DO FUNDS OF HEDGE FUNDS REALLY ADD VALUE?

A "Post" Crisis Analysis[1]

Abstract:

In spite of a somewhat disappointing performance throughout the crisis, and a series of high profile scandals, investors are showing interest in hedge funds. Still, funds of hedge funds keep on experiencing out-flows. Can this phenomenon be explained by the failure of funds of hedge funds' managers to deliver on their promise to add value through active management, or is it symptomatic of a move toward greater disintermediation in the hedge fund industry? Little attention has been paid so far to the added-value, and the sources of the added-value, of funds of hedge funds. The lack of transparency that is characteristic of the hedge funds arena and makes the performance attribution exercise particularly challenging is probably an explanation. The objective of this article is to fill in the gap. We introduce to this end a return-based attribution model allowing for a full decomposition of funds of hedge funds' performance. The results of our empirical study suggest that funds of hedge funds are funds of funds like others. Strategic Allocation turns out to be a crucial step in the investment process, in that it not only adds value over the long-term, but most importantly, it brings resilience precisely when investors need it the most. Fund Picking, on the other hand, turns out to be a double-edged sword. Overall, funds of hedge funds appear to succeed in overcoming their double fee structure, and add value across market regimes, although to varying degrees and in different forms.

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[1] We would like to express our gratitude to Emmanuelle Jay for superb computer assistance.

Positive inflows since the third quarter of 2009 and a number of industry surveys (see for example 2010 Preqin Global Hedge Fund Investor Review) suggest that in spite of a somewhat disappointing performance throughout the crisis, and a series of high profile scandals, investors and especially institutional investors, are still showing interest in hedge funds. Against this backdrop, funds of hedge funds, which used to be the favorite route for traditional investors to gain exposure to hedge funds strategies, keep on experiencing out-flows. Can this phenomenon be explained by the failure of funds of hedge funds' managers to deliver on their promise to add value through active management, or is it symptomatic of a move toward greater disintermediation in the hedge funds industry?

Exhibit 1: Year-to-Date Estimated Change in Assets (in $ Bn), as of the end of Q2 2010
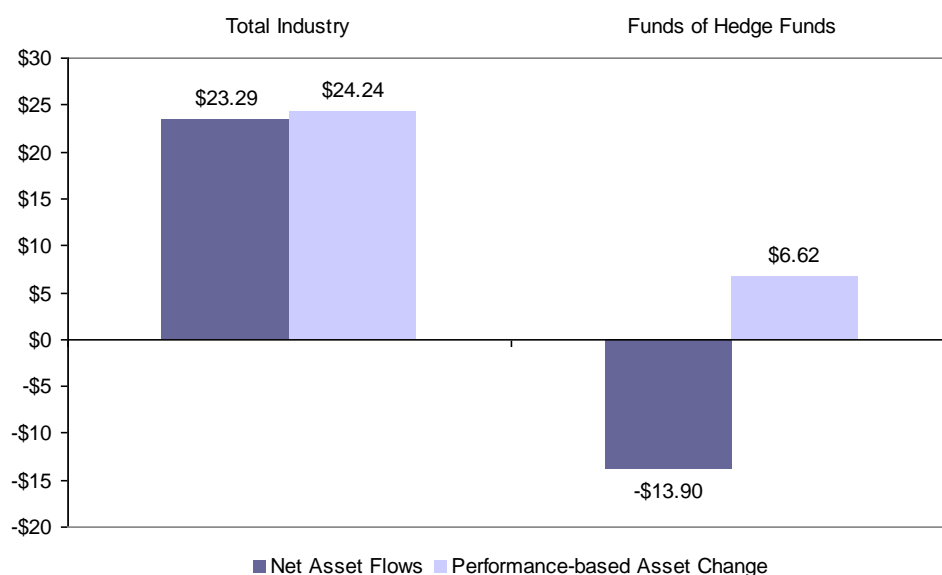
Source: HFR Global Hedge Fund Industry Report, Q2 2010, www.hedgefundresearch.com

The debate on active versus passive management is not a petty local quarrel. It has been agitating the investment community and challenging one of the central assumptions of economic theory, namely market efficiency, for decades. In this respect, a large body of empirical literature has documented the performance of mutual funds, and most studies do not seem to support the proposition that professional money managers succeed in adding value through active management (see Sharpe (1966), Treynor (1966), Jensen (1968), Grinblatt and Titman (1992), Hendricks *et al.* (1993), Elton *et al.* (1996), Carhart (1997), or Blake *et al.* (1999), among other examples). But, despite traditional investors' significant exposure to funds of hedge funds, little attention has been paid so far to the added value of these

investment vehicles. This is all the more surprising in that funds of hedge funds invest in funds that show themselves a persistence that appears to be at best shorter-term than the typical Fund Selection process (see Agarwal and Naik (2000), Amenc *et al.* (2003), Baquero *et al.*. (2005), Capocci *et al.* (2005), Capocci and Hübner (2004), Eling (2009), Herzberg and Mozes (2003), Kat and Menexe (2003), Kosowski *et al.* (2007), Malkiel and Saha (2005)).

The lack of transparency that is characteristic of the hedge fund arena and that makes the performance attribution exercise particularly challenging is probably an explanation. The objective of this study is to fill in the gap. Our contribution in this article is twofold. On the one hand, we propose a performance attribution model incorporating state-space models, that makes it possible to disentangle the value stemming from Strategic Allocation decisions (i.e., static betas), from Tactical Allocation bets (i.e., dynamic betas), and from the Fund Selection (i.e., alpha). The merit of this performance attribution model is therefore to allow for a full decomposition of the performance, i.e., like with portfolio-based approaches (see for example Brinson *et al.* (1986, 1991)), but in a return-based setting. On the other hand, our observation period covers the recent systemic crisis. We can therefore test the extent to which the value added by funds of hedge funds' managers is regime-dependent; we can also analyze more specifically the behaviour of funds of hedge funds while they experience - for the first time on records - a period of significant capital out-flows. Unsurprisingly, asset allocation and risk management being two sides of the same coin, we find that the value added at the Strategic Allocation level is significantly positive, especially during Stressed Market Conditions. The results are more mixed when it comes to Tactical Allocation and Fund Picking.

Exhibit 2: Decomposition of the Performance of a Funds of Hedge Funds

The remainder of this article is organized as follows. In the first section, we will propose a performance attribution model allowing for a full decomposition of funds of hedge funds' returns. We will then try in the second section to figure out whether Strategic Allocation really matters in the case of funds of hedge funds. In the third section, we will dig further and try to get a better understanding of the sources of funds of hedge funds managers' added value, and assess the extent to which it varies across market regimes. We will subsequently evaluate the impact of various exogenous variables on funds of hedge funds managers' added value. We will finally end this article with some concluding remarks and suggestions for future research.

I. A PERFORMANCE ATTRIBUTION MODEL FOR ACTIVELY MANAGED PORTFOLIOS

Most performance studies, consider Strategic Allocation as an exogenous variable, as if fund managers had no impact on this crucial part of the investment process. They therefore only consider the value added by the fund manager through Tactical Allocation, and Stock or Fund Picking. However, as evidenced in the literature, Strategic Allocation appears to be the main determinant of a fund's performance (see Brinson *et al.* (1986, 1991), or Ibbotson and Kapplan (2000), among other examples). It is therefore inconsistent to ignore the value added at the Strategic Allocation level. To address this issue, we suggest extending the approach introduced in Bailey *et al.* (1990) and consider that the performance (P) of a fund of hedge funds is made up of four distinct components:

i/ the performance of an uninformed investor (N),
ii/ the value added by the portfolio manager through the Strategic Allocation process (S),
iii/ the value added by the portfolio manager through the Tactical Allocation process (T),
iv/ the value added by the portfolio manager through the Fund Selection process (F).

