

HEDGE FUNDS: ABILITY PERSISTENCE AND STYLE BIAS

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Abstract

In this paper we analyze the persistence of the ability of hedge fund managers. Using a database of 3627 hedge funds from 1994 to 2004 we demonstrate that the ability does not persist for top performers once the strategy of the fund is correctly assessed. In order to do this we define as manager ability the difference between fund return and the return of a portfolio of hedge fund indices whose weights have been estimated minimizing the tracking error over the last 36 months. Our results are different from other contributions that measure the ability of the fund manager on the base of the investment strategy declared by the hedge fund. Using a consistent subsample of our data we demonstrate that this result is driven by a “style bias” that we define as the fact that the strategy of the fund is consistently different from the stated one.

Jel codes: G11, G14

1 Introduction

The sharp increase in the diffusion of hedge fund investment, combined with the high degree of opaqueness of this vehicles, has generated a relevant research effort aimed at understanding their real risk and return possibilities.

A key issue in this context is the predictability of hedge funds return: what kind of information should investor consider when they have to choose where to invest their money? The same question has been asked in the ‘90s for mutual funds. The focal point of this body of research was the following: if the mutual funds market is less efficient than, let’s say, the stock market, investors are better off choosing mutual funds instead of choosing stocks. In this context Gruber (1996) reaches two main conclusions: i) money seems to be smart, investors using information on past returns are able to invest in the best performing funds and, ii) this produces a positive extra performance over the market.

Even if the research on mutual funds failed to reach a unique and unquestionable conclusion on the topic, the same question is now presented for hedge funds. The sharp market decrease after march 2000 highlighted the desirability of introducing a substantial amount of non correlated assets in traditional financial portfolios. The major hedge fund indices showed a substantial underperformance with respect to the stock market if measured from the '90s to the year 2000, but by 2004 they closed the gap, showing at the same time a much lower volatility. In the last five years hedge funds have become the diversification tool of choice for large institutional and private portfolios, and the possibility of forecasting future (relative) returns on the base of past performance has become of tantamount importance.

A major difference in the literature on the persistence of hedge fund return if compared with articles focused on mutual funds is the definition of what should persist: since the seminal paper of Jensen (1968) the return of mutual funds has been decomposed in ability and exposure to a given set of risk factors, and literature on persistence has focused mainly on the stock selection ability component¹. For hedge funds the research focus remained, mainly, on the total return of the vehicles on the assumptions that:

- they use highly dynamic investment strategies that generates unstable and non linear risk exposures, that cannot therefore be properly captured by a linear model;
- the high degree of freedom of the hedge fund manager overcomes the traditional decomposition in risk factor exposures and manager ability: for hedge funds all the performance can be attributed to the investment choices of the manager.

In the next paragraph we will give a detailed account of the literature on the topic and we will show that the vast majority of the relevant contributions is focused on the persistence of funds total return. Only a small number of articles try to analyze the persistence of fund managers ability measured as the difference between fund return and the performance of an index of hedge funds with the same strategy (as in Brown, Goetzmann and Ibbotson (1999) and Agarwal and Naik (2000)), or as the alpha of a multifactor model à la Fama and French as in Edwards and Caglayan (2001), or with a mixed model as in Jagannathan, Malakhov and Novikov (2006), where the ability is measured as the alpha on a multifactor model where the factors are a stock market index, an index of hedge

¹ Among others Hendricks, Patel and Zeckhauser (1993) find persistence in the ability measured as the constant term in a single index model, Elton, Gruber and Blake (1996) reach the same conclusion for the ability measured as the alpha of a three index model while Carhart (1997) finds, as a possible cause for the persistence of mutual funds return, not the ability of the manager but the exposure to a momentum risk factor.

funds with the same investment strategy and a possible additional index of hedge funds with a different strategy that seems to be statistically relevant.

In our work we follow a somewhat different approach: we employ a measure of manager ability that

1. Is defined as an “above the average ability” it means that it does not measure the ability to outperform a static portfolio but a portfolio of managed hedge funds with the same strategy.
2. Is defined considering the average strategy pursued by the fund in the last three years as it can be inferred by the realized performances, so our measure does not rely on the declaration of the manager.
3. Is defined in a way that attributes the short term strategy changes to the ability of the manager. In this way the manager is considered accountable for the decision to modify the strategy of the fund in order to benefit from current market conditions.

