Hedge Fund-of-Funds Asset Allocation Using a Convergent and Divergent Strategy Approach

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Abstract

Hedge fund asset allocation can be a challenging endeavor given the dearth of tools available to deal with the unique statistical characteristics of long and short strategies. From a top-down perspective, the hedge fund industry is classified into several substyle categories including long/short equity, market neutral equity, convertible bond arbitrage, merger arbitrage, event driven, global macro and managed futures. However, due to the non-correlated nature of rates of return in each style group, the problem of asset allocation appears overly simplistic. This paper takes a different view of the hedge fund universe, classifying strategies as "convergent" or "divergent" in their orientation and thereby adding new meaning to the process of asset allocation. Convergent strategies tend to view the asset world as being mostly efficient, seeking to profit from small asset mispricings. Divergent strategies are based on the promise that from time to time, the market is inefficient, providing opportunities that can be exploited by using price series analysis and autocorrelations when pricing certain portfolio assets. Since convergent strategies tend to be "short volatility" and divergent strategies "long volatility", using a top-down asset allocation policy that recognizes this asset dynamic can lead to a more efficiently allocated hedge fund portfolio. The results of this study show the time-varying validity of the divergent strategy and its potential benefits as a portfolio component. Since the divergent strategy experiences significantly higher performance during the periods of increasing market uncertainty, when it is combined with the convergent strategy, the portfolio experiences increased return and reduced risk with more favorable return distributions relative to the individual convergent strategies.

I. Introduction

While there exists a number of different strategies in hedge fund investment, most of the individual strategies may be grouped into the two competing categories: convergent strategy and divergent strategy.

A *convergent strategy* is based on the notion that every security has an intrinsic value. For equities, that value is based on the company's expected future earnings and dividend payments, the expected growth rate of those earnings and dividends, and the degree of uncertainty surrounding these forecasts. The convergent strategist believes that the intrinsic value of a security can be estimated and that the price of the security will eventually converge to this intrinsic value. Thus, the strategy searches for undervalued or overvalued securities, securities whose prices are out of line with their intrinsic values, hoping to profit from the price correction. Examples include equity market neutral, relative value, event driven and arbitrage strategies.

Conversely, a *divergent strategy* is based on the premise that past patterns in security prices can reliably predict future price patterns. The divergent strategist believes that these patterns reflect the changing attitudes of investors to a variety of economic, political, and psychological factors. The strategy has been successfully applied to equities, equity indexes, foreign currencies, and many other commodities investments. Examples include managed futures and global macro strategies

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The introduction of convergent and divergent hedge fund strategies has given new insights into the theory known as Efficient Market Hypothesis (EMH). EMH states that financial asset prices fluctuate randomly around their respective intrinsic values. Intrinsic values, in turn, rationally reflect all relevant publicly available information and perhaps even privately available information as well. Prices adjust quickly to new information, which also enters the market in a random fashion.

Both the convergent and divergent strategy depend on the interaction of supply and demand of securities, but they each look at different factors in their evaluation of supply and demand. A convergent strategist believes that supply and demand are determined, at least in the long run, by such factors as the growth rate in earnings and macroeconomic factors. Although divergent strategists recognize that intrinsic value plays a role in determining supply and demand, they argue that a wide range of other rational and irrational factors (for example, investor emotion) governs these relationships. As a result, a divergent strategist may recommend a security due to technical factors, even if the security appeared to be selling for more than its intrinsic value. In the divergent strategy, the forces that create a favorable market supply-and-demand relationship are all that matters.

II. Academic Evidence

Convergent Strategy

The concept of convergent strategy is motivated by growing evidence in accounting and finance literature that prices fail to immediately reflect publicly available information. The exploitation of such "market mispricing" is often cited as a justification for engaging in a convergent strategy – a practice that relies heavily on the analysis of current and past financial and economic statement data to identify when underlying asset value differ from prevailing market prices.

The relations between fundamental signals and contemporaneous price changes reported in prior empirical studies suggest that detailed information captured by public sources provides value-relevant information. The mere association between public information and contemporaneous prices, however, is not sufficient to pronounce the market efficient with respect to this information. To the extent that prices do not immediately reflect all the information relevant to valuing assets, return results suggest that some of the tools required to improve the efficiency of prices (or alternatively, exploit mispricing) may be found in the practice of a convergent strategy. Furthermore, previous studies identify specific rules of a convergent strategy supported by straightforward economic reasoning that are not completely reflected in market prices.

Why Do Convergent Strategies Work?

One condition for earning abnormal returns from convergent strategies is that the information generated by fundamental analysis predicts future economic variables that will eventually be priced by the market. Earlier work by Lev and Thiagarajan (1993) introduces a collection of "fundamental signals" that reflect relations in current public information that are purported to predict assets' future value. They demonstrate the value relevance of these signals by showing they are significantly associated, in the directions predicted, with asset returns calculated contemporaneous to the disclosure of the signals. Abarbanell and Bushee (1997) find direct evidence that both future returns and analysts' forecast revisions of future returns are significantly associated with several of the signals over the sample period they examine. This direct evidence of a relation between individual signals and future returns suggests that the observed association between contemporaneous returns and the fundamental signals reflects the signals' ability to predict value-relevant information.

A second condition for earning abnormal returns using convergent strategies is that the market temporarily under uses the information in the fundamental signals about future economic variables. Abarbanell and Bushee present indirect evidence of this possibility by examining ex post analysts' forecast errors. Their results reveal that analysts' forecasts do not reflect, on a timely basis, all of the information about future earnings contained in the fundamental signals. Their findings suggest that relatively sophisticated analysts appear to under use fundamental information when producing earnings forecasts. This raises the possibility that asset prices also fail to reflect fully this information.

Divergent Strategy

When capital markets behave irrationally, demonstrating increased volatility and uncertainty, a divergent strategy might be considered. The divergent strategy uses past prices in order to predict future prices. It detects predefined "patterns" in price series, and assumes it is capable of exploiting the trends that it discovers. Again, the difference between a convergent strategy and a divergent strategy is the following: the first uses variables that the economic theory considers as relevant for the estimation of future earnings and of the rate at which they have to be discounted, while the second uses past prices and various statistics generated as a set of variables that the efficient market hypothesis ignores for the prediction of future movements.

