12-2009

Predicting Hedge Fund Performance with Style

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Citation

Teo, Melvyn. 2009 December. Predicting Hedge Fund Performance with Style. *Hedge Fund Insights: Newsletter of the BNP Paribus Hedge Fund Centre at SMU*, 2-7.

Newsletter of the BNP Paribas Hedge Fund Centre at SMU

Summary

Mission of the BNP Paribas Hedge Fund Centres

The mission of the BNP Paribas Hedge Fund Centres is to facilitate, encourage, and sponsor high-level academic research on hedge funds. The Centres also provide outstanding education to students, executives, and investors, and publish objective and independent information on hedge funds, while promoting understanding and awareness of alternative investment strategies. Through excellence in research on alternative investments, the Centres are recognized for their capacity to foster stimulating exchange of opinions, and to develop a knowledgeable and objective information base regarding hedge funds.

The primary objectives of the BNP Paribas Hedge Fund Centre at the Singapore Management University are to

1. conduct and disseminate high quality academic hedge fund research
2. educate finance practitioners and the investor public on hedge funds, and
3. raise the profile of the hedge fund industry in Asia and Singapore

To achieve these goals, the Centre will collaborate closely with its sister centres at the London Business School and HEC. Moreover at all times, the Centre is absolutely committed to the highest ethical conduct and will actively avoid any conflicts of interest with outside parties.

Predicting hedge fund performance with style

Melvyn Teo[1]

Abstract

I apply the endogenous benchmark approach to the study of hedge funds. I find that including an investment style benchmark significantly reduces within style correlations in hedge fund residuals. Also, the performance spread between high past alpha *t*-statistic (a risk-adjusted information ratio) funds and low past alpha *t*-statistic funds increases dramatically when performance is measured relative to fund investment style. There appears to be valuable information in investment style performance that can aid in fund selection.

Introduction

The hedge fund industry rests on the basic premise that fund managers possess investment skills. Yet the dismal performance in 2008 of several large and hitherto successful hedge funds, including Tudor, Renaissance, Citadel, and Och-Ziff, has shaken investors' belief in the value of active management. Moreover, extant empirical studies have not been kind to hedge funds. If fund managers add value, then good fund performance should persist over time. Unfortunately, researchers have found that hedge fund performance does not persist at annual horizons, save using highly complex statistical techniques. In this installment of the statistical digest, I revisit the issue of hedge fund performance persistence.

Evaluating the persistence of hedge fund performance is fraught with difficulties. For one, the complexity of hedge fund strategies makes benchmarking their returns particularly challenging. Also, hedge fund return series are often short; hence, traditional measures like alpha may be measured imprecisely. To increase the precision of alpha and sidestep the benchmarking problem, I adopt the endogenous benchmarks approach pioneered by Hunter et al. (2010). In their paper, they propose a simple approach to account for commonalities in mutual fund strategies that only uses information on fund returns and investment objectives. They form an additional factor from the portfolio of all same investment objective funds. They call this additional factor the endogenous benchmark, since each fund chooses the group with which it intends to compete.

Using only returns and investment objectives of mutual funds, their endogenous benchmarks reduce the cross-sectional correlations of residuals across individual mutual funds within a group by more than half. They evaluate their model relative to the Carhart (1997) four-factor model used extensively in mutual fund research, which includes factors for the market, the size

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effect, the value premium, and stock momentum. However in their empirical analysis, they find that the endogenous models do not significantly improve the identification of equity mutual funds that continue to outperform going forward. According to them, one reason for their mixed predictability results is that managerial skill may be non-existent, and therefore, a better estimation of alpha may actually imply lower predictability of future returns.

I argue that Hunter et al. (2010) endogenous benchmark approach is even more relevant for the estimation of hedge fund alpha for the following four reasons. First, hedge funds have significant latitude with which to implement their investment strategies. As a result, the possibility of an omitted factor is significantly larger. Second, much less is known about the risk profile of hedge fund strategies, particularly investment strategies such as macro and distressed debt. Third, some hedge funds have been shown to have successfully timed the market e.g., market timers, therefore it is important to accommodate inter-temporal variation in factor loadings. If there are commonalities in the time-series variation in factor loadings within investment styles, then including investment style-based benchmarks would be helpful in capturing such variation. Fourth, hedge fund holdings, especially short positions, are rarely known. Therefore, more sophisticated methods for identifying outperforming funds based on fund holdings information (Cohen, Coval, and Pastor, 2005) cannot typically be applied to hedge funds. In contrast, the full set of mutual fund US equity holdings information is easily available from mandatory 13F filings.

