

## market anomalies and hedge fund strategies

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## Outline

- I. Conceptual Background
- II. Equity Strategies
  - II.A Corporate Events
  - II.B Technical Analysis
  - II.C Fundamental Characteristics
- III. Currency and Fixed Income Strategies
- IV. Trends in the HF Industry

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## Efficient Market Hypothesis

- EMH says:  
You **cannot predict "risk-adjusted" returns** using public info  
→ You **cannot generate excess returns** by active management
- ...the belief in EMH contributed to jump in **indexation** (pure beta)
- Over the past decade EMH was challenged by mounting **evidence** that
  - Returns are somewhat predictable (*maybe*)
  - Underwriting various non-pure-beta risk carries a premium (*likely*)
  - Frictions may be exploited for excess returns (*for sure*)
- **Evidence corroborated** out of sample, in other markets, with decent statistics,...
- ...resulting in partial revision of EMH & huge growth in **ACTIVE ALPHA** investing

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## Explaining Anomalies

Generally, anomalies (on which, by definition, most strategies should be based) can be explained as a result of:

- **Erroneous analysis**: spurious data, bad statistics or some other unreliable detection method
- **Hidden risk**: risks not captured by the standard approach (e.g., liquidity risk, skewness,...)
- ...and, I fall else fails, through behavioral biases, limits of arbitrage, or some other **true capital market failure or inefficiency**
- Academic tools (eg, fundamental doubt, proper stat, proper data handling...) very useful here
- All of the above may SEEM like trading opportunities, but we seek only the fundamental failures (true anomalies) that result in true persistent alpha

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## Reliable Lessons about ALPHA (a quick summary)

- The most reliable evidence resides in cases where you can identify
  - A player in the market who **loses on a consistent basis**
  - A **fundamental inefficiency** or clientele effect that biases economic values
  - Examples:
    - FX: central banks
    - STATARB: liquidity traders
    - FIXINC: legally constrained parties
- It helps (though not a pre-condition) if you can show that inefficiency
  - **persists** through time
  - **occurs elsewhere** (different market, different period)
- You get most bang for the buck from **interacting signals / information**

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## Worries about ALPHA

- Measurement issues: **alpha is easy to manipulate**
  - Stale / asynchronous returns **bias beta** down & alpha up
  - Option and option like strategies may **bias alpha** up
  - **Alpha over what?** With very few observations and many factors we cannot possibly get a reliable read of Alpha
  - What to make of "**peso**" strategies: strategies that provide liquidity and collect a premium, like short vol. Got to have a lot of faith...
- Alpha is "**moving sand**" – now you see it now you don't
- Importantly, this is why the street looks back **36 months** max
- ...and even that with a **lot of doubt**

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## My Approach in this Presentation

In what follows I will

- give a very quick (*sorry, I will have to skip through...*) and incomplete description of some "educative" anomalies and
- briefly *opine* on whether there is an alpha there or not (*sort of subjective*)

I relate mostly to **quant strategies** of the sort that seeks to:

$$\text{MAX} \{ E(R) - \lambda \text{STD}(R) \}$$

subject to RISK & POSITION constraints

where  $E(R)$  function of trading signals & models

$SD(R)$  and RISK result of detailed factor models

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## Persistent Abnormal Returns are Observed Following Corporate Events

Three types of corporate events:

### 1. Financing Decisions

Dividends, Repurchases, Stock Splits, Stock Offerings

### 2. Corporate Restructuring

M&A, Spin-offs / Carve outs

### 3. Information Events

Earnings Announcements, Analysts Recommendations,

Insiders' Transactions, Short Interest

(\* I will focus here only on the underlined type of events

## Event-Based Investment

Empirical observation: **stock returns persist** after certain events

Why?

