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The critique of pure alpha

■ Bubble? What bubble?

We believe the current search for alpha and portfolio diversification is progress in the field of investment management, and perceive the move from relative returns to absolute returns as a form of enlightenment that risk-adjusted returns now matter to the long-term investor.

■ Active versus passive risk management

High risk-adjusted returns are a function of active risk management. The goal of active risk management is an asymmetric return profile. It is important to apply a skill that carries a reward within an opportunity set where the risk/reward trade-off is skewed in favour of the risk-taker. However, the reward from skill is not constant. Skill needs to evolve to remain of value.

■ A hedge fund is a business

Generating alpha is becoming more difficult over time. This means an entrepreneurial approach that is innovative and adapts to changing market conditions probably works better than an administrative, non-adaptive approach. This has material business ramifications in the competitive landscape of investment management.

■ The critique of the search for alpha

Not everyone who is talking about alpha will be generating it, and not everyone who is expecting it will be getting it.

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Key takeaways

- Expectations of future hedge fund returns could be—as possibly with every other investment historically (real estate, equities, tulip bulbs, etc.)—too high, and potentially a source of disappointment. We believe the current institutional search for alpha and portfolio diversification is progress in the field of investment management. We recognise, though, that progress is normally not a gradual endeavour, but an erratically jumpy one.
- We perceive the current move from relative returns to absolute returns as some form of broad-based investor enlightenment that absolute returns matter to the long-term investor. What we believe has changed is not the concept of risk in finance, but the perception of risk in the investor community. If compounding capital positively is an objective, stable and sustainable absolute returns are good, while large drawdowns are not. Risk-adjusted returns now matter to the long-term investor.
- High risk-adjusted returns are a function of active risk management. Active risk management means that the risk-neutral position is cash, whereas in passive risk management the risk-neutral position is a benchmark. Compounding capital is the major objective of the former. The goal of active risk management is an asymmetric return profile.
- In active risk management, it is important to apply a skill that carries a reward in the market place within an opportunity set where the risk/reward trade-off is skewed in favour of the risk-taker. The reward from skill is not constant. Profitable ideas, approaches and techniques get copied and markets become immune to the applicability of the skill—that is, markets become more efficient. Skill needs to be dynamic and adaptive—that is, it needs to evolve to remain of value.
- The blurring of the line separating what we today call a hedge fund from traditional asset management is undeniable. Distinguishing between active and passive risk management, rather than between hedge funds and non-hedge funds, would be more appropriate.
- Generating alpha is becoming more difficult over time. This means an entrepreneurial approach that is innovative and adapts to changing market conditions probably works better than an administrative, non-adaptive approach. This has ramifications for the competitive landscape in investment management.
- Investment management could be Darwinian ('the survival of the richest'). The investor will probably continue having to share the pure alpha (where it exists) with the generator. Efficiency gains through diversification are probably the only free lunch in financial economics accessible for all investors.
- Talking about alpha is easier than generating it.

Structure and overview of report

'If we knew what it was we were doing, it would not be called research, would it?'

Albert Einstein

The hedge fund industry is now close to a global US\$1 trillion industry in terms of assets under management, growing fairly fast at an annual rate of around 25 percent from 1990 to 2004. (Assuming continuous 25 percent growth, and listed equities and bonds being valued at around US\$50 trillion and growing at 5%, hedge funds would become 'the market' by around 2027.) Given the current strong demand for hedge fund exposure and the industry resembling a typical seller's market (where the seller dictates the terms and the buyer willingly accepts), it is quite difficult to argue against the financial community getting a little too excited about an old idea too fast. We believe it makes sense to take a step back and examine what is going on, especially in the light of some hedge fund managers themselves calling the growth of the hedge fund industry a bubble.

This report has three main sections. The objective of the report is to update, enhance and, hopefully, enrich our AIS (Alternative Investment Strategies) research effort. First, we discuss the two extreme contemporary views on the absolute returns phenomenon: a bubble akin to the recently deflated technology bubble, or a new paradigm in investment management akin to the introduction of benchmarks in institutional investment management some 30 years ago. Second, we distinguish between what we believe is active and passive risk management. Third, we discuss business issues related to changes within the investment management industry, as well as changes within the hedge fund industry. We call this report *The Critique of Pure Alpha* for two reasons. First, we find that there are some disturbing issues with respect to alpha: that its pursuit is a zero-sum-game and potentially not widely perceived as such; that alpha is not stable; that the reward from applying skill not static; and that not everyone who is talking about alpha is generating it, and not everyone who is expecting it is getting it. Second, we found that the title *The Critique of Pure Reason* would be more fitting, but that title had unfortunately already been taken.

In the first section (Page 6: Bubble? What bubble?), we revisit our central hypothesis of the past five years of AIS research. The two extreme views of the current absolute returns phenomenon are that it is a bubble about to burst, or a paradigm shift irreversibly changing the investment management industry to its foundations. We try to find a balance between these two extremes (though we can't help leaning towards the latter.) Here we distinguish between cyclical and structural change in the asset management industry: in the short-term the phenomenon shows some bubble-like behavioural characteristics. However, we

also need to acknowledge that there is something more profound going on structurally.

