Wozu (Whereto) Hedge Funds? The Case of Equity Long-Short Strategy

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Since Alfred W. Jones started his collective investment vehicle in 1949, hedge funds have come a long way, covering an array of strategies and investments in financial securities, derivative contracts, and other assets. The original hedge fund, the Jones Hedge Fund, had a relatively narrow focus and "invested in US stocks, both long and short," with the aim of "limit[ing] market risk while focusing on stock selection."[1] It was quintessentially a US equity long-short fund.

Although the basic premise of equity long-short strategy remains unchanged, the strategy has progressed in terms of implementation. The evolutionary changes that the strategy has embraced stem from the growing sophistication of investors and narrowing of the definition of alphas that can be attributed to hedge fund managers' investment capability. The ready availability of liquid alternatives and factor investments today has compounded a challenge to the equity long-short strategy. This paper argues that in order for a larger universe of hedge funds to remain competitive and relevant, these funds are compelled to find ways to bring true value to investors, which investors cannot realize by themselves. This paper is, in large part, based on and motivated by an educational event hosted by the CAIA New York Chapter in June 2019.[2]

Wozu (Whereto)[3] Hedge Funds?

As of March 31, 2019, hedge fund assets under management (AUM) totaled $3.18 trillion[4] which, along with private equity,[5] constitute one of the two largest categories of alternative investments. These days, hedge funds engage in extremely varied strategies, including those historically been deemed the domains of private equity, private debt and private real estate investments. As hedge fund assets rise and their investor base broadens, expectations toward hedge funds have become wide-ranging and, at times, overblown. For instance, some investors become disillusioned when a certain hedge fund does not beat the S&P 500 Index every year, even though the fund's explicit objective may be to extract alphas and lessen the return gyrations stemming from beta exposure to equity and other markets.

Such an inflated expectation aside, there are reasons hedge fund investors ought to be concerned. Exhibit 1 shows the cumulative returns of the Barclay Hedge Fund Index from January 2015 to March 2019. The exhibit also shows the cumulative returns of a portfolio that is intended to replicate the index by allocating 50% of assets to the iShare MSCI World ETF (URTH), 20% to the iShares U.S. Treasury Bond ETF (GOVT), and 30% to U.S. T-bills.[6] Note that the replicating portfolio consists of highly liquid instruments only, and any investor can actually implement the trades involving these ETFs and T-bills easily.[7] Each month, the replicating portfolio is rebalanced so that weights for each asset will remain at 50%, 20%, and 30% respectively at the beginning of every month.[8]

It is remarkable how closely the replicating portfolio tracks the Barclay Hedge Fund Index, based on the simple rebalancing rule just described. The replicating portfolio has somewhat larger volatility (σ=1.69%) than the index (σ=1.32%), but most of the turning points have occurred at the same time. The correlation coefficient between monthly returns of the index and the replicating portfolio is very high (r=0.90). Insofar as the average hedge fund performance during the four year period is concerned, it is difficult to claim that those hedge funds represented by the index added value as a group. In fact, the average monthly return of the replicating portfolio was 0.26%, and outperformed that of the hedge fund index by 0.03%.

One of the reasons for the disappointing result of the Barclay Hedge Fund Index during the past few years is that the index averages the performances of more than several thousand hedge funds. Hedge funds are characterized by highly uneven abilities, and when the performances of a large number of funds are averaged, the results are predictably mediocre. Another reason for less than stellar results lies in the fact that hedge funds employ diverse strategies, and cover a wide investment universe such as the one this replicating portfolio represents. When exposure to all the assets in which a variety of hedge fund strategies invest is aggregated, the investment universe is likely to resemble a globally diversified portfolio. While some hedge funds may be able to generate excess returns from exposure to a certain asset, other hedge funds may be incurring losses from exposure to the same asset. Thus, on average, performance is expected to be similar to that of the relevant investment universe.

There is no doubt that behind the rising popularity of liquid alternatives lie the often mediocre performances of hedge funds relative to what is available in traditional investments. Indeed, if hedge fund investments can be replicated by a static combination of ETFs and Treasury bills and no leverage is necessary, as was just demonstrated, there is no need to pay high management fees and performance fees to hedge funds.[9] For this reason, hedge funds need to add true value to investors.

Let us now examine how hedge funds perform in the long run. Exhibit 2 lists various categories of hedge fund strategies and each strategy category's cumulative return from January 2000 to December 2018, compiled by Eurekahedge, along with the S&P 500 Index's cumulative return for the same period.[10]

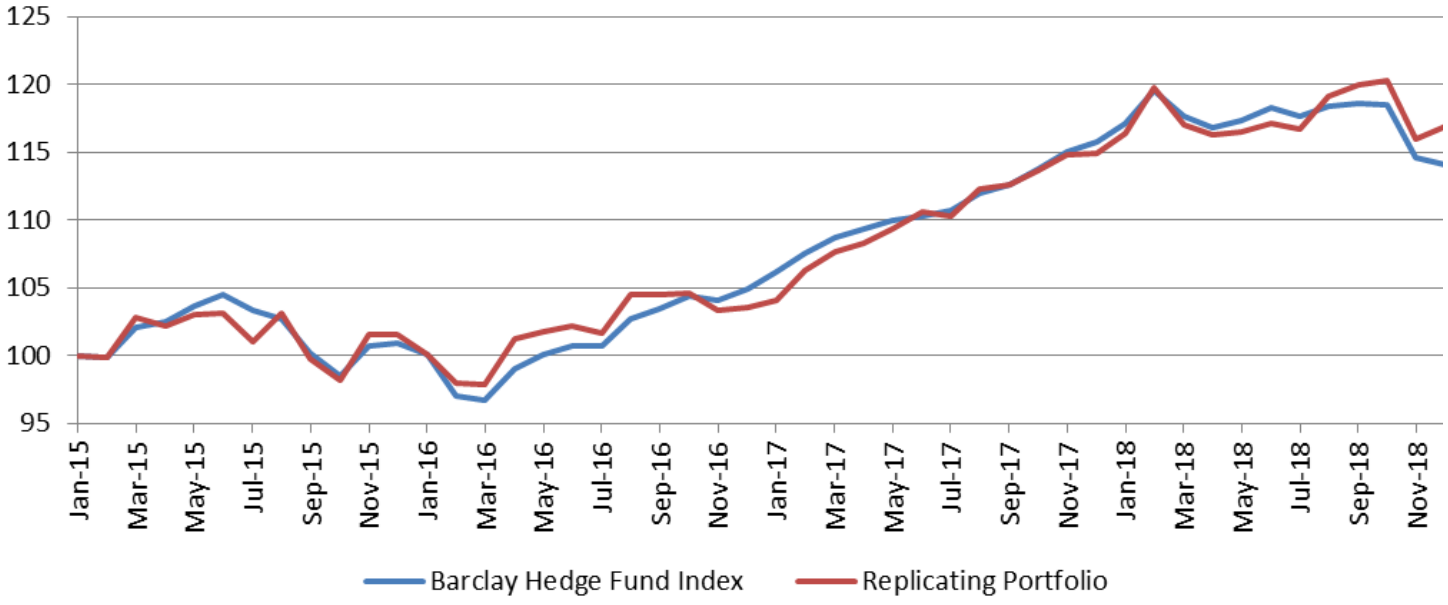


Exhibit 1: Cumulative Returns of the Barclay Hedge Fund Index and its Replicating Portfolio
Source: BarclayHedge, Ltd., Yahoo Finance, and Federal Reserve Board. Calculation by author.

