

# RESEARCH

VIEWPOINT

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## The Role of Long/Short Equity Hedge Funds in Investment Portfolios

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### EXECUTIVE SUMMARY

Long/short equity hedge funds have historically outperformed traditional long equity exposure with lower risk. This is a result of a demonstrated capability by long/short managers to generate alpha via stock selection, rotation in and out of cash and timely shifts in market exposures (e.g. large vs. small capitalization, sector, geography, etc). As a consequence, long/short managers have tended to generate a highly favorable characteristic: a higher correlation to equity markets in rising markets and lower correlation in falling markets (sometimes referred to as an “asymmetrical” risk/return profile).

Over the past decade, assets under management by long/short equity hedge funds have grown more than 20% annually. This expansion was the most rapid of any hedge fund strategy and long/short managers have displaced global macro funds to claim the largest share of industry assets. Although a portion of this growth in long/short assets was attributable to market appreciation, the demonstrated ability of the managers themselves was also a key factor stimulating inflows.

In my view, the optimum portfolio allocation should include adequate doses of “unconstrained” long/short managers in lieu of passive or active long equity exposure. Indeed, if one relies solely on the historical performance record, long/short managers would entirely displace traditional long-only managers. This view holds up even when long/short manager returns are liberally adjusted downward to reflect possible survivor bias. And while there is no guarantee that long/short manager performance will hold up in the future, it would take a severe deterioration in manager capabilities to justify no allocation, in my opinion.

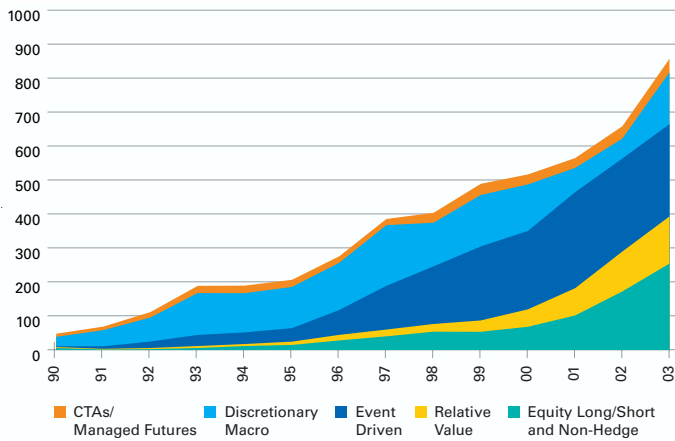
There is no one preeminent asset allocation scheme for delineating the role of long/short hedge funds in portfolios—it depends on an investor’s current positions and portfolio management structure. Approaches include allocating to an aggregate long/short category and populating the space with generalist managers that invest broadly. Alternatively, one can distinguish between geographic markets (developed, emerging, etc) or invest in styles (value/growth) as part of the overall equity allocation.

In this article, I make the case for incorporating the alpha-generating capabilities and the implicit beta exposure of long/short managers explicitly in the asset allocation process. The first section reviews the evolution of long/short hedge funds. The performance characteristics of the long/short managers are then reviewed in the second section. The third section describes the basic determinants of long/short manager returns. This is followed by an analysis of what allocations to long/short managers might make sense. The final section discusses the attributes of various long/short managers who specialize in sectors.

The key conclusion is that long/short managers have a demonstrated ability to outperform on a risk-adjusted basis compared to most long-only vehicles. I believe substantial allocations to these managers are appropriate regardless of whether one views them as a substitute for active equity managers or as a stand-alone hedge fund strategy.

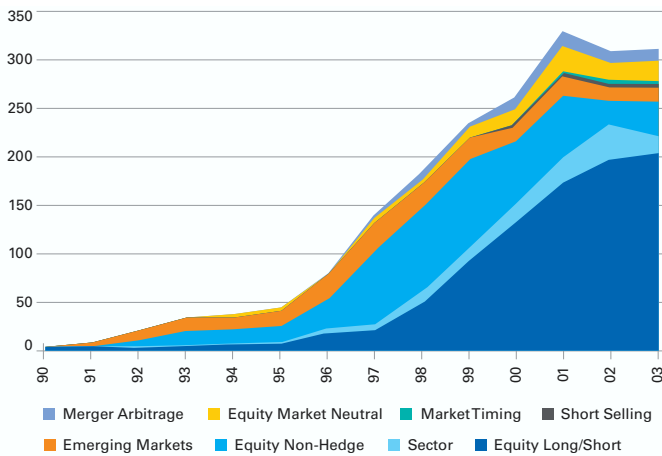


FIGURE 1:  
GROWTH OF HEDGE FUND ASSETS BY STRATEGY: 1990–2003<sup>1</sup>



Source: CISDM and Hedge Fund Research, Inc.  
Data represents period 1/1/90–12/31/03

FIGURE 2:  
EQUITY-RELATED HEDGE FUND ASSETS: 1990–2003<sup>1</sup>



Source: Hedge Fund Research, Inc.  
Data represents period 1/1/90–12/31/03

## BACKGROUND

### Growth of the Long/Short Equity Sector

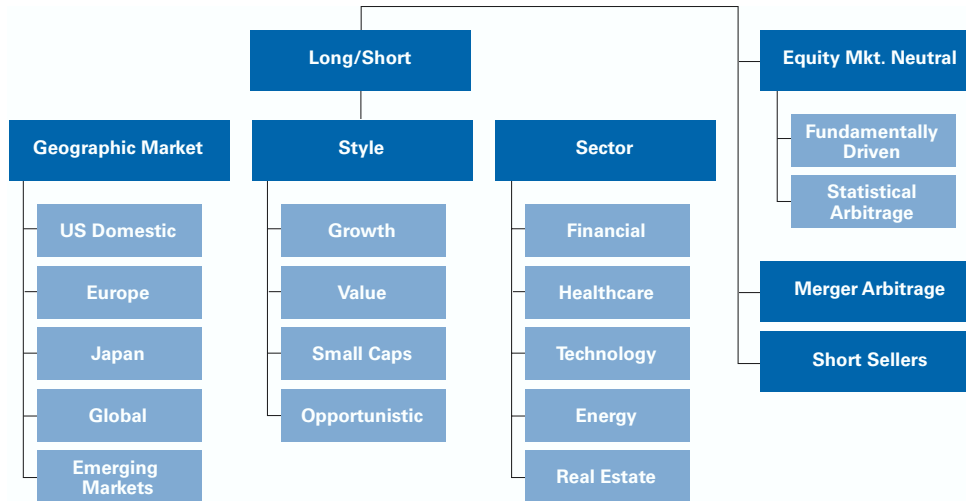
Long/short hedge funds experienced the most rapid growth of any hedge fund strategy during the 1990s (*Figure 1, left*). Long/short managers accounted for less than 10% of all hedge fund assets at the beginning of the decade but reached nearly 45% of assets by the end of 1999. In this regard, long/short managers were a key attraction stimulating flows into hedge funds and a primary source of overall industry growth. While the emergence of long/short hedge funds was partly a consequence of the stock market boom experienced over the period, it also reflected an awakening awareness by investors of the alpha-generation capabilities of managers. This stimulated demand.

The dynamic growth of long/short hedge funds was also influenced by supply side factors. Indeed, long/short equity tends to be the least complicated type of hedge fund to establish. Not only are resource requirements low to enter the business, but there is a large talent pool of thousands of equity portfolio managers eager to migrate from institutions to the entrepreneurial world of unconstrained hedge fund investing. Of course, while long-only portfolio managers may already be skilled in the essentials of stock picking and investment management, they may not possess the capability to identify shorts and the acumen to know when net beta exposure needs to be increased or reduced. This is one reason why the attrition rate is very high and investors need to exercise care in manager selection.

Besides the ease of starting new funds, established long/short managers can expand capacity quickly to meet new investor demand simply by increasing the number of shares held or sold. This is due to the fact that equity markets are generally deep and liquid. The ability of seasoned managers with good track records to absorb large inflows quickly is a chief reason why the long/short hedge fund sector was able to grow rapidly in the 1990s.

Following the burst of the stock market bubble in 2000, asset flows to long/short equity hedge funds slowed (*Figure 2, left*). However, assets under management held up strongly when compared to the sizable declines in the value of portfolios operated by active long-only equity managers. For example, total assets managed by long/short managers rose from \$133 billion to \$205 billion from the end of 2000 to 2003 according to Hedge Fund Research [2003]. This occurred while the S&P 500 was declining 17%. The reason was performance. Although long/short returns were slightly negative in 2001 and 2002, they

FIGURE 3:  
EQUITY-RELATED HEDGE FUND STRATEGIES



Source: Lamm

were nothing like the double-digit declines reported by long-only managers. The difference was that long/short managers significantly reduced their net long equity exposure as markets fell over the period.

**What Is A Long/Short Hedge Fund?**

Before proceeding, it is important to explain what exactly is meant by “long/short” equity hedge funds. Certainly, there is general agreement that long/short managers are those who hold a long equity portfolio offset by a portfolio of short equity holdings. The short portfolio serves as a hedge against market declines but also provides an opportunity for managers to add value by selecting stocks more likely to underperform the market. Long/short managers generally carry a net long bias— that is, the value of the long portfolio exceeds that of the short portfolio. As a result, they are directionally exposed to equity market risk. That said, managers vary the amount of this net exposure as market conditions change and can deliver additional alpha on top of that produced via their stock-picking skills.

The reason for carrying net long exposure is that stock prices generally rise over time and short positions theoretically should deliver negative returns in the long run. Of course, this pattern reverses during bear markets and allocation shifts can add considerably to performance. To hedge against potential market

declines, long/short managers very rarely move above 100% net long exposure and more often carry less than 50%. This assures they are not caught naked with delta one exposure when markets reverse. In essence, by varying net exposure over time as market conditions change, long/short managers are, in effect, acting as tactical asset allocators changing the stock-to-cash ratio as they deem appropriate.