By doing so, we can decompose the performance of a fund of hedge funds as follows:

(1) $P = N + S + T + F$,

or alternatively

$$\begin{cases} N = R_{Neutral\ Portfolio} \\ S = R_{Strategy\ Benchmark} - R_{Neutral\ Portfolio} \\ T = R_{Tactical\ Benchmark} - R_{Strategy\ Benchmark} \\ F = P - R_{Tactical\ Benchmark} \end{cases}$$

Let us now develop the intuition beyond the different benchmarks involved in this decomposition. The impact of any investment decision can be measured by comparing its outcome with the one of an alternative decision (i.e., *Neutral Portfolio*). As highlighted in Hensel *et al.* (1991), the results of the performance attribution process strongly depend on the

choice of this alternative decision; there is however no consensus on its definition. One could choose the risk-free rate or the minimum risk portfolio. But, it is highly questionable that this would be an appropriate benchmark for an uninformed investor. Another option would be to follow a liability-driven logic. But, since investors have specific liability constraints, such a benchmark would not fit them all equally; notwithstanding the fact that designing a liability matching portfolio is not straightforward when it is made up of alternative strategies. We thus took another route and opted for the equilibrium logic, by selecting the market portfolio, or more specifically, an industry composite index[2] as *Neutral Portfolio*.

The Strategic Allocation of a fund of hedge funds reflects the long-term bets made by the portfolio manager. We assume in the following that these bets remain unchanged over the whole observation period. This is a crucial assumption for our sequential return decomposition, as any misspecification at this stage could induce spurious effects on the following terms of the decomposition[3]. From a practical standpoint, the *Strategy Benchmark* is obtained through a classical return-based style analysis, i.e., with a constrained regression (please refer to Sharpe (1992) for greater details on the benefits of this approach).

The performance of all the funds of hedge funds of our sample is first regressed on the same set of risk factors:

$$R_{Fund,t} = \beta' R_{F,t} + \varepsilon_t,$$

where the error term is an independently identically distributed (*iid*) Gaussian white noise $\varepsilon_t \sim N(0,\Omega)$. The intercept term in the regression is set to zero, and the factor loadings are constrained to be positive and sum up to one.

The customized *Strategy Benchmark* of every single fund of hedge funds is computed as the linear combination $\beta' R_{F,t}$ of the statistically significant factors in the regression and their

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[2] A series of Hedge Fund Indices built from various databases of individual Hedge Fund returns are available on the market. Please refer to Amenc *et al.* (2004) for greater details on the characteristics of those indices. For the sake of this study, we selected the asset-weighted composite Index provided by HFR Research; the HFR database is among the most representative of the industry and this asset-weighted Composite Index is, as a result, commonly used by market participants as a proxy for the market portfolio.

[3] One could include a structural break analysis to consider several Strategic Allocations, but such an analysis is out of the scope of this paper and left for further research.

respective performance. The value added by the Strategic Allocation (S) is then defined as the return difference between the *Strategy Benchmark* and the *Neutral Portfolio*.

While Strategic Allocation shifts are expected to occur occasionally, Tactical bets are liable to be taken on a continuous basis. Despite this obvious difference in terms of time horizon, Strategic and Tactical Allocation decisions have one point in common. They both rely on - respectively long-term and short-term - forecasts of risk premiums (i.e., bets on systematic risk), and can as a result be captured using a set of risk factors. In this respect, we assume that funds of hedge funds' managers only make tactical bets on the risk factors entering into the composition of the *Strategy Benchmark*. Two arguments support this assumption. On the one hand, portfolio managers are not immune to the so-called familiarity bias (see Heath and Tversky (1991) for greater details on this behavioral bias). They will therefore be inclined to focus, both at Strategic and Tactical Allocation levels, on the same sub-set of strategies (i.e., those strategies they are most familiar with). On the other hand, limiting the number of factors simplifies the statistical modeling of the time-varying coefficients used to compute the *Tactical Benchmark*, and improves in turn the robustness of the results. Since information arrives randomly[4], and Tactical bets are assumed to be responses to new information, we expect the exposure to risk factors to evolve randomly over time. Unfortunately, risk factor exposures cannot be directly observed in the case of funds of hedge funds. The reason is twofold. Firstly, although the trend is very clearly towards more transparency, investors do not systematically have access to the full composition of funds of hedge funds, and its evolution over time. Secondly, funds of hedge funds' managers themselves do not always have a complete view of the risk factor exposures of the underlying hedge funds, and as a result, of the bets they implicitly take at the fund of funds level. This is all the more true when the trading frequency of the underlying funds is significantly higher than their reporting frequency (i.e., embedded risks can be dramatically different from those showed at a specific date), or when the number and the diversity of positions makes it difficult to come up with accurate aggregated factor exposures. Tactical bets explicitly (i.e., at the strategy level) and implicitly (i.e., at the underlying fund level) taken by the fund of hedge funds' manager can alternatively add up or cancel each others. Using a return-based style analysis therefore allows us to mitigate one of the main shortcomings of holding-based approaches, by capturing and assessing both effects concomitantly.

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[4] It should be noted that our objective here is not to model the investor's information set or his decision making process but rather its impact on risk factor exposures.

Time-varying rik factors exposures are estimated using a state-space model (see Hamilton (1994) for a detailed discussion on state-space models). One of the advantages of this approach is to determine an optimal weighting scheme from the data. As a result, there is no need to specify an arbitrary window size, as is the case for regressions with rolling windows. Building on the growing literature (see Bogue (1973), Sunder (1980), Alexander *et al.* (1982), Annaert and Van Campenhout (2002), Swinkels and Van der Sluis (2002) among other examples) we model the evolution of *k*-dimensional risk factor exposures β_t (the transition equation) with a 1st order Markov process.

$$\beta_{t+1} = A\beta_t + \eta_t,$$

where A is a *kxk* matrix and $\eta_t \sim N(0, H_t)$ H_t denotes the *kxk* variance covariance matrix of the independently identically distributed (*iid*) error terms. We thus link these dynamics to the observed fund returns with the following measurement equation:

$$R_{Fund,t} = \beta_t^{'} R_{F,t} + \varepsilon_t,$$

where the error term is an independently identically distributed (*iid*) Gaussian white noise $\varepsilon_t \sim N(0, g_t)$. Therefore, β_t correponds to the *kx1*-vector of non observable factor exposures. It is generally referred to as the state vector. *A* is the *kxk*- transition matrix. g_t is the unexplained variance of the regression model indicating the covariance structure of the state variables at time *t*. In what follows, the parameters in *g* and *H* will be assumed constant over time and estimated by[5]:

$$g = \hat{\sigma}^2 = \frac{(R_{Fund} - R_F \hat{\beta}_{OLS})(R_{Fund} - R_F \hat{\beta}_{OLS})'}{T - k}$$
$$H = \hat{\sigma}^2 (R_F' R_F)^{-1}$$

where $\hat{\beta}_{OLS}$ is the unconditional least squares estimate and R_F the *Txk*-matrix containing the returns of the *k* factors over *T* observations.

