

Hedge-funds: How big is big?

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A popular radio show by the American humorist Garrison Keillor describes the mythical town of Lake Wobegone, Minnesota, “where the women are strong, all the men are good-looking and all children are above average”. The steady increase of funds flowing into alternative investments suggests that some investors may hold similar beliefs when it comes to hedge funds.

Can this growth be sustained without eroding performance? We attempt to answer this question here by considering the evolution of returns of the hedge-fund industry since 1988. Since assets under management (AUM) in hedge-funds increase every year, we use the notion of *asset-weighted returns* to estimate how the industry performs across time. Comparing this evolution to the returns of stock and bond indices, we find rough estimates on the total size that alternative investments in hedge funds can reach and how far we are today from saturation.

Capacity and manager skills

According to Tremont Advisors, an independent industry organization, the single most important element in hedge fund investing is manager selection. Investors look for managers that are capable of consistently producing returns higher than the market averages. As investors identify these talented managers, they allocate to them to generate above-average returns. This brings about the issue of *capacity*.

Capacity is the technical word for the total amount of money that can be put to work with a given manager or strategy without deteriorating the fund performance. For example, an expert in biotechnology stocks can use his superior knowledge to invest in that industry, but he cannot invest more dollars than the total value of all biotechnology companies. Most likely, his capacity is only a small fraction of the total value of the industry.

Some strategies and managers have naturally greater capacity than others. Currency trading, in which trillions of dollars change hands daily, has more capacity than investing in the stock market of a developing country. All other things equal, investors tend to favor investing in “deep markets” over “niche markets” because more money can be put to work. A seasoned New York trader put it this way: “it is useless to have a good trade idea if there is no one to trade with. You have to find good trades that can actually get done”.

Unfortunately, market depth brings about another problem: can a manager generate above-average profits in an environment that is very liquid and competitive? In a competitive environment, profit margins shrink as more managers enter the space. For this reason, producing consistent rates of return requires taking more risk. Enter the skills

issue: identify managers who can generate superior returns without taking too much risk in an environment where other traders are doing similar trades.

The hedge fund world as a market for managers

We propose a simple supply-demand model for hedge-fund investing in aggregate. As opportunities to generate above-market returns are perceived by the investment community, the demand for new managers rises. In response to this demand, a new supply of managers will set shop. The expansion should continue as long as superior returns are produced (or perceived to be produced).

This allocation process is limited by capacity, in the sense of ``skill-capacity'' discussed above. If the strategy is an arbitrage discovered by an intelligent manager, it will support only a limited amount of investments. More standard strategies like currency trend-following will support a large amount of trading capital, but the ability to produce excess returns depends heavily on managers' skills as traders and risk-managers. Obviously, not all managers can be above average. We can view the hedge-fund industry as a *market for managers or for managers' skills*.

A consequence of the model is that if superior skills are in limited supply (which is a reasonable working assumption) manager quality should diminish as funds flow into hedge funds. In other words, as demand rises, investors are willing to pay more for managers or, equivalently, accept, in aggregate, less returns per dollar invested. This is the well-known ``more money chasing less opportunities'' effect. At some point, the size of the aggregate assets under management (AUM) will be such that the marginal return

