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## **A Detailed Analysis of the Construction Methods and Management Principles of Hedge Fund Indices**

Are all hedge fund indices created equal?

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## Introduction

Hedge funds have been spectacularly successful in recent years. Nonetheless, before being thrust into the media spotlight, alternative investment had experienced a very long incubation period. During that period, only a few wealthy private investors who were looking for absolute performance invested in hedge funds. However, with the bursting of the Internet bubble, investors were searching for investments that were liable to improve the diversification of their portfolio and turned to hedge funds.

This massive arrival of institutional investors sparked off a profound reflection on the management practices in the alternative universe, highlighting in particular the control of risks. Though certain hedge fund strategies are non-directional, i.e. not exposed to market risk, they are nevertheless exposed to other risk factors (volatility, credit, liquidity, etc.), so it was definitive that the risk-free rate could no longer be used to evaluate the performance of hedge funds (cf. Amenc et al. – 2003<sup>1</sup>). As a result, numerous hedge fund indices were set up (cf. table below).

Table 1: List of index providers

Index Provider	Launch Date	Beginning of Historical Data	Web Site
Hennessee Group ( <b>Hennessee</b> )	1987*	1987	hennesseegroup.com
LJH Global Investments ( <b>LJH</b> )	1992	1989	ljh.com
Van Hedge Fund Advisors International, Inc. ( <b>Van Hedge</b> )	1994**	1988	vanhedge.com
Hedge Fund Research, Inc. ( <b>HFR</b> )	1994	1990	hedgefundresearch.com
CISDM / MAR ( <b>CISDM</b> )	1994	1990	marhedge.com
HedgeFundNews.com / Bernheim Index ( <b>Bernheim</b> )	1995	1999 (with monthly frequency)	hedgefundnews.com/
Evaluation Associates Capital Markets, Inc. ( <b>EACM</b> )	1996	1996	eacmalternative.com
Hedgefund.net / Tuna Indices ( <b>HF Net</b> )	1998	1976-1995***	hedgefund.net
HFIntelligence / Invest-, Europe-, Asia-Hedge, Absolute Return ( <b>HFIntelligence</b> )	2002 / 2001 / 2001 / 2003	1998	hedgefundintelligence.com
CSFB/Tremont Index LLC ( <b>CSFB</b> )	November 1999	1994	hedgeindex.com
Investorforce / Altvest ( <b>Altvest</b> )	2000	1993	investorforce.com
Zurich Hedge Fund ( <b>Zurich</b> ) ****	2001	1998	www1.zindex.com
Standard & Poor's ( <b>S&amp;P</b> )	2002	1998	spglobal.com
ABN AMRO / EurekaHedge ( <b>EurekaHedge</b> )	May 2002	2000	eurekaHedge.com
MSCI Hedge Fund Indices ( <b>MSCI</b> )	July 2002	2002	msci.com
Blue Chip Hedge Fund Index ( <b>Blue X</b> )	October 2002	2002	bluex.org
Feri Alternative Assets GmbH ( <b>Ferī</b> )	December 2001	2002	feri-alta.de
Edhec Alternative Indices ( <b>Edhec</b> )	March 2003	1997	Edhec-risk.com
MondoHedgeIndex ( <b>MondoHedge</b> )	March 2003	2002	mondohedgeindex.com
<b>Talenthedge</b>	October 2003	2003	talenthedge.com
Barclay Group / Global HedgeSource Hedge Fund Indices ( <b>Barclay</b> )	September 2003	1997	barclaygrp.com/indices/ghs/

\* In 1992 for the general public

\*\* In 1995 for the general public

\*\*\* Depends on the strategy

\*\*\*\* Note that Zurich has stopped maintaining its hedge fund indices since October 2003.

Just like the profile of the investors, the index providers' profile diversified progressively. The specialised hedge fund firms (Hennessee, Van Hedge, MAR, EACM, etc.), some of whom had been around since the end of the 1980s, therefore had to cope with the arrival of renowned financial institutions (CSFB, S&P, MSCI and ABN AMRO). This phenomenon perfectly illustrates the industrialisation of alternative investment and its principal consequence was the greater transparency of the methods used to construct the indices and their management principles. Nevertheless, the high degree of heterogeneity of the offerings (multiple databases, varied

<sup>1</sup> Amenc, N., Martellini, L. and Vaissié M., 2003, Benefits and Risks of Alternative Investment Strategies, Journal of Asset Management, Vol.4, N°2, p.96-118

construction methods, differing management principles) does not make the investors' search for a reference index any easier.

The aim of this document is to provide a detailed presentation of the different hedge fund indices in order to highlight their strengths and weaknesses. To analyse the reasons for the heterogeneity of their performances, we will focus on the following five points:

- **Transparency & Independence:** the construction method, the composition, the weightings and the data used to calculate the indices must be available to the public,
- **Accuracy of the data and punctuality:** the data used to calculate the index must be retrieved rapidly and verified in order to avoid any delay in publishing the results of the index,
- **Stability:** the composition of the index must not be modified too frequently to avoid exaggerated volatility of its fundamental characteristics (performance, exposures to risk factors, etc.). In the same way, *ex-post* adjustments must only be carried out in exceptional circumstances,
- **Representativity:** the index must account for the manager's entire investment management universe. This implies integrating as large a number of funds as possible into the index,
- **Purity:** The index must only account for the manager's investment management universe. This involves classifying the funds accurately and therefore limiting the number of funds.

The first three points will allow us to provide details on the index construction methods. They will be the subject of the first section of this paper. The following two points will allow us to understand the consequences of the heterogeneity of the construction methods in terms of representativity and purity. We will thus be able to reply to the following question: are all hedge funds indices created equal?

