

Searching for a Hedge Fund Bubble

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Defining a Hedge Fund Bubble

- Since 1999, we have moved from 4,800 hedge funds to 8,000 hedge funds
- Now managing perhaps \$1.3 trillion in assets, before leverage, triple the assets of 1999
- If hedge funds are able to provide alpha, these large asset flows are expected to arbitrage away these opportunities, reducing returns

What is a bubble?

- In long only asset classes, there is talk about a bubble when there is evidence of extreme overvaluation.
- In reality, a bubble exists when there is a small probability of positive future profits.
- In hedge funds, this small probability of future profits comes when market efficiency increases.

Ancient History/Modern History

- Before the Long Term Capital Management Crisis of 1998, hedge funds were largely unknown, especially outside of the investment community
- We define ancient history as 1990-1997, the time period before LTCM
- We define modern history as 1999-2004

How did funds react after LTCM?

- If LTCM failed due to excessive risk and leverage, we would expect funds to reduce risk and leverage in the modern period
- How much return do we sacrifice when reducing risk and leverage?
- We would at least like to keep a constant Sharpe ratio

Evidence of Falling Returns

- Data courtesy of Chicago Based Hedge Fund Research, Inc.
- Seven of fifteen strategies have statistically significant lower returns (Z test, 5% significance)

	Ancient	Modern	Statistical
<u>HFR Index</u>	<u>Return</u>	<u>Return</u>	<u>Significance</u>
• Fund Weighted	19.20%	11.34%	Yes .027
• Equity Hedge	22.83%	12.41%	Yes .027
• Equity Market Neutral	12.22%	5.99%	Yes .000
• Fixed Income Arb.	14.47%	8.50%	Yes .000
• Macro	24.11%	9.99%	Yes .003
• Merger Arb.	13.28%	7.64%	Yes .005
• <u>Relative Value</u>	<u>15.86%</u>	<u>9.63%</u>	Yes .000
• Average return	17.42%	9.36%	

Evidence of Falling Returns

Seven of fifteen strategies have lower returns, but not statistically significant

- Only short sellers had higher returns in the modern period

	Ancient Return	Modern Return	Statistical Significance
• Fund of funds	13.61%	8.80%	No .058
• Convertible Bond Arb.	11.84%	10.41%	No .250
• Distressed Investments	19.95%	14.46%	No .056
• Emerging Markets	24.17%	19.50%	No .307
• Equity Non-Hedge	22.89%	12.75%	No .127
• Event Driven	18.98%	13.22%	No .066
• Market Timing	13.96%	10.10%	No .168
• <u>Short Selling</u>	<u>2.88%</u>	<u>3.79%</u>	No .469
• Average Return	16.04%	11.63%	

Evidence of Changing Risks

- Our theory is that risk would have declined after LTCM. Empirical evidence is mixed.
- Eight of fifteen strategies have rising risk, five with statistical significance (5%, F Test)
- Seven of fifteen strategies have lower risk, three are statistically significant

Strategies with Increasing Risk

	Ancient	Modern	Statistical
• <u>HFR Index</u>	<u>Std. Dev.</u>	<u>Std. Dev.</u>	<u>Significance</u>
• Fund Weighted	5.68%	7.28%	Yes .012
• Fund of Funds	4.82%	5.41%	No .148
• Equity Hedge	7.46%	9.85%	Yes .006
• Equity Market Neutral	2.78%	3.26%	No .075
• Equity NonHedge	12.60%	15.59%	Yes .026
• Event Driven	5.93%	6.38%	No .251
• Market Timing	5.95%	7.48%	Yes .019
• <u>Short Selling</u>	<u>18.71%</u>	<u>24.30%</u>	Yes .009
• Average Std. Dev.	7.99%	9.94%	

Strategies with Decreasing Risk

	Ancient	Modern	Statistical	
	Std. Dev.	Std. Dev.	Significance	
• <u>HFR Index</u>				
• Convertible Bond Arb.	3.28%	3.03%	No	.249
• Distressed Investments	5.27%	5.21%	No	.186
• Emerging Markets	13.50%	13.44%	No	.488
• Fixed Income Arb.	3.08%	2.90%	No	.303
• Macro	9.50%	6.51%	Yes	.001
• Merger Arb	4.39%	3.13%	Yes	.002
• <u>Relative Value</u>	3.59%	2.23%	Yes	.000
• Average Std. Dev.	6.16%	5.21%		

