OM

Rethinking Performance in the Hedge Fund Industry

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Rethinking Performance in the Hedge Fund Industry

The purpose of this briefing is to provide an overview of the current state of hedge fund classification; to offer an analysis of the risk and return characteristics of the major types of hedge funds; to introduce cluster analysis and to describe the hedge fund universe in these terms.

Cluster Analysis turns the classification scheme on its head. Instead of grouping funds by manager described styles we use observed return behaviour.

- Stable clusters perform better. Some investors may wish to invest only in consistent funds that represent a larger class of funds.
- Outliers are loners that can do well or very poorly. Other investors will want unique funds, Amaranth is an example of one that went wrong.
- Drifters are lack-lustre. Funds that drift from one cluster to another tend to underperform.

Three hedge fund myths exploded:

- *Hedge Fund Myth #1: All hedge fund returns exhibit high volatility.* The analysis reported shows that most categories of style and strategy, on average, are less volatile than the equity markets. Caveat: obviously many individual funds do have high volatility and furthermore volatility is not the only measure of risk.
- *Hedge Fund Myth #2: All hedge funds generate pure Alpha.* Despite the ubiquity of the "absolute return" epithet in the industry, hedge fund returns are increasingly systematic or beta driven.
- *Hedge Fund Myth #3: All hedge funds contribute little marginal risk to a core equity portfolio.* As hedge fund and equity returns converge these vehicles are less effective diversification media.

Performance measurement will be a central issue. New products such as replicating portfolios and investable indices will create an industry in performance measurement.

Hedge Funds continue to perform well but there are clouds on the horizon. We analyse the risk and return from various hedge fund strategies. Directional funds have performed the best in the long-term, with CTA/managed funds being the top performing strategy in both return and alpha for the study period; albeit with the highest volatility. A worrying feature is the widespread convergence in returns reflected in the increase in correlation between hedge fund and equity market returns. This could put pressure on the current fee structure in the industry.

Hedge fund techniques are here permanently. The once alternative market is becoming increasingly mainstream with most new inflows being institutional.

David Aldrich, Managing Director
The Bank of New York Mellon

THE BANK OF NEW YORK MELLON

Introduction

Hedge fund techniques are here permanently. Currently growing at approximately 20% per annum, the total value of the industry is now estimated at $2.48 trillion.[1] The once 'alternative market' is becoming increasingly mainstream with most new inflows being institutional. The increasing popularity of hedge funds as an investment for institutions has given rise to much discussion on performance measurement in the sector. The ongoing innovation in the industry such as the phenomenon of replication products and tracker indices will fuel further the demand for high-quality performance data on the sector as a whole and by sub-category. Indexing is unavoidable.

Most of the available hedge fund indices rely on some form of sampling in their construction. It is simply impractical to include all funds in an index. However, the major and unique problem to hedge fund index construction resides in the underlying classification systems which to date have been somewhat arbitrary and rely almost exclusively on the way in which funds describe themselves.

Hedge funds are alternative precisely because they have considerable latitude in the asset classes and sectors they invest in and indeed the strategies they apply to trading. Grouping hedge funds into a coherent classification scheme is fraught with difficulty since every fund is defined to be unique. The development of a standard taxonomy for hedge funds to support a series of indices is highly desirable. The work done by the various providers of hedge fund indices is to be welcomed and there is an emerging nomenclature. However, it seems that a standardised classification scheme has yet to be developed.

There are challenges in index construction; the need for completeness and representational faithfulness is potentially difficult when dealing with hedge funds since, the very hallmark of the industry is idiosyncrasy. Most hedge funds attempt to maximise alpha, or absolute return, which is defined as being unrelated to the average or market return. The problem of classification is exacerbated by the fact that hedge funds may change their strategies. This phenomenon of 'style drift' is the cause of much difficulty in benchmarking.

Oxford Metrica uses cluster analysis, a technique well-known in statistical analysis, to deal with these problems. The technique avoids many of the extant classification problems. Cluster analysis reverses the usual process of classifying funds according to the funds' stated strategy, by grouping funds according to the observed behaviour in their returns. The notions of similarity and genealogy used in Darwinian biology, which underlie the Linnaean classification of species, are applied. The concept of proximity is central. That is, we seek to group funds that exhibit similar patterns of return behaviour continuously, rather than because they carry similar rubrics.

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[1] *Source: HedgeFund Inteligence, July 2007.*
Assets under management in Global Hedge Funds.