We think that this measure has many advantages, particularly in a context where seldom hedge funds are bought singularly but are often included in funds of funds that are held directly by investors or are included in structured products. In this context the manager of the hedge funds portfolio decides the strategy mix of the fund of funds and then looks for the “best hedge funds” and so he is interested in fund manager that are top performers among their peers (properties 1 and 2 of our measure). Moreover the fund of funds manager, while keeping for himself the choice of the long term strategy mix of the product, he often will delegate to these manager the short term management of the strategy mix of the fund in order to exploit market conditions (property 3).

Of course the choice of an investment on the base of past performance relies heavily on the assumption of persistence: this strategy will outperform a random portfolio only if managers that showed the higher ability in the past will still be at the top of the ranking in the near future. Analyzing XXX funds from 1994 to 2005 we find, consistently with past literature, positive evidence of persistence if we consider raw returns or fund manager ability defined using the stated strategy of the fund. Surprisingly we find a different result with our ability measure: in this case the positive evidence of persistence steams from bad performers while top funds do not persist. Reconciling these two evidences we can conclude that the top performers ability evidence found in literature is mainly due to a distortion in the definition of ability: if the fund manager consistently follows a strategy that is different from the stated one (what we call a “style bias”), persistence in the strategy itself will be wrongly attributed to manager ability. A fund of funds manager that allocate the portfolio on the base of fund manager ability defined on the base of the stated strategy will in fact delegate to third parties the long term strategy mix of the fund because the top position in the ability ranking of the

funds that he will probably buy stems from a style bias, a difference between the stated strategy and the actual one.

2 Where are we so far

Usually in empirical research fields comparing results across different studies is a daunting job. This is particularly true for hedge fund performance persistence. Empirical studies may vary across multiple dimensions: first of all a predominant database does not exist and different studies may draw data on fund returns from different sources². Second different time periods may be considered and last, but not least, persistence can be measured with different approaches ranging from contingency tables to regression analysis and simulated investment. With all these degrees of freedom comparison is indeed a hard job. Nonetheless we will try to give in this paragraph a brief account of the main results in order to get at least a feeling of the state of the art in the field. As far as total return is concerned mixed results appear from past literature. To the best of our knowledge the first work that address the question is Brown, Goetzmann and Ibbotson (1999). Using a sample of offshore funds from 1989 to 1995 they find mixed evidence of persistence: they find that past performance is able, in a linear regression framework, to predict future performance to a certain extent but that the sign of the coefficient is not stable through time. Kat and Menexhe (2003) find little evidence of persistence using a contingency table approach and data on 324 funds from the TASS database in the 1994 – 2001 period. Boyson and Cooper (2004), using a larger sample from the same database, in the 1994 – 2000 period, reach (with a simulated investment approach) a slightly different conclusion finding evidence of persistence in total return. They also find that this result is non robust to risk adjustment: the extra performance of recent top performing funds with respect of worst performers can be completely explained by the exposure to a number of traditional risk factors. Positive evidence of persistence has been found by Schneeweis, Kazemi and Martin (2002) using HFR data, by Capocci (2005) that using a combined MAR – Barclays database from 1994 to 2002 finds, again with a simulated investment approach, evidence of persistence in total returns robust to multi-factor risk adjustment and by Henn and Meier (2005). This last result is not fully comparable with the others because the analysis is focused on a longer time period (1998 – 2004) and on a sample of European Long/Short Equities funds scrutinized through a contingency table analysis.

At least part of the variability of these results could be attributed to the fact that almost all the studies compare raw returns of funds with different investment objectives. In that context persistence

² This problem is particularly relevant due to the voluntary disclosure of funds returns.

could emerge through manager ability or through strategy return. If the latter is the case we could indeed observe a variability of persistence results as long as the predominance of a given strategy is related to the persistence of certain market conditions (macroeconomic trends, market volatility, etc.). In order to overcome this problem many studies try to measure the persistence of a return component related to fund manager ability. Again the first study in this family is the seminal work of Brown, Goetzmann and Ibbotson (1999). In order to solve the ambiguity of their results on raw returns the authors measure the persistence of differential return (fund return minus self-reported style benchmark return) with a contingency table framework finding little evidence of persistence.