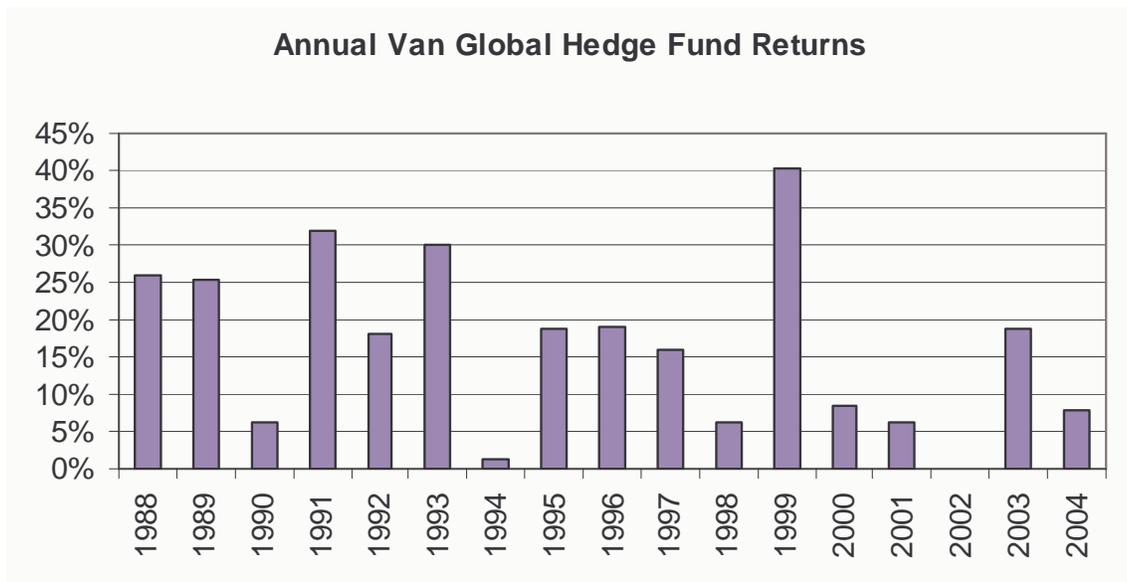
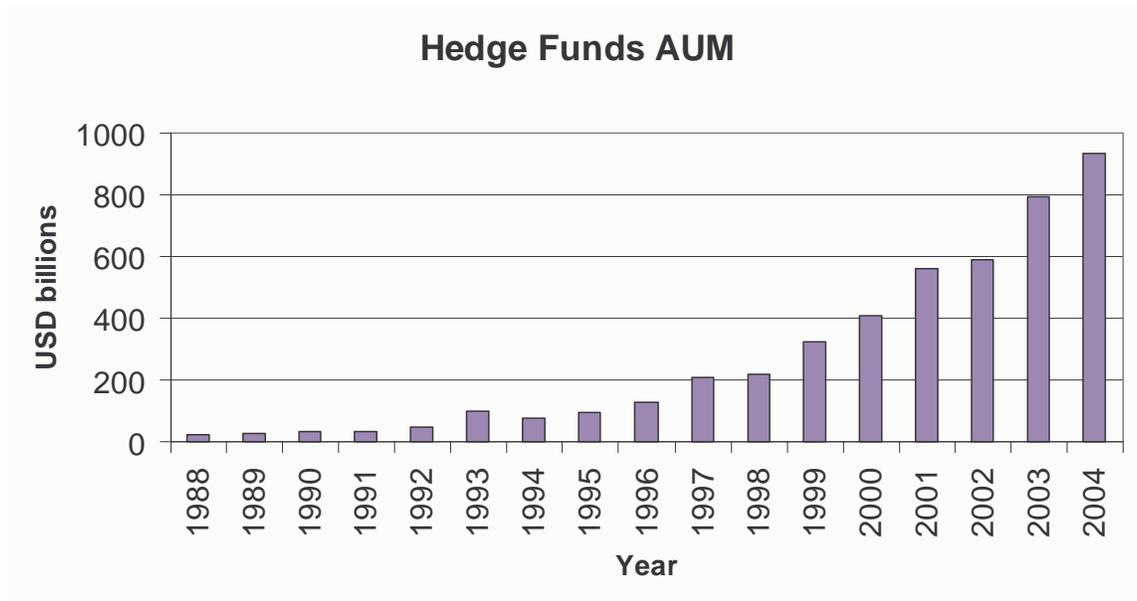
on a dollar is just equal to the return of broad market indices. In other words, equilibrium will be reached when, in aggregate, the universe of available managers has skills which are not superior to those that are needed for index investing.

