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How Surprising are Returns in 2008? A Review of Hedge Fund Risks

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Hedge Funds in a Volatile Market

MELVYN TEO¹

Abstract

We show that relative to the first half of 2007, the volatility of hedge fund returns has doubled during the September 2007 to April 2008 period. At the same time, aggregate hedge fund returns have declined while exit rates have tripled. Commodity, macro, and, to a lesser extent, arbitrage funds outperformed during this period, while bottom-up funds underperformed. In Asia, funds engaging in less traditional strategies like arbitrage, event driven, fixed income, and distressed debt have emerged relatively unscathed. Our results also suggest that around the world, funds with headquarters near their investment markets, fewer assets under management, and higher performance fees have weathered the storm better than other funds.

Press reports² suggest that, stoked by the turmoil in the markets, hedge fund returns have become more volatile over the last year. In reaction to the volatile conditions, many hedge funds have sought to dial back risk by liquidating assets and holding cash. Nonetheless, existing investors, hurt by the fall in fund returns, have started redeeming in droves. At the same time, other investors, like pension funds, are looking increasingly to alternatives and hedge funds as yields have fallen globally. All these point to rather interesting times for the hedge fund industry.

In this issue of the statistical digest, we review the performance of the hedge fund industry over the past eight months: September 2007 to April 2008. We document systematic differences in the performance of funds stratified by fund characteristics, investment strategy, and investment region. Our study hopes to shed light on how hedge funds behave in times of market turmoil.

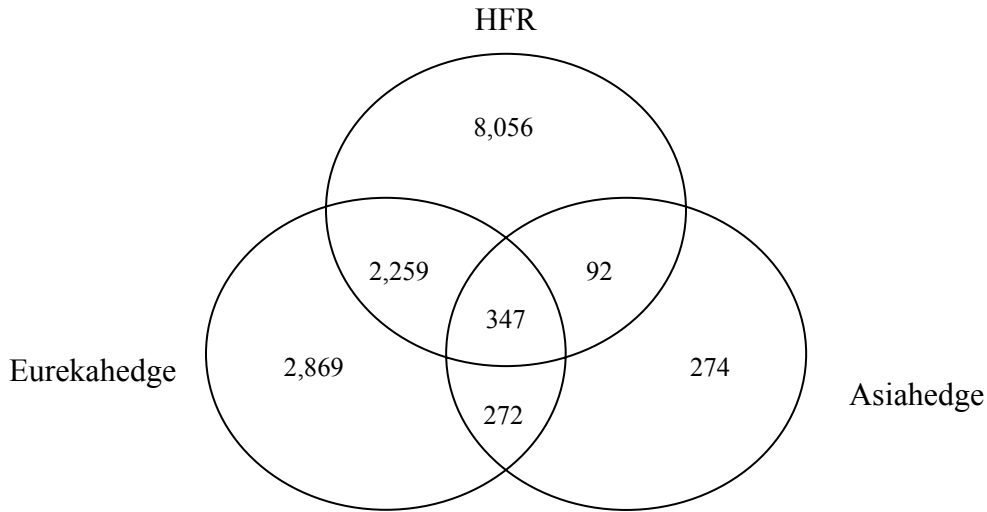
The analysis is centered on a large sample of funds culled from three hedge fund databases: HFR, Eurekahedge, and Asiahedge. The Venn diagram in Figure 1 stratifies the funds by database. The presence of many funds unique to a specific database underscores the importance of collecting fund data from several sources so as to better proxy the entire fund population. Altogether, we have 14,169³ funds in our sample from which to draw statistical inference.

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² See, for example, "Shakeout Roils Hedge Fund World – Big Firms Gain Clout as Field Matures; Parking the Maserati" The Wall Street Journal, 17 June 2008.

