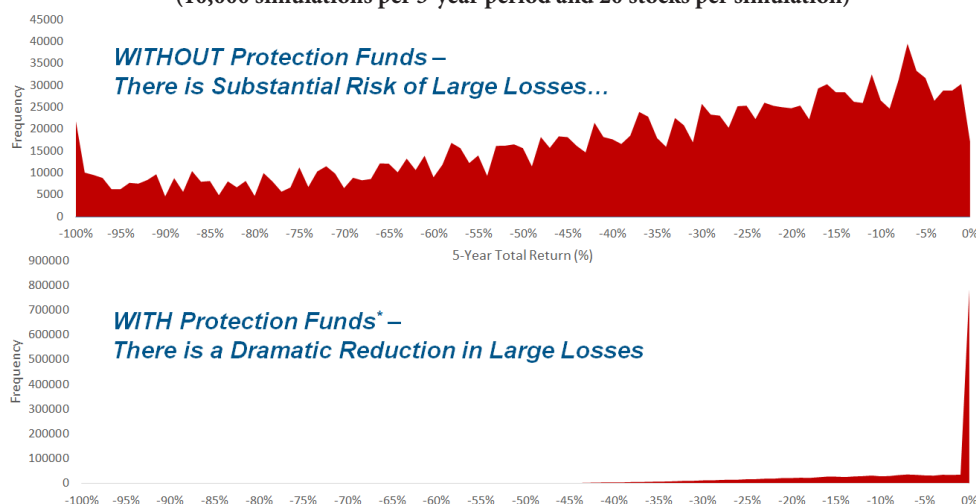
On June 1, 2006, a Stock Protection Fund was formed with a 10 percent up-front cash contribution (2% per annum for 5 years) and a 5-year term, protecting 20 investors (each a “Certificate Holder”) who owned stock positions in 20 different industries (each a “Designated Security”), and who were each protecting the same notional amount of stock. The Fund operated from June 1, 2006 through June 1, 2011, and thus ran throughout the entire Financial Crisis. The “Actual Performance Results: 5-Year Stock Protection Fund” chart on the next page compares the stocks’ total return with and without the Protection Fund. The maximum stock loss was 0 percent, meaning that the cash pool eliminated all stock losses (i.e., all 20 investors achieved downside protection equivalent to that of an at-the-money put option). 31% of the cash originally contributed to the Fund was left over after all stock losses were eliminated, and all of this excess cash was returned to the investors. Therefore, the “all in” cost of the protection (based on the original notional amount of protected stock) was 6.9 percent, or 1.38 percent per annum, when amortized over the 5-year period. Consistent with the backtesting results summarized above, the Protection Fund performed as expected and delivered effective and cost-efficient protection throughout the Financial Crisis.

Although the backtesting and actual performance results discussed on the next page are specific to the US stock market, the authors hypothesize that similar results should be achieved in non-US developed markets, given that the concept of risk mutualization which this strategy leverages is equally applicable to non-US markets, and the primary tenet of MPT that it relies upon (i.e., that the performance of a diverse group of 20 stocks over a period of several years should exhibit substantial dispersion such that a graph of their returns should resemble a normal

Risk Transformation

Historical Backtesting from December 31, 1972, to December 31, 2016 – Cash Contribution of 2% per year (payable up-front) of the Protected Stock Position for a Term of 5-Years

Based on 8 million data points – 400,000 random computer simulations using 1972 - 2016 S&P 500 database (10,000 simulations per 5-year period and 20 stocks per simulation)



Backtesting uses historical market data in an effort to model historical performance and confirm value of a particular strategy. The results above are NOT actual results. Actual results could differ significantly from the theoretical results presented. For actual results, please see “Actual Performance Results: 5-Year Stock Protection Fund” chart below.

Actual Performance Results: 5-Year Stock Protection Fund

“Maximum Stock Loss” = 0%*

Actual Cost of Protection: 1.38% per annum

*Protection achieved is economically equivalent to at-the-money-put options	Stock's Total Return (%)		
	Without the Protection Fund	With the Protection Fund*	Loss Elimination With Protection Fund*
Best Buy Co., Inc.	-36.7	0	36.7
General Electric Co.	-32.1	0	32.1
Toyota Motor Corp.	-24.2	0	24.2
Harley-Davidson, Inc.	-18.2	0	18.2
Amgen, Inc.	-12.5	0	12.5
Eli Lilly & Co.	-7.7	0	7.7
Goldman Sachs Group, Inc.	-5.3	0	5.3
People's United Financial, Inc.	-1.1	0	1.1
Boeing Co.	3.3	3.3	N/A
Time Warner, Inc.	9.5	9.5	N/A
MDU Resources Group, Inc.	11.4	11.4	N/A
Microsoft Corp.	18.9	18.9	N/A
3M Co.	25.5	25.5	N/A
EnCana Corp.	25.6	25.6	N/A
UIL Holdings Corp.	31.7	31.7	N/A
Procter & Gamble Co.	40.2	40.2	N/A
E. I. du Pont de Nemours & Co.	49.4	49.4	N/A
RLI Corp.	55.8	55.8	N/A
Humana, Inc.	56.5	56.5	N/A
Dow Jones & Co., Inc.	100.4	100.4	N/A

*Gross of Protection Fund fees

distribution) has been found to be relatively consistent across non-US developed markets, per the findings of Alexeev and Tapon's study referenced above.³²

Tax considerations for US investors

The utilization of Protection Funds by investors in different countries can result in different tax consequences. Tax regimes are complex and can change rapidly, and therefore, a comprehensive analysis of the tax consequences of the use of Protection Funds by investors in different countries is well beyond the scope of this paper. That said, this section identifies the issues US investors should consider when evaluating the tax implications of investing in a Protection Fund:

1. Should holding a Designated Security and Certificate result in a constructive sale of the Designated Security by the holder?
2. Should holding a Designated Security and Certificate constitute a tax straddle?
3. Should holding a Designated Security and Certificate suspend the holding period for purposes of determining if a dividend received on the Designated Security is qualified dividend income (QDI) to the holder?
4. Should a distribution to a Certificate holder be taxable as long-term capital gain if the distribution exceeds the holder's tax-cost-basis (the Certificate's purchase price) and currently deductible long-term capital loss if such distribution is less than the Certificate holder's cost basis?

Tax analysis for US investors

Holding Designated Security and Certificate is not a constructive sale

There are two sets of “constructive sale” rules. The courts and the IRS developed a doctrine, referred to as the “common law”

constructive sale rules, under which a transaction not structured as a sale is treated as a sale for federal income tax purposes. Separately, Code Sec. 1259 contains “statutory” constructive sale rules under which certain identified transactions are deemed sales for federal tax purposes.

When investors purchase a Certificate to protect their Designated Security they continue to possess all incidents of ownership with respect to their Designated Securities.³³

The right of a Certificate holder to receive a payment upon a total return loss on his Designated Security resembles the acquisition of a cash-settled put option, and an arrangement that is economically similar to an at-the-money put option does not transfer ownership upon acquisition.³⁴

Rev. Rul. 2003-7 concludes that a hedging transaction limiting an investor's downside in exchange for relinquishing the right to share in future appreciation above a certain point does not result in a constructive sale. The Protection Fund potentially limits the loss that would be sustained by a Certificate holder in exchange for the cost of the Certificate (all of which, except for the placement fee, may be returned to the Certificate holder, depending upon the losses sustained on all Designated Securities). As in Rev. Rul. 2003-7, the Protection Fund does not limit a Certificate holder's right to receive dividends or vote his shares, a Certificate holder remains entitled to all of the future appreciation of his Designated Security, in no instance will a Certificate holder be required to deliver shares of his Designated Security, and legal title to the shares of the Designated Securities will not be transferred to the Series.³⁵

For these reasons, the use of a Protection Fund should not trigger a common law constructive sale.³⁶

Likewise, the use of a Protection Fund should not cause a statutory constructive sale. The risk mitigation afforded by a Protection Fund resembles that of a cash-settled put option, in

that the investor is entitled to receive a payment upon a total return loss on his stock and, in addition, retains all upside potential. The Blue Book explanation of the statutory constructive sale rules explains that “Congress intended that transactions that reduce only risk of loss...will not be covered. Congress did not intend that a taxpayer who holds an appreciated financial position in stock will be treated as having made a constructive sale when the taxpayer enters into a put option with an exercise price equal to the current market price (an “at the money” option). Because such an option reduces only the taxpayer’s risk of loss, and not its opportunity for gain, the above standard would not be met.”³⁷

Holding Designated Security and Certificate is not a straddle

A Designated Security protected by a Certificate should not create a straddle because the positions don’t vary inversely. Rather, the value of an investor’s Certificate depends mainly on the: (1) change in value of that investor’s Designated Security, (2) change in value of the other 19 investors’ Designated Securities, and, to a lesser extent, (3) change in value of the cash pool. Investment into a Series of a Protection Fund is economically similar to an investment in a diversified portfolio comprised of 20 unrelated stocks, with the risk reduction due to the changes in value of the individual stocks in the portfolio over time (i.e., the dispersion of stock returns).

