

Risk-Taking and Managerial Incentives: *Seasoned versus New Funds of Funds*

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While the hedge funds industry has grown at a fast pace during the past decade, lack of transparency, need for professionally conducted due diligence, and the inaccessibility to new investors of closed funds led to a significant growth in funds of funds (FOFs). These funds invest in multiple individual hedge funds, hold shares in closed hedge funds, and provide professional oversight on individual hedge funds. The percentage of hedge fund assets that are managed by FOFs increased throughout the past 18 years: Up from 5% in 1990 to 17% in 2000, and 36% in 2006, it stood at 44% of the \$1.7 trillion of total hedge fund assets at the end of the second quarter of 2007, according to a report by Hedge Fund Research Inc. FOFs are also becoming a major venue for institutional investors, such as pension funds, endowments, and wealthy individuals to access hedge funds. According to data collected in *Pensions & Investments'* first survey of hedge funds of funds, more than half of the assets invested in FOFs are from these institutional investors. The industry is also predicting deeper involvement of FOFs in managing institutional money.

As new FOFs are started every year, several questions require an answer: Is there any difference in risk-adjusted performance between newly started and existing FOFs? Do the risk profiles of FOFs change over time? If so, how is this change related to managerial incentives? This article explores these issues by examining

performance, risk-taking behavior, and the underlying managerial incentives of new and seasoned hedge fund managers. Throughout the article, "seasoned" and "existing" will be used interchangeably to refer to funds that are not newly started ones.

Past studies on FOFs mainly explore their performance, risk characteristics, fees structure, diversification benefits, and so on. Liang [2004] compares FOFs to individual hedge funds and CTAs and recognizes them as different asset classes. Fung, Hsieh, Naik, and Ramadorai [2008] examine the performance and risk profile, as well as the capital formation of FOFs. Amo, Harasty, and Hillion [2007] discuss the diversification benefits of FOFs. In this article, we compare the performance and risk profile between new and seasoned FOF managers and find collective evidence that younger managers tend to be more cautious in their risk-taking and some weak evidence that younger ones also deliver better abnormal performances.

Professional managers are believed to change in their risk-taking behavior as they age. Chevalier and Ellison [1997, 1999] point out that the (possible) early termination of younger (mutual fund) managers leads to their implicit incentives to avoid unsystematic risk. Avery and Chevalier [1999] show that younger managers are more likely to "herd" while senior managers do not to signal their ability. On the other hand, Ben-David, Graham,

and Harvey [2006] also present empirical evidence that financial managers are usually overconfident.

Boyson [2005] conducts a study on the risk-taking behavior for individual hedge funds and finds that more senior risk-taking managers have a significantly higher probability of failure than junior managers, which supports the hypothesis of less risk-taking senior managers. Our study on the risk-taking behavior of FOFs related to manager tenure, however, shows similar results for mutual funds studies and contrasting results with Boyson's findings on individual managers.

In this article, standard deviation is used as the measure for total risk-taking and overall β exposure is used as the measure for systematic risk. We also use the Herfindahl measure to evaluate the concentration level of an FOF with respect to different styles of individual hedge funds. Multifactor models are used to evaluate FOF performance. The factors are chosen to cover a wide range, in correspondence to the wide range of financial instruments traded by hedge funds.

Major findings are as follows. First, we find weak evidence for risk-adjusted performance differentials. Second, we find that newly started FOFs take less total risk and less systematic risk compared to the existing ones. Calculated based on 12-month, 24-month, and 36-month rolling windows, the volatility of existing FOFs stays above that of newly started FOF managers and the difference persists until after about two to three years of the establishment of a new FOF. The gross leverage measure, approximated by aggregating absolute value of risk exposures (β), is also consistently higher for existing FOFs than for new FOFs. Third, the Herfindahl measure for existing FOFs is consistently higher than that of new FOFs, showing evidence for higher investment concentration. Fourth, we attribute the risk-taking differential to "herding" theory as documented by Chevalier and Ellison [1997, 1999] for mutual funds: newly started FOFs are more cautious in risk-taking and "herd" more than the existing ones. Finally we note that the above differences in risk-taking behavior between newly started and existing FOFs are found to disappear after two to three years.

