Past, Present and Future in Investment Management

Applying Modern Portfolio Theory to Hedge Funds: An Historical Overview

prepared by :

Dr Ross Barry
Sovereign Investment Research

April 2005

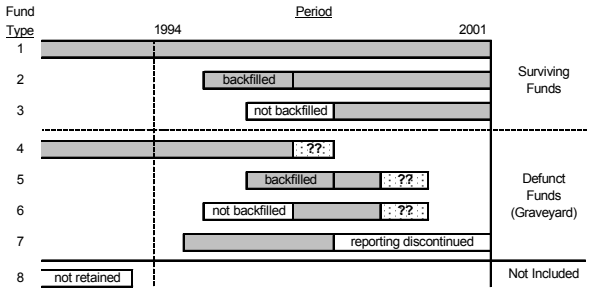
Outline

- The Biases in Hedge Fund Data
- Hedge Fund "Styles"
- Testing for a Long-Run Hedge Fund Manager "Skill Premium"
- Fund-of-Hedge-Funds

The Biases in Hedge Fund Data

- Several databases – TASS, HFR, MAR/CISDM, MSCI
- Some are more comprehensive than others (Liang, 2000)
- Many funds backfill returns after entering the database (i.e. enter with "instant histories")
- Most databases have only retained defunct data since 1994

Left- and Right-Censoring of Hedge Fund Return Databases: An Illustration



3

The Biases in Hedge Fund Data (Cont.)

- **Survivorship and Instant History Bias**

Prior Studies of Survivorship (and Instant History) Bias

In all studies survivorship bias is calculated as the difference in the annualized mean return between "live" hedge funds and "all" hedge funds, including defunct funds.

Study	Database	Period	Survivorship Bias (%p.a.)	Instant History Bias (% p.a.)
Brown, Goetzmann & Ibbottsen (1999)	Offshore Fund Directory	1989-1995	3.0	-
Ackerman, McNally & Ravencraft (1999)	HFR / MAR *	1989-1998	0.2	-
Liang (2000)	TASS *	1989-1998	2.4	-
Fung & Hseih (2000)	TASS	1994-1998	3.0	1.4
Bares, Gibson & Gyger (2001)	FRM *	1996-1999	1.3	-
Edwards & Caglayan (2001)	MAR *	1991-1998	1.9	1.2
Barry (2003)	**TASS**	**1994 - 2001**	**3.7**	**0.4**
Malkiel & Saha (2005)	TASS	1996-2004	4.4	
Ibbotson & Chen (2005)	TASS	1994-2004	2.8	2.9

* Includes fund-of-hedge-funds

4

The Biases in Hedge Fund Data (Cont.)

Cause of Death …

- **Poor Returns and/or Volatility?**
- **Leverage, Other?**
- **Asset Size?**

Hedge Fund Survival Rates by Size: Results from Amin & Kat (2002)

The survival rate is the proportion of funds existing at the beginning of the 12 month period which are still in operation at the end of the period.

Size Group	Survival Rate			
	1994/95	1996/97	1998/99	2000/01
$0m - $4m	0.92	0.82	0.79	0.67
$4m - $7m	0.97	0.88	0.89	0.87
$7m - $67m	1.00	0.94	0.92	0.91
Greater than$67m	0.99	1.00	0.96	0.95

5

Hedge Fund Style Groups

Are there Discernible Hedge Fund Styles? [Brown and Goetzmann, (2001)]

- As many as 17 industry-based classifications – is this relevant given returns are largely idiosyncratic?
- Self-classifying and often misleading
- Use return-based algorithm to sort funds into style groups
- Explains over 20% of variation in returns based on membership to one of eight endogenously defined style classifications (in many cases, this may reflect common beta exposures)
- Corresponds roughly to a number of the key industry style classifications

Table 2: Cross-sectional variance explained by different classification procedures

		Regressing returns on classifications: Adjusted R^2		
Year	N	GSC 8 classifications	GSC 5 classifications	TASS 17 classifications
1992	149	0.3827	0.1713	0.4441
1993	212	0.2224	0.1320	0.1186
1994	288	0.1662	0.1040	0.0986
1995	405	0.0576	0.0548	0.0446
1996	524	0.1554	0.0769	0.1523
1997	616	0.3066	0.1886	0.2538
1998	668	0.2813	0.2019	0.1998
	Average	0.2246	0.1328	0.1874