Although the vast majority of professional traders use divergent strategies, most academics, until recently, had not recognized the validity of these methods. Many academics prefer more theoretical fundamental analysis. The main reason for this comes from their belief in EMH. The theory of EMH, implying that the price of an asset is always equal to its expected fundamental value (i.e. the market never over or under reacts) implies that price changes only reflect new fundamental information, randomly by definition. Thus, price changes should also be random and technical analysis should not have any value if markets were rational.

However, since the article of Brock, Lakonishok and LeBaron (BLL) (1992), showing that simple forms of technical analysis can significantly predict daily price movement of the Dow-Jones index, many academics have begun to realize that divergent strategy might have some value. Brown and Jennings (1998) also explained that the use of past prices may be useful when information acquisition is costly, or when information does not spread instantly among the traders community. But even if the market is relatively efficient and information spreads instantly, a divergent strategy still has value by detecting some systematic over or under reaction to the publicly available information.

Why Divergent Strategies Work

It is quite possible that not all investors have equal access to fundamental information especially during volatile and uncertain market periods. Also, some investors might have access to relevant information before others. This suggests that a lag might separate the initial dissemination of information from the security market reaction. Therefore, some investors may miss out on major moves if they wait for the fundamental information to reach them. Perhaps following the smart money (investors who presumably have better and more access to information) could produce higher returns than the general market over the long run.

Divergent strategies may also work if fundamental information is incomplete or misleading. As we know, accounting information and SEC filings can be misleading. In addition, fundamental information reveals little about non-quantitative factors such as politics, wars, and other market-exogenous events. Past price patterns may provide better insight into market movements caused by these non-quantitative factors.

Beyond the inadequacies of fundamental information, a divergent strategy acknowledges that investor sentiment can have a major impact on asset prices. One of the important lessons of speculative bubbles is that people make investment decisions using reasons that are not driven by fundamental analysis, and human psychology can affect market prices. Behavioral finance argues that human psychology leads investors to make the same mistakes over and over again, creating the possibility of recurrent and predictable patterns in security prices.

III. Empirical Evidence

In order to show the historical performance of each strategy, convergent and divergent, as well as a combined strategy, both the HFR and the CSFB/Tremont substyle Indices were used. For example, the convergent strategy proxy portfolio is composed of three equally weighted substyle indices: market neutral, relative value and event driven from HFR and CSFB databases[1]. Similarly, as a proxy for divergent strategy returns, CSFB/Tremont global macro

[1] Refer the appendix for definitions of each strategy.

and managed futures Indices were equally allocated and used.[2] In addition, various sets of portfolios are constructed and analyzed using both convergent and divergent proxy portfolios.

As shown in Table 1-A and 1-B, the returns of convergent strategies and divergent strategies are relatively similar in the long run, while there exist differences in sub-periods. The annual standard deviation of the convergent strategy, however, is significantly lower than that of the divergent strategy in all periods. In terms of their higher moments, the returns of convergent strategies show a strong tendency to have more negative skewness and larger kurtosis than those of divergent strategy.

The five different portfolios (P1 through P5) show return and risk opportunities in different weighting options. While returns are similar or slightly higher with increased allocation to the divergent strategy, their standard deviations are reduced significantly and efficiencies are increased. The skewness of the convergent portfolio is shifted to the right when the divergent strategy is added; consequently, the kurtosis is increased. This indicates that the combined strategy may reduce the negative outliers and provide more stable returns. The results are consistent for both CSFB and HFR data.

[2] Since HFR omits Global Macro and Managed Futures indices, we use CSFB/Tremont data for a divergent strategy proxy in this paper. In addition, we believe, because of their different methods of performance measurement (HFR uses equally weighting method and CSFB uses Capital weighting method), analyzing the strategy performance from both database is valuable.

Table 1-A: Descriptive Statistics of Different Strategies Using *CSFB Indices* for the Convergent Strategy

1994 – 2002	Convergent	Divergent	P1	P2	P3	P4	P5
Cumulative Return	136.72%	144.74%	144.78%	143.98%	143.27%	142.36%	139.93%
Annual Return	10.12%	10.97%	10.80%	10.63%	10.54%	10.46%	10.29%
Annual Standard Deviation	3.59%	9.74%	7.94%	6.23%	5.45%	4.74%	3.71%
Efficiency	**2.8218**	1.1258	1.3602	1.7047	1.9347	2.2069	**2.7708**
Skewness	**-1.9647**	0.1803	0.2356	0.3117	0.3357	0.2991	**-0.4092**
Kurtosis	9.7626	-0.0021	0.1210	0.2461	0.2963	0.3952	2.4322
Correlation b/w Convergent & Divergent			***0.1574***				

1998 – 2002	Convergent	Divergent	P1	P2	P3	P4	P5
Cumulative Return	53.03%	51.83%	52.64%	53.17%	53.33%	53.41%	53.36%
Annual Return	8.96%	9.11%	9.08%	9.05%	9.04%	9.02%	8.99%
Annual Standard Deviation	3.93%	8.70%	6.94%	5.33%	4.63%	4.04%	3.47%
Efficiency	**2.2817**	1.0477	1.3089	1.6993	1.9539	2.2321	**2.5933**
Skewness	**-2.6289**	0.0742	0.0528	0.0232	-0.0418	-0.2404	**-1.5049**
Kurtosis	12.0754	-0.1157	0.0941	0.3206	0.4349	0.7967	5.7719
Correlation b/w Convergent & Divergent			***-0.0802***				

