

# Hedge Fund Strategy Benchmarks: Tricks of the Light or Lighthouses?



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Over the last few years, alternative investment strategies have dramatically gained in popularity. Initially reserved for high net worth individuals (henceforth HNWI), they progressively drew the attention of individual and institutional investors, to reach approximately 1 trillion dollars in assets under management today. However, while HNWI were looking for absolute returns, private and institutional investors are more focused on capital preservation and/or risk-adjusted performance. This evolution in the profile of hedge fund investors naturally gave rise in the alternative arena to new requirements, especially with regard to the performance measurement process.

Traditional performance measures such as the Sharpe ratio do not account for hedge fund-specific risks (e.g. exposure to multiple risk factors, extreme risks, etc.). In other words, traditional performance indicators cannot inform investors about the risk-adjusted performance of hedge funds. For this reason, investors turned to multi-factor models to measure hedge fund alphas. Unfortunately, traditional multi-factor models also fail to properly account for the specific characteristics of hedge funds (e.g., dynamic and non-linear exposure to risk factors). Building on Glosten and Jagannathan's (1994) contingent-claim approach, some attempts have been made to capture hedge funds' non-linear exposure to risk factors through the use of options. However, though theoretically robust, these models are characterised by high model risk (the misspecification problem). A practical alternative to this approach consists of using factors embedding hedge funds' original risk characteristics. Hedge fund indices therefore appeared to be ideal candidates to serve as pseudo-risk factors. Such models, however, must be handled with care. Investors must bear in mind that the relevance of the results depends heavily on the quality of the inputs.

The construction of an appropriate benchmark is one of the major challenges of the performance measurement process. Without *quality* benchmarks, it is not possible to differentiate between returns due to the investment style of the manager and returns due to the talent of the manager, which in turn makes it difficult to measure relative returns. In this respect, it should be noted that while a good index is above all representative of its investment universe, a *quality* benchmark is above all representative of an investor's risk profile. In some cases, an index may be used as a benchmark if the manager is following a strategy that is closely linked to this index. In most cases, however, strategy benchmarks (see Kuenzi 2003 for further details on strategy benchmarks) will differ from commercial indices, and customized benchmarks will therefore have to be designed. As highlighted by Sharpe (1992), style analysis can be used to construct these benchmarks as long as style indices are collectively exhaustive and mutually exclusive. In practice, investors are somewhat reluctant to use non-investable solutions as benchmarks. A *quality* benchmark must thus be investable and provide investors with a solution offering a low tracking error versus their strategy benchmark, which implies that the indices used in the style analysis must be both representative and investable. As a consequence, constructing *quality* benchmarks is not a trivial task.

In Anson (2003), the author highlighted the fact that indices do not provide investors with a true and fair picture of the performance of hedge fund strategies, and stressed the difficulty for investors of measuring relative returns properly. In the meantime, however, index providers have improved their construction methodology and management principles. At the same time, new series of investable hedge fund indices have been launched. Our contribution will be to revisit the issue of hedge fund strategy benchmarks in light of these new elements and try to answer the question that was implicitly asked in Anson (2003): Can investors in the alternative arena measure the relative returns of hedge funds?

## 1. Are Hedge Fund Indices Really Indices?

The lack of transparency has long been a hurdle to the development of the alternative investment industry. Hedge funds used to be extremely secretive about their performance and their investment strategy, making it very difficult for investors to differentiate between returns explained by the style of the fund (i.e., beta drivers) and returns generated by the skill of the manager (i.e., alpha drivers).

In this respect, the development of *peer indices* (i.e., non-investable indices) has been a strong response to investors' need for a better understanding of hedge fund performance. A multitude of "boutiques" specialised

in hedge funds (HFR, CSFB/Tremont, CISDM, etc.) have launched their own indices relying on different databases (HFR, TASS, CISDM, etc.), using varying construction methodologies (e.g., equally weighted versus value weighted) and diverse management principles (quarterly versus annual rebalancing, no backfilling versus full history backfilling, etc.). Furthermore, it is worth noting that index providers have themselves made considerable efforts towards increasing their own level of transparency. Some of them now dispose of an independent index committee, and most publish the composition and details of the construction methodology on dedicated websites.

