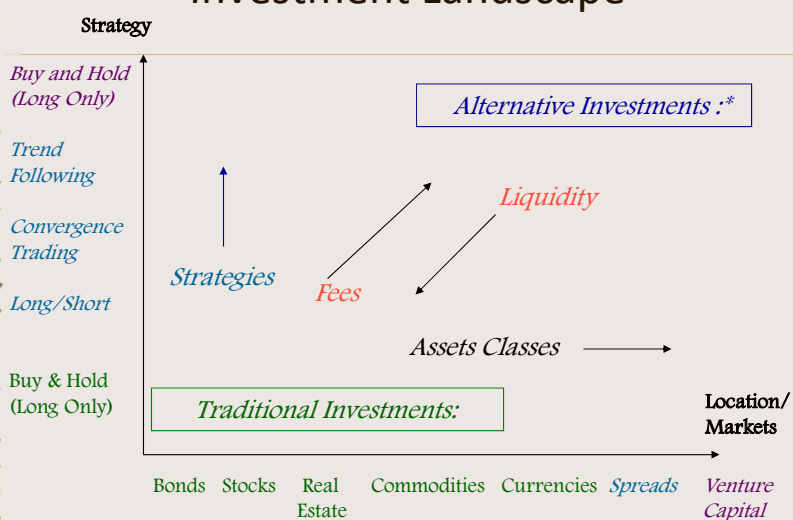


Models of Hedge Fund Risk: CTAs / Trend Followers

1

Investment Landscape



Insights from Research

What investors are willing to pay 2/20 for (or 3/30 for FoHFs)

α

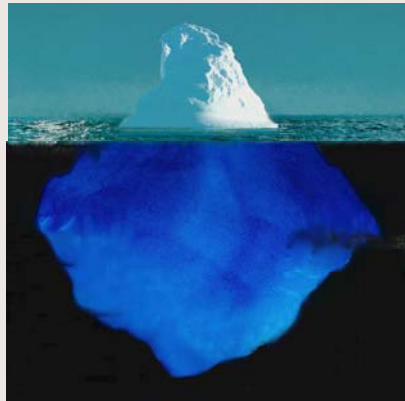
Non-linear, option-like Betas, and Exotic Betas

β

Alternative Betas

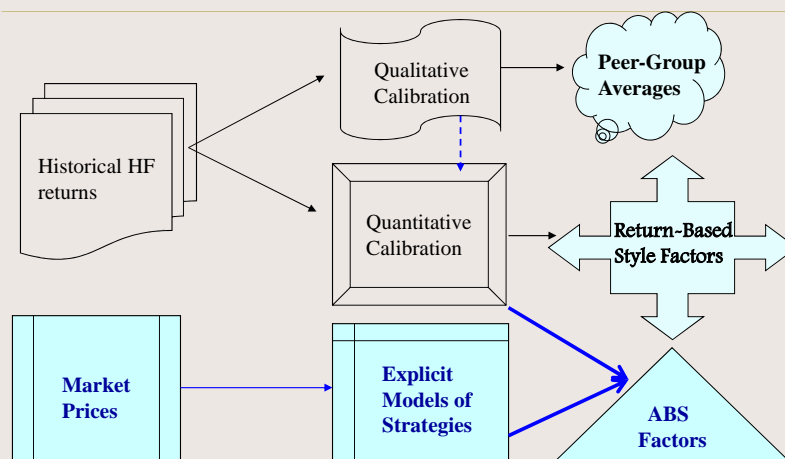
Traditional Betas

β



Page 3

Estimating the Risk in Hedge-Fund Strategies Incorporating conventional asset prices—ABS Factors



4

Research on ABS Factors

- **Trend Following** (Fung & Hsieh, Review of Financial Studies, 2001)
- **Merger Arbitrage** (Mitchell & Pulvino, Journal of Finance, 2001)
- **ABS Factor General Theory** (Fung & Hsieh, Financial Analysts Journal, 2002a)
- **Fixed Income** (Fung & Hsieh, Journal of Fixed Income, 2002b)
- **Equity** (Agarwal & Naik, Review of Financial Studies, 2004; Fung & Hsieh, LBS working paper, 2004)
- **Pairs Trading** (Gatev, Goetzmann, Rouwenhorst, RFS 2006)
- **Convertible Arbitrage** (Agarwal, Fung, Naik, and Loon, 2009)
- And so a few others.