Falling Sharpe Ratios

- Falling returns + Rising Risks = Lower Sharpe Ratios
- Thirteen of the fifteen indices have a lower Sharpe ratio in the modern period
- Only short sellers and convertible bond managers improved their reward-to-risk ratio
- The average Sharpe ratio declined from 2.03 to 1.37
- Six strategies saw their Sharpe ratio decline over 40%:
Fund weighted index, funds of funds, equity hedge, equity market neutral, equity non-hedge, Macro

Returns on Traditional Investments

- However, traditional investments also have seen declining returns and rising risk in the modern period

	Ancient	Modern	Statistical
<u>Index</u>	<u>Return</u>	<u>Return</u>	<u>Significance</u>
• S&P 500 Return	17.54%	2.92%	Yes .040
• Merrill High Yld Return	14.11%	6.50%	Yes .047
• MSCI Emerging Markets	14.69%	18.33%	No .425
• Small-Large	-2.30%	7.53%	No .075

Risks of Traditional Investments

- There has also been an increase in risk in traditional investments in the modern period.

	Ancient	Modern	Statistical
<u>Index</u>	<u>Std. Dev.</u>	<u>Std. Dev.</u>	<u>Significance</u>
• S&P 500 Return	12.30%	15.93%	Yes .009
• Merrill High Yld Return	5.94%	8.30%	Yes .001
• MSCI Emerging Markets	20.73%	22.14%	No .273
• Small-Large	10.44%	15.56%	Yes .000

Alpha or Beta?

- Traditional market exposures explain the majority of hedge fund returns!
- Hedge Fund Index Return = F(SPX return, HY return, Emerging Markets, Small-Large)
- No significant exposure to 10 year yields, 3 month t-bill yields, or yield curve spreads.

	<u>1990-2004</u>	<u>1990-1997</u>	<u>1999-2004</u>
• R-squared	0.806	0.789	0.819
• SPX beta	0.237	0.221	0.213
• Small-Large beta	0.215	0.225	0.206
• High yield beta	0.094	0.156	-0.025*
• Emerging Markets Beta	0.065	0.073	0.119

- * The only variable not significant at the 2% level (0.659)

Regression Implications

- Fund weighted index
- 1990-1997 return/stdev 19.20/5.68
- 1999-2004 return/stdev 11.34/7.28
- Predicted 1999-2004 returns using ancient period regression coefficients: 16.20%
- Average Fund under performed predicted return in modern period