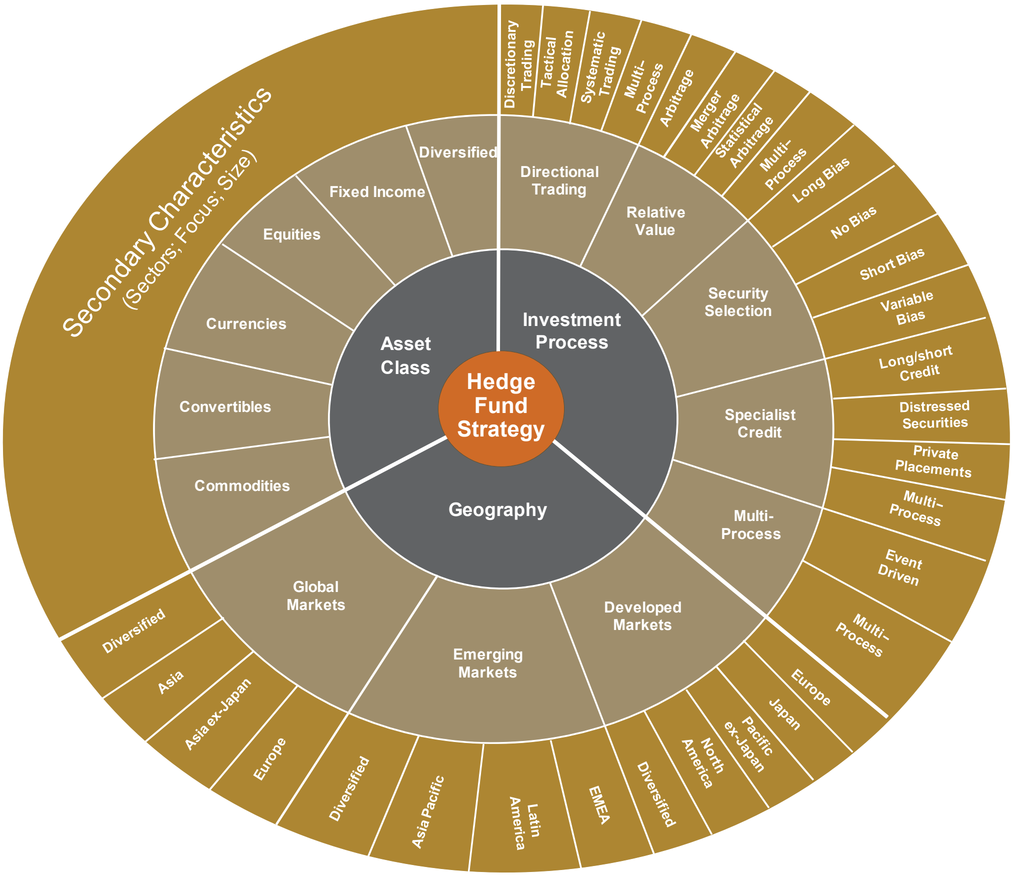
An Emerging Taxonomy for Hedge Funds

The purpose of most classification schemes to date has been to identify the observable attributes of funds that are believed to determine return patterns. Then, using these proxies for returns, indices are created which group funds with similar attributes. The indices created are then put to various uses including benchmarking, portfolio construction and, where the funds are investable, direct trading. The most common proxy is a fund's self-described strategy.

Figure 1 provides an overview of how hedge funds currently are classified for index construction. The format is loosely based on the scheme developed by Morgan Stanley Capital International in the development of the MSCI family of hedge fund indices.

Conventional classification schemes for hedge funds create more categories than funds in existence.

Figure 1: Overview of Prevailing Classification Schemes for Hedge Funds

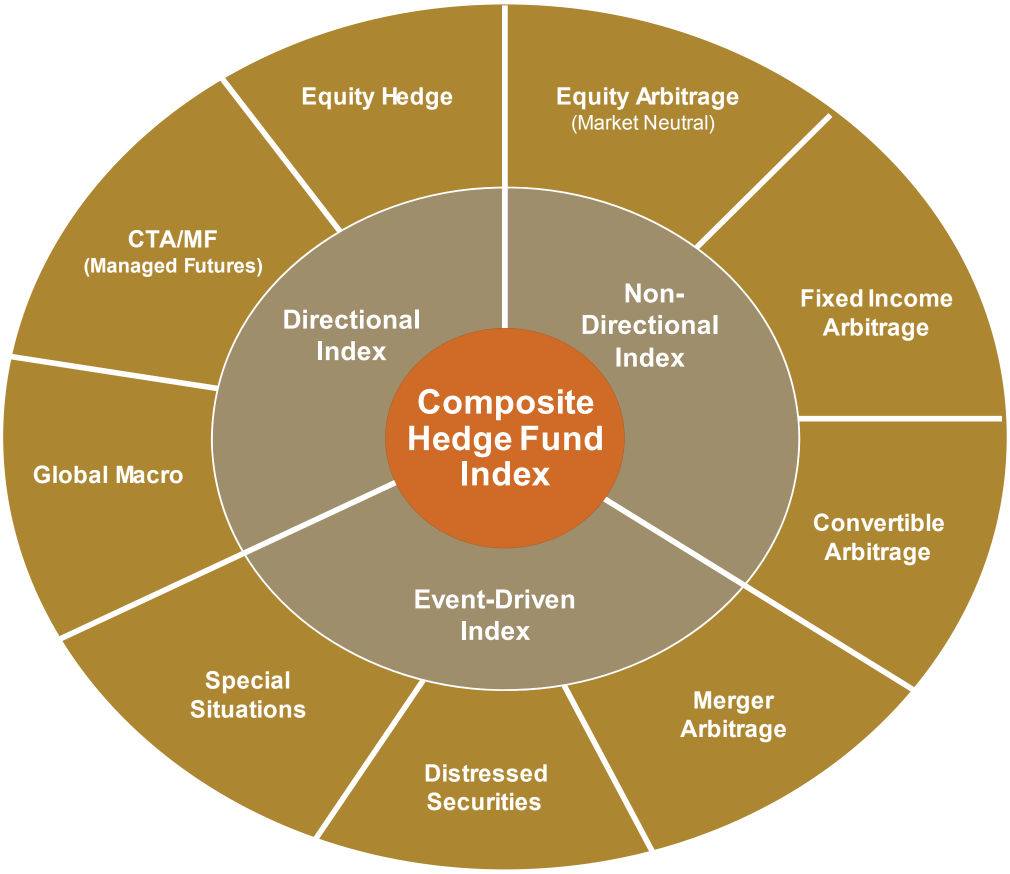

Hedge Fund Strategy
Investment Process
Asset Class
Geography
Directional Trading
Relative Value
Security Selection
Specialist Credit
Multi-Process
Developed Markets
Emerging Markets
Global Markets
Commodities
Convertibles
Currencies
Equities
Fixed Income
Diversified
Discretionary Trading
Tactical Allocation
Systematic Trading
Multi-Process
Arbitrage
Merger Arbitrage
Statistical Arbitrage
Multi-Process
Long Bias
No Bias
Short Bias
Variable Bias
Long/short Credit
Distressed Securities
Private Placements
Multi-Process
Event Driven
Multi-Process
Europe
Japan
Pacific ex-Japan
North America
Diversified
EMEA
Latin America
Asia Pacific
Diversified
Europe
Asia ex-Japan
Asia
Diversified
Secondary Characteristics
(Sectors; Focus; Size)

The wheel diagram provides a very useful insight into the hedge fund world. It takes the three primary attributes of hedge fund strategy as the first basis of classification; (1) Investment Process, (2) Asset Class and (3) Geography. Thus hedge funds are first labelled in these three dimensions (inner wheel) and then into further sub-categories; 18 by process, 13 by geography and 6 by asset class. The primary attribute classification results in 1404 unique categories (pigeon holes) being available (18x13x6). These 1404 pigeon holes are further compartmentalised by overlaying a secondary classification scheme based on such characteristics as size, focus and sector. Each "pigeon hole" can be compartmentalised a minimum of two ways by each of these characteristics which gives rise to a classification scheme with 11,232 (1,404x2x2x2) potential categories. This is convenient, as it exceeds the number of hedge funds currently in existence. The problem is that a classification scheme is meant to be a process of reduction and, ideally, there would be fewer categories than there are elements to be classified. However, it could be argued that an excess of pigeon holes allows for growth.

