Strategy Distinctiveness and Hedge Fund Performance

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Abstract

Presumably, hedge fund managers pursue unique strategies because they have great new ideas and superior investment skills, while less skilled managers are more likely to herd and follow publicly known investment ideas. For investors, knowing how innovative and skillful their managers are is thus extremely important but very difficult because of the opaque nature of hedge fund operations. In this paper, we construct a measure of the distinctiveness of a fund's investment strategy based on historical fund return data. Specifically, we examine the R-square of a regression of individual hedge fund returns against the average returns of its peer funds. We term $(1 - R^2)$ the "Hedge Fund Strategy Distinctiveness Index" (*SDI*), which measures the extent to which a fund's investment strategy differs from the strategies of the peer funds. We document a substantial cross-sectional variation in *SDI* as well as strong persistence in fund *SDI* for up to five years. Our main result indicates that, on average, higher *SDI* is associated with better subsequent performance.

I. Introduction

Investors pay high fees to hedge funds for their unique investment ideas and strategies. When an investment idea becomes known to a large number of investors, the abnormal return from the strategy is likely to be competed away. As a result, hedge funds trade with great secrecy and protect their ideas by all means. Moreover, the rapid growth of the hedge fund industry has resulted in a huge number of funds across a wide range of strategies, with some being more innovative and skillful than others. This, together with the well-documented pattern of large performance variations across hedge funds, suggests that for investors, it is crucial to distinguish between a high-flying hedge fund led by a talented maverick from a mediocre or, even worse, a failing fund run by copy cats. Despite the great importance of knowing how unique a fund is and how innovative and skillful its managers are, it is an extremely difficult task because of the opaque nature of hedge fund operations. In this paper, we propose a measure of the uniqueness and the distinctiveness of a fund's investment strategy using historical hedge fund return data. We further examine whether a more distinctive investment strategy is indicative of greater managerial talents, and hence, superior fund performance.

We measure the distinctiveness of a fund strategy by the R-square of a regression of individual hedge fund returns against the average returns of peer funds in the same style category. In this context, we term the (1-R-square) "Hedge Fund Strategy Distinctiveness Index" (*SDI*). It measures the percentage of total variance in fund returns that can not be explained by the returns of its peers. The higher the *SDI*, the more distinctive is the fund's investment strategy. We then examine the relation between *SDI* and fund performance.

Presumable, Hedge fund managers pursue distinctive strategies because they have great new ideas and superior investment skills, while less skilled managers are more likely to herd and follow publicly known investment ideas. We refer to this as the skill hypothesis. Consistent with this hypothesis, we would expect funds with skilled managers to pursue more innovative strategies and to deliver performance that is more distinctive from their peers. As a result, we should observe a positive relation between the distinctiveness in fund strategy and fund performance.

On the other hand, hedge fund managers may also appear to deviate from their peers if they take on excessive risk due to a potential conflict of interest between fund managers and investors. Typically, hedge fund managers receive performance based incentive fees with high water mark and hurdle rate provisions. As Goetzmann, Ingersoll, and Ross (2003) show, while these provisions have the appealing features of paying the manager a bonus only when he has made up any earlier loss and when investors make a profit, the option-like characteristics of the compensation contract could also provide incentives for managers to make idiosyncratic bets to increase the chance of having extreme performance. We refer to this as the gaming hypothesis. Consistent with this hypothesis, funds pursuing such gaming strategy would appear to be distinctive from the peers. However, in this case, we should not observe a positive relation between future fund performance and the distinctiveness in fund strategy.

Using monthly return data on more than 2700 hedge funds covered by Lipper TASS database over the period of January of 1994 to June of 2007, we construct the Strategy Distinctiveness Index (*SDI*) for individual funds. For the sample of funds, we control for survivorship and backfill biases to the extent the data allow. We document a substantial cross-sectional variation in *SDI*, indicating that some funds follow innovative investment strategies while others tend to herd. We also find strong persistence in individual fund *SDI* for up to five years ahead. This suggests

that the deviation in hedge fund performance captured by *SDI* is likely driven by systematic factors, such as managerial innovation skills, that tend to be persistent over time, rather than by noise or by random bets prompted by manager's gaming motive that are likely to be transitory.

Our main test concerns the relation between *SDI* and fund performance. We form portfolios of hedge funds based on their *SDI* levels and examine the subsequent performance of these portfolios. Consistent with the skill hypothesis, we find that the *SDI* helps to predict future fund performance. Funds with more distinctive strategies tend to perform consistently better after adjusting for differences in their risks and styles. Specifically, with a 3-month sorting and rebalancing trading strategy, the quintile portfolio of funds with the highest lagged *SDI* yields an average risk adjusted return of 10.27 percent per year, whereas the quintile portfolio of funds with the lowest *SDI* yields an average risk adjusted return of 3.63 percent per year. The return difference between the two portfolios is statistically and economically significant.

We further examine the robustness of the above relation in a number of different ways. First, we confirm the positive relation between a fund's *SDI* and its subsequent performance using a multivariate regression approach, in which we control for other fund characteristics. We use both pooled regressions with clustered standard errors and time and style fixed effects as well as Fama-MacBeth regressions. Next, we focus the analysis on the long/short equity category because of the vast difference in hedge fund styles and the resulting difficulty in comparing fund performance across styles. Examining additional performance measures applicable to long/short equity funds, we again observe a positive relation between the distinctiveness of fund strategy and its future performance. We also explore alternative measures for hedge fund strategy distinctiveness by studying $(1\text{-}R^2)$ from regressions of individual hedge fund returns against alternative benchmarks, for example, the aggregate hedge fund index and the seven factors that represent passive investment strategies. The main results remain.

Finally, we study the determinants of *SDI*. We find that *SDI* increases with lagged performance measures including risk adjusted returns and appraisal ratio. This result is consistent with the skill hypothesis that *SDI* is related to better fund performance. Moreover, *SDI* decreases with the idiosyncratic volatility of fund returns in the previous two years. This result is inconsistent the gaming hypothesis that the deviation captured by *SDI* is driven by managers making random bets and taking on excessive risk to maximize the option-like payoff. Furthermore, *SDI* decreases with fund age and size, and increases with incentive fees.

The remainder of the paper is organized as follows. Section II discusses the related literature. Section III introduces data. Section IV explains the construction of *SDI* (Strategy Distinctiveness Index). Section V presents the empirical findings on the relation between *SDI* and future performance measures. Section VI investigates the determinants of *SDI* using a regression analysis. Finally, Section VII concludes.

II. Related Literature

Academic research shows that hedge funds follow dynamic investment strategies and have volatile returns. The empirical findings also indicate that hedge funds consistently outperform mutual funds. Some recent papers include Ackermann, McEnally, and Ravenscraft, (1999) Agarwal and Naik (2000 and 2004), Brown, Goetzmann and Ibbotson (1999), Brown and Goetzmann (2003), Brown, Goetzmann, Liang and Schwarz (2007), Fung and Hsieh (1997, 2000, 2001, 2002), Goetzmann, Ingersoll and Ross (2003), Ibbotson and Chen (2006), and Liang (1999, 2000).

Although hedge funds as a group deliver generous risk-adjusted returns and great diversification benefits, the large cross-sectional variations in hedge fund returns has also been documented by researchers, for example, Malkiel and Saha (2005). Despite the importance of distinguishing between skilled hedge funds from the unskillful ones, research on the cross-sectional determinants of hedge fund returns has been rather limited till recent, when a few papers started to link hedge fund performance to various fund and managerial attributes. Titman and Tiu (2008) postulate that the ability to hedge systematic risk factor exposures reflects managerial talent. They find hedge funds that exhibit lower *R*-squares with respect to systematic factors have better performance. Aragon (2007) finds that funds with more stringent share restriction clauses offer an excess return of 4-7% per year. Aggrawal and Jorion (2007) document strong outperformance by emerging hedge fund managers especially during the first two to three years of fund existence. Agarwal, Daniel, and Naik (2007) show that funds with greater managerial incentives and discretions, measured by delta of option-like incentive fee contracts, personal capital commitment, high-water mark provisions, length of lockup, notice and redemption periods, are associated with superior performance. Li, Zhang and Zhao (2007) find that the educational background and working experience of managers are related to hedge fund performance. However, none of these studies consider the innovativeness aspect of managerial talents and the distinctiveness of fund strategies as we investigate in this paper.

The existing literature examining the effect on fund performance due to the innovativeness of managerial talents and distinctiveness of fund strategy has been primarily focused on the mutual fund sector. Kacperczyk, Sialm, and Zheng (2005) argue that mutual fund managers may decide to deviate from a well-diversified portfolio and concentrate their holdings in industries where they have informational advantages. Their results confirm that more concentrated funds perform better after controlling for risk and style differences. Following a similar line, Cremers and Petajisto (2007) propose a measure of Active Share for individual mutual funds to capture the

share of portfolio holdings that differ from the benchmark index. They find that funds with highest Active Share significantly outperform their benchmark both before and after expenses. This paper, on the other hand, focuses on the universe of hedge funds and investigates whether innovative and distinctive strategies of hedge funds predict superior future performance.