5

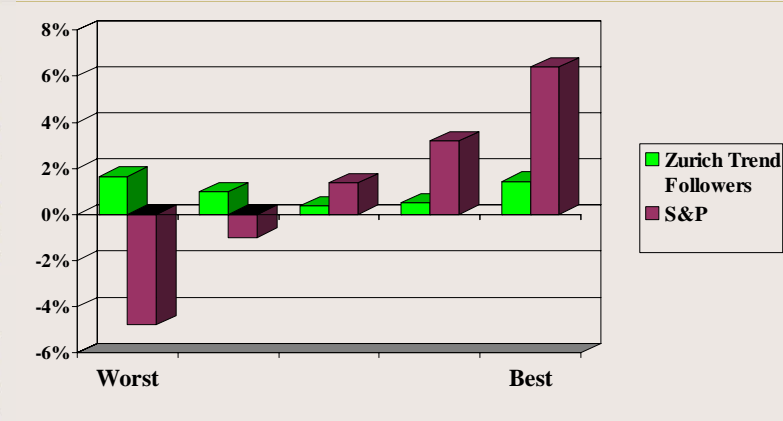
ABS Factors: Trend Following

Fung & Hsieh (RFS, 2001)

- **Strategy:** *Active, Momentum-Driven*
- **Markets:** 28 markets (stock indices, bonds, interest rates, currencies, commodities)
- **Funds:** Tass Commodity Funds, 1987-1995
- **Principal Component Analysis:**
 - % of cross-sectional variation explained by PC1 35%, PC2 8%
 - Returns similar to MAR-Hedge Trend-following index
- **ABS Factors:** Consistent with Lookback Straddles
 - Buy at minimum price (low), sell at maximum price (high)
 - Goldman, Sosin, Gatto (J. Fin, 1979)
 - Use exchange traded straddle to replicate lookback straddles
 - Long realized price volatility

6

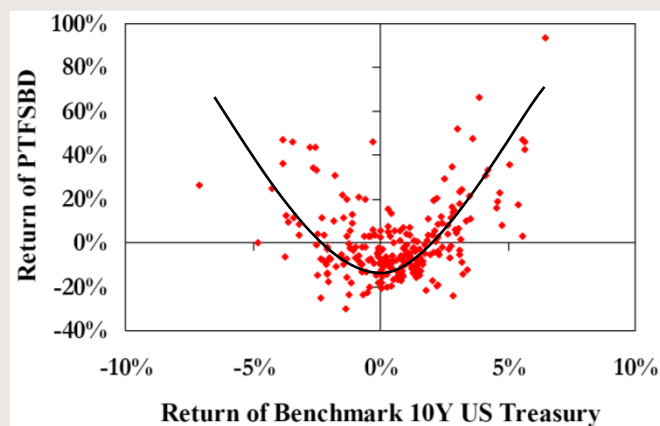
Trend-Following Funds: Zurich (1983-2000)



7

Lookback Straddle Factor (Provides Tail Insurance) Application of Hedge Fund Betas

Fung, W., and D.A. Hsieh, 2001, "The Risk in Hedge Fund Strategies: Theory and Evidence from Trend Followers," *Review of Financial Studies*, June.



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For illustrative purposes only.
Source: Fung, William K.H. and Hsieh, David A. "Hedge Funds: An Industry in Its Adolescence,"
Economic Review, Federal Reserve Bank of Atlanta, Fourth Quarter, 2006.

$\overline{R^2}$ of Trend-Following Funds on Benchmarks

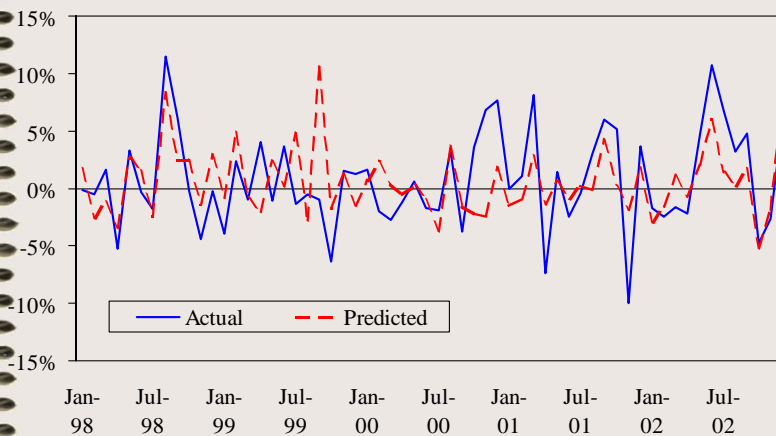
Fung & Hsieh (RFS, 2001)

Eight Risk Factors in Fung and Hsieh (RFS,1997)	1.00%
Five stock markets	-2.10%
Five bond markets	7.50%
Six short-term interest rate markets	1.50%
Four currency markets	-1.10%
Six commodity markets	-3.20%
Goldman Sachs Commodity Index	-0.70%
Commodity Research Bureau Index	-0.80%
Mount Lucas/BARRA Trend Following Index	7.50%
<i>Five Lookback portfolios</i>	47.90%

9

Out-of-Sample Prediction: Trend Followers

Fung & Hsieh (FAJ, 2002 and extended)



10

Application of ABS Factors: *hedging large market declines* Fung and Hsieh (FAJ, September, 2002)