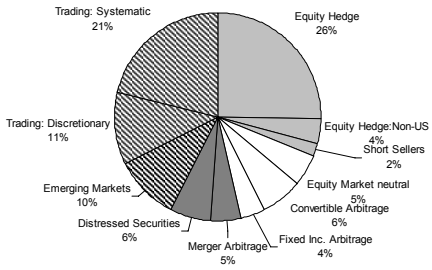
This table compares the adjusted R^2 regressing annual fund returns against several alternative fund classifications. The GSC procedure uses a 36 month estimation period prior to and including December of the year given in the left hand column. GSC classifications were determined both for an 8 style classification as well as a 5 style classification. The third classification considered is the 17 fund descriptors given in the TASS database for funds in the sample as of January 2000. The out of sample test period corresponds to the annual return period subsequent to the year given in the left hand column. The cross section of test period returns on funds are regressed against (K - 1) dummy variables, where $\delta_{ik} = 1$ for fund I in category k, zero otherwise.

6

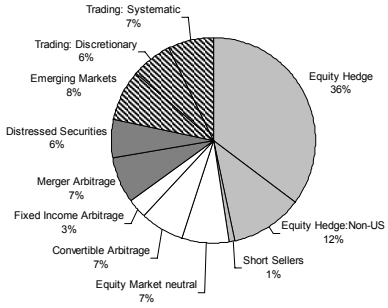
Hedge Fund Style Groups (Cont'd)

Shift in Style Mix Over Time

1995



2001



7

Testing for a Long-Run Hedge Fund "Skill Premium"

- Stale Pricing and Return Smoothing – Asness, Krail and Lew (2001)
- Multi-Factor Models and Non-Linear Betas – Barry (2003)
- Separating Alpha, Beta and Costs – Ibbotson and Chen (2005)

8

Testing for a Long-Run Hedge Fund "Skill Premium" (Cont.)

- **Stale Pricing / Return Smoothing [Asness, Krail and Lew (2001)]**

Monthly Regressions of Excess Hedge Fund Returns on Contemporaneous S&P 500 Excess Returns January 1994 to September 2000

Portfolio	Monthly Regressions		
	Alpha (Annualized %)	Beta vs. S&P 500	Adjusted R-Squared
Aggregate Hedge Fund Index	2.63 (0.76)	0.37 **(5.46)**	26.5%
Convertible Arbitrage	4.78 **(2.35)**	0.04 (1.12)	0.3%
Event Driven	2.93 (1.35)	0.28 **(6.62)**	34.9%
Equity Market Neutral	4.69 **(3.84)**	0.12 **(4.89)**	22.2%
Fixed Income Arbitrage	1.24 (0.70)	0.02 (0.71)	-0.6%
Long / Short Equity	3.82 (0.95)	0.55 **(6.98)**	37.4%
Emerging Markets	-8.38 (-1.15)	0.74 **(5.15)**	24.2%
Global Macro	2.41 (0.44)	0.37 **(3.43)**	11.8%
Managed Futures	-1.30 (-0.29)	0.01 (0.12)	-1.2%
Dedicated Short Bias	7.34 (1.50)	-0.99 **(-10.34)**	57.0%

9

Testing for a Long-Run Hedge Fund "Skill Premium" (Cont.)

- **Stale Pricing / Return Smoothing (Cont.) [Asness, Krail and Lew (2001)]**

Monthly Regressions of Excess Hedge Fund Returns on Contemporaneous and Lagged Excess S&P 500 Returns January 1994 to September 2000