This paper is also related to a burgeoning line of research that aims to gauge the unobserved fund managers' talents using publicly observable fund return and holding data. Cohen, Coval and Pastor (2005) propose to judge a fund manager's skill by how similar her portfolio holdings are to those of managers with superior performance records. Using simulations, they demonstrate that their measures are particularly useful in ranking managers. Kacperczyk, Sialm, and Zheng (2007) propose a return gap measure to capture the unobserved actions taken by mutual fund managers. The return gap is defined as the difference between the reported fund returns and the return that a portfolio that invests in the previously disclosed holding after adjusting for expenses. They find that the return gap, as a proxy for the unobserved managerial talents, indeed helps to predict future fund performance. Kacperczyk and Seru (2007) argue that a skilled manager tends to rely less on public information. They construct a *RPI* measure (Reliance on Public Information) to capture the responsiveness of a mutual fund manager's portfolio allocations to changes in public information, and find a strong inverse relation between *RPI* and future fund performance.

III. Data

The hedge fund data are from the Lipper TASS database, which is recognized as one of the leading sources of hedge fund information. The main data include monthly hedge fund returns, as well as fund characteristics. Fund of funds are excluded, so are the funds denoted in currency other than the US dollar. We also exclude funds with asset under management less than 5

millions US dollar. To reduce the noise in the fund distinctiveness measures, funds with less than 12 monthly returns within each preceding 24-month period are also excluded. To alleviate survivorship bias, we include both live and "graveyard" funds. To avoid back-fill bias, we only include return information after the fund enters into the TASS database. The sample covers the period of January of 1994 to June of 2007.

There are 2767 funds in our sample. TASS groups these hedge funds into 10 style categories, including convertible arbitrage (Convertible), dedicated short bias (Dedicated), emerging markets (Emerging), equity market neutral (Eqtyneutral), event driven (Event), fixed income arbitrage (Fixed), global macro (Global), long/short equity hedge (LSeqty), managed futures (Futures), and multi strategies (Multi). A third of funds are in the long/short equity hedge category. There are only about 30 funds in the dedicated short bias category. The rest of the sample funds are relatively evenly distributed over other 8 hedge fund categories. A further look at the asset distribution across strategies over time reveals a few interesting patterns. From Figure 1, the long/short equity hedge and event driven strategies have clearly gained favor from hedge fund investors over this period. As of 2007, they ranked as the top two categories in our sample, accounting for over 30% and 20% of the total net asset values, respectively. Moreover, the relative fractions of multi strategies and global macro categories in the overall hedge fund assets have been on a steady decline. They each started out as more than 30% of the total asset values as of 1996, and have decreased to 10% or less by 2007.

The abnormal performance of a hedge fund is measured relative to certain benchmarks. Given the wide use of derivatives and dynamic trading strategies among hedge funds, the standard CAPM model cannot adequately capture the risk-return tradeoff for hedge funds. Therefore, we consider a few alternative choices as performance benchmarks. For our main results concerning all fund

styles, we use the Fung and Hsieh (FH) 7-factor model (Fung and Hsieh 2001)[1], which includes an equity market factor, a size spread factor, a bond market factor, a credit spread factor, and trend-following factors for bond, currency and commodities. We also use a modified appraisal ratio of Treynor and Black (1973), which is calculated by dividing the abnormal return by the standard deviation of the residuals from the performance regression. For long/short equity hedge funds, we also consider Carhart 4-factor model and models proposed by Agarwal and Naik (2004) that consist of equity market returns/Carhart 4 factors, and at-the-money and out-of-money call and put options on S&P500.

Brown and Goetzmann (2003) show that the difference in investment strategies across hedge funds accounts for 20% of cross-sectional variation in performance. Therefore, it is important to differentiate across hedge fund styles. We report style adjusted alpha as another performance measure when we estimate *SDI* based on alternative benchmarks other than the style index. We also control for style fixed effects in the regression analysis. We do not report style adjusted alpha when we estimate *SDI* based on style indices to avoid a potential spurious relation between the two due to estimation errors. Nevertheless, in unreported tests, we find that all the main conclusions of the paper obtain when we use style adjusted alpha to measure fund performance.

IV. Hedge Fund Distinctiveness Index

This paper investigates whether a more distinctive investment strategy reflects more innovative and skillful managerial talents, hence predicting superior future performance. To measure the distinctiveness of a fund's investment strategy, we compare its historical returns with the average returns of its peers.

[1] http://faculty.fuqua.duke.edu/~dah7/DataLibrary/TF-FAC.xls

a. Quantifying Hedge Fund Distinctiveness

If a manager is skillful, she is likely to engage in innovative and unique trading strategy, hence delivering performance that is not attributable to the overall performance of the hedge fund sector, or to the performance of the specific style her fund belongs to. This suggests an intuitive measure to capture the distinctiveness of a fund strategy, the R-square of a regression of individual hedge fund returns against the average returns of all peer funds:

$$r_{i,t} = c_{0i} + c_{1i} Benchmark_t + u_{i,t} \qquad (1)$$

In this context, we term the $(1 - R^2)$ "Hedge Fund Strategy Distinctiveness Index" (*SDI*). It measures the percentage of total variance in fund returns that cannot be explained by the returns of all peer funds. The higher the *SDI*, the more distinctive is the fund's strategy.

The primary benchmark to gauge the return distinctiveness for individual hedge funds is the corresponding hedge fund style index (STYLE). At the beginning of each quarter *q*, for each fund with more than 12 monthly returns over the preceding 24-month period, we performed the above regression, and the resulting $1- R^2$ was kept as a measure of the Strategy Distinctiveness Index.

If hedge funds in a certain style exhibit more dispersion than in other styles, the high *SDI* hedge funds may have a disproportional tilt towards this style. Therefore, the performance difference associated with *SDI* may be driven by style, the distinctiveness in fund strategy, or both. To disentangle these effects, we normalize the raw *SDI* measure by subtracting the average *SDI* within the same style and then scaling the difference by the cross-sectional standard deviation in *SDI* within the style. This standardized *SDI* is then a normal variable with mean of 0 and standard deviation of 1 for all styles.

b. Heterogeneity of the Strategy Distinctiveness Index

There is a clear pattern of large variations in the distinctiveness of trading strategies across hedge funds. Panel A of Table 1 reports the time series averages of the cross-sectional summary statistics of the main variables. The Strategy Distinctiveness Index has a mean (median) of 67.52% (70.65%), ranging from 5.86% to 100%, with a standard deviation of about 25%. The histogram presented in Figure 2A further confirms the heterogeneous pattern in *SDI*. More than a quarter of the sample funds exhibits an *SDI* of over 90. The distribution is over 10% in each of the 55 to 95 Index bins, and over 5% in each of the 25 to 95 Index bins. Funds scoring less than 10 in *SDI* account for less than 5% of the total sample.

A comparison of the *SDI* measures between the live and graveyard funds reveals little difference. Moreover, the relative proportion of the live and graveyard samples is stable across the 10 Index bins, as evident in Figure 2A. These statistics suggest that findings on the relation between the *SDI* and fund performance are not likely driven by the different levels of *SDI* for live and graveyard funds.

Figure 2B depicts the relative distribution of hedge funds across styles in each of the index bins. There is a clear pattern that certain styles tend to have higher *SDI* than others. This further confirms the potential confounding style effect associated with the raw *SDI* measures, hence justifying the use of the standardized *SDI* measures for the remaining analysis.[2]

To better understand how *SDI* varies across funds with different characteristics, we report the time series average of the pair-wise correlations among the *SDI* and and the fund characteristics. Panel B of Table 1 yields several noteworthy points. First of all, the raw *SDI* is highly correlated

[2]In unreported tests, we find that the main conclusions of the paper stay qualitatively similar when we use the nonstandardized *SDI* measure. The results are available upon request.

with the standardized *SDI* at a level of 0.84. Second, there is a positive correlation between *SDI* and fund performance as measured by alpha and appraisal ratio. Third, there is a negative correlation between *SDI* (standardized *SDI*) and contemporaneous fund return volatility (*Vol*). Finally, younger, smaller funds and funds with higher incentive fees tend to have higher *SDI* in our sample.

c. Persistence in the Strategy Distinctiveness Index

If the deviation in hedge fund returns from its peers is driven by innovations in trading strategies and managerial skills, funds should display persistent *SDI* over time. For example, if a hedge fund specializing in M&A related investments exhibits high *SDI* in one period due to the manager's unique informational advantage or the unique approach in processing information, its index level is likely to remain high in the future: managers are inclined to their usual resources and styles, as long as the market capacity for this type of strategy has not been fully exhausted.

To test this hypothesis formally, we sorted all funds in our sample into quintile portfolios according to their lagged *SDI* measures and computed the equally weighted average *SDI* for each quintile during the subsequent 1 to 5 years. Panel A of Table 2 reports the average index levels of the quintile portfolios both at the sorting time and during the next 1 to 5 years. The future index levels of the high Index portfolios remain higher than those of the low index portfolios, for all 5 time intervals we considered. The difference in the *SDI* between the high and low index portfolio decreases over time, but remains economically and statistically highly significant at a level of 29% even 5 years later. These results suggest a strong persistence in the *SDI* measure. Figure 3A, which depicts the future index for quintile portfolios sorted on the current index level, shows the persistent pattern. It demonstrates that the ranking of the quintile portfolios sorted based on the Index measures, in the next 1 to 5 years after the formation period, remains identical to that in the formation period. Overall, although we find some evidence for index to revert toward the mean

for the extreme quintiles, the persistence of both the high and low index funds remains over the longer horizon. The patterns based on the standardized *SDI*, as evident in Panel B of Table 2 and Figure 3B, are consistent with the raw *SDI* results.