This model can be modified slightly to take into account volatility or returns, or risk. Rather than measuring pure returns, we can consider adjusted returns by dividing the returns by their volatility. We note here that the current generation of hedge funds has, in aggregate, a lower volatility than the stock market. For this reason, if we adjust for risk, hedge funds may remain attractive with single-digit annual returns. On the other hand, investors in hedge funds are strongly focused on returns and low returns may not be acceptable for many investors.

Deriving a “skills curve” from data

Let us try to quantify the effect of *more money chasing fewer opportunities* (or fewer skills, in our setting). Can we say something about managers’ skills without actually observing them individually or knowing exactly what they do?

Fortunately, we have data going back to 1988 on a broad index of hedge funds. To make our model quantitative, we considered two sets of data, which are in the public domain. One data consists of the yearly record of AUM for hedge funds from 1988 to 2004 (see chart 1). We note that the total assets under management increased steadily from 26 billion USD in 1988 to just below 1,000 billion USD in 2004. The second data is the record of yearly returns of the Van Global Hedge Fund Index over the same period (see chart 2). The Van index groups a wide variety of investment styles. We can view it as representing the performance of hedge funds in aggregate.



Estimating the marginal rate of return for an additional dollar added to the market at any particular time is delicate. For instance, the data does not tell us whether old hedge funds tend to retain high rates of return and new ones have lower rates of return or whether returns diminish through increased competition as new players enter the field.

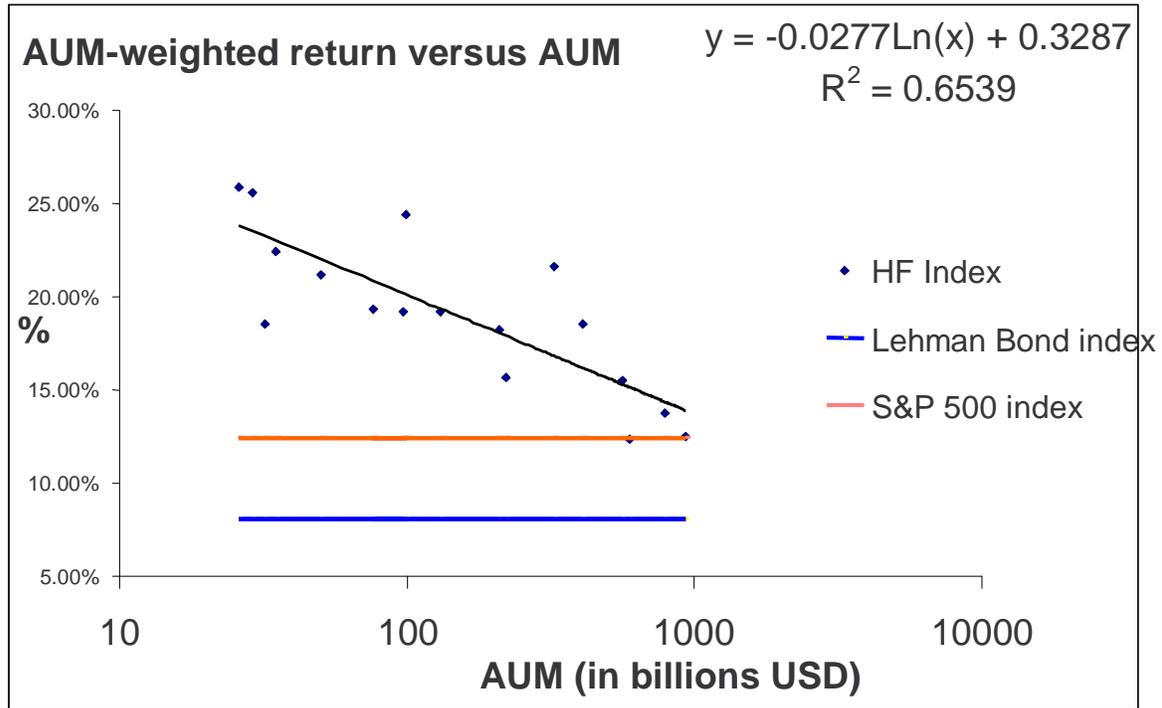
The former assumption appears too ``mechanistic'', and does not account for the effects good versus bad years, funds that are closed, etc.