## I. Hedge fund index construction methods

Before examining the methods implemented by the various index providers in detail, it is important to note that the difficulties relating to the development of high quality indices, which are already present in the traditional universe, are exacerbated in the alternative investment world, notably because of the lack of transparency of the different players.

### I.1 Transparency and independence

Whatever the context in which an index is supposed to be used (asset allocation, performance measurement and/or attribution, etc.), its primary vocation is to be used as a reference by the investor. It is therefore indispensable for the index provider to be sufficiently transparent so as to allow investors to be sure that the index corresponds to their particular needs. In order to do so, they must be able to easily obtain information relating to the index calculation method, its management principles (the frequency with which the index composition is modified, the dates on which the returns are published...), etc.

The investor also has to be sure that all the strategic decisions will be made in a transparent manner by an independent committee. The independence of the decisions is of primordial importance because it limits the risk of being confronted with eventual conflicts of interest between the index provider and the user in the future.

In view of the opacity that generally characterises hedge funds (for example, those that readily communicate the volumes of their assets under management are few and far between), it is not surprising to observe that most

indices are equal weighted (with the exception of the CSFB, Edhec and MondoHedge indices and some of the MSCI and Feri indices). It should be noted, in this area, that a difference in the weighting system can be the source of significant performance differences. Fung and Hsieh (2002) show, on this subject, that the “Weighting Scheme” bias was the source of a performance differential of 9.1% (7.4%) in 1997 (1999), between CSFB and HFR’s Global/Macro (emerging markets) indices. They highlight, moreover, the considerable dispersion in the performances of hedge funds and the thickness of the distribution tails (i.e. significant number of funds having recorded very poor performances). They recall that the median is a better statistical indicator than the mean when the distribution function is not symmetrical. That is why some index providers publish the median of the performances of the underlying funds rather than the mean (CISDM, HFIntelligence).

Table 2: Transparency and Independence

Index Providers	Calculation Method	Transparent Composition	Independent Committee
EACM	AM*	No	No
HFR	AM*	No	No
CSFB	WM**	Yes	Yes
Zurich	AM*	Yes	Yes
Van Hedge	AM*	No	No
Hennessee	AM*	No	Yes
HF Net	AM*	No	No
LJH	AM*	No	No
CISDM	Median	No	No
Altvest	AM*	No	No
MSCI	AM* & WM** for the global indices	No (only to subscribers)	Yes
S&P	AM*	Yes	Yes
Feri	AM* & WM** for the composite index	No	No
Blue X	Between 2% and 8% for a HF and maxi 20% for funds from the same organisation	Yes	Yes
Edhec	Principal Component Analysis	Yes	Yes
MondoHedge	AM* & WM**	Yes	Yes
Eurekahedge	AM*	Yes (on request)	No
HFIntelligence	Median	No (only to subscribers)	Yes
Bernheim	Not communicated	No	No
Talenthedge	AM*	Yes	No***
Barclay	AM*	Yes	Yes

\* Arithmetic Mean, i.e. the indices are equally weighted

\*\* Weighted Mean, according to the net values of the funds, i.e. the indices are value weighted

\*\*\* The funds are selected according to the “TIHFI & TEHFI Selection Conditions” published on the web site

Just like the hedge funds, the index providers have long been relatively opaque in relation to the construction and management methods of their indices. The table above indicates that this is still the case because more than half of the index providers still do not communicate the composition of their index to the public. It is therefore difficult, if not impossible, for investors to check that the composition of the index meets their expectations. On the other hand, one should recognise that significant efforts have been made to guarantee the independence of the indices. The table above shows that almost one-third of the index providers (compared with none only three years ago) have set up a policy committee that is in charge of ensuring that the index’s management rules are respected.

The observations are nonetheless worrying: more than half of the index providers do not publish the composition of their indices and do not have an independent committee. Given the importance of the indices in the investment management process, it may seem dangerous to turn to indices whose management rules are discretionary or even arbitrary.

## 1.2 Accuracy of data and punctuality

Investors need regular and accurate data to manage their positions on a daily basis. It is unfortunately very difficult (or indeed technically impossible) to obtain information in real-time from the funds that enter into the composition of the index. The index providers are therefore obliged to wait for the funds to communicate their performances to the databases before publishing theirs. For that reason, it is generally necessary to wait at least a month to have definitive results from the hedge fund indices (e.g. MAR, CISDM, MondoHedge, HFR, etc.). Since this time scale does not meet the expectations of investors, some index providers (e.g. HFR, Van Hedge, HF Net, CISDM, etc.) also publish estimates calculated using the data sent by the first funds. It is obvious that the intermediate results should be considered with care, because the funds that are quickest to communicate their results are generally those that have recorded the best performances. This explains why the estimations are more often than not better than the definitive results.

Moreover, it is interesting to note that most index providers who offer flash data do not take the time to check the data that is sent to them by the fund managers (MSCI, thanks to relatively late updates, and S&P, thanks to the Managed Accounts system, are exceptions to this rule). On the same subject, fewer than half of the index providers declare that they verify the data that they receive! It is therefore legitimate to wonder about the quality of the information that the investors receive. We should recall that a model, however good it may be, is always limited by the quality of its inputs...