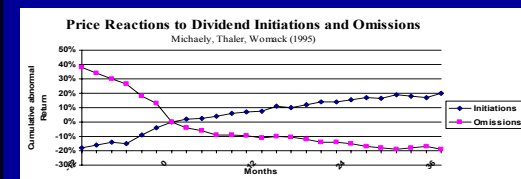
- The stories told: there is **information conveyed by the event is not fully captured by the market** at the time of announcement → "LAGGED ADJUSTMENT"
- While the stories are shaky at best, **markets do often seem to under- or over-react to news**: I will show multiple cases of drift in price in the months and years after the event.

## EVENT #1: Changes in Dividend Policy

- Dividend policy is used as a **signal** by managers
- **If signals are not fully incorporated** by the market then dividend policy is a good place to start looking
- "Explanations"
  - Dividend changes are related to **earnings changes**, and the post-earnings-announcement drift has been well documented.
  - **Clientele effect**; institutional investors tend to buy stocks with higher dividend yield. Higher dividend ⇒ higher demand for shares ⇒ upward drift in price.
  - **Change in risk**

## Lagged Adjustment to Dividend Initiations and Omissions

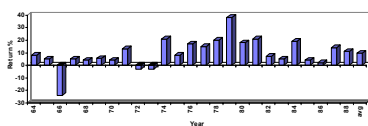
- Extreme change in dividend policy, often a surprise
- Sample period 1964-1988
- Total of 561 initiations and 887 omissions
- One year excess return: Initiations +7.5%, Omissions -11%



### Investment Strategy

- Buy stocks after dividend initiation; Short stocks after dividend omission;
- STAY FACTOR / MARKET NEUTRAL
- Hold for 1 year
- Average return 9.7% per-year (as % of long position).

Yearly return on dividend initiation/ommission investment strategy

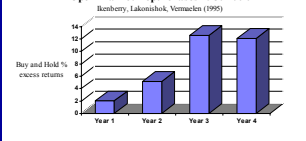


### EVENT #2: Open Market Share Repurchases

Why look for predictable returns after repurchase announcements?

- Repurchases often used as a signal that the **stock is undervalued**
- On average share price increases by 3.5% around the announcement. Unlikely that management will act on such a low undervaluation
- Higher demand** for shares in the coming months guaranteed
- Analysts and the financial press often **recommend buying** firms after a repurchase announcement

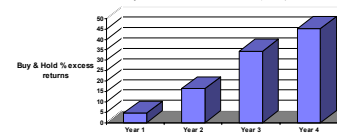
Open Market Repurchases 1980-1990



### Interaction Effect: Value vs. Glamour

"Value" stocks only 1980-1990

Ikenberry, Lakonishok, Vermaelen (1995)



Sharp difference highlights the importance of separating between true signals and other repurchase motives

Lessons specific to repurchases:

- Interact w/ value measures
- Focus on actual repurchases
- Interact w/ option plan driven repurchases

### Mini-Conclusion on Discretionary Corporate Events

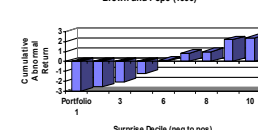
- Results on
  - dividend changes,
  - stock repurchase
  - [stock splits]
  - [Seasoned stock offerings]
 all indicate that **firms use these discretionary events as a way to signal**, and that stock prices respond slowly to this information
- The consistency of results among these studies suggest a **true pattern in stocks and not just data mining**

### EVENT #3: Earnings Announcements

- The granddaddy of under reaction is **post-announcement drift**
- Evidence first introduced in the 60's, and has continued to persist through more recent studies in the late 90's
- The basic result is that
  - Majority of earning surprise gets incorporated into prices rather quickly (minutes),
  - but
  - there is a post-announcement drift (lagged adjustment) over the intermediate run

### Returns following Earning Surprises

60-day CAR after earnings surprise, Brown and Pope (1986)

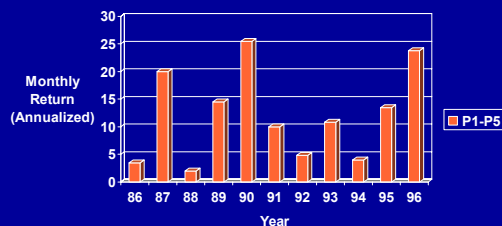


- Independent of other anomalies (P/E, B/M, size).
- Not due to risk
- Robust to expected earnings model
- Profitable even in the presence of transactions costs
- Stronger on low institutional holdings
- 
- Some evidence that earning surprises are predictable!