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[5] Conditional parameters modeled by GARCH or factor analysis models could be taken into consideration but would, to our mind, add too much complexity compared to the expected benefits. Conditioning regressors is independent from conditioning the residuals.

We denote P_t the time-conditional *kxk*-covariance matrix of the state vector β_t and apply the following two-step approach. The first step corresponds to the forecasting system:

$$\begin{cases} \beta_{t|t-1} = A\beta_{t-1|t-1} \\ P_{t|t-1} = AP_{t-1|t-1}A' + H \end{cases}$$

where $\beta_{t|t-1}$ and $P_{t|t-1}$ are the best predictors of β_t and P_t, conditionally on the information set available at time t-1. $\beta_{t|t}$ and $P_{t|t}$ are respectively the updated values obtained by the following updating equations:

$$\begin{cases} \beta_{t|t} = \beta_{t|t-1} + K_t v_t \\ P_{t|t} = P_{t|t-1} - K_t S_t K_t^{'} \end{cases}$$

with $v_t = (R_{Fund,t} - R_{F,t}\beta_{t|t-1})$ the innovation of the process and:

$$S_t = R_{F,t}P_{t|t-1}R_{F,t}^{'} + g \qquad K_t = P_{t|t-1}R_{F,t}^{'}S_t^{-1}.$$

K_t is called the "Kalman-Gain" at time *t* and determines the impact of the innovation on the estimated state parameters. This procedure, known as the Kalman Filter, is applied for any given *t=1…T*.

We initialize the filter with $\beta_{1|0}$ and $P_{1|0}$ as the parameters stemming from a least square estimation over the whole sample period:

$$\beta_{1|0} = \hat{\beta}_{OLS} \quad \text{and} \quad P_{1|0} = H.$$

We use the maximum likelihood method to estimate the transition matrix A from an initial point set to the identity matrix. The Kalman Filter then gives the estimated time series of factor exposures β_t for *t=1…T*. The resulting factor loadings are then used to construct the

Tactical Benchmark $\beta_t' R_{F,t}$. The value added by the Tactical Allocation (T) corresponds to the return difference between the *Tactical* and the *Strategic Benchmarks*.

Finally, the residual term ε_t can be interpreted as the part of the performance that cannot be explained by static and/or dynamic exposures to risk factors. In the context of funds of funds management, this term can be interpreted as the value added through the Fund Selection process (F). It measures the ability of the portfolio manager to select the best alpha providers, i.e., those funds that are able to produce value without any static or dynamic exposure to risk factors.

II. DOES STRATEGIC ALLOCATION MATER?

Running a return-based style analysis requires a significant number of observations so that statistical inferences might be seen as meaningful. We thus merged two of the largest commercial data bases, namely HFR (https://www.hedgefundresearch.com) and Lipper TASS (http://tass.lipperweb.com), in an attempt to dispose of a representative sample; we extracted the 229 funds of hedge funds showing a continuous track record from January 2000 through July 2009 (i.e., out of 1015 funds of hedge funds available), so that we ended up with 115 monthly observations.

For the sake of our analysis, we will subsequently split this observation period in two sub-periods, namely the Normal Market Conditions, ranging from January 2000 through June 2007, and the Stressed Market Conditions, ranging from July 2007 through July 2009. Finally, in order to avoid any double counting, we eliminated 45 funds presenting similar names and a correlation higher than 0.95 with another fund. The results of the empirical study therefore rest on a sample made up of 184 funds of hedge funds. Return data series are denominated in USD and net of all fees.

Exhibit 3: Distribution of Funds of Hedge Funds by Age

Age (in months) from inception to July 2009
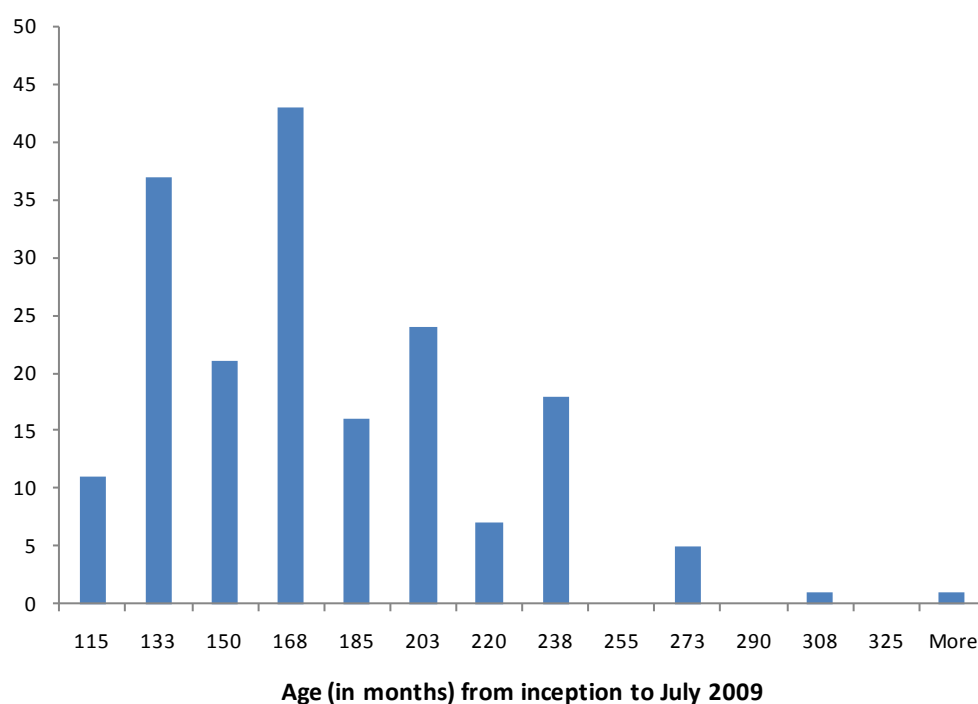
The selection of the inputs is a crucial step in a return-based analysis. As stressed in Sharpe (1992), style factors must be collectively exhaustive and mutually exclusive. For this reason we selected the series of hedge fund indices published by EDHEC. Indeed, as evidenced in Amenc *et al.* (2004), these indices of hedge fund indices have the merit to offer great qualities concerning both the representativity and purity dimensions. In an attempt to mitigate the impact of performance measurement biases, we applied an adjustment factor consistent with Fung and Hsieh (2000, 2002), i.e., an average annual survivorship bias of 3%, plus an average annual instant history bias of 1.4%. We finally charged an index calculation fee in line with market practice (i.e., 60 bps p.a.).

Last but not least, it is worth stressing that a major weakness of the return-based analysis is to ignore the degree of significance of the exposures to style indices, which in turn may have significant consequences on the results of the performance attribution process. To circumvent this issue, and reduce statistical noise, we performed a stepwise regression and removed all the factors showing t-statistics lower than 1.65. As evidenced in Otten and Bams (2000), cases of misclassification might be reduced by 50% when the significance of factor loadings is taken into account. As a result, we expect the resulting models to be more accurate and robust, and in turn better suited for performance measurement purposes.