The classification scheme is extremely useful as a way of depicting the universe of hedge funds and for understanding where individual funds fit into the picture. It does not really help the next level of analysis, which is the construction of performance indices. There are simply too many ways to slice and dice the industry and the result would be a bewildering plethora of indices. MSCI uses a five-label approach and forms an index of any category that has a minimum number of funds classified in the same way. MSCI currently offers 190 indices using a labelling system similar to the taxonomy shown in Figure 1. The MSCI approach deserves credit for being the most comprehensive. However, the emerging industry standard seems to be somewhat more simplified.

> The emerging taxonomy is a simplified structure with broad categories of investment process, each with three sub-strategies.

Figure 2: Core Classification Scheme for Hedge Funds


Equity Hedge
Equity Arbitrage
(Market Neutral)
CTA/MF
(Managed Futures)
Fixed Income Arbitrage
Directional Index
Non-Directional Index
Composite Hedge Fund Index
Global Macro
Convertible Arbitrage
Event-Driven Index
Special Situations
Merger Arbitrage
Distressed Securities

In order to follow the progress of the emerging taxonomy, we select here the FTSE series for analysis of risk and return. Figure 2 provides a summary that shows the core classification being adopted as an industry standard. The structure is more simplified than that of Figure 1. The composite hedge fund index is decomposed into three broad categories of investment process; directional, non-directional and event-driven. These, in turn, are divided into three sub-strategies. In all FTSE offer 12 indices; 8 sub-strategy, 3 strategy and 1 composite index.[2] These strategies and sub-strategies are defined in Appendix 2. The FTSE series is selected as being representative of all public indices.

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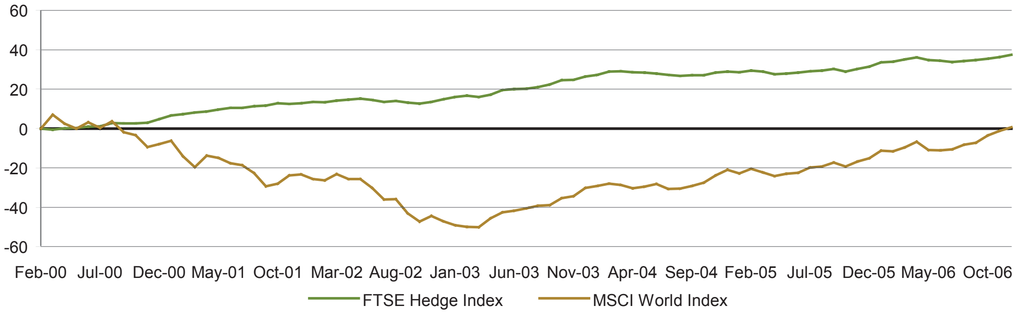
[2] *The FTSE series combines special situations and distressed securities resulting in only two event-driven sub-strategy indices. A glossary of terms and definitions is provided in the Appendices.*

Hedge Fund Performance Analysis

This section seeks to provide some insight into the performance of alternative investments generally, and the relative performance of various sub-strategies in terms of risk, return and correlation from January 2000 to December 2006.

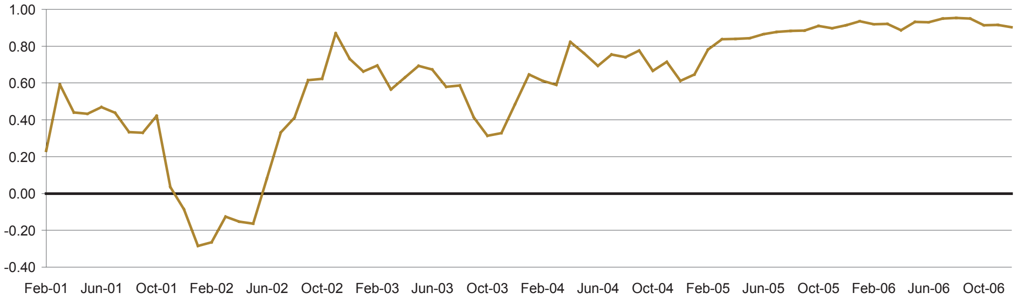
Figure 3: Performance of Hedge Funds over time



Correlation between hedge funds and equity markets has increased systematically over time.

Figure 3 sets out the time series performance of the FTSE hedge fund composite (FT H) versus the MSCI World Index for the period under analysis. Three features of these series are worth pointing out. Firstly, over the full interval, the FTSE Hedge Index has outperformed the MSCI and this has been achieved with much less volatility. Secondly, there is a striking difference between the performance of the MSCI in the first half of the period and the second. In the first three years, the MSCI lost considerable value whilst the hedge funds turned in a positive performance. This is precisely what they were invented to do; generate an absolute return even when markets were declining. In this first sub-interval there is a low correlation between hedge funds and equity markets globally. Thirdly, this lack of correlation is significantly reversed in the second period and the equity markets outperform the hedge funds, albeit with a larger volatility. Figure 4 illustrates the systematic rise in correlation between hedge funds generally and equity markets, as represented by the respective indices. It shows the rolling correlation between the FTSE Hedge Index and the MSCI World Index for the period under review.