In the second section (Page 16: Active versus passive risk management), we update our claim that absolute return investing means managing total risk while relative returns means managing tracking risk. We go so far as to argue that managing total risk is the opposite of managing tracking risk. We have tried to incorporate two special angles: the adaptability of skill and the use of leverage.

In the third section (Page 31: A hedge fund is a business), we look at the current changes in the asset management industry from a business perspective. It seems that hedge funds are to some extent transforming themselves from short-termist operations with little or no franchise value (and hence no exit strategy), to operations that are more valuable (and, ultimately, sellable). Under this heading, we cover a vast range of topics, such as margin pressure, business models, business risk, randomness, adaptability, lotteries as a business, ‘survival of the richest’, innovation, alpha versus skill, and generating alpha versus promising it.

In the accompanying appendix (starting page 56), we provide some supporting information. First, we try to predict the year-end value of the S&P 500 (without being too specific on which year end). Second, we try and compare aggregate fees in the hedge funds industry with aggregate fees in traditional asset management (page 62). (We thought issues related to valuation and accounting to be too esoteric for the main section of a research report on *alternative investments*.) In addition, we have updated some graphs from previous research and added some comments (page 61), and have updated some performance tables (page 70).

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Bubble? What bubble?

'Man had always assumed that he was more intelligent than dolphins because he had achieved so much... the wheel, New York, wars, and so on, whilst all the dolphins had ever done was muck about in the water having a good time. But conversely the dolphins believed themselves to be more intelligent than man for precisely the same reasons.'

Douglas Adams¹

- *Expectations of future hedge fund returns could be—as possibly with every other investment (real estate, equities, tulip bulbs, etc.)—too high, and potentially a source of disappointment.*
- *We perceive the current move from relative returns to absolute returns as some form of broad-based investor enlightenment that absolute returns matter to the long-term investor. What we believe has changed is not the concept of risk, but the perception of risk.*
- *We believe the current institutional search for alpha and portfolio diversification is progress in the field of investment management. We recognise, though, that progress is normally not a gradual endeavour, but an erratically jumpy one.*

Introduction

At the most general level, we believe there is always change.² With respect to change within an industry such as the investment management industry, as with any other industry, one could distinguish between structural and cyclical change. By structural change we mean permanent change—evolutionary, progressive jumps, where outdated ideas and approaches are replaced with new and improved ones (i.e., progress). A classical example of an industrial evolutionary jump was the well-deserved retirement of the horse and the switch to the automobile in the individual transport industry. Although the car has not entirely superseded the horse-powered coach, the latter today represents only a small

'When you are finished changing, you're finished.'

Benjamin Franklin

¹ Rephrased: "Institutional investors, consultants and analysts had always assumed that they were more intelligent than absolute return investors because they achieved so much... benchmarks, tracking errors, performance attribution analysis, and so on, whilst all the absolute return investors had ever done was muck about making money. But conversely the absolute return investors believed themselves to be more intelligent than institutional investors, consultants and analysts for precisely the same reasons."

² 'Change' was the major theme in UBS 'Fireflies before the storm' [2003]. We keep falling back on change in this report too. If the world were static, sticking to the current doctrine would actually make a lot of sense. However, it is not.

part of the industry. By cyclical change, we mean some form of cyclical swing or mean reversion—ups and downs, or good times and bad times, or expansion and contraction, or, in its most erratic form, bubbles and bursts. Our AIS (Alternative Investment Strategies) research is focused on structural change. Our appeals to caution are somewhat related to cyclical change.

Cyclical change

In April 2004 we heard someone say at a conference: “Whenever Main Street falls in love with what Wall Street has to sell, there is a correction within 12-36 months.” There is some empirical evidence that this thought is not entirely without merit.

Under normal circumstances, there is a balance between buyers and sellers—what economists refer to as equilibrium. If there are more buyers than sellers, then prices go up a little (i.e., the marginal buyer outweighs the marginal seller). If there are more sellers than buyers, prices go down a little. However, every now and then the ‘caveat emptor’ rule is abandoned, and herd instinct results in contagion, which then results in some form of hysteria or mania. A bubble builds. Then, at some stage, quite often out of the blue, size causes the bubble to burst.¹ This is roughly the pattern of popping asset bubbles. Note that the frequency of the use of the word ‘bubble’ is probably itself also in a bubble phase.