V. Strategy Distinctiveness Index and Fund Performance

Until now, we have provided evidence that *SDI* has appealing properties that are consistent with its potential of being an effective proxy for managerial innovation skills. In this section, we test the main hypothesis of the paper, i.e. whether *SDI* indeed contains valuable information that could be used to predict future fund performance. We probe this question using both a portfolio sorting and a multivariate predictive regression approach.

a. Portfolio Sorting

To gauge the relative performance of funds with different *SDI* levels, at the beginning of each quarter, we sorted all hedge funds into 5 portfolios according to their standardized *SDI* levels measured over a previous 24-month period. The *SDI* is measured relative to the style factor benchmark. For each quintile portfolio, we computed the equally and value weighted average performance for each quarter. We also repeated the sorting process every 6 months, each year and every two years, and computed the corresponding performance measures for a 6-month, 1-year and 2-year horizon.

We consider various performance measures for each quintile portfolio including the average annualized FH 7-factor adjusted alphas and a modified appraisal ratio of Treynor and Black (1973). For each fund, the appraisal ratio was calculated as the ratio between the mean of its FH 7-factor adjusted returns and the standard deviation of them. We then took the average within each portfolio to derive the appraisal ratio of the quintile portfolios. Table 3 summarizes the time-

series average of these performance measures for each quintile portfolio, as well as the difference between the high and low *SDI* portfolios. The corresponding t-statistics are adjusted for heteroskedasticity and auto-correlation.

For the equally weighted portfolios, the FH 7-factor alphas increase almost monotonically with the past *SDI* measures, for a 3-month, 6-month, 1-year, and 2-year sorting and holding horizon. For a 3-month sorting and rebalancing trading strategy, funds in the quintile with the best innovative managerial investment skills earn an abnormal return of 10.27% per year, with a t-statistics of 4.35. Those in the quintile where managers tend to herd the most, on the other hand, yield a return of only 3.63% each year after controlling for FH 7-factor, with a t-statistics of 1.97. The performance difference between the top and bottom quintile is 6.65% and highly statistically significant. For the other three sorting and rebalancing horizons, funds in the highest *SDI* quintile consistently outperform those in the lowest quintile by over 5% per annum after adjusting for FH 7-factor. Note that to earn this return spread, one has to set up a trading strategy going long on funds with the most innovative investment skills and short on those most likely to herd. Even in the presence of short-sale constraint, the long lag of this trading strategy alone can already secure an abnormal return of over 9% per annum.

As a fund deviates from the benchmark performance, it will be exposed to idiosyncratic risk. To take into account the different amounts of unique risk across our sample of funds, we use a modified appraisal ratio of Treynor and Black (1973), which is calculated by dividing the abnormal return by the standard deviation of the residuals from the style adjusted regression. Brown, Goetzmann, and Ross (1995) show that survivorship bias is positively related to fund return variance. Thus, the higher the return volatility, the greater the difference between the ex-post observed mean and the ex-ante expected return. Using the alpha scaled by the idiosyncratic risk as our performance measure mitigates such survivorship problems. Agarwal and Naik (2000)

further point out that this measure is particularly relevant for hedge funds given that it accounts for differences in leverage across funds. For the equally weighted portfolios, there is a clear tendency for the appraisal ratio to increase with the distinctiveness index. The difference between the top and bottom *SDI* portfolios is 0.25 with a t-statistics of 3.85, for a holding horizon of 3 months. When the holding horizon is extended to a 2-year period, the difference in appraisal ratio between the high and low index portfolios converges but still remains highly significant at a level of 0.16 with a t-statistics of 3.40.

The value weighted portfolio sorting results are essentially the same as the equally weighted ones. This suggests that our results are not driven by small funds playing a dominant role.

b. Multivariate Predictive Regression Analysis

In this section, we further extend our analysis using multivariate regression analysis. The quintile portfolio analysis does not control for hedge fund characteristics that are known to affect future performance. For example, funds with more innovative investment strategies may be smaller than those likely to herd. Moreover, managers of innovative funds may be offered different incentive contracts from those go-with-the-crowd managers. Our previous findings on a positive association between *SDI* and future fund performance may be driven by a size or other fund characteristics. A multivariate regression framework can help to rule out the alternative explanations by simultaneously controlling for these different factors.

To investigate whether *SDI* has a predictive power for future fund performance after controlling for other fund-specific characteristics, we estimate the following regression:

$$\alpha_{i,t} = c + SDI_{i,t-1} + Control_{i,t-1} + e_{i,t} \quad (2)$$

where $\alpha_{i,t}$ represents the abnormal fund performance after adjusting for benchmark returns.

Note that if the future abnormal fund performance is based on the same benchmark as that used to generate *SDI*, this may inadvertently introduce some mechanic link between alphas and the distinctiveness measures due to measurement errors. To address this concern, we adopt a different benchmark for abnormal performance construction from the benchmark used for the distinctiveness index construction. Specifically, we use the style benchmark to generate *SDI* and then FH 7-factor model to estimate the future abnormal returns. For example, for fund *i* at the beginning of each quarter, 2 sets of time series regressions were conducted using the previous 24-month fund returns:

$$r_{i,t} = c_{0i} + c_{1i} Style_t + u_{i,t} \quad (3.1)$$

$$r_{i,t} = d_{0i} + d_{1i} FH7_t + e_{i,t} \quad (3.2)$$

The distinctiveness index is measured as the $(1 - R^2)$ from Equation (3.1), while the estimated loadings from Equation (3.2), together with the 7 factors, are used to derive the risk adjusted return of the fund *i* in quarter *q*, $\alpha_{i,q} = r_{i,q} - d_{1i} FH7_q$.

We use the lagged control variables to mitigate potential endogeneity problem. The $Controls_{i,t-1}$ consist of appraisal ratio (*AR*)[3] defined as $\frac{\overline{Alpha\_FH7}}{Std(Alpha\_FH7)}$, FH 7-factor alpha, idiosyncratic risk measured by the volatility of past 24-month fund returns in percent(*Vol*), restriction days as the sum of the payout and redemption notice periods, lockup months, dummies for whether personal capital is committed and whether there is a high water mark requirement, management fees, incentive fees, ages of funds in years, natural logarithm of asset under management, and

[3] To alleviated the influence of extreme observations, we winsorize AR into [-10, 10]. The results are essentially the same without this winsorizaiton.

flows into funds[4]. These variables are suggested by the existing literature on hedge fund characteristics and performance. If the distinctiveness index indeed reflects innovative and skillful managerial talents, we should expect its estimated coefficient to be significantly positive.

Our data is a pooled time series and cross-sectional unbalanced panel data. Given the stale price issue for hedge fund data, the resulting alphas may be correlated over time for a specific fund, hence we must correct for the fund clustering effect. Moreover, hedge fund performance may also be correlated across funds at a given point of time. Therefore, we need to correct for the time effect. As Petersen (2005) shows, clustering analysis is the preferred approach in addressing the fund-effect, while Fama-MacBeth is appropriate for correcting for the time effect. When both effects exist, we need to address one parametrically and then estimate standard errors clustered on the other dimension. We thus adopt two approaches. The first approach is the pooled panel regression adjusting for both fund clustering and time and style fixed effects. The second approach is the Fama-MacBeth cross-sectional analysis with style dummies and Newey-West heteroscedasticity and autocorrelation adjustment (HAC).

b.1 Panel Regression Analysis

For the panel regression, we pooled the time series of all funds together to estimate Equation (2). The results are reported in Table 4, where the t-statistics are adjusted for fund-level clustering effect and time and style fixed effects. Since abnormal returns better reflects managerial talents, we focus on the regression results with FH 7-factor adjusted returns and the corresponding appraisal ratios as the dependent variables. Table 4 demonstrates that the standardized *SDI* has an important impact on future fund abnormal performance, even after controlling for other fund characteristics.

[4] To alleviated the influence of extreme observations, we winsorize flows into 1 percentile and 99 percentile range. The results are essentially the same without this winsorizaiton.

For the panel regression of alphas, the estimated coefficient for the *SDI* is 1.14 with a t-statistics of 4.87, when time and style fixed effects are controlled for. This implies that a one standard deviation increase in the Index predicts an increase in the annualized FH 7-factor returns of 1.14 percent in the subsequent quarter. Secondly, when a host of control variables are added to the regression, the predicting power of *SDI* remains highly significant at a level of 0.52.

