The strategic value of hedge fund investing

Hedge funds are the cause of much debate. **RICHARD KEARY** and **SIMON ELIMELAKH** suggest a 'radical' methodology for deciding the quantum and funding strategy for a hedge fund investment.

There have been many articles written recently that seek to arrive at some optimal allocation to hedge funds. Most research is based on readily available hedge fund databases, loosely referred to as hedge fund indices.

Analysis of these types of aggregates is next to meaningless. In a bid for orthodoxy, many traditional rules have been abandoned. The literature is rich with articles questioning the usefulness of 'average manager' or 'median manager' benchmarks, as they do not satisfy the generally accepted characteristics of good benchmarks.

Good benchmarks are unambiguous, with the names and weights of securities comprising the benchmark clearly delineated. They are investable — the option is available to forgo active management and simply hold the benchmark. They are measurable — with the benchmark's own return readily calculated. Good benchmarks are specified in advance.

The so-called hedge fund indices do not satisfy any of these requirements. They are ambiguous, with the composition of the median manager's portfolio unavailable for inspection, either before or after the evaluation period. They are not investable, and the performance of the median manager is measurable, but only by the data provider.

The median manager is not specified in advance, and can only be identified ex post. The composition of the median fund will change from one measurement period to the next. The median manager's investment style is not necessarily the same as the investment style of the manager that ultimately must be selected to execute the hedge fund investment.

Respected index provides including S&P and MSCI have recently launched so-called investable hedge fund indices. Analysis of the construction of these benchmarks will show that they are nothing more than funds of hedge funds disguised as indices. Investors will need to make a choice; do they want their hedge fund assets invested by index providers, or by active professionals?

Generally speaking, the deviation between top and bottom quartile managers in the hedge fund world is much greater than for traditional risky assets. The use of median manager-type benchmarks was rejected in the traditional investment space many years ago. Its use in the hedge fund area, apart from being poor practice, is also very risky.

To illustrate how significantly the risks of hedge fund investments can be underestimated using the average/median manager benchmarks, lets consider a stylised, simplified case of a benchmark based on N underlying managers whose returns are independent and identically N(m,s) distributed, where N(m,s) is a normally distributed variable with 'm' mean and 's' standard deviation. Lets consider two possible manager-based benchmarks: the average and the median managers.

In both cases, the mean of the benchmark distribution is the same 'm', but what about the standard deviation? With the average manager, the answer is simple and well-known:

RICHARD KEARY
ASIA Head of Alternative Investments at BT Financial Group

SIMON ELIMELAKH ASIA Head of Quantitative Research at BT Financial Group

s/sqrt(N), which is significantly less that the original s. The result is not so simple or well-known for the median manager but it can be derived that the standard deviation will be equal to s/(2 x f(0)/sqrt(N + 2)) or approximately s x 1.253314/sqrt(N + 2) , which is higher than for the average manager but still significantly lower than the original s.

The following table illustrates the results for typical numbers of managers (we assumed here that the original distribution had standard deviation of 1):

To use an average/median manager proxy to make any investment (including asset allocation decision) regarding a particular hedge fund manager is inherently dangerous. The same will be true even for a group of managers or a fund of hedge funds if the number of the underlying managers is smaller than the number of managers in the universe used to calculate the average/median index.

TABLE 1 EXAMPLE 1

N	Average	Median
10	0.316	0.362
50	0.141	0.174
100	0.100	0.124

Data and method

In our work we have access to a unique historical performance data set of more than 30 years from a fund of hedge fund managers. Identification of and engagement with this manager came out of an extensive due diligence process. Our work therefore is focused on making an informed allocation decision answering the fundamental questions of how much to invest and how to fund the investment. We address these questions from the viewpoint of a range of risk/return objectives representing a range of fund types from very conservative to very aggressive.

Our interest is in making an allocation decision to a particular product, our due diligence process having identified that product already. Our data set is therefore the benchmark data for the traditional asset classes (specified in the attachments) and the unique audited track record of an existing and surviving comingled fund of hedge funds where the underlying investment team and philosophy have an enviable track record of success and stability.

We have considered five model portfolios, each with different risk/return objectives, to see what role, if any, the fund of hedge funds plays in different portfolios. These portfolios range from mainly income objectives through traditional balanced funds to the mainly growth objective. The descriptions and benchmarks for these model portfolios are specified in the attachments.

