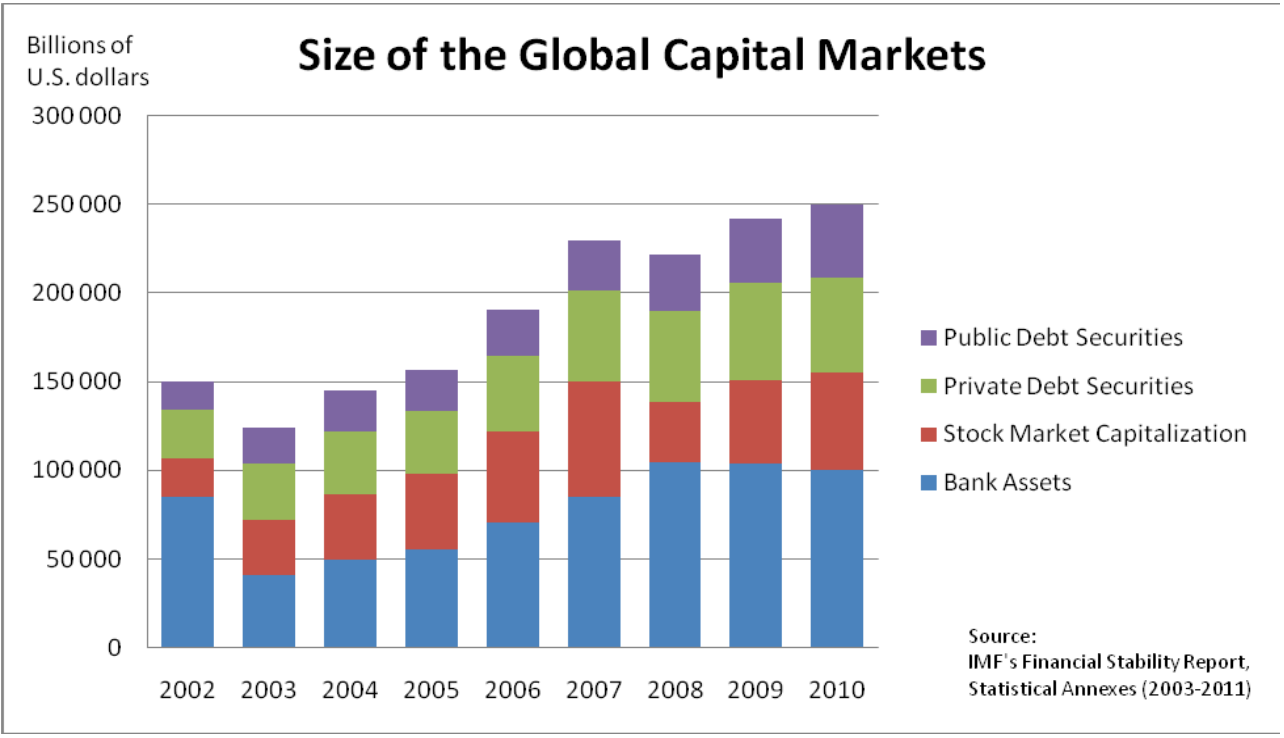
INTRODUCTION TO HEDGE-FUNDS



<u>Traditional investments:</u>

Static invevestments

Risk measured with β

Expected return according to CAPM:

$E(R) = R_f + \beta (R_m - R_f)$

Notional amounts outstanding at year-end, in trillions of USD

	1998	2004	2006	2008	06/2010
OTC Instruments	**80**	**259**	**418**	**598**	**583**
Foreign exchange contracts	**18**	**29**	**40**	**50**	**53**
Forwards and forex swaps	12	15	20	24	26
Currency swaps	2,3	8,2	11	15	16
Options	3,7	6,1	10	11	11
Interest rate contracts	**50**	**191**	**292**	**433**	**452**
Forward rate agreements	5,8	13	19	42	56
Interest rate swaps	36	151	230	341	348
Options	8,0	27	43	50	48
Equity-linked contracts	**1,5**	**4,4**	**7,5**	**6,5**	**6,3**
Forwards and swaps	0,1	0,8	1,8	1,6	1,8
Options	1,3	3,6	5,7	4,8	4,5
Commodity contracts	**0,4**	**1,4**	**7,1**	**4,4**	**2,9**
Gold	0,2	0,4	0,6	0,4	0,4
Other commodities	0,2	1,1	6,5	4,0	2,4
Forwards and swaps	0,1	0,6	2,8	2,5	1,6
Options	0,1	0,5	3,7	1,6	0,9
Credit default swaps	**-**	**6,4**	**29**	**42**	**30**
Single-name instruments	-	5,1	18	26	18
Multi-name instruments	-	1,3	11	16	12
of which index products	-	-		-	7,6
Unallocated/OTC	**10**	**27**	**43**	**63**	**38**
Exchange-traded instruments	**14**	**47**	**69**	**58**	**75**
Futures	**8,4**	**19**	**26**	**20**	**23**
Interest rate	8,0	18	24	19	22
Currency	0,0	0,1	0,2	0,1	0,2
Equity index	0,3	0,6	1	0,7	0,9
Options	**5,6**	**28**	**44**	**38**	**53**
Interest rate	4,6	25	38	34	48
Currency	0,0	0,1	0,1	0,1	0,2
Equity index	0,9	3,0	6	4,1	4,6

Derivatives

- Derivatives
- Hedge-funds
- Real Estate Funds
- CTA's (Commodity Trading Advisors)

What is their expected return?