By doing so, we end up with a limited set of factors, ranging from 2 to 4 depending on the funds of hedge funds. Unsurprisingly, we find that the different funds of hedge funds are not exposed to the same factors, suggesting that they follow different investment policies. As one could have expected, equity-oriented strategies, such as Long/Short Equity, Short Selling, Equity Market Neutral or Merger Arbitrage show the highest rate of occurrence. We finally used the methodology presented in the first section to customize a *Strategy* and a *Tactical Benchmarks* for every single fund of hedge funds in our sample.

Exhibit 4: Results of the Factor Analysis
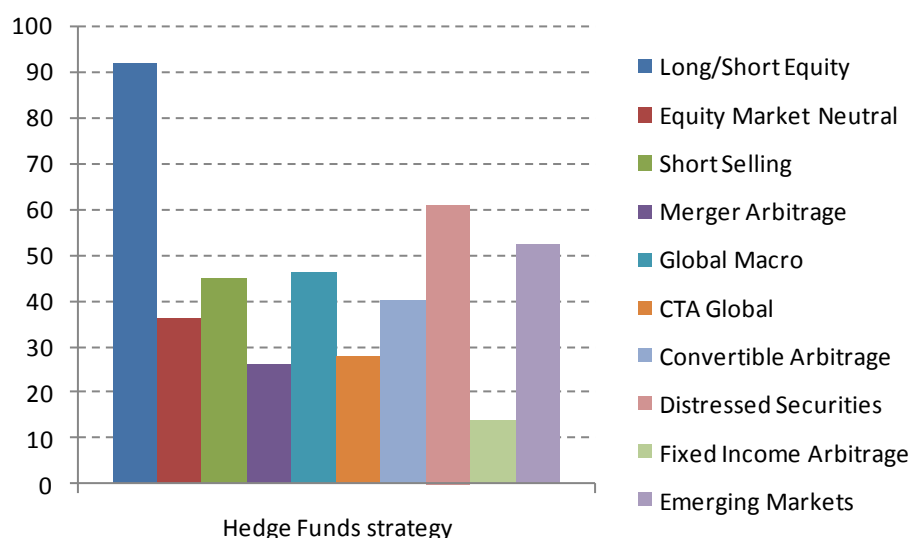
Numerous studies have been conducted on the sources of the variability of mutual fund returns. They all led to the same conclusion: Strategic Allocation accounts for a large part of mutual fund return variability. This is not surprising as mutual funds follow buy-and-hold strategies. Since funds of hedge funds are actively managed, we expect active management (i.e., Tactical Allocation and/or Fund Picking) to account for a substantial part of the variability of their returns. As a result, Strategic Allocation should mechanically account for a significantly lower part of funds of hedge funds return variability.

To measure the impact of Strategic Allocation on the variability of funds of hedge funds' returns, we regressed these returns on the historical returns of the corresponding *Strategy Benchmark*. As can be seen from Exhibit 5, around 68% of funds of hedge funds' return variability are explained by their investment policy. This number has to be contrasted with the one obtained by mutual funds, namely 88% (see Ibbotson and Kaplan (2000)). The first observation we can make is that Strategic Allocation plays a central role in funds of hedge funds' return variability. Funds of hedge funds therefore appear not to be as different from mutual funds as one could have expected. The second observation we can make is that Strategic Allocation is a key driver of funds of hedge funds' return variability whatever the market regime. In this respect, it is interesting to point out that it appears to be all the more true during Stressed Market Conditions, although results must be interpreted with care, part of the increase in the coefficient of determination being attributed to the smaller sample size.

Exhibit 5: Range of Time Series Regression R^2 Values

Percentiles	Full observation period	Normal market conditions	Stressed market conditions	Mutual Funds*
5%	37.8%	37.3%	45.1%	46.9%
25%	55.8%	58.0%	69.7%	79.8%
50%	68.3%	74.3%	83.1%	87.6%
75%	79.9%	88.7%	98.9%	91.4%
95%	104.3%	107.2%	126.4%	94.1%

* Results are taken from Ibbotson and Kaplan (2000)

To measure the impact of Strategic Allocation on the level of funds of hedge funds' returns, we then computed the ratio of the *Strategy Benchmark* returns to the funds of hedge funds' total returns. As can be seen from Exhibit 6, around 45% of funds of hedge funds' return are explained by their investment policy. Here again, the Strategic Allocation process turns out to play an important role; this time around, however, it does not appear to be the main driver, except during Stressed Market Conditions, whereby it accounts for close to 80% of funds of hedge funds' return.

Exhibit 6: Range of Percentage of Total Return Level Explained by Policy Return

Percentiles	Full observation period	Normal market conditions	Stressed market conditions	Mutual Funds*
5%	11.5%	30.1%	29.8%	82%
25%	28.1%	38.6%	45.4%	94%
50%	44.8%	46.7%	78.6%	100%
75%	67.0%	62.2%	111.5%	112%
95%	156.0%	111.0%	240.4%	132%

* Results are taken from Ibbotson and Kaplan (2000)

So, does Strategic Allocation matters? The answer is clearly yes. We find that despite common perception, mutual funds and funds of hedge funds are actually not that different. In both cases, Strategic Allocation turns out to play a central role in the return variability (i.e., coefficient of determination ranging from roughly 70% to 80%), and it also appears to account for a substantial portion of total return. In the later case, however, benefits of Strategic Allocation seem to be clearly higher during Stressed Market Conditions (i.e., 78.6% versus 44.8% for the full observation period). Can this regime-dependency be explained by the behavior of the *Neutral Portfolio* or is it due to a significant change in the nature of the value added by funds of hedge funds' managers? This is what will try to find out in the next section.

III. THE ALPHA AND OMEGA OF FUNDS OF HEDGE FUNDS' ADDED VALUE

Our objective in this section is twofold. On the one hand, we want to better understand the sources of funds of hedge funds managers' added-value. On the other hand, we want to assess the extent to which the added-value of funds of hedge funds' managers, and its sources, is regime-dependent.

To address the first point, we applied the performance attribution model introduced in the first section to the different funds of hedge funds of our sample, on the whole observation period (i.e., from January 2000 through July 2009). As can be seen from Exhibit 8, funds of hedge funds turn out to add on average 3.45% p.a. (i.e., 3.45% = 4.50% - 1.05%) over the performance of the *Neutral Portfolio*. Interestingly, most funds of hedge funds appear to create some value compared to an uninformed investor over the long term.

The first driver of this added-value appears to be Fund Picking, which is positive in 92% of the cases and amounts on average to 2.66% p.a. There is however one caveat. Firstly, the estimation of the value added through Fund Picking very much depends on the adjustments we made to take into account performance measurement biases and other index fees; should these adjustments have been lower, the value added would have decreased proportionally, and would eventually have turned negative. We must therefore interpret this result with care. It is however worth pointing out that Fund Picking appears to be a double-edged sword in that those funds of hedge funds failing to add value at this stage destroy on average as much as 2.50% p.a.