The statistic that we choose to study to capture the expected return on a new dollar invested is *the average annual returns of the Van Hedge Fund Index weighted by the assets under management*. This asset-weighted average will be measured from the index inception (1988) to every year after that, and will be considered as a function of the AUM in the last year (see Box). In this way, we obtain an expected annual return for a dollar invested *as a function of the current AUM*. By varying the amount of assets under management from 26 billion (1988) to 945 billion (2004), we obtain a function which gives a rough idea of how flow of funds into hedge funds have affected the quality of returns.

The AUM-weighted average has a simple interpretation. Suppose that you entered the hedge-fund investment at the end of 1992, when assets under management totaled 92 billion dollars. You would then consider, for every year in the past since 1988, what was the return in investing one dollar for one year. The past years (late 80's), when there were fewer assets under management, would weight less than 1992, when the AUM was highest to date. An investor at the end of 1992 could reasonably assume that the expected returns on investing, if assets remained no greater than 92 billion dollars would be the dollar weighted-return (which is 21.17%). Thus, the AUM-weighted return represents the marginal return of a dollar invested at given AUM levels.

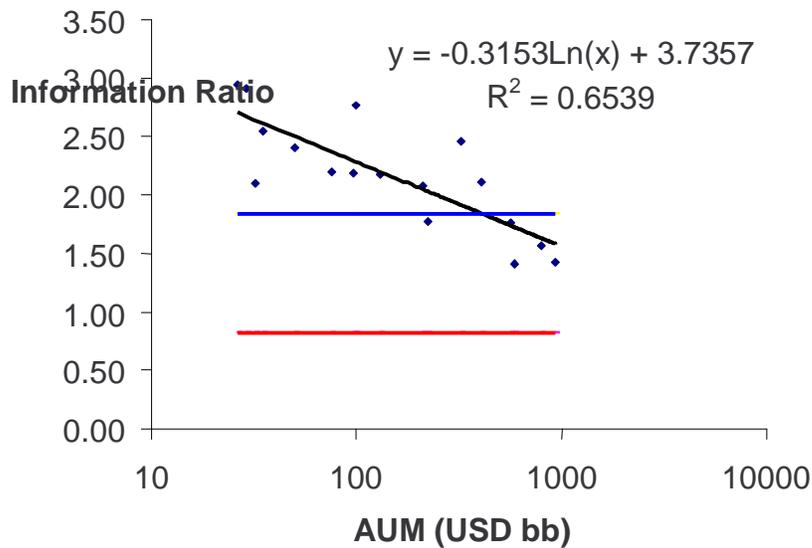
We used a simple a linear regression model to fit asset-weighted returns against AUM (the latter plotted in logarithmic scale). The regression line has a negative slope, as we expected. It predicts a loss of returns of 192 basis points (or 1.92 percent) every time the assets under management double. This regression line is plotted in Chart 3, together

with horizontal lines representing the returns on Standard & Poor's 500 Index and the Lehman Brothers Bond Index returns. The latter are assumed to be given by their long-term averages.



A similar exercise can be done for risk-adjusted returns. In this case, we use the *information ratio*, r/σ , where r and σ are the annual return and volatility. The corresponding AUM-weighted information ratios are plotted in Chart 4. The regression line suggests that, as assets under management double, the hedge fund index IR is reduced by approximately 0.22. By comparison, the S&P 500 index has an information ratio of 0.82 and the Lehman Brothers Global Bond Index of 1.84.