Eurekahedge Strategy Indices	Cumulative Return
Arbitrage	248.79%
CTA/Managed Futures	376.10%
Distressed	542.02%
Event Driven	411.11%
Fixed Income	298.10%
Long-Short Equity*	334.96%
Macro	306.54%
Multi-Strategy	396.45%
Relative Value	388.21%
S&P 500 Total Return	**144.70%**

Exhibit 2: Hedge Fund Performance by Strategy (from 2000 to 2018)
Source: Eurekahedge and Yahoo Finance
Note: *Eurekahedge uses the expression "Long-Short Equity" in reference to "Equity Long-Short."

Whereas the S&P 500's cumulative return was 144.70%, the Arbitrage strategy index, which had the lowest performance among the different strategy indices compared, recorded a cumulative return of 248.79%, adding more than 100% to the equity index. In fact, every hedge fund strategy index substantially outperformed the S&P 500 index over the 19 year period. Although replicating the Barclay Hedge Fund Index for the past nine quarters was surprisingly easy, a question remains as to whether one can create a liquid portfolio that tracks the performance of a certain specific hedge fund strategy.

There are several approaches to pursuing hedge fund replication. One approach focuses on a mechanical method whereby "managers populate portfolios with position characteristics [similar to] particular hedge fund strategies to attempt to reproduce such strategies' returns."[11] This type of replication approach works best with strategies such as merger arbitrage, as information details of a merger may be publicly available.

Another approach to replication focuses on the statistical properties of hedge fund return distributions. Here, the underlying assumption is that the "return profile of hedge funds stems from 'dynamic' trading in standard assets, as represented by indices on traditional asset classes."[12] Dynamic trading alters the distribution of investment outcomes, even if the returns of underlying assets are normally distributed.[13] For instance, managed futures strategies have been considered to generate "straddle-like" payoff patterns, which potentially bring gains in extreme market moves. More generally, some hedge fund strategies employ strategies akin to selling out-of-the-money put options, and are able to generate stable returns for an extended period of time, but potentially with sudden large losses.[14]

Yet another approach is based on a version of linear factor models. Typically, a set of factors that explain the return patterns of a single or a group of hedge funds are identified first. Then, a replicating portfolio is created by linearly combining these factors. Many proprietors of replication products employ this approach. This approach seems to work best with strategies that have directional exposure such as equity long-short and event driven strategies. On the other hand, the approach tends to fall short of generating satisfactory replication results for strategies such as equity market neutral, relative value, and global macro strategies.[15]

Hence, at least some hedge fund strategies can be replicated to a reasonable degree by using liquid instruments or through factor exposure. However, this raises some questions: First, are these hedge fund strategies destined to be replaced by factor investments and/or other liquid alternatives? Second, can these strategies continue to add value for investors beyond what quantitative approaches generate? The answers to these questions are critical when contemplating the future of hedge funds.

As strategy replication and factor-based approaches gain greater acceptance in the investment management community, the pressure on hedge funds to outperform these approaches inevitably increases. Skills that cannot be easily substituted by liquid alternatives or a predetermined set of factor exposure are going to be critical. Unless these skills, along with the generation of true alphas, are emphasized, it will become increasingly difficult to convince investors that hedge fund investing is a positive value proposition. In the section that follows, we will examine the case of Equity Long-Short Strategy with these challenges in mind.

Equity Long-Short Strategy

Among hedge fund strategies, the Equity Long-Short (ELS) strategy accounts for 36% of assets under management (AUM), and it is by far the largest strategy category.[16] Challenges that the strategy faces are likely to affect the overall hedge fund industry significantly. As discussed in the previous section, ELS strategies tend to have directional equity exposure. For this reason, it may be appropriate to compare its performance to that of the equity market. However, one needs to keep in mind an important caveat that most hedge funds, including those employing ELS strategies, are absolute return-oriented and not structured to beat a long-only index such as the S&P 500 every year. It is therefore misleading to consider the S&P 500 as a benchmark in the way commonly accepted in traditional investments.

Exhibit 3 compares the performance of the ELS and the S&P 500 from January 2000 to December 2018, as well two sub-periods: 2000 to 2008 (Panel A) and 2009 to 2018 (Panel B).[17] During the entire 19 year period (Panel C), the ELS strategy outperformed the S&P 500 Index substantially in terms of average monthly returns (0.54% vs. 0.35%), with less than half the risk, i.e., standard deviation (2.02% vs. 4.22%) of the index. This resulted in a much higher Sharpe ratio for the ELS strategy than that of the S&P 500 Index (0.94 vs. 0.29).

	Panel A		Panel B		Panel C	
	From 2000 to 2008		From 2009 to 2018		From 2000 to 2018	
	ELS	S&P 500	ELS	S&P 500	ELS	S&P 500
Mean	0.52%	-0.45%	0.55%	1.07%	0.54%	0.35%
Standard Deviation	2.24%	4.39%	1.82%	3.94%	2.02%	4.22%
Skewness	-0.38	-0.65	0.12	-0.43	-0.33	-0.58
Excess Kurtosis	1.83	1.28	1.03	0.7	1.69	1.11
Maximum	8.51%	9.32%	6.08%	10.93%	8.51%	10.93%
Minimum	-6.70%	-16.85%	-4.70%	-10.67%	-6.70%	-16.85%
95% VaR	-3.16%	-7.67%	-2.45%	-5.40%	-2.79%	-6.59%
Sharpe Ratio	0.82	-0.35	1.08	1.00	0.94	0.29

Exhibit 3: Performance Comparison between the Eurekahedge Long-Short Equity Strategy and the S&P 500 Index
Source: Eurekahedge and Yahoo Finance

It is noteworthy that the ELS maintained similar performances in the two sub-periods in terms of average returns, as well as of risk, measured by standard deviation (Panel A and Panel B). Other distributional properties such as skewness and excess kurtosis were within a reasonable range for both periods. However, in the second sub-period the strategy had a slightly higher return and a lower risk than in the first sub-period, resulting in a better Sharpe ratio (1.08 vs 0.82).

By contrast, the S&P 500 index had drastically different performances in the two sub-periods. From 2000 to 2008 (shown in Panel A), the S&P 500 Index had a negative average monthly return of -0.45%, while from 2009 to 2018 (shown in Panel B), the index showed a large average monthly return of 1.07%. In the latter period, the S&P 500 index outperformed the ELS strategy nearly by 2 to 1 on average, but with over two times the level of risk.

In the second sub-period (Panel B), despite the great performance of the S&P 500, the Sharpe ratio for the ELS strategy was slightly higher than that of the index. The magnitude of the largest monthly loss for the ELS strategy (-4.70%) was much smaller than that of the index (-10.67%). In addition, the 95% value at risk (VaR) was much smaller for the ELS strategy (-2.45%) than the index (-5.40%), confirming that the strategy was exposed to much lower risk than the index. Unless one focuses solely on returns and ignores non-return characteristics such as the levels of risk, it is difficult to conclude that the S&P 500 outperformed the ELS during the second sub-period. In fact, by simply using leverage, the strategy could have generated higher risk-adjusted returns than the equity market.