The second driver of funds of hedge funds managers' added-value appears to be Strategic Allocation, which is positive in 83% of the cases and amounts on average to 1.08% p.a. And this time around, the estimation is not dependent on the performance adjustments we made (i.e., adjustments made at the level of the *Neutral Portfolio* and the *Strategy Benchmark* are virtually the same). Moreover, Strategic Allocation does not appear to be a double-edged sword (i.e., distribution is positively skewed and negative outcomes average to -0.31% p.a.). Not surprisingly given the limited liquidity of their underlying assets, 66% of the funds of hedge funds in our sample destroyed 1.00% p.a. through Tactical Allocation decisions.
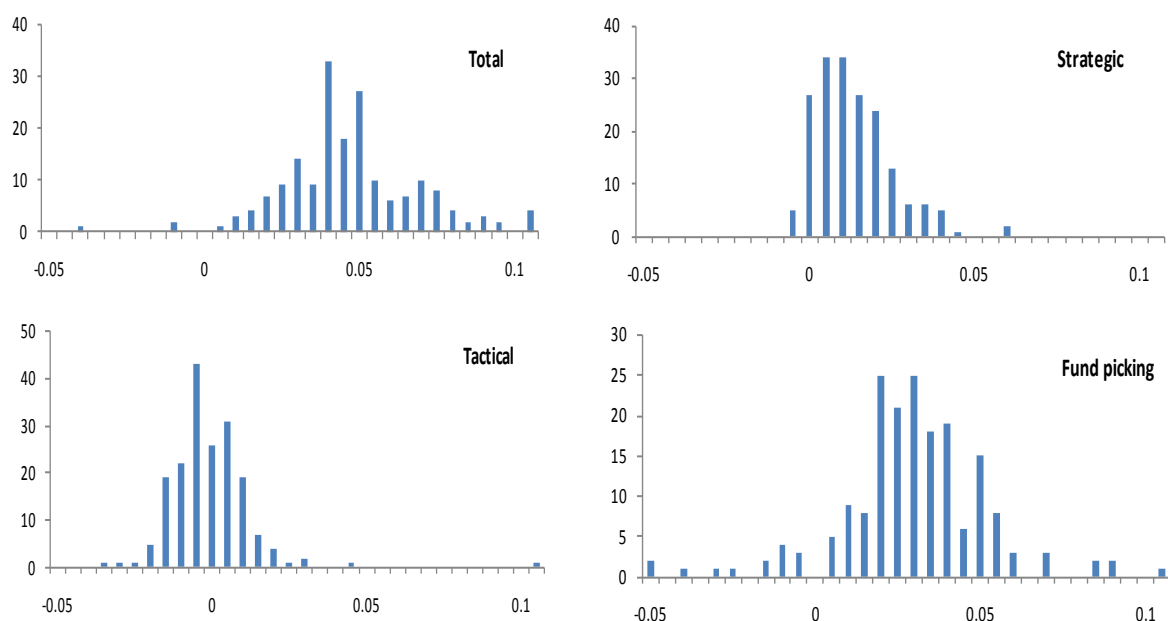
Exhibit 7: Value Added over the Full Period

Exhibit 8: Value Added over the Full Period

Percentiles	Total	Strategic	Tactical	Funds picking
Mean	4.50%	1.08%	-0.29%	2.66%
Volatility	2.39%	1.16%	1.72%	2.47%
Skewness	0.81	1.08	6.18	-1.57
Kurtosis	4.17	1.79	62.80	10.53
% > 0	98.4%	82.6%	33.7%	92.4%
Mean (> 0)	4.61%	1.37%	1.03%	3.11%
% < 0	1.63%	17.4%	66.3%	7.6%
Mean (< 0)	-2.38%	-0.31%	-1.00%	-2.50%

To address the second point, we applied the performance attribution model introduced in the first section to the different funds of hedge funds of our sample, over two different observation periods, i.e., Normal Market Conditions, ranging from January 2000 through June 2007, and Stressed Market Conditions, running from June 2007 to July 2009. As can be seen from Exhibit 10 & 12, while funds of hedge funds appear to add on average 4.21% p.a. (i.e., 4.21% = 0.41% + 0.32% + 3.48%)) during Normal Market Conditions, they turn our to add on average 0.73% p.a. (i.e., 0.73% = 2.50% - 1.69% - 0.09%) during Stressed Market Conditions.

When drilling down to the sources of funds of hedge funds' managers, we have the confirmation that Fund Picking is a double-edged sword. It can be rewarding, during Normal

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Market Conditions, and provided that the funds of hedge funds' manager proves to be able to identify the best single hedge funds (i.e., +3.89% p.a. on average), but it is costly when the funds of hedge funds' manager is not an expert at picking the right funds, especially during Stressed Market Conditions (i.e., -4.30% p.a.). In this respect, it is worth pointing out that while 93% of the funds of hedge funds in our sample succeeded in adding value at the Fund Picking level during Normal Market Conditions, only 48% proved to be able to do so during Stressed Market Conditions. It is thus precisely when one needs Fund Picking to bring resiliency that it seems to add to downside risk. And here again, the estimated value added by funds of hedge funds' managers at the Fund Picking level very much depends on the performance adjustments detailed in the second section of this article. Fund Picking could therefore prove to be an even riskier game to play that the results presented in Exhibit 10 and 12 suggest.

In other words, as far as the value added by funds of hedge funds' managers at the Fund Picking level is concerned, there is not only a wide cross sectional dispersion, but there is also a strong - and unfavorable – regime-dependency. The picture is very different when it comes to the value added by funds of hedge funds' manager at the Strategic Allocation level. Firstly, as can be seen from Exhibit 10 and 12, cross sectional dispersion is fairly limited and the distribution of the added-value is positively skewed whatever the market regime. As a matter of fact, funds of hedge funds that failed to create value (only) destroyed on average 0.64% p.a. during Normal Market Conditions, and 0.99% p.a. during Stressed Market Conditions. Those funds of hedge funds that proved to be more successful added respectively 1.54% p.a. and 3.50% p.a. Secondly, although the value added at the Strategic Allocation level shows a certain regime-dependency, this time around it turns out to be very favorable. While funds of hedge funds in our sample added on average 0.41% p.a. during Normal Market Conditions (48% of were positive), they added on average 2.50% p.a. during Stressed Market Conditions (77% of were positive). As opposed to Fund Picking, it is precisely when it is needed the most that benefits from Strategic Allocation are the strongest. This positive asymmetry is not surprising in that Strategy Allocation and Risk Management are two sides of the coin.

In line with the results found over the whole observation period, Tactical Allocation appears to account for a limited portion of the total value added by funds of hedge funds' managers. Moreover, it shows a similar pattern as Fund Picking when the environment changes. Indeed, when funds of hedge funds add on average 0.32% p.a. at this stage during Normal Market

Conditions, they detract on average 1.69% p.a. when market conditions deteriorate. On top of that, while 61% of the funds of hedge funds in our sample showed a certain skill to time their strategy exposures during Normal Market Conditions, only 31% proved to succeed in doing so during Stressed Market Conditions. This does not come as a big surprise given the liquidity of the underlying funds, and their behavior throughout the recent crisis.