Risk Adjusted AUM-weighted Returns vs AUM



This graph shows that, on average, risk adjusted hedge fund returns have exceeded the Lehman Bond index in the early 1990s, but that the regression line clearly crosses in 2000. Risk-adjusted returns for the Van Hedge Fund Index have underperformed relative to international bonds over the last four years in the AUM-weighted metric.

The numbers obtained must be taken with a grain of salt, since they correspond to a single source (Van Index). Nevertheless, there is a clear trend which signals a gradual diminishing of aggregate returns, whether or not we adjust returns for risk.

Note also that this trend takes place on a *logarithmic* scale (returns decrease by a fixed amount every time assets double) indicating that the aggregate performance of hedge-funds *reacts, but reacts slowly* to increases to assets under management.

“Back of the envelope” calculations: how big is big?

Allocation to hedge funds can be justified on two reasons: to seek superior returns and for diversification. The diversification argument extends even to situations where expected returns are *equal or even slightly below* market averages, since it may still be more efficient to diversify into these assets, based on risk-adjusted returns.

Nevertheless, the comparison of hedge-fund returns with traditional benchmarks such as long-term stock and bond returns is key, especially considering the fact that most investment in the area is made by pension funds and institutions. Hedge-fund investment may be good, but how big is big?

If we take seriously our regression lines drawn above, we can “extrapolate into the future” to see what expected returns or risk-weighted returns would look like according to the regression lines. At what level of assets under management will hedge-fund aggregate returns match long-term equity or bond returns? The answer, taken directly from the data, is given in the following table.

| HF AUM (billions) | Asset-weighted Returns | Equivalent Investment |
|-------------------|------------------------|-------------------------|
| 945 (current) | 14.10 | Hedge Fund Index |
| 1964 | 12.40 | S&P 500 Index |
| 10,450 | 8.10 | Lehman Int’l Bond Index |

The table suggests that HF aggregate returns should match those of the broad U.S. stock indices as assets reach 2000 billion dollars. If, instead, we benchmarked by the Lehman

Bond Index, the aggregate hedge fund returns would continue exceeding long term bond returns even in considerably more funds flowed into the market.

Things change if we consider risk-adjusted returns (the ratio of expected returns to volatility). In this case, we have:

| Total Assets (billions) | Information Ratio | Equivalent Investment |
|-------------------------|-------------------|--------------------------|
| 409 | 1.84 | Lehman Int'l. Bond Index |
| 945 (current) | 1.54 | Hedge Fund Index |
| 10,400 | 0.82 | S&P 500 Index |

According to this performance measure, investing in the Lehman global bond index provides superior expected returns compared to hedge funds at current asset levels. The long term risk-adjusted returns of the Lehman bond index correspond to the risk-adjusted returns of hedge funds when assets were approximately 400 billion, a level that was reached by hedge funds by the end of 2000.

If we estimate roughly the total size of financial assets is of the order of 50 trillion dollars, we conclude that hedge funds assets should total approximately 5% of total investment allocations. At these levels, their performance, in aggregate, should not be better than that of traditional stock and bond investments.

The key to success, not surprisingly, is creativity

The argument for hedge-fund investing is compelling. However, considerations about managers' skills and capacity are very important because as more money enters the field, managers' skills-capacity diminishes.

Does it *really* have to diminish? Perhaps not. With the popularization of hedge-funds, we observe currently a standardization of investment styles ("long-short", "market-neutral", "event driven", "global macro", etc) and a grouping of managers into these categories. This view of the industry, which makes sense perhaps from the marketing point of view, may have the effect of producing "index-like" behavior by investors.

On the other hand, if managers are able to discover new, original, approaches for investing, then high-quality returns can be expected and the decay in returns will be felt less. In other words, if we want to "live in Lake Woebegone", investors and managers must work hard, be patient, and, above all, look permanently for new ideas that can counteract sliding down the "skills curve".