That said, special rules have been promulgated--for offsetting positions that reference any group of stock of 20 or more unrelated issuers--that determine whether such positions create a straddle with the actual stock positions.³⁸ Under rules for portfolio or “basket” transactions, a position will be considered offsetting if there is a “substantial overlap” between the investor’s long stock position(s) and the offsetting position. An investor’s stock position(s) and offsetting position will be considered to substantially overlap if the quotient obtained by dividing the fair market value of the stock(s) held by the investor by the fair market value of all of the stocks referenced by the offsetting position is equal to or greater than 70%.³⁹

Since there are 20 equally weighted Designated Securities referenced by a Series, and assuming a Certificate holder does not hold any of such Designated Securities other than his Designated Security, the overlap between the basket of Designated Securities referenced in the Series and the Certificate holder’s Designated Security is 5%. Since 5% is below the 70% threshold specified for substantial overlap, the basket of Designated Securities referenced by the Series and the Certificate holder’s Designated Security should not be considered to substantially overlap, and therefore should not be considered offsetting positions for the purpose of determining whether a straddle exists.

Therefore, if a Certificate holder borrows against his Designated Security to fund the purchase of a Certificate, the interest expense incurred in connection with such borrowing should be currently deductible against investment income.

Also, if a Certificate holder purchases a Certificate before he owns his Designated Security for one year, the Certificate holder’s holding period in his Designated Security should not be reset for the purpose of determining whether gain or loss on the Designated Security will qualify for long-term capital gain treatment.

Holding period in Designated Security is not tolled when determining whether dividends constitute QDI

QDI is taxed at the lower long-term capital gains rate. For dividends to constitute QDI, a holder must satisfy a holding period test.⁴⁰ The holding period is tolled for each day during which the investor “has diminished his risk of loss by holding 1 or more other positions with respect to substantially similar or related property.”⁴¹ As with the straddle rules, if the offsetting position references 20 or more stocks, the diminution in risk test is undertaken by determining whether the substantial overlap test described in the preceding section is met.⁴²

In the case of the Protection Fund, the substantial overlap test would not result in more than a 5% overlap (assuming that a Certificate holder does not hold any of the referenced Designated Securities of a Series other than his Designated Security). The substantial overlap test requires a 70% or greater overlap. As a result, the substantial overlap test should not be met. Therefore, the holding period for purposes of determining whether any dividends paid on a Designated Security constitute QDI should not be tolled by reason of a Certificate holder holding a Certificate.

Distribution in excess of basis is long-term capital gain and distribution less than basis is deductible long-term capital loss

The Certificates should constitute capital assets in the hands of investors. As amounts paid to Certificate holders will be paid only upon a liquidation of a Series, the amounts paid should be treated as payment in full in exchange for their Certificates.⁴³ Accordingly, if a Certificate holder receives more than his cost in exchange for a Certificate, that amount should be a long-term capital gain. If a Certificate holder receives less than his cost, the result should be a long-term capital loss.

Code Sec. 331 provides that a shareholder who surrenders stock in complete liquidation of a corporation is treated as receiving the proceeds in “exchange for the stock.”⁴⁴ Gain or loss is long-term capital gain or loss if the stock has been held for more than one year.⁴⁵ As mentioned above, the holding period of a position (including stock) can be tolled if the taxpayer enters into a straddle with respect to such property before the long-term capital gain holding period has been met.

As analyzed above, the holding of a Certificate and a Designated Security should not constitute a straddle. As a result, the holding period of a Certificate should not be tolled for a Certificate holder by reason of his holding of a Designated Security. Based upon the assumption that each Certificate holder will have held his Certificate for the five-year life of the Series, each Certificate holder should meet the long-term capital gain or loss holding period. Thus, if a Certificate holder receives an amount in exchange for his Certificate that exceeds the amount that he paid for the Certificate, he should recognize a long-term capital gain. Conversely, if a Certificate holder receives less than the amount that he paid for his Certificate, he should recognize a long-term capital loss.

Same tax rules apply to stock-linked compensation

Executives of public companies often receive compensation designed to incentivize their job performance (including incentive stock options, non-qualified stock options, restricted stock,

restricted stock units, stock appreciation rights and employee stock purchase plan shares), the value of which is derived from, or linked to, the price of the company's publicly-traded common stock ("Stock-Based Compensation"). If an employee holds stock acquired pursuant to the exercise of incentive stock options ("ISOs"), a disposition of such stock before the expiration of statutory holding periods can result in adverse tax consequences. Applicable regulations define a disqualifying disposition as "a sale, exchange, gift or any transfer of legal title."⁴⁶

The same rules that are discussed above should apply to Stock-Based Compensation that is a Designated Security. Given that a Protection Fund transaction should not be treated as a statutory or common law constructive sale, the entry into such a transaction should not be treated as a disqualifying disposition of a Designated Security that has been acquired pursuant to an ISO. Since a Protection Fund transaction should not result in a constructive sale or a tax straddle, the holding of a Certificate and a Designated Security that is Stock-Based Compensation should not result in adverse tax consequences to the holder of the Stock-Based Compensation, or result in a loss of holding period for the purpose of determining whether a dividend constitutes QDI.

Comparative tax analysis

Investor pays \$120K to acquire a Certificate in a Protection Fund to protect his \$1 million position in publicly-traded ABC Corp. stock with a zero basis, which he's held longer than one year. The straddle and dividend holding period rules do not come into play.

- ABC Corp.'s stock price decreases and Investor receives a distribution of \$400K upon the termination of the Fund. He realizes a \$280K long-term capital gain (\$400K amount realized less \$120K basis).
- ABC Corp.'s stock price increases, and Investor does not receive any distribution. He realizes a \$120K capital loss (\$0 amount realized less \$120K basis) that's currently deductible.
- ABC Corp. pays dividends that would constitute QDI to Investor. His ownership of a Certificate in a Protection Fund does not "disqualify" the dividends, which are taxed as long-term capital gains.

Assume Investor pays \$120k to acquire a put option in order to protect that \$1 million stock position in ABC Corp. instead. The straddle rules and dividend holding period rules do come into play.

- ABC Corp.'s stock price decreases and Investor sells the put for \$400K. He realizes a \$280K short-term capital gain (\$400K amount realized less \$120K basis), even though he's held the ABC stock for more than a year. In effect, Investor has converted \$280K of long-term capital gain on his stock to short-term capital gain on the put.⁴⁷
- ABC Corp.'s stock price increases and the put expires worthless. Investor realizes a \$120K long-term capital loss (\$0 amount realized less \$120K basis) that's not currently deductible; rather, the deduction is deferred and effectively increases Investor's cost basis by \$120k.⁴⁸ If Investor holds his shares until death to take advantage of the step-up in basis, the deduction is never used (i.e., it's simply less tax forgiven at death).

- If ABC Corp. pays dividends that would constitute QDI to Investor, his ownership of the put "disqualifies" the dividends, which are taxed at the ordinary rate.⁴⁹

Although the above tax analysis focused on US investors, a similar analysis should be performed by investors, in conjunction with tax counsel, in non-US countries who are contemplating the use of Protection Funds.

Retirement planning considerations

The old rule of thumb for retirees, suggesting that equities should represent a portion of one's portfolio equal to 100%-minus-one's-age, no longer seems to resonate with retirees and their advisors. For instance, in the US, in addition to retirement savings, retirees can rely on Social Security, dividends and pensions to satisfy current income needs. Once sufficient funds have been set aside to cover their liquidity needs, an increasing number of retirees and pre-retirees throughout the world have begun investing more aggressively. In fact, after retirement, it's worth noting that the majority of wealthy investors actually plan to maintain or increase their equity exposure to pursue long-term growth of assets.⁵⁰ Given today's low interest rates, many feel an even greater need to seek higher returns in order to mitigate longevity risk and support a retirement that may last decades. Many wealthy retirees are also investing more aggressively to build a legacy for future generations.

That said, executives, employees, and retirees with highly appreciated company stock positions that they believe will outperform the market might wish to consider retaining a portion of their company stock as a core, long-term holding, but also protect their heretofore unrealized gains via a Stock Protection Fund. In doing so, they maintain the potential to create meaningful wealth by participating in any future appreciation in the stock, while muting much of the downside risk associated with it.

Other Considerations

For company insiders in the US, the use of a Protection Fund does not cause a reportable event (however, they can voluntarily disclose, if they'd like to). In addition, company insiders and employees can use a Protection Fund to shield both stock and stock-linked compensation (assuming company policy allows), including company shares held within a defined contribution plan.