DATA AND METHODOLOGY

We use the electronic copy of the 2005 fund of funds directory published by Alternative Investment Center.¹ As claimed by the data vendor, they focus exclusively

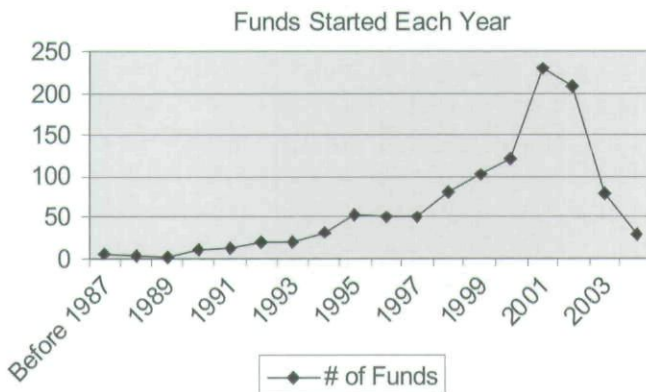
on proven streamlined procedures for data verification, confirmation, and authentication, and this database is the most complete database specific to global funds of hedge funds and their managers.² An advantage of studying FOF returns instead of individual hedge funds comes from reduced back-fill bias, which can be quite serious in hedge fund studies.³ Our data include 1,120 FOFs, with information on the start date, net-of-all-fees performance data, assets under management (AUM), and other fund characteristics. We take the beginning of each year as the observation point for a rolling window and define newly started FOFs to be those with less than one year's return history. The ones with more than one year's return history at observation point are defined to be existing FOFs. Exhibit 1 is a graph of the number of newly started FOFs every year between before 1987 and 2005. Exhibit 2 reports summary statistics on number of funds and AUM of our FOF data. We have several observations: the FOF industry has a boom after 1998. For example, in 2001 alone, 230 new FOFs were started, compared with fewer than 100 on average before 2000. Besides the increase in number of FOFs, the new money attracted to FOFs reached an all-time high in 2001, in the amount of \$42 million for the year, almost double that for 2000. After 2002, the growth in the FOF industry slows down quite a bit. The mean and median AUM of newly started FOFs are usually lower than the seasoned ones and have a decreasing trend over the years.

Exhibit 3 lists the abnormal performance of newly started and existing FOF portfolios based on multifactor model (1). On the one hand, the alphas are positive for both newly started and existing managers over the sample years, ranging from 8 to 69 basis points a year. The difference in alpha between new and seasoned FOFs is not significant according to a two-sample *t*-test⁴ in most of the sample years, and in only three out of the seven sample years do newly started FOFs seem to outperform the existing FOFs. There is also a trend of decreasing alphas after 2000, consistent with the findings of Fung et al. [2008]. On the other hand, the abnormal performance seems to decrease in magnitude after 2002, suggesting intense competition within the industry as well as decreasing economic profit due to that. This might explain why less new capital flows into the FOF industry after 2002.

$$R_{it} = \alpha_{it} + \sum_{j=1}^n \beta_j F_j + \varepsilon_{it} \quad (1)$$

EXHIBIT 1

Number of Newly Started FOFs, 1987–2004



Thirteen factors are used in the model, covering a wide range of traded instruments. They include four equity factors (Fama–French three factors and Carhart [1997] momentum factor), three bond factors (high-yield, term premium, and convertible factors), five look-back straddle factors as described in Fung and Hsieh [2001] (PTFSBD, PTFSFX, PTFSKOM, PTFSIR, and

PTFSSTK) and an emerging market factor.⁵ Summary statistics on these factors are reported in Exhibit 4. We also check the correlation matrix of these factors and do not find high correlation between them.

Our data do not provide direct information on how much experience a fund manager has had in the FOF industry. This might lead to some potential noises for our comparison between the managers in newly started funds versus existing ones. First, a manager is treated as “new” if she/he is with a newly started FOF, despite his/her previous experience. Second, if a FOF changes manager, we treat the new manager as someone with an existing fund. Both noises are likely to lead to weaker results in our proposed comparison. What is more, FOFs are usually organized as limited partnerships and change of manager (general partner) leads to dissolution of the fund. So the latter noise source is less likely to come into play.⁶

We define newly started FOF managers in a certain sample year to be those who have been in business for less than 12 months at the observation point. The existing managers are those with more than one year’s