On the other hand Agarwal and Naik (2000) with the same statistical approach on a more traditional database (HFR from 1982 to 1998) find positive evidence of persistence in differential return (again measured on the self reported style benchmark). More recently Edwards and Caglayan (2001) reach, using a MAR database from 1990 to 1998, the same conclusion (persistence of top performing funds) on a measure of fund manager ability defined as the alpha of a multifactor model³.

3 The Ability of Hedge Fund Managers

In order to measure the hedge fund manager ability we use a methodology introduced, in the context of risk management, by Lhabitant (2001). We define the ability as the difference between the return of the fund and that of a portfolio of nine hedge fund indices. Among the different providers of hedge fund indices return we decided to use Credit Suisse – Tremont mainly because their indices are value weighted and this characteristic is important for us given our relative interpretation of the ability. This source also provides very good coverage of off shore and on shore funds and consistent data reliability⁴.

We use nine indices: Convertible Arbitrage, Dedicated Short Bias, Emerging Markets, Market Neutral, Event Driven, Fixed Income Arbitrage, Global Macro, Long/Short Equity and Managed Futures. Out of the 13 indices provided we have excluded the three sub categories of the event drive main index and the multi strategy (that can be considered as a combination of the others).

In order to evaluate fund manager ability we create for every fund a benchmark using a methodology similar to the style analysis introduced by Sharpe (1988 and 1992). Using 36 monthly returns we estimate the following linear model

³ They employ the Carhart (1997) model enriched with term and default premiums.

⁴ For a detailed comparison of hedge fund indices providers see Kat and Brooks (2002).

$$R_t = \sum_{i=1}^9 \beta_i F_{it} + \varepsilon_t$$

under a non-negativity constraint for the betas. This constraint is reasonable in our case because the factors are not asset classes but portfolios of funds representative of an investment strategy. We do not apply the other usual constraint, sum of the betas equal to one, because we want to allow for a leverage degree different from the industry average. For example if the average leverage for event driven funds is one an hedge fund with a leverage equal to two will register a beta equal to two for the event driven factor. In this way our estimated coefficient can still be interpreted as portfolio weights, even if they do not sum up to one.

The use of a linear model is usually not very suitable for hedge funds because, as Fung and Hsieh (2001) demonstrated, they can easily create non linear relationship with factors return. We think we can overcome this problem using hedge fund indices instead of asset classes as factors in our model: if the factor itself is non linear in its relation with the stock market, the assumption of linearity between fund and factor returns is reasonable.

Another caveat to the use of style analysis for hedge fund is that they follow much more dynamic strategies and so the coefficient should be far less stable than in the case of mutual fund. We solve this problem in two ways: first of all, as in the case of non linearity, the use of funds portfolio as factors should at least partially reduce the instability of the weights, then we explicitly model the residual instability as a component of the fund manager ability: in our analysis we will measure the ability on different time horizons⁵, for example we will define the ability in the fourth quarter of 2001 as the mean difference between fund and benchmark monthly returns from October to December 2001. The benchmark is a portfolio of indices whose weights come from our linear model applied on three years of monthly returns from January 1999 to December 2001.

One may argue that maybe in the last quarter of 2001 the strategy mix of the fund was different from the average of the last three years. Our assumption is that the effect of this change is to be considered part of the ability of the manager who has decided that under the current market conditions a different portfolio strategy would have performed better.

⁵ As Agarwal and Naik (2000) pointed out this is a key problem for hedge funds, where lock up periods may strongly reduce the utility of short term performance persistence.

4 The Database

In our analysis we use data on 3627 hedge funds from the Barclays Capital Database. We have eliminated all the funds with less than 36 months of data from 1994 to 2005, and from 2000 we consider also funds that disappeared from the database in order to reduce as much as possible survivorship bias. Table 1 reports summary statistics for some key characteristics of the hedge funds included in our database. We see that the median fund in our database has a management fee of 1%*m*, a performance fee of 20% of realized profits, 43 million dollars of asset under management and an age of 5.7 years. All these figures are consistent with industry averages as reported from the major databases.

[Insert Table 1 about here]

In Table 2 we analyze the attrition rate of our database. As we can see the number of disappearing funds goes from 107 in 2000 (5.7% of the total number of funds) to 451 in 2002 (18.2% of the number of funds). The table reports mean value and standard deviation of returns for funds that will survive and that will disappear during the following year. We see that in every year from 2000 to 2004 funds that in the next year disappear perform on average worse than surviving funds. The only exception to this rule is 1999 where disappearing funds show a very high mean return. The difference between the mean returns of the two subsamples is always statistically different at the 1% level.