Confusion sometimes arises because there are some funds that are “long-only” with no short positions whatsoever. They differ from active long-only equity managers only in that they are organized as private partnerships and are compensated on the basis of performance. For example, Hedge Fund Research (HFR) and Managed Account Reports (MAR) classify such managers as “hedge funds” even though they do not hedge. However, the majority of industry data providers, such as CSFB, Evaluation Associates and Hennessee, do not. I follow the mainstream view and exclude long-only funds organized as partnerships from the long/short hedge fund category.

Similarly, equity market neutral managers are commonly considered as distinct from the long/short category and I follow this convention. The reason is that while market neutral managers do in fact hold both long and short equity portfolios, they restrict their dollar risk to zero (more or less). This means they are making no stock/cash allocation decisions in any way and seek to

TABLE 1:  
RETURN STATISTICS FOR VARIOUS LONG/SHORT HEDGE FUND INDEXES VS. EQUITY INDEX PERFORMANCE: 1990 TO 2003<sup>3</sup>

	EACM Equity Hedge Fund Index	HFRI Equity Hedge Index	CSFB/ Tremont Long/ Short Index*	TUNA Long/Short Equity Index	S&P 500 Index	Russell 2000 Index	MCSI Emerging Markets Index
Compound annual return	15.3%	18.4%	12.2%	20.3%	10.9%	11.0%	5.3%
Annualized standard deviation	10.2%	9.1%	11.0%	9.0%	15.0%	19.1%	23.5%
Skew	0.30	0.13	0.21	0.23	-0.47**	-0.52**	-0.72**
Kurtosis	3.40**	1.30**	3.35**	1.40**	0.50	0.84**	1.78**
Maximum monthly return	14.6%	10.9%	13.0%	11.4%	11.4%	16.4%	16.4%
Minimum monthly return	-10.1%	-7.7%	-11.4%	-7.3%	-14.5%	-19.5%	-29.3%
Sharpe ratio	1.03	1.50	0.68	1.73	0.41	0.32	0.03
Sample inception (mo./yr.)	1/90	1/90	1/94	1/90	1/90	1/90	1/90
Correlation							
EACM	1.00	0.92	0.93	0.90	0.63	0.81	0.66
HFRI		1.00	0.91	0.92	0.66	0.83	0.60
CSFB			1.00	0.92	0.58	0.78	0.58
TUNA				1.00	0.69	0.88	0.61
S&P 500					1.00	0.73	0.63
RUSSELL 2000						1.00	0.66

**Past performance is not an indication of future results.**

Source: EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Datastream  
Data represents period 1/1/90–12/31/03

\*The CSFB/Tremont series is not directly comparable to the other series since it began in 1994

\*\*Statistically significant with 95% confidence

generate alpha entirely from their stock selection capabilities.<sup>2</sup> Merger arbitrage managers are market neutral specialists who offset long positions in acquired companies with equivalent value short positions in acquiring companies. Like equity market neutral managers, merger arbitrageurs do not actively manage net exposure and make no allocation decisions. Both of these strategies are, therefore, pure arbitrage and I exclude them from my definition of long/short hedge funds.

Lastly, I note that most data providers report returns for pure short sellers as a distinct hedge fund strategy. Indeed, it is. Equity exposure is constrained to 100% in short positions and managers make no decision on net market exposure. I include them in the analysis on an ancillary basis because some investors employ short sellers for alpha transfer or as a means for hedging the overall equity exposure in their portfolios.

Although researchers often discuss the long/short segment of the hedge fund industry in generic terms, it is important to remember the sector is not amorphous. Long/short managers employ a wide array of divergent approaches differentiated most often by the types of stocks in which the manager invests (*Figure 3, page 3*). Managers typically specialize by geographic market (the US, Europe, Japan or emerging markets), style (value versus growth), and sector (technology, healthcare, financial and energy being the most common). While some managers are generalists and allocate simultaneously across geography, style and sector, the majority are not.

**THE LONG/SHORT EQUITY PERFORMANCE RECORD**

**Historical Returns, Risk and Higher Moments**

A cursory examination of the performance record for long/short managers suggests that they are talented (*Table 1, page 4*). Indeed, the reported monthly returns by Evaluation Associates (EAI), Hedge Fund Research (HFR), CSFB and InvestorForce (TUNA)—the best known providers of historical hedge fund series—indicate that long/short managers outperformed the S&P 500 up to as much as 10% (TUNA) over the 1990 to 2003 period. Besides outperforming the S&P, the data also indicate that long/short managers took considerably less risk than embedded in the S&P as measured by the standard deviation of returns. Indeed, the volatility of long/short returns ranges from a low of 9.0% for TUNA to a high of 11.0% for CSFB—all significantly lower than the 15.0% recorded for the S&P. With higher returns and lower risk than the S&P, the result is vastly better Sharpe ratios and the noteworthy appeal of long/short managers.

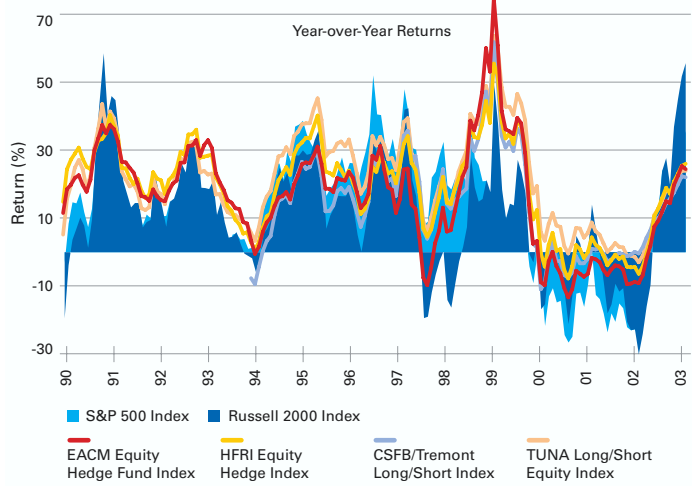
Beyond risk and return, the data also indicate that long/short managers exhibit positive skew—a very desirable characteristic for investors because it means that upside risk exceeds downside risk. Although the amount of positive skew is small and not statistically different from zero, it is preferable to the statistically significant negative skew exhibited by the S&P. That said, long/short returns do exhibit statistically significant kurtosis (fat tails).

**Correlation and Time Variance**

The fact that reported returns vary by provider raises the question of data accuracy. However, all providers' long/short return series are highly correlated to each other with the minimum correlation being .90 for TUNA vs. EACM. This suggests that even though average returns and risk are somewhat different, they appear to be measuring the same phenomenon in the sense that returns rise and fall in unison.

Long/short correlations with equity indexes reveal a more complex story. Indeed, long/short managers exhibit fairly lower correlation with the S&P, ranging from .58 for CSFB/Tremont to .69 for TUNA. This is also true for long/short returns versus those of emerging markets (MSCI Emerging Markets Index). However, returns for long/short managers show a stronger relationship with small cap stocks as measured by the Russell 2000 Index with correlations ranging from .78 for CSFB/Tremont to .88 for TUNA. This suggests that long/short managers should be viewed more as a substitute for small cap exposure rather than

FIGURE 4:  
LONG/SHORT HEDGE FUND INDEXES VS. US EQUITY INDEX RETURNS<sup>3</sup>



**Past performance is not an indication of future results.**

Source: EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Datastream  
Data represents period 1/1/90–12/31/03

large caps. In addition, it implies that investors might consider allocating to large cap stocks and long/short managers in lieu of the standard large cap/small cap allocation if the objective is to invest in less correlated assets.

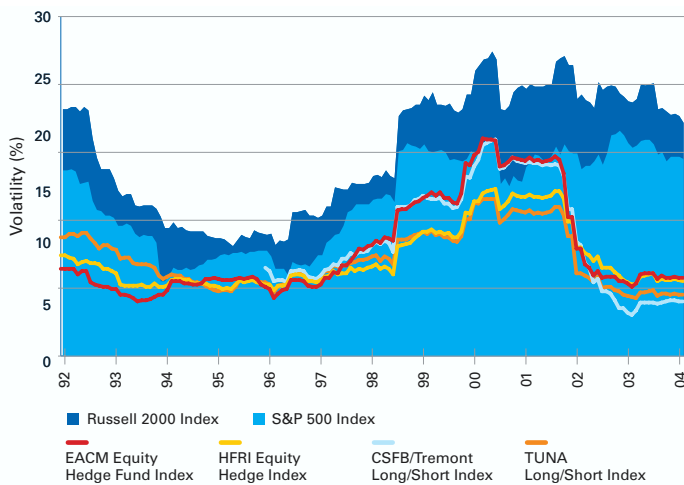
*Figure 4 (above)* summarizes the dynamic nature of long/short hedge fund performance versus the S&P 500 Index and the Russell 2000 Index, illustrating that at times the performance differential is wide and at other times it is narrow. For example, long/short hedge funds outperformed the S&P 500 Index and Russell 2000 Index consistently in the early 1990s and from 2000 through 2002. In the late 1990s and in 2003, long/short fund performance in fact trailed the broader equity indexes.

*Figure 5 (page 6)* indicates why—long/short managers tend to take more risk when equity prices are rising and less during periods when stock prices are declining. The quick conclusion is that with higher returns, lower risk and more attractive higher-moment features than the broad stock market, it would appear to me foolish not to make substantial allocations to long/short managers. Indeed, indications are that one would have been a lot better off for the last decade and more by placing one's entire equity exposure with long/short managers.