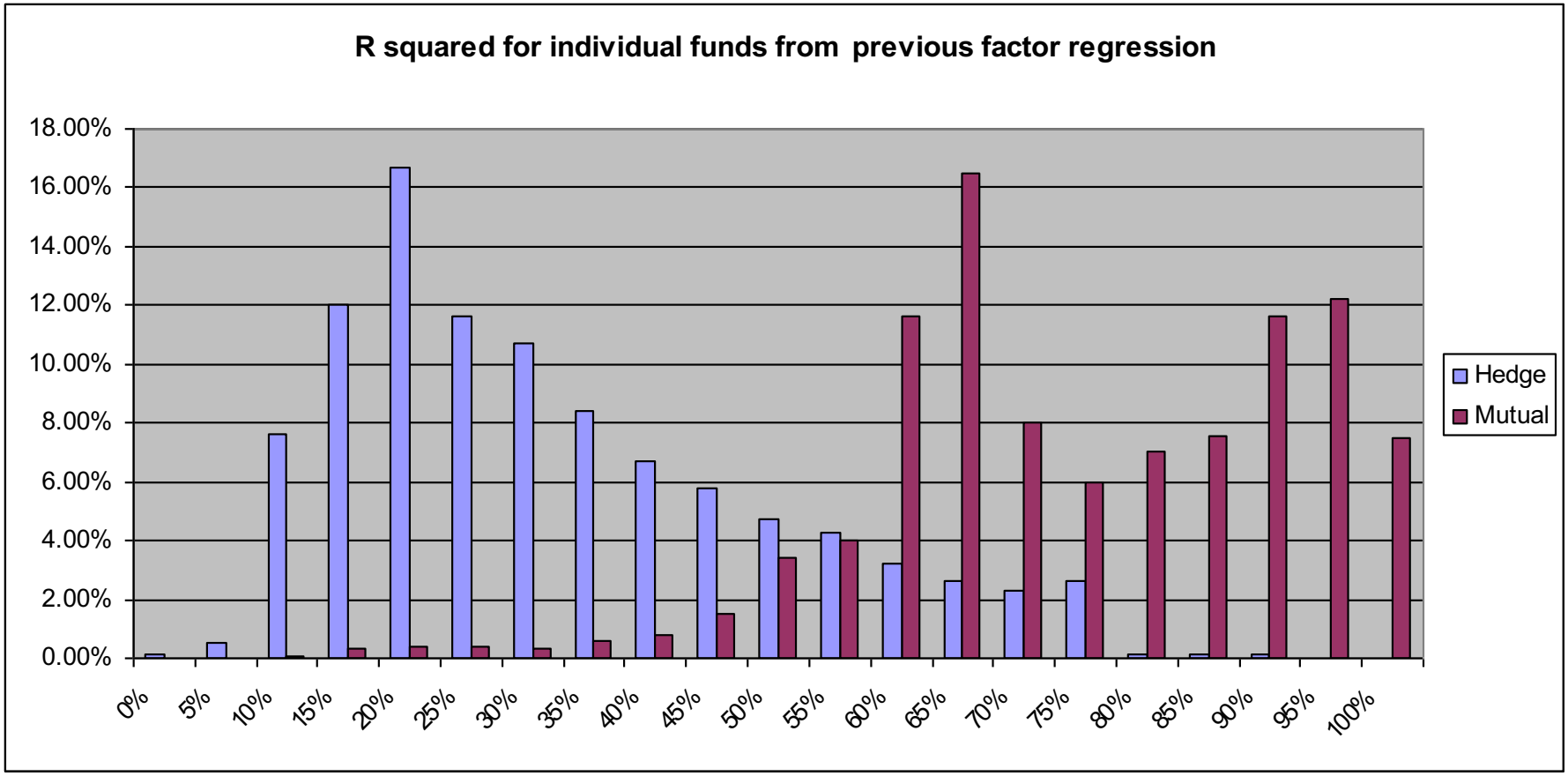
- Traditional mutual funds investment strategy is passive. The investment strategy is about "location": which assets to hold.

- Their returns can be explained largely by a asset class factor model

$$R_t = \alpha + \sum_k \beta_k F_{kt} + u_t$$

Fung and Hsieh (1997) use following factors: 1) MSCI US Equity, 2) MSCI non-US Equity, 3) IFC Emerging market index, 4) JP-Morgan US government bonds, 5) JP-Morgan non-US government bonds, 6) 1 month Eurodollar deposit rate, 7) price of gold and 8) Federal Reserves Trade Weighted Currency Index.

Fung and Hsieh (1997) explain both mutual fund and hedge fund returns using these factors



- Hedge funds cannot be explained by exposure to the same factors.

- They show some hedge funds have a negative exposure to these factors.

- Hedge funds are characterized by not only “location” but by “trading strategy”: their exposure can vary over time hence not picked up by the regression!