Finally, we have used the mean-variance optimisation framework, which requires the following inputs:

- **Return expectations**
  - As historical returns are very unstable, we used risk premium-based expectations for all the asset classes except the fund of hedge fund investment;
  - The fund of hedge fund return expectation was set to cash + 2.5%, a very conservative assumption given the actual track record of the fund of hedge funds.
- **Volatility and correlation expectations**
  - These were calculated using the standard BARRA World Markets Model methodology, which is using 120 months of exponentially smoothed (with 34-month half-life) data.

We acknowledge that these expectations are very subjective but at the same time believe that any practically reasonable set of expectations will produce similar results.

In the traditional methodology, each asset class is represented by a proxy/index/benchmark providing the passive/no active management solution. After the optimal allocation is found, a particular manager or a group of managers is employed to (hopefully) manage relative to the proxy (and hopefully outperform it).

This approach is general and flexible, allowing asset allocation decisions to be long-term and separated from the manager selection decision. Without changing the allocation, any hired manager can be replaced or mixed with another manager.

In our approach, we sacrifice generality and flexibility and 'optimise' (or at least improve) the allocation for

TABLE 2

Scenario	Description	Comment
1	Traditional asset classes only	No allocation to the Fund of Hedge Funds (FOHF) - provides base line to show efficiency gains/funding strategies for FOHF investment
2	Unconstrained	Does not place any limits (max or min) on any asset classes or the FOHF
3	Constrain traditional assets but do not set constraint on FOHF	Unlike the unconstrained scenario, we set minimum limits on the traditional asset classes but do not set any limit on the FOFH investment
4	Allocate 5% to the FOHF	An arbitrary decision is made to allocate 5% to the FOHF in line with current practice

TABLE 3 **TRADITIONAL ASSET CLASSES ONLY**

	Mainly income	Income, some growth	Balanced	Growth, some income	Mainly growth
Australian Shares	10%	20%	25%	33%	50%
Listed Property Trusts	10%	10%	10%	10%	10%
Australian Fixed Interest	25%	25%	30%	20%	5%
International Shares	5%	10%	15%	22%	25%
International Fixed Interest	10%	10%	10%	10%	5%
Fund of Hedge Funds	0%	0%	0%	0%	0%
Cash	40%	25%	10%	5%	5%
Growth	25%	40%	50%	65%	85%
Income	75%	60%	50%	35%	15%
Fund of Hedge Funds	0%	0%	0%	0%	0%
Return	6.64%	7.41%	7.96%	8.65%	9.56%
Growth	1.31%	2.42%	3.18%	4.31%	5.75%
Income	5.33%	4.99%	4.78%	4.33%	3.81%
Risk (St.dev.)	3.13%	4.66%	5.82%	7.22%	9.28%
Sharpe Ratio	0.443	0.463	0.465	0.470	0.465

TABLE 4 **UNCONSTRAINED**

	Mainly income	Income, some growth	Balanced	Growth, some income	Mainly growth
Australian Shares	2%	3%	3%	18%	32%
Listed Property Trusts	14%	19%	23%	33%	37%
Australian Fixed Interest	0%	0%	0%	0%	0%
International Shares	0%	0%	0%	0%	0%
International Fixed Interest	8%	11%	14%	24%	31%
Fund of Hedge Funds	27%	36%	45%	25%	0%
Cash	49%	31%	15%	0%	0%
Growth	24%	33%	40%	75%	100%
Income	49%	31%	15%	0%	0%
Fund of Hedge Funds	27%	36%	45%	25%	0%
Return	6.99%	7.61%	8.15%	9.33%	9.94%
Growth	3.17%	4.28%	5.31%	5.83%	5.52%
Income	3.82%	3.33%	2.84%	3.50%	4.42%
Risk (St.dev.)	3.11%	4.24%	5.19%	7.64%	9.44%
Sharpe Ratio	0.557	0.557	0.557	0.534	0.498

TABLE 5 **ARBITRARY ALLOCATION OF 5% TO FOHF**

	Mainly income	Income, some growth	Balanced	Growth, some income	Mainly growth
Australian Shares	10%	20%	25%	33%	50%
Listed Property Trusts	10%	10%	10%	10%	10%
Australian Fixed Interest	25%	25%	30%	18%	4%
International Shares	5%	10%	15%	22%	25%
International Fixed Interest	10%	10%	10%	9%	3%
Fund of Hedge Funds	5%	5%	5%	5%	5%
Cash	35%	20%	5%	3%	3%
Growth	25%	40%	50%	65%	85%
Income	70%	55%	45%	30%	10%
Fund of Hedge Funds	5%	5%	5%	5%	5%
Return	6.76%	7.53%	8.08%	8.75%	9.68%
Growth	1.70%	2.81%	3.57%	4.70%	6.14%
Income	5.06%	4.73%	4.51%	4.05%	3.54%
Risk (St.dev.)	3.27%	4.80%	5.96%	7.32%	9.40%
Sharpe Ratio	0.462	0.475	0.475	0.479	0.471

