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# The Structural Changes of the Hedge Fund Industry Over Time

*By Simeon Kawakami*

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## **Abstract**

Historically, the hedge fund industry is one of the fastest growing investment classes in the last decade. This study looks to analyze the hedge fund industry structural changes from 1994 to 2010. A premise for this study is previous research which shows small funds tend to outperform large funds. Parameters are set to determine the classification of a fund being small, medium, or large. The asset flows to each category are tracked overtime in order to show structural changes. For each category the number of small, medium, and large hedge funds in tracked over time. The results are inconclusive in analyzing the change of small and large funds of the industry over time. However, each category does show some consistent evidence of changes over time. This study ran into difficulty absolutely defining small and large funds. The methodology used divides the hedge fund universe into equal thirds. The results show over time asset flows are largest to the top third of the universe. This is contrary to the initial hypothesis that small .

## **1. Introduction**

Hedge funds have attracted the attention of academics and professionals over the last decade. A hedge can be defined as an investment vehicle. This definition is broad but it encompasses the essence of what a hedge fund is. According to Hedge Fund Industry Review (Credit Suisse 2010), assets under management totaled \$1.7 trillion as of December 31, 2010. This number is expected to continue to increase over the next decade. Many investors are attracted to hedge funds because of the freedom with which they can invest and the alpha they are able to achieve. The amount of assets under management vary from fund to fund. Many studies (Teo 2009; Hedges 2003) find evidence indicating small funds tend to outperform large hedge funds, so there is an optimal size.

It is unclear how the increase in assets of the hedge fund industry is distributed among large and small new or existing funds. The purpose of this paper is to analyze this relationship over time. In order to measure performance, the Fung and Hsieh (2004) 8-factor model will be used due to its effectiveness for calculating the return net of systematic risk for hedge funds. While the mutual fund industry experiences economies of scale and many benefits from an increase in size, the hedge fund industry's benefits of scale are limited. In addition, past studies show that hedge fund returns tend to erode after two to three years (Aggarwal and Jorion 2008).

## **2. Literature Review**

Current literature focuses on individual fund performance over time. A plethora of factors are used to explain the performance difference of small versus large hedge funds. These include: liquidity, economies of scale, manager tenure, fund flows, and many others. A number

of these factors actually explain performance discrepancies between small and large hedge funds. However, little research has been done on the flow of assets to large and small funds over time.

## **2.1 Size Performance Relationship for Hedge Funds**

Multiple studies have analyzed the size performance relationship of individual hedge funds. Naik, Ramadorai, and Stromqvist (2007) studied the capacity constraints faced by hedge funds. If hedge funds experience capacity constraints then an increase in assets under management beyond a certain point results in diminishing returns. In order to calculate capacity constraints, the hedge fund industry is divided into 8 distinct strategies. Risk is measured using the Fung and Hsieh 8-Factor Model. The data used is derived from 4 databases: HFR, TASS, CISDM, and MSCI. The time frame is ten years: from 1994 to 2004. After filtering, 7,610 relevant hedge funds are left to be analyzed. The methodology is to compare returns with Assets Under Management. The results show that 4 out of the 8 strategies experience capacity constraints. Relative Value, Fixed Income, Directional Traders, and Other strategies all experience constraints.

Teo (2009) used the Fama and Macbeth framework to evaluate the relationship between past fund size and fund performance. The data sets used are TASS and HFR from 1994 to 2008. The results of analyzing the data set show the relationship between fund performance and size is downward sloping and convex. In other words, the results show small hedge funds tend to outperform larger hedge funds. Additional screening tests are done using the information ratio to show leverage, database bias, fund age, and illiquidity are not the source of outperformance.

Hedges (2003), looked at the size versus performance of the hedge fund industry. The average hedge fund size was found to be \$87 million based on 268 hedge funds in 6 distinct

strategies with monthly returns. The results of performance analysis show that mid-sized funds perform the worst and small funds perform the best. Small funds tend to have more liquidity resulting in the ability to move in and out of investments.

## **2.1 Hedge Fund Performance Over Time**

Aggrawal and Jorion (2008) took a unique approach to explaining discrepancies in hedge fund performance. The paper looked at emerging funds with new managers. The database used was TASS from 1977 to 2006. By using funds with the same inception and reporting date, backfill bias is eliminated. The study finds hedge funds experience performance persistence during their early years. However, after a period of about 5 years the performance tapers off. This leads to the conclusion that emerging funds and managers may perform better than older managers and more established funds.