**Data Issues**

However, things are not always what they seem and these con-

FIGURE 5:  
RUNNING 2-YEAR VOLATILITY: LONG/SHORT EQUITY INDEXES  
VS. US EQUITY INDEXES<sup>3</sup>



Source: EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Datastream  
Data represents period 1/1/92–3/31/04

clusions need to be qualified for several reasons. First, data providers use somewhat different definitions of long/short hedge funds. For example, the EACM series includes “domestic opportunistic,” “domestic long-biased” and “global/international” hedge funds as constituents of an aggregate “long biased” category. The HFRI series excludes emerging markets and sector funds, which are reported as separate categories from their “equity hedge” classification. The CSFB/Tremont long/short series also excludes emerging markets, which are reported separately.<sup>4</sup> In addition, TUNA reports both a long/short series and an “opportunistic” category. Therefore, the classifications are not 100% strictly comparable.

Second, it should be noted that data generated by providers are collected voluntarily from hedge funds. Providers profit by charging investors for access to individual fund performance data. This means there is an incentive for new hedge funds and those that are raising assets to submit performance information, while there is little impetus for established funds to do so. As a result, there may be a “self selection bias” and the actual returns of long/short funds may be higher or lower than those reported.

A third issue is that long/short funds that close down due to poor performance typically stop reporting to data providers. As a consequence, reported returns exhibit what is referred to as “survivor bias.” That is, the funds that report are those that survive

while the poorer performance of funds that liquidate is omitted from databases. This deficiency is regarded as of major importance by practitioners and often cited as a primary reason why the rosy long/short return track record should not be believed. Consequently, one must approach reported long/short returns with considerable caution.

### Survivor Bias Evidence

As already noted, it is easy to see why a naïve investor might quickly jump to the conclusion that long/short hedge funds offer an outstanding investment and a substitute for active long-only equity managers. However, once acquainted with the data issues, a reasonable person might rebel and avoid any commitment whatsoever. Is there any reasonable way to resolve the survivor bias issue and improve the reliability of reported returns?

Fortunately, there is—academics have explored the survivor bias issue in depth. Amin and Kat [2003] provide the most comprehensive and up-to-date investigation based on hedge fund data through 2001. Having more recent data is important because it captures the experience after the bursting of the technology bubble in 2000. Amin and Kat’s key findings are that long/short hedge funds in general suffer from a high rate of attrition and that reported data overstates actual performance by an average of 1.9% annually over the 1994 to 2001 period. Although they did not examine bias in higher moments for long/short managers, they did report that for all hedge funds, standard deviation (risk) was understated by 0.64%, skew overstated by 0.66, and kurtosis underestimated by 0.47.<sup>5</sup>

The one study that reports a higher estimate of survivor bias than Amin and Kat was carried out by Schneeweis, Kazemi and Martin [2002]. They find that survivor bias in returns for “global hedged equity” funds averaged 2.9% over the 2-year period beginning January 1998. While it is unclear why survivor bias over this period should be higher than that reported by Amin and Kat over the longer 1994 to 2001 period, it does suggest that survivor bias might have increased in recent years. This possibility is supported anecdotally by the fact that 2002 was a significant down year for equities with press reports indicating that an unusually large number of hedge funds closed at the end of the year due to weak performance.

Critically, these studies do not contradict the initial conclusion that long/short hedge funds exhibit better performance characteristics than the alternative of carrying naked long equity exposure. The reason is simply that the available estimates of sur-

vivor bias are lower than the outperformance of long/short funds over equities. Indeed, even if survivor bias is higher than that suggested by research studies, say in the 3% to 4% range, long/short hedge funds still appear attractive versus unadulterated long investments in stocks.

**Return Dispersion**

One additional reason to allocate to long/short managers, as well as to private assets in general, was suggested by Swensen [2000], who noted that the difference between the performance of top quartile managers and bottom quartile managers is very large. This contrasts with the situation for active long-only managers where the differential is fairly small.<sup>6</sup> Therefore, presuming that one possesses skill in choosing managers, the opportunity to generate alpha via hedge fund manager selection is significant.

This conclusion is strongly supported by available cross-section data on hedge fund performance. For example, *Table 2 (right)* shows the performance of selected hedge fund strategy groups based on CISDM classifications for the 3-year period from 2001 to 2003. The “global established” hedge fund category, which includes mostly long/short managers that invest in developed markets, shows a 24% average annual performance differential between the top and bottom quartiles. The differential for sector managers, all pure long/short equity funds, is nearly the same as that for established managers that are not sector specific.

As for other hedge fund strategies, emerging market hedge funds show an even wider differential—nearly 39% annually. Although managers in this classification include some that invest in debt as well as stocks, the manager selection opportunity appears exceptional. In addition, the performance differential between top and bottom quartile global macro managers appears to be comparable to that for long/short managers, but the performance differentials for event driven and market neutral managers are lower. Clearly, it would appear that skill in manager selection can add tremendously to hedge fund portfolio performance.

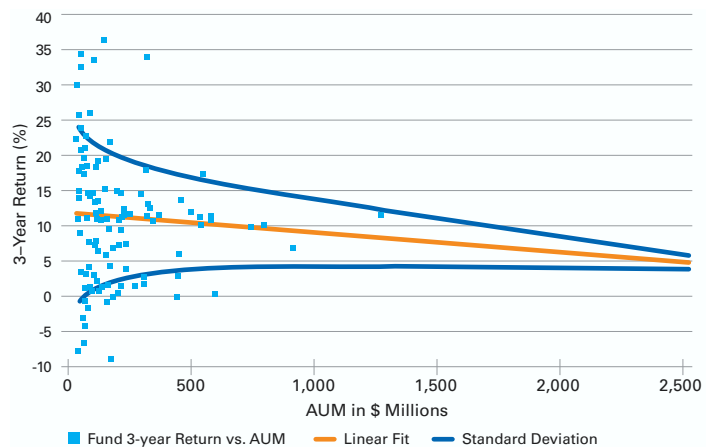
Lest one believe the fairly large difference between top and bottom quartile performance is the result of the limited CISDM sample, De Souza and Gokcan [2004] also report a wide dispersion using hedge fund data from HFR. Indeed, for 118 long/short hedge funds over the 1997 to 2002 period, they find the difference between the top and bottom quartile is more than 14%. Although less than the magnitude indicated by the CISDM data, it is quite large and supports the proposition that one can add significantly to performance via manager selection.

TABLE 2:  
AVERAGE ANNUAL RETURNS FOR VARIOUS HEDGE FUND STRATEGIES<sup>1</sup>  
BY QUARTILE: 2001–2003

Strategy	Quartile				Top less bottom quartile	Number of funds
	1st	2nd	3rd	4th		
Global Established	23.5%	12.4%	8.2%	-0.2%	23.7%	110
Sector	25.0%	17.5%	9.5%	1.5%	23.5%	26
Emerging Markets	46.2%	24.0%	14.0%	7.3%	38.9%	39
Global Macro	29.8%	17.1%	13.4%	4.4%	25.3%	20
Event Driven	23.7%	12.1%	6.0%	1.9%	21.8%	55
Market Neutral	20.9%	10.6%	6.7%	2.3%	18.6%	132

Source: CISDM data for hedge fund managers with more than \$50 million in assets under management  
Data represents period 1/1/2001–12/31/03

FIGURE 6:  
ASSETS UNDER MANAGEMENT VS. RETURN  
FOR LONG/SHORT EQUITY HEDGE FUNDS<sup>1</sup>



Source: CISDM  
Data represents period 12/31/00–12/31/03

TABLE 3:  
ESTIMATES OF LONG/SHORT EQUITY HEDGE FUND FACTOR EXPOSURES<sup>3</sup>

Coefficient	Traditional Factor Model				Alternative Approach			
	Estimate	Standard Error	t Statistic	Constrained Estimate	Estimate	Standard Error	t Statistic	Constrained Estimate
Intercept	-.021	.013	-1.67	.088	.043	.042	1.04	.071
S&P 500 Index Return	-.318*	.045	-7.03	-.179	-.274*	.041	-6.72	-.161
NASDAQ Composite Return	.393*	.024	16.16	.369	.377*	.022	17.41	.361
Russell 2000 Index Return	.271*	.033	8.10	.202	.217*	.031	7.12	.146
Net Long Position	.346			.392	.320			.346
S&P/NASDAQ Correlation					-.051	.037	-1.38	-.056
S&P/Russell 2000 Correlation					-.093*	.032	-2.91	-.132
NASDAQ/Russell 2000 Correlation					.077	.046	1.66	.177
3-Month T-Bill	3.00*	.261	11.49	.608	2.50*	.244	10.25	.654
R <sup>2</sup>	0.88			0.81	0.91			.88

Source: Lamm, EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Datastream  
Data represents year-over-year returns and average 12-month correlation using monthly data from 1/1/91–3/31/04  
\*An asterisk denotes statistical significance at the 95% confidence level

### Fund Size and Returns

A related question is whether the size of long/short hedge funds is related to performance since it is often asserted that large size limits returns for various hedge fund strategies. While long/short managers sometimes claim that this may be the case for other strategies, they often argue that it is not for themselves because of the huge size and liquidity of the equity markets. The available evidence suggests otherwise.

Figure 6 (page 7) shows average 3-year returns for global established funds from CISDM data compared to December 31, 2003 asset levels. Clearly the returns of smaller funds are more dispersed and somewhat higher than those of larger funds. Unfortunately, we lack data on the volatility of funds, so this dispersion may come as a consequence of greater risk. Nonetheless, on a pure return basis, smaller long/short managers appear to offer somewhat better potential for outperformance.

### DETERMINANTS OF LONG/SHORT RETURNS

How do long/short managers make money? Are they truly alpha producers or is there some other secret to their success? The

answer is that long/short managers generally deliver alpha from stock selection and by varying net beta exposure to stocks. This conclusion is based on research by Fung and Hsieh [2002], Hsieh [2004] and Lamm [2002, 2004e], who show that long/short managers generally carry short exposure in large capitalization stocks and long exposure in small capitalization stocks. Furthermore, I demonstrate that there is an essential temporal aspect to alpha and beta contribution by showing that they vary over time. That is, the net long exposure of long/short managers is dynamic, ranging from very high levels during 1999 and 2000 (when stock returns were high) to very low levels more recently in 2002 (when stock returns were negative).