[Insert Table 2 about here]

5 The Persistence of Managers' Ability

Since we assume, in the definition of our measure of ability, the point of view of the manager of a fund of hedge funds we also measure the persistence in a way that is consistent with this setting. Following a widely used methodology we rank funds on a variable of performance (ability, raw return or excess return over the stated strategy index) measured over an evaluation period. We divide the funds in deciles and evaluate the performance of the equally weighted decile portfolios in the following investment period. We repeat these steps for the whole time sample.

We consider 3, 6 and 12 months evaluation and investment periods. In this way we can also investigate the consistency of performance persistence and its practical relevance given the lock up periods widely used in the hedge fund industry.

Table 3 summarizes the results for the case of quarterly evaluation and investment periods. As we can see we find evidence of persistence both in raw returns and fund manager ability. In both cases the difference between the average performance of the top and the bottom decile portfolios is positive and significant. Nonetheless beyond this similarity we find a striking difference in the results: if we consider raw returns we see that the difference between top and median decile performances is statistically significant while the difference between median and bottom is not. This means that recent top performers tend to perform better than the median fund while worst performers do not repeat and perform in a way that is not, on average, statistically different from the median fund.

If we look at the ability of the fund managers we find the opposite result: worst performers tend to persist while top performers do not.

[Insert Table 3 about here]

This difference in the behavior of the two indicators is highly relevant both from the theoretical and from the practical point of view. Moreover it is not confined to quarterly evaluation and investment periods. As we can see from Table 4 we can identify the same phenomenon using different evaluation and investment periods. The clearest interpretation of the evidence of top performer persistence in total returns and bottom performers persistence in managers ability is that there may be a persistence of top performing strategies with a spillover on raw returns. While the theoretical relevance of this evidence is clear, it may be less evident from the practical point of view: why should an investor be worried by the lack of persistence of fund manager ability when he can increase the total return of the portfolio by investing in recent winners? We think that the practical relevance of the problem is high because in the industry the choice of the strategic mix of the hedge fund portfolio, and the choice of the funds usually are separated. Funds of funds managers and institutional investors typically determine the asset allocation of the portfolio in terms of macro strategies in order to maximize the expected return given a set of tactical forecasts, then, within every strategy allocation funds are chosen according to a specific process (that usually combine quantitative and qualitative analysis). In this process the persistence of total return is not a practical tool because it would force a strategic mix dictated by past performances: as a consequence, among the others, the fund of funds would not be able to advertise the strategic mix of the investment product because it would change with every rebalancing.

The two-steps portfolio allocation process outlined above could only benefit from a persistence of top performers within every strategy, that is a persistence of fund manager ability as we defined it. Alas we demonstrated that in this context the only persisting funds are the worst performers: chas-

ing past winners would not produce a performance statistically difference from the investment in the median fund.

6 The Style Bias

As we have seen in the introduction many contributions in the literature have investigated persistence in an ability measure defined as the difference between fund return and the return of an index of hedge funds with the same investment strategy stated by the fund manager.

The condition under which this measure really captures the ability of the manager is a truthful revelation of the strategy followed by the fund, otherwise we would consider as ability something that should be attributed to a different investment strategy. Let's consider the case of a fund that declare itself as "market neutral" but usually keeps a slightly negative net exposure to the market. After a period of negative market returns the fund should have outperformed the average fund in the market neutral category, and this positive outcome would be considered as a signal of high management ability. With our measure the fund would probably be confronted with a benchmark made of different indices with a key role played by the "dedicated short bias" strategy and the good performance would be attributed to a positive exposure toward this strategy and not to the ability of the manager⁶.