To apply the endogenous benchmark approach to hedge funds, I add endogenous benchmarks formed using investment style returns to an augmented Fung and Hsieh (2004) model. The Fung and Hsieh (2004) seven-factor model includes factors for the market (SNPMRF), the size effect (SCMLC), the term spread (BD10RET), the default spread (BAAMTSY), as well as trend-following factors for bonds (PTFSBD), foreign exchange (PTFSFX), and commodities (PTFSCOM). I adjust the term spread and default spread factors appropriately for duration so that all the factors represent returns on traded portfolios. Due to concerns that hedge fund payoffs often resemble those from writing options on the equity market we augment the Fung and Hsieh model with two out-of-the-money option-based factors (OTMCALL and OTMPUT) from the Agarwal and Naik (2004) model. Fund alpha is therefore calculated as follows

$$\begin{aligned} r_{it} &= alpha_i + b_i SNPMRF_t + c_i SCMLC_t + d_i BD10RET_t + e_i BAAMTSY_t + f_i PTFSBD_t \\ &\quad + g_i PTFSFX_t + h_i PTFSCOM_t + m_i OTMCALL_t + n_i OTMPUT_t + o_i STYLERET_t^s + \varepsilon_{it} \end{aligned} \quad (1)$$

where r_{it} is the excess return of fund *i* in month *t* while $STYLERET_t^s$ is the excess return of fund *i*'s investment style *s* in month t.

Hedge funds operate a multitude of investment styles. To streamline the analysis, I classify funds into four broad investment styles: security selection, multi-process, directional trader, and relative value. Security selection funds take long and short positions in undervalued and overvalued securities, respectively, and reduce systematic risks in the process. Usually they take positions in equity markets. Multi-process funds employ multiple strategies that take advantage of opportunities created by significant transactional events, such as spin offs, mergers and acquisitions, bankruptcy reorganizations, and share buybacks. Directional trader

funds bet on the direction of market prices of currencies, commodities, equities, and bonds in the futures and cash market. Relative value funds take positions on spread relations between prices of financial assets and aim to minimize market exposure.

In this study, I employ a merged TASS and HFR dataset which features monthly fund return, monthly assets under management, and annual fund characteristics information. The sample period starts in January 1994 and ends in December 2008. In total, there are 11,701 funds in the data sample. After removing the duplicate share classes, I am left with 8,251 funds, of which 5,014 funds have stopped reporting returns, as of December 2008.

To motivate the analysis, I first test the correlation of fund residuals within investment style groupings after controlling for covariation with the factors from the augmented Fung and Hsieh (2004) model. The results in column 1 of Table 1 below suggests that there are strong commonalities in hedge fund manager's behavior within investment styles that are not captured by the Fung and Hsieh (2004) model. For example, the residuals of more than 40 percent of fund pairs within the multi-process style are positively and significantly correlated. These commonalities could be driven by an omitted factor or by time variation in factor loadings within styles. To capture such commonalities in a parsimonious way, we include investment style returns in the factor model and re-estimate the hedge fund residuals. We find that the inclusion of the endogenous benchmark substantially reduces the number of fund pairs with positive and statistically significant residual correlations. This suggests that hedge fund investment style return is helpful in controlling for commonalities in fund manager behavior.

Table 1: Percentage of fund pairs with positive and statistically significant correlation in residuals (1994-2008)

Investment style	Benchmark model		
	standard benchmarks	investment style benchmarks	standard + investment style benchmarks
relative value	38.65	10.03	8.25
directional traders	29.01	11.73	7.30
multiprocess	44.52	12.75	8.77
security selection	27.00	13.41	8.35

To test whether the simple addition of investment style return improves the evidence for return predictability, I first sort funds based on past three-year nine-factor alpha *t*-statistic (which is similar to sorting by the information ratio often used to rank fund managers). Specifically, every January, I sort funds into deciles based on hedge fund alpha *t*-statistic estimated over the past 36 months of return data. I hold the portfolio for 12 months and reform every January. Finally, I evaluate the performance of the resultant decile portfolios relative to the augmented Fung and Hsieh (2004) model. As shown in Panel A of Table 2 below, there is little evidence of performance predictability when alphas are estimated relative to the augmented Fung and Hsieh (2004) model. Consistent with the findings of Agarwal and Naik (2000), hedge fund

performance does not persist at annual horizons, at least when performance is estimated relative to the nine-factor model. The alpha spread between the decile with the highest past alpha *t*-statistic and the decile with the lowest past alpha *t*-statistic is only 1.29 percent per year and is statistically indistinguishable from zero.