We believe the main characteristic of a bubble is mispriced assets. With respect to hedge funds, this seems not to be the case. Hedge funds are asset managers, not assets. However, as we are probably not necessarily considered the most bearish market observer of the absolute returns industry, we would like to reiterate some of our observations, arguments and thoughts in this matter and discuss whether the current enthusiasm for hedge funds shows some bubble-like symptoms.² Apart from the swing from the ‘hedge-funds-are-for-the-financially-suicidal’ approach of only a couple of years ago to the current, shall we say, ‘optimism’ being an amazing phase in financial history, there are, we believe, also some red flags popping up. Some of these symptoms are shown in Table 1 below. In the table we list some bubble symptoms, and assess whether they are applicable in the case of hedge funds.

**‘In the end, everything is a gag.’
Charlie Chaplin**

**The use of the word ‘bubble’ is in a
bubble**

**Bubble or not, the current (arguably
Darwinian) developments are certainly
an amazing phase in the evolution of
the investment management industry**

¹ Note that those who predict bubbles are normally too early. Robert Shiller and Alan Greenspan, for example, were referring to the “irrational exuberance” US equities markets around December 1996. Their reasoning, based on historical over-valuation, was sound. However, the index roughly doubled in the years after the argument. Others spent the whole of the 1990s arguing that US equities were overpriced.

² From a behavioural finance perspective, one could argue that 2004 saw both fear (Q2 04) and greed (Q1 04). Q2 was characterised by negative returns, while Q1 set a new record in terms of capital inflow.

Table 1: Bubble symptoms

Bubble symptom	True or false?
Mispriced assets	False. Hedge funds might occasionally act as marginal buyers or sellers of an asset or asset class, but that does not imply mispriced assets. We believe that, more often than not, active asset management reduces market inefficiencies.
Excessive leverage	False. Average leverage per fund is lower than it was before 1998. However, aggregate leverage of the whole industry is higher due to massive growth of the industry.
Massive growth	True.
Excessive M&A activity	False. M&A activity has just begun recently. We expect M&A activity to increase, probably during the next equity bear market.
Institutional involvement	True. (There is the notion/belief that institutional investors are last movers by design as their decision-making process, involving consultants, trustees, etc., is slowest.)
Excessive hiring	True. (We recently overheard someone say that analysts still working for an investment bank are all 'duds,' which we—obviously—found hilarious.)
Space getting crowded	True. Spreads have fallen across the board. (Interestingly, but perhaps not too surprisingly, margins for the average hedge fund manager have gone up due to an imbalance between supply and demand.)
Excited media coverage	False. Media coverage has increased <i>quantitatively</i> but is, in our view, balanced to still slightly negative; in some cases still outright ignorant.
Fed talking up the asset class	False. (They are actually 'talking up' a bubble—one could argue—but that's a different story.)
Investor selection overconfidence	False (probably with some exceptions). Most new investors invest through fund of hedge funds.
Return expectations too high	Potentially true (but certainly on the way down).
Fashionable	True.
Expert hairdresser recommending HF	False. (Not yet.)

Source: UBS

Note that we believe overzealous regulatory activity is not a bubble symptom but a post-bubble phenomenon.

Furthermore, we made two somewhat disturbing observations.

‘This time it’s different’

First, we observe that there are now some investment professionals who argue, when presenting to other investment professionals, that ‘this time it’s different.’ This should send a chill down any literate investment professional’s spine. Certain things never change. Human mass behaviour/enthusiasm is probably one of these ‘things’ that never change. As Jim Rogers [2000] puts it:

*“In the laws of economics, in the laws of history, in the laws of politics, and in the laws of society, it’s **never** different this time. The law of gravity isn’t ever suspended for someone’s convenience, and these laws are just as rigorous, though more subtle and complex. If they weren’t universal, we wouldn’t call them laws.”*

We agree. However, an asset bubble is not necessarily the same as the current inflows into hedge funds. We classify hedge funds as an alternative investment strategy—that is, an alternative to a long-only strategy. The most common way of differentiating is in terms of alpha and beta: an alternative investment strategy is about performance being attributed to skill, i.e., alpha, while a long-only strategy is primarily a market-based strategy that is exposed to a market beta of some sort. We will address this in a more differentiated way later.

‘The four most expensive words in the English language are “this time it’s different”.’

Sir John Templeton

Skill-based strategies are about alpha; market-based strategies predominantly about beta

Magical thinking—investors' placebo effect

Typically, people use magic to attempt to explain things that science has not yet explained, or to attempt to control things that science cannot. Many articles in neuroscience have shown that the human brain excels at pattern matching, but that humans do not have a good filter for distinguishing between perceived patterns and actual patterns. Thus, people often are led to see 'relationships' between actions that do not actually exist, creating a magical belief. Behaviouralists call this phenomenon *magical thinking*.