Baba (2006) used data from the Lipper TASS database. Three methodologies were used: non-parametric survival analysis, Semi-parametric Cox proportional hazard analysis, and the Logit analysis. The nonparametric survival analysis assumes the duration of the samples is homogeneous and no censoring is present. The Cox model avoids the problems of no explanatory variable and arbitrary choice. The use of all of these models together provides a better understanding of how a variety of variables affect the survivorship of hedge funds. The results show that funds with higher assets under management, a recent inflow of assets, and lower volatility have a higher probability of surviving.

Getmansky (2004) used the TASS data set with dates from 1977 to 2003 along with the graveyard database which started in 1994. The results show the life cycle of a fund is affected by performance, fund flows, age, assets, favorable position and competition. The attrition rate is 7 times that of the mutual fund industry and is partly explained by the factors listed above.

Hedge fund alphas have decreased over time according to Zhong. In looking for an explanation, the focus is on individual fund yields. This allows for pin pointing of funds with negative returns. In addition, capacity constraints are tested as a possible cause. The data used is from the CISDM Database. The methodology used is the Fung and Hsieh 8-factor model. The results show that hedge funds do suffer from capacity constraints and investing in funds with high alphas could cause diminishing returns. However, of the seven strategies tested directional trading and emerging market seem to be less susceptible to capacity constraints.

## **2.2 Comparison to Traditional Asset Classes**

Similar to hedge funds, mutual funds experience strong performance early on but then taper off (Smith 2009). Mutual funds are able to experience economies of scale and pass on lower fee charges to investors. However, as mutual funds grow they are unable to generate effective investment ideas. The additional capital is used on par or subpar ideas resulting in lower returns. In addition, taking positions in illiquid investments increases the overall risk of a fund.

The main hypothesis of this study is stated as:

H1: There is a non-zero correlation between fund size and its effect on the composition of hedge funds over time.

## **3. Data**

The TASS database is used to compare the number of small funds to large funds over time. The combined live and graveyard fund database is composed of over 15,000 funds. Graveyard funds are categorized as ceasing to operate, failing to report, or combined with another entity. Hedge funds are categorized into 13 Categories: Convertible Arbitrage, Dedicated

Short Bias, Emerging Markets, Equity Market Neutral, Event Driven, Fixed Income Arbitrage, Fund of Fund, Global Macro, Long/Short Equity Hedge, Managed Futures, Multi-Strategy, Options Strategy, and Other. 11 of these are used to observe structural changes within each category. Options strategy and dedicate short bias are not used because data starts after 1994. Preliminary data analysis shows a gradual increase in the average assets under management for the industry with the exception of 2008. This is consistent with previous research. The relevant data from the TASS database includes assets under management, hedge-fund style, and return. Additional data is also need for computing the Fung and Hsiesh 8 factor model.

### **3.1 Performance Measurement**

Hedge funds have a higher degree of freedom compared with traditional asset classes. A direct comparison to indexes such as the S&P500 do not provide an accurate representation of performance and risk factors involved. Fung and Hsieh (2004) analyzed the asset-based style of hedge funds to show the risk factors involved. The HFR and TASS databases are used to represent the hedge fund universe. The results show 8 risks are relevant when evaluating hedge funds: market risk, SC-LC spread, change in the 10 year treasury yield, change in yield spread between 10 year treasury and Moody's Baa bonds, lookback options on bond, currencies, an emerging market index, and commodities. The extensive use of this model in other research papers speaks to its quality. However, it is limited in the sense it is built for a well diversified portfolio, which hedge funds typically are not. Based on the 8-factors average alphas are calculated for each fund from 1994 to 2010.

Table 1: Alphas over time

This table shows the alphas from 1994 to 2010 by each category.

Category	Alpha
Fund of Funds	0.05%
Dedicated Short Bias	0.28%
Equity Market Neutral	0.35%
Long/Short Equity Hedge	0.37%
Event Driven	0.38%
Multi-Strategy	0.43%
Options Strategy	0.47%
Emerging Markets	0.52%
Convertible Arbitrage	0.53%
Managed Futures	0.57%
Fixed Income Arbitrage	0.58%
Global Macro	0.58%
Other	0.75%

### 3.2 Industry Categorization

Data is categorized according to size. The number of funds for each year is divided into thirds. The first third is defined as small, next medium, and top third large. The data used is from 1994 to 2010. The number of funds is equally weighted for each year. For instance, if in a given year one there is 90 funds. There are 30 small, medium, and large funds. The equal adjustment year over year, helps track the flows of assets over time.