Table 3: Accuracy of data and punctuality

Index Providers	Date of Update	Publication of Flash Data	Verification of Data by the Index Provider
EACM	3 <sup>rd</sup> week of month M+1	No	No
HFR	5 <sup>th</sup> , 15 <sup>th</sup> day of M+1 and 1 <sup>st</sup> day of M+2	Yes	No
CSFB	15 <sup>th</sup> day of M+1	No	Yes*
Zurich	4 <sup>th</sup> week of M+1	No	Yes
Van Hedge	5 <sup>th</sup> day of M+1 (for the global index), 10 <sup>th</sup> day of M+1 and last day of M+1 for the definitive results	Yes	No
Hennessee	6 <sup>th</sup> working day of M+1 and 30 days after the end of the month for the definitive results	Yes	No
HF Net	Every day	Yes	No
LJH	Not reported	No	No
CISDM	2 <sup>nd</sup> week of M+1 and 2 <sup>nd</sup> week of M+2	Yes	Yes
Altvest	Every day and the last day of M+1 at 11.00pm for the definitive results	Yes	No
MSCI	The 1 <sup>st</sup> estimation is published during M+1, the second at the end of M+1 and the definitive results at the end of M+2	Yes	Yes**
S&P	Every day (up to 2 days late) and the last day of M for the definitive results	Yes	Yes
Feri	The definitive results are published at the end of M+1	No (available on request)	Yes
Blue X	Every week and then the 25 <sup>th</sup> day of M+1 for the definitive results (with a maximum of 15% of estimated returns)	Yes	No
Edhec	The 1st estimation is published on the 15 <sup>th</sup> day of M+1 and the definitive results on the 3 <sup>rd</sup> working day of M+2	Yes	No
MondoHedge	Last week of M+1, then 1 <sup>st</sup> week of M+2	Yes	No
Eurekahedge	10 <sup>th</sup> , 15 <sup>th</sup> day of M+1 for the estimations and 20 <sup>th</sup> , 30 <sup>th</sup> day of M+1 for the definitive results	Yes	No
HFIntelligence	1st week of M+1	Yes	Yes
Bernheim	During M+1	No	No
Talenthedge	15 <sup>th</sup> day of M+1	Yes	Yes
Barclay	Every day starting from the 2 <sup>nd</sup> day of M+1. The definitive results are published at the end of M+2.	Yes	No

\* The data is compared to the audited results once a year. Only data that is statistically aberrant is subject to verification during the year.

\*\* The data is verified during the end-of-year due diligence. MSCI periodically checks the consistency between the performances and the rankings of the funds.

### 1.3 Stability

For want of being exceedingly accurate and rapidly available, do hedge fund indices offer investors the stability they require in order to make rational investment decisions? The alternative universe is so complex and evolves so quickly that investors do need reliable reference points. Unfortunately, most of the indices that are currently present on the market do not provide this stability that the investors so urgently need. The first reason relates to the frequency with which the funds enter and exit the index. When a fund no longer communicates its results to a database in a timely fashion, it is immediately excluded from the index. Conversely, as soon as a new fund manifests itself to a database, it is liable to be included in the index in the following month or quarter. Only the compositions of the Hennessee and EACM indices are modified on an annual basis! The risk profile and returns of the index are therefore liable to evolve at the same rhythm as the changes in composition. In other words, the characteristics of the index at date  $t$  are not necessarily representative of its characteristics at date  $t+1$ . It is obvious that such a level of reactivity on the part of the indices allows for better tracking of market trends (i.e. the “popular best” in the terminology of Fung and Hsieh). However, an index that evolves on a permanent basis in no way represents a reference for the investor! Furthermore, when a fund is added to the database on which the index is based, all or part of its history is integrated, which leads to an *ex-post* modification of the index history. In other words, the performances published at date  $t-1$  are no longer the same at  $t$  (e.g. HF Net, MSCI, etc.). Can we speak of stability in that case? Very fortunately, fewer than half of the index providers modify the *ex-post* history of the indices.

Tableau 4: Stability

Index Providers	Backfilling	Rebalancing Frequency
EACM	No (EACM nevertheless reserves the right to adjust the index history <i>ex-post</i> in a discretionary manner)	Annual
HFR	No (the last 4 months are kept as estimations and are liable to be modified <i>ex-post</i> )	Monthly
CSFB	No	Quarterly
Zurich	No	Quarterly
Van Hedge	No	Monthly
Hennessee	No	Annual
HF Net	Yes (the whole history)	Continual
LJH	Not communicated	Monthly
CISDM	No	Monthly
Altvest	No	Monthly
MSCI	Yes (the whole history)	Quarterly for inclusion and Monthly for the “reranking” of funds
S&P	No	Annual on the strategy level and periodically on the fund level
Feri	No	Quarterly
Blue X	No	Quarterly
Edhec	No	Quarterly
MondoHedge	No	Monthly
Eurekahedge	Yes (the whole history)	Monthly
HFIntelligence	No (HFIntelligence nevertheless reserves the right to adjust the index history <i>ex-post</i> in a discretionary manner)	Annual
Bernheim	Not communicated	Not communicated
Talenthedge	Yes (12 months)*	Monthly
Barclay	No	Monthly

\*Only on the occasion of the launch of the index, planned for October 30, 2003

Not all hedge fund indices currently present the requisite degree of transparency and/or independence and the indices often have difficulty providing quality information quickly. Nonetheless, even though they are far from perfect, they are embodying the efforts of the various players in the alternative investment world to rationalise and standardise, or, in other words, to industrialise their activity.

## II. The representativity and purity qualities of hedge fund indices

The quality of a hedge fund index depends on two factors: the database on which it is based, and the construction methods and/or management principles that govern it. The first part of this study clearly highlighted the fact that the different hedge fund indices are based on different databases and that the index providers employ numerous construction methods and/or management principles. What are the consequences of this diversity for the indices in terms of representativity and purity?

### II.1 The representativity dimension

The lack of data is one of the major problems with which investors are confronted in the alternative universe. With the exception of the HF Net indices, the history of the main indices goes back to the very beginning of the 1990s (cf. table 1). Since these indices are published on a monthly basis, investors dispose of around 150 observations, in the best case scenario, when performing quantitative analysis. That naturally leads to the question of the “temporal” representativity of the results observed over the period 1990-2003. We note that recent research suggests that the risk-adjusted performances observed in recent years are “abnormally” high (cf. Fung and Hsieh (2002)<sup>2</sup> and Agarwal and Naik (2003)<sup>3</sup>).