Exhibit 4 summarizes the regression results of the Eurekahedge Long-Short Equity Index and S&P 500 excess returns for the entire period, as well as for the two sub-periods. Panel C indicates that for the entire period the slope coefficient was 0.367 and it was statistically significant at the 7.00E-45 level. The intercept term was 0.407 and significant at the 5.09E-06 level. With R square of 0.584, one can surmise that nearly 60% of the variations of the index's excess returns were explained by the market excess returns.

		Panel A	Panel B	Panel C
		From 2000 to 2008	From 2009 to 2018	From 2000 to 2018
R Square		**0.513**	**0.723**	**0.584**
	Coefficient	0.365*	0.394*	0.367*
Slope	**t Statistics**	10.569	17.56	17.797
	P Value	2.90 E-18	1.04 E-34	7.00 E-45
	Coefficient	0.686*	0.125	0.407*
Intercept	**t Statistics**	4.527	1.372	4.674
	P Value	1.57 E-05	0.173	5.09 E-06

Exhibit 4: Regressions of Equity Long-Short Returns on S&P 500 Excess Returns
Source: Eurekahedge and Yahoo Finance
Note: *Statistically significant at below 1% level.

Importantly, Panel B indicates that the market factor played a more significant role during the second sub-period than in the first period (Panel A) with an R square of 0.723, leaving only 27.7% of variation of returns unexplained. Since both the independent variables and dependent variable were measured in the form of excess returns, the slope coefficient can be interpreted as "beta" and the intercept as "alpha," as defined by the Modern Portfolio Theory.[18] In this sense, the ELS strategy had a beta of 0.394, but not a statistically significant alpha.[19] On the other hand, Panel A shows a smaller value of R square and a slightly lower beta than those in Panel B. In addition, the strategy had a high alpha value of 0.686 in the first sub-period.

Panel A of Exhibit 5 lists descriptive statistics for various risk factors. The data for many of these factors are available from 2009 onwards and the sample period corresponds to the second sub-period in previous analyses.[20] The first two, "Size" and

Panel A - Descriptive Statistics

	Factors	Mean	Standard Deviation	Skewness	Excess Kurtosis	Maximum	Minimum	95% VaR
Traditional Factors	Size	0.12	2.41	0.65	2.01	10.64	-4.64	-3.85
	Value	0.1	3.28	2	10.21	19.72	-8.27	-5.31
	Momentum	-0.21	4.68	-3.53	23.61	10.28	-34.39	-7.9
HFR Equity Factors	Congestion	0.36	1.91	0.07	2.98	6.9	-6.27	-2.78
	Cross Sectional Mementum	-0.41	2.24	0.3	1.07	7.52	-6.54	-4.11
	EU Dividend Carry	0.48	1.73	1.07	4.87	8.45	-5.05	-2.37
	Merger Arbitrage	0.42	1.95	0.31	0.78	5.78	-4.68	-2.8
	Thirteen F Long-Short	0.28	3.13	-0.29	-0.09	7.31	-7.87	-4.87
	Trend	0.04	2.58	-0.25	0.75	6.8	-8.18	-4.22
	US Gamma	0.87	3.68	-1.15	2.51	8.95	-13.62	-5.18
	US Long Volatility	-0.55	2.41	1.87	6.77	11.87	-5.9	-4.53
	US Mean Reversion	0.07	1.67	-0.97	6.26	4.93	-8.31	-2.67
	US Vega	0.98	3.56	-2.58	10.2	7.55	-18.49	-4.88

Panel B - Regressions of Equity Long-Short Strategy's Residual Returns on Risk Factors

	Factors	R Square	Slope Coefficient	t Statistic	P Value
Traditional Factors	Size	0.072	0.107**	3.044	0.003
	Value	0.005	0.021	0.795	0.428
	Momentum	0.056	-0.048**	-2.651	0.009
HFR Equity Factors	Congestion	0.009	0.046	1.027	0.306
	Cross Sectional Mementum	0.004	-0.025	-0.658	0.512
	EU Dividend Carry	0.104	0.172**	3.721	0.0003
	Merger Arbitrage	0.0002	-0.007	-0.144	0.886
	Thirteen F Long-Short	0.055	0.071**	2.628	0.0097
	Trend	0.057	0.089**	2.685	0.008
	US Gamma	0.094	0.078**	3.514	0.0006
	US Long Volatility	0.035	-0.073*	-2.086	0.039
	US Mean Reversion	0.018	0.078	1.497	0.137
	US Vega	0.029	0.044	1.874	0.063

Exhibit 5: Equity Risk Factors (From 2009 to 2018)
Source: Size, value and momentum factors are from Kenneth F. French-Data Library. Other factors are courtesy of Hedge Fund Research. The data for the "Trend" factor starts in February 2009, and the value of "0" was assigned to January 2009.
Notes: * Statistically significant at the 5% level. ** Statistically significant at the 1% level.

"Value," are well-known Fama-French factors. Along with the third factor, "Momentum," these factors are considered to be "traditional" factors. The fourth through the twelfth factors are additional equity factors published by Hedge Fund Research (HFR), generally considered to be "alternative betas" (For a brief definition of HFR equity factors, see the appendix). Note that some risk factors experienced negative returns in the 10 year period from 2009 to 2018. From the perspective of portfolio and risk management, it does not necessarily mean that these risk factors are "loss" factors. In light of the fact that risk factors are constructed using a long position in certain securities/contracts and a short position in different securities/contracts, one can easily reverse the positions to create an opposite payoff-pattern.

Many of these factors are by no means normally distributed. For instance, "Momentum" and "US Vega" have a strong negative skewness, and "Value" and "US Long Volatility" have noticeably positive skewness. In addition, many factors have an extremely large excess kurtosis, indicating that their distributions are strongly fat-tailed. To illustrate, "Momentum" has the excess kurtosis of 23.61 with a negative skewness of -3.53, culminating in a large monthly loss of -34.39%. "Value" and "US Vega" also have a large value of excess kurtosis. When performing portfolio optimization using a mean-variance optimization (MVO) approach, one must be mindful of non-elliptical distribution of these factors. MVO focuses only on the first two moments of the distribution, mean and variance, and ignores the third and fourth, skewness and kurtosis.

Panel B summarizes the results of a series of bi-variate regressions, each using a different risk factor as an independent variable. The dependent variable consists of residuals from regression of the market factor (S&P 500 Total Return) on the ELS as measured by the Eurekahedge index, and represents the portion unexplained by the market factor.[21] Since the dependent variable has a mean value of zero, the intercept term was forced to be zero in each regression analysis.[22]

Six of the thirteen factors are statistically significant at the 1% level and one factor is significant at the 5% level. The "EU Dividend Carry" factor explains the largest variation of the residual returns (10.4%), and the "US Gamma" factor explains the second largest variation (9.4%), followed by the "Size" factor (7.2%). This suggests that other risk factors have some explanatory power over the residuals of regression of the ELS strategy, in addition to the market factor. Therefore, there should be opportunities to extract alphas from these factors and/or utilize them for risk management for hedge funds, as well as for some liquid alternative products.