Figure 4: Increasing Correlation between Hedge Funds and Equity Markets



This convergence between hedge fund returns and equity returns raises several issues for the sector and investors therein. Firstly, will investors accept absolute return fee structures when excess returns are low? The spread in return between the two sectors, often called alpha, is demonstrably diminishing while fund managers are largely continuing to enjoy performance fees based on total returns. Secondly, what is the cause of the convergence? Some commentators pessimistically argue that the industry has run out of ideas and all opportunities have been arbitraged. Alternatively, it may reflect simply a general 'style drift' as successful funds become larger. Thirdly, regardless of the causes of the general trend, it is of critical importance for investors in hedge funds to include the issue of style drift in their analysis of the individual hedge funds in which they intend to invest. Since the analysis is based on a considerable level of aggregation, generalisations are made with caution.

Investors in hedge funds must include the issue of 'style drift' in their analysis of the individual hedge funds.

Figure 5: Hedge Fund Index Performance by Category

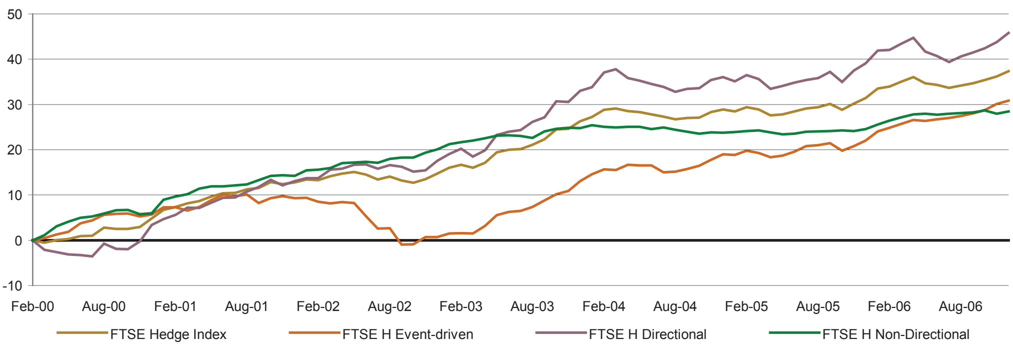


Figure 5 decomposes the FTSE Index into the three major constituent elements, directional, non-directional and event-driven. In the second half of the period analysed, the directional strategies appear to have dominated whereas the non-directional strategies dominated the first half. Although the recent downturn in equity markets had most impact on the directional strategies, and these accounted for all of the downturn in the overall index, the event-driven strategies actually were the better performers in the second period after a poor start.

Table 1 in Appendix 1 reports summary statistics that decompose the three strategy indices into their constituent sub-strategies. The best performer over the full period in the directional category is the CTA/Managed Futures sub-strategy although this group exhibited a very high volatility. In the non-directional group the Convertible Arbitrage strategy delivered the best overall return for the full period although it has delivered a lack-lustre performance since June 2003 and volatility continues to be high. The event-driven strategies have had a more divergent experience in the two components. The Distressed and Special Opportunities outperformed the Merger Arbitrage significantly over the full period. However, as in the previous strategy group, the best performer exhibits significantly higher volatility.

Non-directional strategies perform better in terms of their risk/return ratio than directional strategies.

Figure 6: FTSE Hedge Indices: Total Risk and Return

(Sphere size represents the number of funds)

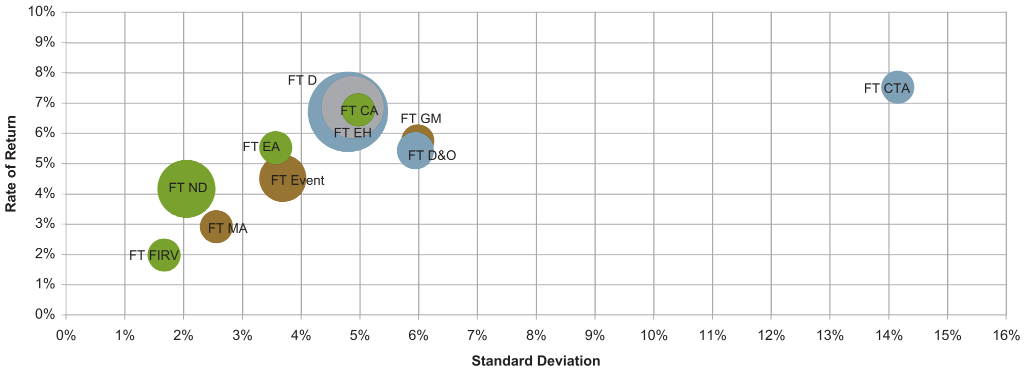
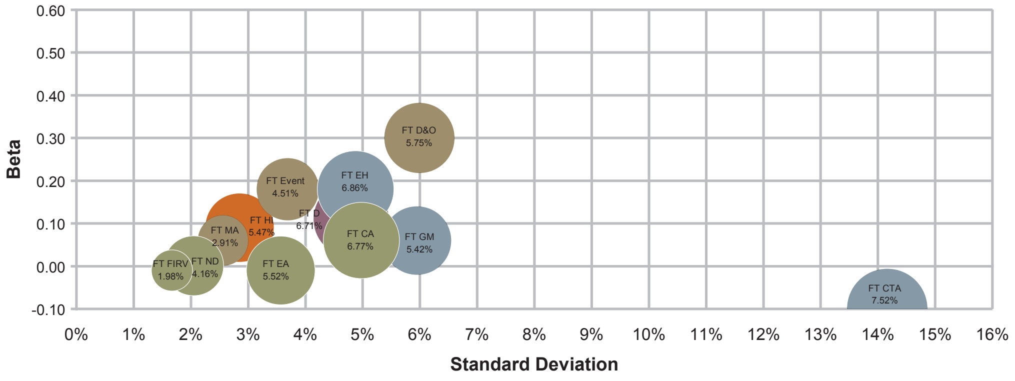


Figure 6 illustrates the risk and return for the various strategies. Return is plotted against standard deviation (volatility). It is clear that the non-directional strategies (green) tend to do better in terms of the return/risk ratio; that is, they tend to generate a better return for a given level of risk. The event driven-strategies (beige) tend to extend the risk range of the non-directional group. The directional strategies (blue) typically outperformed the event driven. The highest risk strategy, as measured by volatility, is the CTA (directional). However, this group is the worst of all in terms of the return/risk or Sharpe ratio. Although there is some overlap, the non-directional occupies a lower range in the risk spectrum, followed by event-driven and directional.[3]

Non-directional Strategies pursue investment opportunities that appear to produce pure alpha.