### Rationale for Net Long Small Cap Exposure

Carrying net long exposure in small caps makes sense intellectually when one considers that small company stocks have historically outperformed large company stocks by several percentage points annually. This means that a long-term holding of small capitalization stocks offset by a short portfolio of large capitalization equities should provide positive returns. The problem is that small caps underperform periodically. On such occasions, successful long/short managers can only avoid negative returns

by reducing exposure to small caps via rotation to large caps or moving into cash. This requires an astute ability to identify secular bear markets when small caps normally underperform.

Besides the long-run performance advantages of long small cap/short large cap positions, there are execution incentives that encourage long/short managers to hold long positions in small caps and to carry short exposure in large caps. The reason is that it is much easier to short large company stocks since the markets are deeper and more liquid. As a consequence, long/short managers face an execution bias that has worked to their advantage, even if they were unaware of the long-term tendency of small caps to outperform.

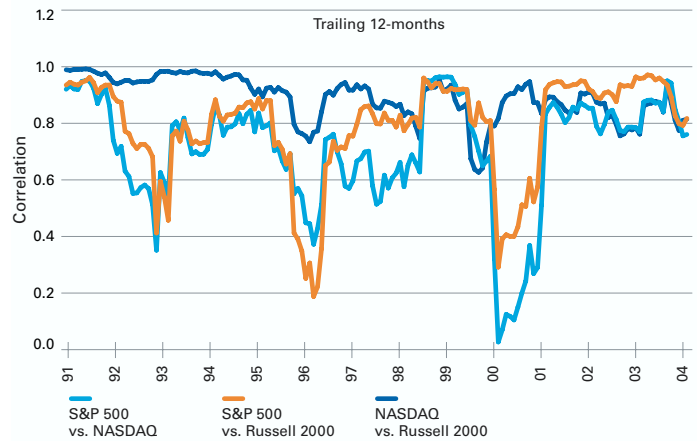
The ability to exploit the freedom to hold multi-cap long/short positions makes for favorable performance comparisons to long-only managers. Critically, long/short managers not only can exploit the small cap performance advantage, but also can rotate back and forth from small to large caps as market conditions change or move into cash. Long-only managers must retain close to a 100% long position to avoid benchmark risk and are usually restricted to an explicit large cap or small cap mandate with crossover prohibited.

One implication of this flexibility is that by allocating to long/short managers, investors are in effect delegating away a portion of the asset allocation decision to the manager—specifically the small cap/large cap split and the equity/cash allocation. While this may produce improved performance, it comes at a cost of much less control over the asset allocation decision. Indeed, it raises the important question of whether allocating to long/short hedge funds is really an asset allocation decision since at times long/short managers may be short the desired cap exposure.

**Estimates of Return-Based Factor Exposure**

Turning to the specific issue of what positions long/short managers typically carry, *Table 3 (page 8)* presents estimates of a simple econometric model that explains long/short returns. Results are presented for both the traditional pure return-based style models advocated by Fung and Hsieh, Lamm, Schneeweis and Spurgin [1998], and Schneeweis, Kazemi, and Martin [2002], as well as for a model variant which goes a step further in attempting to identify in more detail the determinants of long/short manager returns. The latter approach includes asset returns like traditional models but appends cross-asset correlations as explanatory factors. The logic is simply that under normal conditions if managers are long small caps and short large

FIGURE 7:  
EQUITY MARKET INDEX CORRELATIONS<sup>3</sup>



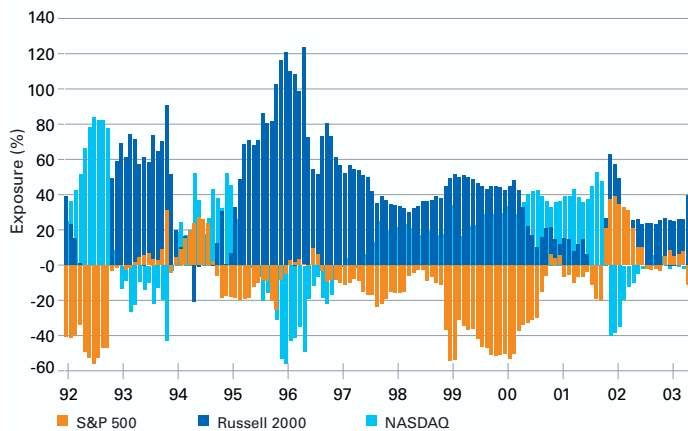
Source: Datastream  
Data represents period 1/1/91–3/31/04

caps, they are also long correlation. They risk underperformance when there is a correlation “break” and large caps outperform. *Figure 7 (above)* illustrates that while equity market correlations normally are fairly stable, there are periods when they break down. For example, S&P 500 correlation with both the Russell 2000 and the NASDAQ Composite disintegrated in 1992, 1996 and 2000. These were years when long/short managers were forced to significantly realign their market exposure in order to deliver positive returns

As for the estimates of the model coefficients presented in *Table 3 (page 8)*, three broad market indexes are used to reflect long/short manager exposure—the S&P 500 (large caps), the Russell 2000 (small caps) and the NASDAQ Composite (technology). The motivation for adding the NASDAQ is to attempt to pick up the unique role that technology investing played over the sample period. Although there is overlap in these indexes, with some of the NASDAQ stocks included in the S&P and others in the Russell, this categorization captures the essence of the capitalization effect as well as the broad sector differences in a very macro context. The alternative version of the model adds the correlation between these indexes. Monthly data are included covering the period from January 1991 to March 2004, although they are expressed as year-over-year returns to smooth the results. I define long/short fund returns as a simple average of the EAI, HFR, CSFB and TUNA indexes already discussed.

The results using the traditional factor model confirm past research, indicating that long/short managers on average carried

FIGURE 8:  
IMPLIED LONG/SHORT HEDGE FUND EXPOSURE BY MARKET SEGMENT<sup>3</sup>



Source: Lamm, EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Datastream  
Data represents period 1/1/92–12/31/03

long positions over the January 1991 to March 2004 period in small caps (20.2%) and technology (36.9%) and were short large caps (-17.9%). This gives a net long position in equities that averaged about 40%. The residual 60% can be viewed as carried essentially in cash. The alternative approach, which allows correlation changes to impact returns, indicates that equity exposures were nearly of the same magnitude and that correlation breaks had a statistically significant negative effect on returns.

### Dynamics

Figure 8 (above) presents estimates of net long exposure for long/short managers based on running factor model regressions over 24-month periods beginning in 1992. As one would expect, the results confirm that long/short managers were generally long small caps and the NASDAQ and short the S&P. However, the results also demonstrate that the timing of long/short managers was quite good—long positions in small caps and technology were generally high when these sectors were outperforming and low when they were not. Importantly, long/short managers appear to have been particularly adept at reversing their normal long technology/small cap positioning in 2001 and 2002 when relative performance reversed versus the S&P.

The results also reveal that net long exposure was taken down to low levels in 1995 and in 2002 when overall market performance was weak and that net long exposure was greatest when

upward market movements were strongest. This further indicates that long/short managers were effective at managing the equity/cash allocation split. Furthermore, the movements in net exposures are much more rapid than are typically evidenced in institutional asset allocation changes, which tend to move very slowly. This suggests that committing funds to long/short managers, which is a *de facto* delegation of the asset allocation decision, produces very quick tactical policy shifts. This is something rarely done within the institutional investment process, nor is it typically within the mandate of active equity managers.

### THE LONG/SHORT STRATEGY ALLOCATION

Many investors approach equity and long/short hedge fund allocations somewhat myopically by failing to incorporate the underlying beta exposure to equities carried by long/short managers. This is an important issue particularly for those who have both substantial equity and hedge fund allocations.

#### Asset Allocation Approaches

**Institutions.** Most institutional investors have been extremely reticent to make allocations to hedge funds, even though hedge funds have been the best performing asset class since 1990 (see Lamm [2004a, 2004b, 2004c]). Indeed, according to Greenwich Associates [2004], the average US institutional allocation to hedge funds is only a little over 1% (Table 4, page 11). While this has almost doubled from 2001 and a sizable percentage of institutions indicate they plan to increase their hedge fund allocations in the future, a mere one percent is hardly sufficient to make any real difference in overall portfolio performance.

The absence of meaningful allocations to hedge funds and long/short managers is most apparent among corporate and public pension plans, which still make up the largest proportion of institutional assets. Corporate sponsors are a little more aggressive than public plans, but their hedge fund allocations remain trivial. The paradox in this is that these plans make huge allocations to equities with roughly 60% of assets committed to stocks. This percentage is even higher when one adds in their private equity allocations whose performance generally mirrors public equity returns. Obviously, based on the discussion up to this point, if long/short hedge funds were substituted for active equity managers, overall portfolio returns would have been significantly higher.

In one sense, it can be argued that pension plans are already making significant allocations to equity hedge fund strategies.

This is illustrated in *Table 5 (page 12)*, which shows the average detailed exposure for corporate defined benefit plans. The reason is that allocations to active managers can be viewed as equivalent to investing in a reference benchmark index and to an equity market neutral manager that is short some stocks versus the index and long other stocks. Furthermore, active equity managers often will not be market neutral but will attempt to outperform by taking on beta exposure. Large cap managers, which add small caps or international exposure, often do this. Of course, taking beta exposure is just what long/short managers do. Therefore, active equity management can be dissected into index plus market neutral, where the goal is the index return plus alpha via stock selection, or index plus long/short more aggressive beta approaches, where the objective is index return plus alpha and beta. Institutional equity investment can thus be viewed as consisting of long index positions combined with positions in equity market neutral and long/short hedge funds.

