
Abnormal return patterns and hedge fund failures

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Abstract One reason why quantitative performance and risk measures fail to adequately expose certain risks in hedge funds is the uniqueness of hedge fund strategies and related operational issues in executing these strategies. This paper will first examine the risk exposures and performance characteristics of a sample of live and dead hedge funds, before turning its attention to four recent hedge fund failures. All four of these funds were subject to enforcement proceedings by the Securities and Exchange Commission and/or Commodity Futures Trading Commission. The paper will explore return characteristics of these funds to determine if risk exposures may be used to identify failing funds. The paper shows that a 'monitoring test' could be used to determine if a hedge fund manager has significantly changed trading strategy, which may be a signal that the manager is engaged in trading activities not covered by the fund's investment mandate. The results indicate that careful qualitative and quantitative due diligence could have uncovered some abnormal return patterns in the four failed funds. The paper concludes that both qualitative and quantitative due diligence are equally important in successfully monitoring hedge fund risk exposures.

Keywords: *hedge funds, fund failures, performance monitoring, performance measurement, risk measurement, abnormal returns*

INTRODUCTION

With current allocations to hedge funds by endowments and pension funds averaging 30.2 per cent and 13.2 per cent respectively,¹ performance and risk measurement in particular and the

overall due diligence process in general have received widespread attention. Performance and risk measurement, however, continue to present intriguing challenges to both academics and practitioners. Compared with traditional

asset classes, hedge funds have certain unique features that make traditional measures of risk-return less effective, and require researchers to adjust these models to reflect these features. This paper examines four significant recent failures and applies a monitoring test to determine if performance figures can help identify failing funds.

Access to accurate and comprehensive data are essential for calculating quantitative risk measures. Hedge funds are not required to disclose their performance figures publicly and, according to a recent study conducted by Pertrac (www.pertrac.com), which sampled 12 databases, over 5,000 hedge funds or funds of funds only reported their performance figures to one database.² Liang³ examines returns reported to various databases and shows that there exist errors in reported figures. Related to the accuracy of performance figures is the issue of potential biases in reported figures. According to Fung and Hsieh⁴ and Ibbotson and Chen,⁵ performance figures reported in hedge fund databases may be affected by the following biases: survivorship bias, instant history bias, look-ahead bias, selection bias and stale prices bias. The authors propose various methods for correcting for some of these biases (there is no correction for the selection bias). Lack of data is perhaps the most severe problem that researchers may face when dealing with individual hedge funds. For example, the Center for International Securities and Derivatives Markets (CISDM) database has performance figures on more than 9,000 active and non-active hedge funds, Commodity Trading Advisors (CTAs) and funds of hedge funds. On average, less than five years of data are available

for these funds and 53 per cent have less than three years of data. Furthermore, the reported data include net-of-fees monthly performance data which do not reflect intra-month movements. Daily data on individual hedge funds are currently not available in any database.

Even with accurate and bias-free data, some traditional performance measures may not be applicable to hedge funds. Because hedge funds take long and short positions in various asset classes and may dynamically adjust these positions through time, they may display time-series properties not displayed by traditional asset classes.^{6,7} For example, probability distributions of hedge fund returns tend to display significant departures from normality. Therefore, measures such as Sharpe ratio, Treynor ratio and Jensen's alpha are not applicable to many hedge funds (see Lo⁸ and Kazemi *et al.*).⁹

Recently, research has focused on quantifying various hedge fund default risks as well as the value of disclosure. These risks may be in various forms such as financial risks, operational risks and straight fraud. Corentin *et al.*¹⁰ examined the statistical properties of 109 defaults over the period 1994–2005. They found that a high percentage of defaults (over 50 per cent) were due to fraud, while operational risk and financial risk accounted for 13 per cent and 33 per cent respectively. Another interesting finding in the study is that a high percentage of funds (almost 50 per cent) that defaulted had less than US\$100m under management. Further, 56 per cent of defaults were in funds that traded simple instruments, while 29 per cent of defaults were in funds that traded complicated or opaque instruments. Brown *et al.*¹¹ used the recent

controversial and unsuccessful attempt by the Securities and Exchange Commission (SEC) to increase hedge fund disclosure to examine the potential benefits of registration to investors. They note that any consideration of disclosure requirements should take into account the endogenous production of information within the industry and the marginal benefit of required disclosure on different clienteles. Other papers in the area of performance and risk measurement have focused on specific failures such as Amaranth,^{12,13} as well as liquidity issues.¹⁴ For overviews of this line of research, the reader is directed to Till and Gunzberg¹⁵ or Gehin.¹⁶

Given these problems, quantitative measures of risk-return that are solely based on historical returns very often fail to protect investors against losses. One of the main reasons for this failure is the uniqueness of hedge fund strategies and related operational issues in executing each strategy. Consider, for example, the problems at Bayou Funds, which are among the most highly publicised in recent years. Table 1 lists the summary statistics of Bayou's reported returns as well as those of comparable CISDM, Credit Suisse First Boston (CSFB) and Hedge Fund Research (HFR) indices. While the indices reported annualised returns in the 4–7 per cent range over the period from January 2000 to December 2004, Bayou reported a

return of 13.14 per cent over that same period. Moreover the volatility of Bayou's returns was significantly lower than those of the three indices. The primary question that arises from this discussion is how relevant are the return figures? The return figures are extremely important as a first check in the quantitative due diligence process. However, the returns do not reveal the entire risk profile. A rigorous qualitative due diligence process is required to supplement the returns-based analysis. Interestingly, according to media reports, since diligence conducted by certain firms revealed problems at Bayou, some investors have chosen not to invest in the fund (eg see *Wall Street Journal*).¹⁷

This paper will examine several risk measures using a large sample of active and dead hedge funds drawn from the CISDM database. CISDM has been tracking managed futures since 1979 and hedge funds since 1992 and has a collection of over 9,000 funds in its active and dead databases. The paper reports the average values of these measures for large samples of active and dead funds. Although the goal is not to statistically compare the values of these risk-return measures for active and dead funds, the results indicate that there does not appear to be a systematic difference between live and dead hedge funds. Due to differences in sample sizes, timing of

Table 1: Summary statistics of Bayou Funds

	<i>Annualised return</i>	<i>Standard deviation</i>	<i>Skew</i>	<i>Kurtosis</i>
Bayou Funds	13.14%	4.58%	-1.01	2.67
CSFB-Tremont HFI Long/Short Equity	4.83%	9.01%	0.79	5.11
HFR Equity Hedge Index	6.26%	8.75%	0.67	2.21
CISDM Equity Long/Short Index	5.73%	6.64%	0.42	0.80

addition to and deletion from the database, such a robust statistical comparison is not possible. Further, differences in sample sizes and the timing of addition to and deletion from the database may introduce biases in the results as dead funds tend to have fewer observations.

