Evaluating the Performance Persistence of Mutual Fund and Hedge Fund Managers

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HEC MONTRĒAL

Self-Declared Investment Objective

Fidelity®

Magellan®

Fund

(fund number 021, trading symbol FMAGX)

Prospectus

May 30, 2007

Fund Basics

Investment Objective

Magellan Fund seeks capital appreciation.

Investment "Details"

- Fidelity Management & Research Company (FMR) normally invests the fund's assets primarily in common stocks.
- FMR may invest the fund's assets in securities of foreign issuers in addition to securities of domestic issuers.
- FMR is not constrained by any particular investment style. At any given time, FMR may tend to buy "growth" stocks or "value" stocks, or a combination of both types […].
- In addition to the principal investment strategies discussed above, FMR may lend the fund's securities to broker-dealers or other institutions to earn income for the fund.
- FMR may also use various techniques, such as buying and selling futures contracts and exchange traded funds […].

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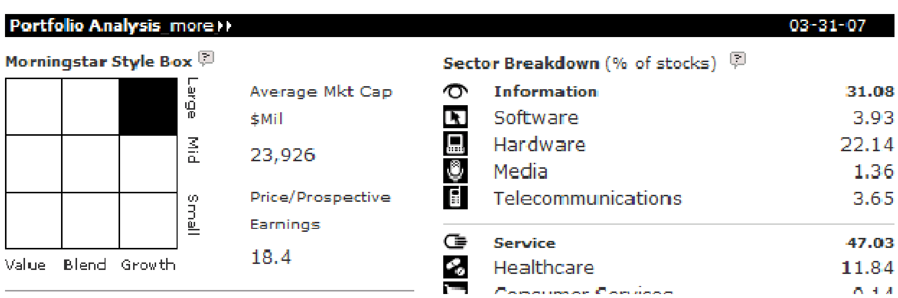
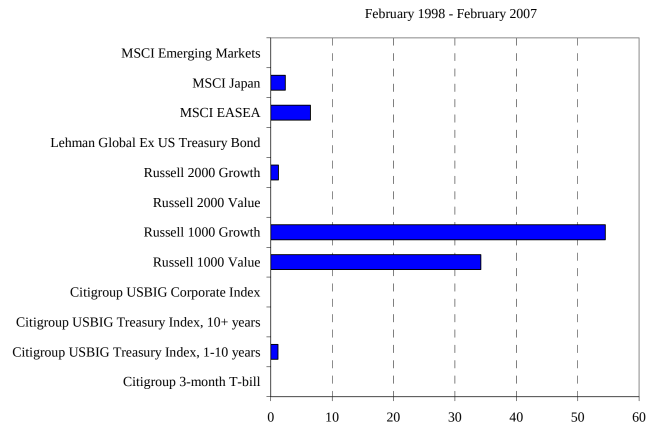


Style Allocation Over Past 10 Years



Source: Ben Dor, Jagannathan and Meier (2003). Understanding mutual funds and hedge fund styles, *Journal of Investment Managment* 1(1), 94-134. Updated May 2007.

Roadmap

- Methodologies to find the right benchmark for hedge funds
- Style drift of peer-group-based benchmarks
- The challenges for return-based style analysis when managers change

Style Benchmarks

- Peer-group-based style factors
- Asset-based style factors (ABS)
- Return-based style factors (RBS)
- Primitive trading strategies (PTS)

Ways to Form Peer Groups

- Self-declared fund objectives
- Holdings-based approach (Morningstar Style Box)
- Return-based style analysis, cluster analysis

References:

Sharpe (1988). Determining a fund's effective asset mix, *Investment Management*, 59-69.

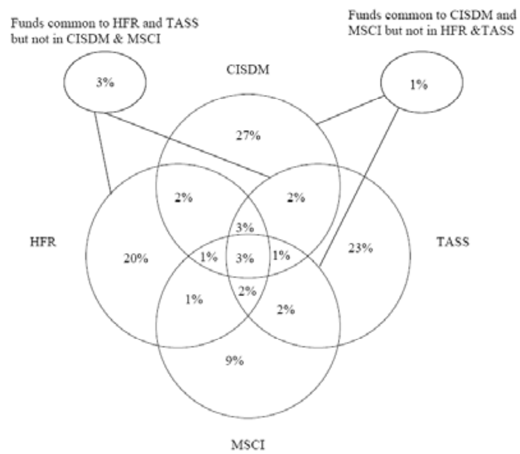
Sharpe (1992). Asset allocation: Management style and performance measurement, *Journal of Porfolio Managment* 18(2), 7-19.