The sign of the coefficients for other fund characteristics is consistent with the existing evidence. For example, the lengths of restriction periods and lockup periods are positively associated with future fund performance. This corroborates with the findings in Aragon (2007), which documents funds with more stringent share restriction clauses offering higher returns to compensate for the illiquidity. Dummy variables for personal capital commitment and high water mark are also positively related to future abnormal performance, and higher management fees and incentive fees are associated with better future alphas. Those results are similar to the findings in Agarwal, Daniel, and Naik (2007), which argues that hedge funds outperform when managers are better incentivized. The size is negatively associated with future abnormal return, which is consistent with the findings in Chen, Hong, Huang and Kubik (2004) that size erodes performance in active money managing business.

Moreover, we adopt appraisal ratio as an alternative performance measure and conducted the following panel regression:

$$AR_{i,t} = c + SDI_{i,t-1} + Control_{i,t-1} + e_{i,t} \quad (4)$$

The results indicate a strong positive association of standardized *SDI* and future appraisal ratio. For example, a one standard increase in the standardized *SDI* will result in an increase in the appraisal ratio of 0.08 when time and style fixed effects are controlled for.

b.2 Fama-MacBeth Analysis

Under the Fama-MacBeth analysis, for each quarter, we performed the cross-sectional regression of Equation (2) together with style dummies to get the estimated coefficients. Then we used the time series of the estimated coefficients to derive the final Fama-MacBeth regression results, with Newey-West heteroscedasticity and autocorrelation adjustment on standard errors. The results are reported in Table 4. The main results are consistent with the panel regression analysis. For brevity, in the rest of the paper, we only report the panel regression results controlling for fund clustering effect and time and style fixed effects.

c. Robustness

We have found evidence that *SDI* predicts future fund performance. In this section, we conduct a set of robustness tests.

c.1 Alternative Performance Benchmarks: Long/Short Equity Hedge Funds

The FH 7 factors cover a large span of major asset classes, allowing the model to adequate capture the risk-return tradeoff for hedge funds with different strategies. Hence, we have chosen the FH 7-factor model as the primary benchmark to gauge abnormal returns of hedge funds thus far. However, for a specific hedge fund style, there may be alternative performance benchmarks that contain more relevant factors, and hence, better capturing the risk-return tradeoff. One example is the long/short equity hedge style, which accounts for 30% of the current total hedge fund value. For the US $ denominated long/short equity hedge funds in our sample, a combination of US equity market factors and option factors may serve as a good performance benchmark. Following the spirit in Agarwal and Naik (2004), we consider as alternative performance benchmarks a Carhart 4-factor model, a model consisting of the S&P 500 return and

returns on at-the-money and out-of-the-money call and put option in S&P500, and a model combining Carhart 4 factors and the 4 option returns.

Table 5 summarizes the panel regression results of the alternative performance measures on the standardized (style based) *SDI* for the long/short equity hedge strategy. The relation between the distinctiveness measure and future abnormal return persists for all performance measures. A 1% increase in the standardized *SDI* is associated with an increase in the annualized risk adjusted returns of 1% for FH 7-factor adjustment, 1.05% for Carhart 4-factor, 1.58% for the option augmented S&P model, and 0.85% for the option augmented Carhart 4-factor model. We observe a similar positive predicting power of *SDI* on future appraisal ratios based on all four risk benchmarks, and the association is significant at 10% level or above for all but the FH 7-factor based *AR*. Overall, these results confirm a strong link between the distinctiveness of hedge fund strategies and their future performance, even when performance are measured across various benchmarks.

c.2 Alternative *SDI* Measures

As an additional robustness check, we test whether our results withstand alternative measures of *SDI*. Specifically, we use the aggregate hedge fund return index and the FH 7-factor as alternative benchmarks to gauge the distinctiveness of a fund's performance from its peers. Results reported in Table 6 show a similar pattern as the findings in Table 4, again indicating a positive relation between the distinctiveness of a fund strategy and future fund performance. For example, when *SDI* is constructed based on the portion of performance variations unexplained by the co-movement with the total hedge fund index returns, one standard deviation increase in standardized *SDI* increases the hedge fund style adjusted alpha by 1.75% per annum, and

increases the FH 7-factor adjusted returns by 0.58% per annum[5]. When the distinctiveness is measured in relative to FH 7-factor, one standard deviation increase in standardized *SDI* increases the hedge fund style adjusted returns by 1.71% per annum, and increases the hedge fund aggregate index adjusted returns by 1.72% per annum. We observe a similar predicting power for future appraisal ratios when different *SDI* measures are adopted.

VI. Determinants of Strategy Distinctiveness Index

To better understand what affects the level of distinctiveness of a hedge fund performance, in this section, we examine the relation between the standardized *SDI* and lagged fund-specific characteristics using a multivariate panel regression approach, controlling for fund clustering and time and style fixed effects. The fund characteristics considered include the lagged appraisal ratio (*AR*), FH 7-factor alpha, idiosyncratic risk (*Vol*), lengths of restriction and lock up periods, personal capital commitment dummy, high water mark dummy, management fees, incentive fees, fund age, natural logarithm of asset under management, and flow into funds.

Table 7 summarizes the results. The results are consistent with the overall patterns we observe from the correlation matrix in Panel B of Table 1. Specifically, *SDI* increases with *AR* and alpha, indicating a positive relation between *SDI* and fund performance. This finding is consistent with the skill effect. Moreover, *SDI* decreases with *Vol*, fund age, and fund size; while it increases with fund incentive fees. This negative relation between *SDI* and *Vol* suggests that our measure of fund performance deviation from its peers is unlikely driven by managers making random bets and taking on excessive risk to maximize the option-like payoff. Instead, the deviation measured by our index is likely associated with managerial talents in designing and implementing innovative strategies, which is consistent with the evidence in Titman and Tiu (2008) that skilled managers

[5] To alleviate the concern of a mechanic link, we do not focus on the results when both *SDI* and future performance are measured in relative to the same benchmark.

take less risk. The results regarding fund age, size and incentive fees are intuitive if *SDI* reflects innovation talents. Young funds are likely to have innovative ideas. This finding is related to the evidence in Aggarwal and Jorion (2007) that emerging fund managers perform better. Small funds, being more nimble, can more readily incorporate innovations into their current practice. Higher incentive fees may better motivate managers to pursue innovative and profitable strategies, or more talented managers may charge higher fees. On the other hand, age, size and incentive fees may also relate to funds' risk taking incentives.

VII. Conclusion

Investors want to identify talented hedge fund managers who have unique alpha generating investment ideas. Since little information about the funds' security holdings or trading strategies is disclosed to investors, assessing managerial ability is a challenging task that relies mainly on learning from funds' historical return information and managers' tracking record. Academic literature has studied how past fund performance relates to future fund performance. In this paper, we examine a different aspect of fund historical returns, namely the extent to which a fund's return series resemble the return series of its peer funds. We hypothesize that skilled managers with innovative ideas would herd less and thus their returns would display less resemblance to those of an average fund.

To measure the distinctiveness of a fund's investment strategy, we estimate the R-square of a regression of individual hedge fund returns against the average returns of its peer funds. We term the $(1 - R^2)$ "Strategy Distinctiveness Index" (*SDI*). Using fund return data from January of 1994 to June of 2007, we document a substantial cross-sectional variation in the *SDI*, indicating much heterogeneity in funds' style distinctiveness. We also find strong persistence in the individual

funds' *SDI* for up to five years into the future, which suggests that the *SDI* reflects systematic factors. Further analysis indicates that younger funds, smaller funds, funds with higher incentive fees display higher *SDI*.

Our main result shows that *SDI* is associated with significantly better future fund performance. Funds with high *SDI* tend to perform consistently better after adjusting for differences in their risks and styles. We show this finding using a portfolio approach, a panel regression approach and the Fama-MacBeth method.

Overall, our evidence indicates that *SDI* is a potentially useful indicator of managerial innovative talents and can be used by investors in selecting funds.

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Figure 1: Distribution of Total Assets over Different Hedge Fund Strategies Over Time (1996 to 2007)

Figure 1 represents the distribution of total net hedge fund assets over 10 strategies from 1996 to 2007, and the strategy classification follows the definition in Lipper TASS database.