Next, the paper examines the risk exposures and performance characteristics of selected recent hedge fund failures, and applies a monitoring test to these funds to determine if performance figures can help in identifying failing funds. One reason why these funds are selected is that they have previously reported their performance figures to the CISDM database. The selection includes Bayou Funds, which was managed by Bayou Management Group; Lancer Offshore Fund, which was managed by Lancer Management Group; Marque Partners 1, which was managed by Marque Millennium Group; and V-Tek Capital (BVI), which was managed by V-Tek Capital. Choosing these cases was motivated by average investor losses over the period 2000–2006 as well as available data.¹⁸ According to the CISDM database, estimated assets at stake or lost in each of these funds were US\$450m, US\$657m, US\$129m and US\$2.4m respectively. In the cases examined by Corentin *et al.*,¹⁰ almost 50 per cent of the defaulted funds had less than US\$100m under management. The specific characteristics of each of these failures will be described in the next section.

DATA AND SUMMARY STATISTICS

The data for the present study have been taken from the CISDM database. As noted before, this database, as of December 2006, had a collection of

9,000 active and dead funds. CISDM provides both qualitative as well as quantitative information on these funds and their management companies. The so-called dead funds database consists of hedge funds that at some point have decided to stop reporting to the database. CISDM attempts to find out why a hedge fund has stopped reporting and in some cases these funds provide some information to the database. However, in a majority of cases it is not clear why a hedge fund stops reporting.

Performance statistics for both live and dead funds are presented in Tables 2A and 2B. For the entire sample of active and dead funds, each of the risk-return measures is calculated and their average values reported. Several features of the estimates need to be pointed out. As expected, for each strategy the average volatility of dead funds is greater than the average volatility of active funds. Of course, these managers are not homogeneous and there is considerable variation within each group.

Tables 2A and 2B also show that dead funds generally tend to have lower skewness than active funds. This result is particularly strong for event-driven strategies, where the average active fund has positive skewness while the average dead fund has negative skewness. This indicates that, everything else being the same, dead funds are more likely to experience large negative returns. These two tables also show that dead funds tend to have higher estimated kurtosis, indicating that return distributions of the dead funds tend to have fatter tails.

An interesting aspect of the analysis is the direction and magnitude of the estimates for alphas and betas obtained from a single-factor regression. The single factor is defined as a weighted

Table 2A: Summary statistics of active funds, 1990–2006

	<i>Annualised mean</i>	<i>Annualised standard deviation</i>	<i>Skew</i>	<i>Kurtosis</i>	<i>Sharpe</i>	<i>Beta</i>	<i>Alpha</i>	<i>R-square</i>	<i>Sharpe Omega</i>	<i>Auto correlation</i>
Relative value strategies										
Convertible arbitrage	10.44%	6.81%	−0.06	2.61	1.99	0.43	0.04	0.13	1.40	0.39
Fixed income arbitrage	8.36%	4.52%	−0.37	5.38	1.40	0.13	0.04	0.06	1.09	0.22
Equity market neutral	8.66%	8.94%	0.23	6.03	0.47	0.09	0.04	0.02	1.36	0.07
Event-driven strategies										
Distressed securities	16.52%	9.00%	0.45	3.23	1.53	0.49	0.10	0.14	1.65	0.25
Merger arbitrage	8.31%	4.64%	0.55	8.34	0.86	0.21	0.03	0.10	1.45	0.17
Event-driven multi-strategy	12.97%	10.47%	0.06	3.54	1.08	0.85	0.05	0.27	1.62	0.22
Opportunistic strategies										
Equity long/short	14.89%	14.27%	0.36	2.75	0.82	0.82	0.07	0.18	1.76	0.13
Global macro	15.01%	16.57%	0.33	3.26	0.56	0.58	0.08	0.10	1.48	0.06
Emerging markets	21.46%	20.35%	−0.07	4.41	1.03	1.35	0.10	0.21	2.19	0.17

All estimates are averages within each group.

Reported betas, alphas and R-squares are from a single-factor model

Table 2B: Summary statistics of dead funds, 1990–2006

	<i>Annualised mean</i>	<i>Annualised standard deviation</i>	<i>Skew</i>	<i>Kurtosis</i>	<i>Sharpe</i>	<i>Beta</i>	<i>Alpha</i>	<i>R-square</i>	<i>Sharpe Omega</i>	<i>Auto correlation</i>
Relative value strategies										
Convertible arbitrage	11.70%	7.91%	−0.16	4.13	1.22	0.32	0.06	0.09	1.13	0.29
Fixed income arbitrage	7.18%	8.40%	−1.25	11.41	0.78	0.17	0.02	0.07	1.00	0.21
Equity market neutral	8.12%	9.27%	0.16	2.29	0.39	0.03	0.04	0.03	1.05	0.09
Event-driven strategies										
Distressed securities	12.35%	14.13%	−0.01	4.77	0.88	0.88	0.04	0.22	1.17	0.22
Merger arbitrage	9.80%	8.21%	−0.41	4.04	0.76	0.38	0.04	0.12	1.01	0.16
Event-driven multi-strategy	14.29%	11.40%	−0.24	4.04	1.04	0.75	0.06	0.24	1.18	0.21
Opportunistic strategies										
Equity long/short	14.26%	20.83%	0.19	3.50	0.60	1.12	0.04	0.20	1.31	0.10
Global macro	9.11%	17.53%	0.11	2.99	0.37	0.75	0.01	0.10	1.02	0.07
Emerging markets	10.35%	27.45%	−0.28	6.86	0.26	1.45	−0.01	0.15	0.56	0.16

All estimates are averages within each group.

Reported betas, alphas and R-squares are from a single-factor model

combination of the Russell 3000 Total Return Index (40 per cent), the Lehman US Aggregate Index (40 per cent) and the Lehman High Yield Index (20 per cent). The estimates for alphas and betas as well as the R-squares of the single-factor linear regression for active and dead samples are very similar both in direction and magnitude (a multi-factor

model is used when the monitoring test is applied to failed hedge funds). This indicates that quantitative measures based solely on historical returns may not be useful in predicting which funds are likely to become defunct. Finally, estimates are presented for the Sharpe–Omega measure.¹⁹ It can be seen from Tables 2A and 2B that, on average, dead

funds have lower Sharpe-Omega ratios than active funds.