Portfolio	Regression Coefficients and t-statistics					Adjusted R-Squared	Hypothesis Testing	
	Alpha (Annualized %)	Beta with S&P 500 (t)	Beta with S&P 500 (t-1)	Beta with S&P 500 (t-2)	Beta with S&P 500 (t-3)		Sum All Betas (=0)	Sum Lagged Betas (=0)
Aggregate Hedge Fund Index	-4.46 (-1.16)	0.40 **(6.21)**	0.12 (1.85)	0.22 **(3.37)**	0.10 (1.45)	35.3%	0.84 **(0.0%)**	0.44 **(0.1%)**
Convertible Arbitrage	-0.98 (-0.46)	0.08 **(2.16)**	0.16 **(4.31)**	0.13 **(3.46)**	0.07 (1.92)	23.8%	0.43 **(0.0%)**	0.35 **(0.0%)**
Event Driven	-2.12 (-0.91)	0.31 **(8.04)**	0.18 **(4.39)**	0.08 (1.89)	0.05 (1.19)	47.0%	0.61 **(0.0%)**	0.30 **(0.0%)**
Equity Market Neutral	3.36 **(2.32)**	0.13 **(5.18)**	0.05 (1.95)	0.01 (0.39)	0.02 (0.84)	23.4%	0.20 **(0.1%)**	0.08 (10.8%)
Fixed Income Arbitrage	-3.78 **(-2.08)**	0.05 (1.61)	0.10 **(3.23)**	0.15 **(4.84)**	0.06 (1.83)	25.2%	0.36 **(0.0%)**	0.31 **(0.0%)**
Long / Short Equity	-2.83 (-0.61)	0.57 **(7.39)**	0.10 (1.25)	0.18 **(2.24)**	0.14 (1.76)	40.9%	0.99 **(0.0%)**	0.42 **(0.9%)**
Emerging Markets	-16.20 (-1.88)	0.79 **(5.47)**	0.30 **(2.02)**	0.10 (0.68)	0.06 (0.39)	25.3%	1.25 **(0.0%)**	0.46 (11.8%)
Global Macro	-6.64 (-1.08)	0.41 **(3.94)**	0.12 (1.12)	0.37 **(3.45)**	0.09 (0.83)	21.1%	0.98 **(0.0%)**	0.57 **(0.7%)**
Managed Futures	1.72 (0.32)	-0.01 (-0.15)	-0.15 (-1.58)	-0.01 (-0.10)	-0.02 (-0.19)	-1.9%	-0.19 (38.3%)	-0.17 (34.1%)
Dedicated Short Bias	11.59 **(2.00)**	-1.01 **(-10.45)**	-0.15 (-1.51)	0.02 (0.22)	-0.13 (-1.26)	57.5%	-1.27 **(0.0%)**	-0.25 (19.7%)

10

Testing for a Long-Run Hedge Fund "Skill Premium" (Cont.)

Multi-Factor Model with Lagged Market Returns [Barry 2003]

OLS estimates for the multi-factor model, including contemporaneous, 1- and 2-month lagged returns to the S&P500 and fou long/short characteristic portfolios, for 11 hedge fund style groups from 1994 to 2002.

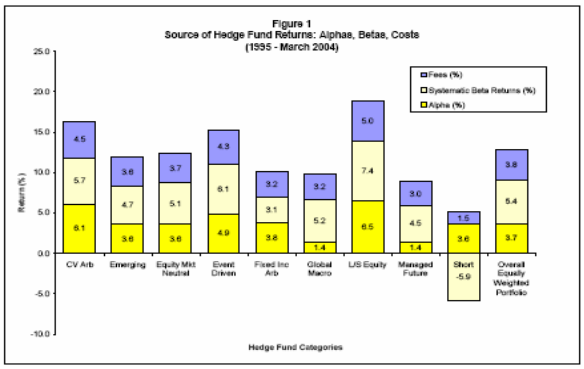
Style Group	α	β	β(-1)	β(-2)	SCAP	VALU	CRED1	CRED2	adjR^2	D-W
Equity Hedge	7.12	0.57*	0.07	0.05	0.50*	-0.19*	-	-	0.88	1.37
Equity Hedge: Non-US	4.74	0.30*	0.09	0.06	0.28*	-0.11*	-	-	0.47	1.50
Dedicated Short Sellers	7.55	-1.01*	-0.03	0.08	-0.64*	0.43*	-	-	0.87	1.73
Equity Market Neutral	5.33	0.05*	0.02	0.03	0.09*	0.03	-	-	0.24	1.42
Convertible Arbitrage	4.63	0.13*	0.08*	0.03	0.09*	-	0.43*	-	0.48	0.97
Fixed Inc. Arbitrage	5.00	-0.00	0.00	0.04	-	-	0.55*	0.47*	0.24	1.15
Merger Arbitrage	5.35	0.17*	0.09*	0.03	0.14*	-	-	-	0.61	1.44
Distressed Securities	3.58	0.20*	0.09*	0.05*	0.18	-	0.65*	-	0.62	1.35
Emerging Markets	-2.29	0.60*	0.19	-0.01	-	-	-	-	0.35	1.04
Global Macro	1.76	0.07	0.01	0.03	-	-	-	-	0.04	1.86
Managed Futures	4.50	-0.13	-0.10	0.02					0.06	2.11

* significant at the 5% level

11

Testing for a Long-Run Hedge Fund "Skill Premium" (Cont.)