Brown and Goetzmann (1997). Mutual fund styles, *Journal of Financial Economics* 43, 373-399.

Biases Inherited from Databases

- Short history
- Selection bias
- Survivorship bias
- Instant history bias
- Sampling differences

Overlap of Four Major Databases



Source: Agarwal, Daniel, and Naik (2006). Role of managerial incentives and discretion in hedge fund performance, SSRN Working Paper, 44 pages.

Some Strategies are More Problematic

Sub-Universe	Average Correlation	Lowest Correlation
Convertible Arbitrage	0.8183	0.6350
Emerging Markets	0.9284	0.8301
Equity Market Neutral	0.4276	0.1258
Event Driven	0.9232	0.8458
Fixed Income Arbitrage	0.5407	0.2254
Global Macro	0.5598	0.2698
Long/Short	0.4575	-0.1901
Merger Arbitrage	0.9193	0.8797
Relative Value	0.6752	0.3042
Short Selling	0.8811	0.7796
Distressed Securities	0.8645	0.7218
Fund of Funds	0.8757	0.7985

Source: Amenc and Martellini (2003). The brave new world of hedge fund indices, EDHEC Working Paper, 38 pages.

Return-Based Style Factors

- Non-observed variables that are extracted from fund returns
- Determine a parsimonious set of driving factors that explains a large fraction of the variation in returns
- Typically, principal component analysis is used to find these implicit, common style factors

Many Strategies Exhibit One Major Style Factor

Study	Style	Database	Sample period	# of obs.	Cross-sectional variation explained by principal components		
					1st	2nd	3rd
Fung and Hsieh (1997a)	Hedge funds, CTA pools	Tass, Paradigm LDC	1993-95	409	12%	10%	9%
Fung and Hsieh (1997b)	CTA pools	Tass	1987-95	75	36%	8%	6%
Fung and Hsieh (2002)	Convertible bond	Hedge Fund	1998-00	12	59%	13%	-
	High-yield bond	Research		20	63%	16%	-
	Mortgage-backed	(HFR)		17	55%	17%	-
	Fixed-income arbitrage			19	33%	24%	16%
	Fixed-income diversified			39	36%	21%	11%

Source: Meier (2007). *Encyclopedia of alternative investments*, edited by G.N. Gregoriou, forthcoming, Chapman Hall UK.

Asset-Based Style Factors

- An ABS factor is a portfolio of conventional assets defined by a simplified proxy of a particular class of hedge fund strategies (or style)
- To construct ABS factors, extract the common sources of risk in hedge fund returns and link these common sources of risk to observable returns on assets

Examples of ABS Factors

Strategy	Study	Data period	Regression result	R^2
Long/short equity	Fung and Hsieh (2004)	1994-2002	0.01 + 0.46 × (S&P 500) + 0.44 × (Small-cap – Large-cap)	0.77
Fixed-income arbitrage	Fung and Hsieh (2002)	1990-1997	0.01 – 5.37 × (Change in credit spread)	0.30

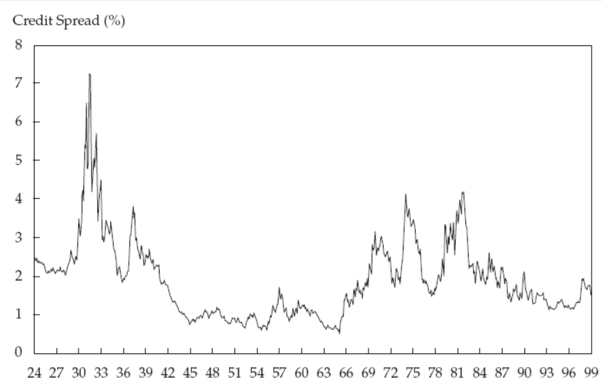
References:

Fung and Hsieh (2002). The risk in fixed-income hedge fund styles, *Journal of Fixed Income* 12(2), 16-27.

Fung and Hsieh (2004). Hedge fund benchmarks: A risk-based approach, *Financial Analyst's Journal* 60(5), 65-80.

The Application of ABS Factors

Figure 3. The Credit Spread, 1924–99



Note: Dates are as of December.