Moreover, in order for the index to be useful to the investor, it must primarily be representative of the investment management universe that it claims to be a part of. While this notion of “spatial” representativity is fairly intuitive in the traditional universe, it is much more difficult to apprehend in the alternative universe. To the extent that the information on the assets managed by the hedge funds is not generally available in real time, the logic of representativity through capitalisation can only be applied with considerable difficulty. That is why all of the hedge fund indices, with the exception of CSFB/Tremont and MondoHedge (and some MSCI and Feri indices) today operate in equal weighting mode (cf. table 2).

Next, the absence of obligation to publish performances in the alternative world renders access to exhaustive databases very difficult. Each index provider is therefore limited by the size of the database from which it constructs its indices. To what degree is the sample of funds contained in the database representative of the whole population of hedge funds (more than 7,000 according to the most recent estimations)? The table below shows us that the indices do not all have the same strong points. While Van Hedge has a database containing more than 5,400 hedge funds and funds of hedge funds, the EACM 100 index is calculated from the performances of 100 hedge funds. It is obvious that these two indices will not present the same representativity qualities. It clearly appears that the choice of database on which the indices are based is not inconsequential. It is also interesting to note that the databases that cover the largest numbers of funds are either the oldest (cf. Hennessee, Van Hedge, TASS, Altvest, HFR, etc.), or those from institutions with a good reputation (S&P, MSCI).

The size of the database used to construct an index gives an initial indication as to the degree of representativity that the index may reach. However, when we are interested in the representativity of a hedge fund index, the size of the underlying database is only a limiting factor; it is not a sufficient factor. In other words, it is not because an index is constructed from an exhaustive database that it will necessarily be representative of the investment management universe. The index must also be representative of the database itself. The table below shows us that that is not always the case. While some indices integrate all the funds in the database (cf. EACM, HF Net, Altvest, HF Intelligence and Barclay), others only consider a restricted number of the funds (cf. Feri, S&P, Zurich, CSFB, Hennessee, MondoHedge, BlueX and Bernheim). Even though it is obvious that an index that is strongly representative of a very complete database will be more representative than an index that is not very representative of a very incomplete database, it is trickier to compare the representativity of an index that is not very representative of a very complete database (e.g. S&P, CSFB, Feri, BlueX) and that of an index that is strongly representative of a database that is, *a priori*, incomplete (e.g. EACM). The index construction method

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<sup>2</sup> Fung, W., Hsieh, D.A., 2002, Journal of Fixed Income, Sept. 2002, Vol.12, Issue 2, p.6-28

<sup>3</sup> Agarwal, V., Naik, N.Y., 2003, Risks and Portfolio Decisions involving Hedge Funds, Working Paper



therefore plays a predominant role. While S&P use the Stratified Sampling technique (cf. Patel et al. (2002)<sup>4</sup>) to obtain a satisfactory degree of representativity with a restricted number of funds, the CSFB indices manage to represent 85% of the assets under management in the TASS database (with fewer than 15% of the funds contained in the same database) by weighting the funds by their net values. To remove the problems inherent in hedge fund indices (e.g. non-representative of the underlying databases, problem with the availability of the data relating to the funds, late publication of the fund data, etc.), the Edhec indices are constructed from the indices and not from the individual funds. They therefore naturally tend to be more representative than the indices from which they are composed. In addition, since the weightings are calculated with the help of Principal Component Analysis (PCA)<sup>5</sup>, the representativity of the Edhec indices is systematically maximised.

Table 5: The hedge fund indices and their databases

Index Providers	Database	No. of Funds in the Database	No. of Funds in the Indices	Composite Index	Fund of Fund Index
Van Hedge	Proprietary Database	+5,400	1,300	Yes	Yes
Feri	Proprietary Database + Other Available Databases (Van Hedge, TASS, HF Net)	+5,000	41	Yes	No
Hennessee	Proprietary Database	+3,500	+690	Yes	No
S&P	Proprietary Database + Other Available Databases	3,500	40	Yes	No
CSFB	TASS Database and Tremont Database	3,300	431	Yes	No (planned)
HFIntelligence	Proprietary Database	3,202	2,652	Yes	Yes
Altvest	Proprietary Database	+2,600	All the funds	Yes	Yes
Barclay	Global HedgeSource	2,450	All the funds	Yes	Yes
HF Net	Proprietary Database	+2,300	All the funds	Yes	Yes
HFR	Proprietary Database	+2,300	+1,400	Yes	Yes
CISDM	Proprietary Database	2,300	+1,600	No	Yes
MSCI	Proprietary Database	1,800	+1,500	Yes	Not communicated
Bernheim	U.S. Offshore Funds Directory	+900	18	Yes	No
Zurich	ZCM + Other Available Databases	900	60	No	No
LJH	Proprietary Database	+800	All the funds	Yes	No
Edhec	Main hedge fund indices available on the market	n.a.	n.a.	No	Yes
MondoHedge	Proprietary Database	720	48	No	Yes
Blue X	Proprietary Database	350 - 400	30-40	Yes	No
Eurekahedge	Proprietary Database	365*	110	No	No
EACM	Proprietary Database	100	100	Yes	No
Talenthedge	Proprietary Database	Not communicated	5 to 20 per index	Yes	No

\* Note that the Eurekahedge Asian Database covers at least 95% of the Asian alternative industry.