### 4. Analysis

A two sample t-test was run to show the effect of size on the alpha a fund is able to achieve. The results show small funds have a statistically significant effect on fund performance. This is consistent with prior research which states that small funds tend to perform large funds. In addition, large funds were shown to not have a statistically significant effect on fund



performance. However, the flow of assets over time show a significant increase in assets in the top third compared to the bottom third of the total number of funds for each year.

Table 2: T-tests

This table displays the t-tests that were conducted on fund size and alpha. Panel A shows small funds effect on alpha compared to large and medium funds. Panel B shows medium compared to large and small. Panel C shows large compare with small and medium.

Panel A: Small versus Large and Medium

t-Test: Two-Sample Assuming Unequal Variances		
	<i>Small</i>	<i>Medium and Large</i>
Mean	-0.001152726	0.00683673
Variance	6.98529E-05	0.02970169
Observations	2181	4668
Hypothesized Mean Difference	0	
df	4714	
t Stat	-3.15937806	
P(T<=t) one-tail	0.000795532	
t Critical one-tail	1.645176935	
P(T<=t) two-tail	0.001591064	
t Critical two-tail	1.960467297	

Panel B: Medium versus Small and Large

t-Test: Two-Sample Assuming Unequal Variances		
	<i>Medium</i>	<i>Small and Large</i>
Mean	0.002431454	0.001148829
Variance	0.00049659	0.000484411
Observations	1002	1442
Hypothesized Mean Difference	0	
df	2136	
t Stat	1.406569073	
P(T<=t) one-tail	0.079850338	
t Critical one-tail	1.645567314	
P(T<=t) two-tail	0.159700677	
t Critical two-tail	1.961075167	

Panel C: Large versus Medium and Small

t-Test: Two-Sample Assuming Unequal Variances		
	<i>Large</i>	<i>Medium and Small</i>
Mean	0.003987331	0.004444667
Variance	0.000105991	0.03040624
Observations	2290	4560
Hypothesized Mean Difference	0	
df	4622	
t Stat	-0.176495777	
P(T<=t) one-tail	0.4299561	
t Critical one-tail	1.645183371	
P(T<=t) two-tail	0.859912199	
t Critical two-tail	1.960477319	

The six charts below show some notable observations across the 11 hedge fund categories. The charts show the percentage of small, medium, and large funds in each category. For instance if there are 300 total funds for a given period 100 are each small, medium, and large. Taking this a step further. if there are 50 hedge funds classify as Global Macro, of these 50 how many small medium or large from the total number of funds. This relationship is tracked from 1994 to 2010. As seen in Chart 1 the number of small fund decreases in the fixed income arbitrage category.

This can possibly be explained by the need for a large amount of funds to make a profit in Fixed Income Arbitrage. Fixed Income Arbitrage looks to profit off pricing discrepancies across markets for identical products. Since the pricing discrepancies are typical small margins a large amount of funds is need to earn a sizable return.

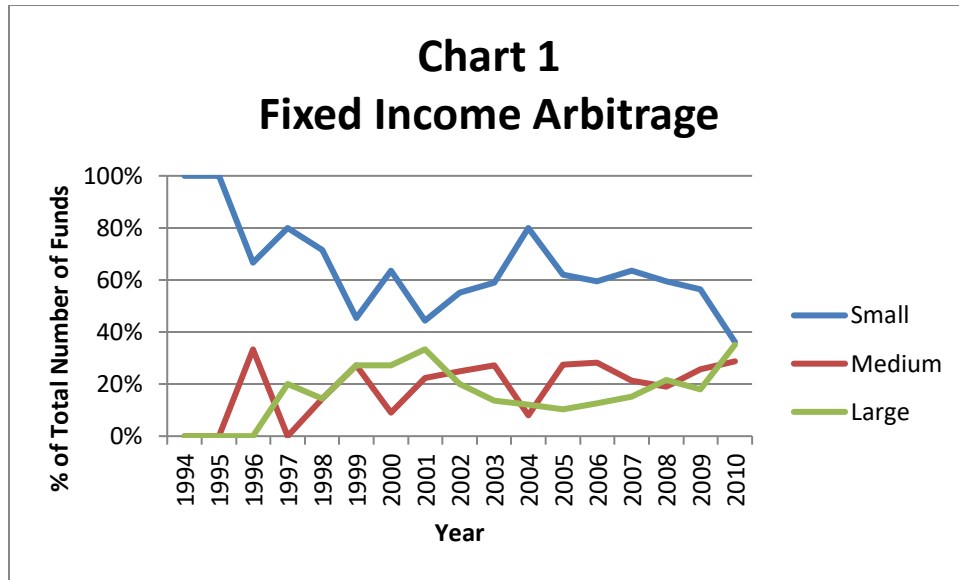


Chart 2 shows multi-strategy. Multi-strategy as the name implies uses a combination of several strategies. The chart does not show a trend because the use of multi-strategy most likely represents a variety of combined strategies.