The shares needn't be pledged, are not encumbered in any way, and can be held in custody wherever the investor desires. Therefore, the investor can sell, gift, donate, borrow against or otherwise dispose of his shares at any time.

If desired, investors can borrow against their stock to fund their investment into a Protection Fund, so as to not disturb their asset allocation.

Protection Funds are easy to understand, transparent, and entail no counterparty credit risk.

Summary

Protection Funds add a new and desirable dimension to the wealth planning and portfolio construction process for public company executives, employees and retirees, as well as other

investors and trusts, with concentrated stock positions. These investors can continue to “chip away” at and diversify their concentrated stock positions over time using the traditional tools, while using a Protection Fund to cost-effectively and tax-efficiently de-risk that portion of their position that they wish to retain as a core, long-term holding in order to potentially generate aspirational wealth to partake in a better lifestyle, reduce longevity risk, or pass on a legacy to heirs. Of course, investors can also use a Protection Fund to protect new concentrated stock investments they make based on fundamental equity research, to satisfy those same objectives.

Endnotes

1. Steyer, R. (2017). “Passive investment train overtakes active in corporate DC plans,” *Pensions & Investments*. Retrieved from <http://www.pionline.com/article/20170320/PRINT/303209986/passive-investment-train-overtakes-active-in-corporate-dc-plans>.
2. Yu, J. (2015). “Executive Compensation Bulletin: Stock Ownership Guidelines and Retention Policies – Creating Stronger Links Between Executives and Shareholders.” Retrieved from <https://www.towerswatson.com/en-US/Insights/Newsletters/Global/executive-pay-matters/2015/Executive-Compensation-Bulletin-Stock-Ownership-Guidelines-Retention-Policies-Stronger-Links>.
3. In the US, the SEC defines corporate insiders (i.e., “affiliates”) as “a company’s officers and directors, and any beneficial owners of more than ten percent of a class of the company’s equity securities registered under Section 12 of the Securities Exchange Act of 1934.” While it’s not completely clear what is meant by a company’s “officers”, most securities lawyers take the position that company insiders include senior-level executive officers, directors and 10% owners.
4. Exchange Funds, also known as swap funds, allow investors to exchange a large holding of a single stock for an ownership interest in a diversified portfolio, while deferring any capital gains tax. This provides investors with a tax-efficient means of diversifying out of highly appreciated single-stock positions.
5. Equity derivatives, such as put options, call options, collars, prepaid variable forwards, and permutations thereof, are instruments that can be used to hedge single-stock positions, the price of which is derived from or linked to the price of the underlying asset, which is an equity security.
6. A charitable remainder trust (CRT) is an irrevocable trust that generates an income stream for the investor who funds the trust (the donor), and/or other beneficiaries chosen by the donor, during his (or their) lifetime, and then contributes any remainder assets to the charity(ies) of the donor’s choice. CRTs are a tax-efficient means of diversifying out of a single stock position for those investors who are charitably inclined, as any capital assets (including publicly traded stock) that are sold by the CRT (i.e., after a donor has contributed the assets to the CRT) are not subject to capital gains tax. In addition, donors are eligible to take a partial income tax deduction based upon the type of trust, the term of the trust, the projected income payments, and IRS interest rate assumptions (which estimate a certain growth rate with respect to the trust assets).
7. The American Taxpayer Relief Act of 2012, enacted January 2, 2013, increased the top tax rate on long-term capital gains to 20% for high-income earners. In addition, beginning in 2013 long-term capital gains became subject to an additional 3.8% surtax, enacted as part of the Health Care and Education Reconciliation Act of 2010.
8. <https://taxfoundation.org/high-burden-state-and-federal-capital-gains-tax-rates-united-states>
9. See Code Section 1014.
10. For example, assume Investor purchased shares of ABC Corp. many years ago for \$100,000 (i.e., the original tax-cost-basis of those shares), and that Investor still owns those shares that are currently worth \$1 million. If Investor sells the shares for \$1 million (i.e., the amount realized on the sale), he will incur a long-term capital gains tax on his gain of \$900,000 (i.e., the amount realized less his original tax-cost-basis or \$1 million less \$100,000). Should Investor instead decide to hold the shares until his death, his estate or beneficiaries will receive the shares with an adjusted tax-cost-basis equal to fair market value. In this case, assuming the shares are worth \$1 million upon Investor’s death, his estate or beneficiaries could sell the shares for \$1 million (i.e., the amount realized on the sale), but incur zero capital gains tax because in this case there is no gain (i.e., the amount realized less the now adjusted tax-cost-basis or \$1 million less \$1 million is zero). Although the value of those shares would still be subject to the estate tax, assuming that Investor’s estate is worth less than \$5.49 million (i.e., the estate tax exemption for individuals for 2017), Investor’s \$900,000 gain would avoid both the capital gains tax and the estate tax.
11. Exchange Funds, also known as swap funds, allow investors to exchange a large holding of a single stock for an ownership interest in a diversified portfolio, while deferring any capital gains tax. This provides investors with a tax-efficient means of diversifying out of highly appreciated single-stock positions.
12. See Cohen, Randolph, Christopher Polk, and Bernhard Silli. “Best Ideas.” Working paper, London School of Economics, May 2010. Cremers, K.J. Martijn and Antti Petajisto. “How Active Is Your Fund Manager? A New Measure That Predicts Performance.” *Review of Financial Studies*, September 2009. Elton, Edwin J., Martin J. Gruber, Stephen J. Brown, and William N. Goetzmann. *Modern Portfolio Theory and Investment Analysis*. John Wiley & Sons, 2009. Petajisto, Antti. “Active Share and Mutual Fund Performance,” *Financial Analysts Journal*, July/August 2013. Yeung, Danny, Paolo Pellizzari, Ron Bird, and Szali Abidin. “Diversification versus Concentration ...and the Winner is?” Working paper series, University of Technology Sydney, September 2012. See also Allen C. Benello, Michael van Biema, and Tobias E. Carlisle, *Concentrated Investing: Strategies of the World’s Greatest Concentrated Value Investors*, Wiley & Sons, 2016.
13. “The Agony & The Ecstasy--The Risks and Rewards of a Concentrated Stock Position,” by J.P. Morgan Asset Management, September 2014.
14. Goldman Sachs Asset Management, FactSet, 2016.
15. Prior to the financial crisis equity derivatives were commonly used as part of a long-term, strategic approach to managing single-stock risk. In recent years, however, due to the

convergence of several factors, including historically low interest rates, an unfavorable volatility skew (making puts much more expensive relative to calls than they had been in the past), and the ramifications of Dodd-Frank on derivative dealers, equity derivatives have become much more expensive. Consequently, the strategic utilization of equity derivatives to manage the risk of a concentrated stock position on a long-term basis is simply not practical. Equity derivatives are now primarily used in a tactical manner for short-term protection and/or income generation.

16. Ibid.

17. A prepaid variable forward (PVF) is an over-the-counter (OTC) equity derivative that combines the economics of a collar and a borrowing against the hedged stock position in a single financial instrument.

18. These unattractive tax results occur because, in most instances, the stock position, when combined with the derivative hedging instrument, will be deemed a “straddle” under Internal Revenue Code Section 1092; further, the dividend holding period requirements of IRC Section 1(h)(11)(B)(iii)(I) won’t be satisfied.

19. If an investor purchases put options to protect his stock (and does not borrow against the protected shares in order to fund the purchase price), the protected shares do not need to be pledged to, or held in custody by, the dealer, and the shares can be sold (or otherwise disposed of) at any time.

20. See U.S. patents: Nos. 7,720,736; 7,739,177; 7,987,133; 8,229,827; and 8,306,897.

21. See CFA Institute, “Innovations in Managing Concentrated Single-Stock Positions,” Take 15 Series: http://players.brightcove.net/1183701590001/rkcysOOFe_default/index.html?videoId=5377678349001. See also Kochis, Timothy, *Managing Concentrated Stock Wealth*, (2nd ed., Wiley, 2016, pages 160-162). “For clients who own highly appreciated stock and for certain reasons wish to keep some portion of their concentrated position as a core, long-term holding, a Stock Protection Fund can be a very attractive alternative and an excellent choice.” Janus Capital Group, “2017 Wealth Advisor’s Guide,” page 19. “A Stock Protection Fund is a new tool that allows a group of investors to continue to own their shares and retain all of the upside potential while mutualizing the downside risk.” Kennedy, William, “Bear Cage”, *Fieldpoint Private*, Spring 2016 “A Stock Protection Fund is a simple, transparent and repeatable strategy for mitigating this risk without incurring excessive expenses or taxes”.

22. See John L. Evans and Stephen H. Archer, “Diversification and the Reduction of Dispersion: An Empirical Analysis,” *Journal of Finance* 23, no. 5 (December 1968), at pp. 761-767; Thomas M. Tole, “You Can’t Diversify Without Diversifying,” *Journal of Portfolio Management* 8, no. 2 (Winter 1982), at pp. 5-11; and Meir Statman, “How Many Stocks Make a Diversified Portfolio?” *Journal of Financial and Quantitative Analysis* 22, no. 3 (September 1987), at pp. 353-363.