A number of authors have argued that the presence of auto-correlations in hedge fund returns is an indication of the illiquidity of the underlying assets held by hedge funds.²⁰ Some authors have gone further and have claimed that the presence of positive autocorrelation could be used to detect fraudulent return smoothing in the hedge fund industry.²¹ Looking at Tables 2A and 2B, one can see that certain strategies display higher positive autocorrelation than others. As expected, autocorrelation estimates are higher for convertible arbitrage, distressed securities and fixed income arbitrage, and very low for equity and global macro strategies. However, there do not appear to be significantly uniform differences between active and dead funds when it comes to auto-correlation.

An interesting aspect of the sample of dead and active funds is that the means for dead funds are not uniformly smaller than those of active funds. In certain cases, such as convertible arbitrage, event-driven multi-strategy and merger arbitrage, the mean for dead funds is actually higher. A careful examination of the list of dead hedge funds reveals the presence of funds run by firms such as Steel Partners, Third Point Partners and Perry Partners. These funds are still active with strong performance, but have voluntarily stopped reporting to the database.

To improve the information content of the results, it was decided to examine the dead fund database further and eliminate those funds that are still active but have decided not to report to the database, as well as those funds that had strong performance prior to their decision not to report to the database. To

compare the performance of this selected group of dead funds with a similar group of active funds, it was decided to concentrate on the same number of active funds that had the lowest ranking according to their Sharpe ratios. In a sense, one is comparing the performance of the selected dead funds with the same number of poor performing active funds. The results are presented in Table 3. Even for these selected groups of dead and active funds, there do not appear to be strikingly different measures for all types of risks. The two results that stand out are that dead funds tend to have higher kurtosis and lower skewness.

CASE STUDIES OF FAILED FUNDS

The characteristics of the funds for consideration are presented in Tables 4A and 4B. Below, the circumstances surrounding the failures of each of these funds are briefly described. More information on these failures is available on the SEC (www.sec.gov) and Commodity Futures Trading Commission (CFTC) (www.cftc.gov) websites.

Bayou Funds

In a complaint dated September 2005, the SEC noted that Samuel Israel III of New York and Daniel E. Marino of Connecticut, the managers of a group of hedge funds known as the Bayou Funds, defrauded their investors and misappropriated millions of dollars in investor funds for their personal use.²² In its complaint, the SEC noted that from 1996 through 2005, investors deposited over US\$450m into the Bayou Funds and a predecessor fund. During that period, Israel and Marino defrauded current investors and attracted new investors by grossly exaggerating the

Table 3: Summary statistics of selected dead and active funds, 1990–2006

	<i>St dev</i>	<i>Mean</i>	<i>Skew</i>	<i>Kurtosis</i>	<i>Sharpe ratio</i>	<i>Beta</i>	<i>Alpha</i>	<i>R sqr</i>	<i>Sharpe Omega</i>	<i>Auto correl</i>
Dead emerging markets funds	26.76%	0.76%	−0.475	5.635	−0.150	1.437	−10.7%	15.4%	−0.12	14.7%
Active emerging markets funds	25.87%	18.41%	−0.203	5.385	0.533	1.639	5.9%	21.9%	2.76	16.4%
Dead convertible arbitrage funds	8.60%	3.30%	−1.352	6.287	−0.305	0.199	−1.8%	5.8%	−0.22	16.3%
Active convertible arbitrage funds	8.23%	6.02%	−0.359	2.239	0.138	0.559	−0.9%	18.3%	0.60	25.8%
Dead equity long/short funds	22.16%	−1.65%	−0.457	4.628	−0.288	1.184	−11.8%	20.9%	−0.36	4.7%
Active equity long/short funds	15.49%	7.65%	0.019	2.440	0.197	0.905	−1.1%	19.2%	0.70	8.2%
Dead equity mkt neutral funds	8.87%	2.66%	−0.021	1.710	−0.283	−0.034	−1.3%	3.0%	−0.24	6.0%
Active equity mkt neutral funds	8.35%	4.17%	−0.298	6.876	−0.023	0.232	−0.6%	2.4%	0.28	6.7%
Dead distressed securities funds	23.23%	2.17%	−0.767	6.116	−0.041	1.188	−8.0%	20.4%	0.03	25.7%
Active distressed securities funds	12.55%	12.98%	0.239	6.344	0.732	0.521	6.2%	9.7%	2.54	15.4%
Dead global macro funds	19.51%	0.15%	0.099	2.876	−0.225	0.856	−8.3%	11.3%	−0.19	3.7%
Active global macro funds	13.86%	9.15%	0.049	3.470	0.310	0.317	3.5%	8.8%	0.90	7.5%
Dead merger arbitrage funds	7.18%	2.53%	−0.552	3.490	−0.504	0.280	−3.0%	7.8%	−0.20	5.1%
Active merger arbitrage funds	4.30%	6.98%	0.732	7.724	0.575	0.164	2.1%	7.3%	1.34	16.6%
Dead fixed inc arb funds	12.55%	2.86%	−1.569	11.799	−0.181	0.194	−2.2%	10.2%	−0.29	17.2%
Active fixed inc arb funds	6.05%	7.02%	−1.080	7.499	0.473	0.173	2.1%	7.4%	1.21	16.6%
Dead event driven funds	12.61%	4.73%	−0.611	3.013	0.051	0.480	−1.8%	24.8%	0.21	20.5%
Active event driven funds	19.77%	8.38%	−0.017	5.180	0.246	1.481	−3.3%	22.1%	0.96	9.9%

Table 4A: Characteristics of failed funds

<i>Fund name</i>	<i>Fund type</i>	<i>Inception date</i>	<i>Strategy</i>	<i>Strategy description</i>	<i>Min. investment US\$</i>
Bayou Funds	Hedge fund	31-Jan-97	Equity long/short	Long/short	500,000
Lancer Oshore Fund	Hedge fund	31-Oct-95	Equity long/short	US opportunity. Value	500,000
Marque Partners I	Hedge fund	31-Oct-97	Equity long/short		100,000
V-Tek Capital (BVI)	CTA	31-Jan-00	CTA-systematic/ trend-following	169 systems covering stock indices, currencies, interest rates	500,000

Table 4B: Summary statistics for failed funds

<i>Fund name</i>	<i>Reporting period</i>	<i>Annualised return</i>	<i>Standard deviation</i>	<i>Skew</i>	<i>Kurtosis</i>	<i>Minimum</i>	<i>Maximum</i>
Bayou Funds	January 97–February 05	16.69%	10.95%	2.08	15.91	−10.55%	20.35%
Lancer Oshore Fund	October 95–December 02	34.53%	24.25%	2.34	8.09	−8.96%	35.75%
Marque Partners I	October 97–November 99	37.72%	15.72%	1.02	2.14	−4.93%	16.61%
V-Tek Capital (BVI)	January 00–September 03	56.28%	83.73%	6.29	41.01	−8.80%	159.83%

performance of Bayou Funds to make it appear a profitable and attractive investment, despite it never actually

posting a year-end profit. On October 2005, charges were also filed against Israel and Marino by the CFTC.