This is clear when one examines the investment styles of “enhanced indexers” and “overlay” managers often employed by institutions. In the former case, the manager carries a large position in the index and makes selected tangential bets by going long or short certain stocks expected to outperform or underperform. In an overlay portfolio, the stock selection is managed actively, but a small amount of leverage is employed that is committed to a hedge fund strategy. Therefore, it would appear that if institutions are already implicitly combining index exposure with hedge fund approaches, they might as well skip the intermediary step and commit to long/short managers directly.

**Trusts and Endowments.** Within the institutional world, endowment funds and foundations are the most aggressive in allocating to hedge funds with 9% positions at the end of 2003, according to Greenwich. The preference for hedge funds would appear to be highly polar, however, because the Ivy league endowment funds, such as Yale’s, have more than 20% committed to hedge funds. Similarly, the University of Virginia and the University of North Carolina purportedly have very large allocations to hedge funds. As a result, there must be quite a few trusts and endowments with near zero allocations.

Within the endowment and foundation category, Greenwich reports that hedge fund allocations are split 37% to event driven strategies, 30% to equity hedging strategies, 12% to relative value strategies, 10% to fund-of-funds and 8% to global macro and CTAs. Some endowments, which previously held large allocations to equities, have reallocated much of their equity expo-

TABLE 4:  
US INSTITUTIONAL ASSET ALLOCATIONS: 2003

Asset	Corporate Defined Benefit Plans	Public Plans	Defined Contribution Plans	Endowments/ Foundations
US Stocks	45.5%	44.9%	60.6%	36.0%
International Stocks	15.2%	12.6%	3.3%	12.5%
Total Equity	60.7%	57.5%	63.9%	48.5%
Fixed Income & GICs	29.3%	31.8%	30.4%	23.8%
Real Estate	3.7%	4.2%		4.4%
Private Equity	3.6%	3.1%		8.0%
Hedge Funds	1.3%	0.2%		9.4%
Other	1.4%	3.2%	5.7%	5.9%
	100.0%	100.0%	100.0%	100.0%

Source: Greenwich Associates—2004 survey. Respondents reported total \$5.2 trillion in assets under management

sure to long/short managers in lieu of active equity management. This is normally done on a dollar-for-dollar basis. Furthermore, some endowments and foundations have excluded long/short managers from their hedge fund allocation and include only relative value, event driven and macro strategies.<sup>9</sup>

**Private Investors.** The vast majority of private investors are relatively unsophisticated and use a bottom up building process to construct investment portfolios. Asset allocation is usually an afterthought and rarely comes first. Nonetheless, high-net-worth (HNW) investors historically have been aggressive allocators to hedge funds accounting for 85% of hedge fund assets by some measures. Indeed, it is not unusual to find HNW investors with 50% or more of their portfolios in hedge funds. Needless to say, most HNW investors do not look through to net beta exposure and are more focused on returns at the micro level. In this context, large allocations are often made to long/short managers with little consideration of the fact that this entails substantial equity market risk.

Similarly, for the many private investors who allocate to funds-of-funds (FOFs), there may be little realization that a significant portion of the portfolio is invested with long/short managers and that this means their FOF performance will be correlated with equity market returns. Even the more sophisticated family offices often fail to delineate between the underlying exposures

TABLE 5:  
AVERAGE ASSET WEIGHTS FOR US CORPORATE DEFINED BENEFIT PLANS: 2003<sup>7</sup>

Asset Category	Asset	Weight	Category Total	Other Categorizations	Weight
Domestic Stocks	Core Equities	5.1%	46.9%	Active	75.0%
	Large Cap Value	5.9%		Passive	25.0%
	Large Cap Growth	5.8%			100.0%
	Mid Cap Value	0.9%			
	Mid Cap Growth	0.9%		Equities	58.0%
	Small Cap Value	2.2%		Fixed Income and GICs	30.9%
	Small Cap Growth	1.9%		Real Estate	3.6%
	Index	18.1%		Private Assets	7.5%
	Enhanced Index	4.6%			100.0%
	Other Equity	1.5%			
International Stocks	EAFE Core	2.7%	11.1%	Active Equities	33.0%
	EAFE Growth	1.2%		Passive Equities	25.0%
	EAFE Value	1.4%			58.0%
	Global ex US	1.7%			
	Global Equity	0.2%		US Equities	46.9%
	Emerging Markets	1.1%		International Equities	10.0%
	International Small Cap	0.3%		Emerging Market Stocks	1.1%
	Enhanced Index	0.5%		US Fixed Income	27.8%
	Index	1.8%		International Fixed Income	1.4%
	Other	0.2%		High Yield	1.6%
Bonds	Domestic Core	18.0%	26.8%	Real Estate	3.6%
	Domestic Core Plus	5.0%		Private Equity	3.0%
	Global Bonds	1.1%		Hedge Funds	1.3%
	International Bonds	0.4%		Other	3.2%
	High Yield	1.6%			100.0%
	Private Placements	0.4%			
	Other	0.4%			
Other Assets	GICs	4.1%	15.2%		
	Real Estate	3.6%			
	Private Equity	3.0%			
	Hedge Funds	1.3%			
	Other	3.2%			
		100.0%	100.0%		

Source: Greenwich Associates—2004 survey

of different hedge fund strategies. Perhaps this will change with time but there is a long way to go. That said, private investors are more open to new ideas and can act much more quickly than institutions. Most understand the basic concepts of portfolio diversification and one would expect HNW investors in particular to be open to the idea of substituting long/short funds for active equity managers.

**Conceptual Approach to the Long/Short Allocation Problem**

Having established that long/short managers carry net long exposure to stocks, it would seem imperative to take this into account in asset allocation. To do this, long/short managers need to be treated as a distinct class separate from other hedge fund strategies. Furthermore, as already discussed, long/short managers possess different higher order moment properties from stocks—they exhibit more positive asymmetry. In this context, traditional Markowitz [1959] mean-variance (MV) portfolio optimization is inadequate since it presumes that asset returns are symmetrical.

Recently, Lamm [2003], Signer and Favre [2002] and Favre and Galeano [2002] have proposed alternative asset allocation

approaches that explicitly allow for asymmetric return distributions in the construction of optimal portfolios. These approaches rely on the Cornish-Fisher approximation to incorporate asymmetrical returns. Because there is no easy analytical solution for portfolio optimization when returns are not normal, it is expedient to use numerical methods and the value-at-risk (VAR) methodology. In the MV sense, this means solving:

$$\min VAR(w) = V(r-\alpha) \text{ subject to } w > 0, w^T i = 1, r = w^T r \quad (1)$$

over the known return space where V is the value of the portfolio at any time with return r, z is the normal confidence measure,  $\sigma$  is the standard deviation of the portfolio return, w is the vector of portfolio weights and r is the vector of returns. The constraints require the weights sum to unity and are positive.

To account for asymmetries, the Cornish-Fisher (CF) expansion simply replaces the normal z value with an alternative delta-gamma approximation and the problem is to solve:

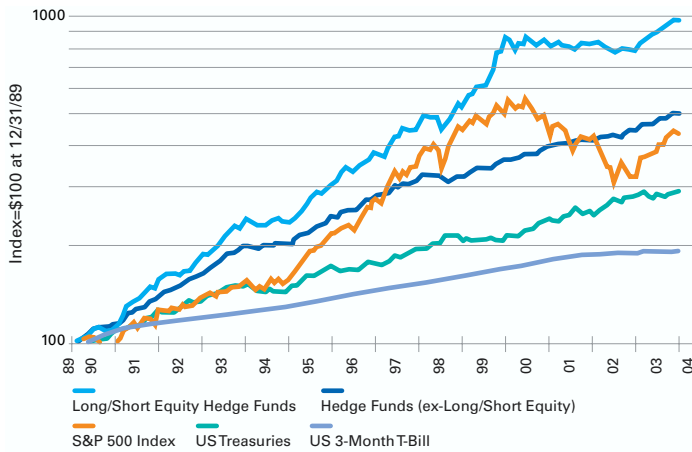
$$\min MVAR(w) = V(r-\hat{z}\sigma) \text{ subject to } w > 0, w^T i = 1, r = w^T r, \hat{z} = z + (z^2-1)s/6 + (z^3-3z)k/24 - (2z^3-5z)s^2/36 \quad (2)$$

TABLE 6: ASSET DISTRIBUTION STATISTICS: 1990–2003<sup>3, 11</sup>

Measure	Long/Short Equity Hedge Funds	S&P 500 Index	US Treasuries	US 3-Month T-Bill	Hedge Funds (ex. Long/Short Equity)
Compound Annual Return**	17.3%	10.9%	7.7%	4.7%	12.0%
Annualized Standard Deviation**	9.3%	15.0%	4.6%	0.5%	3.4%
Skew	0.23	-0.46*	-0.42*	-0.15	0.15
Kurtosis	2.50*	0.50	0.61	-0.30	1.32*
Maximum Monthly Return	12.2%	11.4%	4.1%	0.7%	4.4%
Minimum Monthly Return	-9.1%	-14.5%	-4.2%	0.1%	-2.8%
Sharpe Ratio	1.35	0.41	0.66	—	2.19
Correlation					
Long/Short Equity Hedge Funds	1.00	0.66	0.03	0.07	0.53
S&P 500 Index		1.00	0.05	0.05	0.31
US Treasuries			1.00	0.17	0.25
US 3-Month T-Bill				1.00	0.11

Source: Lamm, EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Hennessee, Van Hedge, Altvest, Barclays, Merrill Lynch, Datastream  
 Data represents period 1/1/90–12/31/03  
 \*Denotes statistical significance with 95% confidence based on .189 and .378 skew and kurtosis standard deviations, respectively  
 \*\*Based on monthly data

FIGURE 9:  
CUMULATIVE ASSET RETURNS: DECEMBER 1989–MARCH 2004<sup>3,11</sup>



Source: Lamm, EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Hennessie, Van Hedge, Altvest, Barclays, Merrill Lynch, Datastream  
Data represents period 12/31/89–3/31/04

where MVAR is “modified” VAR,  $s$  is skew and  $z$  represents kurtosis. This approach incorporates asymmetry explicitly into the optimization process by penalizing portfolios whose return distributions exhibit negative skew and excess kurtosis while rewarding those with positive skew.