2000 – 2002	Convergent	Divergent	P1	P2	P3	P4	P5
Cumulative Return	29.82%	38.80%	37.23%	35.54%	34.66%	33.74%	31.83%
Annual Return	9.12%	11.93%	11.36%	10.80%	10.52%	10.23%	9.67%
Annual Standard Deviation	2.31%	8.45%	6.65%	4.90%	4.07%	3.29%	2.14%
Efficiency	**3.9483**	1.4110	1.7078	2.2023	2.5851	3.1135	**4.5253**
Skewness	**-0.3358**	-0.0481	-0.1271	-0.2452	-0.3193	-0.3857	**-0.2099**
Kurtosis	0.1417	0.0751	0.1047	0.1522	0.1844	0.2167	0.1851
Correlation b/w Convergent & Divergent			***-0.2723***				

1995 – 2002: MA(12)	Convergent	Divergent	P1	P2	P3	P4	P5
Cumulative Return	133.38%	133.46%	133.54%	133.57%	133.57%	133.56%	133.49%
Annual Return	11.07%	11.09%	11.08%	11.08%	11.08%	11.08%	11.07%
Annual Standard Deviation	1.68%	2.36%	1.99%	1.70%	1.60%	1.53%	1.52%
Efficiency	**6.6040**	4.6944	5.5590	6.5100	6.9316	7.2363	**7.2794**
Skewness	**-0.6536**	-0.1620	-0.0057	0.0979	0.0719	-0.0357	**-0.4136**
Kurtosis	-0.7775	-0.4581	-0.5034	-0.4668	-0.4232	-0.3997	-0.5387
Correlation b/w Convergent & Divergent			***0.2310***				

Data Source: CSFB Tremont Indices for both Convergent and Divergent Strategies

Convergent Strategy: 33% of Equity Market Neutral + 33% of Relative Value + 33% of Event Driven
Divergent Strategy: 50% of Managed Futures + 50% of Global Macro
Portfolio 1: 20% of Convergent Strategy + 80% of Divergent Strategy
Portfolio 2: 40% of Convergent Strategy + 60% of Divergent Strategy
Portfolio 3: 50% of Convergent Strategy + 50% of Divergent Strategy
Portfolio 4: 60% of Convergent Strategy + 40% of Divergent Strategy
Portfolio 5: 80% of Convergent Strategy + 20% of Divergent Strategy
Efficiency is measured by Annual Return over Standard Deviation
MA(12) indicates data using 12 months moving average returns.

Table 1-B: Descriptive Statistics of Different Strategies Using *HFR Indices* for the Convergent Strategy

1994 – 2002	Convergent	Divergent	P1	P2	P3	P4	P5
Cumulative Return	152.12%	144.74%	147.97%	150.34%	151.19%	151.83%	152.43%
Annual Return	10.90%	10.97%	10.95%	10.94%	10.93%	10.93%	10.91%
Annual Standard Deviation	3.74%	9.74%	7.90%	6.18%	5.39%	4.69%	3.73%
Efficiency	**2.9140**	1.1258	1.3858	1.7706	2.0278	2.3299	**2.9238**
Skewness	**-1.8935**	0.1803	0.2374	0.3328	0.3779	0.3678	**-0.3283**
Kurtosis	9.8579	-0.0021	0.0581	0.0689	0.0337	0.0526	2.4029
Correlation b/w Convergent & Divergent			***0.1013***				

1998 – 2002	Convergent	Divergent	P1	P2	P3	P4	P5
Cumulative Return	47.63%	51.83%	51.54%	50.98%	50.59%	50.14%	49.02%
Annual Return	8.10%	9.11%	8.67%	8.59%	8.53%	8.47%	8.31%
Annual Standard Deviation	4.23%	8.70%	6.99%	5.45%	4.79%	4.26%	3.77%
Efficiency	**1.9135**	1.0477	1.2407	1.5767	1.7811	1.9882	**2.2022**
Skewness	**-2.1000**	0.0742	0.1100	0.2222	0.2815	0.2471	**-0.7041**
Kurtosis	9.6051	-0.1157	0.0518	0.2088	0.2677	0.5162	4.1796
Correlation b/w Convergent & Divergent			***-0.0236***				

2000 – 2002	Convergent	Divergent	P1	P2	P3	P4	P5
Cumulative Return	22.82%	38.80%	35.73%	32.59%	31.00%	29.39%	26.13%
Annual Return	7.09%	11.93%	10.72%	9.86%	9.42%	8.97%	8.04%
Annual Standard Deviation	3.12%	8.45%	6.68%	5.00%	4.24%	3.56%	2.75%
Efficiency	**2.2712**	1.4110	1.6048	1.9711	2.2234	2.5189	**2.9213**
Skewness	**-0.1907**	-0.0481	-0.0770	-0.0397	0.0598	0.2723	**0.7763**
Kurtosis	0.5078	0.0751	0.2132	0.4761	0.6582	0.8018	0.3289
Correlation b/w Convergent & Divergent			***-0.1793***				

1995 – 2002: MA(12)	Convergent	Divergent	P1	P2	P3	P4	P5
Cumulative Return	144.79%	133.46%	135.79%	138.08%	139.22%	140.35%	142.59%
Annual Return	11.71%	11.09%	11.19%	11.33%	11.39%	11.46%	11.59%
Annual Standard Deviation	1.59%	2.36%	1.97%	1.65%	1.53%	1.45%	1.43%
Efficiency	**7.3735**	4.6944	5.6913	6.8838	7.4583	7.9134	**8.1222**
Skewness	**-0.3497**	-0.1620	-0.0769	0.0187	0.0401	0.0164	**-0.1740**
Kurtosis	-1.0541	-0.4581	-0.5139	-0.6550	-0.7678	-0.8954	-1.0740
Correlation b/w Convergent & Divergent			***0.1643***				

Data Source: HFR Indices for Convergent Strategy and CSFB Tremont Indices for the Divergent Strategy

Convergent Strategy: 33% of Equity Market Neutral + 33% of Relative Value + 33% of Event Driven

Divergent Strategy: 50% of Managed Futures + 50% of Global Macro

Portfolio 1: 20% of Convergent Strategy + 80% of Divergent Strategy

Portfolio 2: 40% of Convergent Strategy + 60% of Divergent Strategy

Portfolio 3: 50% of Convergent Strategy + 50% of Divergent Strategy

Portfolio 4: 60% of Convergent Strategy + 40% of Divergent Strategy

Portfolio 5: 80% of Convergent Strategy + 20% of Divergent Strategy

Efficiency is measured by Annual Return over Standard Deviation

MA(12) indicates data using 12 months moving average returns.