It is worth noting that this analysis is cross-sectional, meaning the regression results shown in the exhibit represent static relationships with the assumption that exposure to each factor remains constant. When time-varying exposure is taken into account, however, these factors can potentially play a much larger role than the statistics in Panel B indicate. Such a possibility will be discussed in a later section.

Beyond Fundamental Research

To the degree that equity markets are efficient, it is difficult to generate alphas based on fundamental research alone. Hedge fund managers, including those pursuing Equity Long Short (ELS) strategies, have engaged in various niché types of investments. In this section, we will discuss focusing on micro and small cap stocks, activist investing, as well as quantitative investing. In addition, some funds of hedge funds (FoHFs) have sought to co-invest with underlying hedge fund managers in selected stocks in order to deliver additional value to investors. These sources of potential alphas are discussed below. One should be cognizant of the fact that hedge fund managers have the capability to create value beyond what static factor investments and liquid alternatives can bring to investors.

Focusing on Micro and Small Caps

The validity of a long-standing academic argument for the size premium aside, ELS hedge funds have extracted, or have attempted to extract, returns out of smaller companies that are not broadly covered by analysts. This suggests that relative to micro and small cap companies[23] the price discovery process is less efficient than that for larger companies.[24] Hence, opportunities for alphas through active investing are expected to be greater.

The size of the investment portfolio becomes critical when trying to extract alphas from investing in micro and small capitalization companies. For a large-sized portfolio, even a fractional allocation can cause market disruptions and exceed available liquidity of the company to invest. While any size hedge fund can attempt to identify these opportunities, smaller hedge funds have an increased ability to be nimble and create a portfolio where each investment has meaningful impact on the portfolio's performance. In sum, smaller managers can better take advantage of alpha opportunities among smaller capitalization stocks than large managers.[25]

The most striking example of why staying small and nimble is important is maintaining their ability to short. While a manager with a high conviction long may not hesitate owning shares in a company that represent multiples of the company's Average Daily Trading Volume (ADV), most hedge funds that short a stock are more likely to short a number of shares that represent a fraction of its ADV. Assuming a hedge fund can trade 20% of ADV effectively per day, it would take five days to get out of a position size of 1 times ADV (long or short). In a short position where one faces unlimited losses and has other considerations such as borrowing costs, position sizing becomes even more critical.

To illustrate this point, suppose that a manager has $250MM in AUM and plans to place a 4% short position ($10MM) in a basket of stocks. In this example, the rule of thumb of trading 20% of ADV applies. Under these conditions, only 3% of the Russell 2000 stocks would have 1 day liquidity and roughly 35% would have less than 5 days liquidity, which most managers consider to be the maximum number of days allowable. This means that even a manager with only $250MM in AUM would be seriously constrained in his/her shorting of Russell 2000 stocks, and needs to be extremely selective in shorting. Thus, for many investment managers, successfully pursuing the ELS strategy in micro and small cap stocks poses a challenge. To maintain a competitive edge, such a manager needs to be disciplined in growing the size of his/her portfolio.

Activism

Over the past few decades, shareholder activism has increased substantially. In recent years, the number of companies targeted by activist managers has increased by 8% per annum, and the amount of assets managed by these managers has increased by 9% per annum.[26] Some funds classify themselves as activist strategies while others will become "active" on companies selectively. Funds that are classified as activist strategies typically have a more concentrated portfolio and higher net exposure to the market than the average ELS manager.

Simply put, an activist hedge fund "identifies a company with unrealized value that it believes can be unlocked, and seeks to release that value by working with management and other shareholders, or in some cases advocates for a change in management direction."[27] Most activist funds focus on how a company is structured from a financial perspective. Often, activists work behind the scenes with the company, trying to convince to take certain steps to unlock shareholder value. For example, an activist fund might request that company sell off a division in a non-core operation and return that money to shareholders.

The rise in popularity of the activist strategies has created competition among hedge fund managers. Crowding in activist strategies is not necessarily undesirable, as more activists will request that a company make certain changes will increase the likelihood of those changes occurring. In addition, activists can often convince long only money managers and institutional investors[28] to vote for, or otherwise support, their resolutions and objectives[29]

While there are a handful of well-known activist hedge funds that often engage in headline-grabbing public pronouncements and transactions involving large corporations, many activist managers focus on below-the-radar opportunities. In addition, activist style investing need not be hostile to the management of the company. In fact, a report by Alternative Investment Management Association (AIMA) states "most activism by alternative investors takes the form of low-profile interventions and 'soft' strategies, such as seeking board representation with management support. Collaborative engagement also appears more likely to achieve success than more assertive approaches."[30]

Investments in micro-cap stocks share some of the desirable features of private equity investments.[31] This is particularly true if an activist style is pursued. Specifically, value can be created out of the active involvement of fund managers in corporate reorganizations, through actions such as M&A activities and enhanced corporate governance. For example, in 2018, a small-cap activist investor acquired a stake of over 5% in a provider of weight loss products and services, and "brought in marketing experts to help it lower its customer acquisition costs."[32] The activist investor collaborated with the "management and the board of directors to 'significantly accelerate and improve' the company's digital strategy efforts in order to 'drive a substantial increase' in profitability."[33] The company was sold for multiples of acquisition cost for the activist investor in a short period of time.

Quantitative Investing

To the extent that ELS managers attempt to hedge away at least part of equity beta, these managers have utilized some quantitative techniques even if the sources of returns are based on fundamental research capability. As a greater number of drivers of equity return (i.e., smart or alternative betas) are identified, some long-short managers have further adopted quantitative techniques.

For instance, around 2012 a well-known ELS hedge fund, which previously focused on fundamental analysis, brought in a quantitative discipline in order to perform the following tasks and gather the following data/information:

- Analysis of portfolio exposures to common risk factors;
- Performance attribution analysis based on portfolio risk-factor exposures;
- Contribution of each sector, region, and individual security to the portfolio risk budget;
- Outlier reports highlighting potentially aggressive assumptions;
- A proprietary economic activity indexes tracking regional activity on a weekly and monthly basis;
- Position-sizing capabilities;
- Screens to identify potential long and short investments; and
- Information regarding portfolio positioning of the long-short equity hedge fund category.[34]

It is worth emphasizing that unlike focusing on micro and small cap stocks, sophisticated quantitative investing requires a sufficiently large scale operation as the capability to process massive amount of data and to make an extensive use of computer algorithms is required. It is unlikely that regular investors, including institutional investors with a massive amount of assets, can pursue state of the art quantitative investing as efficiently as some of the large hedge funds. This is an area where large hedge funds can deliver value to investors.

Co-investments

Co-investments occur when a hedge fund offers institutional investors the opportunity to invest in a specific company or sometimes a group of companies. Co-investments have been part of the private equity landscape for much longer than the hedge fund landscape. To run co-investments, the hedge fund will set up a special purpose vehicle (SPV), create a customized structure, or use a separately managed account.

According to a recent survey, 41% of institutional investors have co-invested with hedge fund managers. Sixty-eight percent (68%) of large investors - those with assets over $ 5 billion, have made co-investments, compared to 34% of those with assets under that threshold. In a similar survey conducted in 2013, only 11% of investors indicated that they co-invested.[35] Thus, co-investing has clearly risen in popularity, especially among large investors.