One drawback of a numerical approach such as MVAR is that while it is easy to apply retrospectively over historical data, it is more difficult to use prospectively since multiple scenarios must be simulated, requiring the specification of the distribution of the (nonnormal) return-generating processes. Of course, this does not matter for the task at hand, which is simply to estimate the benefit of long/short managers if they were incorporated into portfolios looking backward in time.<sup>10</sup>

### The Optimum Allocation to Long/Short Hedge Funds

I take a straightforward approach to the retrospective allocation problem, utilizing the CF algorithm to build optimal MVAR portfolios consisting of stocks, long/short managers, bonds, cash and hedge funds (excluding long/short managers). I acknowledge that historical long/short and hedge fund performance data exhibits survivor bias and arbitrarily reduce historical returns by an aggressive estimate of the amount of survivor bias present based on past studies. This is pragmatic and asks simply what adjustment would satisfy a reasonable person, relying on prior research to establish a standard.

As for the relevant measures, I include US stocks (the S&P 500), US bonds (the Merrill Lynch Treasury Master Index) and cash (the Merrill Lynch 3-Month Index). I define long/short fund returns as a simple average of the EAI, HFR, CSFB and TUNA series already discussed. The measure of hedge fund performance is a simple average of strategy returns including convertible arbitrage, fixed income arbitrage, equity market neutral, merger arbitrage, distressed debt, global macro and CTAs/managed futures. The construction of this measure is described in Lamm [2004d].

Table 6 (page 13) presents summary return distribution statistics for each asset, which are the raw ingredients for the analysis. Figure 9 (left) plots returns for each asset over the sample period. Interestingly, the information indicates that although long/short managers possess statistically significant positive kurtosis, stocks and bonds show statistically negative skew and kurtosis. This suggests that long/short managers provide a modest offset to downside risk inherent in traditional assets. The data also indicate that other hedge fund strategies appear to play the same role. To adjust for survivor bias, I subtract 4% annually from the reported long/short return series and 3.5% annually from the hedge fund return series excluding long/short managers. These are extremely conservative adjustments well beyond levels reported in empirical studies.

Figure 10 (page 15) presents the results of the numerical optimization analysis based on the traditional mean-variance approach (VAR), while Figure 11 (page 15) presents the optimization results using the CF expansion (MVAR). The optimum allocations differ substantially at higher risk levels although the basic message from the two methodologies is the same—long/short hedge funds displace stocks and receive the bulk of allocations for the riskier portfolios. For example, for \$2 VAR per \$100 invested at 95% confidence, the optimal portfolio consists of 28% long/short hedge funds, 0% stocks, 37% bonds, 0% cash and 35% in other hedge fund strategies. In contrast, the same risk MVAR optimal portfolio includes 31% long/short hedge funds, 0% stocks, 34% bonds, 0% cash and 35% hedge funds.

For a somewhat riskier portfolio with \$5 VAR and MVAR, the allocations to long/short hedge funds are 84% and 82%, respectively, with 9% and 0% to stocks. That is, MVAR allocates even less to stocks than VAR. This is a consequence of negative asymmetry in stock returns. The obvious conclusion is that when higher order moments are taken into account, stock allocations induce more risk than commonly perceived with allocations to long/short hedge funds producing more positive skew and kurtosis.

**Caveats**

Using either the traditional VAR or MVAR approach, the implications are that investors could have significantly increased their returns over the 1990 to 2003 period by allocating more to long/short managers and other hedge fund strategies while simultaneously reducing risk. The greatest payoff is in the mid-range risk levels where annual portfolio returns are approximately 2% higher when allocations to hedge funds are permitted (Table 7, page 16). Importantly, these higher returns are accomplished with somewhat lower risk, as measured either by VAR or standard deviation, and significantly more positive asymmetry. Taking higher order moments into account illustrates yet another advantage of admitting hedge funds, particularly long/short managers, to the asset allocation.

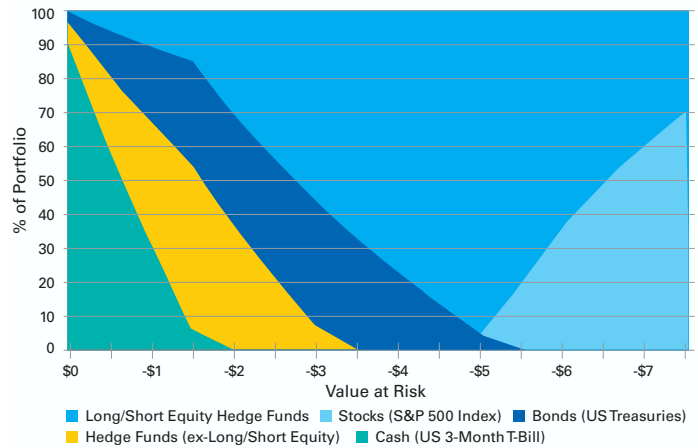
Of course, these are retrospective conclusions and the analysis does not allow one to say whether long/short managers and other hedge fund strategies will provide the same benefits in the future. However, even if the performance of hedge fund managers were to weaken, it would take a lot of deterioration to reach the point where substantial allocations were not indicated. In particular, as previously discussed, the behavior of long/short managers exhibits considerable variation over time. Going forward, it is possible that as assets continue to flow into the strategy, new managers do not exhibit the exceptional capability of fund managers in the past.

**SECTOR STRATEGIES**

**Allocation Schemes.** The large number of hedge funds specializing in various long/short strategies suggests the possibility of employing a more detailed asset allocation and manager selection approach than is typically used. For example, a traditional asset allocation that divides geographic equity exposure among the US, Japan, Europe and emerging markets could be expanded to incorporate long/short managers for each of these categories. This could be a partial allotment split among long/short funds and active managers, or the entire allocation could be to long/short managers specializing in these regions.

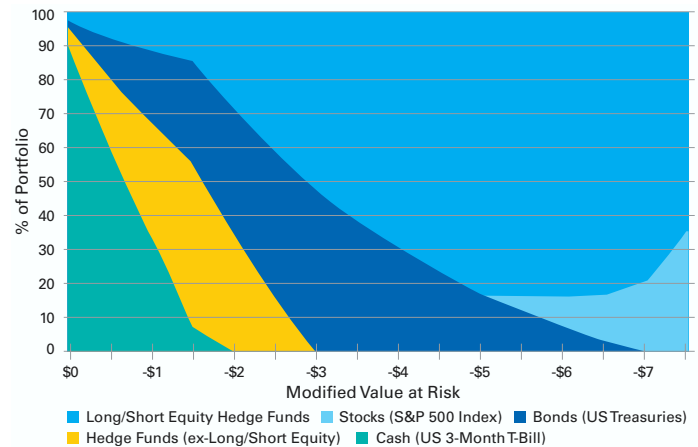
Similarly, for investors that subdivide the US allocation into growth and value styles, long/short managers specializing in these styles could be used in part or for all. Alternatively, the investor may want to make sector allocations within the overall US exposure. Specialized sector long/short funds could be used in addition to or in lieu of active managers. That said, some equity sectors are not well represented by long/short funds and it

FIGURE 10:  
OPTIMUM VAR ASSET ALLOCATION: 1990–2003<sup>3,11</sup>



Source: Lamm. Results of an optimization analysis using data from EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Hennessee, Van Hedge, Altvest, Barclays, Merrill Lynch, Datastream Data represents period 1/1/90–12/31/03

FIGURE 11:  
OPTIMUM ASSET ALLOCATION BASED ON MODIFIED VAR: 1990–2003<sup>3,11</sup>



Source: Lamm. Results of an optimization analysis using data from EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Hennessee, Van Hedge, Altvest, Barclays, Merrill Lynch, Datastream Data represents period 1/1/90–12/31/03