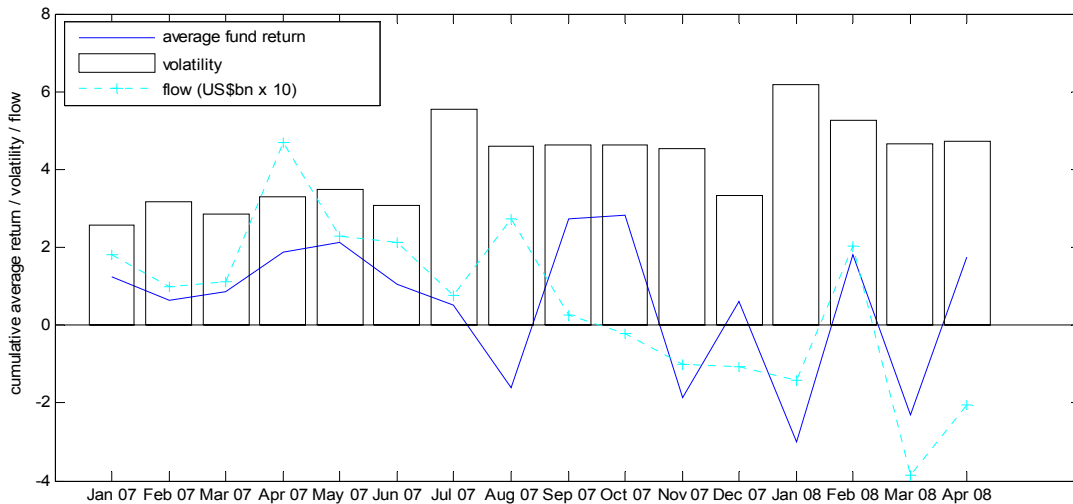
³ The data sample includes multiple share classes of essentially the same fund.

Figure 1: Breakdown of fund sample by database



To get an overview of the hedge fund industry, we trace in Figure 2 the average return, cross-sectional standard deviation of fund returns, and total fund inflows for each month from January 2007 to April 2008. We observe that average hedge fund returns have diminished post July 2007. Hedge funds on average delivered negative returns in August 2007, November 2007, January 2008, and March 2008. Interestingly, returns were even lower in January 2008 than in August 2007. Not only has the level of monthly returns changed, but the time series volatility of returns has also been affected by the market gyrations. The average monthly fund returns have become much more variable after July 2007. The cross-sectional volatility bar graph of Figure 2 reveals a similar picture. It suggests that hedge fund returns have become increasingly dispersed

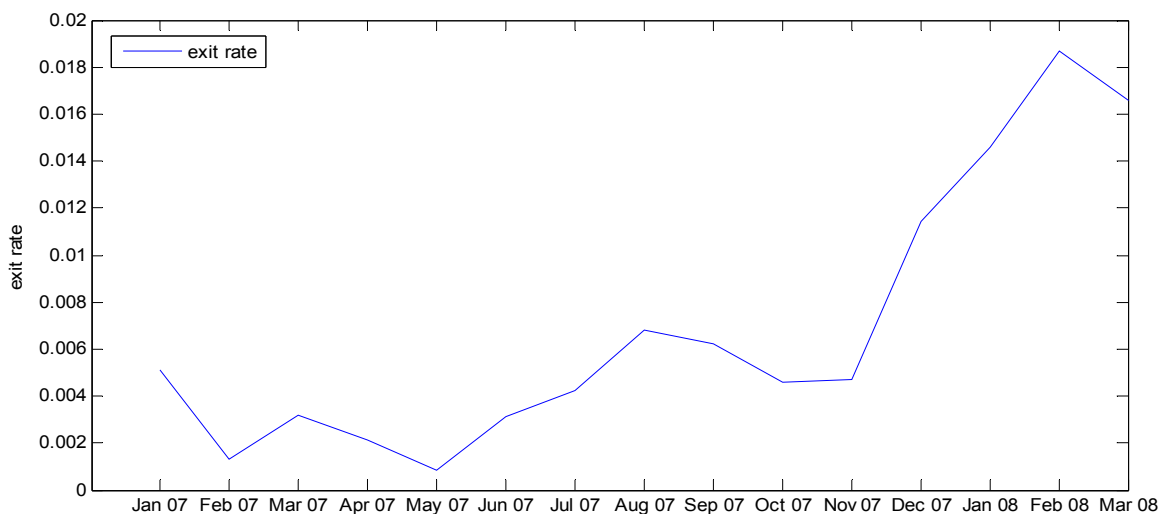
Figure 2: Hedge fund performance, volatility, and flows from January 2007 to April 2008



over the sample period. For example, the standard deviation of fund returns has increased from 2.57 percent in January 2007 to 5.56 percent in July 2007 and subsequently to 6.19% in January 2008. All in all, the hedge fund industry appears to be characterized by a sharp increase in volatility. Given the fall in fund returns, it is not surprising that fund flows have also dropped in sympathy.

Hedge fund investors were probably also spooked by the increase in exit rates amongst hitherto good performing funds. As shown in Figure 3 below, the increased dispersion in returns coincided with higher monthly exit rates.⁴ In January 2007, only about 0.5% of the funds exited the databases. In contrast, in February 2008, 1.8% of the funds exited or stopped reporting returns to the databases. This represents a three-fold increase in exit rates and paints a rather sobering picture of hedge fund the industry.