Lancer Offshore Fund

In a complaint dated July 2003, the SEC noted that Michael Lauer, principal of Lancer Management Group, LLC, the firm that operated Lancer Offshore Fund, violated the federal securities laws in connection with their deliberate manipulation of the closing prices of various over-the-counter bulletin board and pink sheet quoted stocks. The complaint also noted that, from at least March 2000 to July 2003, the defendants used their portfolio pumping techniques to overstate the value of certain of the fund's holdings in virtually worthless companies and to over-inflate performances and net asset values. Through the defendants' scheme the fund amassed hundreds of millions of dollars from investors, and the defendants earned at least tens of millions of dollars in fees. As of 30th April, 2003, defendants Lauer and Lancer represented that the fund had US\$657m in assets.²³

Marque Partners I

In December 2003, the SEC instituted public administrative and cease-and-desist proceedings pursuant to Sections 203(f) and 203(k) of the Investment Advisers Act 1940 against Wilfred Meckel and Robert T. Littell. Littell, from October 1997 through June 2000, was employed by Marque Millennium Group, Ltd (MMG) as Manager of Investments. Until March 2000, Littell was primarily responsible for operating Marque Partners I, including making all investment decisions, entering trades and communicating with investors. The order noted that, from at least December 1998 through March 2000, MMG, through Littell, communicated materially inaccurate performance

information to limited partners and potential investors in the hedge funds. In addition, from the inception of Marque Partners I in October 1997 through March 2000, MMG, through Littell, made various misrepresentations to investors and potential investors about the hedge funds' management structure, retention of an accountant and auditor, and risk management techniques.²⁴

V-Tek Capital (BVI)

On 10th September, 2004, Judge Blanche Manning of the US District Court for the Northern District of Illinois issued an order freezing assets in an enforcement action filed on 8th September, 2004, charging Edward R. Velazquez of Chicago, Illinois, and his companies V-Tek Trading Group, Inc. and V-Tek Capital, Inc. with fraud. Specifically, the complaint alleged that defendants defrauded at least 43 customers of at least US\$2.4m by fraudulently misrepresenting the profit potential and failing to adequately disclose the risks of trading commodity futures. According to the complaint, until July 2004, Velazquez, V-Tek Capital and V-Tek Trading Group touted their collective operations, which they referred to as 'V-Tek', as a hedge fund, and promoted investments in managed commodity futures trading accounts on a website that displayed a V-Tek Capital banner proclaiming 'rated in the top 1 per cent of capital management firms worldwide'. The complaint also alleged that defendants falsified Velazquez's trading performance track record and distributed it to customers, falsely stating on a website and in printed promotional material that V-Tek Capital was registered with the CFTC.²⁵

METHODOLOGY

Summary statistics for each of these funds will be presented first. Single-factor regression results for each of the four funds against the relevant indices will be presented subsequently. Finally, a 'monitoring test' as described below will be performed to detect any structural breaks in the data.

When an investor decides to allocate capital to one or more hedge fund strategies, the first step is to perform due diligence. During this process, the investor can learn a great deal about the fund, the portfolio manager, his/her trading strategy, the fund's back office support and its risk management techniques. Once the due diligence is over and the commitment is made, the investor will typically visit the manager every few months to ensure that the provisions of the investment agreement are still followed. Between regular visits to the office, the investor has to rely on the fund's reported returns to determine if it is following the agreed guidelines. In the last section of this paper, the 'monitoring test' of Zeileis *et al.*²⁶ will be applied to show how between due diligence visits a fund's return could be used to determine if the manager has deviated from his/her investment mandate.

The mathematical details of the monitoring test can be found in the original paper of Zeileis *et al.*²⁶ Briefly, suppose the rate of return on a fund's strategy can be expressed by a linear factor model of the following form:

$$r_t = \beta_0 + \sum_{j=1}^F \beta_j f_{jt} + \varepsilon_t \quad (1)$$

In this expression r_t is the return on the fund at time t , β_i for $i = 1, \dots, F$ are

factor exposures of the fund, f_{it} is the return to factor i and ε_t is the error term.

Suppose one has confidence that the manager's return up to the last due diligence visit, $t = n$, was generated by the above model. Therefore, the objective is to use returns observed at time t , where $t = n + 1, \dots, T$, with T being the time for the next visit, to determine if there have been material changes in factor exposures. The monitoring test proposed by Zeileis *et al.*²⁶ uses the following test statistic:

$$Y(t) = \Lambda(t) \times (\hat{\beta}^{(t)} - \hat{\beta}^{(n)}),$$

where $\hat{\beta}^{(n)}$ is the estimated value of the vector of the coefficients of the linear factor model using data up to period n and $\Lambda(t)$ is a scaling factor related to the volatility of the data and the standard errors of the estimates (see equation [3] of Zeileis *et al.*²⁶). It can be shown that the statistic $Y(t)$ follows a Brownian bridge process. To decide if there has been a structural change in the linear factor model, the value of $Y(t)$ is compared with $\pm b(t)$, where:

$$b(\tau) = \sqrt{\tau(\tau - 1) \left[\lambda^2 + \log\left(\frac{\tau}{\tau - 1}\right) \right]}.$$

$$\tau = \frac{t}{n}$$

If $Y(t)$, for $t = n + 1, \dots, T$, crosses the two boundaries, then the null hypothesis of no change is rejected. The value of λ^2 is selected to reflect the level of confidence (eg at 95 per cent confidence level, $\lambda^2 = 7.78$). The above monitoring case can be applied to the selected group of failed funds listed in Table 4.

EMPIRICAL RESULTS AND DISCUSSION

The results regarding the failed funds are segmented into three parts. First, summary statistics for the four funds described previously will be presented. Next, single-factor regression results against the relevant indices for each of the four funds will be presented. Finally, the results of the ‘monitoring test’ of Zeileis *et al.*²⁶ will be presented, illustrating how a fund’s return could be used to determine if the manager has deviated from his/her investment mandate.

Summary statistics

The summary statistics for the four funds are presented in Table 4B. The numbers reveal two interesting points. First, the annualised return of all four funds over their respective reporting

periods is in excess of 15 per cent. At first glance, these funds look as promising as the top funds in the CISDM database. Secondly, with the exception of V-Tek, the other three funds are classified as long/short equity in the database. These statistics would imply that these funds are among the best performers of all funds executing equity long/short strategies.