### EVENT #4: Analysts Recommendations

- Recommendations by security analysts
- Broken up from 1 to 5: strong buy, buy, hold, sell, strong sell
- These recommendations are publicly available
- Data source from 1985, which collects all records of the analyst's recommendations
- At any given date, average recommendation is calculated for each stock and stock is placed into one of five portfolios: 1-1.5, 1.5-2, 2-2.5, 2.5-3, >3
- Track performance of these portfolios through time.

### Long-Short Portfolios Formed on the Basis of Analyst Recommendations



Barber,Lehavy,McNichols and Trueman (1998)

### Interaction Effect: Independent vs All Investment Banks

- ◆ Who is singing your praise?
- ◆ Mar2000-Jun2003 period
  - Trade on ALL: -0.15 SR
  - Trade on Independent: 4.58 SR

Panel A: Full recommendation sample

	February 1996 to June 2003		February 1996 to March 10, 2000		March 11, 2000 to June 2003	
	Avg. abnormal daily return (%)	t-statistic	Avg. abnormal daily return (%)	t-statistic	Avg. abnormal daily return (%)	t-statistic
	(1)	(2)	(3)	(4)	(5)	(6)
All investment banks (IB)	0.007	1.26	0.011	1.86	-0.001	-0.15
Independent research firms (IND)	0.034	4.05	0.006	0.58	0.067	4.58
IB - IND	-0.031	-3.38	0.004	0.41	-0.069	-4.72

Barber Lehavy Trueman (2005)

### GENERAL Concerns about Event-Based Strategies

- **Data mining (general, not just here):** Investors and academics try many filters on information, some work "by chance" but will not work OUT OF SAMPLE (in trading)
- Another frequent worry: the anomaly is mostly in **small firms**

To ease concerns:

- Try to adjust backtests for **transaction cost**
- Look for reasons **why** the patterns exist
- Conduct out of sample tests:
  - \* Later years
  - \* Other countries
  - \* Similar events (regular dividend changes)
  - \* Correct for mis-measurement (eg, buybacks)

### THE COMPLETE SHOPPING LIST: Information-Based Anomalies

Significant evidence on anomalies in stock returns -- markets under react to event news releases:

- **Dividends** (in direction of change)
- **Stock repurchase (+)**
- **Stock split (+)**
- **Equity offerings (-)**
- **Acquisitions cash (+), stock (-)**
- **Spin-offs (+)**
- **Earnings (+)**
- **Analyst recommendations (+)**
- **Short interest (-)**
- **Insider buy (+)**

... long-short equities by far the largest segment (25-30%) of the HF industry...

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### TECH STRAT #1: Relative Strength Trading

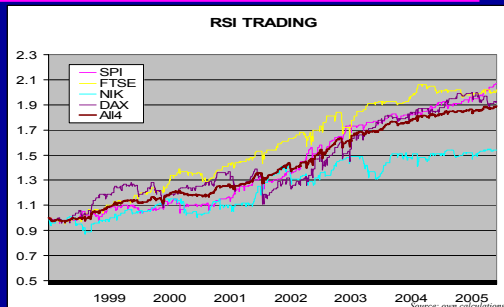
- RSI=a number between 0 and 100
- Story is one of reversals:
  - asset is **OVERSOLD** (low RSI) → long
  - Asset is **OVERBOUGHT** (hi RSI) → short
- For example: long under 25, short over 75
- In reality: a goldmine for data and parameter mining
- Example here: equity futures -- SPI, NIKK, FTSE, DAX