Figure 7: FTSE Hedge Indices Risk Composition

(Sphere size represents the rate of return)



In Figure 7 risk is measured in two ways; firstly, by standard deviation as in the previous figure and, secondly, as beta which is plotted on the vertical axis. Beta reports the covariance in returns relative to the MSCI World Index. A value of 1 indicates that a strategy's return tends to fluctuate by the same amount as the market, a beta greater or less than 1 indicates that the strategy's return is amplified or dampened in concert with market movements. Beta captures the correlation between the returns to a particular strategy and the market returns using the MSCI World Index as a proxy for the market.

All categories exhibit low beta values; the distressed and opportunity funds show the highest at around 0.3. It should be remembered that this is an average and masks the fact that correlation is increasing, which eventually will impact betas. The non-directional strategies exhibit a beta not significantly different from zero. This demonstrates that these strategies pursue investment opportunities that appear to produce absolute returns, or pure alpha. Typically, a beta close to zero suggests little or no net exposure to equity markets. The event-driven strategies offer a range of beta typically higher than the non-directional strategies; the largest beta in the latter group is the convertible arbitrage strategy, which has a beta (0.07) slightly greater than the lowest of the former, namely merger arbitrage at 0.06, although this difference is not material. The directional strategies exhibit the greatest divergence in beta. The CTA/managed futures funds are negatively correlated with the MSCI World Index as demonstrated in a negative beta. This implies that, this group of funds are net short the equity markets. This latter group is an example of an investment opportunity, which, although the highest risk in terms of volatility, provides strong diversification of equity market risk.

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[3] *Descriptions of the various strategies and a glossary of abbreviations are presented in Appendix 2.*

There are a number of stereotypes about hedge fund investing that are challenged in analysing these data:

i. ***Hedge funds are high-volatility.*** This may not be the case as all but one index analysed has exhibited considerably lower volatility, as measured by standard deviation in return, than the MSCI World Index. This equity index enjoys considerably reduced volatility due to the lack of correlation among its widely spread constituents. Caution is required in that individual hedge funds may be of considerable risk, which is not captured in the historic standard deviation metric; furthermore the diversification of manager risk is fairly limited in a number of these indices, which contain only a small number of funds. Nevertheless, the composite index, which acts as a proxy for a well-diversified hedge fund portfolio, has a much lower volatility for the study period than the MSCI World Index, which is a proxy for a globally diversified equity portfolio.

ii. ***Hedge funds generate pure alpha.*** Although in aggregate hedge funds appear to have a low beta relative to equity markets over the full period, as reflected in the value of 0.1 for the FT HI, certain sub-strategies do have high betas. In addition, over recent sub-periods, the degree of correlation between hedge funds and equity markets has increased markedly.

iii. ***Hedge funds contribute little marginal risk to an all equity portfolio.*** As hedge fund and equity returns converge these vehicles are less effective diversification media.

Cluster Analysis

Cluster Analysis involves analysing in detail five different aspects of return for 5,282 funds, which allows one to map the hedge fund universe in terms of groupings or clusters. Each fund is either assigned to a specific stable cluster based on strict similarity criteria or it is identified as an outlier with no peers. A third possibility is for a fund to be a 'drifter' that moves between clusters over time. Figure 8 illustrates the process.

Cluster analysis maps the hedge fund universe in terms of groupings or clusters, and identifies "outliers".

Figure 8: The Cluster Analysis Process

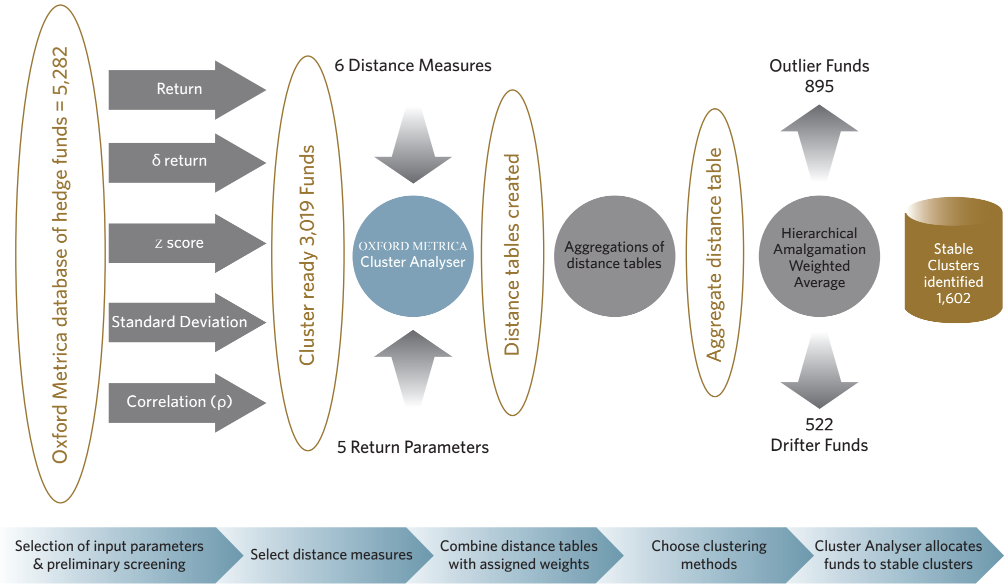
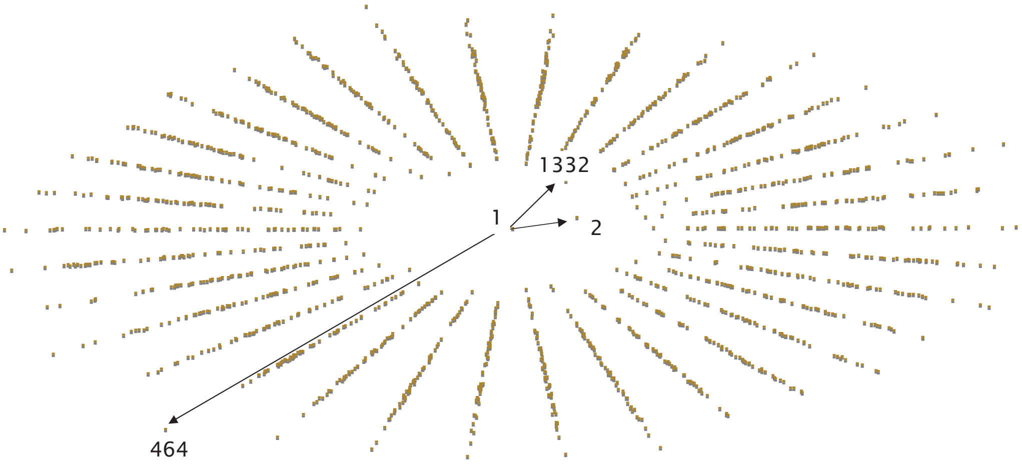