Figure 1 displays 12-month rolling return volatilities for the four failed funds. Also included are rolling volatilities on the CISDM Equally Weighted Hedge Fund index (HF) and CISDM Asset Weighted CTA index (CTA). With the exception of the Marquee Partners I fund, the remaining funds show dramatic changes in their return volatility — for example, note the significant reduction in Bayou’s return volatility. While this reduction in and of

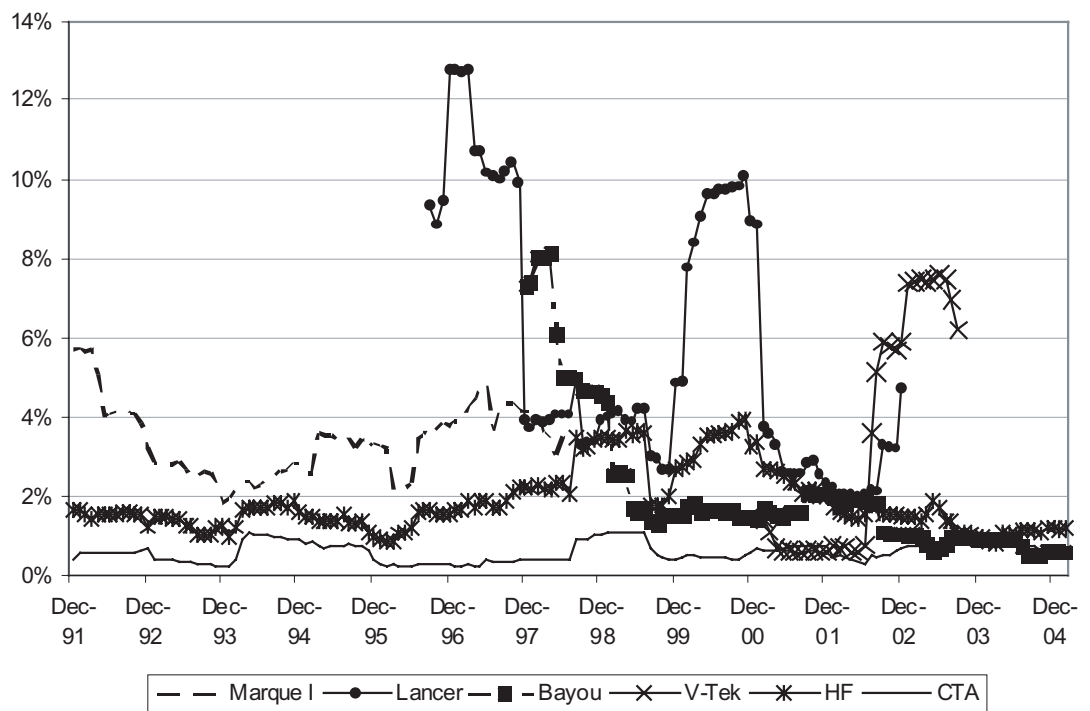


Figure 1: 12-month rolling volatilities of failed funds and related benchmarks

itself may not always be a cause for concern, it is certainly an indication that a fund's trading strategy needs to be examined closely to understand the nature of its returns. According to media reports, trouble began brewing at the fund in 1998, around the time when there was a drastic reduction in its volatility.²⁷

Single-factor regressions

Single-factor regression results of the Bayou return series against three major hedge fund indexes — the CSFB/Tremont, HFR and CISDM — are presented in Table 5. Note that strategy hedge fund indices are being used to

determine the performance of a particular fund relative to the average performance of all funds in the same strategy. For this reason, a single-factor regression is most suitable. The R-squares are extremely low and the slope coefficients are insignificant in all three cases. One would expect the strategy indices to have a little more explanatory power than those obtained from the regressions.

Single-factor regression results for Marque, Lancer and V-Tek are presented in Tables 6, 7 and 8 respectively. The R-squares are extremely low in two of the three cases

Table 5: Single-factor regression results for Bayou Funds

Bayou Funds				
Regression: Bayou Return = $\alpha + \beta \times \text{Index Return} + \epsilon$				
Index=CSFB-Tremont HFI Long/Short Equity				
Regression statistics				
R square	0.01			
Adjusted R square	-0.01			
	Coefficients	Standard error	t stat	P-value
Intercept	1.06%	0.17%	6.14	0.0000
CSFB-Tremont HFI Long/Short Equity	-5.13%	6.64%	-0.77	0.4424
Index = HFR Equity Hedge Index				
Regression statistics				
R square	0.02			
Adjusted R square	0.00			
	Coefficients	Standard error	t stat	P-value
Intercept	1.01%	0.17%	5.76	0.0000
HRFI Equity Hedge Index	6.95%	6.81%	1.02	0.3112
Index = CISDM Equity Long/Short Index				
Regression statistics				
R square	0.02			
Adjusted R square	0.01			
	Coefficients	Standard error	t stat	P-value
Intercept	0.99%	0.18%	5.65	0.0000
CISDM Equity Long/Short Index	10.81%	8.94%	1.21	0.2318

(Lancer is the exception). The slope coefficients are negative and insignificant in the case of Marque, while they are positive and significant in the case of Lancer. Equity-based strategies generally performed well in the period 1995–2000 and the results indicate that Lancer is a top performer. Of course, it was later revealed that the reported performance numbers were materially false.

The results reported above can be compared with average R-squares of all live and dead funds using the same strategy. The averages for intra-strategy R-squares for live and dead funds are displayed in Table 9. Note that while

the average R-squares are low in general, the R-squares of the funds examined are much lower, with the exception of Lancer.

Monitoring test

This section applies the previously discussed monitoring test to the four failed funds. As discussed, these funds failed because of fraud and other illegal activities. The goal is to determine if the monitoring test can be used to detect significant changes in these funds' strategies after the first 12 months of operations. Typically, an investor will perform this test after the due diligence

Table 6: Single-factor regression results for Marque Partners I

Marque Partners I				
Regression: Marque Partners 1 Return = $\alpha + \beta \times \text{Index Return} + \epsilon$				
Index = CSFB Long/Short Equity				
Regression statistics				
R square	0.09			
Adjusted R square	0.05			
	Coefficients	Standard error	t stat	P-value
Intercept	3.74%	0.95%	3.95	0.0006
X Variable 1	-35.19%	22.65%	-1.55	0.1334
Index = CISDM Long/Short Equity				
Regression statistics				
R square	0.12			
Adjusted R square	0.08			
	Coefficients	Standard error	t stat	P-value
Intercept	3.71%	0.91%	4.08	0.0004
X Variable 1	-48.68%	27.08%	-1.80	0.0848
Index=HFR Equity Hedge				
Regression statistics				
R square	0.10			
Adjusted R square	0.06			
	Coefficients	Standard error	t stat	P-value
Intercept	3.93%	0.99%	3.98	0.0006
X Variable 1	-47.15%	28.82%	-1.64	0.1149