Co-investments give investors the opportunity to capitalize on hedge fund managers' best ideas. Thus, a fund of hedge funds (FoHFs), acting as an investor in a hedge fund, can take advantage of the opportunity to add extra value. To illustrate, suppose a relatively small hedge fund with AUM of $100MM has an investment idea where the fund believes its edge is quite high but given that the fund needs to limit any long positions to under 5% of its portfolio, the fund can only invest $5MM. By offering the ability to invest alongside the fund, it is providing to a limited number of investors the opportunity to create outsized returns.

In turn, the FoHF with the proper expertise to evaluate best ideas can put a certain portion of assets into a co-investment, leveraging best ideas. It should be noted that not all co-investments come with a fee. Some FoHFs have agreements with underlying managers that they can invest in their best ideas without charge. Typically, these arrangements are with small funds that have a strong desire to grow AUM and relationships.[36]

Value Creation through Risk Management

There are at least three ways that hedge fund managers can generate alphas: (1) allocation alphas by altering beta exposure, (2) controlling factor exposure; and (3) extracting true alphas.[37] Various methods to extract true alphas in the Equity Long-Short Strategy (ELS) have been discussed in the previous section. In the following paragraphs, we will focus on the first two ways and their relation to risk management. Note that risk management is considered to be a means of active value creation, and not just a means of passive risk mitigation or control, though the latter means can also help improve risk-return payoffs.

A regression analysis shown in Panel B of Exhibit 5 assumed that exposure (or coefficient) to an independent variable remains static. Since it was based on a cross-sectional framework, it could not incorporate a dynamic element without relying on more complex statistical procedures incorporating time-varying components. In reality, hedge funds have freedom to dynamically adjust exposure to market risk. It is unlikely that the equity long-short managers "in toto" intended to maintain a 0.394 exposure to the market factor. Either through the changes in long positons and/or short positions, or with hedging or leveraging of the market risk, these managers have adjusted such an exposure. It is important to recognize that the dynamic adjustment can be a source of returns (or losses).

Exhibit 6 summarizes the result of a simple experiment based on naïve forecasts of volatility. Starting January 2000, the volatility of returns of the US equity markets (NYSE, AMEX, and NASDAQ)[38] for a given month was used as a forecast for the next month's volatility, which then was compared to the historical volatility for the 30 year period from January 1970 to December 1999. The ratio of the forecasted volatility to the historical volatility was used as a leverage ratio. For instance, if the forecasted volatility were half of the historical volatility, the ratio would be 2. Conversely, if the forecasted volatility were twice the historical volatility, the ratio would be 0.5. The decision rule was applied to the S&P 500 Index, as many low-cost tradable products that track the index are available.

This historical simulation demonstrates that the dynamic allocation strategy would have added, on average, 12 basis points to monthly returns while lowering the average volatility by 0.91%.[39] Over the course of 19 years, the cumulative return of the dynamic strategy would have brought an additional 105% return to the buy and hold strategy. The additional return can be viewed as "allocation alpha." The leverage ratio ranged from 0.16 to 2.81, and the average leverage ratio was less than 1. Thus, by using a very simple decision rule, the above strategy would have improved the performance substantially. This was literally an exercise in risk management, as adjusting the level of risk, i.e., volatility, was a means of value addition. The forecasts themselves were so naïve as to supplement no new information.

In contrast to traditional investment mandates and products, hedge funds have freedom to choose the locus, extent, and timing of exposure to assets or factors. By exercising judicious risk management, hedge fund managers can clearly improve risk-return payoffs. This is where hedge fund managers can pursue competitive advantages vis-à-vis traditional portfolio managers and private equity managers. They have both opportunities and capabilities to add value by "controlling factor exposure." This fact needs to be emphasized to investors; otherwise, a large group of investors may assume that the lower return of the ELS than that of the S&P 500 in the past 10 years is indicative of lack of investment acumen not worthy of high fees (See Panel B of Exhibit 3). In a similar vein, unless dynamic factor exposures are taken into consideration, the performance of hedge fund managers will appear to be increasingly dominated by these risk factors, and investors are likely to opt for liquid alternatives including smart beta products because of the lower fees.

	S&P 500	Volatility Adjusted Investments in S&P 500
Average Return	0.48%	0.60%
Standard Deviation	4.20%	3.29%
Cumulative Return	145%	250%
Leverage Range	N/A	0.16-2.81
Average Leverage	1	0.97

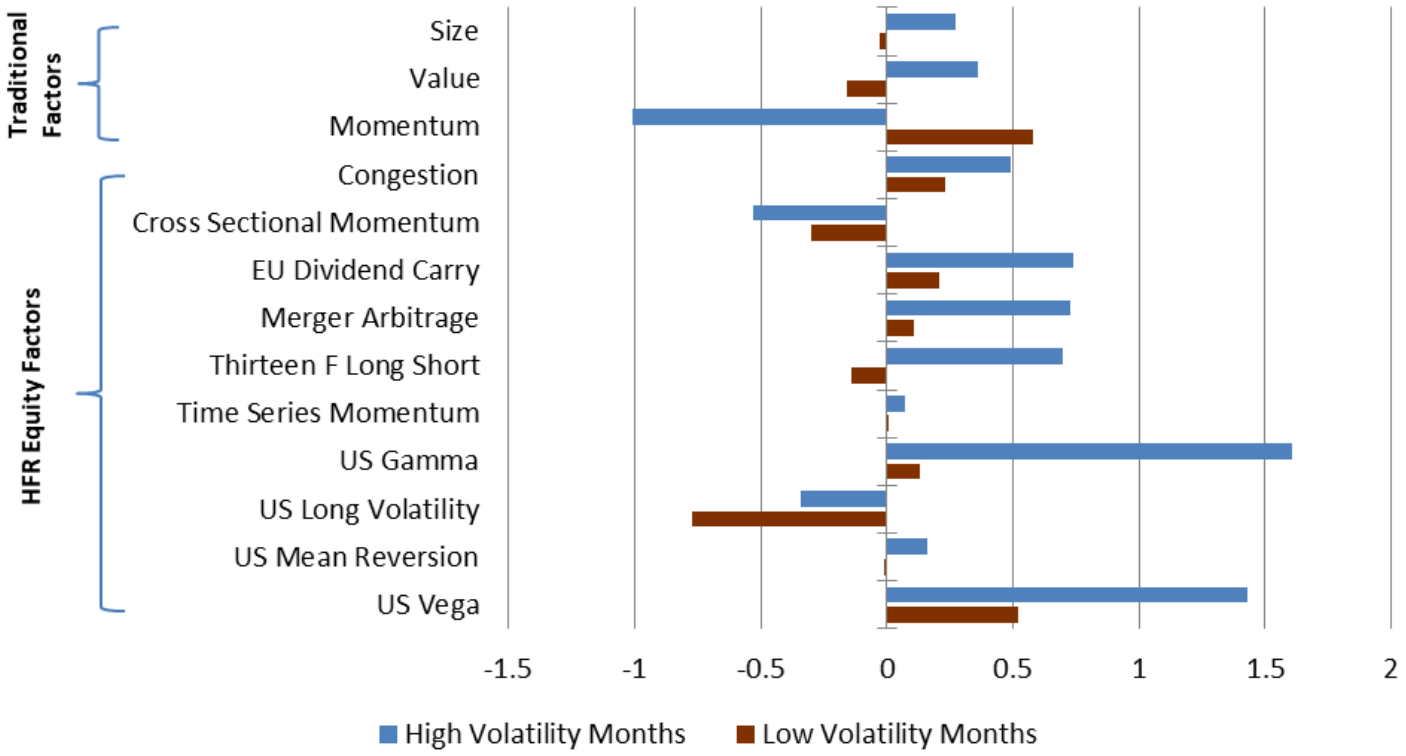
Exhibit 6: Allocation Based on Naïve Volatility Forecast (From 2000 to 2018)
Source: Yahoo Finance and Kenneth F French-Data Library. Calculation by Author.