The last two columns of table 5 contain the providers that publish a composite index and/or a fund of fund index. These indices are generally used to evaluate the hedge fund universe as a whole. We note that Fung and Hsieh (2003)<sup>6</sup> suggest that fund of fund indices should be preferred to composite indices because they give a less biased view of the performances of the hedge funds. One must nonetheless keep an important point in mind: indices of that kind in no way account for the broad diversity of hedge fund strategies. Their usefulness is therefore limited.

<sup>4</sup> Patel, S.A., and Krishnan, B., 2002, Constructing A Hedge Fund Benchmark: Random or Stratified Sampling, *Alternative Investment Quarterly*, 3<sup>rd</sup> Quarter 2002

<sup>5</sup> The presentation booklet for the Edhec indices can be downloaded from the [www.edhec-risk.com](http://www.edhec-risk.com) web site. It can be referred to for more details on the index construction method.

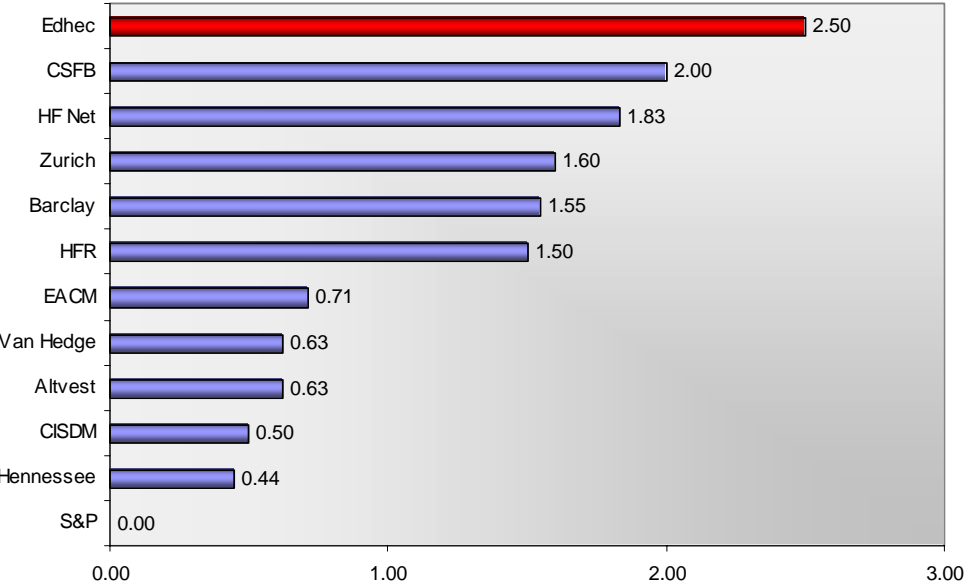
<sup>6</sup> Fung, W. and Hsieh D. A., 2002, Benchmark of Hedge Fund Performance, Information Content and Measurement Biases, *Financial Analysts Journal*, Jan/Feb 2002, Vol.58, Issue 1, p.22-34.

To test the representativity qualities of the main hedge fund indices<sup>7</sup>, we proceeded in the following way: we constituted, for each of the 12 most important strategies in terms of assets under management, an equal weighted portfolio from a database of 7,422 funds (2,317 of which are not recorded in any database)<sup>8</sup>. These portfolios therefore contain an average of more than 600 funds for each of the strategies and are, as such, considered to be relatively representative of their investment management universe. We then calculated these portfolios' correlation coefficients with the hedge fund indices between January 1998 and December 2000. The higher the correlation coefficient, the more representative the indices are. For each of the strategies, we ranked the indices in ascending order of their correlation coefficients and attributed a number from 1 to 3 corresponding to the group in which they were situated (1 corresponding to the top third and 3 to the bottom third). We then attributed 3 points to the indices that were ranked in the first third, 1 point to those in the second third and 0 points to the indices in the last third. The graph below gives us the average number of points obtained by each of the index providers for all of the strategies that they cover. We observe that the indices do not all provide the same representativity qualities.

The graph shows us that the size of the database appears to be a necessary but insufficient factor to obtain a high degree of representativity. As we might have expected, the indices that are made up of a reduced number of funds (e.g. S&P, EACM) are less representative than those that contain a larger number of funds (HF Net, HFR, CSFB, Barclay). We should note that this phenomenon is particularly significant in the case of non-directional strategies. As such, it would seem that the "Stratified Sampling" method employed by S&P does not allow a high degree of representativity to be obtained (the S&P indices are systematically ranked in the bottom third). However, the good results of the CSFB indices show that the efforts made to weight the performances of the funds by their assets under management are not in vain (the CSFB indices are generally ranked in the top or middle third). In the same way, the excellent results obtained by the Edhec indices confirm the importance of the construction method.

Among the indices evaluated, only the S&P indices are investment oriented. In view of the modest results obtained by these indices during our representativity test, it clearly appears that the representativity dimension has been sacrificed in favour of better "investability." This tends to confirm the thesis that "investable" indices resemble funds of funds rather than indices in the actual sense of the term.

Graph 1: Average ranking of the index providers according to their degree of representativity



<sup>7</sup> Only the indices for which the returns over the period 1998-2000 were available to the public were considered. The providers that only publish regional and/or global indices were also set aside.

<sup>8</sup> Special thanks are due to François Serge Lhabitant for providing us with the representative portfolio data.

## II.2 The purity dimension

The hedge fund indices are mainly addressed to funds of hedge funds. To be pure, they must perfectly (i.e. without bias) reflect the investment process of the latter. The first step in this process is to identify the investment management universe (i.e. the breakdown of the investment world and the classification of the different funds). However, there is no consensus as to the definition of hedge fund strategies<sup>9</sup>, nor even as to the number of categories of hedge fund strategies. The providers therefore have a certain degree of liberty in classifying the funds. Table 4 shows us that they take advantage of this by segmenting the hedge fund universe as they see fit. While Zurich only consider 5 investment management styles, EACM publish 18 style indices, CISDM 19, HF Net and HFR 37, and MSCI more than 190!