RSI formula real simple:  
 $RSI(t) = 100 - 100 / (1 + RSI(t))$   
 Where  
 $RSI(t) = RSp(t) / RSneg(t)$   
 $RSp(t) = k * RSp(t-1) + (1-k) * Max(0, R(t-1, t))$   
 $RSneg(t) = k * RSneg(t-1) + (1-k) * Min(0, R(t-1, t))$

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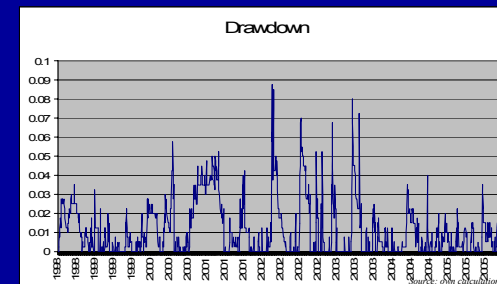
### Relative Strength (RSI) Trading



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### RSI Drawdowns



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### RSI Stats

Asset	Mean	STDEV	AnnSR	%in
SPI	0.16	1.21	2.09	22.79
FTSE	0.18	1.34	2.1	19.74
NIKK	0.1	1.48	1.05	22.14
DAX	0.13	1.74	1.17	25.44
<b>ALL4</b>	<b>0.13</b>	<b>1.27</b>	<b>1.61</b>	<b>54.27</b>

Source: own calculations

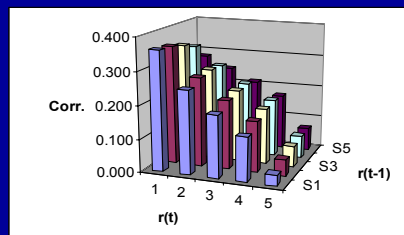
#Pos	%Time
0	45.73
1	30.03
2	14.49
3	7.9
4	1.85

- Stats look pretty good, but, what do you make of it all? **How could it be that easy?**
- Some profitable systems are said to be based on not much more...
- Key ingredients
  - low transaction costs!
  - multiple assets!
  - cross w. more info (eg, volume)!

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### TECH STRAT #2: Lead/Lag



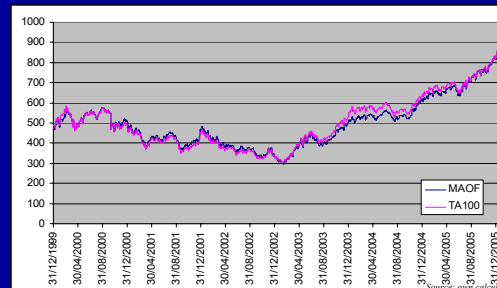
Boudoukh Richardson Whitelaw (1994)

Weekly serial correlations, size quintiles, 1962-90

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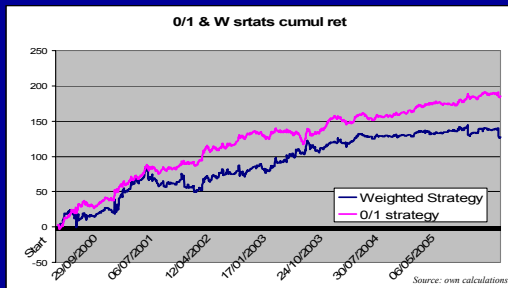
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### Lead Lag for the MAOF25-TA100 Pair