Table 7: Single-factor regression results for Lancer Offshore Fund

Lancer Offshore Fund				
Regression: Lancer Offshore Fund Return = $\alpha + \beta \times \text{Index Return} + \epsilon$				
Index = CSFB Long/Short Equity				
Regression statistics				
R square	0.29			
Adjusted R square	0.29			
	Coefficients	Standard error	t stat	P-value
Intercept	1.71%	0.66%	2.57	0.0118
X Variable 1	107.17%	18.04%	5.94	0.0000
Index = CISDM Long/Short Equity				
Regression statistics				
R square	0.26			
Adjusted R square	0.25			
	Coefficients	Standard error	t stat	P-value
Intercept	1.51%	0.70%	2.17	0.0325
X Variable 1	128.85%	23.61%	5.46	0.0000
Index = HFR Equity Hedge				
Regression statistics				
R square	0.32			
Adjusted R square	0.31			
	Coefficients	Standard error	t stat	P-value
Intercept	1.31%	0.67%	1.96	0.0537
X Variable 1	128.99%	20.53%	6.28	0.0000

process is completed. In the given case, one can assume that any significant changes in these funds' strategies have taken place after the first 12 months of operations.

Using monthly figures from the Lehman High Yield Bond Index (HIYLD), Goldman Sachs Commodity Index (GSCI), Fama and French factors²⁸ (excess return on market portfolio (RM), small minus big (SMB) and high book value minus low book value (HML)) and the momentum factor of Carhart (MOM),²⁹ one estimates the factor exposures that appear in equation (1).

Figures 2–5 display the results of the tests. The graphs display the dynamics of standardised factor exposures of the four funds to the above factors and the 95 per cent confidence bands. If one of the factor exposures moves outside the band, then one can conclude that the manager's style has significantly changed.

One can see that in the cases of Bayou Funds, Marque Partners I and V-Tek Capital there were significant changes in the strategy after the first 12 months. News reports have indicated that Bayou Funds was involved in illegal activities almost from the outset and, as it can be seen, the test indicates that the fund's

Table 8: Single-factor regression results for V-Tek Capital

V-Tek Capital (BVI)				
Regression: V-Tek Return = $\alpha + \beta \times \text{Index Return} + \epsilon$				
Index = CSFB Managed Futures Index				
Regression statistics				
R square	0.00			
Adjusted R square	-0.02			
	Coefficients	Standard error	t stat	P-value
Intercept	4.93%	3.71%	1.33	0.1903
X Variable 1	-32.97%	95.07%	-0.35	0.7305
Index = CISDM CTA Asset Weighted Index				
Regression statistics				
R square	0.00			
Adjusted R square	-0.02			
	Coefficients	Standard error	t stat	P-value
Intercept	4.57%	3.77%	1.21	0.2314
X Variable 1	17.69%	143.58%	0.12	0.9025
Index = Barclay CTA Traders Index				
Regression statistics				
R square	0.00			
Adjusted R square	-0.02			
	Coefficients	Standard error	t stat	P-value
Intercept	4.84%	3.73%	1.30	0.2016
X Variable 1	-26.72%	143.05%	-0.19	0.8527

Table 9: Average R-squares of managers versus strategy indices

<i>R-square of individual funds with respect to strategy index</i>		
<i>Strategy</i>	<i>Live funds</i>	<i>Dead funds</i>
Emerging markets	0.41	0.21
Convertible arbitrage	0.45	0.14
Equity long/short	0.29	0.28
Equity market neutral	0.02	0.14
Distressed securities	0.33	0.28
Global macro	0.14	0.15
Merger arbitrage	0.37	0.14
Fixed income arbitrage	0.08	0.12
Event driven	0.37	0.26
CTA	0.24	0.19
Bayou Fund	Equity Long/Short	0.02
Marque Partners I	Equity Long/Short	0.10
Lancer Offshore Fund	Equity Long/Short	0.32
V-Tek Capital	CTA-Systematic	0.00