Illustration 1: Overview of Major Non-Investable Hedge Fund Indices

Index Provider	Launch Date	Base Date	Index Weighting	Nbr of Funds in the Database	Nbr of Funds in the Indices	Rebalancing Frequency
Altvest	2000	1993	E.W.*	+2600	+2260	Monthly
Barclay Group	2003	1997	E.W.*	+3200	2120	Monthly
CISDM	1994	1990	Median	+2300	+1280	Monthly
CSFB/Tremont	1999	1994	V.W.**	+3300	431	Quarterly
EACM	1996	1996	E.W.*	100	100	Annual
Edhec	2003	1997	P.C.A.***	n.a.	n.a.	Quarterly
Hennessee	1987	1987	E.W.*	+3500	+690	Annual
HF Net	1998	1976 -1995 <sup>†</sup>	E.W.*	+4100	+3100	Continual
HFR	1994	1990	E.W.*	+4000	+1600	Monthly
MSCI	2002	2002	E.W.* & V.W.** <sup>‡</sup>	+1900	+1500	Quarterly <sup>§</sup>
Van Hedge	1994	1988	E.W.*	+6000	+1300	Monthly

- \* E.W. stands for Equally Weighted
- \*\* V.W. stands for Value Weighted
- \*\*\* P.C.A. stands for Principal Component Analysis
- <sup>†</sup> Depends on the strategy
- <sup>‡</sup> For global indices
- <sup>§</sup> For inclusion and Monthly for the "reranking" of funds

Source: EDHEC Risk

We can thus consider that hedge fund indices are to a certain extent unambiguous, accountable and verifiable. But do they meet the traditional criteria (see Bailey 1992) for a *quality* benchmark? The answer is definitely no.

On the one hand, most of these indices are affected by biases inherited from the underlying databases (selection bias) and from the way the indices are maintained (survivorship bias or backfilling bias) (see Fung and Hsieh 2002. For more details on performance measurement biases). The consequence is twofold. Firstly, no index is representative of the whole industry since they all cover different parts of the investment universe. Secondly, the different indices available on the market are variously impacted by performance measurement biases. This is largely reflected in the heterogeneity of their returns. Investors are thus provided with a somewhat confusing picture of alternative investment strategies (Amenc et al. 2004).

As it is impossible to come up with an objective judgment on the best existing index, a natural idea consists of using some combination of the indices available on the market (henceforth referred to as competing indices) to reach a better understanding of what the common information about a given investment style would be. One straightforward method would involve computing an equally-weighted portfolio of all competing indices. Since competing hedge fund indices are based on different sets of hedge funds, the resulting portfolio of indices would be more exhaustive than any of the competing indices it is extracted from.

The index of indices construction methodology pushes the logic one step further and consists of using factor analysis techniques to generate a set of indices that can be thought of as the best possible one-dimensional summaries of information conveyed by competing indices for a given style, in the sense of the largest fraction of the variance explained. Technically speaking, this amounts to using the first component of a Principal Component Analysis (PCA) of competing indices. The coefficients of the first component are

normalised so that they sum up to 1. The resulting coefficients are then used to construct portfolios of indices. It is thus possible to generate an index of indices for every single strategy. Note that the first component typically captures a large proportion of cross-sectional variations because competing style indices tend to be at least somewhat positively correlated. Indices of indices generated as the first component in a factor analysis have a built-in element of optimality, since there is no other linear combination of underlying indices that implies lower information loss.

The underlying indices entering into the composition of the indices of indices are partially made up of funds that are closed to new investment or do not provide investors with sufficient extra capacity. It is thus technically difficult for investors to replicate the performance of these indices with a satisfactory tracking error. Consequently, those indices, and in turn, the indices of indices, do not offer a viable alternative to existing investment vehicles (hedge funds or funds of hedge funds), and since investors are generally reluctant to use indices that are not investable as benchmarks, they cannot qualify as *quality* benchmarks. Being a good index is a necessary but insufficient condition for a good benchmark.

In conclusion, non-investable hedge fund indices, due to their lack of representativity, tend to present a confusing picture of the performance of hedge fund strategies. To address this issue, and more generally to mitigate the impact of performance measurement biases, several approaches have been suggested. The index of indices approach, for example, resolves the issue of representativity. It thus provides investors with interesting yardsticks by which to measure the performance of hedge funds. However, this approach does not provide a viable alternative to hedge fund investing, and cannot as a result provide investors with *quality* benchmarks.