Suppose that instrumental variables such as volatility changes also affect the performance of various risk factors. Exhibit 7 lists the same set of factors as were shown in Exhibit 5, but graphically demonstrates the differences in mean returns (Panel A) and standard deviations (Panel B) of these factors between high volatility months and low volatility months for the 120 month period from January 2009 to December 2018.[40] In order to differentiate between volatility regimes, the same naïve forecasts of volatility as were used for Exhibit 6 were utilized. This means that when the previous month's volatility was lower (higher) than the average volatility, the current month is classified as a low (high) volatility month. In order to have an equal number of months between the two regimes, a value close to the in-sample mean was utilized to represent the average volatility.[41] By so doing, the average return and volatility for each risk factor between the two regimes corresponds to those shown in Panel A of Exhibit 5.[42] This analysis is done for illustration purposes only, and none of the figures or relationships among the risk factors in the exhibit should be used for actual allocations.[43]

Examining Panel A, one may find it extraordinary how such a naïve volatility forecast can lead to different mean returns between the two volatility regimes for most factors. For many factors such as "US Gamma," a return in one regime is many times larger than that in the other regime. What is more, for four factors,[44] the sign of the returns are opposite; while the high volatility regime generated positive returns, the low volatility regimes resulted in negative returns. For another factor, the high volatility caused a negative mean return but the low volatility brought a positive mean return. In addition, for the majority of factors, the high volatility regime added more value than the low volatility regime did. This fact is important as many traditional assets tend to suffer in the high volatility environments. The use of these factors can help raise average returns, mitigate large drawdowns, and contribute to diversification.

Some alternative beta factors such as "US Gamma," "US Long Volatility," and "US Vega" make explicit use of equity derivatives. It is not surprising that these factors strongly respond to the movements in equity volatility, as volatility is an important component of derivative pricing. As discussed previously, one of the approaches to replicate a hedge fund strategy relies on dynamic trading. The use of these factors can bring about effects similar to dynamic trading. This also means that hedge fund

Panel A: Mean Return (in % per month)



Panel B: Standard Deviation (in % per month)

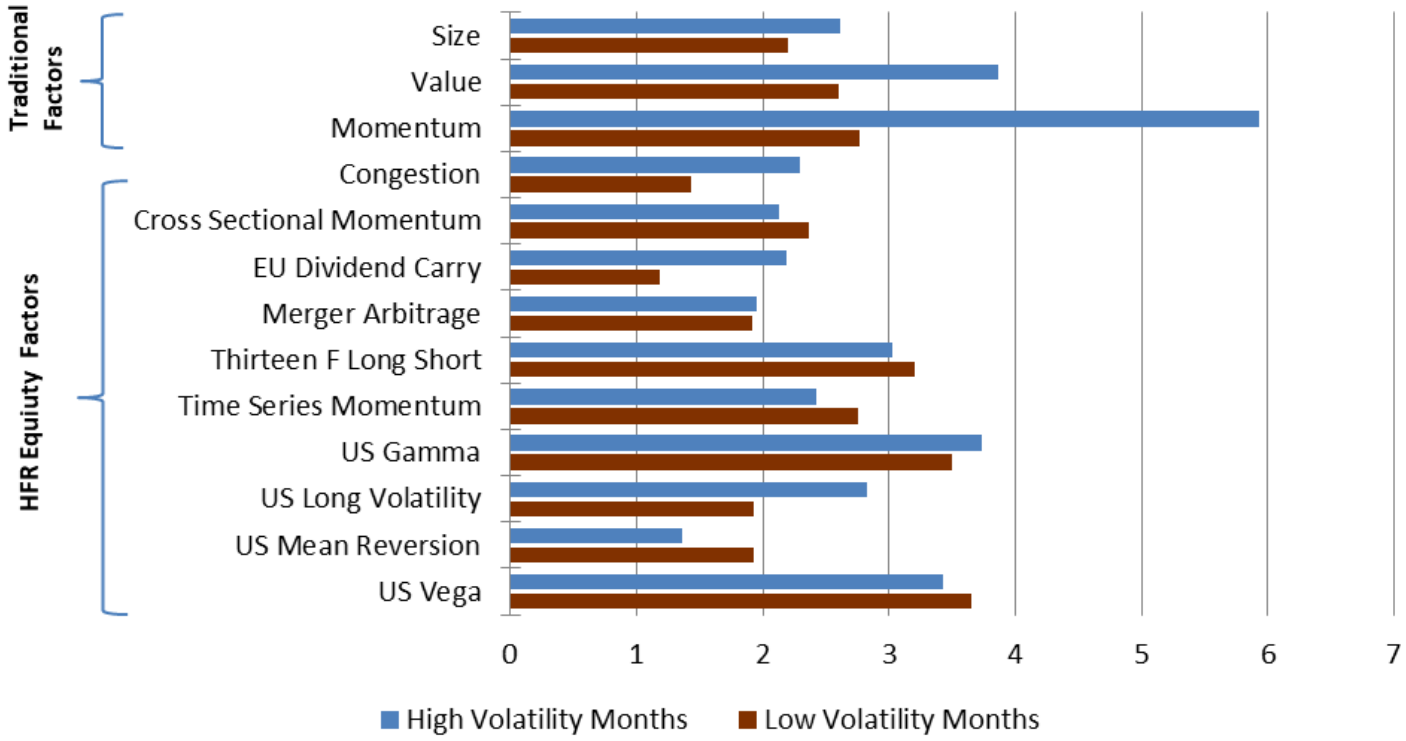


Exhibit 7: Differences in Risk and Return between Forecast Volatility Regimes
Source: Kenneth R. French - Data Library, and HFR. Calculation by Author.

managers can use these factors to control risk or add returns (Caveat emptor – some of these factors are susceptible to large losses as shown in Panel A of Exhibit 5).

Panel B compares the standard deviation of each risk factor between the two volatility regimes. In the case of "Momentum" the standard deviation is twice as high in the high volatility months as in the low volatility months. With a few exceptions including "Momentum," however, most risk factors have similar levels of standard deviation. In addition, five out of twelve risk factors have lower levels of standard deviation in the high volatility regime. This means that having exposure to some risk factors during a time of high market volatility does not necessarily lead to higher portfolio volatility. In fact, depending on the covariance structure among selected factors and the market factor, it can help lower the portfolio volatility.