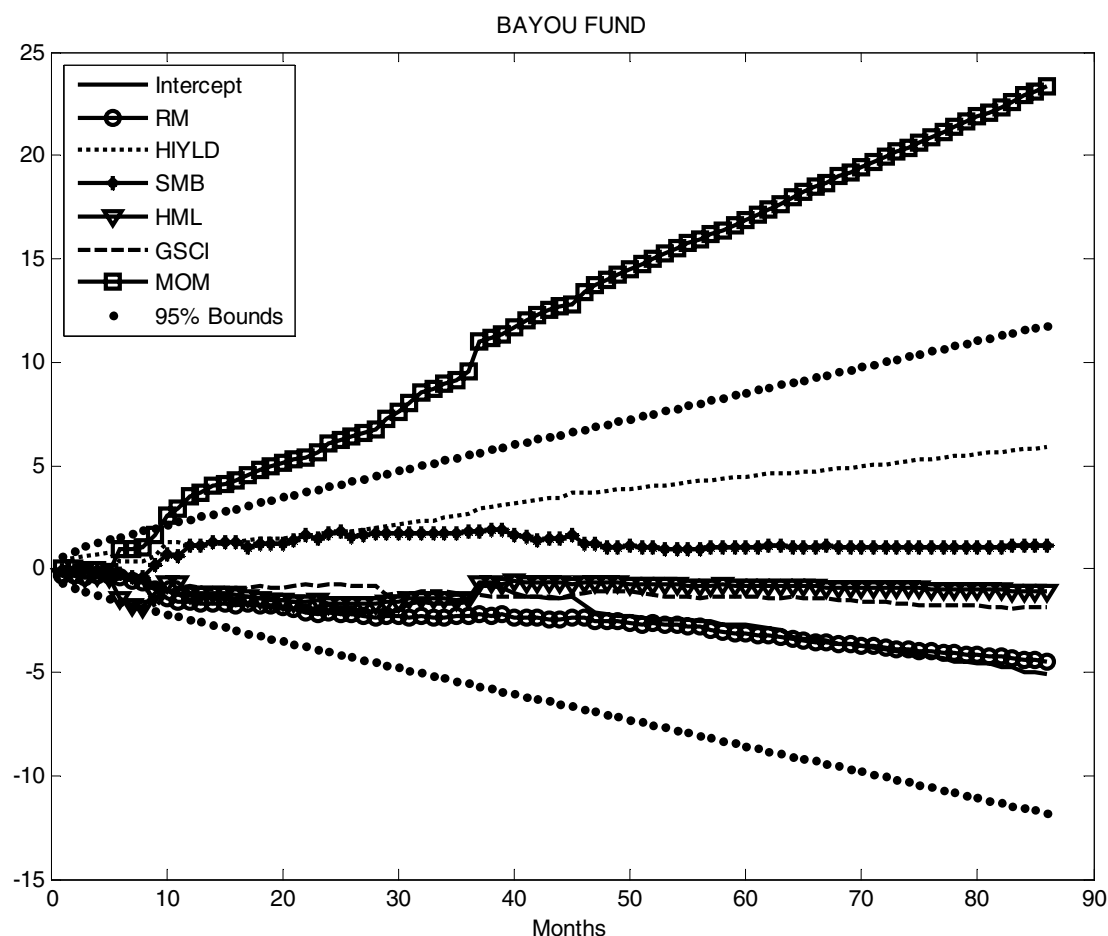


Figure 2: Monitoring test results for Bayou Fund

factor exposures violated the 95 per cent boundaries almost immediately.³⁰ A more interesting case is V-Tek Capital — as can be seen, the fund's exposures remained basically unchanged for the first 26 months (ie 14 months after the initial 12 months). However, in month 27 there was a significant shift in the fund's trading strategy and less than two years later the fund was closed for fraudulent activities. Finally it must be noted that the above monitoring test was applied to the sample of live funds. The results show that the test gives 'false negatives' in about 12 per cent of cases. Therefore, the results of this test should be used carefully and, as stated, in most

cases on-site due diligence is the most effective way in which an investor can verify if a hedge fund is engaged in fraudulent activities.

CONCLUSIONS

One of the continuing challenges to hedge fund performance measurement is the efficacy of available measures. Several measures of risk and return to a large sample of active and dead funds were applied. The results generally indicate that traditional measures of risk and return may not provide enough early warning about failing funds.

This paper examined the return patterns of four significant recent failures.

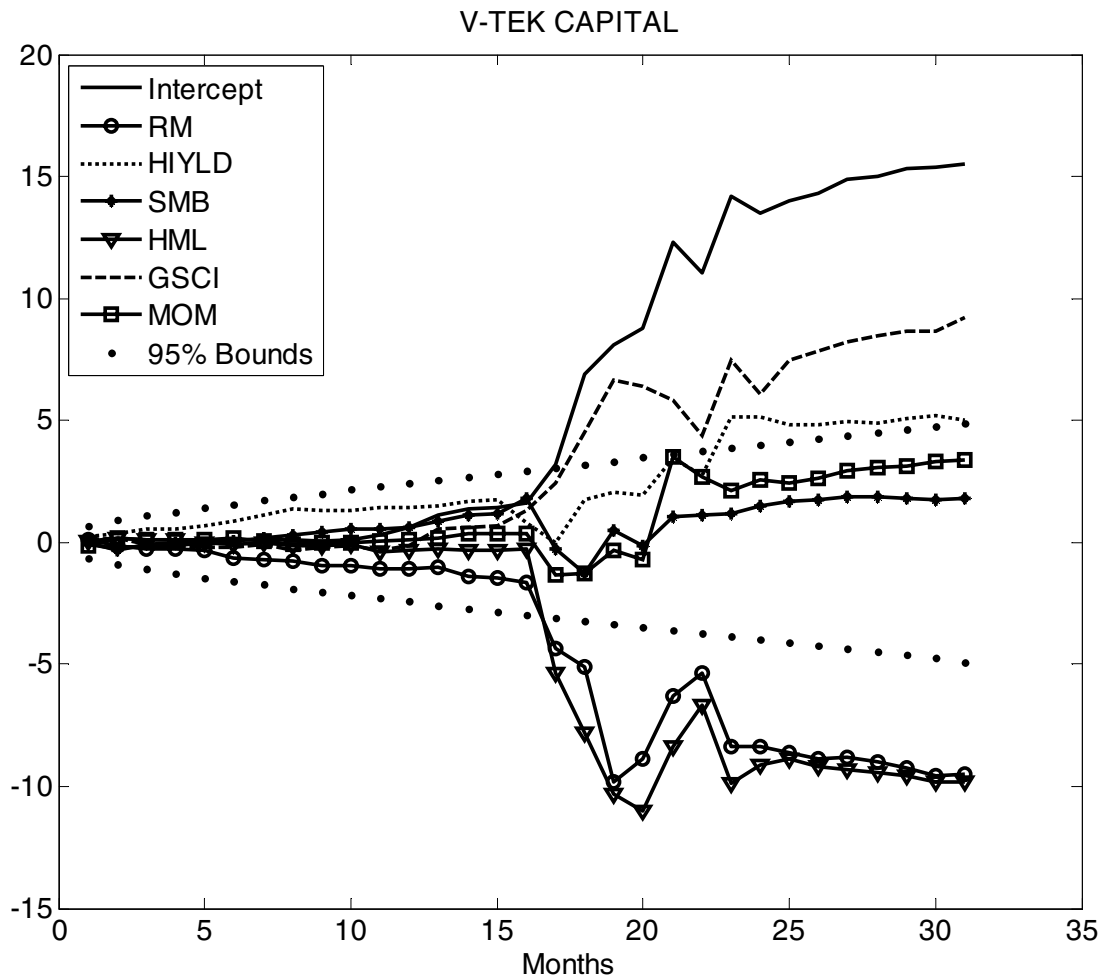


Figure 3: Monitoring test results for the V-tek Fund

These were Bayou Funds, Lancer Offshore Fund, Marque Partners I and V-Tek Capital. It was found that in all cases when fund returns were regressed against relevant strategy indices the resulting R-squares were very low, irrespective of the index provider used. One would expect stronger exposures to the strategy index. The study also applied a monitoring test to these funds to detect changes in style. Results from the monitoring tests show that in most cases there were significant changes in strategy after the first 12 months. The methodologies used in the study would be very effective for

investors seeking to test stability of fund strategies from reported returns.