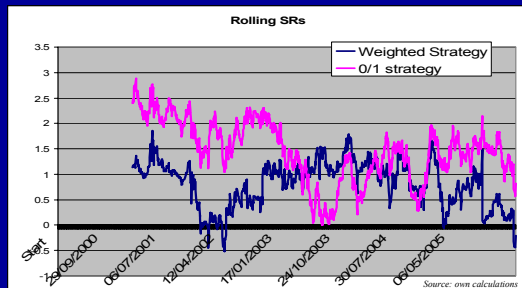


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## Cumulative Return

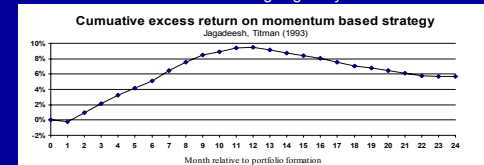


## Rolling SR



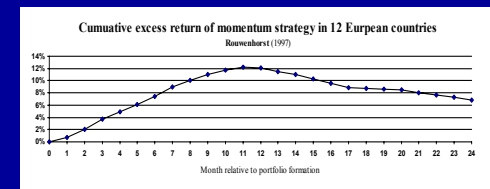
## TECH STRAT #3: Momentum Investment

- Positive momentum stocks tend to outperform negative momentum stock in the **intermediate term**.
  - Define strength portfolios based on returns in the past 3-12 months.
  - Positive momentum firms are those in the highest return portfolio, Negative momentum firms are those in the lowest return portfolio.
  - Hold the portfolio for 3-12 months.
- Phenomenon does not seem to be going away...



## Momentum: International Evidence

- ◆ Some evidence that it also works for **single names in Europe**:
  - 2190 stocks from 12 European countries, during 78-95
  - Robust to size and beta adjustment
  - Consistent across markets



- ◆ Some evidence that it also works on **global equity indexes**

## How to Interpret Momentum Strategy Results?

- ◆ **SPURIOUS?**
  - Microstructure explanations
  - Problems in interpreting statistics
  - Incorrect account of conditional risk
- ◆ **...or TRUE?**
  - Behavioral stories (has been linked to lagged reaction to earning, incorrect account of earning momentum,...)
  - ...but price momentum is not subsumed by earning momentum(Chan, Jegadeesh and Lakonishok (96))
  - **Cross with mutual fund holdings** (compelling feedback trading story but based on a core inefficiency of supply/demand effect)

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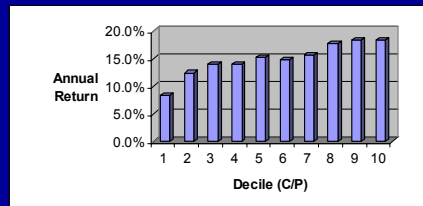
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## Fundamental Strategies

The explanation behind the ability of fundamental characteristic-based strategies to make abnormal returns is essentially the same, regardless of the specific implementation: **stock prices differ from their fundamental values due to mistakes, biases, or misperceptions by investors.**

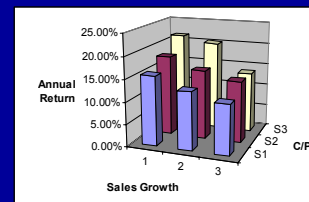
- Examples of mistakes/biases include: under-reaction, over-reaction, naïve extrapolation,...
- The classic: **value stocks** are characterized by low prices relative to accounting/financial variables, i.e., high values of the ratios
  - Book to market equity (B/M)
  - Earnings to price (E/P)
  - Cash flow to price (C/P)
  - Dividend yield (D/P)

## A Simple Value Strategy



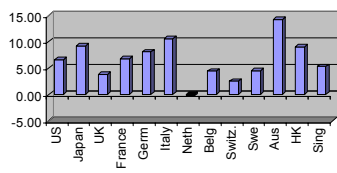
Lakonishok, Shleifer, Vishny (1994): average returns 1968-89

## A More Complex Value Strategy



Lakonishok, Shleifer, Vishny (1994): average returns 1968-89

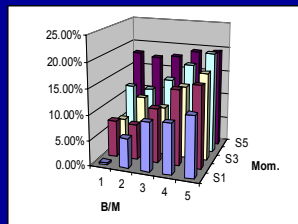
## International Evidence



Above: FF98 annual returns on high C/P minus low C/P portfolios, 1975-1995

- Value phenomenon **also present in EMs** (Rouwenhorst (1998))
- Correlation of value strategies is low across countries (diversification!)
- Value strategies work at the country level, i.e., invest in national index of "undervalued" countries (Asness, Liew & Stevens (1997))