Furthermore, in a world in which the competitive advantage of managers is based to a large extent on the sophistication and confidentiality of their “proprietary” management techniques, the index providers, apart from a few exceptions (Zurich, EACM, LJI, S&P, Feri, Talenthedge and BlueX), are generally content to use the managers’ self-proclaimed styles. There is however good reason to believe that some managers, faced with ever fewer opportunities, may be led to deviate significantly from their ostensible management style (a so-called “style drift” phenomenon, cf. Lhabitant (2001)<sup>10</sup>). The indices that rely on the managers’ self-proclaimed styles are therefore liable to classify funds in categories that are not entirely appropriate. The composition of the style index then deviates from that of a fund of funds specialised in the same strategy, because the latter would have immediately divested its shares in funds that had changed style. The index therefore loses in purity because it covers funds that a fund of hedge funds would not hold in its portfolio.

The breakdown of the investment world and the fund classification is the direct responsibility of the database provider. The choice of database therefore has a direct influence on the purity of the index.

Table 6: The fund classification methods

Index Providers	Number of Indices	Classification Method
EACM	18	Classified by EACM
HFR	37	Classified by the manager
CSFB	14	Classified by the manager and then validated by the index committee
Zurich	5	Classified by Zurich
Van Hedge	16	Classified by Van Hedge
Hennessee	24	Classified by the manager and then validated by the index committee
HF Net	37	Classified by the manager
LJI	16	Classified by LJI
CISDM	19	Classified by the manager
Altvest	14	Classified by the manager
MSCI	More than 190	Classified by the manager and then validated by the index committee
S&P	10	Classified by S&P
Feri	16	Classified by Feri
Blue X	1	Classified by BlueX
Edhec	13	n.a.
MondoHedge	7	Classified by the manager and then validated by the index committee
Eurekahedge	3	Classified by Eurekahedge
HFIntelligence	13 InvestHedge + 13 EuroHedge + 7 AsiaHedge + 12 Absolute Return	Classified by the manager and then validated by the index committee
Bernheim	1	Not communicated
Talenthedge	2	Classified by Talenthedge
Barclay	18	Classified by Barclay

<sup>9</sup> We should note that the AIMA is currently working on this subject.

<sup>10</sup> Lhabitant, F.S., 2001, Assessing Market Risk For Hedge Funds and Hedge Funds Portfolios, The Journal of Risk Finance, Spring, p.1-17

After identifying the investment management universe and deciding on the strategic allocation, the fund of hedge fund manager carries out the fund selection. If we assume that for a given strategy the fund of fund manager is looking for a very precise type of fund, the indices should contain funds with similar profiles. However, if the indices do not all have the same selection criteria, that cannot be the case. They cannot therefore all be perfectly pure.

The following table illustrates the diversity of the selection criteria imposed by the different index providers. While most indices integrate both onshore and offshore funds, some focus on onshore funds (e.g. MondoHedge is only made up of Italian funds) or offshore funds (e.g. Bernheim). In the same way, some indices require a minimum size (in terms of assets under management) and history (e.g. S&P, EACM, Zurich), while others accept funds of all sizes, without any restriction on the length of the track record (e.g. HFR, Van Hedge, HF Net, CISDM, Altvest or MondoHedge). Finally, some indices only consider funds that are still open to new investors (e.g. EACM, S&P, Feri, BlueX), and others do not (e.g. HFR, Van Hedge, Hennessee, HF Net, etc.). In view of the diversity of the selection criteria, the different indices cannot all give an unbiased view (i.e. with no selection bias) of one and the same strategy. It is thus obvious that the indices do not all provide the same degree of purity.

Table 7 (1<sup>st</sup> part): Fund selection criteria

Index Providers	Onshore and Offshore	Minimum Size	Track Record	Defunct Funds <sup>11</sup>	Funds Closed to New Investors <sup>12</sup>	Other Conditions
EACM	Not communicated	20mn USD	2 years	No	No	No
HFR	Yes	No	No	Yes	Yes	The funds must give their net value in USD every month
CSFB	Yes	10mn USD	1 audited financial year (or 500mn USD under management)	Yes	Yes	The funds must send an initial estimation of their returns before the 7 <sup>th</sup> day of M+1 and their last results audited before June 30
Zurich	Yes	From 25 to 75mn USD depending on the strategy	25mn USD for 2 years	Yes	Yes	No
Van Hedge	Yes	No	No	Yes	Yes	No
Hennessee	Yes	10mn USD	1 year	Yes	Yes	No
HF Net	Yes	No	No	No	Yes	No
LJH	Not communicated	Not communicated	Not communicated	Not communicated	Not communicated	Not communicated
CISDM	Yes	No	No	Yes	Yes	The funds must have a good level of organisational and managerial infrastructure
Altvest	Yes	No	No	Yes	Yes	No
MSCI	Yes	15mn USD	No	Yes	Yes	No
S&P	Yes	75mn USD	3 years	Yes	No	The funds must accept to manage a "managed account" with a capacity of 100mn USD
Feri	No (only offshore funds, i.e. non-US funds)	50mn USD	1 year	Yes	No	The funds must obtain a Feri rating of A or B. Their liquidity must be at least quarterly and their target return at least 7% with limited drawdown. The funds must report to a major institution and be open to investors of all nationalities. At least 30% of their capital must come from external sources and the lock-up period must not exceed 6 months. The expected performance must be at least 3% greater than Libor and only 30% of the capital can have a liquidity greater than or equal to 3 months
Blue X	Yes	20mn USD*	1 year	Yes	No	