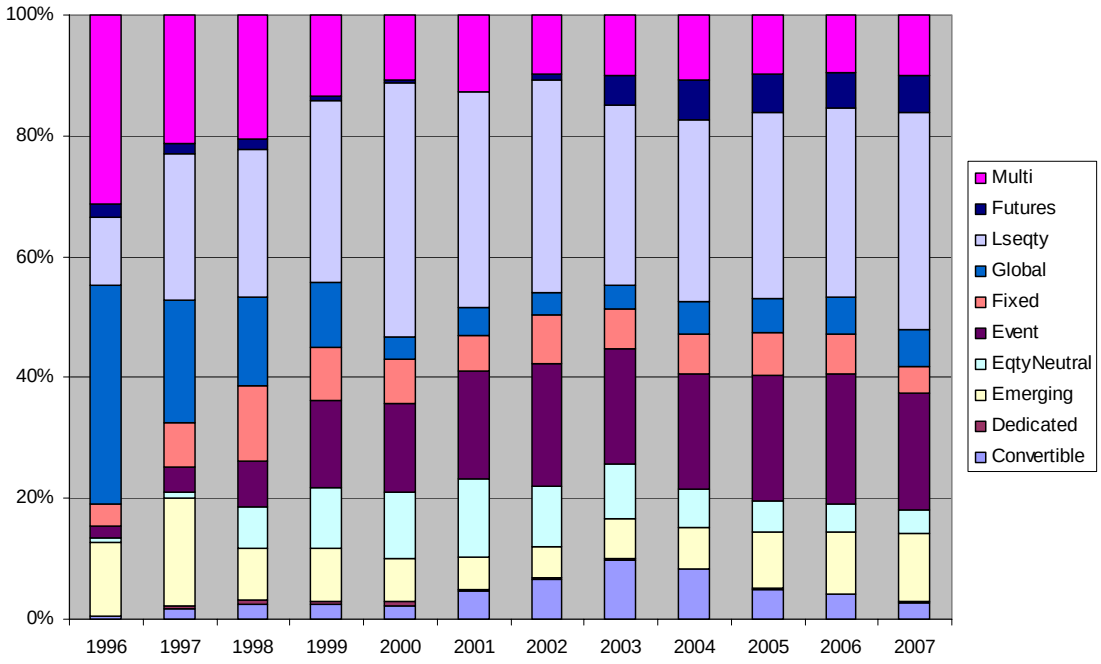

Figure 2: Histogram of Hedge Fund Strategy Distinctiveness Index

Figure 2A represents the histogram of *SDI* for all funds from 1996-2007. It also depicts a breakdown between the live and graveyard funds in the distribution. Figure 2B represents the distribution across styles for each of the ten SDI bins in Figure 2A.

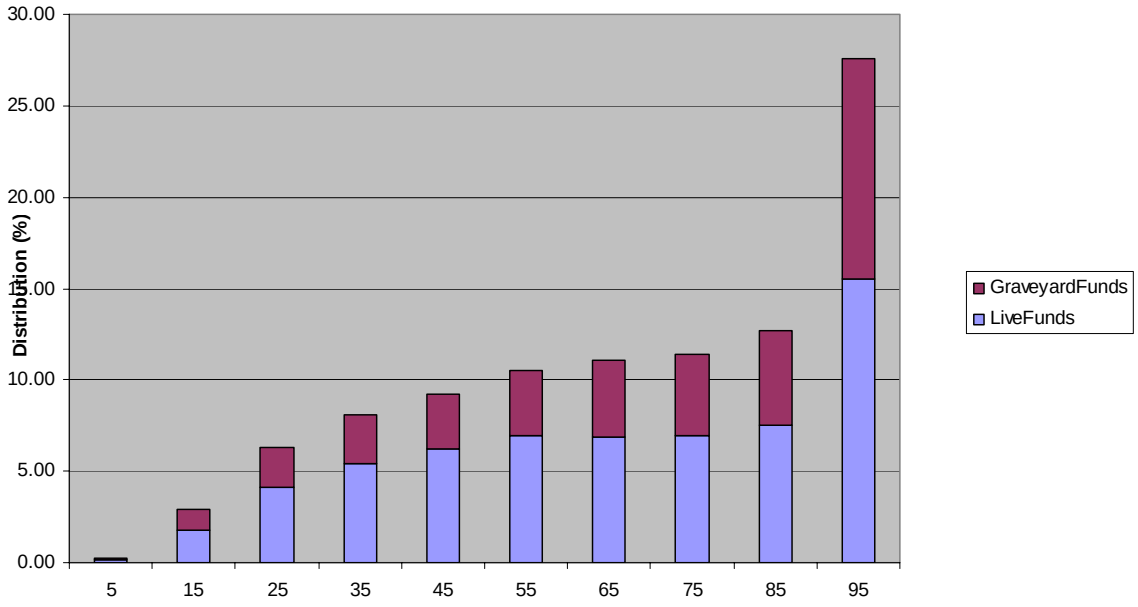

Figure 2A: SDI(%)

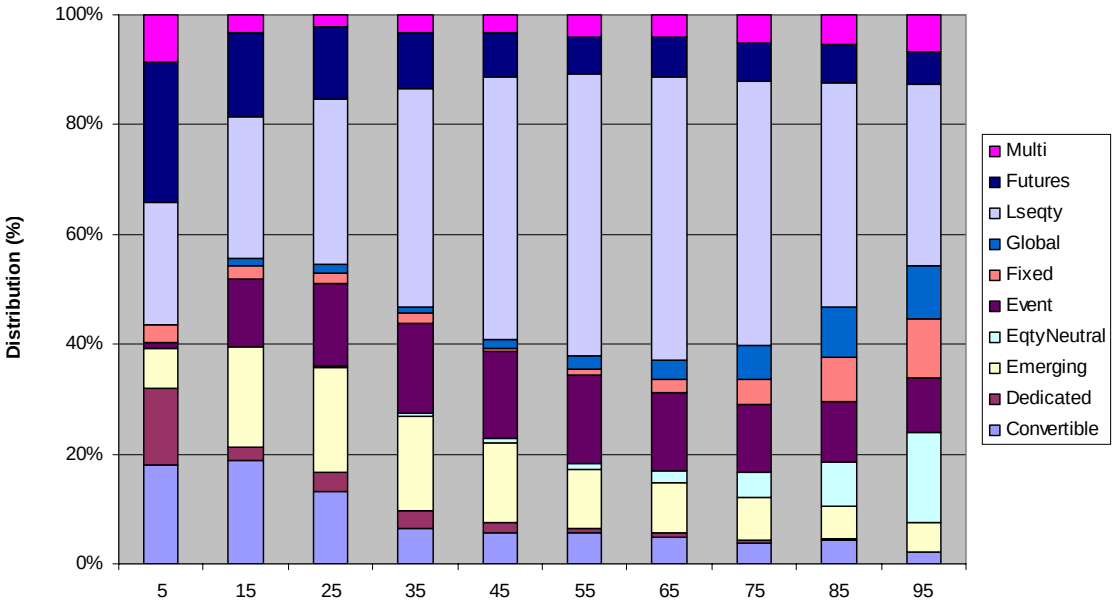

Figure 2B: SDI (%)

Figure 3: Persistence of the Hedge Fund Strategy Distinctiveness Index

Figure 3A (3B) represents the average *SDI* (standardized *SDI*) for quintile portfolios tracked over a five-year period from 1996 to 2007. The portfolios are formed by sorting all funds into quintiles based on the Distinctiveness index measured over a previous 24-month period.