Exhibit 9: Value Added over Normal Market Conditions
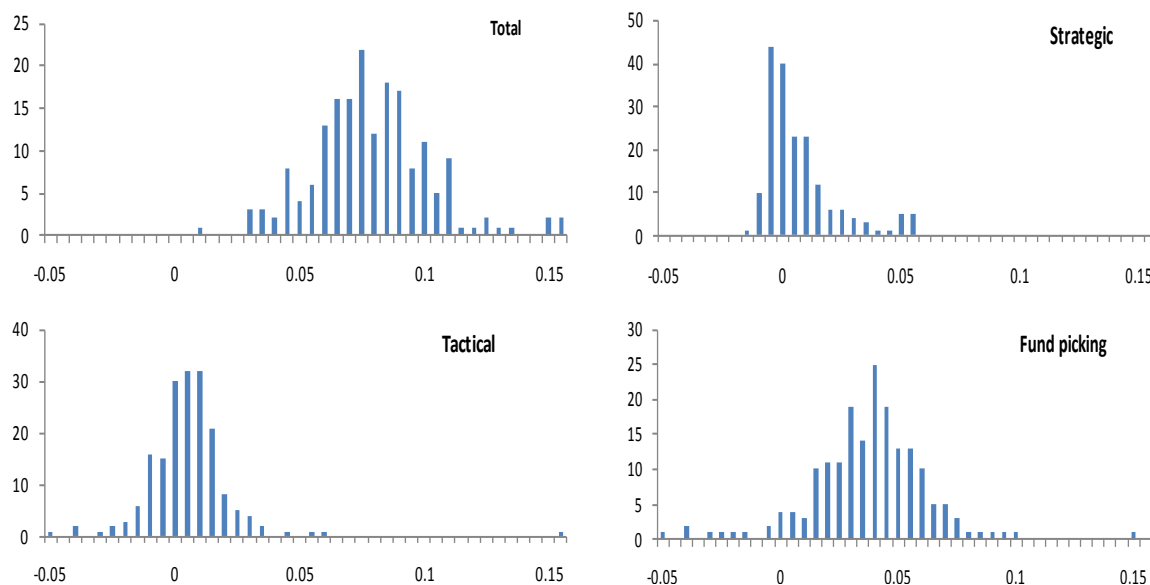
Exhibit 10: Value Added over Normal Market Conditions

Percentiles	Total	Strategic	Tactical	Funds picking
Mean	7.76%	0.41%	0.32%	3.48%
Volatility	2.77%	1.51%	2.24%	2.50%
Skewness	2.15	1.56	5.82	-0.19
Kurtosis	11.93	2.04	60.39	3.38
% > 0	100%	48.4%	60.9%	92.9%
Mean (> 0)	7.76%	1.54%	1.24%	3.89%
% < 0	0%	51.6%	39.1%	7.1%
Mean (< 0)		-0.64%	-1.08%	-2.11%

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Exhibit 11: Value Added over Stressed Market Conditions
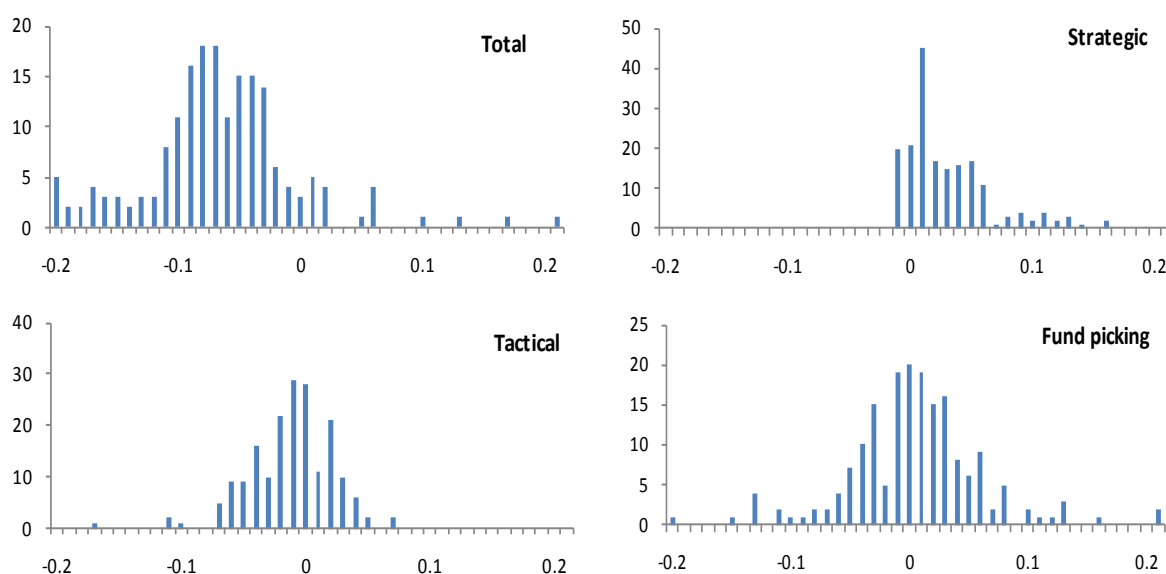
Exhibit 12: Value Added over Stressed Market Conditions

Percentiles	Total	Strategic	Tactical	Funds picking
Mean	-7.25%	2.50%	-1.69%	-0.09%
Volatility	7.31%	3.60%	3.31%	6.79%
Skewness	-0.63	1.37	-0.77	0.44
Kurtosis	11.09	1.74	2.30	13.73
% > 0	9.8%	77.7%	30.9%	48.4%
Mean (> 0)	5.64%	3.50%	1.86%	4.19%
% < 0	90.2%	22.3%	69.1%	51.6%
Mean (< 0)	-8.65%	-0.99%	-3.13%	-4.30%

From the above we can conclude that Strategic Allocation is the only step of the investment process where funds of hedge funds' managers consistently bring value, and more importantly, that helps mitigating the downside risk during Stressed Market Conditions. It therefore clearly appears as a key driver of the value added by funds of hedge funds' managers.

The question is to find out which step of the investment process best explains the cross sectional dispersion of funds of hedge funds' returns. To address this point, we simply regressed the value added by the different funds of hedge funds at the different steps of the investment process, on their total return. Results are presented below.