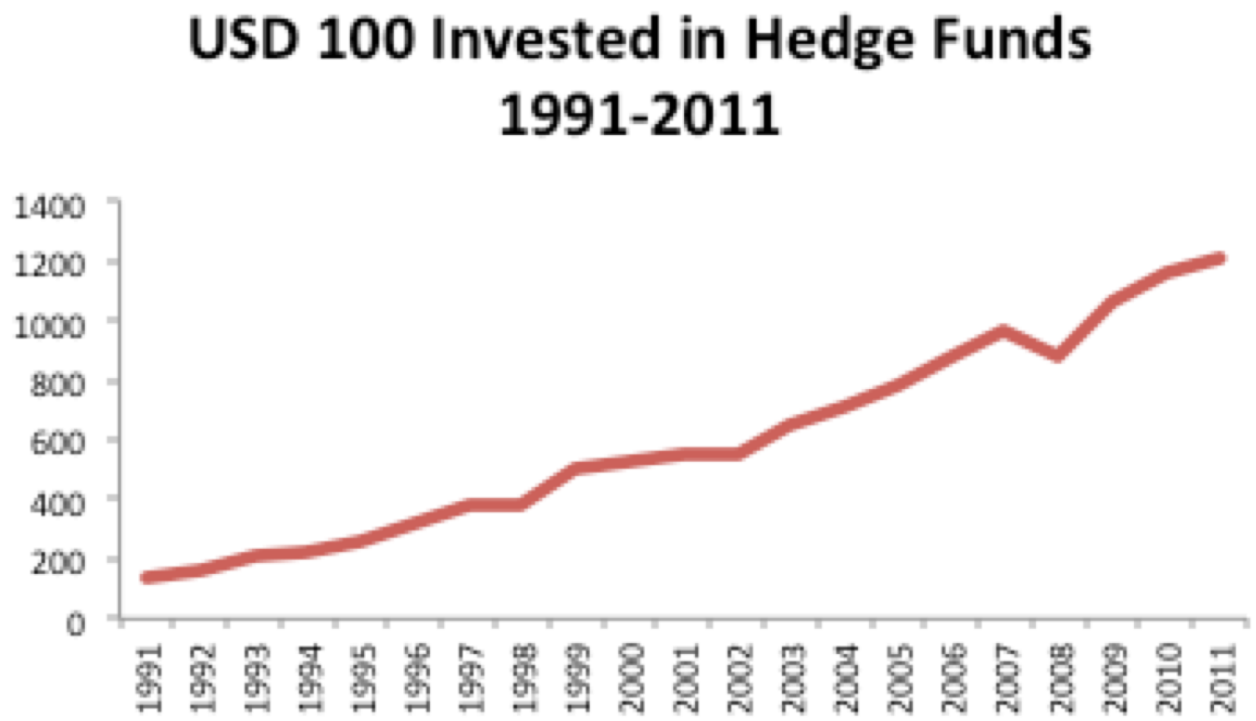
- Principal component analysis reveals five distinct hedge fund styles. Fung and Hsieh call these:
  - Systems/Opportunistic
  - Global/Macro
  - Value
  - Systems/Trend Following
  - Distressed
- They identify funds belonging to each style and look at their returns in different states of the world: Divide e.g. foreign equity to five states based on returns to foreign equity (i.e., what ex post turned out to be bull or bear markets).

- Results show that returns to e.g. trend following strategy are good both in bull and bear markets (hence like a straddle)

- Opportunistic style has high returns when commodities markets are booming (like a call option)

- Global macro has high returns when dollar has moved a lot to either direction (hence also like a straddle)

Hedge Funds' Historical returns (source HFR)
(possibly some selection bias)



Average return 13%pa
Low correlation (app. 0.5 with SP500)