In order to test the presence of a style bias in the funds declaration we run the persistence test on the difference between fund return and the return of the stated strategy index. For this analysis we used a subset of 2205 funds. We excluded all the funds whose strategy could not be clearly matched with one of the thirteen Credit Suisse – Tremont indices. That included funds that did not report the strategy and funds that declared themselves as "Fund of funds", "Closed-end fund", "Statistical Arbitrage" or "Option Strategies". We reported the results of this analysis in Table 5. In order to evaluate the effect of the bias potentially introduced by the sample reduction we repeated the analysis on raw returns and our measure of ability. The results about the persistence on these two performance measures are very similar to the ones in Table 4 and so we can exclude any relevant sample reduction bias. In this table we introduced a new performance measure, the "active return" defined as the difference between the return of the hedge fund and that of an index of hedge funds belonging to the same category. Comparing the results with the other measures we clearly see the ef-

⁶ Please note that with our measure this is true only if the exposure to the dedicated short bias strategy is constant trough the time. If it is a short term tactical decision it would not result in the benchmark composition and would still be attributed to the fund manager ability.

fect of a style bias in strategy declaration: this would-be measure of manager ability shows the same behavior of the raw return, with a significant evidence of persistence of top performers.

Our interpretation of this set evidences is that hedge funds managers consistently follow a strategy that can be better explained by a mix of category indices than from the single index of the stated strategy⁷. Once we control for the effect of this distortion we get a measure of ability that does not persist for top performers but persists for the worst funds.

7 Conclusions

In this paper we demonstrated that once one accounts for the effect of long term strategy choices the ability of top performing hedge fund managers does not persist. The only persistence that results from our analysis comes from worst managers that consistently show below the median ability. Evidences of ability persistence for top performers managers comes from an incorrect definition of ability that is subject to a style bias.

This evidence is highly relevant for funds of hedge funds managers and for institutional portfolio managers that use a two step portfolio allocation where the choice of the concrete investment vehicle is precede by an asset allocation on a number of hedge fund macro strategies. In this case the portfolio manager cannot simply choose hedge funds with the higher past total return, she has to choose the best funds inside every chosen strategy. In this case, once the strategy of every hedge fund has been correctly identified beyond the simple declaration of the manager, the past relative performance (the ability of the fund manager) does not persist: choosing recent winner will not produce a result statistically different from the investment in the median fund.

⁷ To better understand this it's important to remember that in our regression approach the benchmark could still be made by a single index with a 100% weight if this minimized the tracking error. Our measure can thus be interpreted as an outright extension of the traditional active return with respect to the stated strategy index.

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Table 1
The Database

The table provides summary information about mutual funds included in the database. The sample is made by 3627 funds from the Barclay Capital database with at least 36 months of data.

Characteristic	Mean	Median	25° Pct	75° Pct
Management Fee	1.33	1	1	1.5
Performance Fee	15.3	20	10	20
AUM (mil \$)	126.310	43.108	15.772	122.870
Age (years)	6.6	5.7	4	8.5

Table 2
The attrition rate

The table provides information about mean return and standard deviation of return for every year from 1994 to 2004. The sample of 3627 funds from the Barclay Capital database with at least 36 months of data is divided into two sub samples: *Surviving Funds* are the funds that will still be included in the database at the end of the year after the one indicated in line, while *Non surviving Funds* are those that will not report the return to the database in the following year.

Year	Surviving Funds			Non Surviving Funds		
	N° of funds	Mean Return	St. Dev of returns	N° of funds	Mean Return	St. Dev of returns
1994	482	0.19	2.86			
1995	662	21.79	2.73			
1996	901	21.32	3.00			
1997	1207	15.93	3.70			
1998	1539	8.31	5.32			
1999	1771	28.57	4.52	107	37.57	6.65
2000	2056	13.42	4.77	113	-0.35	6.76
2001	2022	6.19	2.97	451	-0.20	3.70
2002	2432	2.39	2.63	159	-1.53	2.92
2003	2562	18.49	2.11	240	10.46	2.03
2004	2145	6.94	2.06	420	5.60	2.10
<i>Mean 94-04</i>		<i>13.05</i>	<i>3.33</i>			
<i>Mean 99-04</i>		<i>12.67</i>	<i>3.18</i>	<i>8.59</i>	<i>4.03</i>	

Table 3
Persistence of Manager Ability and fund Raw Return

Hedge funds are sorted at the beginning of each quarter from 1997 to 2004 into decile equally weighted portfolios based on their previous quarter's performance (raw returns in the left part of the table and fund manager ability on the right side). Fund manager ability is measured as the difference between the fund return and the return of a benchmark portfolio of hedge fund indices whose weights have been estimated minimizing the tracking error over the previous three years of monthly returns with a non negativity constraint on the weights.*** indicates significance at the 1% level, ** at the 5% and * at the 10%.