Exhibit 13: Cross Sectional Dispersion of Funds of Hedge Funds' Returns
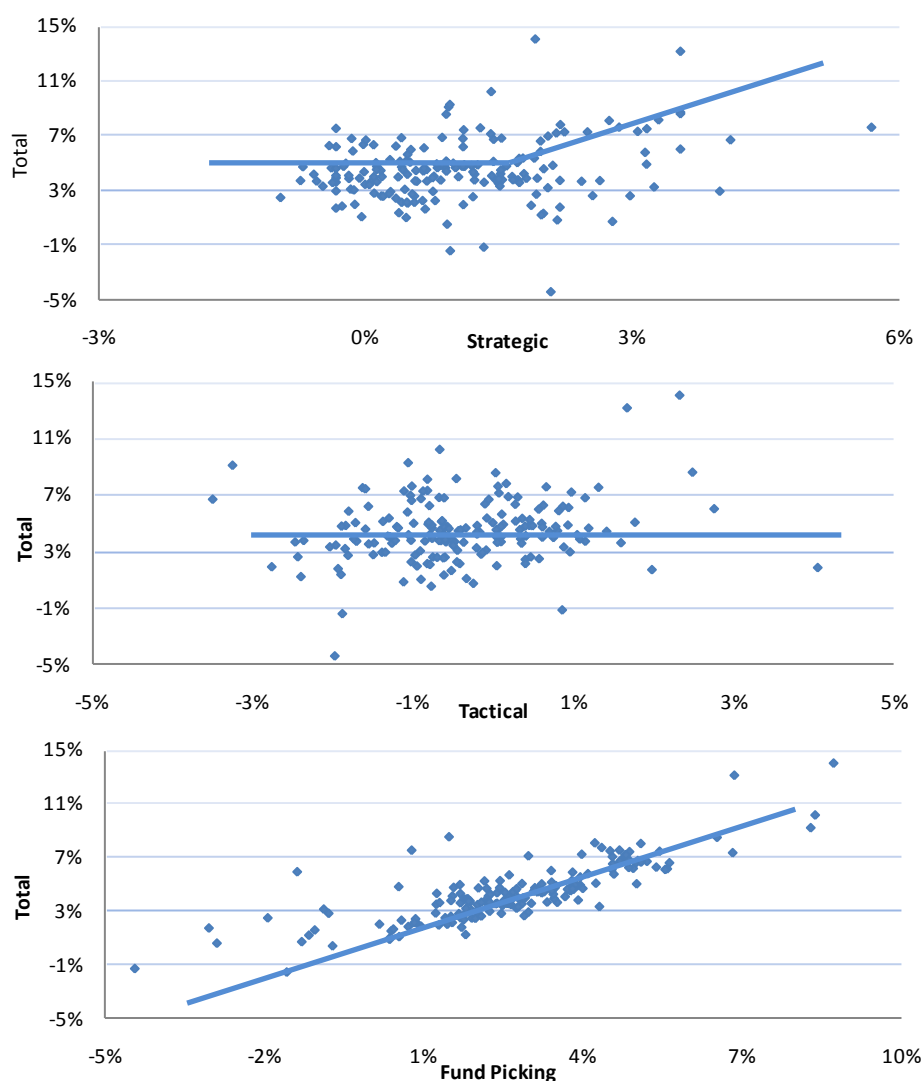
As can be seen from Exhibit 13, Fund Picking turns out to be a discriminating factor for funds of hedge funds' performance, both on the upside, and on the downside, while Strategic Allocation shows a positive asymmetry. And, in line with our previous conclusions, Tactical Allocation does not seem to be of a great help to explain the performance discrepancy between the different funds of hedge funds of our sample. These results suggest that investment companies, with limited resources and/or no specific Fund Picking skill, would clearly be better off focusing their efforts on Strategic Allocation.

In the next section, we'll try to find out whether some funds of hedge funds' characteristics, such as the assets under management, the liquidity terms, or the flows, may also impact their ability to add value throughout the investment process.

IV. SHEDDING MORE LIGHT ON THE ADDED VALUE OF FUNDS OF HEDGE FUNDS

As we have seen in the previous section, the value added by funds of hedge funds, and the sources of this added-value largely depend on the market environment. Our objective in this section is to assess the extent to which it may also depend on funds' characteristics.

We started by sorting funds of hedge funds by size and formed three groups with assets ranging from 0 to $250mio, from $250mio to $1bn, and with assets above $1bn. We then calculated the average value added by the three groups at the different stages of the investment process. The results presented in Exhibit 14 confirm the intuition that we had in the previous section, in that the largest funds of hedge funds appear to be better equipped than smaller ones to add value through Fund Picking; Fund Picking even shows up as the main determinant of the outperformance of largest funds of hedge funds. The reason for that might be a privileged access for star hedge fund managers or simply a wider coverage of the investment universe. It is however difficult to draw a definitive conclusion given the sensitivity of this result to the adjustments made to account for performance measurement biases. Interestingly, the larger the fund of hedge funds, the smaller the value added at the Strategic Allocation stage. This suggests that when assets grow, funds of hedge funds get - at a certain point - cumbersome, and they lose the flexibility required to gain exposure to niche strategies. They therefore end up with a portfolio that is closer to the market portfolio than the one of more nimble managers.

Exhibit 14: Impact of Funds of hedge Funds' Assets Under Management (in $ mio)

		All	0-250	250-1000	Over 1000
Total	Mean	4.50%	4.39%	4.64%	4.93%
	Vol	*2.39%*	*2.64%*	*1.82%*	*1.51%*
Strategic	Mean	1.08%	1.14%	1.05%	0.72%
	Vol	*1.16%*	*1.24%*	*0.91%*	*1.01%*
Tactical	Mean	-0.29%	-0.44%	-0.26%	-0.03%
	Vol	*1.72%*	*1.24%*	*0.93%*	*0.86%*
Funds picking	Mean	2.66%	2.64%	2.81%	3.20%
	Vol	*2.47%*	*2.40%*	*1.61%*	*1.40%*

The liquidity of fund of hedge funds is also liable to have a material impact on their flexibility, and in turn, on their capacity to add value. Funds of hedge funds' redemption frequency can *a priori* be used as a proxy for the weighted average liquidity of the underlying hedge funds. The most liquid funds of hedge funds are therefore supposed to be those benefiting from the greatest capacity to adjust their Strategy Allocation to changing market conditions. One can consequently expect that these funds of hedge funds will tend to add more value than their less liquid competitors at the Tactical Allocation level. Conversely, less liquid funds of hedge funds being less constrained than their most liquid competitors, they should be able to create more value at the Strategic Allocation and eventually at the Fund Picking levels. To test these hypotheses, we sorted the funds of hedge funds by liquidity terms, and contrasted the average value added by the corresponding funds of hedge funds at the Strategic Allocation, Tactical Allocation, and Fund Picking levels. As can be seen from Exhibit 15, value added at the Tactical Allocation level declines when liquidity terms deteriorate, but only to a limited extent (i.e., an average of -0.30% p.a. for the monthly liquidity bucket vs. -0.55% p.a. for the annual liquidity bucket). The impact at the Strategic Allocation and Fund Picking levels appears to be somewhat higher. Value at the Strategic Allocation level surprisingly increases when we go up the liquidity ladder (i.e., an average of 1.15% p.a. for the monthly liquidity bucket vs. 0.87% p.a. for the annual liquidity bucket). As expected, value at the Fund Picking level is significantly higher when we go down the liquidity ladder (i.e., an average of 3.74% p.a. for the annual liquidity bucket vs. 2.37% p.a. for the monthly liquidity bucket).

Exhibit 15: Impact of Funds of Hedge Funds' Liquidity

		Total	Strategic	Tactical	Fund picking
All	Mean	4.50%	1.08%	-0.29%	2.66%
	Vol	*2.39%*	*1.16%*	*1.72%*	*2.47%*
Monthly	Mean	4.26%	1.15%	-0.30%	2.37%
	Vol	*2.80%*	*1.22%*	*0.97%*	*2.29%*
Quarterly	Mean	4.42%	1.13%	-0.11%	2.35%
	Vol	*2.32%*	*1.24%*	*2.61%*	*3.04%*
Annual	Mean	5.10%	0.87%	-0.55%	3.74%
	Vol	*1.33%*	*0.88%*	*0.99%*	*1.28%*