Thus, it is important to note that if these risk factors are used strategically and dynamically by hedge funds, exposure to these factors can become a source of alphas as managing exposure to the factors will be interpreted as these funds' abilities to improve risk-reward ratio. The current trend is to view the increasing use of smart betas as a primary cause for narrowing the range of alphas that hedge funds can generate. However, managing such exposure systematically can make an abundance of factors an opportunity to fully utilize hedge fund managers' abilities to choose the locus, extent, and timing of various factor exposures.

Exhibit 8 shows the different domains of betas and alphas. The left side chart is adapted from an Alternative Investment Management Association's publication.[45] The chart is a classification scheme of manager universe and is labeled "The New Hedge Fund Product Taxonomy." It highlights the increasing importance of smart betas and alternative betas. It also implies that the domain of alphas, which can be extracted through security selection and market timing, has become very narrow. It can be interpreted as a "view of manager universe based on sources of returns." A series of regression analyses shown in Exhibit 5 were a static representation of relationships between risk factors (smart betas and alternative betas) and the excess returns of the ELS. Since many risk factors have explanatory power over the excess returns, it gives an impression that the domain to pursue alphas is indeed very small.

By contrast, the right side chart represents the "risk management centered view of alpha generation opportunities." It emphasizes the fact that dynamic exposure to indices, factor betas and alternative betas can be a source of alphas. Exhibit 7 demonstrated that dynamic exposure to selected risk factors, either long or short, can deliver returns much higher than the mean return of each factor shown in Panel A of Exhibit 5. Thus, from the perspective of risk management, alpha generation opportunities envelop all three types of betas (pure betas, smart betas, and alternative betas) and broaden alpha opportunities. In this sense, the rising popularity of smart betas and alternative betas should not be viewed as a threat to the future of hedge funds. Rather, it represents greater availability of means of alpha generation and risk management. Hedge funds should embrace these additional opportunities.

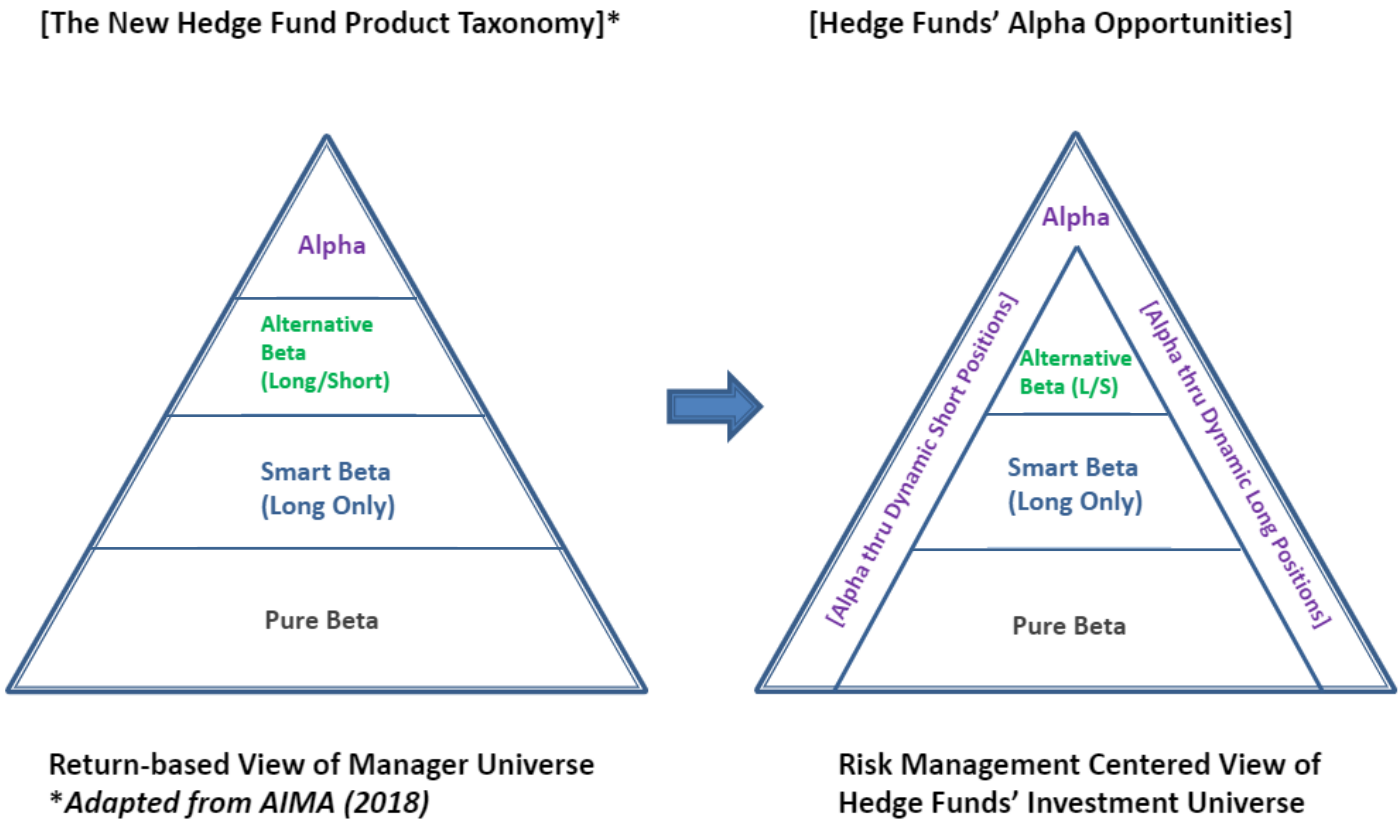


Exhibit 8: Domains of Alphas and Betas

Conclusion

Though hedge funds remain one of the major categories of alternative investments, their growth has slowed compared to private equity funds. Hedge funds face some challenges as some of what once were deemed alphas are now classified as some types of betas. These challenges are well embodied in the difficulties that Equity Long-Short Strategy faces. Using the Equity Long-Short Strategy as an example, this paper has discussed several means by which hedge funds can stay competitive and provide true value to investors.

Two potential areas of value addition can be found in the places where the reach of market efficiency is not as strong, such as in smaller capitalization stocks and activist investments. Smaller hedge fund managers can be effective in both these areas. The third area can be found in employing quantitative strategies where managers make use of alternative data, machine learning, and artificial intelligence. The well-capitalized hedge fund managers can be strong players in this field. The fourth area is where hedge funds offer co-investment opportunities to investors. Often, a FoHF can function as a conduit to deliver extra return opportunities through such an arrangement.

Together, the areas where Equity Long-Short managers have thrived recently indicate that hedge funds need to further diversify in terms of sources and methods of alpha generation. In terms of hedge fund business models, smaller managers may need to stay small and nimble, whereas larger managers may need to further hone their ability to deliver value that investors themselves cannot pursue. The rising use of replication techniques, liquid alternatives, and factor investments may appear to narrow hedge funds' domain for alphas and to present competitive threats to these funds. However, by embracing these risk factors, hedge fund managers can add value and broaden the scope for alpha generation. Specifically, dynamic use of factor exposure not only serves as a means of risk mitigation, but can help improve risk-reward ratios substantially.