	Raw Returns			Fund Manager Ability		
	Evaluation Period	Investment Period	P-value	Evaluation Period	Investment Period	P-value
1 (worst)	-1.31	0.6		-3.72	-3.03	
2	-0.31	0.78		-2.11	-1.39	
3	0.19	0.77		-1.25	-0.83	
4	0.55	0.84		-0.68	-0.44	
5	0.88	0.85		-0.23	-0.26	
6	1.23	0.84		0.18	-0.05	
7	1.68	0.96		0.58	0.03	
8	2.31	0.98		1.07	0.06	
9	3.51	1.11		1.91	0.19	
10 (best)	23.35	1.77		15.83	0.18	
<i>Spread 10-1</i>		<i>1.17**</i>	<i>0.022</i>		<i>3.21***</i>	<i>0.002</i>
<i>Spread 5-1</i>		<i>0.25</i>	<i>0.557</i>		<i>2.76***</i>	<i>0.007</i>
<i>Spread 10-5</i>		<i>0.92**</i>	<i>0.014</i>		<i>0.45</i>	<i>0.191</i>

Table 4**Persistence of Manager Ability and fund Raw Return on different time horizons**

Hedge funds are sorted at the beginning of each investment period from 1997 to 2004 into decile equally weighted portfolios based on their performance (raw returns or fund manager ability) in the previous evaluation period that is three months in panel A, 6 months in panel B and 12 months in panel C. In every panel different investment periods are tested. Fund manager ability is measured as the difference between the fund return and the return of a benchmark portfolio of hedge fund indices whose weights have been estimated minimizing the tracking error over the previous three years of monthly returns with a non negativity constraint on the weights.*** indicates significance at the 1% level, ** at the 5% and * at the 10%.

Panel A				
<i>Quarterly Evaluation Period</i>				
Inv. Period 3 m	Raw Returns	P-value	Man. Ability	P-value
1 (worst)	0.6		-3.03	
5 decile	0.85		-0.26	
10 (best)	1.77		0.18	
<i>Spread 10-1</i>	<i>1.17**</i>	<i>0.022</i>	<i>3.21***</i>	<i>0.002</i>
<i>Spread 5-1</i>	<i>0.25</i>	<i>0.557</i>	<i>2.76***</i>	<i>0.007</i>
<i>Spread 10-5</i>	<i>0.92**</i>	<i>0.014</i>	<i>0.45</i>	<i>0.191</i>
Inv. Period 6 m	Raw Returns	P-value	Man. Ability	P-value
1 (worst)	0.66		-2.94	
5 decile	0.83		-0.24	
10 (best)	1.67		0.2	
<i>Spread 10-1</i>	<i>1.01***</i>	<i>0.007</i>	<i>3.14***</i>	<i>0</i>
<i>Spread 5-1</i>	<i>0.17</i>	<i>0.567</i>	<i>2.70***</i>	<i>0.002</i>
<i>Spread 10-5</i>	<i>0.84***</i>	<i>0.004</i>	<i>0.44</i>	<i>0.126</i>
Inv. Period 12 m	Raw Returns	P-value	Man. Ability	P-value
1 (worst)	0.68		-2.8	
5 decile	0.85		-0.25	
10 (best)	1.54		0.11	
<i>Spread 10-1</i>	<i>0.85***</i>	<i>0.003</i>	<i>2.90***</i>	<i>0</i>
<i>Spread 5-1</i>	<i>0.16</i>	<i>0.475</i>	<i>2.54***</i>	<i>0</i>
<i>Spread 10-5</i>	<i>0.69***</i>	<i>0.002</i>	<i>0.36</i>	<i>0.184</i>

Panel B and C follow in the next page.