Specifically, portfolio 5, the portfolio of 80% convergent and 20% divergent strategies clearly shows the benefit of diversification; enhancing returns and reducing risks for all periods, and demonstrating the highest efficiencies. More importantly, the deep negative skewness of the convergent strategy is reduced significantly when the divergent strategy is added. For example, during the 2000-2002 period, portfolio 5 increased the efficiency and skewness of the convergent strategy; from 3.95 to 4.53 (efficiency) and from –0.34 to –0.21 (skewness) in CSFB data, and from 2.27 to 2.92 (efficiency) in HFR data from –0.19 to 0.78 (skewness) in HFR data, respectively.

As discussed above, during periods of rising volatility and uncertainty, divergent strategies take advantage of serial price movement in a marketplace that temporarily ignores fundamental information, and tend to outperform convergent strategies. Interestingly, if we compare the historical record of equity market volatility to each strategy's performance, as shown in Figure 1 and Figure 2, we can easily observe the pattern of divergent strategy performance.

Figure 1

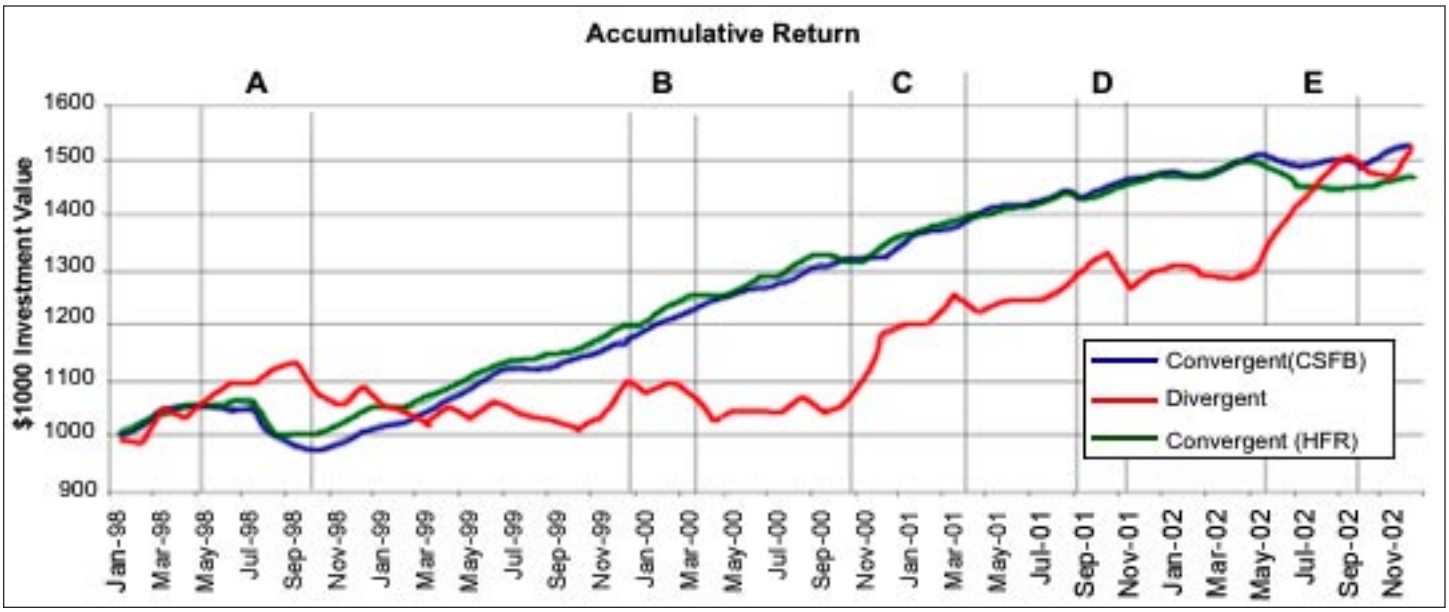
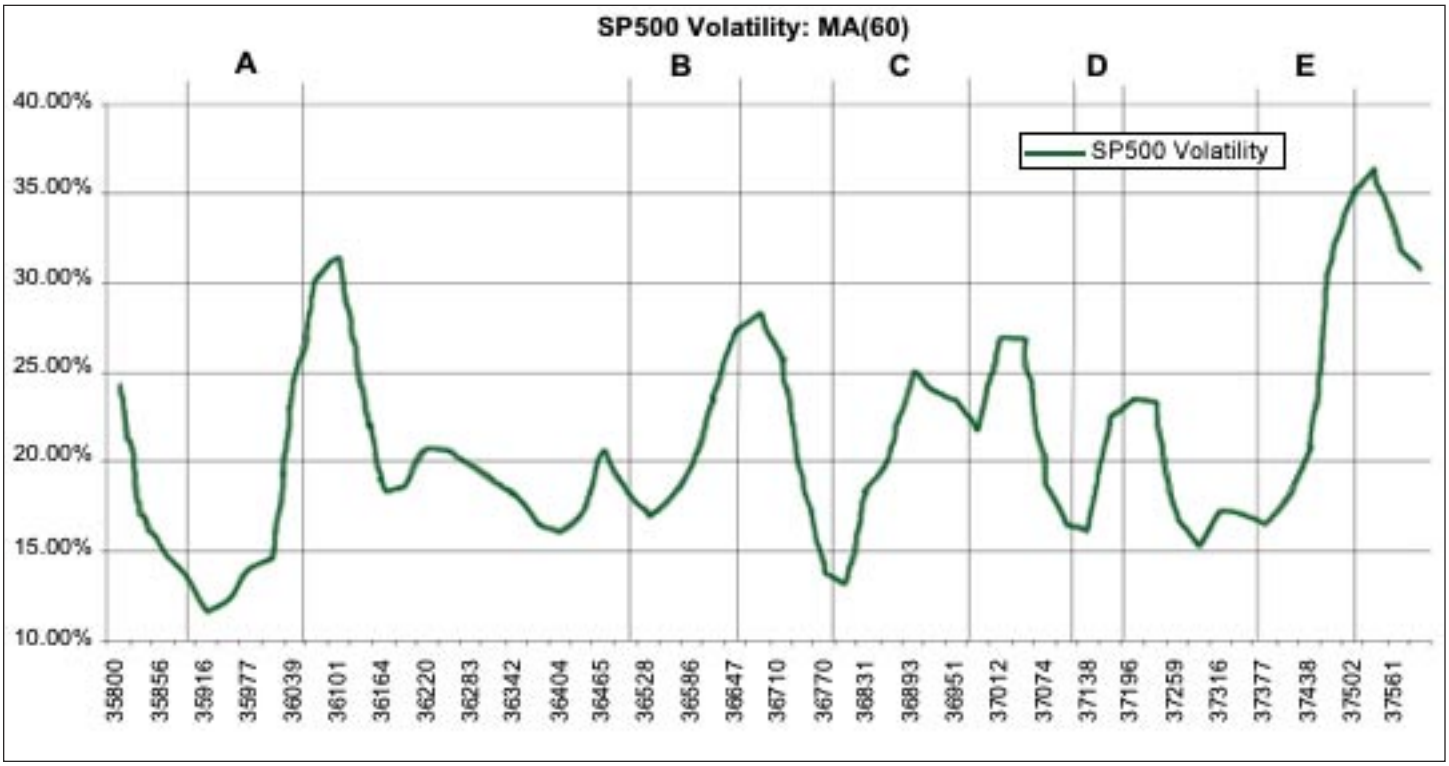