TABLE 7:  
OPTIMUM ASSET ALLOCATIONS<sup>3,11</sup>

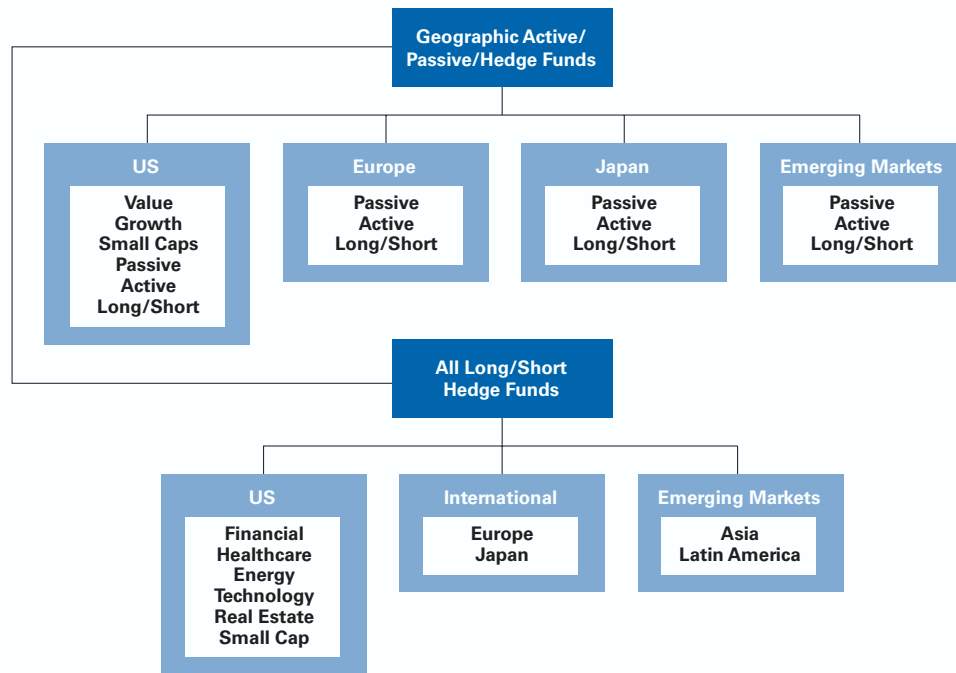
VAR/ MVAR	Portfolio				Allocation				
	Return	Standard Deviation	Skew	Kurtosis	Long/ Short Equity Hedge Funds	Stocks (S&P 500 Index)	Bonds (US Treasury)	Cash (US 3-Month T-Bill)	Hedge Funds (ex-Long/ Short Equity)
Classical Optimization—No Hedge Funds									
\$0.0	4.9%	0.6%	-0.10	-0.24	--	0.9%	3.7%	95.4%	--
-\$1.0	6.5%	2.3%	-0.06	0.68	--	8.0%	39.3%	52.7%	--
-\$2.0	7.9%	3.9%	-0.11	0.68	--	13.9%	70.2%	15.9%	--
-\$3.0	9.1%	5.5%	-0.03	0.27	--	28.8%	71.2%	--	--
-\$4.0	9.7%	7.1%	-0.14	0.07	--	43.0%	57.0%	--	--
-\$5.0	10.2%	8.6%	-0.25	0.12	--	55.1%	44.9%	--	--
-\$6.0	10.7%	10.2%	-0.33	0.22	--	66.4%	33.6%	--	--
-\$7.0	11.2%	11.7%	-0.38	0.32	--	77.3%	22.7%	--	--
Mean-Variance									
\$0.0	5.1%	0.6%	-0.08	-0.38	1.1%	--	2.0%	91.0%	6.0%
-\$1.0	7.6%	2.4%	0.06	0.41	11.1%	--	22.1%	31.3%	35.5%
-\$2.0	9.6%	4.1%	0.07	0.67	30.6%	--	33.8%	--	35.6%
-\$3.0	10.9%	5.8%	0.19	1.38	56.9%	--	36.2%	--	6.9%
-\$4.0	12.0%	7.4%	0.24	2.03	77.8%	--	22.2%	--	--
-\$5.0	13.0%	9.0%	0.23	2.44	95.9%	--	4.1%	--	--
-\$6.0	12.9%	10.4%	-0.49	1.04	63.4%	36.6%	--	--	--
-\$7.0	12.6%	11.9%	-0.58	0.73	39.4%	60.6%	--	--	--
Cornish-Fisher									
\$0.0	5.2%	0.7%	0.01	-0.49	2.5%	--	1.6%	90.5%	5.4%
-\$1.0	7.5%	2.3%	0.06	0.41	11.6%	--	21.0%	34.3%	33.1%
-\$2.0	9.5%	4.0%	0.04	0.50	27.9%	--	37.6%	--	34.6%
-\$3.0	10.7%	5.4%	0.16	1.06	52.9%	--	47.1%	--	--
-\$4.0	11.6%	6.7%	0.23	1.75	69.4%	--	30.6%	--	--
-\$5.0	12.3%	7.8%	0.24	2.17	83.1%	--	16.9%	--	--
-\$6.0	12.8%	8.8%	0.00	1.83	84.1%	8.5%	7.4%	--	--
-\$7.0	13.0%	9.8%	-0.28	1.44	78.8%	21.2%	--	--	--

Source: Lamm. Results of an optimization analysis using data from EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Hennessee, Van Hedge, Altvest, Barclays, Merrill Lynch, Datastream

Data represents period 1/1/90–12/31/03

VAR is per \$100 invested with 95% confidence

FIGURE 12:  
ALTERNATIVE EQUITY ALLOCATION SCHEMES WITH LONG/SHORT HEDGE FUNDS



Source: Lamm

would be difficult to construct a complete long/short portfolio with exposure to all industry sectors.

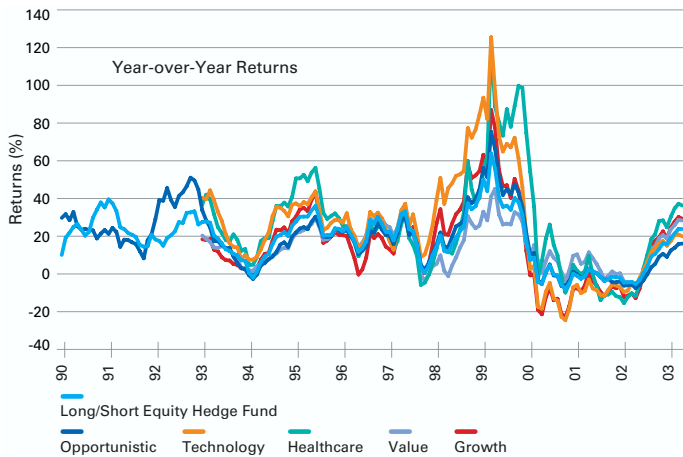
In addition, one may not want to go too far in subdividing allocations among long/short managers. The reason is that the dispersion of returns is high and beta exposure to underlying markets can vary significantly over time. For example, the effect of differential top and bottom quartile performance due to fluctuating manager alpha contribution and time-varying net long exposure could easily overwhelm any value added from the investor picking the correct sector.

**Long/Short Subclasses.** While category definitions are too diffused to construct extremely reliable performance measures, it is nonetheless informative to examine available data. In this context, I simply average together obtainable indexes to construct various sector aggregates. I come up with five subsector categories as well as a composite for emerging markets. The sectors include: (1) “opportunistic” managers, based on reported returns from EAI, Hennessee, VanHedge, and TUNA; (2) “technology” long/short funds, from Hennessee and Altvest; (3) “healthcare”

managers, from Hennessee and Altvest; (4) “value” style funds, from Hennessee and VanHedge; and (5) “growth” style managers, from Hennessee and VanHedge. The composite for emerging markets is based on reported returns from HFR, CSFB, Hennessee, VanHedge and Altvest.

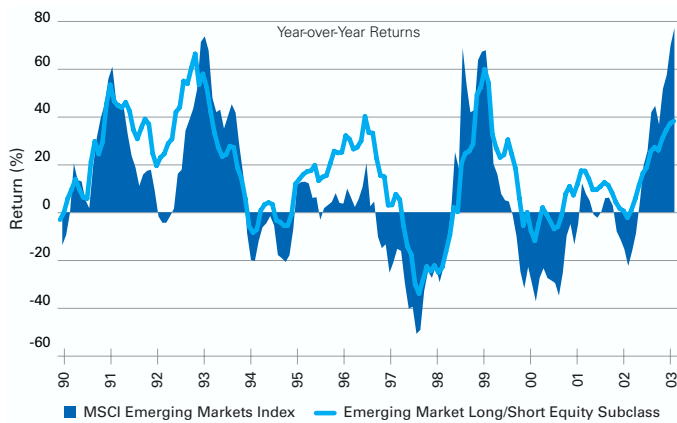
Figure 13 (page 18) compares the sector indexes to the aggregate long/short index returns over the period for which data are available, while Table 8 (page 19) shows related performance statistics. Indications are that most of the sector returns move more or less in parallel with the long/short composites. Importantly, the opportunistic sector is statistically indistinguishable from the overall long/short aggregate on the basis of return and standard deviation. One might imagine therefore that perhaps all long/short managers are opportunistic. However, the opportunistic index has positive asymmetry as evidenced by statistically significant skew and kurtosis. This implies that opportunistic managers are better at capturing upside price movements and avoiding drawdowns, which may be a consequence of more rapid-fire trading.

FIGURE 13:  
LONG/SHORT EQUITY SUBCLASS RETURNS VS.  
BROAD LONG/SHORT EQUITY MANAGER RETURNS<sup>11,12</sup>



Source: Lamm, EACM, Hedge Fund Research, Inc., CSFB/Tremont, TUNA, Hennessee, Van Hedge, Altvest  
Data represents period 1/1/90–12/31/03

FIGURE 14:  
EMERGING MARKET HEDGE FUNDS VS. LONG-ONLY MARKET RETURNS<sup>3,12</sup>



Source: Lamm, HFRI, CSFB/Tremont, Hennessee, Van Hedge, Altvest, Datastream  
Data represents period 1/1/90–12/31/03

**Sector Specialists.** The overall “sector” index, which is a composite from HFR, represents a conglomeration of long/short managers specializing in technology, healthcare, telecommunications, financials, energy and other industry groups. It shows somewhat higher returns and volatility than the overall long/short index but a similar pattern of asymmetry with no statistically significant skew and statistically significant fat tails.

Of significant interest, the stand-alone technology and healthcare indexes exhibit similar returns to the long/short index but somewhat higher volatility. However, both technology and healthcare managers exhibit statistically significant positive asymmetry. This is very important for investors. Nonetheless, it raises the question of consistency since the overall sector index shows no such pattern. The reason may be that some sectors offer more opportunities than others. Indeed, Ineichen [2003] found that healthcare sector manager returns show positive asymmetry while financial sector managers have a record of negative asymmetry! It is difficult to believe that this is truly the case and these findings may simply be a consequence of small samples. Further research is needed before reaching any firm conclusions.