23. See Frank Reilly and Keith Brown, (5th ed), at pp. 284-285, summarizing the relevant research studies and findings. *Investment Management and Portfolio Management*

24. Solnik (1974) analyses markets in the US, UK, Germany, France, Switzerland, Italy, Belgium and the Netherlands; Bird

and Tippett (1986) and Brands and Gallagher (2005) report on Australia; Copp and Cleary (1999) and Kryzanowski and Singh (2010) studied Canada; Byrne and Lee (2000) studied the UK.

25. Discussion Paper, Tasmanian School of Business & Economics, No. 2013-16, “Equity Portfolio Diversification: How Many Stocks are Enough? Evidence from Five Developed Markets,” Vitalie Alexeev and Francis Tapon.

26. The authors do not extrapolate these developed markets findings to emerging markets due to a dearth of academic studies and evidence in the literature, although it would not be terribly surprising if a similar number (i.e., approximately 20) of stocks is necessary to achieve diversification.

27. StockShield, LLC: StockShield, LLC: www.stockshield.com. Based on extensive back-testing performed, the amortized cost of such protection is expected to be approximately 1.25 percent per annum. In addition, a Protection Fund was operated during the 5-year period from June 1, 2006, to June 1, 2011. The Fund protected 20 investors with 20 stocks in different industries, each looking to protect the same notional amount of stock. The upfront cash contribution was 10% (2% per annum for 5 years) of the notional value of the stock being protected. Of the 20 stocks protected, eight incurred losses (37%, 32%, 24%, 18%, 13%, 8%, 5%, and 1%). For investors participating in the Fund, all stock losses were reimbursed (i.e., the maximum stock loss was 0%) and the remaining cash was returned to the investors. Each of the 20 investors received the economic equivalent of 5-year “at-the-money” put protection on their stock, and the amortized cost of that protection was 1.38% per annum pre-tax or about 1% after-tax.

28. The cash contribution is 2% per year for 5-years (which can be thought of as akin to an annual “premium”). The cash is contributed upfront to eliminate any counterparty risk (i.e., the risk that one or more of the 20 investors might default on his/her obligation to make one or more annual contribution payments).

29. StockShield, LLC: www.stockshield.com.

30. Ibid.

31. In a scenario in which the calculated maximum loss is 0.0%, any remaining cash will be distributed such that any certificate holder whose designated security did not suffer a loss (“gainer”) will be refunded an amount equal to the amount reimbursed to the certificate holder whose designated security had the smallest loss (“smallest loser”) to the extent funds are available. Otherwise, the gainers will split the remaining cash on a pro-rata basis. If any cash remains once all gainers have received a distribution equal to the smallest loser’s reimbursement, all gainers as well as the smallest loser will then each receive an additional share of the excess cash in an amount that will make the total distribution he/she has received equal to the amount reimbursed to the certificate holder whose designated security had the second-smallest loss (“second-smallest loser”) to the extent cash is available. Otherwise, the gainers and the smallest loser will split the remaining Series Pool Assets on a pro-rata basis. This “waterfall” methodology continues until no cash remains. A certificate holder who has had the loss on his/her designated security fully reimbursed will only receive a share of the excess cash if all certificate holders whose designated securities incurred a smaller loss (or did not incur a loss at all) have first received a share of the

excess cash equal to the reimbursement the certificate holder with a loss has already received.

32. Discussion Paper, Tasmanian School of Business & Economics, No. 2013-16, "Equity Portfolio Diversification: How Many Stocks are Enough? Evidence from Five Developed Markets," Vitalie Alexeev and Francis Tapon.

33. After purchasing a Certificate, each holder of a Designated Security retains legal title to his shares, retains the absolute right to keep, sell, pledge, gift, borrow against, or otherwise dispose of his shares at any time, keeps all future appreciation, retains all dividends and distributions, maintains voting rights, does not pledge his shares to the Fund, will not be required to deliver shares of his Designated Security to the Fund under any circumstances (and the Fund will not obtain the use of or have the right to re-hypothecate his shares), remains entitled to a potential distribution even if he no longer owns his shares at the conclusion of the five-year term of the Fund, and may be entitled to receive back some or all of the price paid for the Certificate, excluding the placement fee.

34. *Lucas v North Texas Lumber*, 281 U.S. 11, 50 S. Ct. 184, 74 L. Ed. 668 (1930).

35. The conclusion that the principle of Rev. Rul. 2003-7 should apply to a Protection Fund transaction should not be affected by the negative conclusions in TAM 20060433, A.M. 2007-004 and *Anschutz*, because the Fund will not obtain the use of the Designated Securities or have the right to re-hypothecate such Designated Securities.

36. See "Leeds, Mark, and Boczar, Thomas, "The 21st Century Tontine Lookalike: Tax Aspects of Stock Protection Funds," *Taxes—The Tax Magazine*, CCH Tax and Accounting/Wolters Kluwer, September, 2017 issue, for an in-depth analysis of the case law and other legal authorities which support the conclusion that a holder of a Designated Security who acquires a Certificate should not be considered to have undertaken a common law constructive sale of his shares of the Designated Security.

37. Joint Committee on Taxation, General Explanation of Tax Legislation Enacted in 1997 (JCS-23- 97), Dec. 17, at 177 (the "Blue Book"). "The Congress anticipated that future Treasury regulations will treat as constructive sales other financial transactions that, like those specified in the provision, have the effect of eliminating substantially all of the taxpayer's risk of loss and opportunity for income and gain with respect to the appreciated financial position. Because this standard requires reduction of both risk of loss and opportunity for gain, the Congress intended that transactions that reduce only risk of loss or only opportunity for gain will not be covered. Thus, for example, the Congress did not intend that a taxpayer who holds an appreciated financial position in stock will be treated as having made a constructive sale when the taxpayer enters into a put option with an exercise price equal to the current market price (an "at the money" option). Because such an option reduces only the taxpayer's risk of loss, and not its opportunity for gain, the above standard would not be met."

38. Reg. §1.246-5(c)(1).

39. Reg. §1.246-5(c)(1)(iii)(B).

40. Code Sec. 1(h)(11)(B)(iii) provides that a dividend will not constitute QDI unless the holding period requirements for common stock provided in the dividend received deduction (or DRD) rules are met by substituting 60 days for 45 days and substituting 121 days for 91 days, in each place that such number appears. The DRD holding period rules, as modified by the QDI rules, require that a shareholder hold a share of stock paying a dividend more than 60 days during the 121-day period beginning on the date that is 60 days before the ex-dividend date in order for a dividend to be treated as QDI. The DRD holding period rules provide that the holding period is tolled for each day during which the "taxpayer has diminished his risk of loss by holding 1 or more other positions with respect to substantially similar or related property." If the offsetting position references 20 or more stocks, the diminution in risk test is undertaken by determining whether the substantial overlap test is met.

41. *Ibid.*

42. *Ibid.*

43. These results are achieved because each Series of a Protection Fund elects to be treated as an association taxable as a "C" corporation. Therefore, Certificate holders will be treated as shareholders and their ownership interests as stock that they purchased in the corporation. On the termination date, a complete liquidation of the corporation will occur under Code Section 331. Therefore, the cash distribution will be treated as the proceeds of a purchase of the shareholder's stock by the corporation and will qualify for long-term capital gain or loss treatment, provided that the stock of the liquidating corporation is a capital asset in the hands of the investor.

44. Reg. §1.331-1(a) (amounts received by a shareholder in a complete liquidation "shall be treated as full payment in exchange for the stock").

45. Code Secs. 1222(3), 1222(4).

46. Reg. §1.422-1(c).

47. This result is achieved because under Section 1092(b)(1) and Temp. Reg. Section 1.1092(b)-2T(a)(1), the investor's holding period in the put cannot "age," with the result that any gain on the put will be short-term capital gain. Thus, even though this gain is, in an economic sense, simply the long-term gain built into the ABC Corp. stock at the time the hedge was established, the holding period termination rule renders that gain short-term. The investor could have avoided this result by physically settling the put by delivering the shares to the seller of the put upon exercise. Because the gain with respect to the put is "merged" into the sale of the ABC Corp. stock, the resulting gain would be long-term rather than short-term.

48. The loss is long-term because, under Temp. Reg. 1.1092(b)-2T(b)(1), the shares being hedged satisfied the one-year long-term holding period requirement, and therefore the loss on the put (i.e. a position in the straddle) is deemed to be a long-term capital loss regardless of holding period. The loss is deferred due to the loss disallowance rule of Section 1092(a)(1) because the unrecognized gain in the stock exceeds the realized loss on the put.