Figure 2



There exists a strong positive serial correlation between the performance of divergent strategies and the volatility of equity markets. As shown in Figure 1 and Figure 2, during the periods of A, B, C, D and E, where the S&P 500 experienced sharp increase in its volatility resulting in an increase in market uncertainty, divergent strategies performed much better than convergent strategies. This empirical evidence further supports the benefit of the combined strategy.

Figure 3 shows graphical representations of the diversification benefit between convergent and divergent strategies. In all the scenarios, the results are consistent. As shown in Figure 3-A and 3-B, the return distribution of portfolio 5 (80% convergent and 20% divergent) presents fewer negative outliers and more positive returns compared to the convergent strategies (blue line), indicating a positive shift of return distribution. Although it always has more positive skewness than the convergent strategy, the divergent strategy alone shows little benefit because of its high standard deviation and low kurtosis.

Figure 3-A

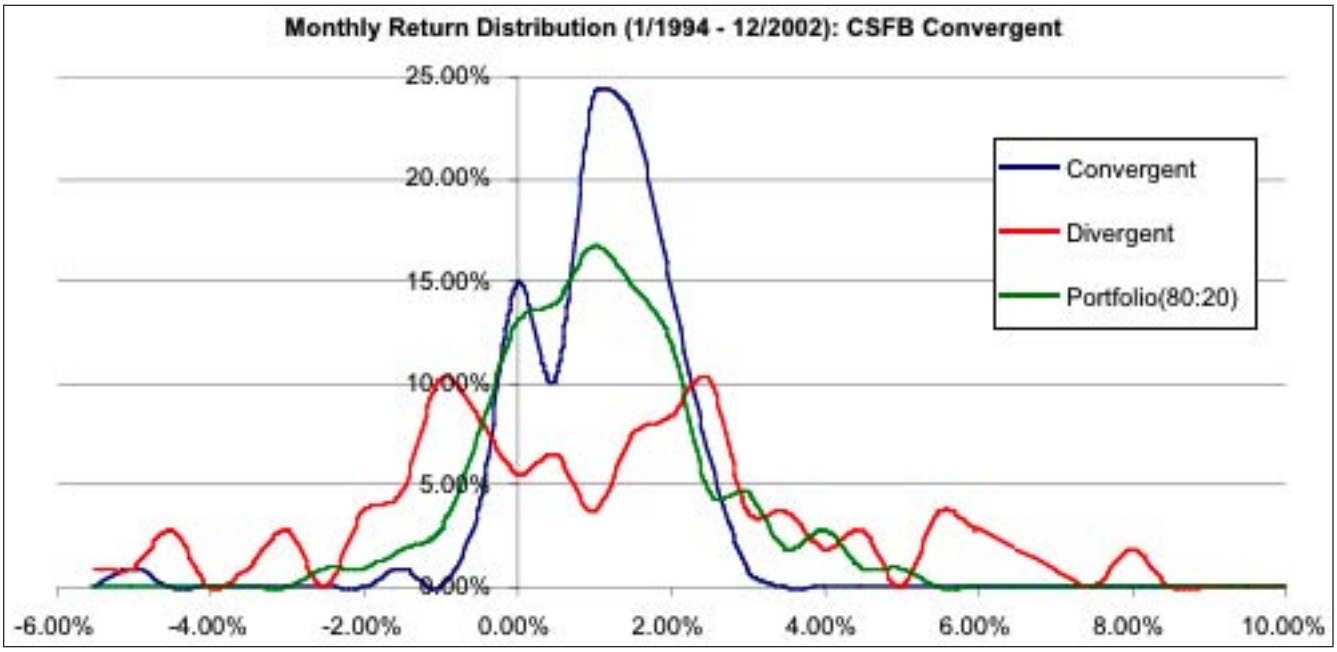
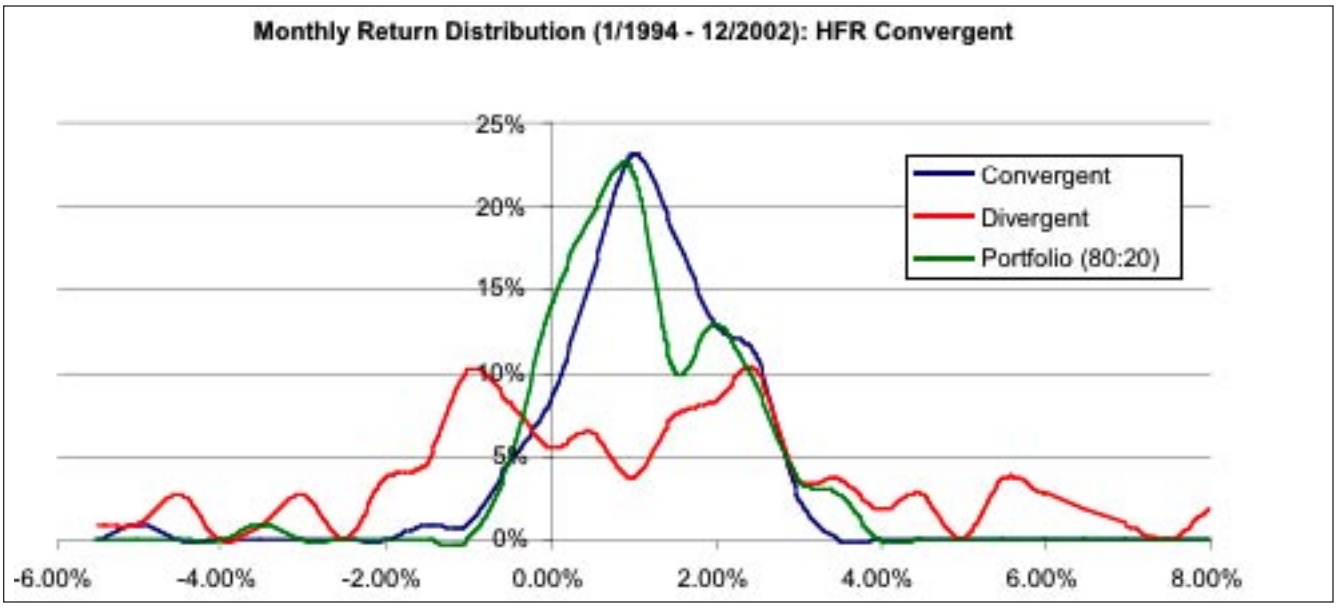