The second observation that raised red flags for us was a headline where a pension fund manager was quoted saying something along the lines of 'we don't believe in equities and bonds; we invest in hedge funds.' This goes too far even for our reckoning. We fear that this implies that hedge fund managers are magicians who deliver returns out of the hat without taking risk. This, we believe, to some extent also implies a somewhat fuddled understanding of risk. We believe the benefits of hedge funds to the institutional portfolio are primarily complementary to the other moving parts in the portfolio. Searching for alpha as an alternative source of return and diversifying portfolio risk is, we believe, laudable. However, we would not go as far as abandoning the other parts in their entirety. The search for alpha is a zero-sum game. The main benefits are an additional return component in the form of alpha (in those cases where it's achieved) and exposure to different (alternative) strategies and asset classes, i.e., different sources of return that are more or less independent from the rest of the portfolio, and which therefore reduce portfolio volatility. Many hedge fund strategies are difficult to execute and, more often than not, involve some form of skill. However, that's probably the only commonality with magicians.

Bottom line

Expectations of future hedge fund returns could be—as possibly with every other investment (real estate, equities, tulip bulbs, etc.)—too high, and potentially a source of disappointment. Some investors thought of the 180 basis point fall in Q2 2004 in AIS as a catastrophe. (This fall was the sixth worst quarter over the past 15 years for a diversified hedge funds portfolio as measured by the HFRI Fund of Funds Composite Index.) If a 180 basis point loss is referred to as a catastrophe, then there is certainly room for disappointment going forward.¹

As we have highlighted in previous research, as well as later in this document, we believe the search for alpha, risk-adjusted returns and diversification—i.e., the current absolute returns phenomenon—is progress in the field of institutional investment management. However, progress is not a gradual endeavour. Rather, progress is erratically jumpy and dotted with setbacks. The current movement into AIS is unlikely to depart from this norm. Temporary setbacks are a possibility.

The notion that diversification reduces portfolio volatility is fundamental, not magical

Relating a 180 bps drop as a catastrophe implies the presence of a 'weak hand', i.e., a low degree of investor confidence

Progress is not gradual but dotted with setbacks

¹ What we found interesting was that a 180 basis points loss in the traditional portfolio is perceived as 'just another day in the office'. Potentially there is some serious mental accounting going on with investors new to AIS, where confidence in the recently made investment decision is low.

Structural change

In the past, we have argued that the asset management industry is going through structural change.¹ The catalyst that triggered change was, we believe, the equity bear market. Sometimes—for want of a better term—we call it an ‘oops-effect’, where we reason that a majority of investors realised, that, ‘oops’, ignoring short-term portfolio volatility is not in line with investment objectives after all.² More formally, this means that investors are migrating to the belief that time does not reduce risk.³

We believe the following graph illustrates the negative effects of a volatile portfolio and its implications for short-term as well as long-term financial health or solvency. We believe the bear market triggered the change in risk perception among a wide investor audience. Note that nothing at all has changed with respect to the concept of risk. A volatile portfolio is still a volatile portfolio, irrespective of equity markets going up or down. Nor do we believe that there were any scientific breakthroughs in financial theory causing the change. We believe it was the live experience of capital depreciation that was the catalyst for this change in perspective. What we believe has changed is how investors *perceive* risk.

Chart 1 below shows the impact of large drawdowns on compounding capital over time. We called this the ‘underwater perspective’ as it shows an index as a percentage of its previous all-time high, i.e., it shows by how much an investment is ‘under water’. The problem with large drawdowns is that they kill the rate at which capital compounds. Any relative return approach (use of asset or liability benchmarks as risk-neutral position) does not give the avoidance of large drawdowns the high priority we believe it deserves. Or as Barry Riley (Financial Times) puts it in connection with the current move by pension funds to match the duration of assets (long-term bonds) with long-term liabilities (pension promise).⁵

‘There is no reason to believe that safe investments will always yield a positive long-run return. In a world in which savings flows exceed the volume of profitable investment opportunities they may not. If returns fall to near zero the logical response is to stop saving, or to rely on risky assets.’

Perhaps we just have to accept that pensions have become speculative: but institutions and regulators find that too unpleasant to contemplate.’⁶

‘If you’re already walking on thin ice, you might as well dance.’

Gil Atkinson

Equity bear market has changed risk perception

Investing is like swimming: in both cases the survival-appreciating economic agent—after diving under water—has an incentive to reach the surface level at some stage⁴

¹ See for example UBS ‘In Search of Alpha’ [2000], p. 152 or UBS ‘The Search for Alpha Continues’ [2001] p. 7-17.

² In cartoons, this is shown by a light bulb popping up above the head of the character with the effect. We are unaware of a formal term in the behavioural sciences that describes an observer’s sudden switch from ignorance to enlightenment of an obvious fact. Nevertheless, an internet search revealed that this could be called the ‘light bulb effect’.