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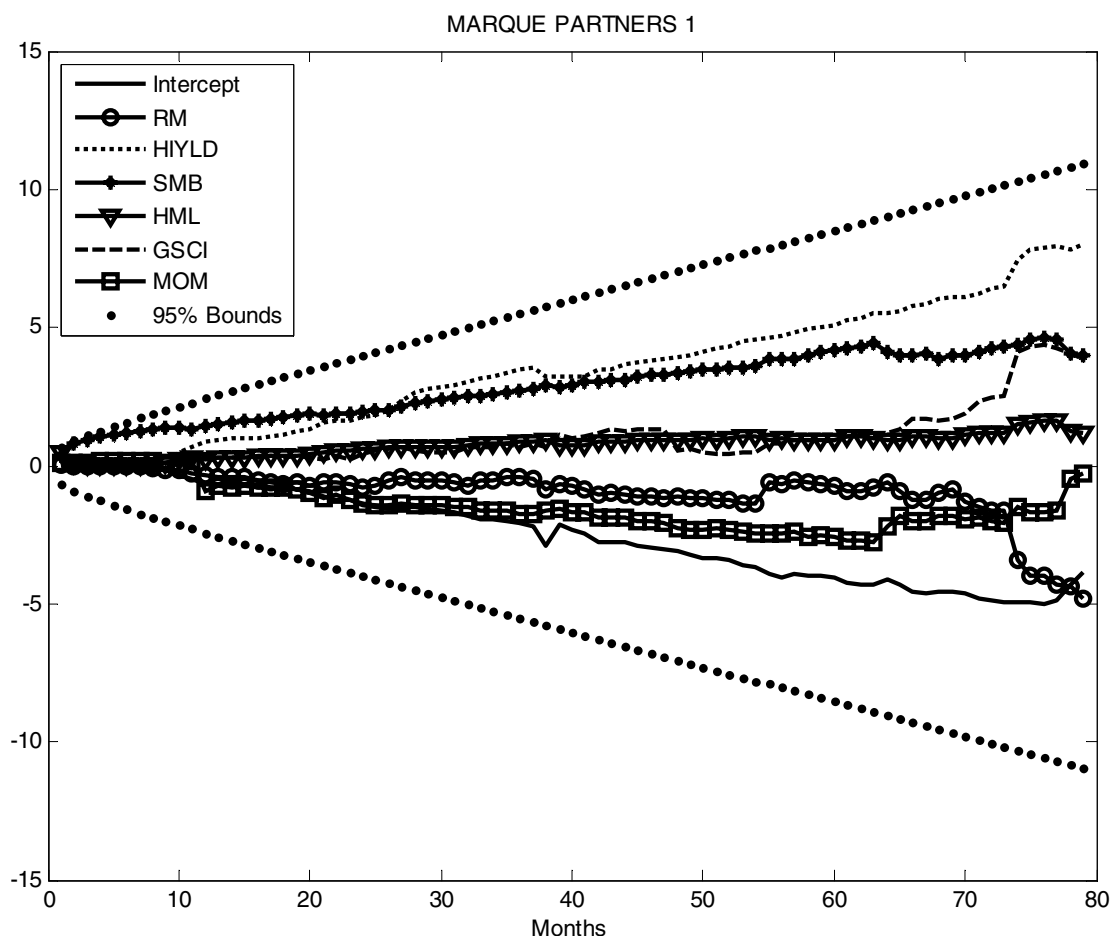


Figure 4: Monitoring test results for the Marquee Partners I

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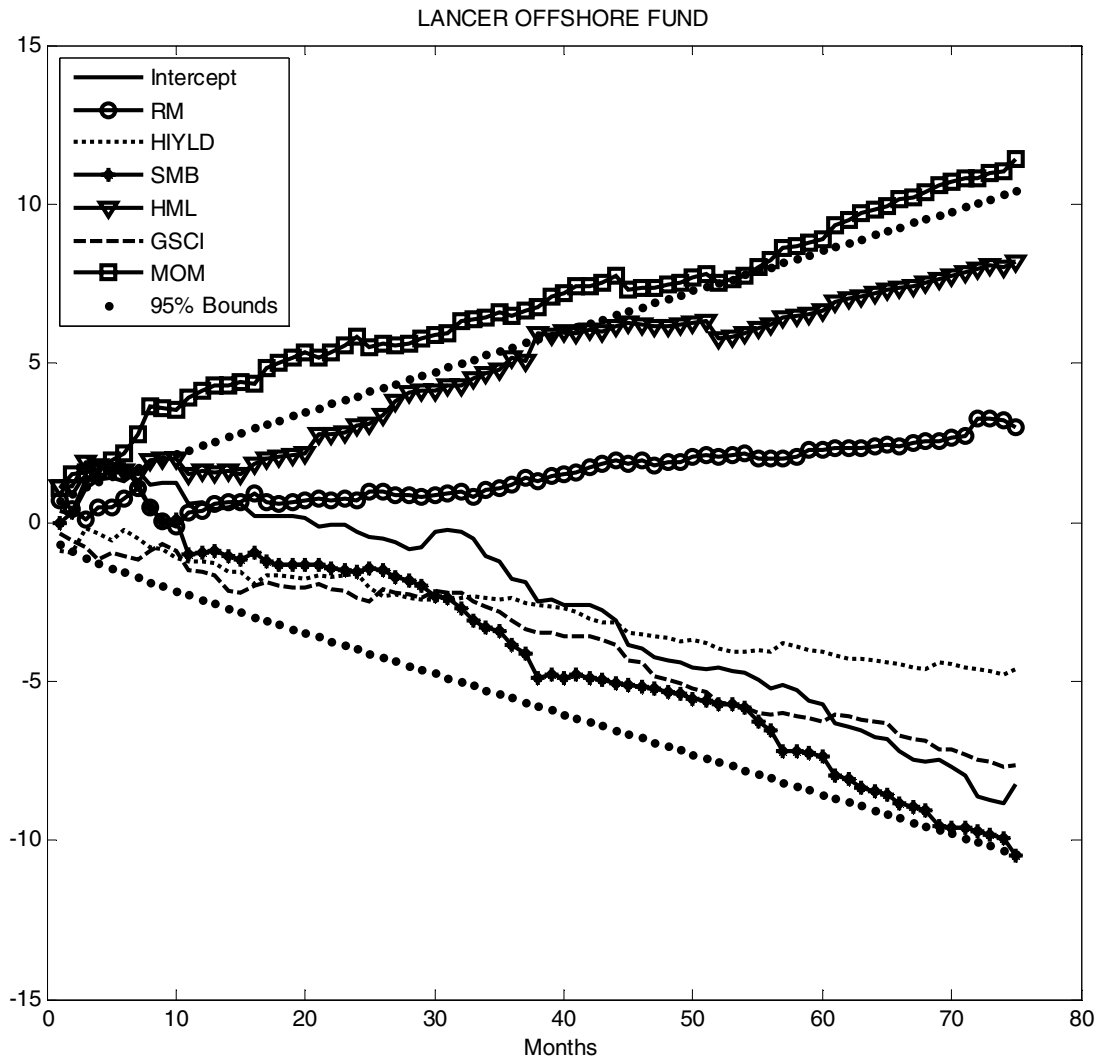


Figure 5: Monitoring test results for the Lancer Offshore Fund

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