Figure 3-B



The analysis of convergent and divergent portfolios is presented in Figure 4-A and 4-B. Again, it is clear one can improve the convergent strategy portfolio consisting of either CSFB or HFR data by adding the divergent strategy. The combined strategy simultaneously increases returns and decreases risks of the convergent strategy.

Figure 4-A: Efficient Portfolio Sets from CSFB Convergent Strategy

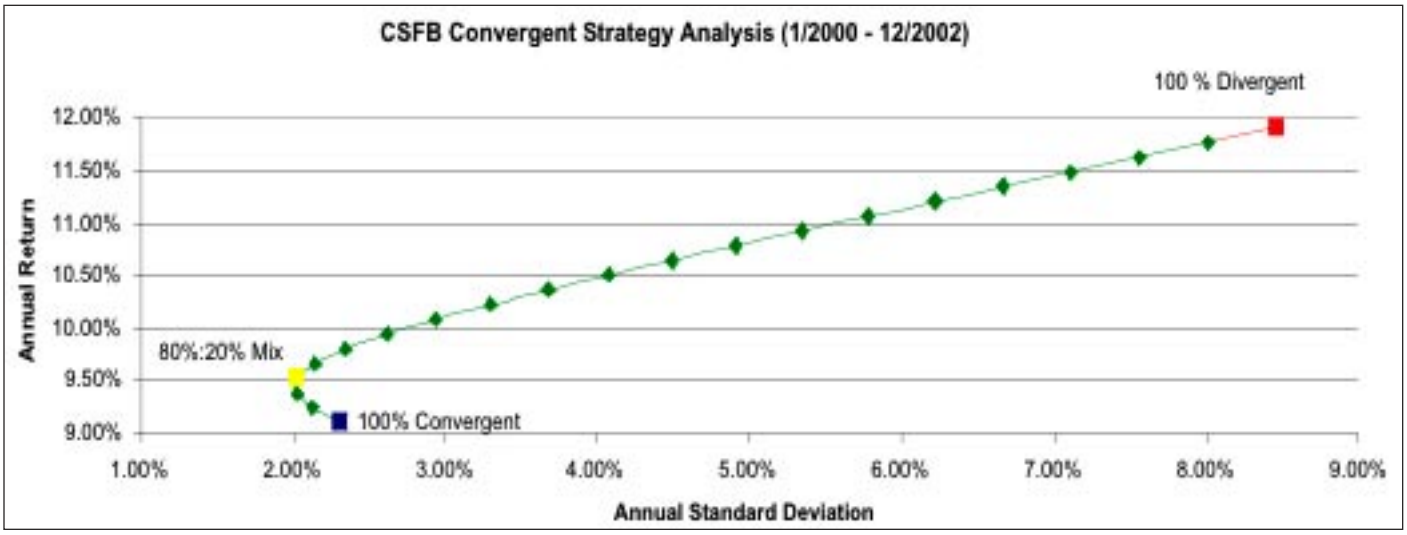


Figure 4-B: Efficient Portfolio Sets from HFR Convergent Strategy

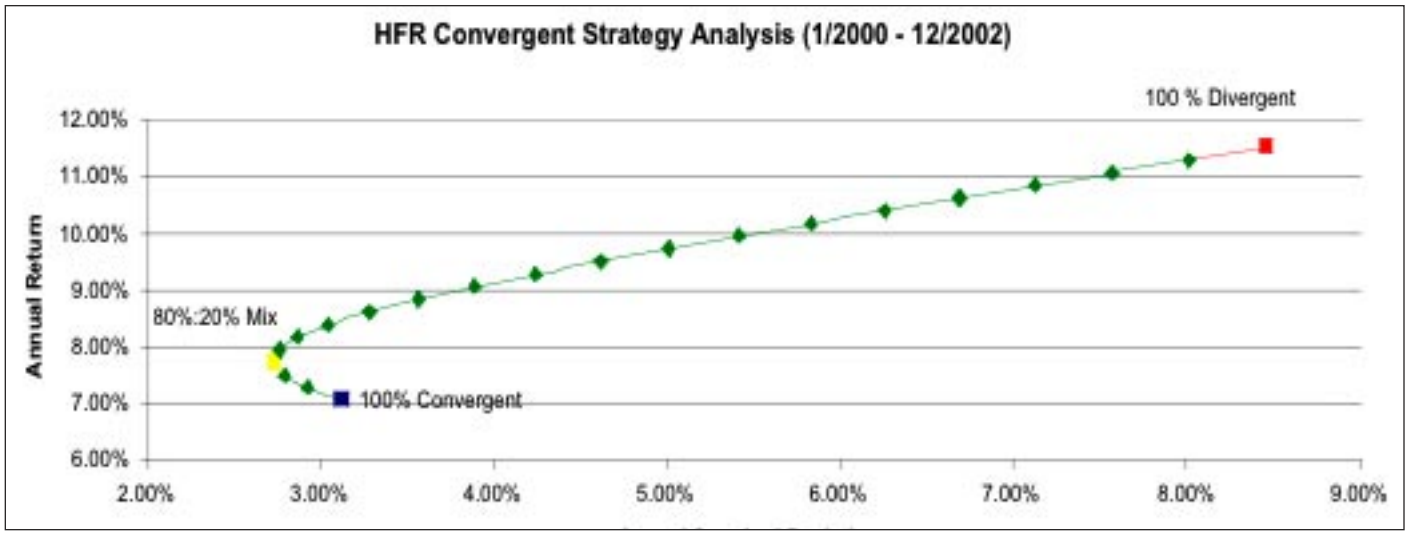
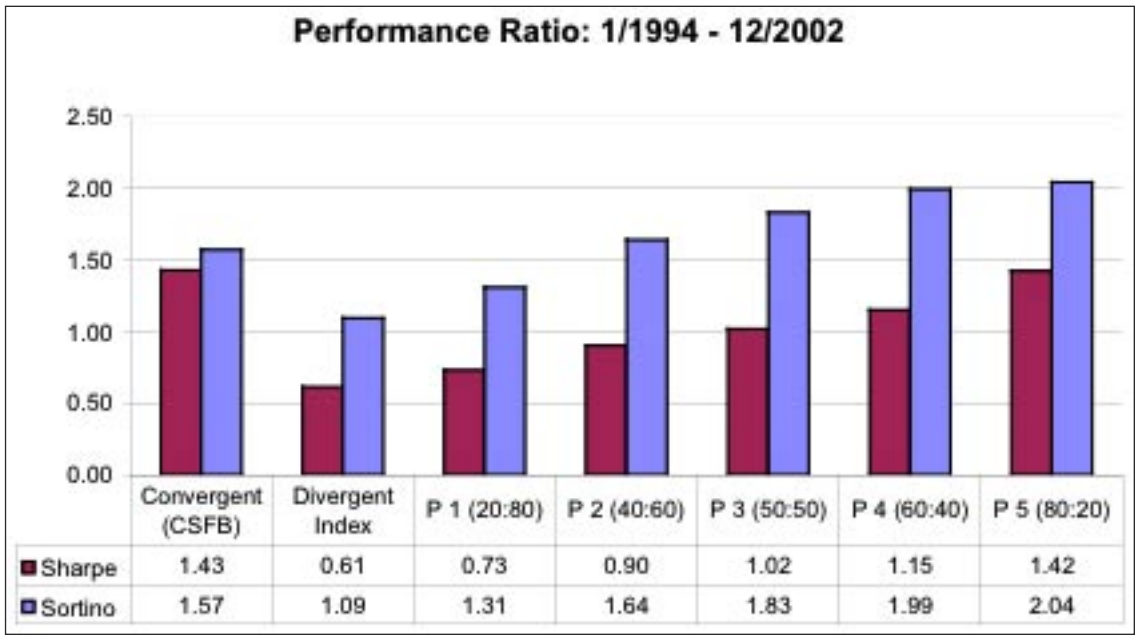
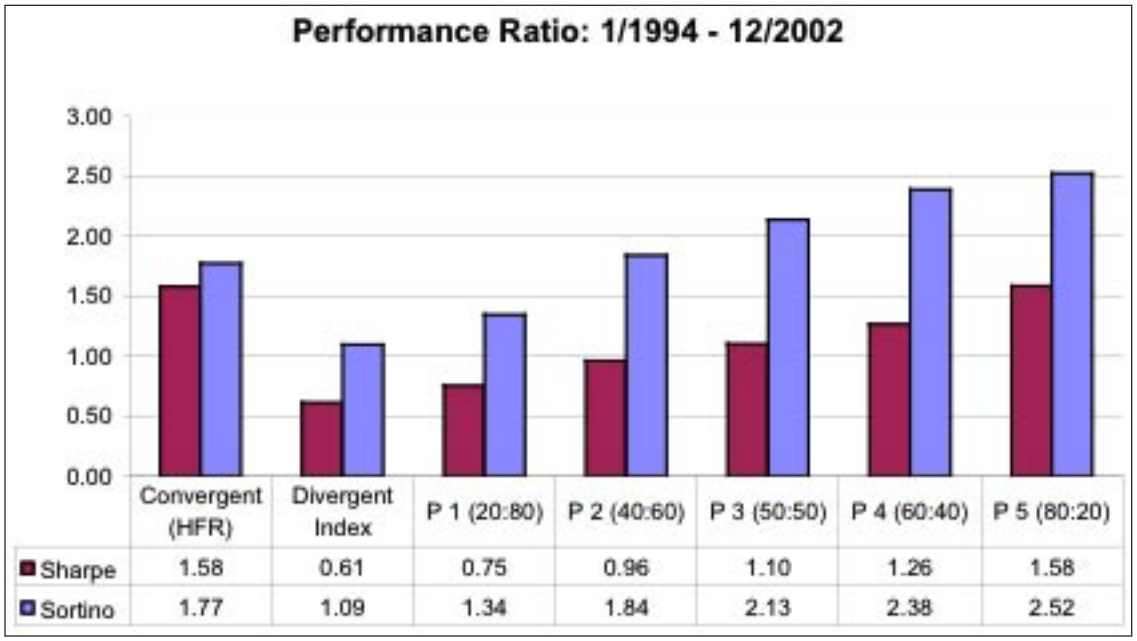