49. See IRC Section 1(h)(11)(B)(iii)(I). The put purchase tolls the dividend holding period.

50. "Retiring Old Clichés," UBS Investor Watch, UBS Wealth Management Americas, 3rd Quarter, 2017. Based on a survey of 2,028 affluent and high net worth investors (with at least \$1 million in investable assets) from June 8 – 13, 2017, including 475 with at least \$5 million.

References

John L. Evans and Stephen H. Archer, "Diversification and the reduction of dispersion: An empirical analysis." *The Journal of Finance*, 23(5):pp. 761–767, 1968.

Thomas M. Tole, "You Can't Diversify Without Diversifying." *Journal of Portfolio Management* 8, no. 2 (Winter 1982): pp. 5-11.

Meir Statman, "How Many Stocks Make a Diversified Portfolio?" *Journal of Financial and Quantitative Analysis* 22, no. 3 (September 1987): pp. 353-363.

Bruno H. Solnik, "Why not diversify internationally rather than domestically?" *Financial Analysts Journal* 30(4):pp. 48–52+54, 1974.

Ron Bird and Mark Tippett, "Naive Diversification and Portfolio Risk—a Note," *Management Science*, 32(2):pp. 244–251, 1986.

Simone Brands and David R. Gallagher, "Portfolio Selection, Diversification and Fund-of-Funds: a Note," *Accounting & Finance* 45(2):185–197, 2005.

David Copp and Sean Cleary, "Diversification with Canadian stocks: how much is enough?" *Canadian Investment Review* 12(3):21–25, 1999.

Lawrence Kryzanowski and Singh Singh, "Should minimum portfolio sizes be prescribed for achieving sufficiently well-diversified equity portfolios?" *Frontiers in Finance and Economics* 7(2):1–37, 2010.

Peter Byrne and Stephen Lee, "Risk reduction in the United Kingdom property market," *Journal of Property Research* 17(1):23–46, 2000.

Discussion Paper, Tasmanian School of Business & Economics, No. 2013-16, "Equity Portfolio Diversification: How Many Stocks are Enough? Evidence from Five Developed Markets," Vitalie Alexeev and Francis Tapon.

Authors' Bios



Tom Boczar, JD, CFA, CPWA
Intelligent Edge Advisors

Tom Boczar, CFA, CPWA, LL.M., is CEO of Intelligent Edge Advisors. Tom is expert in the discipline of single-stock risk management, and has structured and arranged the execution of billions of dollars of single-stock hedging and monetization transactions. Tom is a prolific researcher and has authored over fifty published articles, a number of which have won prestigious awards, on issues related to concentrated wealth and the taxation of financial instruments, products and transactions. Tom holds an LL.M. (Taxation) from NYU School of Law, and a J.D., MBA and Masters in Professional Accounting from the University of Miami. Tom holds an Advanced Professional Certificate in Estate Planning from NYU School of Law, and earned the CFA Institute's CFA designation and IMCA's CPWA designation. Tom is admitted to the bar in NY and CT.



Nischal Pai, CFA
Intelligent Edge Advisors

Nischal Pai, CFA, is Managing Director, Head of Hedging & Structured Solutions at Intelligent Edge Advisors where he advises clients on the formulation, structuring and implementation of strategies to mitigate single-stock concentration risk. Before that, Nischal was Managing Director, Senior Portfolio Manager in the Quantitative Strategies Group at U.S. Trust where he managed tax-optimized equity portfolios using quantitative methodologies for ultra-high-net-worth and institutional clients. Nischal has over 20 years in the investment management and wealth management arena. He holds an MS in Physics and an MBA in Finance from the University of Akron.



The CAIA Endowment Investable Index

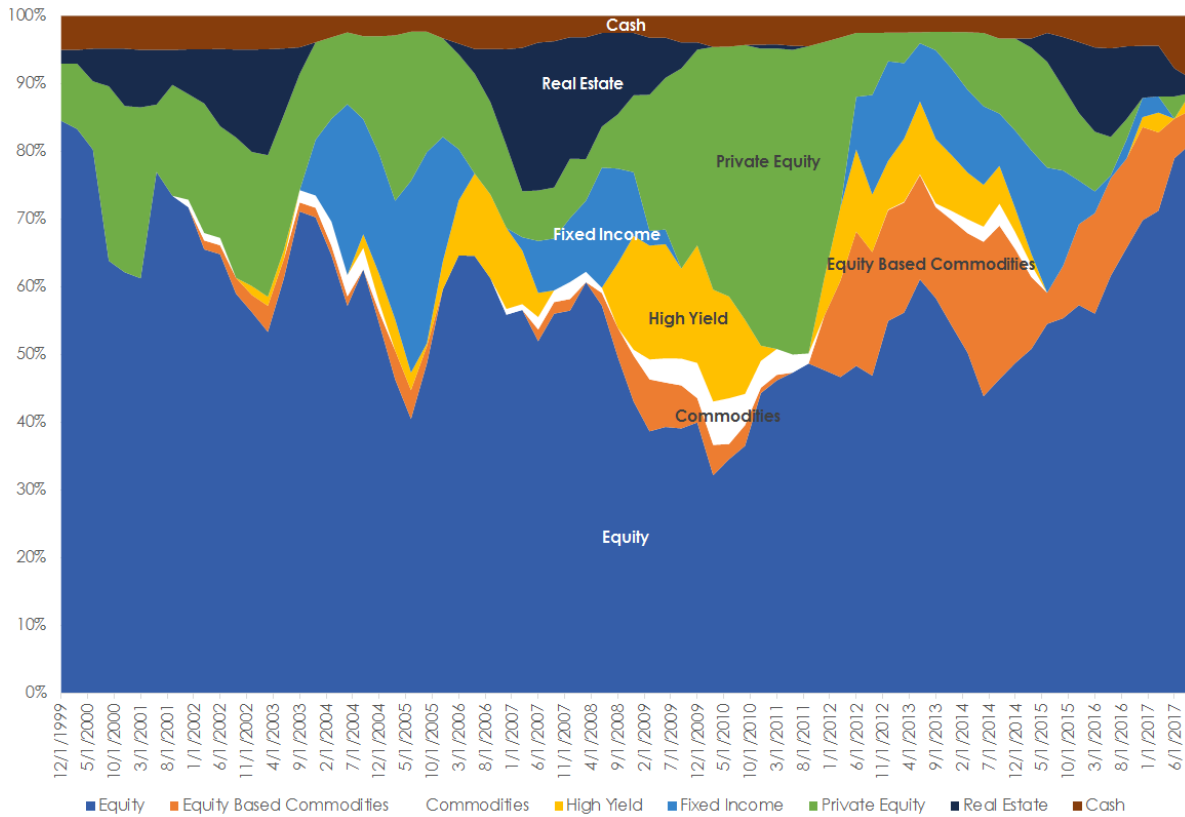
Hossein Kazemi
CAIA Association

Kathryn Wilkens, CAIA
Pearl Quest

We present the historical weights, allocation as of month-end September 2017, and historical performance to the replication portfolio that was introduced in our AIAR publication Volume 6 Issue 1.

The below graph shows the exposures of the Multi-Asset ETF portfolio through time. It is important to note that the volatility displayed by these exposures does not imply that endowments alter their asset allocations as frequently as the Multi-Asset ETF portfolio. While an endowment may hold a fixed allocation to various asset classes, the underlying assets/manager may display time-varying exposures to different sources of risk. For instance, a hedge fund manager may decide to increase her fund's exposure to energy stocks while reducing the fund's exposure to healthcare stocks. Though the endowment's allocation to that manager has remained unchanged, its exposures to energy and healthcare sectors have changed. Also, if returns on two asset classes are highly correlated, then the algorithm will pick the one that is less volatile. For instance, if returns on venture capital and small cap stocks are highly correlated, then the program will pick the small cap index if it turns out to be less volatile.