## **2. Are Investable Hedge Fund Indices Nothing but Passively Managed Funds of Hedge Funds?**

To address the investability issue, some of the aforementioned index providers (CSFB/Tremont, HFR, etc.) and renowned traditional financial institutions (S&P, MSCI, Dow Jones, FTSE, etc.) have launched investable hedge fund indices. Generally based on platforms of separated accounts rather than on hedge fund databases, this new generation of indices has been able to provide investors with improved liquidity (up to weekly) and increased transparency (managed accounts allow full transparency and daily pricing). In addition, for all these indices, the composition, construction methodology and management principles are overseen by an independent committee and disclosed to the public. The success of these indices was almost immediate and assets managed by investment vehicles linked to these indices rapidly reached 10 billion dollars.

We can thus consider that most investable hedge fund indices are unambiguous, accountable and verifiable. But can these investment vehicles be regarded as *quality* benchmarks? Again, the answer is no.

Investable hedge fund indices give investors an opportunity to obtain relatively low-cost<sup>1</sup> exposure to alternative investment strategies. Consequently, unlike non-investable indices, they offer a viable alternative to hedge fund or fund of hedge fund investing. Nevertheless, in most cases, investability is the primary objective of the index construction process. Funds are selected by the index providers, or more often by the managed account platform teams, for their extra capacity, liquidity, good infrastructure, high level of transparency or track record, and not for any criteria related to representativity (CSFB/Tremont indices are an exception since they are generally composed of the six largest funds in the eligible universe). Similarly, indices are equally weighted (Dow Jones, S&P), weighted according to their level of "investability" (FTSE Index) or at best value (CSFB/Tremont indices). Except for the HFR indices (the weights are chosen so as to maximise the correlation with the corresponding non-investable index) and perhaps for the CSFB/Tremont indices, which are value weighted, there is generally no explicit reference to representativity.

Unfortunately, one of the by-products of this search for investability is a significant loss in terms of representativity. Focusing on funds' liquidity leads to the exclusion of numerous funds (especially funds with small additional capacity or investing in illiquid securities). As a result, the different investable hedge fund indices available on the market fail to capture the actual betas of hedge fund strategies, and thus fail to

satisfy a basic criterion for representativity. They should thus be referred to as passively managed funds of hedge funds rather than indices. Obviously, since the various investable indices are representative of different investment universes, they present a certain degree of heterogeneity in terms of risk factor exposures and performance. They cannot *ipso facto* qualify as *quality* benchmarks.

#### Illustration 2: Overview of Major Investable Hedge Fund Indices

Index Provider	Launch date	Base date	Strategy / Fund Weighting	Nbr of Funds in Database / Eligible Universe	Nbr of Funds in the Index	Rebalancing Frequency
CSFB/Tremont	Aug-03	Jan.-00	V.W. / V.W.	3300 / 420	60	Semi annually
Dow Jones	Nov-03	Jan.-02	n.a. / E.W.	300 / 100	35	Quarterly*
FTSE	Apr-04	Jan.-98	I.W. / I.W.	6000 / 75	40	Annual**
HFRX	Mar-03	Jan.-00	V.W. / *	2300 / n.m.**	n.a.***	Quarterly
MSCI	Jul-03	Jan.-00	Adj. Median Asset Weighted / E.W.	105 / n.m.**	97	Quarterly
S&P	May-02	Jan.-98	E.W. / E.W.	3500 / 300	40	Annual***

\* Fund weightings are optimised to maximize correlation with their group

Source: EDHEC Risk

\*\* n.m. stands for not mentioned

\*\*\* Optimal number of funds for strategy replication is determined through Monte Carlo simulation

\* Additions or deletions can occur without notice at the complete and absolute discretion of Dow Jones

\*\* Funds may be added/deleted more frequently in response to changing market conditions or fund-specific events

\*\*\* Annual at the strategy level and periodically on the fund level

This consensus is that to maximise representativity an index must cover the largest possible number of funds. From this simplistic angle, because representativity requires the inclusion of both open and closed funds, and since closed funds are excluded from investable indices because they are not investable, it seems impossible to obtain an investable index that is representative of its strategy. Under such an assumption investable indices are doomed to being FoHF only.