But, as clearly evidenced during the recent crisis, the liquidity of the assets and the liabilities of funds of hedge funds is not always perfectly aligned. Results presented in Exhibit 15 may therefore give a biased picture of the relationship between liquidity and the capacity of funds of hedge funds' managers to create value at the different stages of the investment process. We proceeded as follows to address this issue and estimate the liquidity of their assets, and in turn, the extent to which it affects their capacity to create value throughout the investment process. Firstly, we classified hedge fund strategies in two groups, referred to as liquid (i.e., Long/Short Equity, Equity Market Neutral, Short Selling, Merger Arbitrage, CTA, and Global Macro) and illiquid (i.e., Convertible Bond Arbitrage, Fixed Income Arbitrage, Emerging Markets). Secondly, using their customized *Strategy Benchmarks* we estimated the exposure of funds of hedge funds to liquid/illiquid strategies. Finally, we formed three groups, with varying exposures to liquid/illiquid strategies. We considered that those funds of hedge funds made up of at least two third of liquid strategies were liquid, whereas those with less than a third of liquid strategies were illiquid; the remaining funds of hedge funds fall into the so-called "Average" category. As can be seen from Exhibit 16, we get a very different picture from the one obtained in the previous experiment. While the value destroyed at the Tactical Allocation level is also minimal for the most liquid funds of hedge funds, value added through Strategic Allocation and Fund Picking evolves in the opposite way. It improves when we go down the liquidity ladder for the Strategic Allocation (i.e., an average of 2.29% p.a. for the illiquid category vs. 0.69% p.a. for liquid one), but deteriorates a bit in the case of Fund Picking (i.e., an average of 2.99% p.a. for the liquid category vs. 2.27% p.a. for the illiquid one). This time around, most of the illiquidity premium appears to be captured, as one could have expected, at the Strategic Allocation level.

Exhibit 16: Impact of Funds of hedge Funds' Investment Policy

		Total	Strategic	Tactical	Fund picking
All	Mean	4.50%	1.08%	-0.29%	2.66%
	Vol	2.39%	1.16%	1.72%	2.47%
Liquid	Mean	4.67%	0.69%	-0.06%	2.99%
	Vol	2.46%	1.04%	1.01%	2.18%
Average	Mean	3.88%	1.03%	-0.75%	2.56%
	Vol	2.46%	0.71%	0.84%	2.18%
Illiquid	Mean	5.01%	2.29%	-0.60%	2.27%
	Vol	2.63%	1.30%	1.65%	2.31%

Finally, as a result of a potentially significant mismatch between the liquidity of the assets and the liabilities, the capacity of funds of hedge funds' managers to add value at the different steps of the investment process may be sensitive to flows, especially out-flows. In an attempt to test this hypothesis, we sorted the funds of hedge funds based on the flows they have experienced over the period corresponding to Stressed Market Conditions, and contrasted the average value added by the corresponding funds of hedge funds at the Strategic Allocation, Tactical Allocation, and Fund Picking levels. As can be seen from Exhibit 17, there is a high correlation between funds of hedge funds' total performance and flows, but it is on Fund Picking that the impact of flows appears to be the largest (i.e., an average of 4.34% p.a. for funds experiencing in-flows vs. -3.84% p.a. for those experiencing out flows). It is however difficult to draw a definitive conclusion due to the endogeneity between flows and performance. What is more interesting to observe is the fact that funds of hedge funds add value at the Strategic Allocation level even in the case of massive out-flows, although to a lesser extent (i.e., an average of 4.08% p.a. for funds experiencing in-flows vs. 1.92% p.a. for those experiencing out-flows). This confirms that Strategic Allocation brings resilience during market turmoil.

Exhibit 17: Impact of Funds of Hedge Funds' Out-Flows over the Stressed Market Conditions Period

		Total	Strategic	Tactical	Fund picking
All	Mean	-7.25%	2.50%	-1.69%	-0.09%
	Vol	7.31%	3.60%	3.31%	6.79%
>0%	Mean	-1.60%	4.08%	-2.04%	4.34%
	Vol	7.89%	4.58%	3.73%	8.54%
[-50%;0%]	Mean	-6.90%	2.24%	-1.72%	0.55%
	Vol	4.85%	3.32%	3.12%	4.42%
<-50%	Mean	-11.31%	1.92%	-1.41%	-3.84%
	Vol	7.72%	3.06%	3.35%	6.75%

V. CONCLUDING REMARKS AND EXTENSIONS

Funds of hedge funds have long been the favourite route for traditional investors that look for alternative investments, but lack the experience and more generally the resources to internalize the whole investment process. The flipside of funds of hedge funds' appealing value proposition, however, is a double fee structure. Our objective in this article was to find out whether funds of hedge funds' managers succeed in overcoming this setback through active management, or if, like mutual funds, they tend to fail to add value. We proposed to this end a return-based attribution model incorporating state-space models that allows for a full decomposition of funds of hedge funds' returns.

The results of our empirical study suggest that funds of hedge funds are funds of funds like others. Strategic Allocation turns out to explain a significant portion of both the variability and the level of return of funds of hedge funds (respectively 68% and 45%). Moreover, it adds value over the long-term, and most importantly, it brings resilience precisely when investors need it the most. Strategic Allocation therefore is a key driver of funds of hedge funds' performance. Fund picking also turns out to be a potential source of enhanced returns though more difficult to capture, as shown by a significant cross section dispersion; Fund Picking clearly is a double-edged sword that requires extensive resources and a seasoned expertise to be mastered properly. Tactical Allocation, on the other hand, has a marginal impact on the performance of funds of hedge funds. In sum, investors with limited resources and/or expertise would probably be better off focusing on Strategic Allocation.

Overall, funds of hedge funds - unlike mutual funds - succeed in overcoming their double fee structure, and add value across market regimes, although to varying degrees and in different forms. We can therefore conclude that the out-flows from funds of hedge funds that we keep on observing cannot be attributed to a collective failure of funds of hedge funds' managers to deliver on their promises. These results tend to corroborate the findings of a recent industry survey which concludes that "[…] the trend for going direct is a result of an industry maturity rather than that of an individual player" (please refer to "It Takes Three for a Tango", Barclays Capital Asset Management Solutions Group, April 2010).

There is however one caveat to these results. As mentioned in the first section, we made the assumption that funds of hedge funds maintained the same Strategic Allocation over the whole observation period. But market conditions have changed materially, and some managers may have adjusted their Strategic Allocation accordingly. Further research needs to be done to take this phenomenon into account in the design of the Strategy. As highlighted by Merton (1981), Admati and Ross (1985), or Dybvig and Ross (1985), when a fund is timing the market, its exposure to the market will not be linear, generally leading to a biased estimate of its stock picking ability. The same remark probably holds true when considering changes in the Strategic Allocation of a fund of hedge funds, and the estimation of the value added at the Tactical Allocation and Fund Picking levels. One solution to address this issue would be to include a structural break analysis to consider several strategic allocations.

From a practical standpoint, this article provides investors with a pragmatic approach to gain an in-depth understanding of the added value and the sources of the added value of funds of hedge funds. It can therefore help smaller investors separating the wheat from the chaff and mitigate the so-called selection risk when they are looking for a partner. It can also help investors with more resources to determine whether they would be better off going on their own, or via a dedicated fund of hedge funds structure. Should they opt for the later solution, it could help them monitoring the hidden costs that typically come hand in hand with agency relationships.

Finally, our empirical study clearly evidenced that the contribution of Tactical Allocation to funds of hedge funds' overall performance is limited, and more often than not negative. This can probably be partly explained by the poor level of liquidity offered by hedge funds in the past. But now that liquid products are available on the market, further research needs to be conducted on dynamic portfolio construction approaches, in order to take into account the dynamics of hedge fund strategies, and in turn, better control for funds of hedge funds' downside risk.
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