EXHIBIT 2

Summary Statistics of FOFs

	Total Funds	New Funds	Existing Funds	Mean AUM (\$M)		Median AUM (\$M)		New Money in FOFs(\$M)
				New Funds	Existing Funds	New Funds	Existing Funds	
Before								
1987	7	7	0	N/A	N/A	N/A	N/A	N/A
1988	11	4	7	442	790	141	550	1768
1989	14	3	11	98	651	71	215	294
1990	26	12	14	510	535	37	131	6120
1991	40	14	26	207	524	137	103	2898
1992	60	20	40	292	413	50	109	5840
1993	80	20	60	116	373	20	85	2320
1994	113	33	80	220	423	46	72	7260
1995	166	53	113	189	274	76	68	10017
1996	218	52	166	269	325	110	68	13988
1997	269	51	218	119	312	36	75	6069
1998	349	80	269	309	277	68	91	24720
1999	452	103	349	307	284	45	70	31621
2000	573	121	452	179	290	56	65	21659
2001	803	230	573	184	266	47	62	42320
2002	1011	208	803	137	243	50	56	28496
2003	1090	79	1011	73	222	42	55	5767
2004	1120	30	1090	32	211	27	53	960

EXHIBIT 3

Abnormal Performance Based on the 13-Factor Model

	Mean Alpha		Mean t-statistics		Adj. R-square		T-value of
	New FOFs	Existing FOFs	New FOFs	Existing FOFs	New FOFs	Existing FOFs	Two-sample Comparison
1995–1997	0.32%	0.29%	1.689	1.148	0.725	0.730	2.120**
1996–1998	0.25%	0.22%	1.407	0.943	0.863	0.825	-0.950
1997–1999	0.59%	0.39%	2.747	1.934	0.728	0.764	0.760
1998–2000	0.35%	0.26%	1.592	1.228	0.701	0.745	-0.830
1999–2001	0.65%	0.69%	3.418	3.554	0.716	0.828	2.487***
2000–2002	0.08%	0.08%	0.313	0.334	0.478	0.544	1.981**
2001–2003	0.09%	0.15%	0.865	1.710	0.644	0.788	-0.334

***indicates significance at 1% level; **indicates significance at 5% level; *indicates significance at 10% level.

EXHIBIT 4

Summary Statistics of Factors

	Mean (%)	Stdev (%)	Min (%)	Max (%)	ρ_1
A. PTFS Factors					
PTFSBD	0.796	15.994	-24.215	66.224	0.143
PTFSFX	-0.123	19.231	-29.975	90.267	0.038
PTFSCOM	-0.514	12.484	-22.935	64.996	-0.123
PTFSIR	-0.242	18.852	-24.645	98.698	0.040
PTFSSTK	-5.696	13.287	-30.192	46.149	0.200
B. Traditional Factors					
Exmkt	0.631	4.534	-15.990	8.160	0.045
SMB	0.292	3.719	-11.600	14.620	-0.030
HML	0.201	4.472	-20.790	14.920	0.111
UML	0.823	5.528	-25.000	18.380	-0.071
Emerging Market	0.410	6.715	-28.914	13.770	0.166
Convertible	0.818	3.628	-12.542	12.686	0.091
Term Premium	0.653	2.538	-8.875	7.732	0.099
High Yield	0.596	2.066	-7.372	7.492	0.147

history since their initial date. We choose the observation point to be the beginning of each sample year. So for sample year 1994 the observation point is January 1994, newly started FOFs are those that were started between January 1993 and December 1993, and existing funds are those that were started in or before December 1992. We equally weight all FOFs and group them into newly started and existing FOFs portfolio for each sample year based on this rule.

We measure the total risk of FOFs using return volatility. We calculate and compare the 12-, 24-, and 36-month return volatility for newly started and existing funds in sample years 1995 to 2001. Interestingly, the return volatility for these two portfolios presents a very similar pattern over the seven sample years, as shown in Exhibit 5, which plots the return volatility over a 36-month window: The newly started FOFs have a lower return volatility than the more seasoned FOFs in the initial stage. This difference continues for about 2–3 years, when the return volatility for the two gradually converges.