Examples of hedge fund strategies

MERGER ARBITRAGE

- Stocks under-react to public tender offers

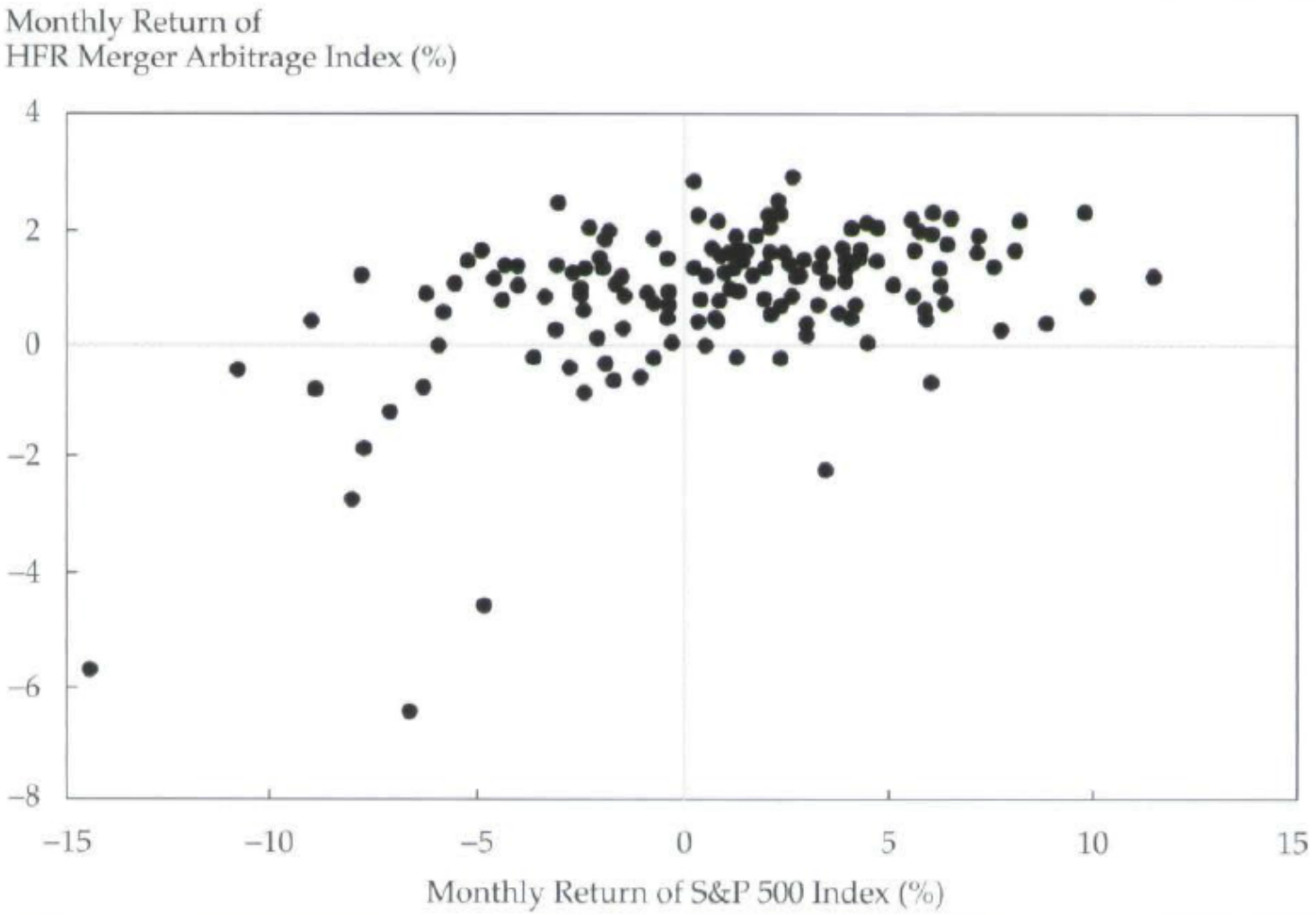
MOMENTUM-STRATEGY

CONVERTIBLE ARBITRAGE

- Most convertible bonds today sold to hedge funds

Fung and Hsieh, 2004

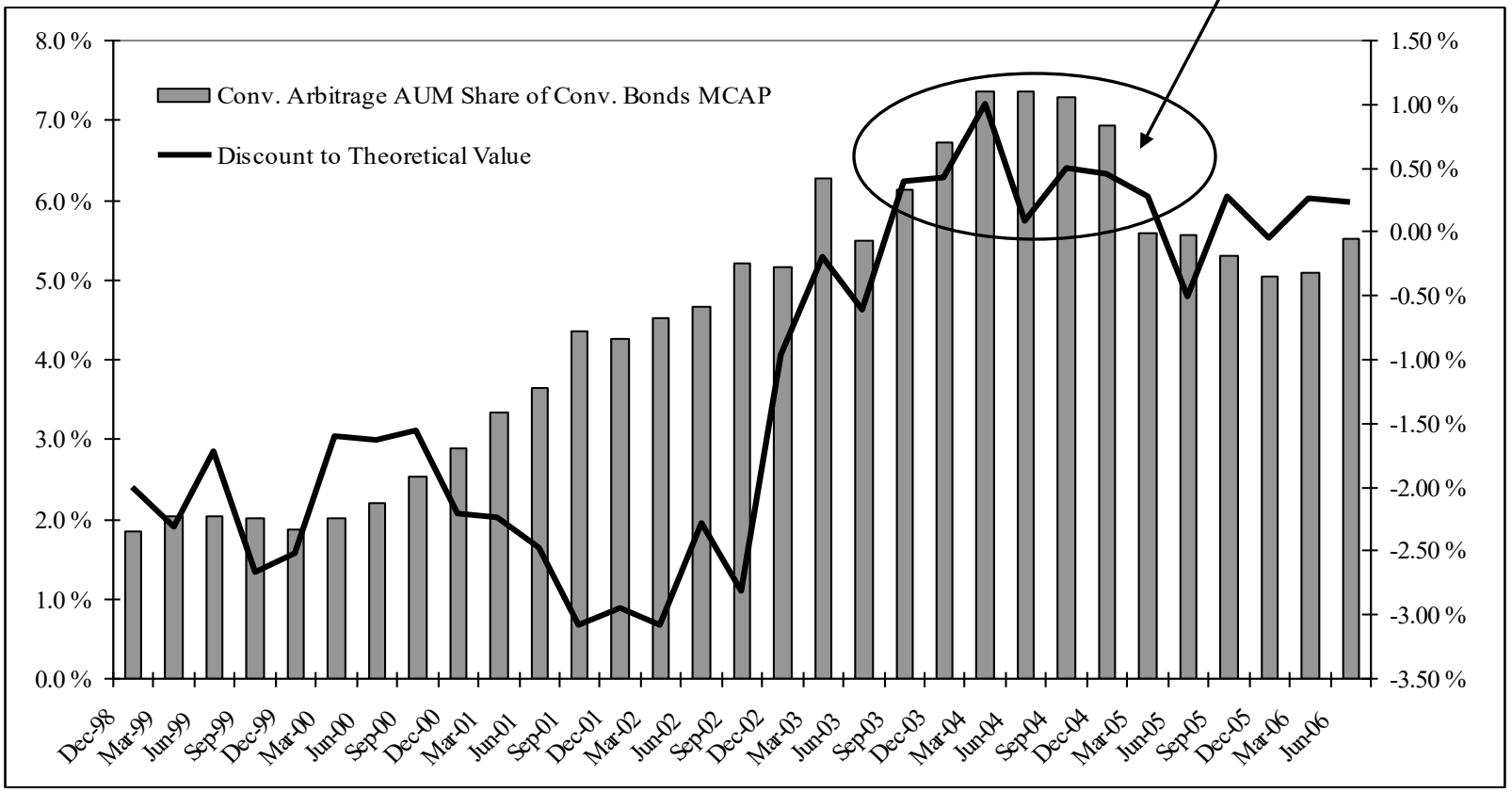
Figure 2. Merger Arbitrage Returns vs. S&P 500 Returns, 1990–2002