## Hybrids: Value/Momentum



Asness (1997): annual returns on B/M and momentum sorted portfolios

- Value strategies work better for past losers than past winners
- The momentum effect is strongest for glamour/growth stocks (low B/M), but it exists for value stocks as well
- The evidence is consistent with a story of investor irrationality and over-reaction to both good and bad news

## Importance of Measurement

- Why focus on dividends? Repurchases > 50% of payouts...
- Presumably, what really matters is **TOTAL (NET) PAYOUT**

Yield Measure	Return DIFF(*)
Div Yld	0.18
DY +Repurchase Yld	0.28
DY+RY-Seasoned Offering Yld	0.33

Return DIFF = Decile8,9,10 - Decile1,2,3

Source: Boudoukh, Michaely, Richardson, Roberts (f2006)

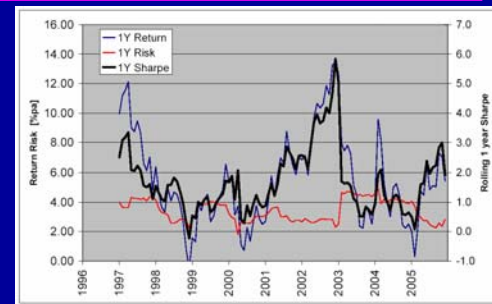
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## Global Carry

- ◆ "Carry Strategies" is a general name for strategies of the GLOBAL MACRO variety.
- ◆ Traded quant or cowboy style.
- ◆ Based generally on the **FORWARD PREMIUM ANOMALY**:
  - Currencies w/ high yield tend to appreciate, or, at least, do not tend to depreciate
  - The 3<sup>rd</sup> player in the casino loosing the \$\$\$ is apparent...
- ◆ Typical Sharpe ratios hover around **1.3-1.8**
  - ... which partly explains the persistence of the effect
- ◆ G10 Currencies example
  - Currencies USD EUR JPY GBP CHF CAD AUD NZD NOK SEK
  - Strategy optimizes on conditional SR ( $E[R_t]/SD[R_t]$ )
  - Strategy infinitely scalable and easy to execute

## Past 10y: Sharpe Ratio=1.7, No down years



## Sharpening the Sharpe Ratio

Possible improvements may enhance performance significantly:

- ◆ Better **risk model**
- ◆ Better **expected return model**
  - Distinguish between **real vs. nominal** spread
  - Use **forward curves** to predict interest rate cycle & capgain
- ◆ Trade a **wider universe**: expand to **G10 & EM currencies**
  - Larger premium, but risk model much more difficult
  - Very sensitive to risk appetite (liquidity)
  - Question: **how to trade G10+EM together?**
- ◆ **Bottom line**: SRs may rise to 2.5+ !
  - ... w/ valid concerns on selection bias

## Forwards Predict XR changes

Exchange Rate	j	$\alpha$	Std. err.	$\beta$	Std. err.	$\gamma$	Std. err.	R <sup>2</sup>
USD/GBP	1	-2.01	2.52	0.23	1.51	-1.63	0.84	9.92
	2	1.84	2.26	2.99	1.22	-1.24	0.70	32.50
	3	-0.59	2.46	1.01	1.58	-1.05	0.95	12.27
	4	1.71	2.58	2.35	1.51	-0.56	0.88	19.33
	Avg	3.63	2.47	4.52	1.58	-1.01	0.80	28.30
USD/DEM	1	-1.23	2.59	0.53	1.31	-2.79	0.99	13.50
	2	-0.62	2.71	0.31	1.46	-1.38	0.72	6.88
	3	-2.77	2.73	1.58	1.61	-1.28	0.80	14.04
	4	-3.87	2.84	2.49	1.63	-1.11	0.91	22.69
	Avg	-4.56	3.28	2.54	1.82	-2.03	0.83	19.58

Source: Boudoukh, Richardson, Whitelaw (2006) "the information in Long Maturity..."