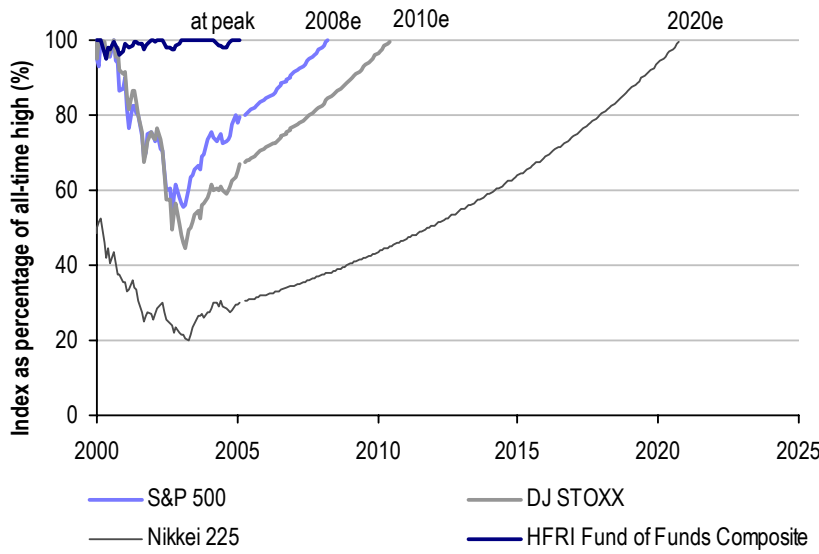
³ We discussed issues related to time diversification in UBS ‘Managing the curve’ [2002a].

⁴ Or as Lo [2004] puts it: ‘Survival of the richest.’

⁵ Essentially moving to liability benchmarking after reckoning that asset benchmarking does not work.

⁶ From Barry Riley, ‘The hidden risks of safe bonds,’ Financial Times (FTfm), 21 February 2005.

Chart 1: Losses as percentage of previous all-time high and potential time to recovery*



Source: UBS (Bloomberg, Thomson Financial Datastream)
 * Assuming indices compound at eight percent per year.
 February 2005 inclusive. Based on local currencies, HFRI in US\$.

- The idea of what we believe is an absolute return investment philosophy is to try and stick close to the surface level in Chart 1, as digging oneself out of a deep hole can be time-consuming.

More formally, we argue that the post-TMT bubble period is characterised by a transition from the second into the third stage of asset management. We defined the three stages as follows:

- (1) Absolute return approach with low degree of manager specialisation
- (2) Relative return approach with high degree of manager specialisation
- (3) Absolute return approach with high degree of manager specialisation

We believe it is fair to argue that there was an asset management industry before there were benchmarks. This first stage was characterised by an absolute return focus and a low degree of specialisation on the part of the manager. Managers had a balanced mandate whereby the asset allocation decision was the most important. This approach suffered from poor performance in the mid-seventies, as well as an agency problem as the objectives of the manager were misaligned with those of the principal (i.e., managers were incentivised to beat the peer-group rather than invest in an economically sensible fashion based on their individual edge).

There was an industry before there were benchmarks

This first stage was replaced by the second stage: the relative return game. In this second stage, managers have a relative return focus. The asset allocation mandate was taken away from the manager and hence, quite naturally, resulting in higher specialisation. We believe that, next to poor performance and principal/agent issues, the introduction of the Employee Retirement Income Security Act (ERISA) in the U.S. in 1974 was one of the primary catalysts for the industry to move from the first to the second stage, as it changed the fiduciary responsibility of the end investor. The introduction of an index was an improvement as it somewhat resolved the agency problem through using a rigid benchmark. In addition, the EMH (Efficient Market Hypothesis)² rose to academic prominence through the work of Samuelson [1965] and Fama [1965, 1970], and the investment community was intellectually gradually moving away from the merits of active asset management in general and the feasibility of stock selection, as demonstrated by Brinson et al. [1986], in particular. We believe the main product to emerge from the 1964-2000 consensus thinking in the investment community was the index fund. Hedge funds—what some call ‘active managers on steroids’—are (or, more precisely, until recently were) somewhat antithetical to the EMH and the consensus view.

Compounding and drawdowns

The adoption of the absolute return approach is, we believe, to some extent the industry ‘returning to its roots’, at least for the active part of the asset management industry. The negative effect of large drawdowns on compounding capital was not lost on Benjamin Graham (1894-1976):

‘An investment operation is one which, upon thorough analysis, promises safety of principal and an adequate return. Operations not meeting these requirements are speculative.’⁴

Nor was it lost on Mr. Einstein:

‘Compound interest is the eighth natural wonder of the world and the most powerful thing I have ever encountered.’

¹ In a paper called ‘Earnings manipulation and managerial investment decisions: evidence from sponsored pension plans,’ Bergstresser et al. [2004] highlight an equity market inefficiency (inability of market participants to distinguish between operating earnings and inflated pension earnings) resulting from executives capitalising on manipulating pensions accounting. Relating to capacity constraints in the absolute return space, we believe this paper underlines the notion that sound bottom-up fundamental company research in combination with the ability to sell stock short has always been and continues to be a potentially profitable proposition. In addition, our interpretation of the article strongly suggests that a market where short selling is restricted should be less information efficient.