When supply of assets meets the availability of good investment opportunities in various markets the returns to these trading strategies decrease

– but should not become negative !!

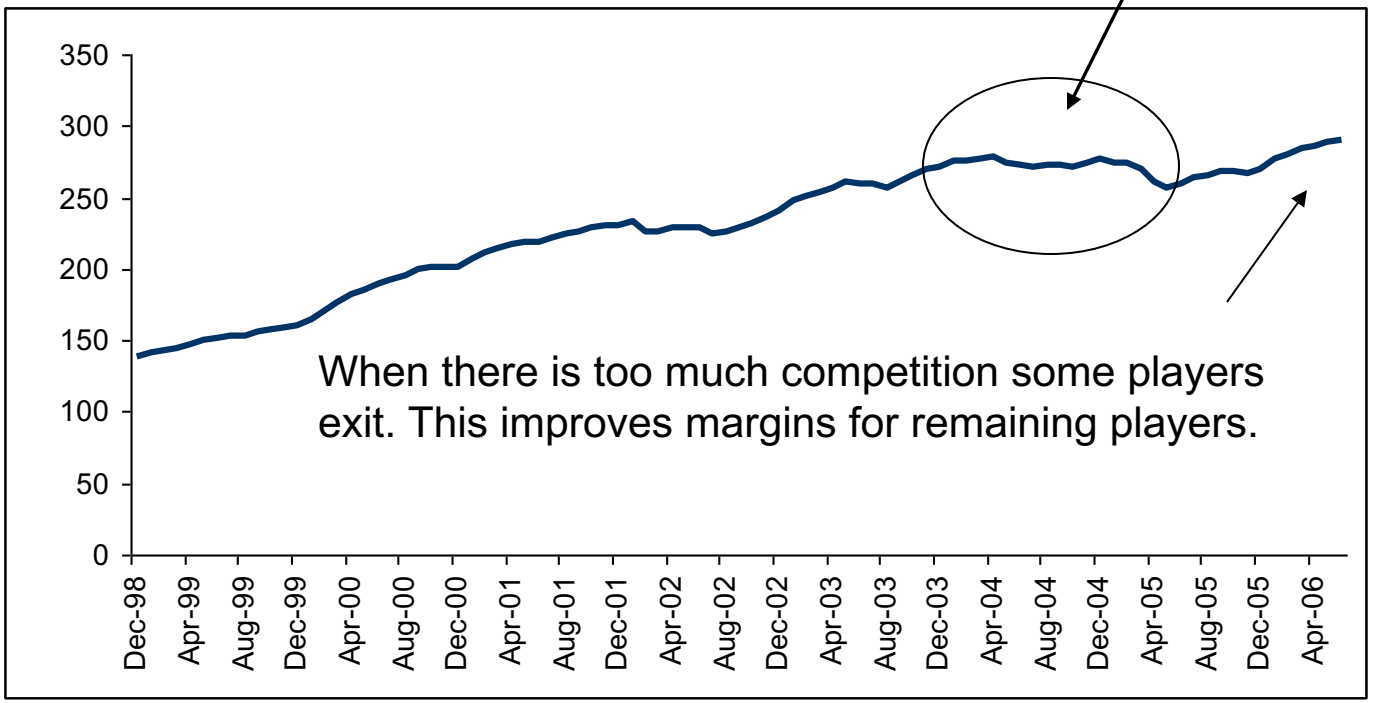
Case of convertible bonds



Lähde: Lukka 2007

Too much competition

Convertible Arbitrage returns



Tremont Convertible Arbitrage Index. Lähde: OKO

Fung and Hsieh 2004

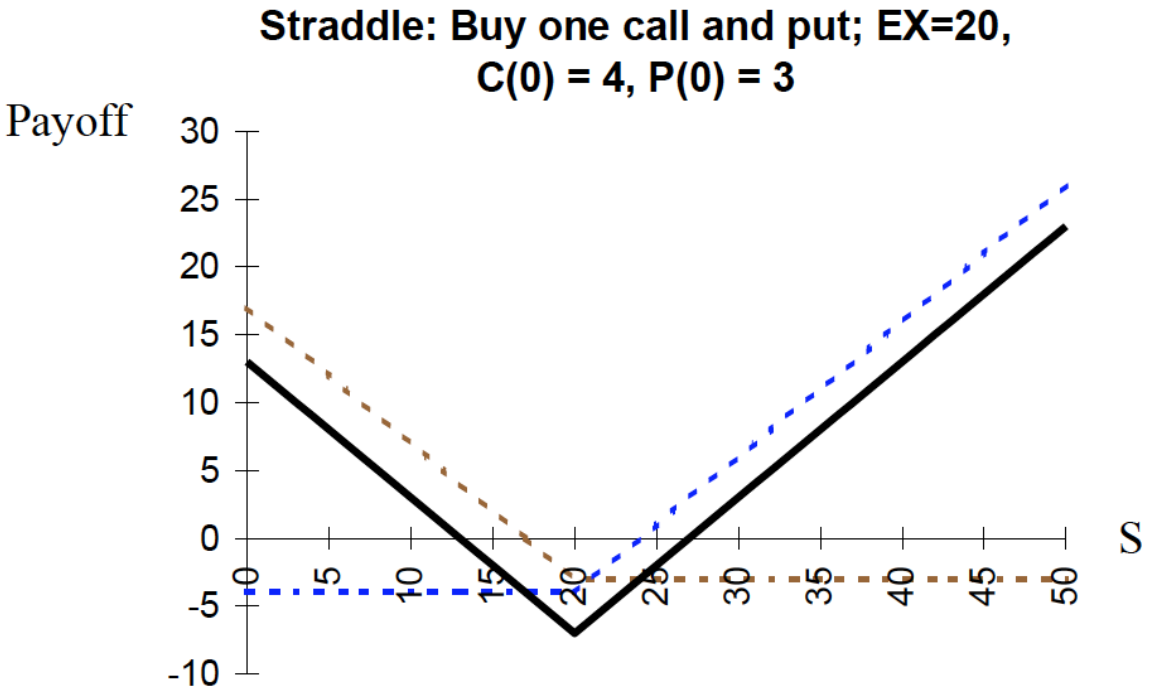
- 7 factors explain 55% to 80% of hedge fund returns depending on the time period. These are:

- S&P Index
- SC-LC (Small cap – Large cap) stock returns
- 10Y US Federal Reserve yield
- Change in the yield difference between BAA rated bonds and 10Y US Federal Reserve yield
- Lookback straddles on
    - Bond futures
    - Foreign exchange
    - Commodities

- 8th factor, Emerging markets' stock index explains further

- What are lookback straddles?

Payoff to a regular straddle (one call + one put)



- What are lookback straddles?

A lookback straddle is an option strategy composed of a lookback call option and a lookback put option.

The former grants its holder the right to buy an asset at the lowest price observed during the lifetime of the option while the latter grants its holder the right to sell the same asset at the highest price observed during the lifetime of the option.

Table 1. Regression of the HFRFOF on Seven Hedge Fund Risk Factors