Appendix

Congestion	The risk premium associated with the price dislocations caused by systematic index rebalancing.
Cross Sectional Momentum	Buying indices with the most positive relative reutrns, selling those with the most positive.
EU Dividend Carry	The risk premium associated with the systematic underestimate of dividends by dividend futures.
Mean Reversion	The tendency of stock index returns to mean revert.
Thirteen F Long-Short	The returns associated with tracking the top stock holdings of large hedge funds.
Trend	Time-series momentum.
US Gamma	Volatility carry using delta-hedged strangles.
US Long Volatility	Long vega using VIX futures.
US Vega	Volatility carry, exploiting the implied-to-realized volatility risk premium.

- *The author would like to acknowledge the welcome and valued support provided by T.J. Theodorsen, who moderated the educational event organized by the New York Chapter of CAIA Association on June 10, 2019. In particular, his input based on his practical knowledge and experience in managing a fund of hedge funds was extremely valuable for the section titled "Beyond Fundamental Research."*

Endnotes

1. Anson (2006). Page 36.
2. The event titled "Fundamental Equity Long-Short Strategy---Where is the Alpha?" was held on June 10, 2019 and was moderated by T.J. Theodorsen. The panelists were Kieran Cavanna, Eric DeLamarter, James Mitarotonda, and Chris Buonafede.
3. "Wozu" is a German word denoting "what for," "why," "to what," or "where to." There is a German philosophy book titled "Wozu Philosophie?"
4. Pension and Investment (2019).
5. The private equity industry had an AUM of over $3.06 trillion at the end of 2017. See Preqin (2018).
6. Monthly returns are calculated based on the month-end prices of two ETFs and the month-end value of the index for treasury bills.
7. Treasury bills are deemed risk free assets, and the index is used to estimate monthly returns.

8. These weights were chosen to assimilate a similar experiment conducted by Maneesh Shanbhag. Shanbhag used the HFRI index instead of the Barclay Index. See Shanbhag (2016).

9. A part of the difference in monthly returns (0.03%) comes from the higher fees that hedge funds charge relative to ETFs.

10. The S&P 500 is not an appropriate benchmark for many hedge funds. However, it often represents the best performing traditional asset class in terms of historical returns.

11. Italics mine. Freed (2013).

12. Italics mine. Amenc and Shröder (2008). Page 12.

13. However, it is important to note that this approach does not aim to follow "dynamically" the time series of hedge fund returns. Rather, it tries to match the statistical properties of return distributions such as means, variance, skewness, and kurtosis. See Chapter 7 of Jaeger (2008).

14. A study shows that 6% OTM puts on the S&P 500 Index had negative returns every month between 1991 and 1997. This means that writing such put options would have resulted in profits for every month during the 8 year period. See Brodie et al. (2009).

15. Jaeger (2008). Page 176.

16. Eurekahedge (2009).

17. In a later analysis, HFR risk factors are utilized. The data for these factors starts at January 2009, and in order to maintain consistency with this analysis, the second sub-period was chosen to start at this month.

18. In reality, there is an important conceptual slippage here. The hedge funds included in the Eurekahedge Long-Short Equity Index invest in equities outside of the US equity markets, but the independent variable is S&P 500's excess returns. In this sense, both alphas and betas are inexact.

19. One cannot say that alpha was 0.1.25 as the intercept was not statistically significant.

20. The traditional factors such as "size," "value," and "momentum" have longer historical data. Many factors compiled by Hedge Fund Research start at around the beginning of 2009.

21. There is a controversy as to the correctness of this type of two stage regression. See Chen et al (2018). However, the purpose of Exhibit 6 is not to construct an econometric model of Equity Long-Short Strategy. The factors are introduced to show that there are potential explanatory powers for these factors, but not to verify their explanatory powers.

22. Even if the intercept term is not made zero, it has a virtually zero value, and the slope coefficient does not change much. One disadvantage is that Equity Long-Short Strategy was assumed to maintain a constant exposure to the market factor. In reality, it is likely that hedge funds have changed the beta exposure, either adding to or subtracting from allocation alphas.

23. The companies with market capitalization of less than $300 million are generally considered to be micro-caps. See Blum (2018). Those with market cap of between $300 million to $2 billion are considered to be small caps. See Yahoo Finance (September 16, 2019). However, these thresholds can vary. For instance, as of August 2019, the Russell Microcap Index reported the average market cap of $488 million, but the largest company in the index had over $2.8 billion. See FTSE Russell (August 31, 2019). In this case, "small cap" stocks by a common definition are part of Russell's Microcap index. For this paper, the distinction between micro and small caps is not critical.

24. While a large cap stock has coverage by 22 analysts on average, a micro cap stock has coverage by 2.2 analysts. See DGHM & Co. (June 2019). Page 7.

25. In theory, a manager working for a large investment management company can focus on micro and small stocks. However, impact of such a portfolio on a large pool of investments will be too small to be meaningful.

26. McKinsey & Co. (2019).

27. German (2015).

28. See Institutional Investors (2018) for how institutional investors can aid activist hedge funds.

29. Companies have increased their defenses against activist campaigns. This is often done by making sure that certain ratios, such as expense ratios, do not exceed a certain level that investors in their industry would consider excessive.

30. Alternative Investment Management Association (2015).

31. See, for instance, Boston Partners (2015).

32. Barron's (2019). Legion Partners Asset Management acquired a stake in Nutrisystem.

33. The Fly.com (2018).

34. Pensions & Investments (2015).

35. Institutional Investors (2019).

36. Generally speaking fees are much lower than those for a normal fund. Though there is no official average figure, the author estimates that the average fee is 1% management fee and 10% incentive fee. Lockups can vary from quarterly with 30 day notice to several years of initial investment. Where most of the longer lockups occur is in activist situations.

37. There are at least two more ways. They are: (1) extracting liquidity premium, and (2) generating uncorrelated returns. All five ways are discussed in Matsuda (2019).

38. The standard deviation of "the excess return on the market value-weight return of all CRSP firms incorporated in the US and listed on the NYSE, AMEX, or NASDAQ that have a CRSP share code of 10 or 11 at the beginning of month t, good shares and price data at the beginning of t, and good return data for t minus the one-month Treasury bill rate." See https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html.

39. T-bill rates were used both as rates of returns on cash and as the cost of leverage.

40. While only equity related HFR factors were chosen for comparison purposes in Exhibit 7, there is no reason to avoid non-equity factors such as rates factors and commodity factors. In fact, some non-equity factors can be expected to bring about greater diversification benefits than equity factors.

41. The value of 0.766 was used. The actual mean value was 0.785. The difference occurred because the distribution of volatility was not completely elliptical.

42. For a verification purpose, the 30 year average mean value of the volatility, which was utilized in exhibit 6 (0.915), was also applied. While the number of low volatility months rose to 70 and the number of high volatility months declined to 50, the overall tendency was very similar.

43. There have been a number of empirical analyses involving the traditional factors in the exhibit. It is known that depending on the sample period, these factors respond to volatility differently. For instance, Abdymomunov and Morley (2011) uses a two-state Markov switching process between low and high volatility regimes.

44. These are the "Size," "Value," "Thirteen F Long Short," "US Mean Reversion" factors. The "Time Series Momentum" factor had 0.004% mean return.

45. See Page 21 of AIMA (2018).

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