Average past forwards and forward-spot interest rate differential, together, significantly predict XR changes & outperform random walk

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## Alpha Hunting

### Current Themes in HF investing

- Long-Short Market Neutral: esp. non-US
  - Special Situations:
    - Merger Arb (esp. in Europe)
    - Corporate Activism
  - General Charter: Illiquid Investing
  - FoHFs: Emerging Managers
  - HF's gone PE: EMs
- 
- EM Equity Funds: BRIC
  - Commodity Funds: Energy

When you think about it, it makes sense: young hedge funds will perform better because they're hungry and still have the drive to do well, compared with their complacent, more experienced counterparts. But how much better is a shocker.

**According to Hedge Fund Research, annualized returns over a 10-year period to December 2004 of HF's under 2 years old were 16.91% – 1,000 basis points above the overall 6.38% for all funds.**

Even over five-years, based on the HFR figures, the young ones blew away the more established hedge funds: 11.13% vs. 5.17%. That will not be lost on investors, especially in these times when returns – notwithstanding the healthy quarter hedgies just enjoyed – have not been what they used to be. "The gap is significant even after taking account of the failure rate of start-ups," namely survivor bias. **Stephen Oxley** of **Pacific Alternative Asset Management** told a recent conference. It should be noted that last month, a study concluded the same thing about private equity. The lesson elders need to learn, it appears, is how to keep the fire under them burning.

## What does it Take to Invest in a HF?

In addition to the usual:

COMMON SENSE, DOUBT & PARANOIA, ...

Also, a **fundamental belief** that, depending on the strategy:

- ◆ there is an anomaly (a story), *and/or*
  - ◆ providing liquidity is more than compensated for, *and/or*
  - ◆ there is an institutional friction that can be exploited w/o excess risk
- 
- ◆ And that it all make sense after paying HF fees...

## Future of HF's

- Convergence in performance and the "quiet storm" ahead
- 1940-1990
  - Few smart people making smart trades for smart money
- 1990-2006
  - 8000+ funds invest \$1.5tril in a market of shrinking opportunities
- We're all waiting for
  - An event that will drive a large sell off
  - A pop in vol
  - ...that will reveal "who's swimming naked" (true beta...)

## What's Happening Until Then ?

- ◆ Distinction between HF's and PE getting less and less clear:
  - HF's key asset is their AUM
  - HF's know their AUM is very fickle
- fear of VOLTILITY drives to illiquidity
- ◆ Way on the other end of the spectrum
  - lower Sharpe Ratio plays w/ longer lockups and lower fees
- ◆ Common to both:
  - a game of belief and leaps of faith by investors, and
  - a way for the veterans to cash on experience

### Cash-Rich HF's Jump-Start Start-Ups

**Loaded with cash, hedge funds were major contributors to start-ups in early 2006, helping give venture capital its biggest quarter in commitments in five years.**

The reason, says *VentureWire*, is that it's taking more money for start-ups to get on their feet until they're ready for an initial public offering, and hedge funds are more than happy to pitch in.

According to **VentureOne** and **Ernst & Young**, cash committed to VC in the first quarter was \$6.02 billion, up 18% from a year ago, and the most since the first quarter of 2001. Also, the median size of VC deals in the U.S. for the first three months of 2006 was \$7.5 million, compared with \$6.8 million a year ago – and that makes it the largest median deal since the fourth quarter of 2000.

The **VentureOne/ER&Y** Figures also show there is still a greater preference for later-stage deals, which accounted for half of all the VC money committed in the first quarter.