(standard errors in parentheses)

Factor	1/1994–12/2002	1/1994–9/1998	4/2000–12/2002
Intercept	0.00477	0.00192	0.00212
	(0.00128)**	(0.00176)	(0.00133)
S&P	0.21533	0.32426	0.17300
	(0.02873)**	(0.04539)**	(0.02938)**
SC–LC	0.22561	0.17794	0.14972
	(0.03629)**	(0.06628)**	(0.03633)**
10Y	−1.56445	−1.11718	−2.70801
	(0.65403)**	(0.94950)	(0.63269)**
CredSpr	−2.96390	−6.66498	−2.13051
	(1.19194)**	(2.24776)**	(0.98164)*
BdOpt	−0.01529	−0.01057	−0.00682
	(0.00731)*	(0.01064)	(0.00601)
FXOpt	0.00703	0.00655	0.00313
	(0.00670)	(0.00741)	(0.00692)
ComOpt	0.01903	0.02719	0.03563
	(0.01042)*	(0.01382)*	(0.01280)**
R^2	0.55	0.69	0.80

Notes: S&P = Standard & Poor's 500 stock return; SC–LC =

POSITIVE EXPOSURE (LONG STOCKS)

Table 1. Regression of the HFRFOF on Seven Hedge Fund Risk Factors
(standard errors in parentheses)

Factor	1/1994–12/2002	1/1994–9/1998	4/2000–12/2002
Intercept	0.00477	0.00192	0.00212
	(0.00128)**	(0.00176)	(0.00133)
S&P	0.21533	0.32426	0.17300
	(0.02873)**	(0.04539)**	(0.02938)**
SC–LC	0.22561	0.17794	0.14972
	(0.03629)**	(0.06628)**	(0.03633)**
10Y	–1.56445	–1.11718	–2.70801
	(0.65403)**	(0.94950)	(0.63269)**
CredSpr	–2.96390	–6.66498	–2.13051
	(1.19194)**	(2.24776)**	(0.98164)*
BdOpt	–0.01529	–0.01057	–0.00682
	(0.00731)*	(0.01064)	(0.00601)
FXOpt	0.00703	0.00655	0.00313
	(0.00670)	(0.00741)	(0.00692)
ComOpt	0.01903	0.02719	0.03563
	(0.01042)*	(0.01382)*	(0.01280)**
R^2	0.55	0.69	0.80