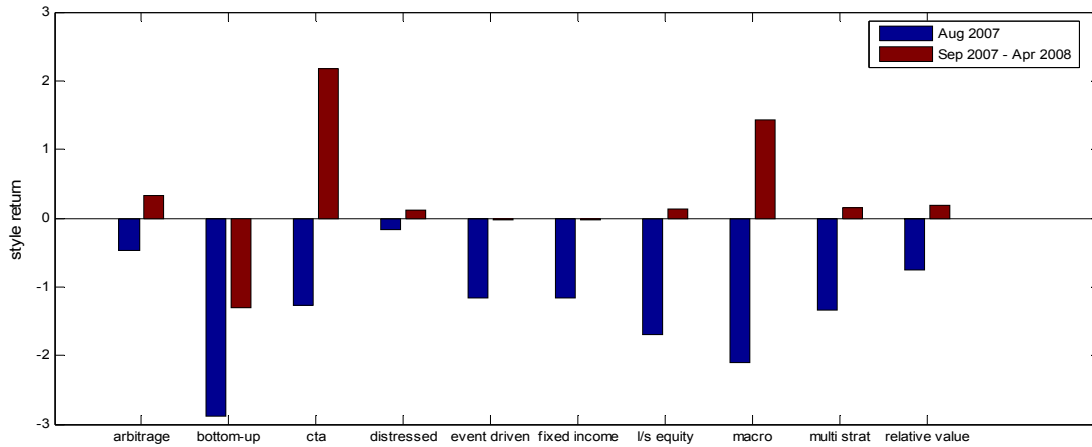
Figure 3: Monthly exit rates for hedge funds



How did the different hedge fund investment styles weathered this volatile period? In Figure 4, we plot the August 2007 and the September 2007 to April 2008 performance of the different investment styles in our sample. The bar graph of Figure 4 reveals that the mild increase in returns (averaged across time) post August 2007 masks significant differences across styles. Relative to other styles, commodity trading advisors and macro funds have outperformed while bottom up funds which tend to track the performance of equity markets have underperformed. While distressed debt funds are poised to take advantage of opportunities created by down markets, their returns have so far been only mildly positive. One view is that the opportunities on the distressed side require a long gestation period and only pay off during market rebounds.

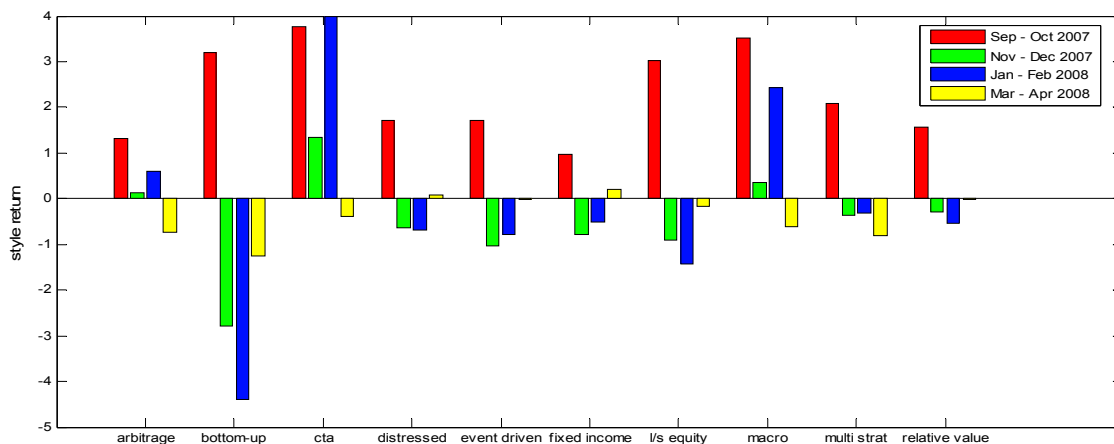
⁴ We label a fund as having exited the databases on month t if it reported negative returns in month $t-1$ and did not report returns in month t . We do not report exit rates for the last month of our sample, i.e., April 2008, as some funds may not have yet reported their April 2008 returns.

Figure 4: Variation in performance across investment styles, Aug 2007 versus Sept 2007 – Apr 2008



Given the increased dispersion of fund returns depicted in Figure 2, it is not surprising that returns also vary widely across investment styles. What about the behavior of investment style returns over time? To check, we compute investment styles returns over two-month intervals and plot those returns in Figure 5. The resultant bar graph demonstrates substantial variation in investment style returns over time. In general fund returns have rebounded in September – October 2007 from their August 2007 lows but have declined again after October 2007. Investors may find it worrisome that, with few exceptions, returns have been negative post-October 2007. There also appears to be significant correlation in returns across styles. Naturally, bottom up funds and equity long/short funds display a strong similarity in their time series pattern of returns. Specifically, their returns have fallen from a peak in September – October 2007 to a trough in January – February 2008 and ended negative or close to zero in March – April 2008. It is likely that a common exposure to global equity factors drives most of the time series variation in these funds. The returns of arbitrage, macro, and CTA funds also appear correlated. These are the only investment styles that achieve positive returns in the November – December 2007 and January – February 2008 period. However, they too have not escaped the secular downturn in performance during the March – April 2008 period.