With multifactor models, we are able to decompose the return of a fund into return from various risk factors. This is especially true for mutual funds, as illustrated in Sharpe [1992]. We follow a similar route to extract the factor loadings (β) for FOFs and sum up their absolute values to reflect the fact that even though hedge funds may take either direction in a trade, FOFs usually are long in individual hedge funds. Thirteen risk factors are used to capture the broad trading universe for hedge funds, namely four equity factors, three bond factors, five straddle

factors, and one emerging market factor.⁷ We name the resulting measure “GLM” (gross leverage measure) and treat it as a proxy for leverage usage in FOF portfolios.⁸ Christie [2007] uses another measure for FOF leverage by defining it to be the ratio between the aggregated levered and unlevered returns. His proxy, similarly, requires a series of assumptions, as leverage of hedge funds and FOFs is not public information and can only be inferred.

$$GLM = \sum_{j=1}^n |\beta_j| \quad (2)$$

EMPIRICAL RESULTS

We see from Exhibit 6 that based on the 13 risk factors, the GLM is slightly over 1 for existing FOFs in the initial sample years and it decreases over the later years. In contrast, the new FOF portfolio never had a GLM value more than 1, showing that newly started FOFs employ less leverage than their more experienced counterparties. After 1998, both new and seasoned FOFs have GLMs less than 1, showing that both are more cautious in terms of using leverage. The fall of 1998 is known to be the most turbulent period to the hedge funds industry, partly due to the failure of LTCM with extreme leverages. Our findings may be due to voluntary and forced reduction in risk exposures: on one hand, managers are more cautious; on the other hand, big brother’s failure in the period may lead to credit rationing for all FOFs and especially newly started FOFs.

EXHIBIT 5

The 36-Month Rolling Window Return Volatility for Newly Started and Existing FOFs

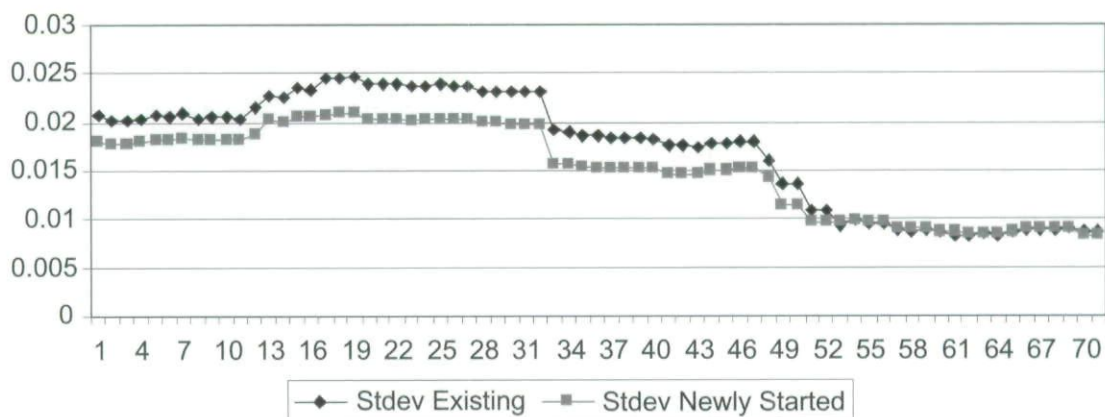


EXHIBIT 6

GLM for Newly Started and Existing FOFs (Thirteen Factors)

Sample Year	Obs	Mean		Comparison of Mean (Old > New)		
		Seasoned	New	P-value	95% CI Low	95% CI High
1995–1997	84	1.074	0.921	0.036	-0.013	0.319
1996–1998	72	1.017	0.769	0.001	0.097	0.399
1997–1999	60	0.799	0.705	0.056	-0.022	0.210
1998–2000	48	0.768	0.563	<0.000	0.155	0.254
1999–2001	36	0.561	0.356	<0.000	0.158	0.212
2000–2002	24	0.606	0.362	<0.000	0.197	0.291
2001–2003	12	0.486	0.453	0.006	0.008	0.058

What is more, newly started FOFs consistently have a lower GLM throughout the seven sample years, and a two-sample *t*-test shows that the difference is significant throughout.

To reconfirm that our estimates of risk exposures are reasonable, we utilize the reported results in Fung and Hsieh [2008]⁹ and find that their magnitude of GLM measures is comparable to ours. This suggests that our finding is not sample-dependent.

If the newly started FOFs have incentives to be more cautious, we expect them to have lower unsystematic risk besides having lower total risk. With evidence that newly started FOFs are cautious to lever up systematic risk, we continue to examine whether newly started FOFs are better diversified to minimize unsystematic risk.