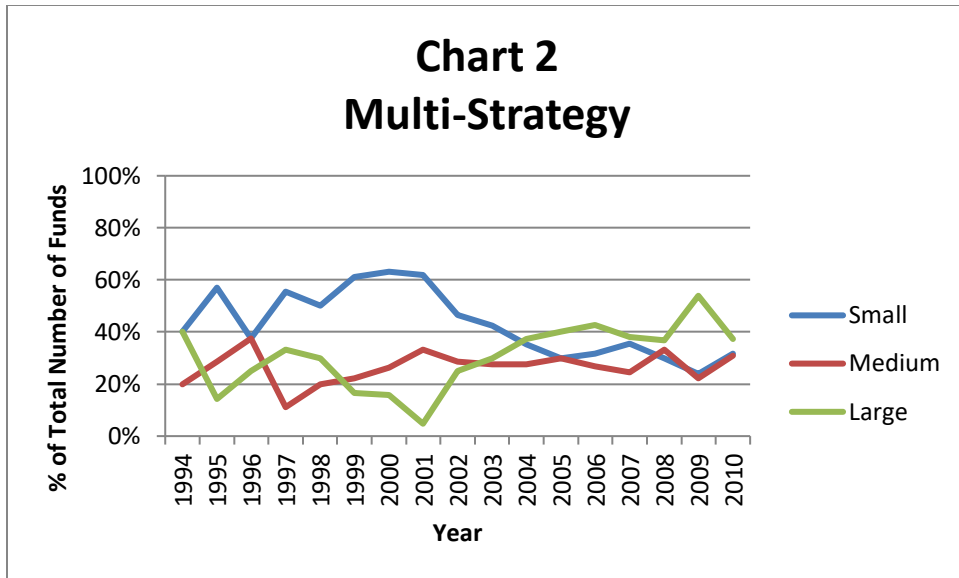


Chart 3 Convertible Arbitrage shows an increase in the number of small funds. Convertible Arbitrage seeks to profit off purchasing convertible securities while simultaneously shorting underlying stock. The increase in small funds could possibly be due to ability of small funds to move quickly in and out of short positions.

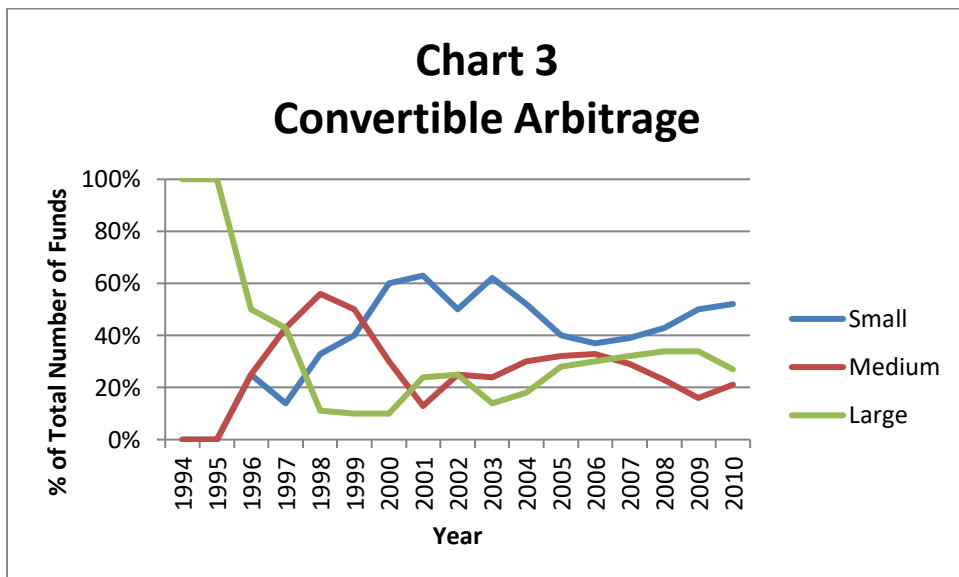


Chart 4 tracks the Fund of Fund category over time. Fund of Funds invest in other hedge funds which typically results in a diversification benefits. This could possibly explain why the number of small, medium, and large funds has remained consistent over the years.