POSITIVE EXPOSURE (SMALL CAP BIAS)

Table 1. Regression of the HFRFOF on Seven Hedge Fund Risk Factors
(standard errors in parentheses)

Factor	1/1994–12/2002	1/1994–9/1998	4/2000–12/2002
Intercept	0.00477	0.00192	0.00212
	(0.00128)**	(0.00176)	(0.00133)
S&P	0.21533	0.32426	0.17300
	(0.02873)**	(0.04539)**	(0.02938)**
SC–LC	0.22561	0.17794	0.14972
	(0.03629)**	(0.06628)**	(0.03633)**
10Y	–1.56445	–1.11718	–2.70801
	(0.65403)**	(0.94950)	(0.63269)**
CredSpr	–2.96390	–6.66498	–2.13051
	(1.19194)**	(2.24776)**	(0.98164)*
BdOpt	–0.01529	–0.01057	–0.00682
	(0.00731)*	(0.01064)	(0.00601)
FXOpt	0.00703	0.00655	0.00313
	(0.00670)	(0.00741)	(0.00692)
ComOpt	0.01903	0.02719	0.03563
	(0.01042)*	(0.01382)*	(0.01280)**
R^2	0.55	0.69	0.80

NEGATIVE EXPOSURE

Table 1. Regression of the HFRFOF on Seven Hedge Fund Risk Factors
(standard errors in parentheses)

Factor	1/1994–12/2002	1/1994–9/1998	4/2000–12/2002
Intercept	0.00477	0.00192	0.00212
	(0.00128)**	(0.00176)	(0.00133)
S&P	0.21533	0.32426	0.17300
	(0.02873)**	(0.04539)**	(0.02938)**
SC–LC	0.22561	0.17794	0.14972
	(0.03629)**	(0.06628)**	(0.03633)**
10Y	–1.56445	–1.11718	–2.70801
	(0.65403)**	(0.94950)	(0.63269)**
CredSpr	–2.96390	–6.66498	–2.13051
	(1.19194)**	(2.24776)**	(0.98164)*
BdOpt	–0.01529	–0.01057	–0.00682
	(0.00731)*	(0.01064)	(0.00601)
FXOpt	0.00703	0.00655	0.00313
	(0.00670)	(0.00741)	(0.00692)
ComOpt	0.01903	0.02719	0.03563
	(0.01042)*	(0.01382)*	(0.01280)**
R^2	0.55	0.69	0.80

NEGATIVE EXPOSURE

Table 1. Regression of the HFRFOF on Seven Hedge Fund Risk Factors
(standard errors in parentheses)

Factor	1/1994–12/2002	1/1994–9/1998	4/2000–12/2002
Intercept	0.00477	0.00192	0.00212
	(0.00128)**	(0.00176)	(0.00133)
S&P	0.21533	0.32426	0.17300
	(0.02873)**	(0.04539)**	(0.02938)**
SC–LC	0.22561	0.17794	0.14972
	(0.03629)**	(0.06628)**	(0.03633)**
10Y	–1.56445	–1.11718	–2.70801
	(0.65403)**	(0.94950)	(0.63269)**
CredSpr	–2.96390	–6.66498	–2.13051
	(1.19194)**	(2.24776)**	(0.98164)*
BdOpt	–0.01529	–0.01057	–0.00682
	(0.00731)*	(0.01064)	(0.00601)
FXOpt	0.00703	0.00655	0.00313
	(0.00670)	(0.00741)	(0.00692)
ComOpt	0.01903	0.02719	0.03563
	(0.01042)*	(0.01382)*	(0.01280)**
R^2	0.55	0.69	0.80

MIXED EXPOSURE

It seems from this that hedge fund returns come from:

- Occasional positive exposure to SP 500 stocks (long in stocks to get equity risk premium)
- Positive loading on small stocks to capture illiquidity premium
- Long bonds (bonds lose in value as 10Y rises; costs of leverage rise)
- Credit spread (invest in illiquid and poorly rated bonds to capture credit risk premium)

- Long exposures to lookback straddles capture returns from trend following strategies in different markets. Short exposure can arise from writing overpriced options.

AQR categorizes its absolute return funds followingly

Arbitrage	*Arbitrage seeks to capture mispricing between highly related securities, as when a company's shares trade on different exchanges at different prices, or a convertible bond trades for less than the value of its components.*
Macro	*Macro investing seeks to benefit from mispricings and dislocations in stock, bond, currency and commodity markets by going long assets that the data suggest are undervalued and short those that are overvalued.*
Managed Futures	*Managed Futures focuses on trends in global markets by trading futures contracts — agreements to buy or sell an asset (stocks, bonds, currencies or commodities) in the future at a price set in advance.*
Multi-Strategy	*Multi-Strategy offers a diversified approach to alternatives investing, seeking to provide broad exposure to several different strategies — such as arbitrage, stock selection and macro — at the same time.*
Real Return	*Real Return investing involves actively managing a diversified portfolio of liquid, inflation-sensitive assets, designed with the objective to benefit from increases in inflation.*
Reinsurance	*Reinsurance involves sharing an insurance company's economic exposure to an event, or series of events, in exchange for a premium. Reinsurance is generally uncorrelated with the capital markets.*
Stock Selection	*Stock Selection seeks to profit from market inefficiencies in individual stocks, as when a stock's price appears higher or lower than the company's intrinsic value indicates it should be.*