Herfindahl index, calculated as in Equation (3), is widely used to measure the concentration level of a business organization. Getmansky [2004] uses it to measure concentration level within styles of hedge fund industry.

$$H_i = \sum_{j=1}^n |P_{ij}^2| \quad (3)$$

where P_j represent the percentages of investment in one asset class by a FOF. The Herfindahl measure (hereafter H-measure) is calculated based on the 13-factor model for both newly started and existing FOFs. If a portfolio concentrates on a few risk factors, we should detect a higher H-measure and vice versa. We find that for six out of seven sample three-year windows, the portfolio of existing FOFs has a higher H-measure,

showing a higher concentration level for investment into asset classes. A two-sample *t*-test also shows that this difference is statistically significant (p -value < 0.001) in the six sample windows, while the exception is not significant (p -value = 0.791).

We are very curious about this exception: a coincidence of this finding is that during that estimation period, many more new FOFs were started as the industry underwent a boom. Our suspicion is that the large number of newly started FOFs have less new capital to chase on average and this leads to capital rationing, so that newly started FOFs may not be able to diversify as they wish. More funds chasing limited capital and that it leads to weaker alpha during the time period is also documented in Fung et al. [2008].

In summary, newly started FOFs tend to be more diversified with less risk exposures and exhibit lower total risk in the initial years than the existing ones as evidenced by lower GLM, H-measure, and return volatility. However, the risk-adjusted performance of the two is not so different. Hence, we infer that newly started FOFs should have higher systematic risks or they are better at choosing systematic risks that deliver good returns. Fung et al. [2008] divide FOFs into “have alphas” and “have betas” and find the “have alphas” are better at delivering abnormal performance than “have betas,” which usually have higher risk exposures instead of delivering alphas consistently. An interesting study would be to combine Fung et al. [2008] and this article to see whether the younger FOFs tend to belong to “have alpha” groups while the more seasoned FOFs tend to belong to “have beta” groups.

EXHIBIT 7

Herfindahl Measure for Newly Started and Existing FOFs (13 Factors)

Sample Year	Obs	Mean		Comparison of Mean (Old > New)		
		Existing	New	P-value	95% CI Low	95% CI High
1995–1997	84	0.170	0.123	<0.001	0.034	0.059
1996–1998	72	0.160	0.097	<0.001	0.051	0.075
1997–1999	60	0.161	0.132	<0.001	0.015	0.042
1998–2000	48	0.142	0.093	<0.001	0.041	0.057
1999–2001	36	0.159	0.098	<0.001	0.039	0.083
2000–2002	24	0.141	0.061	<0.001	0.073	0.087
2001–2003	12	0.195	0.207	0.791	-0.040	0.017

ROBUSTNESS

For robustness testing, we use a different set of risk factors, the pure strategy indices, to explain FOF returns. Since FOFs invest in individual hedge funds and individual hedge funds belong to various styles based on major financial instruments they use and trading strategies they employ, FOFs can be considered as invested in various hedge fund strategies to achieve diversification. Pure strategy indices are constructed from hedge fund style indices provided by various data vendors.¹⁰ We regress the FOFs' return on pure strategy indices to evaluate their exposures to the various strategies, and calculate the GLM and H-measure to compare between newly started and existing FOFs.

We then conduct the same exercises as in the previous section for newly started and existing FOFs. The results are reported in Exhibit 8. The pure strategy indices do a reasonably good job explaining FOF return variations, with mean-adjusted R^2 s around 80% in general.¹¹ The results from using pure strategy indices as risk factors are consistent with our previous findings from the 13 factors. The GLM and H-measure are again found to be higher for existing FOFs, showing higher concentration level on strategy investments and risk exposures. We also notice that the magnitude of GLM measure is higher with this new set of risk factors.

CONCLUSION

This article examines the differences in performance, risk-taking behavior, and underlying managerial incentives between newly started and existing FOFs. We investigate the difference in total risk, as

well as level of diversification and risk exposure for FOFs. We find that consistent with Chevalier and Ellison [1997, 1999], newly started FOFs tend to be more cautious in taking risk and are more diversified with lower risk exposure. Newly started FOFs tend to have lower aggregate risk exposure (lower leverage usage), be more diversified, and have lower total return volatility than their more seasoned counterparts. This is true despite the fact that being more established in the industry with access to more hedge funds that might have closed to new investment, existing FOFs are able to be more fully invested with more diversified portfolios. It is also surprising to find that even though FOFs can have double layers of leverage, this does not seem to be the case judging from the magnitude of GLM. It raises concern that many FOFs are having investors' capital sitting with them idling and cannot find real talents to invest. Fung et al. [2008] also point out a worrying picture: The magnitude of alpha is decreasing in the recent years while more capital is flowing into the industry chasing performance. We ask this question: Are the more seasoned FOF managers more "entrenched"? This is a future research topic well worth pursuing.