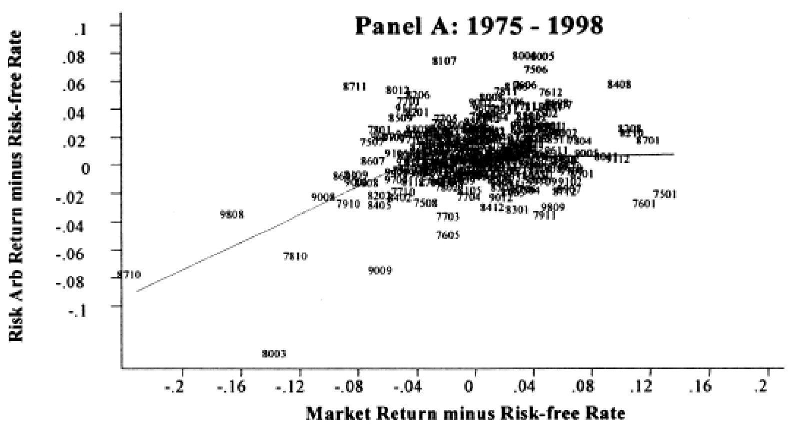
Source: Fung and Hsieh (2004). Hedge fund benchmarks: A risk-based approach, *Financial Analyst's Journal* 60(5), 65-80.

Two Examples of Primitive Trading Strategies

Merger Arbitrage
“ […] returns are positively correlated with market returns in severely depreciating markets but uncorrelated with market returns in appreciating markets.”

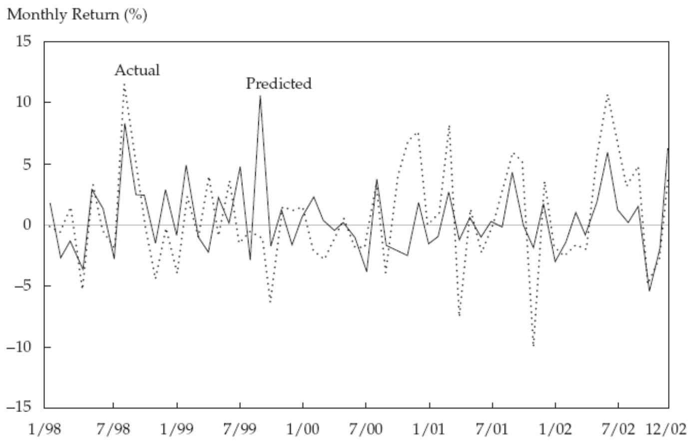
Trend Followers
“The owner of a lookback call option has the right to buy the underlying at the lowest price over the life of the option. Similarly, a lookback put option allows the owner to sell at the highest price. The combination of these two options is the lookback straddle, which delivers ex post maximum payout of any trend-following strategy.”

Merger Arbitrage Resembles Uncovered Put on Market Index



Source: Mitchell and Pulvino (2001). Characteristics of risk and return in risk arbitrage, *Journal of Finance* 56(6), 2135-2175.

Trend-Followers Can Be Replicated by a Lookback Straddle



Source: Fung and Hsieh(2001). The risk in hedge fund strategies: Theory and evidence from trend followers, *Review of Financial Studies* 14(2), 313-341.

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ABS Factors For Equity Long / Short

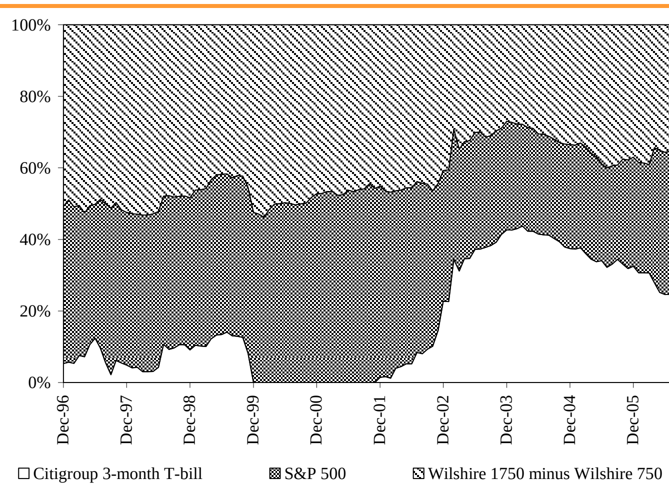
- Sample period 1994-2002
- Regression result:

  HFR Equity Hedge Index =
  0.01 + 0.46×(S&P 500) + 0.44×(SC – LC)

  where
  SC = Wilshire Small Cap 1750 Index
  LC = Wilshire Large Cap 750 Index
- R^2 of this regression is 0.77

Source: Fung and Hsieh (2004). Hedge fund benchmarks: A risk-based approach, *Financial Analyst's Journal* 60(5), 65-80.