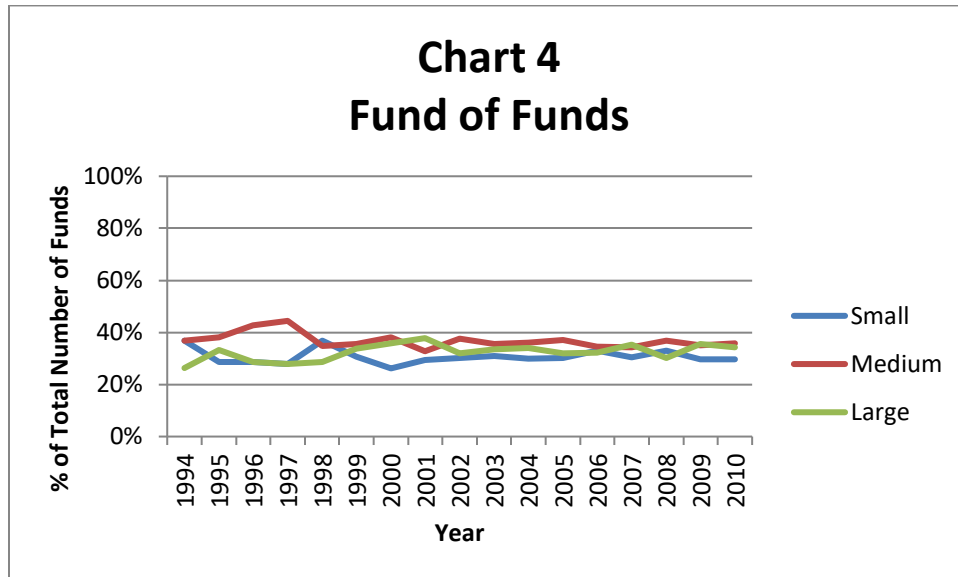
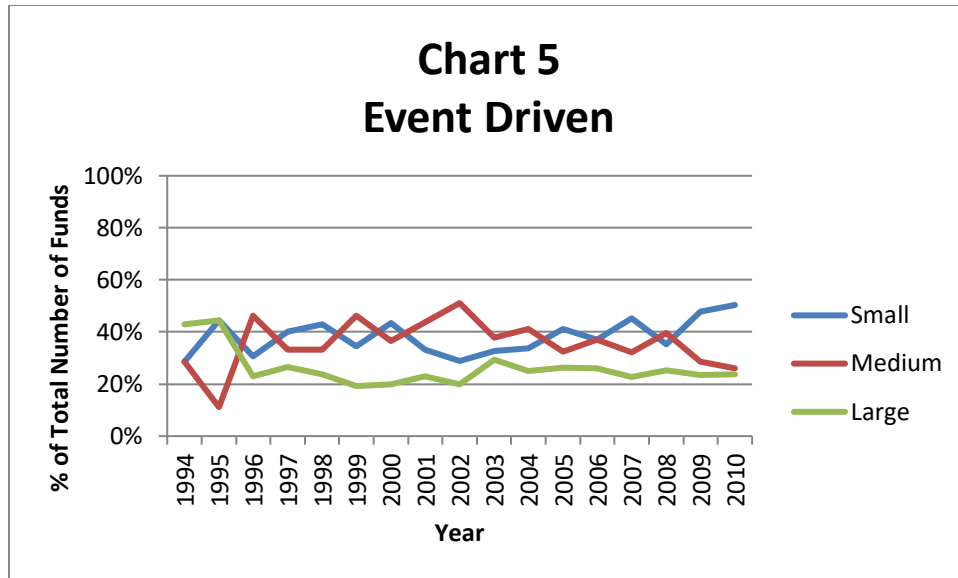


Chart 5: Event Driven funds seek to profit of specific corporate events. This could be a merger, takeover, new stories, or any event that could have a substantial impact on the price of the company's stock. Small funds historically represent a larger number of funds in the event driven category. One explanation for this is the ability of smaller funds to be nimble and react quickly to events.



## 5. Conclusion

This study tracks the structural changes of the hedge fund industry over time. Specifically, the asset flows between small, medium, and large funds is tracked. The changes are observed from the time period of 1994 to 2010. In addition, performance is measured using the Fung and Hsieh (2004) 8-factor model. The TASS database is used and it provides information on hedge fund style category and assets under management on a monthly and yearly basis. Due to limitations in finding an effective methodology for defining small, medium, and large funds, the results of this study are inconclusive. However, analysis of performance over time did show small funds to have a more significant impact on fund performance than medium or large.