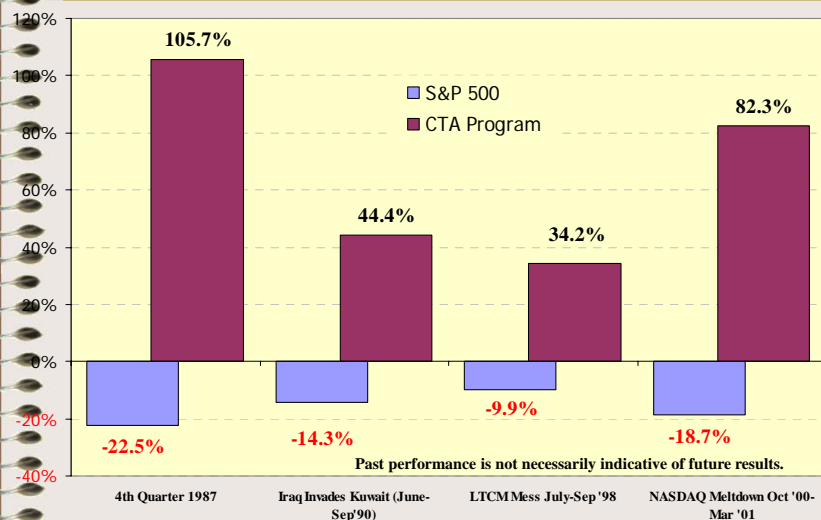
- Based on our original model on trend followers (RFS, 2001), subsequent stressful periods 8/98, 9-10/2000, 2-3/2001 and 8-9/2001 have all shown similar results

Table 4.
Returns During Extreme Declines in the Stock Market

Periods of <u>Large Decline</u>	<u>S & P 500</u>	<u>Zurich Trend Followers</u>	<u>Asset-Based Style Factor</u>
Sep-Nov of 1987	-29.6%	11.7%	12.9%
Jun-Oct 1990	-14.7%	23.5%	28.5%
Jul-Aug of 1998*	-15.4%	9.4%	5.6%
Sep-Nov 2000*	-13.1%	6.5%	-5.0%
Feb-Mar 2001*	-14.9%	9.3%	3.6%
Aug-Sep 2001*	-13.8%	9.2%	3.9%
Apr-Sep 2002*	-31.9%	28.2%	11.1%

11

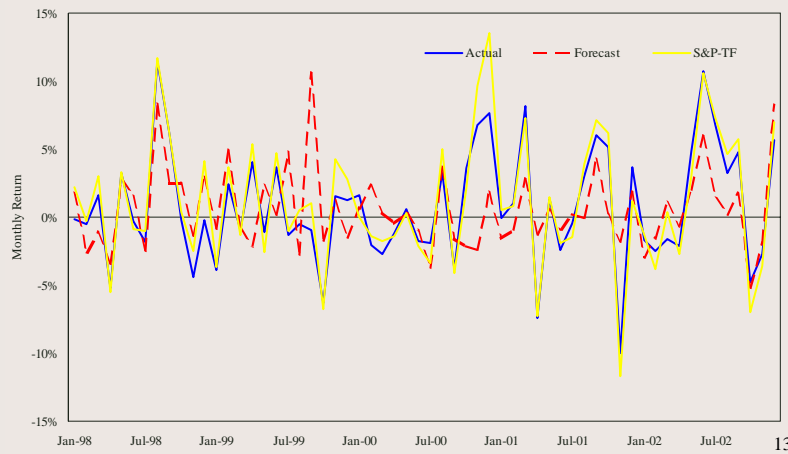
JWH Financial & Metals~Program (Source: JWH & Co.)



12

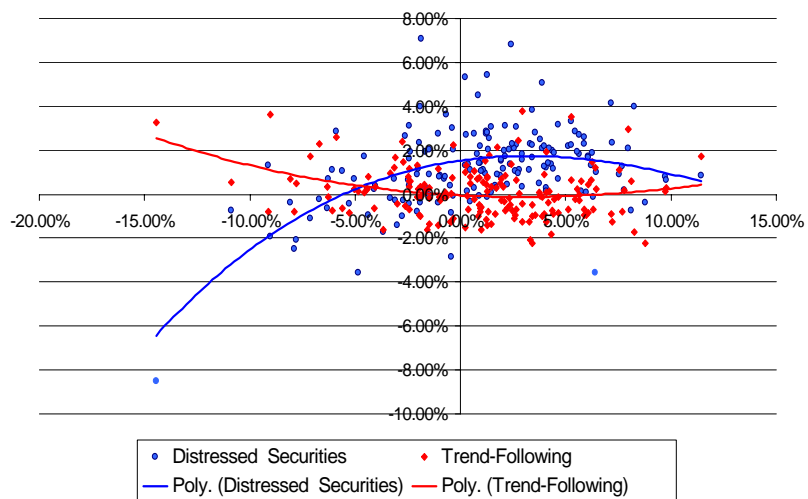
An Investable Trend-Following Index

Actual and Forecasted Zurich Trend-Following Index



13

Effect of S&P Move



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