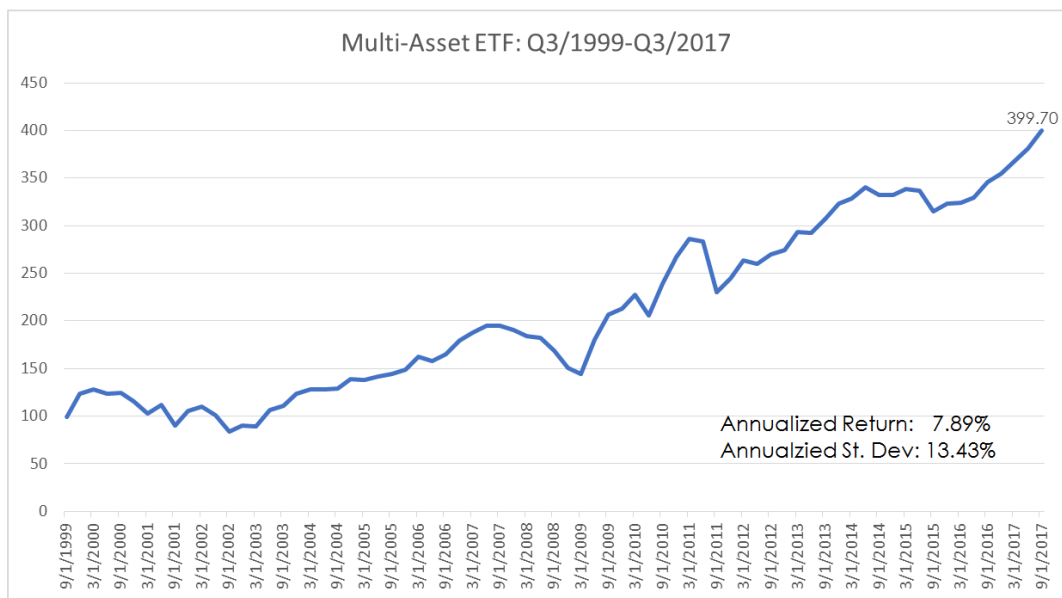
Endowment Index Weights



Allocation Suggested by Algorithm

RUSSELL 2000 ETF	MSCI World Free	Vanguard FTSE Emerging Markets ETF	Materials Select Sector SPDR® ETF	Technology Select Sector SPDR® ETF	Utilities Select Sector SPDR® ETF	Health Care Select Sector SPDR® ETF	BbgBarc US Corporate High Yield TR USD	SPDR® Dow Jones Global Real Estate	Treasuries + Cash
26.62%	30.99%	6.65%	5.00%	6.30%	1.36%	9.15%	2.52%	2.25%	9.16%

Historical Performance



Authors' Bios



Hossein Kazemi, Ph.D., CFA
CAIA Association
Isenberg School of Management,
University of Massachusetts Amherst

Dr. Hossein Kazemi is the Senior Advisor to the CAIA Association's Program. Dr. Kazemi has been involved with the CAIA Association since its inception as a senior advisor and a managing director. In his current role, he helps with the development of the CAIA program's curriculum and directs the CAIA Association's academic partnership program. In addition, he serves as the editor of *Alternative Investment Analyst Review*, which is published by the Association. He has worked with universities and industry organizations to introduce them to the CAIA program. Dr. Kazemi is Michael and Cheryl Philipp Distinguished Professor of Finance at the Isenberg School of Management, the University of Massachusetts - Amherst. He is the Director of the Center for International Securities & Derivatives Markets, a nonprofit organization devoted to research in the area of alternative investments, a co-founder of the CAIA Association, and home to CISDM Hedge Fund/CTA Database and the *Journal of Alternative Investments*, the official research publication of the CAIA Association. He has over 25 years of experience in the financial industry and has served as consultant to major financial institutions. His research has been in the areas of valuations of equity and fixed income securities, asset allocation for traditional and alternative asset classes, and evaluation and replication of active management investment products. He has a Ph.D. in finance from the University of Michigan.



Kathryn Wilkens, Ph.D., CAIA
Pearl Quest LLC

Kathryn Wilkens is the president and founder of Pearl Quest LLC, a consulting company currently focused on tracking and replication products, and educational services in the alternative investments space. She is also an RIA with S Capital Wealth Advisors and assistant editor for the *Journal of Alternative Investments*.

About CAIA

Founded in 2002, the CAIA Association is the world leader and authority in alternative investment education. The CAIA Association is best known for the CAIA Charter (www.caia.org), an internationally-recognized credential granted upon successful completion of a rigorous two-level exam series, combined with relevant work experience. Earning the CAIA Charter is the gateway to becoming a Member of the CAIA Association, a global network of more than 9,000 alternative investment leaders located in 90+ countries who have demonstrated a deep and thorough understanding of alternative investing. The CAIA Association now supports 30 vibrant chapters located in financial centers around the world and sponsors more than 150 educational and networking events each year.



MSCI Global Intel Report: Building Targeted Real Estate Portfolios

MSCI Real Estate

Introduction

Institutional investors include private real estate in their portfolios for a variety of reasons, including diversification, return enhancement, income to pay benefits and inflation hedging. Regardless of the objectives, investors looking to execute on an allocation strategy will often target certain markets. However, heterogeneity of assets and high asset-specific risk mean that a representative market exposure cannot be built with just one or two assets. Investors targeting particular markets should therefore think carefully about how many assets they need to obtain broader market exposure.

Focusing on the example of an investor targeting global office markets, this paper shows that a representative exposure to such markets could have been achieved with portfolios approaching 10 assets in size. Indeed, the majority of the reduction in tracking error against mean performance comes from the

first few assets acquired. However, the number of assets needed to approach market exposure can vary from market to market, and over the business cycle.

In this paper, we used MSCI asset-level data to simulate the performance of 250,000 hypothetical office portfolios of different sizes across 25 global cities from 2012 to 2016. We examined how many assets would have been needed in order to build sufficient exposures to individual markets. At the end of this paper, we provide insights on how to manage performance and risk when investors don't own "enough" assets.

How the Number of Assets Influences Performance

From a portfolio construction perspective, the use of attribution analysis (allocation and selection) helps to align and manage a portfolio's stated strategy with its actual sources of performance. Allocation tracks the top-down

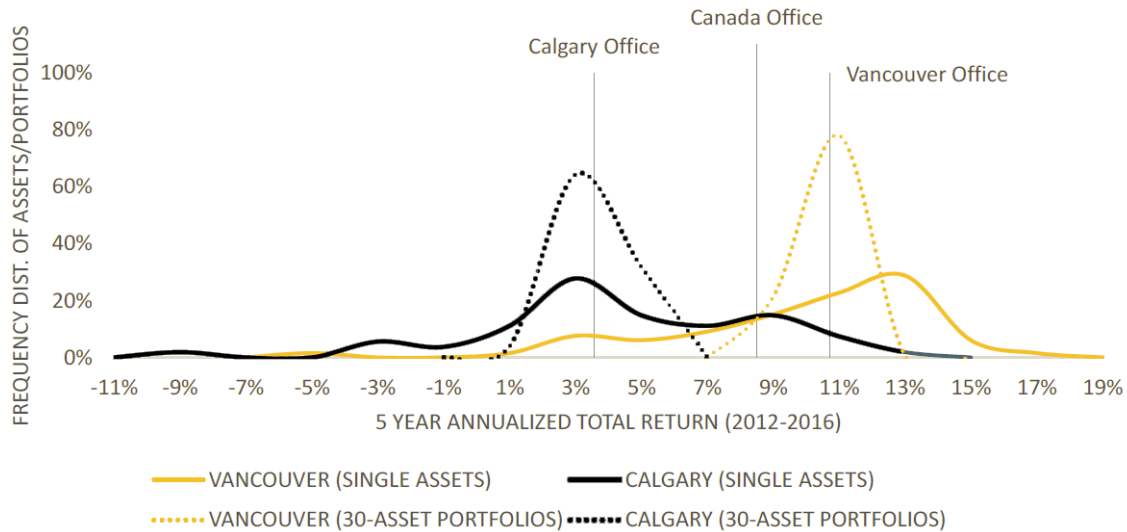


Exhibit 1: Distribution of Office Returns in Calgary and Vancouver

Source: MSCI

strategic decisions a portfolio manager makes regarding which markets, property types or risk strategies to target.¹ Selection tracks the bottom-up execution of the strategy, i.e., have the assets acquired in a defined segment (e.g., Sydney office) outperformed, underperformed or exhibited performance in-line with other assets in that segment?

Allocation is a major part of any real estate strategy, but can be difficult to implement due to asset heterogeneity. In Exhibit 1, we show the distribution of office returns for individual assets and 30-asset portfolios for the Canadian cities of Calgary and Vancouver. The economies of these cities are very different, and, at an aggregate level, real estate performance has differed sharply in recent years. For our 5-year study period, Calgary and Vancouver had total returns of 3.6% and 10.7%, respectively.²

Over the 5-year period, the distribution of performance of individual assets in these two cities overlapped considerably. However, the overlap of return distributions was eliminated when we looked at the distributions of 30-asset portfolios. Does this mean that investors would have needed to create portfolios of 30

assets in each market to obtain market exposure? The answer is no, but begs the question of how many assets would have been enough.

To answer this question systematically, we randomly selected assets to create portfolios of increasing size, from one to 30 assets, across 25 different global cities, and then calculated their performance, including the tracking error of each portfolio versus the city it was located in, over the analysis period.

In Exhibits 2a and 2b, we illustrate the results of this analysis for Washington, D.C. In Exhibit 2a, we show the distribution of portfolio return outcomes around the mean as we increase a portfolio's size from a single asset to 30 assets. As more assets are added, the range of possible return outcomes narrows around the market average. In Exhibit 2b, we show the

reduction in tracking error as a portfolio adds additional assets. The reduction in average tracking error fell rapidly after the first couple of assets and the marginal change became relatively insignificant by the 10th asset.