Oxford Metrica database of hedge funds = 5,282
Return
δ return
z score
Standard Deviation
Correlation (ρ)
Cluster ready 3,019 Funds
6 Distance Measures
OXFORD METRICA Cluster Analyser
5 Return Parameters
Distance tables created
Aggregations of distance tables
Aggregate distance table
Outlier Funds 895
Hierarchical Amalgamation Weighted Average
522 Drifter Funds
Stable Clusters identified 1,602
Selection of input parameters & preliminary screening
Select distance measures
Combine distance tables with assigned weights
Choose clustering methods
Cluster Analyser allocates funds to stable clusters

Figure 9 places fund 1 (ART Target Fund) at the centre and reports the distance to the other 3,018 funds analysed. Fund 2 (ABN Global Multi-Strategy Fund) represents ART's closest neighbour whereas 464 (DB Torus Japan Fund) is its most distant and 1332 (P&A Balanced Fund) it's second nearest and so on. Clusters are based on a full aggregation.

Figure 9: Fund Dimension 1 of 3019

The cluster analysis output provides an investor important insights; funds in stable clusters perform better; funds that are outliers need special analysis and drifters tend to under-perform.



50% of funds studied are members of a stable cluster.

The Topography of the Hedge Fund Universe

The key result is that approximately 50% of the funds subjected to the cluster analysis were members of a stable cluster. The number of funds in each cluster varied from 2 to 90, approximately one third of the stable funds belonged to a cluster with more than 6 members, approximately one third reside in funds with between 4 and 6 members and the remaining third were assigned to clusters with fewer than 4 members. All further analysis will focus on the largest twenty clusters, all of which contain at least six funds. In total, the largest 20 clusters contain 292 funds.

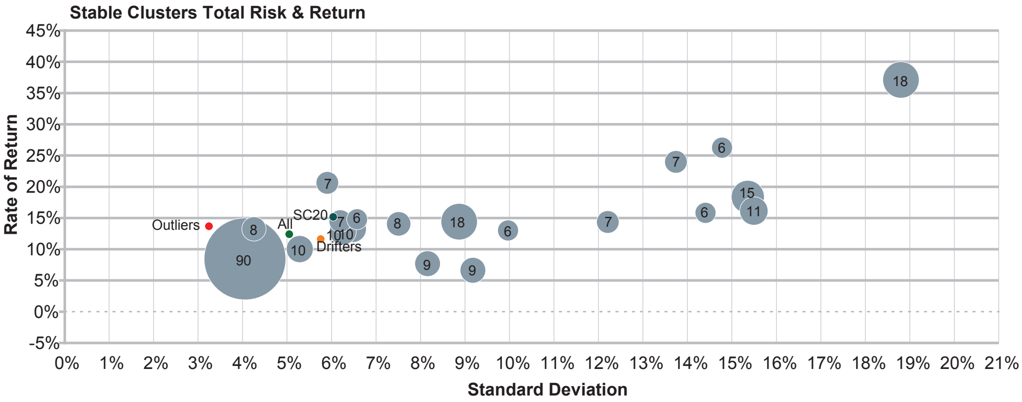
Table 2 in appendix 1 sets out the summary statistics for each of the 20 stable clusters. In addition, four indices are reported; all eligible funds (3,019); the top 20 by size (20); all outliers (895) and all drifters (522). Notice that each stable cluster is allocated a style based on the self-described style of the majority of its members. Although some clusters, such as Cluster 1 (fund of funds), are populated with funds which all have the same self-described style, this is not a necessary requirement in cluster analysis. The analysis is made without reference to self-described style. The result is that we have generated a mapping of the hedge fund universe in a risk-return plane in such a way that we are able to track performance for representative samples of the universe that have a proximity and stability in return behaviour. Since stable clusters represent most of the major classifications, it turns out to be a reasonably straightforward task to generate indices that are composed of stable clusters for each strategy class.

The risk/return plane depicted in Figure 11 is strikingly different from the pattern generated by the index approach shown in Figure 6.

Cluster analysis makes no reference to self-described styles.

Figure 10: Stable Clusters Total Risk and Return

(Sphere size represents the number of funds)



Aside from the obvious dominance in performance of the stable clusters of the indices in Figure 6, the stable clusters provide a sample across a wider range of return and risk than the indices. The indices are largely concentrated in the bottom left quadrant of the plane. Furthermore there is a more complete representation of the opportunities on offer in using clusters. In addition, the stable clusters represent funds that are very similar over a period of time. For this reason, we find it an extremely informative additional window into the general performance of the sector.

The best risk/return ratio is generated by the outlier index.

Some features are worth highlighting. The largest cluster, which, as mentioned above, is made up of fund of funds, generates a better risk-adjusted return than most other clusters. This suggests that the genre generates good value for investors. The best risk/return ratio is generated by the outlier index. Thus it would be unwise for investors to stick to stable clusters only; in fact, the better performing hedge funds contain a significant proportion of outlier funds. Drifters, by contrast, under perform the other three indices in Figure 11 in terms of the risk/return ratio. Interestingly, the top 20 clusters exhibit a similar risk/return ratio to the index of all stable clusters, suggesting that the size of the cluster is not a major factor in determining performance.