Table 2: Portfolio sorts based on past fund alpha *t*-statistic (1994-2008)

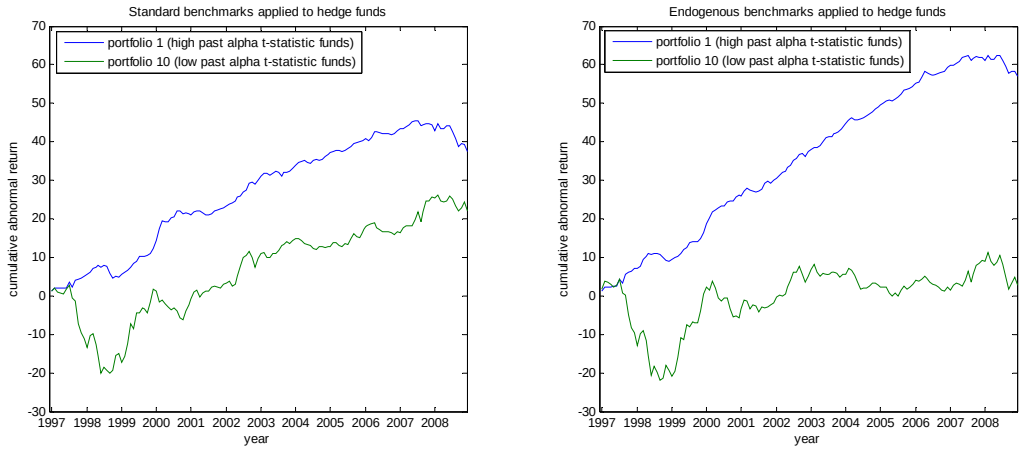
Portfolio	Excess Ret. (pct/ year)	*t*-stat of excess return	Alpha (pct/ year)	*t*-stat of alpha	SNPMRF	SCMLC	BD10RET	BAAMTSY	PTFSBD	PTFSFX	PTFSCOM	OTMCALL	OTMPUT	Adj. R^2
Panel A: Alpha estimated relative to the augmented Fung and Hsieh (2004) seven-factor model														
Portfolio 1 (high past alpha tstat)	4.36	3.49	3.12	3.47	0.15	0.12	0.04	0.16	-0.01	0.00	0.00	-0.29	-0.12	0.60
Portfolio 10 (low past alpha tstat)	2.42	1.07	1.83	0.99	0.22	0.25	0.00	0.07	0.00	0.02	0.00	0.32	-0.15	0.48
Spread (1-10)	1.94	1.07	1.29	0.69	-0.07	-0.12	0.04	0.09	-0.01	-0.02	0.01	-0.61	0.03	0.17
Panel B: Alpha estimated relative to the full endogenous benchmark model														
Portfolio 1 (high past alpha tstat)	5.66	4.94	4.75	5.86	0.17	0.12	0.05	0.13	-0.01	0.00	0.01	-0.20	0.00	0.61
Portfolio 10 (low past alpha tstat)	1.31	0.49	0.23	0.11	0.24	0.28	0.01	0.18	0.00	0.01	0.00	0.29	-0.36	0.53
Spread (1-10)	4.36	2.21	4.53	2.40	-0.07	-0.16	0.05	-0.05	0.00	-0.01	0.01	-0.49	0.36	0.29
Panel C: Alpha estimated relative to the simple endogenous benchmark model														
Portfolio 1 (high past alpha tstat)	5.52	5.40	4.43	5.08	0.09	0.07	0.04	0.17	-0.01	0.00	0.00	-0.31	-0.06	0.44
Portfolio 10 (low past alpha tstat)	0.80	0.29	0.09	0.06	0.32	0.31	-0.09	0.09	0.00	0.01	0.00	0.31	-0.32	0.71
Spread (1-10)	4.72	2.09	4.33	2.73	-0.23	-0.24	0.13	0.08	-0.01	-0.01	0.00	-0.62	0.26	0.62