ENDNOTES

¹This database from Alternative Investment Center has since been acquired by Barclays and now is a part of Barclay-Hedge Database.

²See <http://www.barclayhedge.com/products/fund-of-fund-datafeeder.html>.

³According to Fung and Hsieh [2000], back-fill bias in individual funds can be as high as 2% per year, while that for

EXHIBIT 8

Newly Started and Existing FOFs (Pure Strategy Index Factors)

A. GLM

Sample Year	Obs	Mean		Comparison of Mean (Old > New)		
		Seasoned	New	P-value	95% CI Low	95% CI High
1995–1997	84	1.487	1.494	-0.165	-0.099	0.083
1996–1998	72	1.446	1.036	<0.0001	0.317	0.502
1997–1999	60	1.384	1.169	<0.0001	0.136	0.296
1998–2000	48	1.152	0.935	<0.0001	0.116	0.318
1999–2001	36	1.028	0.894	0.001	0.052	0.216
2000–2002	24	1.035	0.992	0.153	-0.040	0.125
2001–2003	12	1.098	1.224	0.997	-0.212	0.04

B. H-Measure

Sample Year	Obs	Mean		Comparison of Mean (Old > New)		
		Seasoned	New	P-value	95% CI Low	95% CI High
1995–1997	84	2200	2100	0.388	-180	0.024
1996–1998	72	2100	1160	<0.0001	850	1070
1997–1999	60	2100	1760	0.002	100	520
1998–2000	48	2190	1450	<0.0001	520	970
1999–2001	36	2490	1890	0.0001	270	930
2000–2002	24	2100	2070	0.313	-170	290
2001–2003	12	2240	2240	0.505	-270	260

FOFs is estimated to be about 0.7%. Malkiel and Saha [2005] have similar estimates.

⁴The *t*-statistics are not reported to save space.

⁵Factor returns for Fama–French and Carhart [1997] are taken from French's website. Factor returns for Fung and Hsieh [2001] are taken from Hsieh's website.

⁶Some FOFs are managed by a fund family and can change managers as a mutual fund does. We conduct a search by visiting the FOF website to check whether the manager remains the same. There are some websites that are not accessible, and some do not provide information on the manager. However, out of the ones that do, more than 95% of managers are the same as provided in our data.

⁷The four equity factors are three Fama–French factors and Carhart [1997] momentum factor; the three bond factors are return on long-term, high yield, and convertible bonds; the five straddle factors are return on constructed straddles based on futures contracts, including currency futures, bond futures, commodity futures, interest rate futures, and stock index futures. The emerging market factor is return on MSCI

emerging markets. All returns are in excess of the risk-free rate.

⁸The adjusted R^2 for the regression based on which GLM is calculated shows reasonable explanatory power for FOFs, ranging from 50–80%.

⁹They run a seven-factor model to capture FOFs' alphas and risk exposures using a combined FOF sample from CISDM, HFR and TASS databases.

¹⁰Various data vendors provide different index values for similar/same styles since the managers reporting to them are not all the same. However, the style indices are highly correlated as they describe similar/same strategies. The pure strategy indices are a weighted average of indices for the same style, and the weight is based on the contribution of an index to the first principal component extracted from the style indices of various sources (data vendors). The data vendors we use in constructing our pure strategy indices include CISDM, HFR, and TASS. There are seven pure strategy indices constructed: convertible arbitrage, event driven, equity hedge, merger arbitrage, equity market neutral, global macro, and managed futures. These seven

pure strategy indices serve as risk factors in Regression (1). More detailed discussion on pure strategy indices can be found in Lhabitant [2004].

¹¹These are pseudo- R^2 s since we impose the positive coefficients constraint to reflect the fact that FOFs can only be considered long certain hedge funds strategies and that an R^2 from a constrained regression is not the same as what we usually mean by R^2 . However, high pseudo- R^2 still reflects better explanatory power of the model.

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