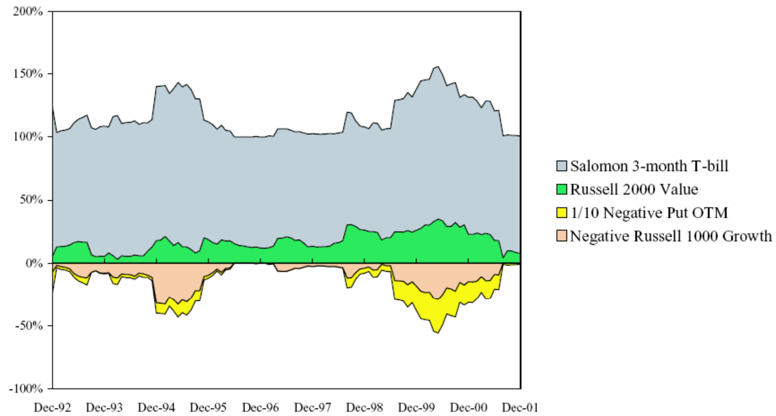
Peer Groups May Shift Style



Source: Meier (2007). *Encyclopedia of alternative investments*, edited by G.N. Gregoriou, forthcoming, Chapman Hall UK.

Style Changes of Merger Arbitrage

January 1990 - December 2001: 36-Month Moving Windows, Computed Monthly



Source: Ben Dor, Jagannathan and Meier (2003). Understanding mutual funds and hedge fund styles, *Journal of Investment Managment* 1(1), 94-134.

Alternative Measures of Style Drift

- A low tracking error is an indication of a consistent fund
- Style benchmark turnover is the change in the weights defining the style benchmark
- The style drift score uses the variance of the weights

Reference: Idzorek and Bertsch (2004). The style drift score, *Journal of Portfolio Management* 31(1), 76-84.

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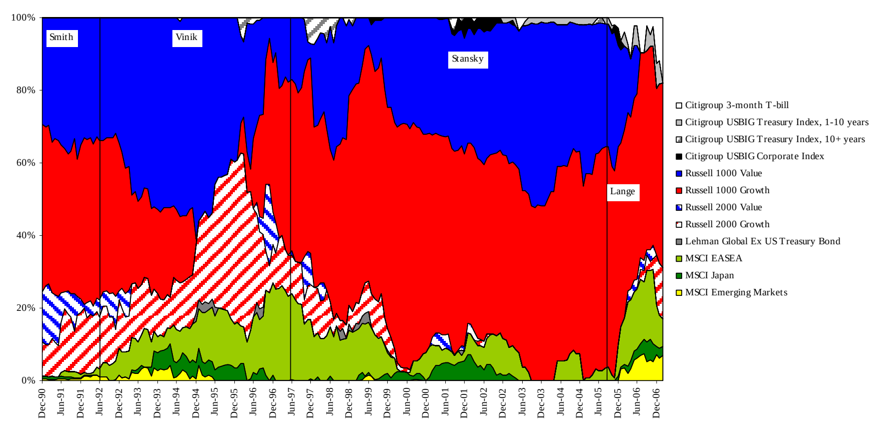
Style Changes in Fidelity Magallan



Source: Ben Dor, Jagannathan and Meier (2003). Understanding mutual funds and hedge fund styles, *Journal of Investment Managment* 1(1), 94-134. Updated May 2007.

Recent Bet of Fidelity

Fidelity Betting Big on Growth (and Homebuilders)
By Dan Lefkovitz | 05-16-07 | 05:40 PM

If a large-growth rally materializes, Fidelity will be ready. According to March 31, 2007, stock ownership information just filed with the SEC, Fidelity moved even further to the right of the large-growth style box during the first quarter, at the aggregate level. Examining Fidelity's big positions and its recent buys and sells reveals a lot about the shop's investment biases.