\*10% of the funds contained in the index can be smaller  
Table 7 (2<sup>nd</sup> part): Fund selection criteria

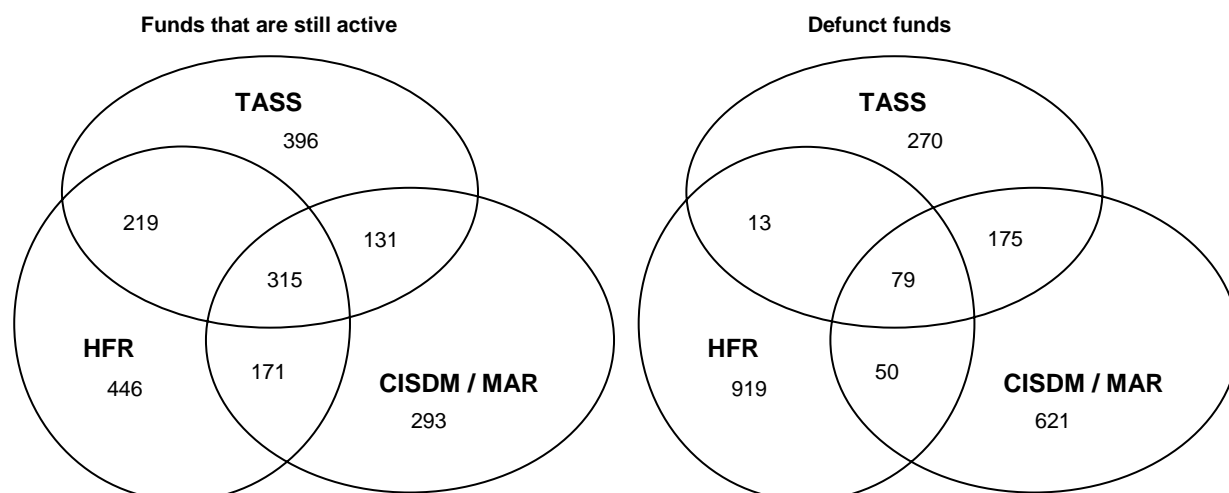
<sup>11</sup> This involves funds that no longer communicate their results to a database for one reason or another (bankruptcy, merger with another fund, fund closed to new investors, etc.). If the past performances of defunct funds are retained in the index history the answer is "Yes"; if they are excluded from the index history the answer is "No."

<sup>12</sup> If the funds that are closed to new investment are included in the index the answer is "Yes"; otherwise the answer is "No."

Index Providers	Onshore and Offshore	Minimum Size	Track Record	Defunct Funds <sup>13</sup>	Funds Closed to New Investors <sup>14</sup>	Other Conditions
Edhec	n.a.	n.a.	n.a.	n.a.	n.a.	The underlying index data must be publicly available.
MondoHedge	No (only onshore funds, i.e. Italian funds)	No	No	Yes	Yes	The funds must be authorised by the Bank of Italy and provide their net share value and their assets under management. The funds must have increased their assets under management in t-1.
Eurekahedge	Yes	40mn USD	No	Yes	Yes	No
HFIntelligence	Yes	No	1 month	Yes	Yes	No
Bernheim	No (only offshore funds i.e. non-US funds)	Not communicated	Not communicated	Not communicated	Not communicated	Not communicated
Talenthedge	Yes	5mn USD	12 months	No	No	The funds must accept to manage a "managed account" with a capacity of 200mn USD. The fund must not follow a discretionary strategy and must be 90% invested in liquid markets. It must have performance that is greater than 10% and a drawdown of -15% at most. Finally, it must have its head office in one of the cities cited by Talenthedge.
Barclay	Yes	No	No	Yes	Yes	No

Finally, to be pure, an index must not only reflect the investment process of a fund of hedge funds but also give a realistic estimation of the performance that the fund of hedge funds in question could expect to obtain by investing in that strategy. It must not therefore be significantly affected by performance measurement biases such as the survivorship bias. However, when an index provider decides to exclude from its index history the past performances of funds that have stopped communicating their results to the database, it is exposed to survivorship bias (e.g. EACM, HF Net). Since the databases do not contain the same funds, whether it involves funds that are still active or defunct funds, (cf. Graph 2), the different indices will not be affected by the survivorship bias in the same way (cf. Liang (2002)<sup>15</sup>).

Graph 2: Number of funds that are common to the different databases



Source: Agarwal et al. (2003)<sup>16</sup>

<sup>13</sup> This involves funds that no longer communicate their results to a database for one reason or another (bankruptcy, merger with another fund, fund closed to new investors, etc.). If the past performances of defunct funds are preserved in the index history the answer is "Yes"; if they are excluded from the index history the answer is "No."