Next, I include the investment style benchmark with the augmented Fung and Hsieh factors and redo the portfolio sorts. The results from this analysis are reported in Panel B of Table 2. I find that the inclusion of the endogenous benchmark (i.e., as in Equation 1 above) significantly increases the evidence of predictability in hedge funds. The spread alpha increases by three-fold relative to the one in Panel A. Moreover, the spread return and spread alpha are now statistically significant at the 5 percent level. For completeness, we also redo the sort for alpha *t*-statistics measured relative to just the endogenous factor. After sorting funds on alpha *t*-statistics measured relative to this single factor model, we find in Panel C of Table 2 that the return spread is marginally higher while the nine-factor alpha spread is marginally lower than those from the sort using the full endogenous benchmark model.[2]

Figure 1 illustrates the variation in the abnormal spread as a result of the inclusion of the investment style benchmark (Equation 1). Under the hypothesis that managerial skill exists in the hedge fund industry, it is clear that the inclusion of the investment strategy return as a benchmark makes it easier to identify fund managers that outperform going forward.

[2] The mean fund overlap between the portfolios in panels A and B versus those in panel C is 57 percent, while the mean fund overlap between the portfolios in panel A versus those in panel B is 66 percent. It is therefore not surprising that the risk loadings (e.g., on BD10RET, SCMLC, and SNPMRF) in panel C differ significantly from those in the other panels.

Figure 1: Cumulative abnormal returns from portfolios sorted on fund alpha *t*-statistic (1994-2008)



To check the strength of the results, I perform a series of robustness tests. First, I remove the first 12 months of returns from each fund and redo the portfolio sorts to control for backfill bias. Next, the fund sample is adjusted for thin trading-induced serial correlation using the Getmansky, Lo, and Makarov (2004) methodology and the funds re-sorted so as to counter the assertion that return smoothing behavior may be driving the persistence in performance. Finally, fees are added back to the post-fee returns before carrying out the predictability analysis to cater to concerns that the high/low past alpha portfolio may be capturing hedge funds with low/high management and performance fees. Consequently, post-fee returns may persist even though pre-fee returns do not. The results from these additional analyses suggest that the findings are not driven by backfill bias, thin trading-induced serial correlation, or the persistence of fund fees.

Conclusion

Empirical evidence of performance persistence amongst hedge funds remains sparse despite the widely held belief among investors that hedge fund managers possess skill. I show that by simply evaluating performance relative to an investment style benchmark, one can dramatically increase return predictability. Funds with high past alpha *t*-statistics outperform funds with low past alpha *t*-statistics by 4.53 percent per year after adjusting for risk. The results cannot be explained by database biases, fund fees, or thin trading-induced serial correlation. These findings may interest hedge fund investors who are open to supplementing the due diligence process with quantitative fund selection tools.

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Update on the Centre's Activities

Education

35 participants attended our executive education program in October 28-29. They included practitioners from Citibank, ING Asia Private Bank, The Royal Bank of Scotland, Tokio Marine Asset Management, Ernst and Young, and The Hong Kong Housing Society, among others. The program was taught by professors from the London Business School and the Singapore Management University, as well as by hedge fund managers. It gave participants the opportunity to learn from recent advances in academic research and provided valuable insights into how the industry is evolving and where it is headed.

Our annual hedge fund symposium, on October 30, featured Jim Chanos, the famed short-seller and hedge fund manager; Professor Bill Fung, acclaimed hedge fund academic from London Business School; Paul ffolkes Davis, the senior bursar from Trinity Hall, Cambridge University; Ng Nam Sin, Executive Director at MAS; and Christopher Fawcett, CEO of Fauchier Partners and former chairman of AIMA. The speakers weighed in on the topic: What is the future of the hedge fund industry? The speech by Jim Chanos on "The 11 lessons from the financial crisis that investors will soon forget (if they haven't already)" resonated well with the 239 strong practitioner audience.

Research

The centre awarded research grants to the following three papers in 2009:

(i) Side by side management of hedge funds and mutual funds (Tom Nohel, Jay Wang, and Lu Zheng)
(ii) How liquid are liquid hedge funds? (Melvyn Teo)
(iii) Can hedge funds time liquidity? (Charles Cao, Yong Chen, and Bing Liang)

Working versions of these papers are available for download from our research webpage

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For more information regarding the BNP Paribas Hedge Fund Centre at SMU and our upcoming activities, please contact Ms Karyn Tai, centre coordinator (Tel: +65-6828-0933, E-mail: hfc@smu.edu.sg) or visit our webpage at http://www.smu.edu.sg/centres/hfc/index.asp. We look forward to receiving your suggestions and comments.