Figure 5-A: Performance Ratio From CSFB Convergent Strategy



	Convergent (CSFB)	Divergent Index	P 1 (20:80)	P 2 (40:60)	P 3 (50:50)	P 4 (60:40)	P 5 (80:20)
Sharpe	1.43	0.61	0.73	0.90	1.02	1.15	1.42
Sortino	1.57	1.09	1.31	1.64	1.83	1.99	2.04

Figure 5-B: Performance Ratio From HFR Convergent Strategy



	Convergent (HFR)	Divergent Index	P 1 (20:80)	P 2 (40:60)	P 3 (50:50)	P 4 (60:40)	P 5 (80:20)
Sharpe	1.58	0.61	0.75	0.96	1.10	1.26	1.58
Sortino	1.77	1.09	1.34	1.84	2.13	2.38	2.52

5% risk free rate was assumed for both Sharpe ratio and Sortino ratio calculation.

Sharpe Ratio = [Annual Return - Risk Free Rate] / Annual Standard Deviation
Sharpe Ratio = [Annual Return - Risk Free Rate] / Annual Downside Deviation

Lastly, in order to show the risk and return characteristics of portfolios, we measure both Sharpe and Sortino ratios[3]. To the extent that the convergent strategy has a statistically different level of skewness than the divergent strategy, the convergent strategy has an asymmetric risk characteristic that can be measured by semi-deviation of returns.[4]

The Sortino ratio is a variation of the Sharpe ratio, which differentiates harmful volatility from volatility in general using downside deviation analysis. Since the Sortino ratio is the excess return over risk-free rate over the downside semi-variance, it measures the return to "bad" volatility. This ratio allows investors to assess risk in a better manner than simply looking at excess returns to total volatility, since such a measure does not consider how often the price of the security rises as opposed to how often it falls.

Thus, comparing Sharpe and Sortino ratios, as shown in Figure 5A and 5B, is meaningful. During the period, 1994-2002, increasing the amount of the divergent strategy boosts both Sharpe and Sortino ratios. The magnitude of increase in the Sortino ratio, however, is much higher which implies the asymmetric risk characteristics of convergent strategies and shows the benefits of the divergent strategy as a portfolio diversifier.

IV. Conclusion

The apparent conflict between the level of resources dedicated to the study of divergent strategies and theories of market efficiency is a long-standing puzzle in financial literature.

There is an ongoing belief in the investment community that divergent analysis, which involves the study of historical price data, can be used to infer the direction of future prices. A substantial segment of investment within the hedge fund industry is dedicated to this type of strategy. Despite its popularity among practitioners, academics have historically dismissed the utility of divergent strategy because it is inconsistent with one of the most fundamental theories in traditional finance – the theory of market efficiency. The theory states that all publicly available information must be reflected in market prices. Much of the finance literature relies on the assumption of market efficiency because, in its absence, investors could earn excessive profits while assuming little or no risk, a state that is not sustainable in equilibrium. If markets are indeed efficient, then the divergent strategy, which relies heavily on historical data, cannot predict future prices despite analysts' claims. Traditional academic wisdom and investment community practices are clearly at odds. If a divergent strategy is well-founded, then its performance history suggests that markets must be inefficient. Alternatively, if markets are efficient, then it seems that the divergent strategy is of little worth and only convergent strategies should be pursued.

Our study, however, shows the time-varying validity of the divergent strategy and its potential benefits as a portfolio component. Specifically, the divergent strategy experienced significantly higher performance during the periods of increasing market uncertainty, and when combined with the convergent strategy the resulting portfolio:

(1) reduces the volatility of the individual strategy, increasing the kurtosis of the return distribution,
(2) reduces the negative outliers, shifting the skewness to the positive side,
(3) enhances returns in economic environments in which the convergent strategy alone offers limited return opportunities,
(4) increases the risk adjusted performance measures significantly, obtaining the maximum return/risk tradeoff.

The results of this study demonstrates that the logical extension of combining both convergent and divergent strategies provides increased return and reduced risk opportunities with more favorable return distributions relative to either strategy alone.

[3] We assume 5% risk free rate for both measures.

[4] While Sharpe ratio assumes portfolio returns are normally distributed, Sortino ratio allows asymetric return distribution assumption.

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Appendix
Hedge Funds Strategy Definitions

Market Neutral:
This investment strategy is designed to exploit equity market inefficiencies and usually involves being simultaneously long and short matched equity portfolios of the same size within a country. Market neutral portfolios are designed to be either beta or currency neutral, or both. Well-designed portfolios typically control for industry, sector, market capitalization, and other exposures. Leverage is often applied to enhance returns.

Relative Value:
Relative Value Arbitrage attempts to take advantage of relative pricing discrepancies between instruments including equities, debt, options and futures. Managers may use mathematical, fundamental, or technical analysis to determine misvaluations. Securities may be mispriced relative to the underlying security, related securities, groups of securities, or the overall market. Many funds use leverage and seek opportunities globally. Arbitrage strategies include dividend arbitrage, pairs trading, options arbitrage and yield curve trading.

Event Driven:
This strategy is defined as 'special situations' investing designed to capture price movement generated by a significant pending corporate event such as a merger, corporate restructuring, liquidation, bankruptcy or reorganization. There are three popular sub-categories in event-driven strategies: risk (merger) arbitrage, distressed/high yield securities, and regulation D.

Global Macro:
Managers carry long and short positions in any of the world's major capital or derivative markets. These positions reflect their views on overall market direction as influenced by major economic trends and or events. The portfolios of these funds can include stocks, bonds, currencies, and commodities in the form of cash or derivatives instruments. Most funds invest globally in both developed and emerging markets.

Managed Futures:
This strategy invests in listed financial and commodity futures markets and currency markets around the world. The managers are usually referred to as Commodity Trading Advisors, or CTAs. Trading disciplines are generally systematic or discretionary. Systematic traders tend to use price and market specific information (often technical) to make trading decisions, while discretionary managers use a judgmental approach.

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