Other classifications of hedge funds (source: Lukka, 2007)

Strategy	Common characteristics	Expected Volatility
Aggressive Growth	Invests in equities expected to experience acceleration in growth of earnings per share. Generally high P/E ratios, low or no dividends; often smaller and micro cap stocks which are expected to experience rapid growth. Includes sector specialist funds such as technology, banking, or biotechnology. Hedges by shorting equities where earnings disappointment is expected or by shorting stock indexes. Tends to be "long-biased."	High
Distressed Securities	Buys equity, debt, or trade claims at deep discounts of companies in or facing bankruptcy or reorganization. Profits from the market's lack of understanding of the true value of the deeply discounted securities securities and because the majority of institutional investors cannot own below investment grade securities. (This selling pressure creates the deep discount.) Results generally not dependent on the direction of the markets.	Low Moderate
Emerging Markets	Invests in equity or debt of emerging (less mature) markets that tend to have higher inflation and volatile growth. Short selling is not permitted in many emerging markets, and, therefore, effective hedging is often not available.	Very High

Funds of Hedge Funds	Mix and match hedge funds and other pooled investment vehicles. This blending of different strategies and asset classes aims to provide a more stable long-term investment return than any of the individual funds. Returns, risk, and volatility can be controlled by the mix of underlying strategies and funds. Capital preservation is generally an important consideration. Volatility depends on the mix and ratio of strategies employed.	Low Moderate High
Income	Invests with primary focus on yield or current income rather than solely on capital gains. May utilize leverage to buy bonds and sometimes fixed income derivatives in order to profit from principal appreciation and interest income.	Low
Macro	Aims to profit from changes in global economies, typically brought about by shifts in government policy that impact interest rates, in turn affecting currency, stock, and bond markets. Participates in all major markets -- equities, bonds, currencies and commodities - though not always at the same time. Uses leverage and derivatives to accentuate the impact of market moves. Utilizes hedging, but the leveraged directional investments tend to make the largest impact on performance	Very High

Market Neutral-Arbitrage	Attempts to hedge out most market risk by taking offsetting positions, often in different securities of the same issuer. For example, can be long convertible bonds and short the underlying issuers equity. May also use futures to hedge out interest rate risk. Focuses on obtaining returns with low or no correlation to both the equity and bond markets. These relative value strategies include fixed income arbitrage, mortgage backed securities, capital structure arbitrage, and closed-end fund arbitrage.	Low
Market Neutral-Securities Hedging	Invests equally in long and short equity portfolios generally in the same sectors of the market. Market risk is greatly reduced, but effective stock analysis and stock picking is essential to obtaining meaningful results. Leverage may be used to enhance returns. Usually low or no correlation to the market. Sometimes uses market index futures to hedge out systematic (market) risk. Relative benchmark index usually T-bills.	Low
Market Timing	Allocates assets among different asset classes depending on the manager's view of the economic or market outlook. Portfolio emphasis may swing widely between asset classes. Unpredictability of market movements and the difficulty of timing entry and exit from markets add to the volatility of this strategy.	High

Opportunistic	Investment theme changes from strategy to strategy as opportunities arise to profit from events such as IPOs, sudden price changes often caused by an interim earnings disappointment, hostile bids, and other event-driven opportunities. May utilize several of these investing styles at a given time and is not restricted to any particular investment approach or asset class.	Variable
Multi Strategy	Investment approach is diversified by employing various strategies simultaneously to realize short- and long-term gains. Other strategies may include systems trading such as trend following and various diversified technical strategies. This style of investing allows the manager to overweight or underweight different strategies to best capitalize on current investment opportunities.	Variable
Short Selling	Sells securities short in anticipation of being able to rebuy them at a future date at a lower price due to the manager's assessment of the overvaluation of the securities, or the market, or in anticipation of earnings disappointments often due to accounting irregularities, new competition, change of management, etc. Often used as a hedge to offset long-only portfolios and by those who feel the market is approaching a bearish cycle.	Very High

Special Situations	Invests in event-driven situations such as mergers, hostile takeovers, reorganizations, or leveraged buyouts. May involve simultaneous purchase of stock in companies being acquired, and the sale of stock in its acquirer, hoping to profit from the spread between the current market price and the ultimate purchase price of the company. May also utilize derivatives to leverage returns and to hedge out interest rate and/or market risk. Results generally not dependent on direction of market.	Moderate
Value	Invests in securities perceived to be selling at deep discounts to their intrinsic or potential worth. Such securities may be out of favor or underfollowed by analysts.	Low Moderate

Hedge Fund Alpha

- In contrast to mutual funds, there is some compelling evidence that hedge funds produce alpha (see e.g. Kosowski, Teo and Naik, Do hedge funds deliver alpha? A Bayesian and bootstrap analysis, Journal of Financial Economics, 2007).