Panel B
Six Months Evaluation Period

Inv. Period 6 m	Raw Returns	P-value	Man. Ability	P-value
1 (worst)	0.47		-3.25	
5 decile	0.85		-0.25	
10 (best)	1.86		0.56	
<i>Spread 10-1</i>	<i>1.39***</i>	<i>0.007</i>	<i>3.82***</i>	<i>0.005</i>
<i>Spread 5-1</i>	<i>0.37</i>	<i>0.348</i>	<i>3.01**</i>	<i>0.025</i>
<i>Spread 10-5</i>	<i>1.02***</i>	<i>0.007</i>	<i>0.81*</i>	<i>0.064</i>

Inv. Period 12 m	Raw Returns	P-value	Man. Ability	P-value
1 (worst)	0.73		-2.95	
5 decile	0.84		-0.26	
10 (best)	1.56		0.33	
<i>Spread 10-1</i>	<i>0.84*</i>	<i>0.06</i>	<i>3.29***</i>	<i>0.004</i>
<i>Spread 5-1</i>	<i>0.11</i>	<i>0.762</i>	<i>2.69**</i>	<i>0.015</i>
<i>Spread 10-5</i>	<i>0.73**</i>	<i>0.017</i>	<i>0.59</i>	<i>0.138</i>

Panel C
Twelve Months Evaluation Period

Inv. Period 6 m	Raw Returns	P-value	Man. Ability	P-value
1 (worst)	0.6		-3.61	
5 decile	0.79		-0.44	
10 (best)	1.42		0.28	
<i>Spread 10-1</i>	<i>0.81</i>	<i>0.262</i>	<i>3.89**</i>	<i>0.033</i>
<i>Spread 5-1</i>	<i>0.18</i>	<i>0.783</i>	<i>3.18*</i>	<i>0.077</i>
<i>Spread 10-5</i>	<i>0.63</i>	<i>0.106</i>	<i>0.71</i>	<i>0.173</i>

Inv. Period 12 m	Raw Returns	P-value	Man. Ability	P-value
1 (worst)	0.83		-2.85	
5 decile	0.86		-0.33	
10 (best)	1.5		0.49	
<i>Spread 10-1</i>	<i>0.67</i>	<i>0.326</i>	<i>3.34**</i>	<i>0.046</i>
<i>Spread 5-1</i>	<i>0.02</i>	<i>0.968</i>	<i>2.52</i>	<i>0.116</i>
<i>Spread 10-5</i>	<i>0.65</i>	<i>0.131</i>	<i>0.82</i>	<i>0.171</i>

Table 5
Persistence of Manager Ability and Style Bias

Hedge funds are sorted at the beginning of each investment period from 1997 to 2004 into decile equally weighted portfolios based on their performance (raw returns or fund manager ability) in the previous evaluation period that is three months in panel A, 6 months in panel B and 12 months in panel C. In every panel different investment periods are tested. Fund manager ability is measured as the difference between the fund return and the return of a benchmark portfolio of hedge fund indices whose weights have been estimated minimizing the tracking error over the previous three years of monthly returns with a non negativity constraint on the weights. Active return is the difference between the return of the fund and that of an index of hedge funds with the same investment strategy stated by the fund manager. *** indicates significance at the 1% level, ** at the 5% and * at the 10%.

Panel A							
<i>Quarterly Evaluation Period</i>							
Inv. Period	3 m	Raw Returns	P-value	Man. Ability	P-value	Active Return	P-value
1 (worst)		0.64		-3.39		-0.23	
5 decile		0.92		-0.3		-0.07	
10 (best)		1.92		0.14		0.85	
<i>Spread 10-1</i>		<i>1.29**</i>	<i>0.022</i>	<i>3.54***</i>	<i>0.002</i>	<i>1.08***</i>	<i>0.002</i>
<i>Spread 5-1</i>		<i>0.28</i>	<i>0.542</i>	<i>3.09***</i>	<i>0.006</i>	<i>0.16</i>	<i>0.59</i>
<i>Spread 10-5</i>		<i>1.00**</i>	<i>0.014</i>	<i>0.45</i>	<i>0.243</i>	<i>0.93***</i>	<i>0.001</i>
Inv. Period	6 m	Raw Returns	P-value	Man. Ability	P-value	Active Return	P-value
1 (worst)		0.72		-3.28		-0.19	
5 decile		0.91		-0.3		-0.03	
10 (best)		1.78		0.17		0.76	
<i>Spread 10-1</i>		<i>1.06***</i>	<i>0.01</i>	<i>3.45***</i>	<i>0</i>	<i>0.95***</i>	<i>0</i>
<i>Spread 5-1</i>		<i>0.2</i>	<i>0.551</i>	<i>2.99***</i>	<i>0.002</i>	<i>0.16</i>	<i>0.41</i>
<i>Spread 10-5</i>		<i>0.87***</i>	<i>0.007</i>	<i>0.47</i>	<i>0.142</i>	<i>0.79***</i>	<i>0</i>
Inv. Period	12 m	Raw Returns	P-value	Man. Ability	P-value	Active Return	P-value
1 (worst)		0.73		-3.14		-0.2	
5 decile		0.91		-0.3		-0.04	
10 (best)		1.63		0.06		0.65	
<i>Spread 10-1</i>		<i>0.90***</i>	<i>0.005</i>	<i>3.20***</i>	<i>0</i>	<i>0.85***</i>	<i>0</i>
<i>Spread 5-1</i>		<i>0.19</i>	<i>0.483</i>	<i>2.83***</i>	<i>0</i>	<i>0.16</i>	<i>0.32</i>
<i>Spread 10-5</i>		<i>0.72***</i>	<i>0.002</i>	<i>0.37</i>	<i>0.207</i>	<i>0.69***</i>	<i>0</i>