Figure 5: Variation in performance across investment styles, Sept 2007 – Apr 2008



Do returns vary significant across investment regions? The answer at first blush appears to be no. The kernel density functions of hedge fund returns stratified by broad investment region in Figure 6 shows that hedge fund return distribution only vary marginally across the regions: Asia, U.S., and Europe. The mean and median fund returns hover around zero for all investment regions. This contrasts sharply with August 2007 when returns were significantly lower in Asia. Please see the results in Teo (2007).

Figure 6: Distribution of hedge fund returns between Sep 2007 and Apr 2008, stratified by investment region

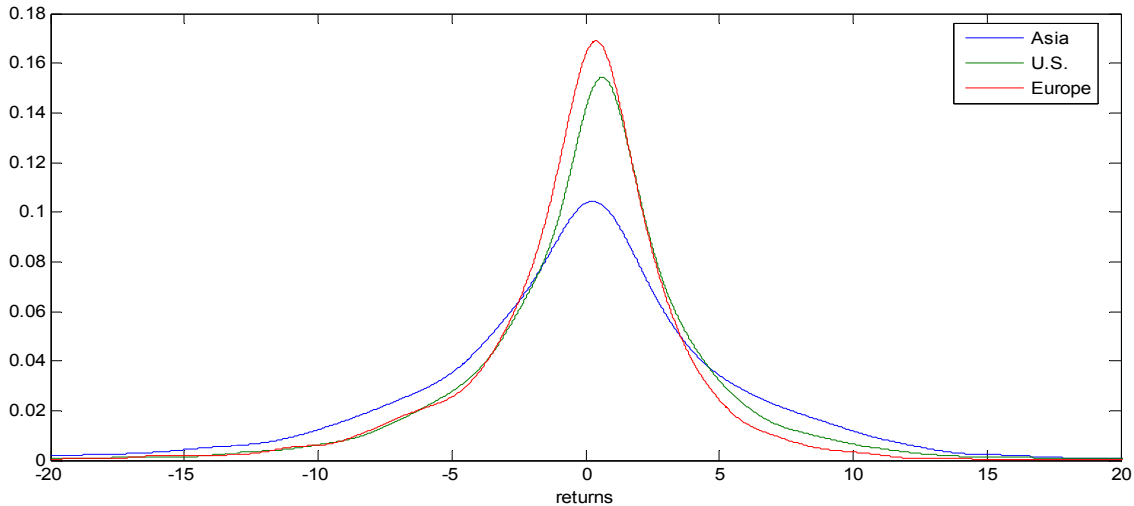
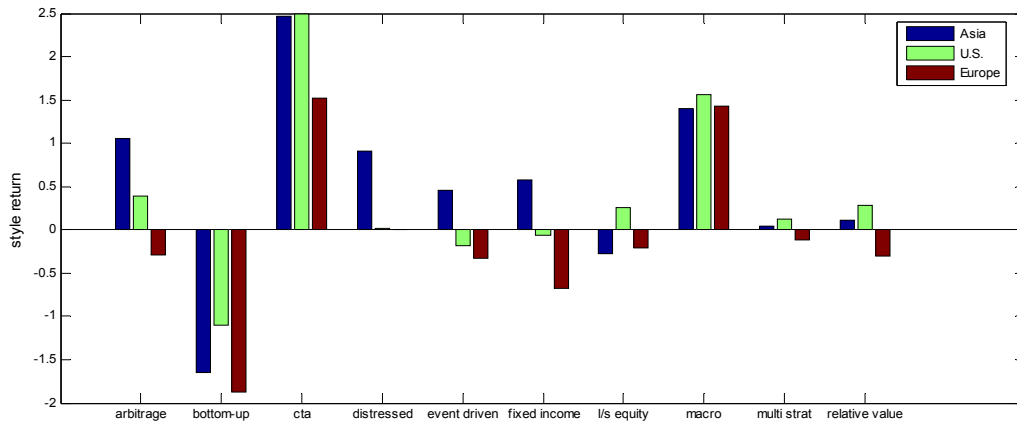


Figure 7 further breaks down fund performance by investment region and investment style. We observe that there does not appear to be much variation in performance within investment styles across the regions for the most extreme performing styles, i.e., bottom-up, commodity, and macro funds. However, there is some evidence that pockets of outperformance exists for Asia focused funds engaged in arbitrage, distressed debt, and event driven strategies.⁵ These funds have emerged relatively unscathed perhaps in part due to their minimal exposures to equity markets.