The most important feature of the clusters is the degree of correlation among constituent members as measured by the average intra-cluster correlation coefficient reported in Table 2. Interestingly, but perhaps not surprisingly, there are a number of fund of funds clusters. This illustrates two important points. Firstly, the analysis is able to uncover significant distinctions within the general fund of funds groupings. Fund of funds are arrayed into quite distinct clusters rather than being treated as an homogenous group. Secondly, fund of funds being made up of many funds appear more likely to rise to the surface as stable clusters than other funds. Notice that not all fund of funds have this quality, however they are represented in clusters in a greater proportion to other funds. Not surprisingly they constitute an important element of the hedge fund universe. Conversely multi-strategy funds are under represented in stable clusters.

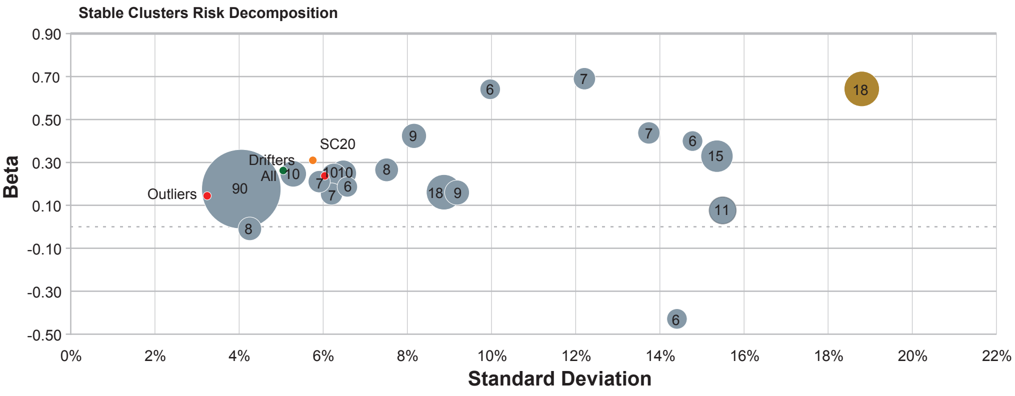
Cluster analysis arrays fund of funds into distinct clusters rather than a homogenous group.

Amaranth is notably absent from any stable cluster and it is identified as an outlier in our analysis, exhibiting a return to risk ratio below the average for this group. The OMCA tool identified Amaranth as requiring special evaluation. Its returns through June 2006 exhibit highly idiosyncratic behaviour which, although not a problem in and of itself, should have alerted investors to the divergence in Amaranth's return over time.

Cluster analysis identified Amaranth as requiring special evaluation.

Figure 11: Stable Clusters Risk Decomposition

(Sphere size represents the number of funds)



The decomposition of risk into beta and standard deviation is shown in Figure 11. Again, clusters exhibit a wider range of betas than the hedge indices in Figure 7. The outliers tended to be lower beta funds than the drifters and stable clusters. The funds of funds were lower than most stable clusters. Notable exceptions are the convertible arbitrage cluster and an unusual cluster of mainly emerging market Eastern Europe funds, which obviously short the market.

The main advantage of adding cluster analysis to the evaluation of hedge funds is that, as a classification system, it is based on the consistent similarity in the observed return behaviour of funds. It adds a time dimension to the classification and thereby allows a robust means of evaluating any drift in style over time.

Appendix 1

Summary Performance Statistics

Table 1: Summary Statistics for FTSE Hedge Indices

January 2000 to December 2006

Correlation	FT HI	FT D	FT ND	FT Event	FT EH	FT GM	FT CTA	FT EA	FT FIRV	FT CA	FT MA	FT D&O	MSCI
FTHI	1												
FT D	0.9	1											
FT ND	0.4	0.1	1										
FT Event	0.7	0.4	0.3	1									
FT EH	0.8	0.8	0	0.6	1								
FT GM	0.6	0.6	0.1	0.3	0.4	1							
FT CTA	0.5	0.7	0	-0.1	0	0.2	1						
FT EA	0.1	0	0.7	0	-0.1	0	0.1	1					
FT FIRV	0.2	0	0.6	0.1	0	0.2	0	0.1	1				
FT CA	0.4	0.1	0.8	0.3	0.1	0.1	0	0.2	0.2	1			
FT MA	0.4	0.3	0.2	0.6	0.4	0.2	0	0.1	0.2	0.1	1		
FT D&O	0.6	0.4	0.1	1	0.6	0.3	-0.1	0	0.1	0.4	0.3	1	
MSCI	0.5	0.3	0	0.7	0.5	0.1	-0.1	0	-0.1	0.2	0.3	0.7	1
Return (% pa)	5.47	6.71	4.16	4.51	6.86	5.42	7.52	5.52	1.98	6.77	2.91	5.75	0.92
Std. Deviation	2.85	4.8	2.05	3.69	4.88	5.95	14.16	3.57	1.67	4.98	2.59	5.99	13.93
Sharpe Ratio	1.92	1.40	2.03	1.22	1.41	0.91	0.53	1.55	1.19	1.36	1.12	0.96	nm
Beta	0.10	0.10	0.00	0.19	0.18	0.04	-0.10	0.00	-0.01	0.07	0.06	0.30	1.00
MRSR	3.84	4.66	nm	1.75	2.81	9.11	-5.31	nm	nm	6.80	3.75	1.37	nm
Alpha	5.38	6.61	4.16	4.34	6.70	5.38	7.61	5.52	1.99	6.70	2.86	5.47	0.00
# of Funds	43	23	12	8	14	5	4	4	4	4	4	4	

The top panel of Table 1 reports the bilateral correlation coefficient between each pair of indices. As would be expected, the correlation between indices in the same strategy is relatively high and is relatively low between indices in different strategy groupings. Grey shading applies to correlations below 0.3 and orange shading shows correlations above 0.5. (see appendix 2 for descriptions and abbreviations of the indices)