Separating Returns in Alpha, Beta and Costs (TASS, 3500 Funds) [Ibbotson & Chen, 2005]



12

Fund-of-Hedge-Funds

Time Variation in hedge Fund Alpha and Betas (Combined Databases, 277 FOFs)

[Fung, Hsieh, Naik & Ramadoria, 2005]

- "Style group" composition of FOF has shifted significantly since early 1990s – greater long/short equity and multi-strategy funds and less global macro/managed futures (likely to have changed FOF sources of alpha and beta)
- Regress FOF returns on main asset class returns to distinguish alpha from beta
- Observation 1. 43 (16%) generate significant alpha over full period, while remainder generate returns primarily from (a mix of) beta exposures [on average, no significant alpha across whole group over entire period]
- Observation 2: Significantly higher survival rate for "alpha-generators" (at end 1998) in subsequent 5 year period
- Observation 3: For 43 alpha-generators, the magnitude of alpha was:

  1994-1998Q3: 7.6% p.a. 1998Q3-2000Q1: 17.8% p.a. 2001Q2-2004: 3.5% p.a.
- Observation 4: Beta-generators produce alpha but only in 2nd period (bull market period), otherwise negative
- Observation 5: Time variation in alphas reflects cyclical nature of alpha from underlying style groups (historically, FOFs have not generated value add from active style rotation)
- Observation 6: Secular decline in alpha from alpha-generators (post-bubble period) – FHNR link this to growth in assets under management and propensity for investors to chase previous period's alpha-generating style groups.

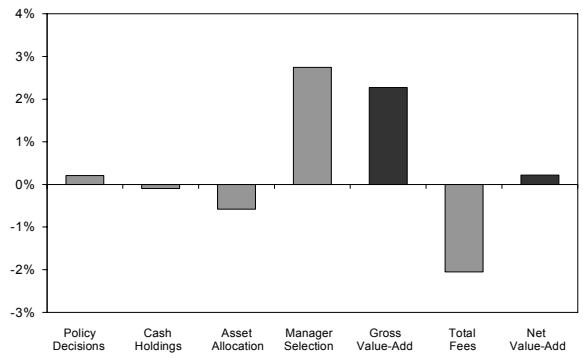
13

Fund-of-Hedge-Funds (Cont'd)

Source of FOHF Value-Added [Barry (2003)]

FIGURE XV. FOHF PERFORMANCE ATTRIBUTION

Figure XV shows value added or lost on average by seven of the 20 Leaders for the period 1995-2002 through four broad decision sets – policy decisions, cash holdings, asset allocation and manager selection – as well as the value detracted through fees.



14

References

Amin G. S. and Kat H. M. (2002), Welcome to the Dark Side: Hedge Fund Attrition and Survivorship Bias Over the Period 1994-2001, *University of Reading, IMSA Centre Discussion Papers in Finance 2002-02.*

Asness C., Krail R. and Lew J. (2001), Do Hedge Funds Hedge? *AQR Capital Management LLC Working Paper Series*

Barry R. (2003), Hedge Funds: Is Manager Skill a Sound Basis for the New Asset Class, *Macquarie University Applied Finance Centre*

Brown S. J. and Goetzmann W. N. (2001), Hedge Funds with Style, *Yale International Center for Finance* Working Paper No. 00-29.

Fung W., Hsieh D. A., Naik N. Y. & Ramadorai T. (2005), Lessons from a Decade of Hedge Fund Performance: Is the Party Over or the Beginning of a New Paradigm? Paper presented to the BSI Gamma Foundation Hedge Fund Conference (June 9, 2005)

Ibbotson R. G., & Chen P. (2005), Sources of Hedge Fund Returns: Alphas, Betas and Costs, *Yale International Center for Finance* Working Paper No. 05-17

Liang B. (2000), Hedge Funds: The Living and the Dead, *Journal of Financial and Quantitative Analysis*, 35, 309-336

Malkiel B. G & Saha A. (2005), Hedge Funds: Risk and Return, *Draft Research Paper for the Princeton University and Analysis Group*

15