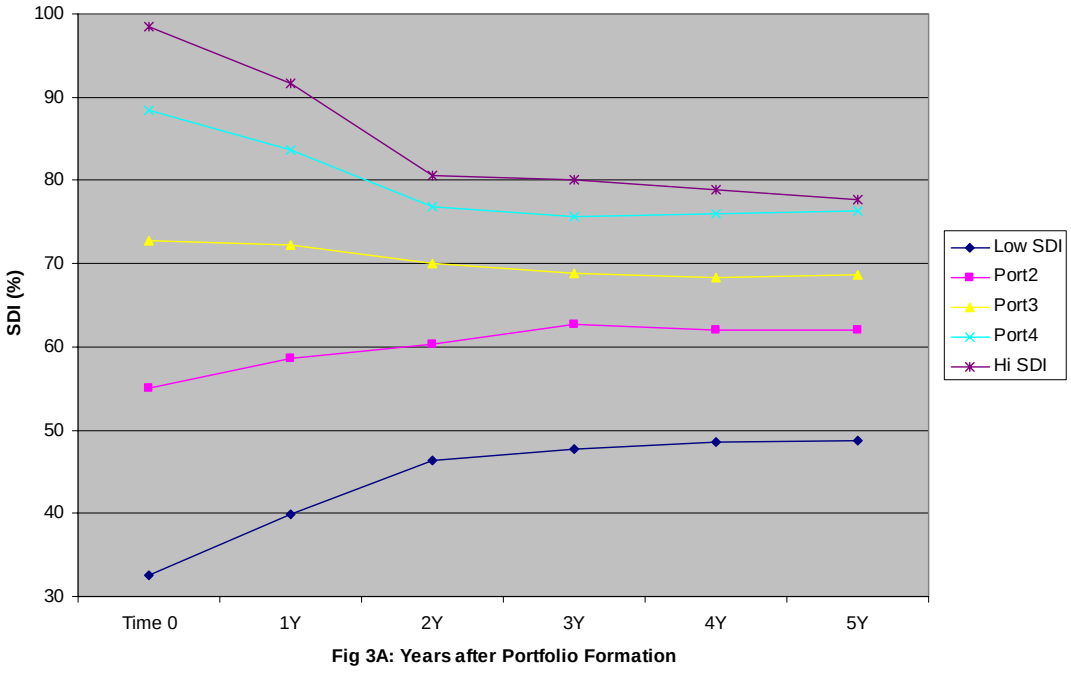

Fig 3A: Years after Portfolio Formation

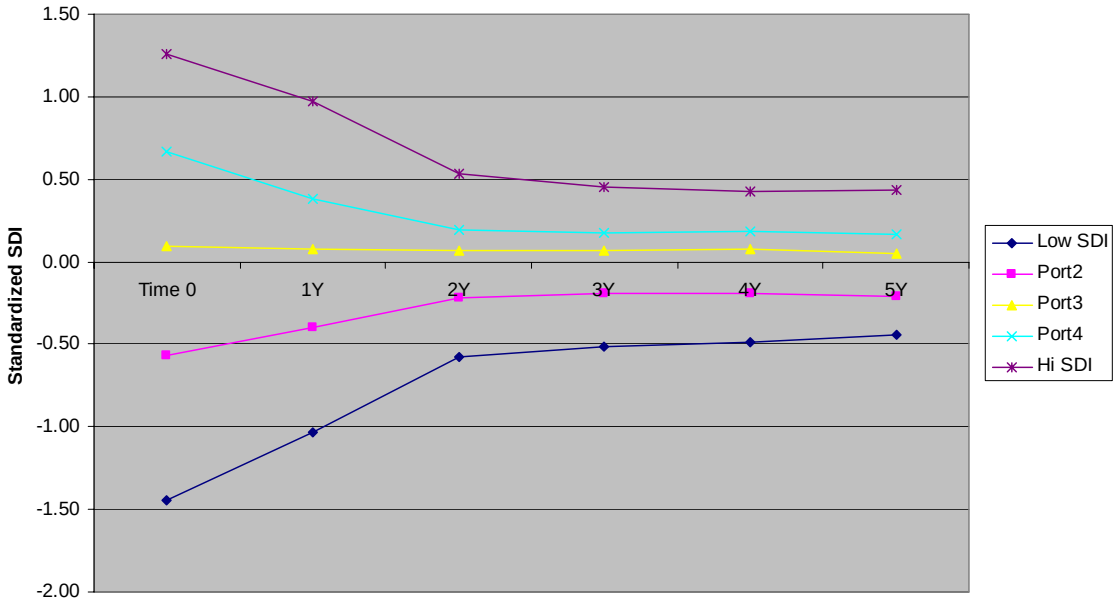

Fig 3B: Years after Portfolio Formation

Table 1: Summary Statistics (1996 to 2007)

Panel A of Table 1 summaries the time series averages of cross-sectional summary statistics for main variables, for full sample, and for live and graveyard fund sub-samples. Variables considered are number of funds, the raw and the standardized Strategy Distinctiveness Index (*SDI*) and contemporaneous characteristics including monthly net fee returns, FH 7-factor adjusted alphas and corresponding appraisal ratio (*AR*), fund performance volatility (*Vol*), lengths of restriction periods and lockup periods, dummies for personal capital commitment and high water mark, management fees, incentive fees, fund age, asset under management (*AUM*), and new money flow into funds as a fraction of *AUM*. Panel B reports the time series average of pair-wise correlation among these variables. Raw *SDI* is the 1-R2, in percentage, for the time series regression using the past 24 month data: $r_{i,t} = c_0 + c_1 STYLE_t + u_{i,t}$. Standardized *SDI* is the difference between the raw *SDI* and the average *SDI* of the corresponding style scaled by the cross-sectional standard deviation of SDI within the same style.

Panel A: Fund Performance and Characteristics

	Full Sample					Live Funds					Graveyard Funds				
	Mean	Median	Min	Max	Std	Mean	Median	Min	Max	Std	Mean	Median	Min	Max	Std
#Funds	852.50	733.50	100.00	1641.00	537.77	540.17	349.50	13.00	1482.00	511.83	312.33	314.00	31.00	517.00	156.33
SDI(%)	67.52	70.65	5.86	100.00	25.31	68.28	71.87	8.09	100.00	25.13	68.94	72.27	9.62	100.00	24.69
Standardized SDI	0.00	0.07	-3.64	2.26	0.98	-0.03	0.03	-3.38	2.20	0.97	0.08	0.16	-3.08	2.08	0.96
NetFeeRet(% p.m.)	1.03	0.91	-5.19	9.17	1.30	1.11	1.02	-4.37	8.07	1.26	0.91	0.78	-4.29	7.22	1.33
Alpha(% p.m.)	0.66	0.67	-8.72	12.52	1.55	0.77	0.77	-7.69	9.30	1.45	0.53	0.54	-8.21	10.18	1.62
AR	0.58	0.39	-3.64	9.77	1.09	0.77	0.51	-3.01	9.25	1.20	0.44	0.32	-2.99	7.57	0.95
Vol(%)	3.94	3.18	0.08	24.20	3.21	3.65	3.05	0.09	22.38	3.12	4.12	3.34	0.18	20.67	3.29
Restriction(days)	40.10	33.00	0.00	323.08	33.82	49.63	41.67	1.25	200.58	35.97	36.31	30.83	0.17	285.00	30.54
Lockup(months)	2.91	0.00	0.00	57.25	5.85	3.98	0.00	0.00	57.25	7.38	2.40	0.38	0.00	24.00	4.34
PersonalCapDummy	0.58	0.58	0.00	1.00	0.47	0.63	0.67	0.00	1.00	0.45	0.54	0.50	0.00	1.00	0.46
HighWaterMarkDummy	0.45	0.50	0.00	1.00	0.42	0.56	0.50	0.00	1.00	0.48	0.42	0.50	0.00	1.00	0.36
MgmtFee(%)	1.35	1.16	0.00	5.33	0.60	1.36	1.22	0.08	4.67	0.53	1.32	1.12	0.08	4.58	0.61
IncentiveFee(%)	18.15	20.00	0.00	50.00	5.96	18.41	20.00	0.00	42.08	5.77	18.05	20.00	0.00	44.25	5.92
Age(years)	5.82	4.97	1.03	31.81	3.76	5.99	5.13	1.08	31.15	3.78	5.41	4.38	1.05	21.72	3.58
AUM(M$)	190.32	57.50	5.01	5833.64	455.81	284.26	82.20	5.18	5802.09	628.35	124.94	36.09	5.06	3214.00	315.74
Flow(%)	0.31	0.00	-41.31	41.95	8.15	0.78	0.04	-36.88	38.62	7.35	-0.22	0.00	-41.13	40.81	8.44

Panel B: Correlations

	SDI	Standardized SDI	NetFee Ret	Alpha	AR	Vol	Restriction	Lockup	Personal Cap Dummy	HighWater Mark Dummy	MgmtFee	Incentive Fee	Age	AUM
Standardized SDI	0.84													
NetFeeRet(%)	-0.11	-0.08												
Alpha(%)	0.05	0.06	0.62											
AR	0.17	0.08	0.22	0.47										
Vol(%)	-0.27	-0.13	0.25	0.06	-0.35									
Restriction(days)	0.04	0.01	0.07	0.08	0.22	-0.17								
Lockup(months)	-0.02	-0.01	0.05	0.04	0.07	0.00	0.31							
PersonalCapDummy	-0.01	-0.02	0.08	0.04	0.00	0.08	0.05	0.03						
HighWaterMarkDummy	0.06	0.02	0.03	0.06	0.13	-0.09	0.30	0.28	-0.06					
MgmtFee(%)	-0.01	0.02	0.02	0.00	-0.01	0.10	-0.11	-0.07	-0.04	-0.03				
IncentiveFee(%)	0.08	0.06	0.06	0.09	0.11	-0.05	0.15	0.10	0.02	0.21	0.02			
Age(years)	-0.17	-0.15	-0.02	-0.05	-0.07	0.05	-0.11	-0.01	0.16	-0.19	-0.09	-0.17		
AUM(M$)	-0.07	-0.12	0.09	0.04	0.09	-0.06	0.05	0.02	0.05	0.02	0.02	-0.10	0.19	
Flow(%)	0.02	0.01	0.13	0.09	0.11	-0.03	0.05	0.02	0.01	0.04	0.00	0.02	-0.06	0.02

Table 2: Persistence of the Strategy Distinctiveness Index (1996 - 2007)

Table 2 reports time-series means and t-statistics of the average Strategy Distinctiveness Index (*SDI*) for each of the quintile portfolios sorted on the index measure, as well as the difference between the high and low Index portfolio. Panel A reports the *SDI* from sorting on the raw *SDI*, and Panel B reports the standardized *SDI* from sorting on the standardized *SDI*. It includes both the current and future *SDI* levels for the next 1 to 5 years. Raw *SDI* is the 1-R2, in percentage, for the time series regression using the past 24 month data: $r_{i,t} = c_0 + c_1 STYLE_t + u_{i,t}$. Standardized *SDI* is the difference between the raw *SDI* and the average *SDI* of the corresponding style scaled by the cross-sectional standard deviation of SDI within the same style. The t-statistics in italics are adjusted for heteroskedasticity and auto-correlation.