Panels B and C follow in the next page.

Panel B
Six Months Evaluation Period

Inv. Period 6 m	Raw Returns	P-value	Man. Ability	P-value	Active Return	P-value
1 (worst)	0.46		-3.63		-0.45	
5 decile	0.91		-0.38		-0.1	
10 (best)	2.05		0.64		1.07	
<i>Spread 10-1</i>	<i>1.59***</i>	<i>0.005</i>	<i>4.26***</i>	<i>0.005</i>	<i>1.53***</i>	<i>0</i>
<i>Spread 5-1</i>	<i>0.44</i>	<i>0.306</i>	<i>3.24**</i>	<i>0.028</i>	<i>0.35</i>	<i>0.303</i>
<i>Spread 10-5</i>	<i>1.15***</i>	<i>0.006</i>	<i>1.02**</i>	<i>0.034</i>	<i>1.17***</i>	<i>0</i>

Inv. Period 12 m	Raw Returns	P-value	Man. Ability	P-value	Active Return	P-value
1 (worst)	0.77		-3.36		-0.18	
5 decile	0.91		-0.4		-0.05	
10 (best)	1.66		0.35		0.74	
<i>Spread 10-1</i>	<i>0.89*</i>	<i>0.065</i>	<i>3.71***</i>	<i>0.003</i>	<i>0.92***</i>	<i>0.003</i>
<i>Spread 5-1</i>	<i>0.14</i>	<i>0.737</i>	<i>2.96**</i>	<i>0.014</i>	<i>0.13</i>	<i>0.633</i>
<i>Spread 10-5</i>	<i>0.76**</i>	<i>0.017</i>	<i>0.75*</i>	<i>0.083</i>	<i>0.79***</i>	<i>0</i>

Panel C
Twelve Months Evaluation Period

Inv. Period 6 m	Raw Returns	P-value	Man. Ability	P-value	Active Return	P-value
1 (worst)	0.65		-4.16		-0.24	
5 decile	0.9		-0.44		-0.06	
10 (best)	1.55		0.3		0.54	
<i>Spread 10-1</i>	<i>0.89</i>	<i>0.27</i>	<i>4.46**</i>	<i>0.028</i>	<i>0.78</i>	<i>0.202</i>
<i>Spread 5-1</i>	<i>0.25</i>	<i>0.74</i>	<i>3.72*</i>	<i>0.064</i>	<i>0.18</i>	<i>0.734</i>
<i>Spread 10-5</i>	<i>0.64</i>	<i>0.136</i>	<i>0.74</i>	<i>0.215</i>	<i>0.60*</i>	<i>0.064</i>

Inv. Period 12 m	Raw Returns	P-value	Man. Ability	P-value	Active Return	P-value
1 (worst)	0.94		-3.33		-0.08	
5 decile	0.94		-0.35		-0.04	
10 (best)	1.54		0.51		0.43	
<i>Spread 10-1</i>	<i>0.61</i>	<i>0.414</i>	<i>3.84**</i>	<i>0.037</i>	<i>0.51</i>	<i>0.302</i>
<i>Spread 5-1</i>	<i>0</i>	<i>0.995</i>	<i>2.98*</i>	<i>0.094</i>	<i>0.04</i>	<i>0.935</i>
<i>Spread 10-5</i>	<i>0.6</i>	<i>0.194</i>	<i>0.87</i>	<i>0.209</i>	<i>0.48**</i>	<i>0.011</i>