TABLE 6 **NO FOHF CONSTRAINTS – BUT SET MINIMUM ALLOCATION TO TRADITIONAL ASSETS**

	Mainly income	Income, some growth	Balanced	Growth, some income	Mainly growth
Australian Shares	10%	10%	10%	25%	50%
Listed Property Trusts	6%	10%	10%	10%	10%
Australian Fixed Interest	2%	0%	0%	0%	0%
International Shares	5%	9%	14%	25%	25%
International Fixed Interest	15%	0%	1%	0%	0%
Fund of Hedge Funds	22%	31%	48%	37%	12%
Cash	40%	40%	17%	3%	3%
Growth	21%	29%	34%	60%	85%
Income	57%	40%	18%	3%	3%
Fund of Hedge Funds	22%	31%	48%	37%	12%
Return	6.87%	7.40%	8.07%	9.13%	9.81%
Growth	2.94%	4.04%	5.77%	6.87%	6.68%
Income	3.93%	3.36%	2.30%	2.26%	3.13%
Risk (St.dev.)	3.08%	3.93%	5.18%	7.44%	9.54%
Sharpe Ratio	0.525	0.547	0.544	0.521	0.478

TABLE 7 **DESCRIPTION OF BENCHMARK DATA**

Asset class	Representative benchmark
Australian shares	S&P/ASX 300 Accumulation Index
International shares	MSCI World ex Australia (Net div reinvested) unhedged in AUD
Listed property trusts (Aust)	S&P/ASX 300 Property Trusts Accumulation Index
Australian bonds	UBS Australian Composite 0+ yrs
International Bonds	Lehman Brothers Global Aggregate Index (hedged to AUD)
Cash	UBS Australian 90 day Bank Bill Index
FOHF	Reserved

TABLE 8 **DESCRIPTIONS OF MODEL PORTFOLIOS**

Portfolio Number	Description
1	Mainly income
2	Income, some growth
3	Balanced
4	Growth, some income
5	Mainly growth

TABLE 9 **MODEL PORTFOLIO BENCHMARK WEIGHTS**

	1	2	3	4	5
Australian shares	10	20	25	33	50
International shares	5	10	15	22	25
Listed property trusts	10	10	10	10	10
Australian fixed interest	25	25	30	20	5
International fixed interest	10	10	10	10	5
Cash	40	25	10	5	5
Fund of fedge funds (FOHF)	0	0	0	0	0

a particular hedge fund manager (selection of managers).

We used BARRA WMM (World Markets Model) software to run traditional mean variance optimisation. To build the 'efficient frontier' and allocate 'optimal' or close-to-optimal portfolios for the given set of asset classes with their return, volatility and correlation expectations, the following utility function is optimised:

$$U = R - \lambda * \sigma^2$$

Where:
R = Portfolio return expectation
σ^2 = Portfolio volatility (variance) expectation
λ = Risk aversion

It was important for our scenario analysis (see below) that the WMM allows to run unconstrained and — practically more realistic and feasible — constrained optimisation.

Observations

The tables show the results of our analysis. There are four scenarios summarised in these tables.

Under every scenario we tried to generate five portfolios that correspond to the original 'traditional' asset classes-only model portfolios by keeping the same risk (standard deviation) expectations.

Tables 3-6 show the results of the process. Each table is different reflecting the constraining criteria summarised above. Each table shows the resultant allocation between the competing asset classes including the fund of hedge fund investment. Each table also shows the prospective performance metrics of the various model portfolios including return, risk and Sharpe Ratio.