	Time 0	1y	2y	3y	4y	5y
Panel A: Raw SDI Sort						
LowSDIPort	32.50	39.88	46.27	47.65	48.52	48.74
Port2	55.05	58.62	60.25	62.66	62.09	62.06
Port3	72.80	72.32	70.09	68.79	68.40	68.62
Port4	88.49	83.68	76.85	75.71	75.98	76.36
HiSDIPort	98.40	91.60	80.62	80.03	78.81	77.75
Hi-Low	65.90	51.71	34.35	32.38	30.29	29.01
t-stat	*22.44*	*18.62*	*10.12*	*8.65*	*7.76*	*7.57*
Panel B: Standardized SDI Sort						
LowSDIPort	-1.45	-1.03	-0.58	-0.51	-0.49	-0.44
Port2	-0.57	-0.40	-0.21	-0.19	-0.20	-0.21
Port3	0.09	0.07	0.06	0.07	0.07	0.05
Port4	0.66	0.38	0.19	0.17	0.18	0.16
HiSDIPort	1.25	0.97	0.53	0.46	0.42	0.43
Hi-Low	2.70	2.00	1.11	0.97	0.91	0.88
t-stat	*78.66*	*23.98*	*10.87*	*10.49*	*9.99*	*9.20*

Table 3: Portfolio Performance Based on the Strategy Distinctiveness Index (1996 - 2007)

Table 3 reports time series means and t-statistics of the equally and value weighted post-formation annualized FH 7-factor adjusted alphas and the corresponding appraisal ratios, for quintile portfolios sorted on the standardized Strategy Distinctiveness Index (*SDI*) at the end of each quarter/every 6 months/each year/every 2 years. The corresponding portfolios are rebalanced each quarter/every 6 months/each year/every 2 years. *SDI* is based on (1-R2) in percentage from the following time series regression using the past 24 month data: $r_{i,t} = c_{0i} + c_{1i} STYLE_t + u_{i,t}$. The standardized *SDI* is the difference between the raw *SDI* and the average *SDI* of the corresponding style scaled by the cross-sectional standard deviation of SDI within the same style. The t-statistics reported below in italics are adjusted for heteroskedasticity and auto-correlation.

	Alpha_FH7(% p.a.)				AppraisalRatio			
	3m	6m	1y	2y	3m	6m	1y	2y
Panel A: Equally Weighted Portfolios								
LowSDIPort	3.63	3.24	2.91	3.66	0.37	0.24	0.20	0.20
tstat	*1.97*	*1.49*	*1.40*	*1.71*	*6.26*	*5.06*	*2.94*	*2.55*
Port2	0.87	1.43	0.44	1.86	0.30	0.23	0.20	0.20
	0.28	*0.56*	*0.14*	*0.65*	*4.09*	*4.72*	*3.55*	*3.22*
Port3	7.21	6.43	5.50	5.34	0.56	0.36	0.32	0.29
	4.92	*3.70*	*2.57*	*2.69*	*9.47*	*8.77*	*5.70*	*4.45*
Port4	5.79	8.22	6.84	5.83	0.54	0.40	0.33	0.29
	3.75	*2.77*	*2.43*	*2.27*	*11.60*	*11.53*	*6.22*	*3.72*
HiSDIPort	10.27	10.50	9.72	9.18	0.62	0.44	0.40	0.36
	4.35	*4.07*	*4.45*	*5.05*	*8.79*	*6.76*	*4.74*	*4.06*
Hi-Low	6.65	7.25	6.81	5.51	0.25	0.21	0.20	0.16
	2.84	*2.58*	*2.15*	*1.74*	*3.85*	*4.46*	*3.79*	*3.40*
Panel B: Value Weighted Portfolios								
LowSDIPort	1.39	0.42	0.02	1.40	0.49	0.30	0.26	0.29
tstat	*0.36*	*0.10*	*0.00*	*0.31*	*4.38*	*2.92*	*1.71*	*2.03*
Port2	2.67	2.93	-0.32	1.90	0.50	0.41	0.36	0.36
	0.70	*0.85*	*-0.07*	*0.57*	*5.59*	*6.06*	*4.48*	*5.10*
Port3	7.30	6.48	5.09	6.51	0.58	0.45	0.38	0.36
	2.94	*2.72*	*2.31*	*3.33*	*7.29*	*6.86*	*4.67*	*4.11*
Port4	4.32	5.99	7.07	7.25	0.70	0.58	0.57	0.44
	1.36	*2.39*	*3.74*	*4.12*	*6.19*	*5.06*	*4.44*	*4.60*
HiSDIPort	9.31	9.86	10.37	9.95	0.78	0.59	0.50	0.45
	3.07	*2.84*	*2.82*	*3.38*	*6.86*	*5.99*	*5.48*	*4.93*
Hi-Low	7.93	9.45	10.35	8.55	0.28	0.29	0.24	0.16
	2.10	*2.04*	*1.38*	*1.37*	*2.03*	*2.49*	*1.58*	*1.27*

Table 4: Regression Analysis of Hedge Fund Performance on the Strategy Distinctiveness Index (1996Q1 to 2007Q2)

Table 4 reports both the panel and Fama-MacBeth regression results for hedge fund performance on the standardized Strategy Distinctiveness Index (*SDI*) measure and other fund characteristics as: $\alpha_{i,t} = c + SDI_{i,t-1} + Control_{i,t-1} + e_{i,t}$. Survivorship and backfill biases are controlled for. $\alpha_{i,t}$ is the annualized FH 7-factor adjusted performance over quarter t in percentage. *AR* is the corresponding appraisal ratios. For the panel regression, the t-statistics reported underneath the estimated coefficients in italics are adjusted for fund clustering effect and time and style fixed effects. For the Fama-MacBeth regression, the t-statistics reported underneath the estimated coefficients in italicized font are adjusted for heteroskedasticity and auto-correlation.

	Alpha (% p.a.)				AR			
	Panel Regression		Fama-MacBeth		Panel Regression		Fama-MacBeth	
Standardized SDI	1.14	0.52	2.05	1.33	0.08	0.02	0.08	0.03
t-stat	*4.87*	*2.50*	*2.85*	*1.66*	*4.62*	1.60	*4.26*	*1.79*
AlphaPast2Y(% p.a.)		4.14		3.63				
		12.53		*2.97*				
ARPast2Y						0.59		0.51
						15.78		*11.50*
Vol(%)Past2Y		-0.40		0.09		-0.03		-0.03
		-2.02		*0.19*		-6.52		*-3.97*
Restriction(days)		0.01		0.01		0.00		0.00
		1.33		*0.83*		2.38		*1.91*
Lockup(months)		0.06		0.08		0.00		0.01
		1.60		*0.66*		2.04		*1.32*
PersonalCapital		0.76		1.13		0.05		0.02
		1.86		*0.98*		2.02		*0.91*
HighWaterMark		0.34		1.35		-0.03		0.05
		0.64		*1.20*		-0.93		*0.82*
MgmtFee(%)		1.49		1.51		0.00		0.02
		3.32		*1.92*		0.20		*0.62*
IncentiveFee(%)		0.10		0.14		0.00		0.00
		2.59		*1.80*		1.06		*2.17*
Age(yrs)		0.15		0.04		0.02		0.01
		2.93		*0.76*		4.57		*1.98*
Ln(AUM(-1))		-0.53		-0.37		0.00		0.01
		-3.66		*-1.14*		-0.41		*0.71*
Flow(-1) (%)		0.02		-0.01		0.00		0.00
		0.53		*-0.32*		-2.07		*-1.56*
AdjR2(%)	4.93	7.44	10.06	20.23	6.97	18.76	10.67	21.20
#FundQtrObs	31733				31733			

Table 5: Alternative Performance Measures: Long/Short Equity Hedge (1996Q1 to 2007Q2)

Table 5 reports the panel regression results for hedge fund performance measures on the standardized Strategy Distinctiveness Index (*SDI*) and other fund characteristics as: $\alpha_{i,t} = c + SDI_{i,t-1} + Control_{i,t-1} + e_{i,t}$ for the long/short equity hedge funds. Survivorship and backfill biases are controlled for. $\alpha_{i,t}$ is the annualized risk adjusted performance over quarter t in percentage and *AR* is the corresponding appraisal ratio, where the risk benchmarks considered include FH 7-factor, Carhart 4-factor, options augmented S&P model, and options augmented Carhart model. The t-statistics reported underneath the estimated coefficients in italics are adjusted for fund clustering effect and time and style fixed effects.