Within the overall sector category, the major underperformers as far as returns go are the style managers. Both growth and value managers generate returns that are just a little above those of the S&P 500 and significantly lower than returns for the long/short index. Although the Sharpe ratios for growth and value managers are a little better than the S&P, this could change if survivor bias were taken into account. Therefore, there is no strong evidence to support the use of style long/short funds as substitutes for active equity managers. This is not the case for any of the other sector indexes, which exhibit annual returns of 5% and more above the S&P.

**Emerging Market Managers.** As far as geographic equity markets, there are a sufficient number of US, Europe and Japan long/short fund managers to allow a traditional allocation to be filled completely by substituting hedge funds for active equity managers. Indeed, there are hundreds of US and Europe long/short managers from which to draw. Unfortunately, the data providers do not provide robust indexes for these categories to allow a good representation.

Emerging markets are different with five primary data providers having maintained category statistics for many years. The last columns of *Table 8 (page 19)* and *Figure 14 (left)* show the performance of long/short emerging market hedge fund managers compared to the MSCI Emerging Markets Index (MXEF).

TABLE 8:  
PERFORMANCE OF SELECTED LONG/SHORT EQUITY SUBCLASSES<sup>3,11,12</sup>

	Long/ Short Equity Hedge Funds	Oppor- tunistic	Sector	Technology	Health- care	Value	Growth	S&P 500 Index	Emerging Markets	MSCI Emerging Market Index
Return	17.3%	18.1%	20.2%	16.6%	17.7%	11.6%	11.2%	10.9%	13.9%	5.3%
Standard Deviation	9.3%	9.5%	13.9%	15.0%	17.6%	9.1%	13.9%	15.0%	13.9%	23.5%
Skew	0.22	0.80*	0.03	0.67*	1.66*	-0.67*	0.37	-0.47*	-0.71*	-0.73*
Kurtosis	2.50*	3.28*	2.94*	2.27*	10.56*	2.46*	2.03*	0.50	3.45*	1.78*
Sharpe	1.35	1.40	1.11	0.80	0.74	0.77	0.47	0.41	0.66	0.03
Members**	EFCT	EHVT	F	HA	HA	HV	HV		FCHVA	
Sample	1990-2003	1990-2003	1990-2003	1993-2003	1993/2003	1993-2003	1993-2003	1993-2003	1993-2003	1993-2003
Correlations										
Long/Short Equity Hedge Funds	1.00	0.83	0.86	0.92	0.80	0.87	0.96	0.66	0.71	0.63
Opportunistic		1.00	0.79	0.89	0.79	0.83	0.92	0.44	0.50	0.46
Sector			1.00	0.92	0.85	0.85	0.94	0.58	0.60	0.57
Technology				1.00	0.79	0.76	0.94	0.60	0.59	0.57
Healthcare					1.00	0.66	0.81	0.40	0.51	0.47
Value						1.00	0.85	0.74	0.73	0.71
Growth							1.00	0.67	0.64	0.61
S&P 500 Index								1.00	0.57	0.63
Emerging Markets									1.00	0.86

Source: Lamm, EACM, HFRI, CSFB/Tremont, TUNA, Hennessee, Van Hedge, Altvest, Datastream

\*Denotes statistical significance with 95% confidence based on .189 and .378 skew and kurtosis standard deviations, respectively

\*\*The acronyms E, F, C, T, H, V, and A represent EACM, HFRI, CSFB/Tremont, TUNA, Hennessee, Van Hedge and Altvest, respectively

Indications are that emerging market managers exhibit significantly higher returns and lower risk than a passive investment in the index. Nonetheless, emerging market long/short performance is highly correlated with the MXEF. This means that the performance characteristics of emerging markets, such as negative asymmetry, are largely passed through directly to investors. Indeed, emerging market long/short funds showed negative returns in parallel with the MXEF in 1994 and more importantly, during the 1998 sell-off. This may be a consequence of the fact that it is more difficult to short emerging market stocks. Nonetheless, despite fairly high correlation with the MXEF, the reported 8% outperformance per annum of emerging market

long/short funds appears quite attractive. Indeed, this, combined with the fact that manager return dispersion is the highest for any hedge fund strategy, suggests that emerging market long/short managers are prime candidates as substitutes for active long-only emerging market managers.

## CONCLUSION

The key conclusions of this report are that, first, long/short equity hedge funds have historically outperformed naked long equity exposure with lower risk. This is a consequence of a demonstrated capability by long/short managers to generate alpha via stock selection, timely switching market exposures from small

caps to large caps and back and rotating into and out of cash when beneficial. In addition, long/short managers possess beneficial asymmetry characteristics compared to passive equity indexation.

Second, the portfolio optimization indicates that heavy doses of long/short managers in lieu of plain active or passive equity market exposure is appropriate. Indeed, long/short managers displace virtually any allocation to stocks whatsoever. This conclusion holds even when long/short manager returns are liberally adjusted downward to reflect survivor bias. While there is no guarantee that this attractive performance will persist in the future, it would take a marked deterioration in manager capabilities to suggest otherwise.

Third, there is no one preeminent asset allocation scheme for delineating the role of long/short hedge funds in portfolios. It depends on investors' current asset management structure and operational preferences. One can allocate to an aggregate long/short category, populating the space with generalist managers that invest broadly in developed markets. Alternatively, one can distinguish between geographic markets and invest in styles or sector long/short funds for the US market. That said, based on Sharpe ratios and correlations, it appears that allocations to emerging market long/short funds offer the most potential for performance enhancement.

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DB Absolute Return Strategies (DB ARS), the global hedge fund management business of Deutsche Bank, manages \$8.9 billion in single-manager and fund of hedge funds assets (as of April 1, 2004). It distributes its products globally to institutions and high-net-worth individuals. DB ARS has more than 130 employees in its offices in Summit, New York, London, Frankfurt, Sydney and Tokyo.

1. The HFRI individual strategy indexes are equally-weighted, unmanaged indexes comprised of domestic and offshore hedge funds in the HFR database.
2. As Ineichen [2002] notes, there is confusion between market neutral equity and long/short managers. Technically, market neutral can be interpreted in several ways. For example, the manager may be beta neutral, sector neutral or market cap neutral. However, the common denominator is some form of dollar neutrality. Some managers describe themselves as market neutral but in reality do make small bets on market direction.
3. The EACM Equity Hedge Index is an equally-weighted composite of unaudited performance information from the private investment funds chosen by EACM to represent the Equity Hedge strategy in the EACM 100 Index. The HFRI Equity Hedge Index is an equally-weighted, unmanaged index comprised of domestic and offshore hedge funds in the HFR database in the equity hedge category. The CSFB/Tremont Long/Short Index is an unmanaged index constructed using the TASS database of hedge funds and includes both open and closed funds located in the US and non-US. The TUNA Long/Short Equity Index is comprised of equity hedge funds who report their information to HedgeFund.net.  
The S&P 500 Index (Standard and Poor's Composite Stock Index) is an unmanaged index that tracks the performance of 500 large US companies. The Russell 2000 Index is an unmanaged index which consists of 2000 US-domiciled stocks with the largest market capitalizations (adjusted for cross holdings). The Morgan Stanley Capital International (MSCI) Emerging Market Index is an unmanaged, free float-adjusted market capitalization that is designed to measure equity market performance of 26 global emerging markets. The NASDAQ Composite is an unmanaged market capitalization-weighted index of all the common stocks electronically traded in the NASDAQ market.
4. The CSFB series also is not strictly comparable to the others since it begins in 1994 and is capitalization-weighted. The other series originate in 1990 and are equally-weighted
5. That is, standard deviation is too low and there is more negative symmetry than implied in reported returns. This indicates that downside risk is more significant than represented in reported statistics and is consistent with the idea that nonsurvivors often experience dramatic drawdowns that lead to their demise.
6. For example, Lipper reports that the differential between the returns of the top and bottom quartile performers for core large cap mutual funds was 8.7%, 7.6%, 6.4% and 5.3%.

respectively, over the last 3, 5, 7 and 10 years ending December 2003.

7. The asset categorizations are based on Greenwich Associate's broad asset categories and their sub-categories.
8. Of course, this presumes that institutions know the net beta exposure of their long/short managers. This may be difficult in periods of high market volatility.
9. At least several also exclude any allocation to rotational and multi-strategy hedge funds to avoid excessive beta exposure to equity markets.
10. A particular problem with including long/short managers (and hedge fund strategies in general) is that they may introduce redundancy in portfolio optimization since they may contain beta exposure to large caps, small caps or other primary asset markets.
11. Long/Short Equity Hedge Funds returns and statistics are calculated using a simple average of the EACM Equity Hedge, the HFRI Equity Hedge, the CSFB/Tremont Long/Short and the TUNA Long/Short Equity indexes described above. Hedge Fund (ex-Long/Short) returns and statistics are calculated based on an index of unmanaged indexes approach using strategy data provided by EACM, HFRI, CSFB/Tremont, Hennessee, Van Hedge, Altvest, TUNA and Barclays. The Hennessee Indexes are equally-weighted averages of funds in the Hennessee Hedge Fund Index. The Van Global Hedge Fund indexes are constructed using the VAN database of 5,800 hedge funds and are simple, non-dollar weighted averages. The Altvest Hedge Fund indexes are made up of 250 hedge funds in various investment strategies. The Carr Barclays Futures Index is an equally-weighted unmanaged index that calculates the daily return rate for a pool of CTAs selected from larger managers that are open to new investment.  
US Treasuries is represented by the Merrill Lynch Yield to Maturity AAA US Treasury/Agency Master Index, an unmanaged index of US government issues. US 3 Month T-Bill represents the Merrill Lynch Yield to Maturity 3-Month US Treasury Bill Index.
12. Performance and metrics for the long/short equity subclasses (including sector and emerging markets) are calculated based on an index of unmanaged indexes approach using data from EACM, HFRI, CSFB/Tremont, Hennessee, Van Hedge, Altvest and TUNA. Please see footnotes 3 and 11 for definitions of these providers.

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