These results are obviously based on our specific return/volatility expectations but — we believe — will hold in many more general cases. Observations include:

- Even a limited inclusion of the right fund of hedge funds into multi-asset class portfolios can substantially improve their risk/return profiles (Sharpe ratios);
- Extremely aggressive growth-type portfolios benefit least from the hedge funds as they rely on the equity market to deliver long-term high returns and can tolerate high risk (volatility);
- Hedge funds are most beneficial for

TABLE 10 **ASSET CLASS RETURN EXPECTATIONS**

	Premium to Cash % pa	Expected return % pa
Cash		5.25
Australian shares	5.25	10.5
International shares	4.95	10.2
Listed property	4.0	9.25
Australian bonds	0.75	6.0
International bonds	0.25	5.5
Fund of fedge funds (FOHF)	2.5	7.75

TABLE 11 **COVARIANCE MATRIX, VOLATILITY AND CORRELATION STATISTICS**

Covariance	AEQ	LPT	AFI	OEQ	OFI	FOHF	Cash
AEQ	0.01690	0.00663	0.00189	0.00861	0.00049	0.00356	0
LPT	0.00663	0.00980	0.00198	0.00361	0.00101	0.00170	0
AFI	0.00189	0.00198	0.00185	0.00071	0.00093	0.00062	0
OEQ	0.00861	0.00361	0.00071	0.01796	–0.00013	0.00228	0
OFI	0.00049	0.00101	0.00093	–0.00013	0.00102	0.00024	0
FOHF	0.00356	0.00170	0.00062	0.00228	0.00024	0.00336	0
Cash	0	0	0	0	0	0	0

Volatility	AEQ	LPT	AFI	OEQ	OFI	FOHF	Cash
AEQ	0.13	0	0	0	0	0	0
LPT	0	0.099	0	0	0	0	0
AFI	0	0	0.043	0	0	0	0
OEQ	0	0	0	0.134	0	0	0
OFI	0	0	0	0	0.032	0	0
FOHF	0	0	0	0	0	0.058	0
Cash	0	0	0	0	0	0	0

Correlation	AEQ	LPT	AFI	OEQ	OFI	FOHF	Cash
AEQ	1	0.515	0.338	0.494	0.117	0.472	0
LPT	0.515	1	0.464	0.272	0.319	0.296	0
AFI	0.338	0.464	1	0.123	0.676	0.249	0
OEQ	0.494	0.272	0.123	1	–0.03	0.293	0
OFI	0.117	0.319	0.676	–0.03	1	0.13	0
FOHF	0.472	0.296	0.249	0.293	0.13	1	0
Cash	0	0	0	0	0	0	1

the middle-ground portfolios (conservative to high growth balanced), to which they provide substantial diversification benefits combined with competitive returns;

- At the defensive end of the scale, hedge funds are again less beneficial as higher returns cannot fully compete with the stability of cash returns.

The arbitrary scenario of allocating 5% to the FOHF represents a pragmatic approach. More importantly, under more realistic assumptions, even a very limited 5% allocation to fund of hedge funds improves the portfolios risk/return characteristics with the balanced funds Sharpe Ratio going up from 0.465 to 0.475.

Notwithstanding the apparently compelling numbers, we doubt that it would be a sensible step to move from a zero allocation to hedge funds to a large allocation in the order of 25% to 45%.

The purpose of the exercise is to see how the optimiser decides to fund the 5% fund of hedge fund investment. In most cases the investment is funded out of the benchmark allocation to cash. In the 'growth, some income' and 'mainly growth' portfolios, the investment is partially funded out of cash and then out of bonds.

Due to a relatively low volatility of the fund of hedge funds and its low correlation with the traditional asset classes, the optimiser allocates very significant proportions of portfolios to the fund of hedge funds in the unconstrained cases: up to 45% for the 'balanced' fund with Sharpe Ratio as high as 0.557.

Summary

Ineichen (2002) concluded "…all hedge funds are not created equal. A poorly chosen portfolio of hedge funds can produce disappointing results. All fund of funds managers are not created equal, either. A poor choice of fund of funds managers can yield disappointing results."

In this article we have:

- Demonstrated the inherent risk associated with the practice of using so-called hedge fund benchmarks for asset allocation decisions;
- Suggested a methodology that can be used to address the benchmark

problem and use a traditional mean variance framework;
- Illustrated the methodology using traditional multi-asset class portfolios and a unique set of performance data associated with a very long-standing fund of hedge funds.

We observe that, even using conservative forward-looking estimates of return and historical values for volatility and correlation, the efficient frontier is shifted upward by the inclusion of this product in the asset mix. Further, we observe that the fund of hedge funds has a role in a range of model portfolios from very conservative to very aggressive. This is contrary to current opinion that seems to confine hedge fund investment to 'risky' portfolios.

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