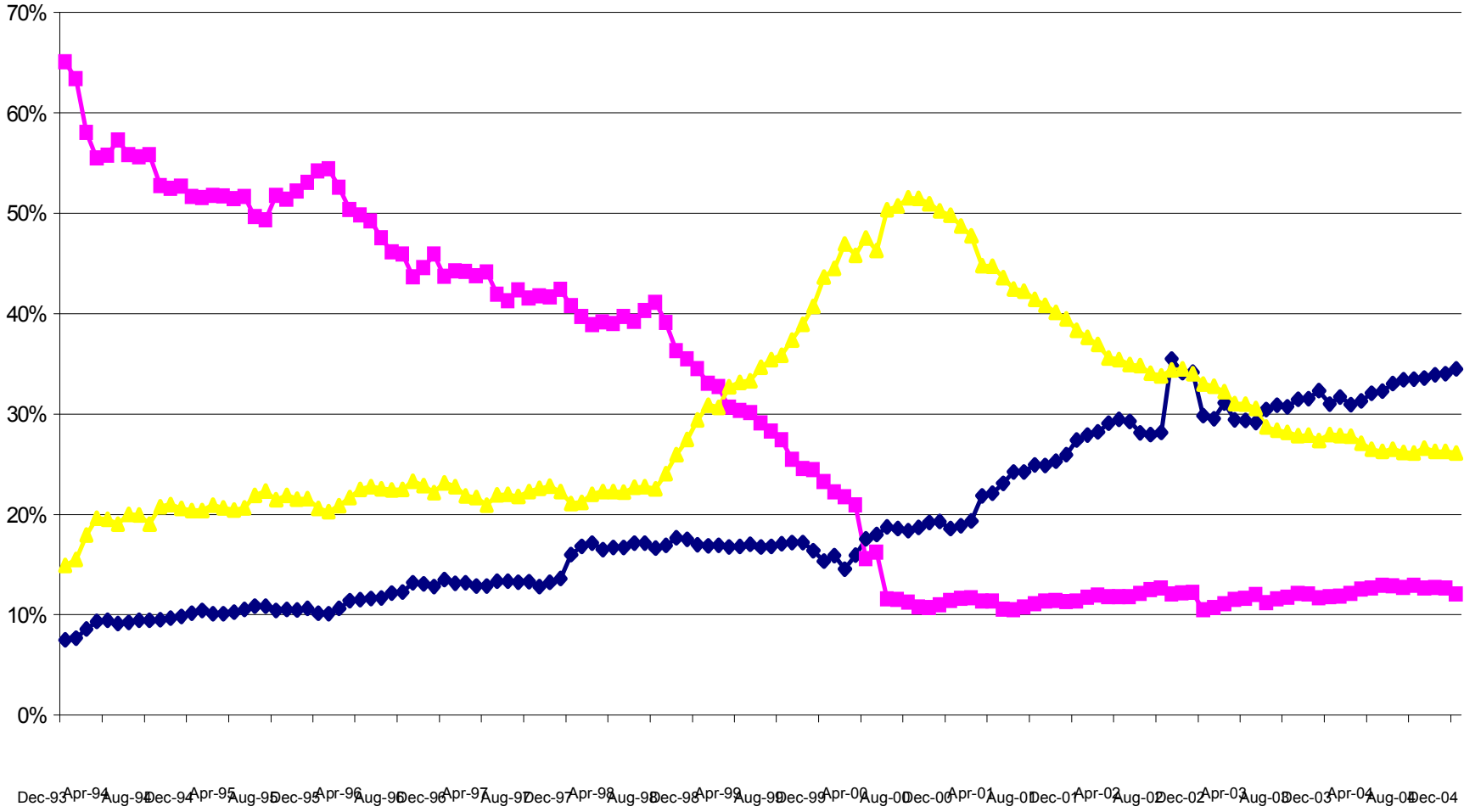
Regression Implications

- Alpha has only fallen 4.8% from ancient to modern period (0.96% to 0.56% per month).
- Average annual return to the hedge fund index fell by 7.86% from the ancient to modern period
- 40% of declining returns is due to market factors
- 60% of declining returns is from declining alpha

Funds have market risk

- The average hedge fund is not fully hedged
- Exposures are relatively stable
- Future hedge fund returns may likely increase with rising returns on the S&P 500 and High Yield bonds
- Conclusion: There isn't compelling evidence that alpha is being arbitrated away! Declining returns are due to unfriendly markets!
- If alpha is still positive, we can't conclude that there is a hedge fund bubble.

Hedge Fund Style Allocations Change Over Time CSFB/Tremont Asset Weighted Indices, 1994-2004



◆ Event Driven & Multi Strategy ■ Macro ▲ Long/Short Equity

Hedge Fund Style Regressions

- Some hedge fund strategies derive most of their returns from beta exposures.
- HF style return = f(Traditional asset returns)
- All coefficients significant at 1% level
- | | Equity Hedge | Event Driven |
|------------------|--------------|--------------|
| • R-squared | 0.711 | 0.726 |
| • S&P 500 | 0.405 | 0.223 |
| • Small – Large | 0.380 | 0.203 |
| • Value – Growth | -0.121 | |
| • High Yield | | 0.317 |

Hedge Fund Style Regressions

- Other hedge fund strategies are more difficult to explain with market factors.
- HF style return = f(Traditional asset returns)
- All coefficients significant at 1% level
-
-
- R-squared
- Emerging Markets
- VIX
- 10 Yr Treasury
- High Yield

Macro

Fixed Income

0.249

0.452

0.158

-0.074

1.608

0.452

Implications for Fee Structures

- Pay lower fees for passive exposures (beta) and higher fees for active exposures (alpha)
- Use a hurdle rate that acknowledges the beta exposure
- This gives the manager an opportunity to explicitly profit from factor timing
- For example, an investor in an equity hedge fund may pay an incentive fee on returns that exceed $0.380 * \text{Russell 2000}$, as the r-squared of this single factor is 0.688