	Alpha(% p.a.)				AR			
	FH7	Carhart4	S&P+ Options	Carhart4+ Options	FH7	Carhart4	S&P+ Options	Carhart4+ Options
Standardized SDI	1.00	1.05	1.58	0.85	0.01	0.03	0.04	0.03
t-stat	*2.63*	*3.14*	*3.07*	*1.87*	*0.95*	*2.39*	*2.73*	*1.76*
AlphaPast2Y(% p.a.)	2.28	2.31	5.69	6.06				
	4.96	*2.92*	*8.48*	*6.83*				
ARPast2Y					0.34	0.54	0.57	0.34
					13.23	*12.83*	*17.96*	*18.39*
Vol(%)Past2Y	-0.69	0.30	-1.56	0.22	-0.03	-0.02	-0.03	-0.01
	-2.36	*0.89*	*-3.73*	*0.55*	*-4.93*	*-3.14*	*-5.57*	*-2.19*
Restriction(days)	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00
	0.09	*-0.04*	*-0.06*	*-1.43*	*0.44*	*-0.19*	*-1.46*	*-0.55*
Lockup(months)	0.06	0.00	-0.03	-0.10	0.00	0.00	0.00	0.00
	1.13	*0.06*	*-0.47*	*-1.86*	*1.57*	*0.38*	*0.87*	*-0.41*
PersonalCapital	0.54	0.20	0.40	-0.15	0.01	0.02	0.01	-0.03
	0.76	*0.36*	*0.48*	*-0.18*	*0.28*	*0.63*	*0.18*	*-0.95*
HighWaterMark	0.89	0.84	2.58	1.43	0.01	0.00	0.07	-0.04
	1.05	*1.14*	*2.68*	*1.52*	*0.21*	*0.01*	*1.94*	*-0.96*
MgmtFee(%)	2.28	0.79	2.29	1.58	0.07	0.03	0.10	0.08
	2.53	*0.89*	*1.97*	*1.31*	*1.60*	*0.78*	*2.47*	*2.03*
IncentiveFee(%)	0.16	0.00	-0.20	-0.05	0.01	0.00	0.00	0.01
	2.08	*0.05*	*-2.14*	*-0.64*	*2.52*	*1.05*	*1.36*	*2.20*
Age(yrs)	0.10	-0.13	0.27	0.00	0.01	0.00	0.01	-0.01
	1.22	*-2.05*	*2.24*	*-0.02*	*1.88*	*0.10*	*1.70*	*-1.53*
Ln(AUM(-1))	-0.07	0.57	-0.73	0.02	0.00	0.02	0.00	0.02
	-0.27	*2.64*	*-1.99*	*0.06*	*0.09*	*2.06*	*-0.43*	*1.79*
Flow(-1) (%)	0.05	0.01	0.00	-0.04	0.00	0.00	0.00	0.00
	1.04	*0.12*	*0.04*	*-0.71*	*-1.45*	*-1.06*	*-1.13*	*-1.02*
AdjR2(%)	7.87	6.66	16.21	12.28	7.51	8.49	12.66	10.13
#FundQtrObs	13225	13225	10150	10150	13225	13225	10150	10150

Table 6: Alternative Strategy Distinctiveness Index Measures

Table 6 reports panel regression results of hedge fund performance on standardized Strategy Distinctiveness Index (*SDI*) measure and other fund characteristics as follows: $\alpha_{i,t} = c + SDI_{i,t-1} + Control_{i,t-1} + e_{i,t}$. Survivorship and backfill biases are controlled for. *SDI* measures are based on different benchmarks including the aggregate hedge fund return index (*HFIdx*) and FH 7-factor (*FH7*) models. Performance measures considered include annualized risk adjusted returns, $\alpha_{i,t}$ in percentage, and the corresponding appraisal ratio, *AR*, where the risk benchmarks include a style return index, the aggregate hedge fund index return, and FH 7-factor models. The t-statistics reported underneath the estimated coefficients in italics are adjusted for fund clustering effect and time and style fixed effects.

	SDI(HFIdx)						SDI(FH7)					
	Alpha(% p.a.)			AR			Alpha(% p.a.)			AR		
	Style	HFIdx	FH7	Style	HFIdx	FH7	Style	HFIdx	FH7	Style	HFIdx	FH7
Standardized SDI	1.75	3.33	0.58	0.12	0.19	0.04	1.71	1.72	0.73	0.08	0.09	0.11
t-stat	*8.59*	*13.67*	*2.70*	*11.20*	*17.31*	*4.06*	*8.31*	*7.61*	*3.26*	*7.12*	*8.03*	*10.14*
AlphaPast2Y(%p.m.)	4.29	4.52	4.15				4.33	5.05	4.14			
	13.15	*12.18*	*12.56*				*13.37*	*14.37*	*12.50*			
ARPast2Y				1.08	1.05	0.59				1.09	1.10	0.60
				38.74	*37.33*	*15.71*				*38.95*	*38.42*	*16.18*
Vol(%)Past2Y	-1.35	-1.76	-0.40	-0.05	-0.05	-0.03	-1.34	-1.77	-0.39	-0.05	-0.05	-0.02
	-9.53	*-11.44*	*-2.03*	*-10.31*	*-10.78*	*-6.41*	*-9.42*	*-11.31*	*-1.96*	*-10.42*	*-10.55*	*-5.26*
Restriction(days)	0.02	0.02	0.01	0.00	0.00	0.00	0.02	0.02	0.01	0.00	0.00	0.00
	2.06	*2.73*	*1.30*	*2.16*	*2.81*	*2.35*	*2.14*	*2.97*	*1.31*	*2.21*	*2.81*	*2.31*
Lockup(months)	0.03	0.01	0.06	0.00	0.00	0.00	0.02	0.01	0.06	0.00	0.00	0.00
	1.01	*0.49*	*1.60*	*2.11*	*1.62*	*2.07*	*1.00*	*0.31*	*1.61*	*2.00*	*1.34*	*2.21*
PersonalCapital	0.45	0.22	0.76	0.06	0.05	0.04	0.38	0.20	0.73	0.06	0.05	0.04
	1.35	*0.61*	*1.85*	*2.59*	*2.03*	*1.97*	*1.17*	*0.58*	*1.77*	*2.53*	*2.04*	*1.59*
HighWaterMark	0.45	0.86	0.35	0.02	0.02	-0.02	0.48	0.85	0.37	0.02	0.02	-0.02
	1.09	*2.04*	*0.67*	*0.58*	*0.59*	*-0.88*	*1.21*	*2.07*	*0.71*	*0.60*	*0.57*	*-0.69*
MgmtFee(%)	1.05	1.00	1.46	0.02	0.04	0.00	0.96	0.97	1.42	0.01	0.03	-0.01
	2.82	*2.48*	*3.26*	*0.85*	*1.84*	*0.12*	*2.61*	*2.37*	*3.15*	*0.72*	*1.76*	*-0.31*
IncentiveFee(%)	0.02	0.01	0.11	0.00	0.00	0.00	0.02	0.01	0.10	0.00	0.00	0.00
	0.49	*0.29*	*2.62*	*-0.02*	*0.31*	*1.01*	*0.51*	*0.33*	*2.61*	*0.08*	*0.51*	*0.78*
Age(yrs)	0.02	0.08	0.14	0.01	0.01	0.02	0.01	0.05	0.14	0.00	0.01	0.02
	0.48	*1.80*	*2.88*	*2.01*	*2.56*	*4.71*	*0.17*	*1.06*	*2.84*	*1.52*	*1.71*	*4.92*
Ln(AUM(-1))	-0.33	-0.48	-0.56	-0.03	-0.03	0.00	-0.46	-0.74	-0.60	-0.04	-0.04	-0.01
	-2.65	*-3.73*	*-3.89*	*-3.98*	*-3.58*	*-0.37*	*-3.80*	*-5.95*	*-4.17*	*-5.13*	*-5.42*	*-0.97*
Flow(-1) (%)	-0.01	0.00	0.02	0.00	0.00	0.00	-0.01	-0.01	0.02	0.00	0.00	0.00
	-0.26	*-0.11*	*0.57*	*-1.56*	*-3.19*	*-2.02*	*-0.27*	*-0.48*	*0.58*	*-1.66*	*-3.56*	*-2.03*
AdjR2(%)	8.90	14.74	7.44	26.34	28.72	18.80	8.89	14.12	7.46	26.14	28.09	19.15
#FundQtrObs	31733			31733			31733			31733		

Table 7: Determinants of Strategy Distinctiveness Index (1996Q1 to 2007Q2)

Table 7 reports the panel regression results for hedge fund standardize Strategy Distinctiveness Index (*SDI*) measure on lagged fund characteristics as follows: $SDI_{i,t} = c + Control_{i,t-1} + e_{i,t}$. Survivorship and backfill biases are controlled for. $SDI_{i,t}$ is the 1-R2 in percentage, for the following time series regression using the past 24 month data; $r_{i,t} = c_{0i} + c_{1i} STYLE_t + u_{i,t}$. The standardized *SDI* is the difference between the raw *SDI* and the average *SDI* of the corresponding style scaled by the cross-sectional standard deviation of SDI within the same style. The coefficients are multiplied by 100. The t-statistics reported underneath the estimated coefficients in italics are adjusted for fund clustering effect and time and style fixed effects.

	Standardized SDI (Style)		
AlphaPast2Y(%p.m.)	5.16		3.15
tstat	*5.80*		*3.10*
ARPast2Y		8.35	6.10
		7.27	*4.34*
Vol(%)Past2Y	-6.05	-5.25	-5.52
	-8.97	*-7.67*	*-8.08*
Restriction(days)	0.06	0.04	0.04
	1.06	*0.79*	*0.80*
Lockup(months)	-0.36	-0.38	-0.37
	-1.19	*-1.24*	*-1.23*
PersonalCapital	5.21	5.37	5.14
	1.42	*1.47*	*1.41*
HighWaterMark	-1.54	-1.53	-1.50
	-0.36	*-0.36*	*-0.35*
MgmtFee(%)	-0.34	-0.54	-0.48
	-0.11	*-0.17*	*-0.15*
IncentiveFee(%)	0.87	0.90	0.86
	1.98	*2.02*	*1.94*
Age(yrs)	-2.96	-3.00	-2.95
	-6.49	*-6.58*	*-6.47*
Ln(AUM(-1))	-11.88	-11.93	-12.12
	-9.11	*-9.11*	*-9.28*
Flow(-1) (%)	0.13	0.13	0.10
	1.66	*1.61*	*1.29*
AdjR2(%)	7.51	7.61	7.75
#FundQtrObs	31733	31733	31733