Different Manager Styles

Asset class	Sample From To	Full Jan-88 Feb-07	Lynch Jan-88 May-90	Smith Jun-90 Jun-92	Vinik Jul-92 May-96	Stansky Jun-96 Oct-05	Lange Nov-05 Feb-07
Citigroup 3-month T-bill		-	-	-	-	-	-
Citigroup USBIG Treasury Index, 1-10 years		-	-	-	-	-	-
Citigroup USBIG Treasury Index, 10+ years		-	-	-	2.4%	-	-
Citigroup USBIG Corporate Index		-	-	-	-	2.4%	-
Russell 1000 Value		38.4%	29.0%	37.0%	46.0%	34.4%	-
Russell 1000 Growth		44.3%	47.0%	45.6%	-	54.7%	43.2%
Russell 2000 Value		2.3%	14.9%	-	-	-	-
Russell 2000 Growth		7.8%	7.7%	17.4%	29.9%	0.5%	24.2%
Lehman Global Ex US Treasury Bond		-	-	-	2.8%	-	-
MSCI EASEA		4.2%	-	-	14.8%	6.3%	18.7%
MSCI Japan		3.1%	1.2%	-	3.2%	1.6%	12.7%
MSCI Emerging Markets		-	0.3%	-	0.9%	-	1.3%

Source: Ben Dor, Jagannathan and Meier (2003). Understanding mutual funds and hedge fund styles, *Journal of Investment Managment* 1(1), 94-134. Updated May 2007.

Take-Aways

- It is important to understand the potential drawbacks of the selected benchmarks
- Style rotation complicates the assessment of a fair benchmark even further
- The fair benchmark might change with a new manager

Step 1: Determine the Major Style

Table 7 Analysis of an individual event-driven hedge fund

Asset classes	Basic		Basic plus HFR Merger Arbitrage Index	
Optimization criterion	R^2 (%)	AIC (%)	R^2 (%)	AIC (%)
Salomon 3-month T-bill	108.6	83.0	18.3	8.9
SSB Treasury 1—10 yr	−31.8	—	−6.3	—
SSB Treasury 10+ yr	8.5	—	5.1	—
SSB Corporate Bond	0.7	—	−11.6	—
Russell 1000 Value	6.2	—	0.8	—
Russell 1000 Growth	−0.2	—	2.2	—
Russell 2000 Value	8.2	14.3	−2.7	—
Russell 2000 Growth	2.4	—	0.5	—
Lehman Global Ex US Bond	−3.2	—	−3.8	−6.0
MCSI EASEA	−1.8	—	−1.8	—
MSCI Japan	3.1	2.7	2.2	2.6
MSCI EMF	−0.6	—	−1.3	−1.7
HFR Merger Arbitrage			98.4	96.2
R^2	21.8		73.8	
Adjusted R^2	15.3	18.4	71.4	72.1

The results of return-based style analysis using different sets of asset classes are provided. The monthly returns for Hudson Valley Partners LP are from January 1990 to December 2001.

Source: Ben Dor, Jagannathan and Meier (2003). Understanding mutual funds and hedge fund styles, *Journal of Investment Managment* 1(1), 94-134.

Step 2: Understand the Risk Characteristics of a Particular Style

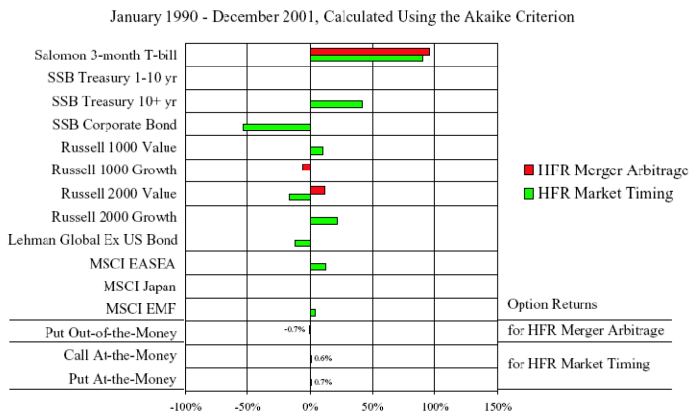


Figure 13 Style analysis with options.

Source: Ben Dor, Jagannathan and Meier (2003). Understanding mutual funds and hedge fund styles, *Journal of Investment Managment* 1(1), 94-134.

Current Research

- Cremers and Petaijisto (2007)
  How Active Is Your Fund Manager? A New Measure That Predicts Performance
  Working Paper Yale School of Management
- Fung and Hsieh (2007)
  Will Hedge Funds Regress towards Index-like Products?
  forthcoming *Journal of Investment Management*
- Encyclopedia of Alternative Investments
  edited by G.N. Gregoriou
  forthcoming, Chapman Hall UK