However, there is a different way to maximise representativity without covering the largest number of funds. A rigorous and innovative method that reconciles investability and representativity with a small number of funds has recently been proposed in Goltz et al. (2004). The construction methodology developed in this paper is based on the concept of factor replicating portfolios (see Huberman, Kandel and Stambaugh 1987 for a formalisation of the concept). Following Fung and Hsieh (1997), the authors try to identify implicit factors mimicking hedge fund strategies, through the use of principal component analysis (PCA). They then try to replicate these factors with the following two-step approach:

- Selection stage: strategy by strategy, the 10 hedge funds that are most correlated with the first principal component are selected in-sample. The selected funds will be the most representative of a given strategy.
- Optimisation stage: the weights of each fund are calculated so that the replicating portfolio returns' in-sample correlation with the corresponding principal component is maximised.

The selection and optimisation phases are carried out on an annual basis. In-sample and out-of-sample correlations are greater than 0.95 for four strategies, namely convertible arbitrage, CTA global, event driven and equity long/short. Results are similar to the average of non-investable indices, showing that investability was not obtained at the cost of representativity.

The relevance of such indices is strengthened by a conclusive robustness analysis, with regard to the number of funds (tests with 5 and 15 funds), the ranking of funds in the portfolios in terms of correlation with the first principal component (tests with 10 funds ranked after the 10th rank), the rebalancing of funds (tests without re-performing the selection stage each year, while the optimisation stage is repeated each year), the frequency with which the selection is performed and the optimisation stages (tests with a frequency of three months), and constraints on weights (weights to be comprised between 5% and 20%). This confirms that representativity and investability can be achieved if both objectives are taken into account during fund selection and portfolio construction.

in conclusion, investable hedge fund indices offer a relatively low-cost solution to gaining exposure to hedge fund strategies, but as a result of their lack of representativity, they tend to present a confusing picture of the performance of hedge fund strategies. They cannot therefore serve as benchmarks to measure hedge funds' relative returns. To tackle this issue, a methodology was recently introduced in Goltz et al. (2004). Results indicate that it is possible to construct strategy benchmarks for hedge fund strategies that are both representative and provide investors with a viable alternative to hedge fund or fund of hedge fund investing. In other words, it is technically possible for investors to construct *quality* benchmarks, and as a consequence, to measure hedge funds' relative returns properly.

### 3. Conclusion

An overview of the current literature on hedge fund indices leads to the observation that it is not an easy path to take. Hedge fund indices suffer from numerous theoretical shortcomings and practical challenges. In spite of these problems, a wide range of indices, both non-investable and investable, is available on the market. Their characteristics can be very different among providers. Consequently, investors have to be very cautious when considering hedge fund indices. Both non-investable indices and investable index offerings suffer from heterogeneity, and from that angle the selection of one or the other will have significant consequences.

As stressed in this article, hedge fund indices are not created equal. While most of the indices available on the market are not representative of their investment universe, some manage to provide investors with a true and fair representation of hedge fund strategies. This is the case of the "index of indices" approach introduced in Amenc et al. (2004).

However, having representative indices is a necessary but not sufficient condition for constructing quality benchmarks. As mentioned in this article, investors are reluctant to use benchmarks that do not offer viable passive alternatives to actively managed funds in the performance measurement process. To measure relative returns, they must thus have indices that are not only representative but also investable. Unfortunately, the investable hedge fund indices available on the market turn out to be nothing more than passively managed FoHF, and, as a result, are not representative of hedge fund strategies.

To avoid having investability coming at the cost of representativity, Goltz et al. (2004) recently proposed a methodology based on the concept of factor replicating portfolios. These indices, made up of a limited number of single hedge funds, can be thought of as the best possible one-dimensional summaries of information conveyed by a variety of hedge funds of a given style, in the sense of the largest fraction of the variance explained. In other words, it is possible, provided that representativity is taken into account at during selection and optimisation, to construct indices that are appropriate for the construction of *quality* benchmarks. In conclusion, the answer to the question asked in Anson (2003) is 'Yes'. It is now possible for investors to measure the relative returns of hedge fund strategies properly.

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