² In our view, soon to be replaced with Lo’s [2004] AMH. As a matter of priority, investment professionals who read footnotes of sell-side AIS research (such as this one), should also read ‘The Adaptive Markets Hypothesis’ by MIT-professor Andrew Lo.

³ Puzzling, then, that not everyone agrees with our notion that long-term investors cannot be indifferent to short-term volatility. Note that a 10-year investment of 100 that compounds at 8% in the first nine years and then falls by 50% will end at 100 too.

Some market observers are now arguing that hedge funds on average have performed in line with equities, implying a poor investment. They are missing an important point: Compounding at 8% for a year or two with a volatility of 5% is not the same as compounding at 8% with a volatility of 15%.

⁴ From Graham [1985], p. 1. This quote was originally from Graham’s classic ‘Security Analysis’ first published in 1934.

‘Two finance professors are walking down the street. One says: “Look, there’s a \$100 bill lying on the floor.” To which the other replies: “Impossible, someone else must have spotted it already.”’

Old EMH joke¹

A 10-year investment of 100 that is flat in the first year and then compounds at 8% will end at 200.

A 10-year investment of 100 that falls by 50% in the first year and then compounds at 8% will end at 100.³

What we refer to as the third stage is a combination of the absolute return approach from the first stage, and the high degree of specialisation of the second stage. Combining an absolute return approach with a high degree of manager specialisation¹ results in the manager having a mandate to balance investment opportunity with capital at risk. This is a more flexible approach than adding value beyond a benchmark. It takes into account the fact that market inefficiencies have a tendency to go away when identified by too many investors, as well as the fact that the reward from a certain skill falls over time. Today we call this a hedge fund. However, the term, essentially a misnomer characterising a legal construct, might disappear. We believe the move from the second stage to what we believe is the third stage, is a structural shift, as opposed to a cyclical one.

A different view from our own is the belief that the absolute return investment philosophy will somehow be integrated into the status quo—what we call the second stage of asset management, the relative returns game. After all, the end investors (pension funds, insurers, etc.) have a multiple set of objectives, some of which are defined in relative terms. We do not share that point of view. As a matter of fact, we are inclined to treat the benchmarked long-only and absolute return approaches as opposites, or, more formally, as passive and active risk management. Why?

Our angle (or bias) comes from looking at the world from what we believe is a risk management perspective. The bottom-up stock selection process of a long-only manager and a long/short manager might be identical, or indeed very similar. However, we believe there is a big difference in the way risk is defined. If the definition of risk is different, it is obvious that the whole risk management process differs as a result. We believe that, in a benchmark-driven investment process, risk is defined as *tracking risk*, while, in an absolute investment process, risk is defined as *total risk*. Managing tracking risk means participating in any boom/bust cycle unhedged, whereas managing total risk means reducing risk when the risk/return opportunity set changes to the investor's disadvantage.² The investment philosophy and culture resulting from this differentiation could not be further apart. Indeed, we believe they could be considered opposites.

When opposites merge

In 2003, we distinguished between investor protection and wealth or capital protection with respect to the structural change in the investment management industry. We believe the merger between 'traditional' and 'alternative' has become more apparent over the past two years. Table 2 is a reprint from 2003, where we contrasted long-only with hedge funds with respect to investor protection and wealth or capital protection. (We believed—and still do—that the

Two of the few common denominators among hedge funds are the absolute return investment philosophy and a high degree of specialisation

'It is not disbelief that is dangerous to our society; it is belief.'
George Bernard Shaw

Managing total risk and managing tracking risk are opposites

'You can't say civilization don't advance... in every war they kill you in a new way.'
Will Rogers (1879-1935)

¹ We believe this to be the case for the asset management industry as a whole. One could argue that within the subspace today called the hedge fund industry there is a trend towards broader mandates – i.e., less specialisation as many single-strategy managers seem to be migrating towards multi-strategy approaches. We believe this to be related to the scalability (or non-scalability) of an absolute return venture, as well as the adaptability and flexibility of skill in the market place, two issues addressed in more detail later in this document.

² See, for example, Brunnermeier and Nagel [2003], who examined hedge fund market behaviour in the technology bubble and bust that followed.

regulator protects the investor but not his money. It is risk management that protects investors' portfolios from capital depreciation.)¹ With respect to investor protection, we believe there is a trend from the right to the left in Table 2, i.e., hedge funds facing tougher regulatory scrutiny, becoming more transparent when catering to institutional investors, and, more recently, introducing benchmarked products. With respect to wealth or capital protection, we believe there is a trend from the right to the left, i.e., traditional managers becoming more oriented towards absolute returns.

Table 2: Investor versus wealth protection

		Long-only	Hedge fund
Investor Protection	Regulation	High	Low
	Transparency	High	Low
	Benchmark	Yes	No
Wealth Protection*	Derivatives	No	Yes
	Leverage	No	Yes
	Short selling	No	Yes

Source: UBS *Fireflies before the storm* [2003]

* Note that the real world is not and never was as black and white as this table implies.