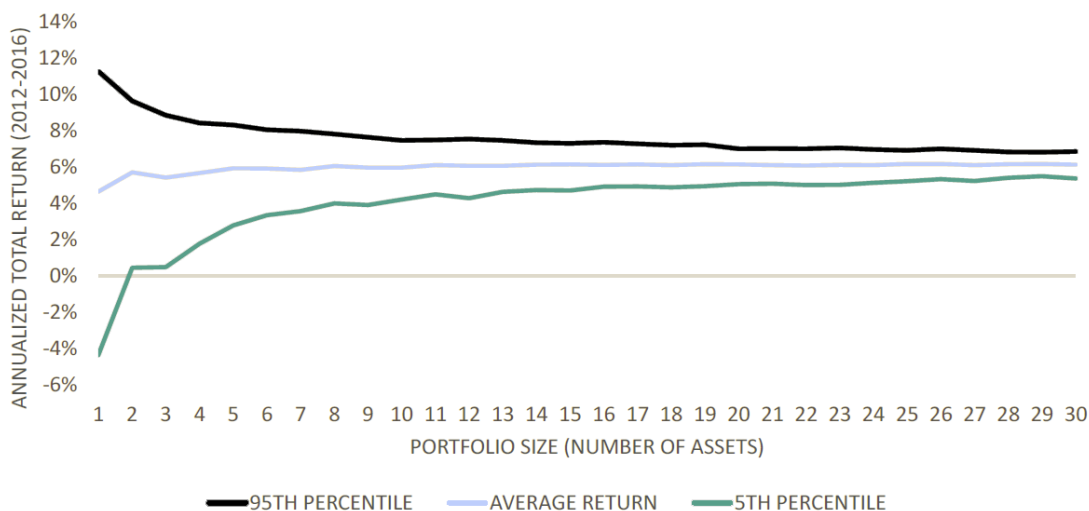


Exhibit 2a: Distribution of Washington, D.C. Returns

Source: MSCI

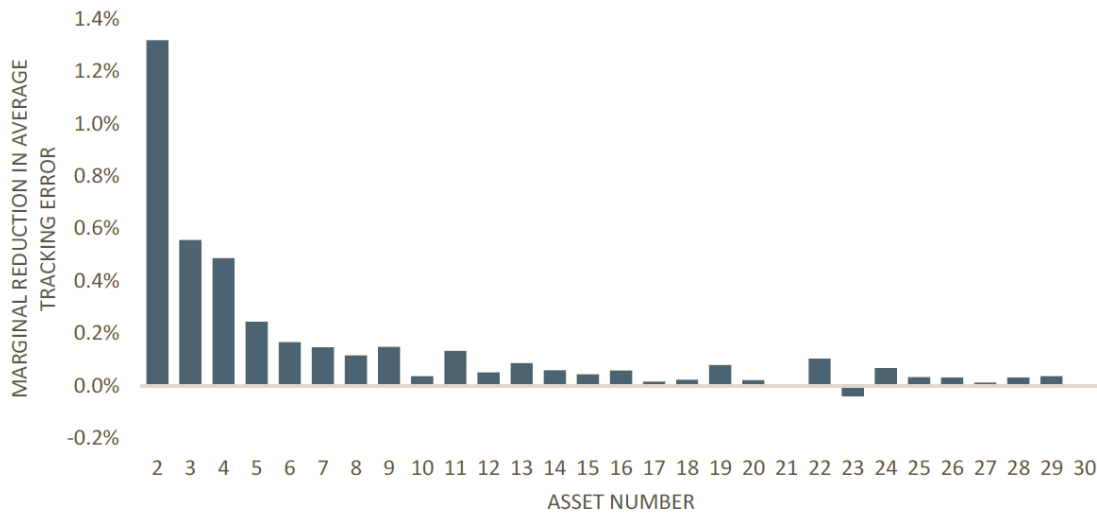


Exhibit 2b: Reduction in Average Tracking Error for Washington, D.C.

Source: MSCI

While Washington, D.C. provides a good example of the benefits of increasing the number of assets, we also found that the reduction in average tracking error varied across cities depending on the level of heterogeneity in the local market. For example, a city with multiple nodes and economic drivers could have required more assets to achieve a market exposure than more homogeneous markets with only a single node (Central Business District versus suburban) and one economic driver. Volatile markets, such as those experiencing a turning point or rapid capital growth movement, could also have required more assets to achieve market exposure. Exhibit 3 presents the results for tracking error reduction for the cities in our analysis, with London, Dublin, Washington, D.C. and Tokyo highlighted.

We caveat our findings against real-world portfolios. In our analysis, each asset is assumed to have an equal probability of being included in a portfolio, but an actual actively managed portfolio might have needed more assets to track the market; the reverse could also have been true. Relative asset size can also have an impact. If a portfolio of 10 assets contains one asset that makes

up a dominant weight in the overall portfolio (say 50% or more), then the portfolio would have tended to act like that asset more than the market.

When Market Exposure Cannot Be Obtained

Naturally, it is not always possible to build representative exposure in every market. Sometimes it is too costly or the assets are just not available. In situations where only a smaller portfolio can be constructed, what risk factors might investors consider the most important?

In previous research, we showed that over the long term about 80% of total return has come from income and 20% from capital growth.³ The reverse is true when we look at risk, as measured by standard deviation, where 80% came from capital growth and 20% from income. This relationship is magnified in smaller portfolios that cannot diversify away assetspecific risk. In these cases, investors may be best served by focusing on the duration, concentration, credit strength and reversionary potential of the contractual income in their portfolio. By carefully managing