Figure 7: Variation in performance across investment styles and regions in Sep 2007 – Apr 2008



⁵ We note that while Asia-focused fixed income strategy funds have performed relatively well, the exit rates for funds in that strategy has also been exceptionally high.

To further uncover systematic differences in performance across funds, we estimate pooled ordinary least squares regressions on our sample of monthly fund returns. We seek to explain the variation in performance across funds with various fund characteristics including fees, last month's assets under management, minimum investments, age, leverage, redemption period, and the presence of a local headquarters. Table 1 reports the coefficient estimates from the aforementioned cross-sectional regressions for the full sample of funds and for the sample of equity long/short funds.

We find strong evidence to suggest that small funds, funds with nearby headquarters, and funds charging high performance fees outperform other funds. Specifically, the coefficient estimate on fund size in the first column of Table 1 indicates that consistent with the diseconomies of scale hypothesis expounded by Getmansky (2005), a US\$10 billion fund underperforms a US\$100 million fund by 1.77 percent per year. Also, local information appears helpful to investment performance during this volatile period. Around the world, hedge funds with nearby headquarters outperform funds with distant headquarters by 1.62 percent per year (see Teo (2008) for a more detailed discussion). Finally, funds with stronger incentives to generate alpha, i.e., funds with high performance fees, outperform funds with weak incentives. A 5 percent increase in performance fees translates to a 1.68 percent increase in annual returns. This result echoes the findings of Agarwal, Daniel, and Naik (2008) who show that hedge funds with greater managerial incentives, as proxied by the delta of their option like incentive fee contracts, are associated with superior performance.

Table 1

Cross-sectional regression on hedge fund returns, Sep 2007 - Apr 2008

Cross-sectional regressions on hedge fund returns from September 2007 to April 2008. The independent variables are hedge fund characteristics including management fee in percentage, performance fee in percentage, redemption period in business days, minimum investment in US\$m, assets under management in US\$bn in the last month, age in years, an indicator variable that equals one if a fund has a local headquarters, and an indicator variable that equals one if a fund uses leverage. The regressions for the "all funds" sample include investment style dummies and month dummies. The t-statistics from heteroscedasticity consistent White (1980) standard errors are in parentheses. Coefficient estimates that are statistically significant at the 5% level are in bold. Each month, on average, the regression sample includes 4,834 hedge funds with sufficient return and characteristics information, of which 2,474 are long/short equity funds.

	All funds		Long/Short Equity funds	
	univariate	multivariate	univariate	multivariate
Assets under management (US\$bn)	-0.015 (-2.13)	-0.017 (-2.47)	-0.032 (-3.45)	-0.020 (-2.55)
Local headquarters	0.135 (2.20)	0.132 (2.18)	0.175 (2.49)	0.201 (2.91)
Management fee (%)	0.114 (2.42)	0.119 (2.58)	0.019 (0.39)	0.016 (0.34)
Performance fee (%)	0.028 (4.56)	0.030 (4.94)	0.021 (2.65)	0.023 (3.05)
Redemption period (business days)	-0.001 (-2.86)	-0.001 (-2.03)	-0.001 (-1.32)	0.000 (-0.51)
Minimum investment (US\$m)	0.002 (0.42)	-0.003 (-0.51)	0.055 (3.14)	0.034 (2.34)
Age (years)	0.010 (1.70)	0.004 (0.77)	-0.008 (-1.06)	-0.010 (-1.31)
Leverage	0.046 (0.86)	0.065 (1.23)	0.051 (0.71)	0.057 (0.82)

As hedge funds brace themselves for more volatility in the coming months, we survey the damage done over the last eight months. We show that consistent with anecdotal evidence, both the cross-sectional and the time series volatility of fund returns have increased since July 2007 while exit rates have risen. There are marked differences in performance of funds across investment styles during this tumultuous period. Commodity and macro funds which feed off volatile asset prices have delivered superior performance while bottom-up funds handicapped by their exposure to flagging equity markets have trailed significantly behind. Although fund performance appears largely independent of investment region, pockets of alpha remain in the less-saturated Asia-focused investment styles, i.e., distressed debt, arbitrage, and event driven. Finally, despite the unstable economic environment, managerial incentives, local information, and fund size continue to exert a strong impact on investment performance.

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