Table 2 is too static. We see the trends as follows.

- **Regulation:** Hedge funds are certainly on the agenda of most regulatory bodies.² We believe it is fair to claim that the gap between traditional asset management and hedge funds with respect to regulation is in the process of closing and will continue to do so in the coming years. (One interesting remark made on the record from one of the five SEC members after the SEC's 2002/03 probe into hedge funds was that, potentially, one need is to de-regulate mutual funds, rather than regulate hedge funds.)
- **Transparency:** Generally speaking, hedge funds and hedge fund investments are becoming more transparent over time. A hedge fund might have an incentive to meet the higher transparency requirements of an institutional investor, as the capital could be considered as 'smart money' that is more stable, as opposed to 'dumb money' that is more responsive to fads and return chasing (and ultimately to untimely withdrawals)—that is, less stable and hence of lower quality to the manager. (The increased use of lock-ups could be seen partly as a way to manage the occasional and proverbial 'weak hand'.)

¹ As a matter of fact, we lean towards the belief that regulatory approval could give investors a false sense of security. A portfolio has an attractive risk/reward trade-off because it was intelligently constructed and not because the regulator approves the approach. Whether there is correlation between the two is probably in the eye of the beholder.

² Some call the current zealous regulatory post-bubble activity rippling through the financial industry the 'regulatory bubble'.

- **Benchmark:** Generally speaking, we believe the obsession with benchmarks among sponsoring bodies has cooled off somewhat. Many investors have noticed that their liabilities do not follow the S&P 500 or MSCI World index. (Someone once said—upon retirement—you cannot eat a relative sandwich.) Remarkably, however, in the more recent past, some hedge funds have been launching long-only funds with a benchmark. This, we believe, is an interesting development, supporting our central hypothesis that we should be thinking about product differentiation in asset management rather than hedge funds and non-hedge funds.

- **Derivatives, leverage, short selling:** Regulation might ‘protect’ the investor, but not necessarily his money. We believe it is risk management that preserves capital from depreciation. To do risk management, one requires risk management tools and techniques. These, we believe, happen to be the use of derivatives, flexibility to lever and de-lever, and the ability to sell short. We believe the use of risk management tools in investment management is somewhat akin to the use of telescopes in the field of astronomy. That is to say, the development is structural: there is no way back.

One amazing observation we regularly make is the long and continuous aversion to derivatives among a large majority of investors and market observers. This is amazing because we believe that derivatives are just an instrument to complete a task efficiently. Being generally opposed to the use of derivatives in finance because its misuse has caused casualties is like opposing the use of morphine in medicine because of its misuse. Potentially, the ongoing criticism of derivatives is as helpful to progress in the field of finance as *Cheech & Chong* is helpful to progress in the field of medicine.

Bottom line

We believe progress is not smooth and gradual, but erratic and jumpy due to new discoveries and new ideas. First a new development or idea is typically ridiculed, then it is contested as it does not fit nicely with the current doctrine, then the opposing camp adapts to the changed environment and then—finally—goes on to argue that ‘we knew this all along’. With respect to absolute return investing, we believe we have safely passed the first phase. There is only a minority of die-hard contemporaries from the popular press and a minority of investors left arguing that the search for alpha, the preference for an asymmetric return profile over exposure to randomness, the quest for independent return streams (portfolio diversification), and thinking about the extreme impact of large drawdowns to investor survival probability is ridiculous. We believe we are somewhere in the second phase where there is still opposition, as the ‘new’ idea does not fit nicely with ‘old’ beliefs.¹

¹ Here the term ‘incommensurability’ used by Thomas Kuhn in the context of paradigm shifts and scientific change comes to mind. Kuhn [1962] held the abandoned paradigm and the embraced one to be ‘incommensurable’ with one another, such that the fundamental concepts of one cannot be rendered by the terms of the other. In other words, according to Kuhn, the current dominant paradigm is conceptually so different that a debate is not possible. We find

‘Discontent is the first necessity of progress.’

Thomas Edison

‘The high theorising of the present period [in economics] attains a degree of unreality that can be matched only by medieval scholasticism.’

Professor Robert Heilbroner, author of *Worldly Philosophers: The Lives, Times and Ideas of the Great Economic Thinkers*

Risk-uncontrolled exposure to market forces could one day—looking back—be compared to the unsheltered exposure of our ancestors to the whims of natural forces. Most people probably agree that finding ways to control and shelter life and belongings from the natural elements is considered progress. We believe the same is true for controlling capital at risk. (Nudists might disagree, though.)

that this applies to the asset management industry, in the sense that the concepts and perceptions of risk between the relative and absolute return world are sometimes so wide, that they seem incommensurable.