Table 2: Summary Statistics for the Stable Clusters

Cluster	No. of Funds	Rate of Return	Std. Dev.	Beta	Intra-cluster correlation	Self described styles
Cluster 1	90	8.44%	4.05%	0.18	0.80	Fund of fund
Cluster 2	18	14.39%	8.87%	0.16	0.81	Convertible Arbitrage
Cluster 3	18	37.10%	18.80%	0.64	0.86	Emerging Market East Europe
Cluster 4	15	18.37%	15.36%	0.33	0.83	Equity Long
Cluster 5	11	16.10%	15.50%	0.08	0.84	Equity Market Neutral
Cluster 6	10	13.24%	6.48%	0.25	0.81	Fund of Fund
Cluster 7	10	10.00%	5.29%	0.25	0.85	Fund of Fund
Cluster 8	10	12.84%	6.26%	0.23	0.81	Global Macro
Cluster 9	9	7.66%	8.16%	0.42	0.80	Equity Long/short
Cluster 10	9	6.62%	9.18%	0.16	0.83	Merger Arbitrage
Cluster 11	8	14.05%	7.51%	0.27	0.72	Japan
Cluster 12	8	13.24%	4.26%	-0.01	0.85	Convertible Arbitrage
Cluster 13	7	23.97%	13.74%	0.44	0.84	Fund of Fund (Global)
Cluster 14	7	14.48%	6.20%	0.15	0.78	Fund of Fund
Cluster 15	7	14.34%	12.21%	0.69	0.86	Multi-Strategy
Cluster 16	7	20.62%	5.91%	0.21	0.86	Fund of Fund
Cluster 17	6	15.80%	14.41%	-0.43	0.82	Emerging Market East Europe
Cluster 18	6	12.99%	9.97%	0.64	0.82	Equity Long/short
Cluster 19	6	26.25%	14 .78%	0.40	0.85	Fund of Fund
Cluster 20	6	14.79%	6.58%	0.19	0.76	Emerging Market Asia
All Funds	3,019	12.40%	5.05%	0.26	-	-
Outliers	895	13.66%	3.25%	0.14	-	-
Drifters	522	11.60%	5.76%	0.31	-	-
SC 20	292	15.17%	6.04%	0.24	-	-

Appendix 2
Definition of Hedge Fund Strategies

1. Directional trading

Directional trading refers to the set of strategies, which are based on speculating on the direction of market prices. Markets include all equities, currencies and commodities. Three sub-strategies typically make up this group.

1.1 Equity Hedge
This group of strategies revolves around a central portfolio of long equities, which are hedged tactically via short-selling individual shares or indices.

1.2 Commodity Trading Association (CTA)/Managed Futures
Strategies that predominately involve active trading both short and long in liquid financial futures, the most common of which are currencies, stock market indices, commodities and interest rates.

1.3 Global Macro
Global Macro strategies are distinctive by virtue of their top down approach. Typically these strategies attempt to forecast and interpret shifts in the world economy, the political climate, international conflicts, world trade or the global supply of commodities. Investments are then based on these world views, aiming to participate in the expected change in prices. These investments may be both long or short, in any tradable market and they are typically leverage.

2. Non-directional trading

2.1 Equity Arbitrage (market-neutral)
Equity arbitrage strategies are designed to exploit perceived pricing differences among and between traded securities. Relatively under priced securities will be acquired and traded against overpriced securities, which are sold short. These positions typically neutralise market-wide movements common to the traded securities. Equity arbitrageurs aim to speculate exclusively on the difference between the prices of the relatively mispriced securities. The assumption is that, through the price equilibration, profits will be generated.

2.2 Fixed Income Arbitrage
Fixed income arbitrage strategies follow a similar pattern to the equity arbitrage approach but are applied to fixed income securities. Strategies to exploit mispricing in fixed income securities are usually accompanied by strategies to neutralise interest rate risk simultaneously. Examples of such trading include yield curve arbitrage, corporate versus Treasury yield spreads and spot versus future spreads.

2.3 Convertible Arbitrage
Convertible arbitrage is characterised by strategies that invest in convertible securities and simultaneously hedge all or part of the implicit equity risk by short-selling the underlying stock. Managers may on occasion neutralise interest rate risk in addition to the equity risk.

3. Event-driven

3.1 Merger Arbitrage
This group of strategies includes trading in anticipation of any change in corporate control. This includes acquisitions, leveraged buyouts and hostile takeovers. Typically, these strategies involve acquiring stock in the target company and often selling short the acquirer.

3.2 Distressed Securities

Distressed strategies exploit potential shifts in price in the securities of companies that are under duress. Examples include bankruptcies and corporate crises. Securities may be acquired or sold short.

3.3 Special Situations

Unusual corporate events give rise to profit taking through well-timed trading opportunities. Transactions such as share-buybacks, corporate spin-offs, international listings and many others are examples of special situations. All corporate instruments are involved potentially, traded both long and short.

Abbreviations used for FT Hedge Indices

Full name of Index	Abbreviation
FTSE Hedge Index USD	FT HI
FTSE Hedge Directional Index	FT D
FTSE Hedge Non-Directional Index	FT ND
FTSE Hedge Event-Driven Index	FT Event
FTSE Hedge Equity Hedge Index	FT EH
FTSE Hedge Global Macro Index	FT GM
FTSE Hedge CTA/Managed Futures Index	FT CTA
FTSE Hedge Equity Arbitrage Index	FT EA
FTSE Hedge Fixed Income Relative Value Index	FT FIRV
FTSE Hedge Convertible Arbitrage Index	FT CA
FTSE Hedge Merger Arbitrage Index	FT MA
FTSE Hedge Distressed & Opportunity Index	FT D&O

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Europe

David Aldrich, Managing Director	+ 44 20 7163 3233
Marc Russell-Jones, Managing Director	+ 44 20 7163 3234

North America

Marina Lewin, Managing Director	+ 212 815 6973
Orla Nallen, Managing Director	+ 212 635 6703

Asia Pacific

Jai Arya, Executive Vice President	+ 65 6432 0220
Andrew Gordon, Executive Vice President	+ 852 2840 9801

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Dr Rory Knight, Chairman	+ 44 1865 390 825
Dr Deborah Pretty, Principal	+ 44 1865 847 770

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