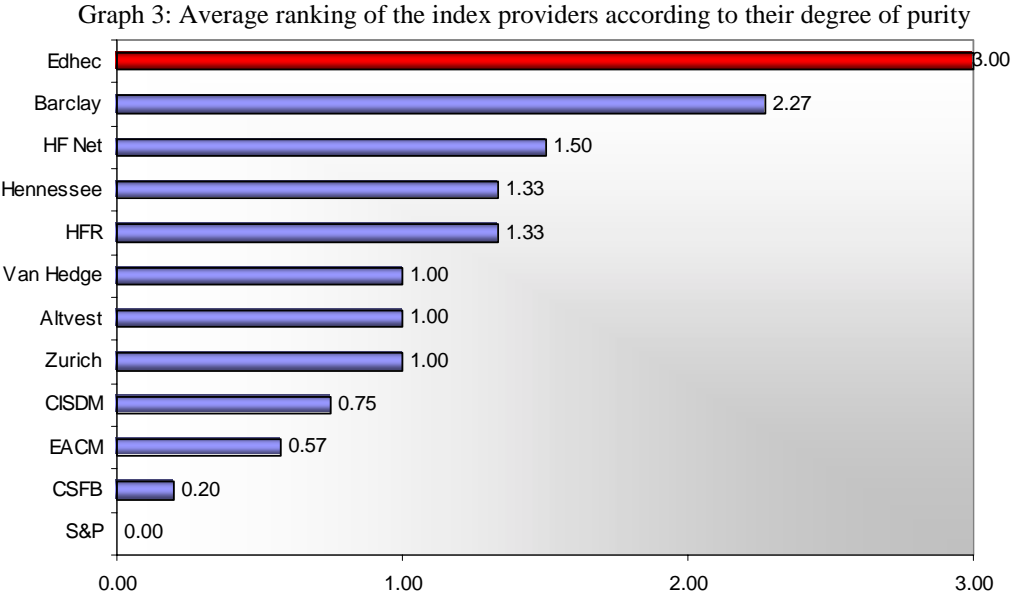
<sup>14</sup> If the funds that are closed to new investment are included in the index the answer is "Yes"; otherwise the answer is "No."

<sup>15</sup> Liang B., 2000, Hedge Funds: the Living and the Dead, *Journal of Financial and Quantitative Analysis*, September 2000

<sup>16</sup> Agarwal, V., Daniel, N.D., Naik, N.Y., 2003, Flows and Performance in the Hedge Fund Industry, *Working Paper*, Centre for Hedge Fund Research and Education

While it is not possible to evaluate the impact of each of the previously mentioned biases on the general degree of purity of an index (it would require the selection criteria and the exact composition of the pure indices to be known), it is possible to evaluate the overall level of purity of an index. Even though the information provided by the different indices is not exactly the same, a large part of the information is nonetheless common between them. The pure index is the one that best reflects this common information because it is not affected by the different biases we have referred to. It is therefore possible to test the purity of the different indices by following the procedure proposed by Amenc and Martellini (2002)<sup>17</sup>. This involves an initial extraction of the common information from the different indices with the help of the Kalman Filter method. We thereby obtain a time series that represents a perfectly pure index. One then simply calculates the correlation coefficients of the different indices with this pure index. The higher the coefficient, the purer the index. For each of the strategies, we ranked the indices in ascending order of their correlation coefficients and attributed a number from 1 to 3 that corresponded to the group in which they were situated (1 corresponding to the top third and 3 to the bottom third). We then attributed 3 points to the indices that were ranked in the first third, 1 point to those in the second third and 0 points to the indices in the last third.

The following graph gives us the average number of points obtained by each of the index providers for all of the strategies that they cover. We observe that the indices do not all provide the same purity qualities.



It is interesting to note that the level of purity seems to be correlated with the degree to which the selection criteria imposed by the database (minimum size, track record, etc.) are demanding. The less restrictive the selection criteria, the higher the degree of purity presented by the indices (e.g. HFR, Hennessee and HF Net). Conversely, the stricter they are, the lower the degree of purity of the index (e.g. S&P, CSFB, EACM, etc.). In addition, we should note that Zurich’s classification method based on the “Cluster Analysis” technique enables satisfactory results to be obtained despite relatively strict selection criteria (i.e. the indices are ranked in the middle third on average). In the same way, the construction method used by the Edhec indices allows them to obtain excellent results (i.e. they are systematically ranked in the top third). We should note that this is not surprising, since by maximising the representativity dimension, the PCA technique leads implicitly to a minimisation of the biases (i.e. the construction of a portfolio of indices results in diversification of the biases).

<sup>17</sup> Amenc N., Martellini L., 2002, The Brave New World of Hedge Fund Indices, Working Paper, Edhec Risk & Asset Management Research Centre

# Conclusion

The aim of our study was to understand the reasons behind the heterogeneity of the performances of the different indices that are available on the market. That led us to focus on the construction methods and management principles of the different indices. We were therefore able to observe the diversity of the underlying databases, construction methods and management principles of those same indices. We then questioned the consequences of diversity of that kind on the representativity and purity qualities of the different indices. The verdict is clear and unambiguous: all indices are not created equal! While some obtained better than average results in our representativity and purity tests (e.g. Zurich, HFR, Barclay and HF Net), others did worse than the average of their peers in both tests (e.g. S&P, EACM and CISDM). Finally, other index providers illustrated themselves either for their representativity (CSFB) or for their purity (e.g. Hennessee, Van Hedge and Altvest).

Nevertheless, we should recall that indices should reflect both the diversity and the evolution of investors' needs. Those needs are numerous and evolve continually: tracking the market (or a particular investment style), asset allocation, performance measurement and/or attribution, acting as underlying assets for derivative instruments, etc. As a result, the indices take different forms. It is then obvious that the index that will suit one will not necessarily suit the others. While the ideal index remains a myth, each individual is responsible for determining the type of index that they need and for selecting/constructing *their* ideal index. The quality of an index must imperatively be evaluated in the light of the use that will be made of it. Our study is capable of assisting investors in that direction (cf. graph 4).

Since hedge funds have long been favoured for their absolute returns, hedge fund indices have only played a marginal role up until recently. Nonetheless, one is obliged to observe that they are now participating fully in the growth of the alternative investment industry. Their role in the rationalisation process for alternative investment practices is central and, thanks to the development of numerous "investable" indices (cf. S&P, MSCI, CSFB, HFR, Van Hedge, Feri, BlueX, etc.) and the marketing of various derivative products, they are making a significant contribution to the growth in volumes under management. They are now the favoured tool in the industrialisation of hedge funds and there is no doubt that they will continue to play a central role in the development of alternative investment in the future.

Graph 4: Synthesis – Representativity vs. Purity