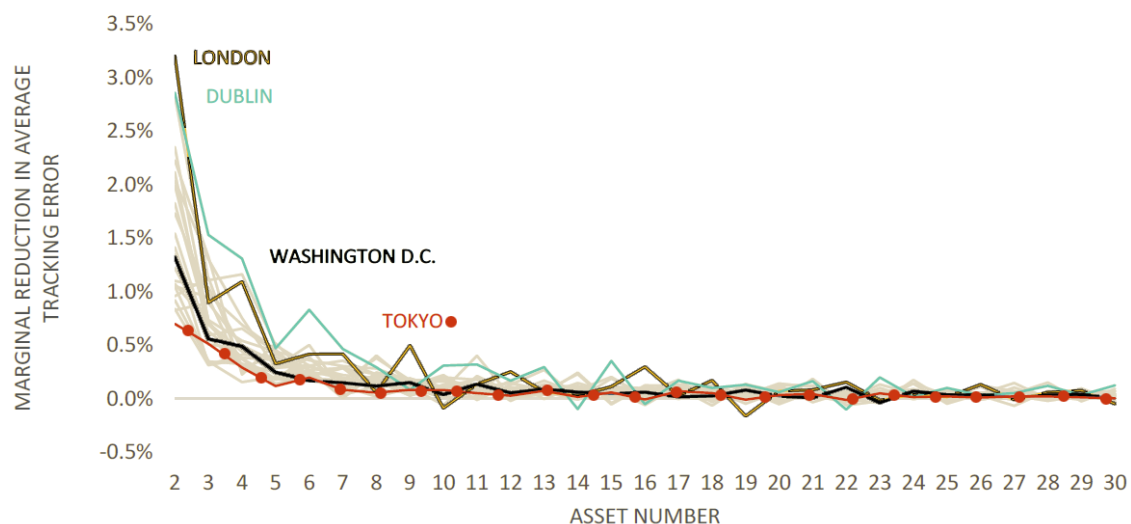


Exhibit 3: Marginal Reduction in Average Tracking Errors

Source: MSCI

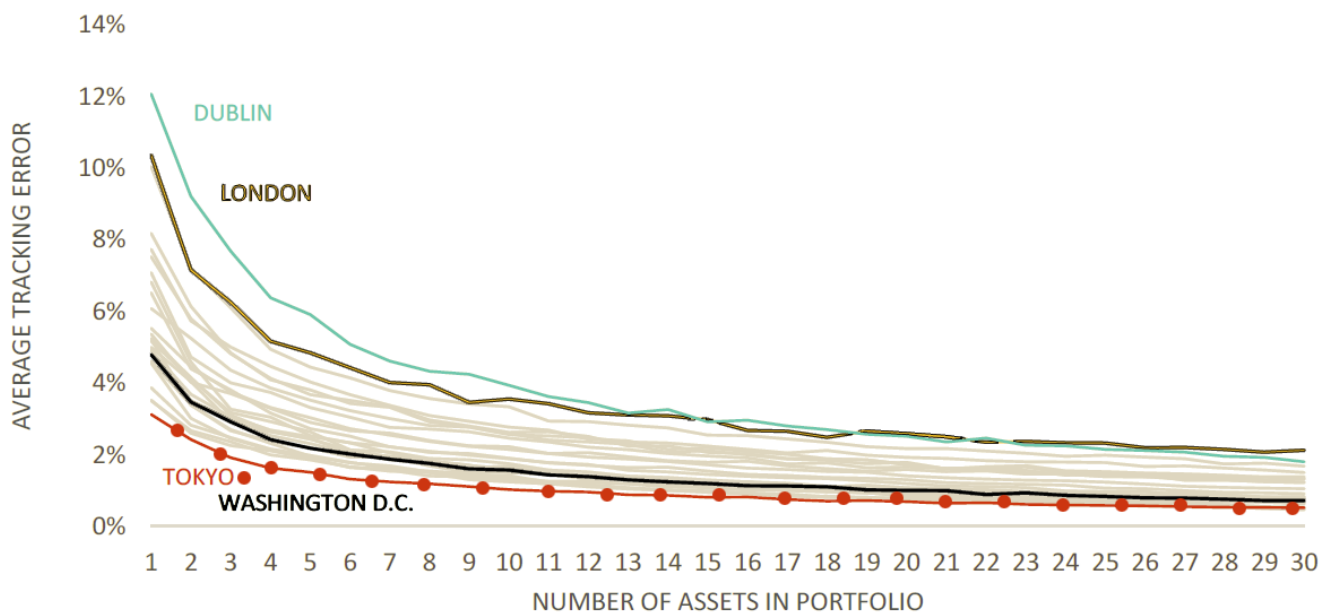


Exhibit 4: Average Portfolio Tracking Error

Source: MSCI

and monitoring these risks, investors may improve their chances gaining full exposure to a given market, even with a small portfolio.

Investors can also consider indirect investment in listed or unlisted vehicles that are built around their target strategy. Indirect investment can make it easier to achieve sufficient exposure, but it comes at the cost of direct control over the portfolio. Indirect investors may also want to study and monitor the contribution and attribution scores of the funds they invest in, to measure whether they are achieving their desired exposures.

It is also worth noting that our analysis simulates the performance of unlevered, asset-only portfolios only. In the real world, fund level overlays such as debt, swaps and cash can add further complications. These aspects may not be as important for direct investors but may be larger considerations for indirect investors looking to target a particular market.

Does The Choice of Assets Still Matter?

Might investors with a sufficiently large and balanced exposure to their target market still look to consider which assets or funds they have invested in? The answer is likely yes. Real estate assets, and by extension real estate portfolios, are by nature typically heterogeneous. Even though our analysis shows that most of the marginal reduction in tracking error was achieved by the 10-asset mark, the overall level of tracking error remained high, as illustrated in Exhibit 4. This suggests the importance of picking the right assets or managers.

Conclusion

In our analysis, we have used the example of an investor targeting global office markets to explore the challenges in building market exposures. Using data over a 5-year period across 25 global cities, our results illustrate that the number of assets required varied from market to market, and over the business cycle. But, in most markets, the majority of the reduction in tracking error comes

from the first few assets acquired, and a representative exposure could have been achieved as a portfolio approached 10 assets in size.

We offer several additional observations:

- Where it was not possible to build sufficient exposure, the duration, concentration, credit strength and reversionary potential of the contractual income played a larger role in performance.
- Investors can also consider using indirect investment to target the market exposures they are unable to build directly, but need to be aware of the potential impact that fund-level overlays like cash and gearing can have on their investments.
- Even when a representative exposure has been built, the heterogeneous nature of the asset class means that care needs to be taken when selecting assets or funds in which to invest.

When seeking to build exposures to target markets, real estate investors may want to understand each market's distinct characteristics and construct their portfolios carefully.

Endnotes

1. Here we are referencing asset specific risk strategies at the time of purchase. What was the business plan when the asset was purchased? Was it purchased as an operating asset, a leasing play, a rehab/reposition or a new development?
2. These are same store returns, calculated on a fixed sample of assets held as standing investments over the whole 5-year period.
3. Reid, B. (2017). "Global Property Performance: Trends and Insights from MSCI's 2016 IPD® Global Annual Property Index. MSCI Research. <https://www.msci.com/documents/10199/00d5b517-aa55-4d93-8160-470a18b57683>

About MSCI

For more than 40 years, MSCI's research-based indexes and analytics have helped the world's leading investors build and manage better portfolios. Clients rely on our offerings for deeper insights into the drivers of performance and risk in their portfolios, broad asset class coverage and innovative research. Our line of products and services includes indexes, analytical models, data, real estate benchmarks and ESG research. MSCI serves 97 of the top 100 largest money managers, according to the most recent P&I ranking.

Submission Guidelines

Article Submission: To submit your article for consideration to be published, please send the file to AIAR@caia.org.

File Format: Word Documents are preferred, with any images embedded as objects into the document prior to submission.

Abstract: On the page following the title page, please provide a brief summary or abstract of the article.

Exhibits: Please put tables and graphs on separate individual pages at the end of the paper. Do not integrate them with the text; do not call them Table 1 and Figure 1. Please refer to any tabular or graphical materials as Exhibits, and number them using Arabic numerals, consecutively in order of appearance in the text. We reserve the right to return to an author for reformatting any paper accepted for publication that does not conform to this style.

Exhibit Presentation: Please organize and present tables consistently throughout a paper, because we will print them the way they are presented to us. Exhibits may be created in color or black and white. Please make sure that all categories in an exhibit can be distinguished from each other. Align numbers correctly by decimal points; use the same number of decimal points for the same sorts of numbers; center headings, columns, and numbers correctly; use the exact same language in successive appearances; identify any bold-faced or italicized entries in exhibits; and provide any source notes necessary. Please be consistent with fonts, capitalization, and abbreviations in graphs throughout the paper, and label all axes and lines in graphs clearly and consistently. Please supply Excel files for all of the exhibits.

Equations: Please display equations on separate lines. They should be aligned with the paragraph indents, but not followed by any punctuation. Number equations consecutively throughout the paper, using Arabic numerals at the right-hand margin. Clarify, in handwriting, any operation signs or Greek letters, or any notation that may be unclear. Leave space around operation signs like plus and minus everywhere. We reserve the right to return for resubmitting any accepted article that prepares equations in any other way. Please provide mathematical equations in an editable format (e.g., Microsoft Word, using either Equation Editor or MathType).

Reference Citations: In the text, please refer to authors and works as: Smith (2000). Use parenthesis for the year, not brackets. The same is true for references within parentheses, such as: (see also Smith, 2000).

Endnotes: Please use endnotes, rather than footnotes. Endnotes should only contain material that is not essential to the understanding of an article. If it is essential, it belongs in the text. Bylines will be derived from biographical information, which must be indicated in a separate section; they will not appear as footnotes. Authors' bio information appearing in the article will be limited to titles, current affiliations, and locations. Do not include full reference details in endnotes; these belong in a separate references list; see next page. We will delete non-essential endnotes in the interest of minimizing distraction and enhancing clarity. We also reserve the right to return to an author any article accepted for publication that includes endnotes with embedded reference detail and no separate references list in exchange for preparation of a paper with the appropriate endnotes and a separate references list.

Submission Guidelines

References List: Please list only those articles cited, using a separate alphabetical references list at the end of the paper. We reserve the right to return any accepted article for preparation of a references list according to this style.

Copyright Agreement: CAIA Association's copyright agreement form giving us non-exclusive rights to publish the material in all media must be signed prior to publication. Only one author's signature is necessary.

Author Guidelines: The CAIA Association places strong emphasis on the literary quality of our article selections.

Please follow our guidelines in the interests of acceptability and uniformity, and to accelerate both the review and editorial process for publication. The review process normally takes 8-12 weeks. We will return to the author for revision any article, including an accepted article, that deviates in large part from these style instructions. Meanwhile, the editors reserve the right to make further changes for clarity and consistency.

All submitted manuscripts must be original work that has not been submitted for inclusion in another form such as a journal, magazine, website, or book chapter. Authors are restricted from submitting their manuscripts elsewhere until an editorial decision on their work has been made by the CAIA Association's AIAR Editors.

Copyright: At least one author of each article must sign the CAIA Association's copyright agreement form—giving us non-exclusive rights to publish the material in all media—prior to publication.

Upon acceptance of the article, no further changes are allowed, except with the permission of the editor. If the article has already been accepted by our production department, you must wait until you receive the formatted article PDF, at which time you can communicate via e-mail with marked changes.

About the CAIA Association

Founded in 2002, the Chartered Alternative Investment Analyst (CAIA) Association® is the international leader in alternative investment education and provider of the CAIA designation, the alternative industry benchmark. The Association grants the CAIA charter to industry practitioners upon the successful completion of a rigorous two-level qualifying exam. Additionally, it furthers the Association's educational mandate through the dissemination of research, webinars, and videos. CAIA supports three publications for members: AllAboutAlpha.com, The Journal of Alternative Investments, and the Alternative Investment Analyst Review. CAIA members connect globally via networking and educational events, as well as social media.

CAIA.org