Return update and outlook

What is our take on future returns in the absolute return space? Well, we would be surprised if the compound annual rate of return of a diversified hedge fund portfolio over the next five years matches the average annual return of a diversified hedge fund portfolio over the past 15 years (roughly a nominal 10.5 percent return, net of two layers of fees, beating US T-Bills by about 630 basis points). We believe a diversified portfolio of absolute investment strategies over the next five years will compound in line with equities and bonds, i.e., 300-500 basis points above the risk-free rate, with a much lower probability of the investors' capital being wiped-out in the interim. Note that this last remark is quite important. Potentially, some investors' return expectations for long-only equities and diversified hedge fund portfolios net of two layers of fees are the same, i.e., a nominal return of around eight percent. However, the expectation for the risk-adjusted return is not the same, as diversified hedge fund portfolios are much less volatile than long-only investments. Table 3 shows historical annual returns of a diversified hedge funds portfolio net of two layers of fees compared to T-Bills and US inflation.

Expecting equity-like positive returns with lower probability of equity-like drawdowns

Table 3: Historical annual returns

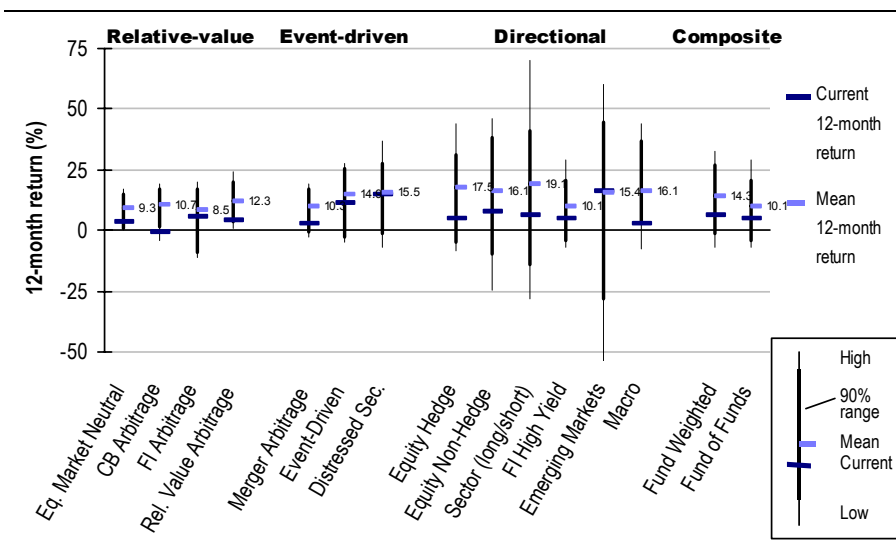
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Avg.
FoHF	17.5	14.5	12.3	26.3	-3.5	11.1	14.4	18.0	-5.1	26.5	4.1	2.8	1.0	11.6	6.7	10.5
T-Bills	7.7	5.4	3.5	3.0	4.4	5.6	5.1	5.2	4.9	4.8	6.0	3.3	1.6	1.0	1.4	4.2
Inflation	5.4	4.3	3.0	3.0	2.6	2.8	2.9	2.3	1.6	2.2	3.4	2.8	1.6	2.3	2.7	2.9

Source: UBS (Thomson Financial Datastream, Bloomberg)

FoHF: HFRI Fund of Funds Composite Index; T-Bills: monthly average of 3-month T-Bills; Inflation: average annual US inflation.

Chart 2 shows 12-month returns as of December 2004 compared with its mean 12-month returns, full trading range of 12-month returns and 90%-range of 12-month returns.

Chart 2: Twelve-month returns for a selection of hedge funds strategies



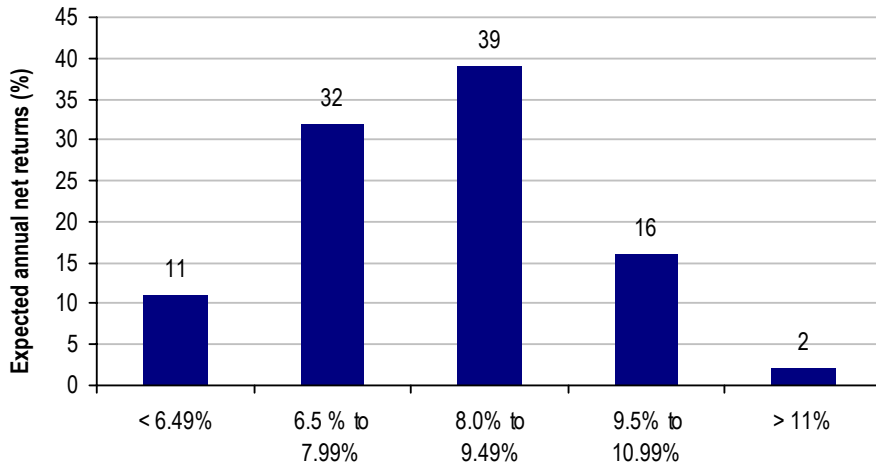
Source: UBS (raw data from Bloomberg)

Based on HFRI indices in US\$ from January 1990 to January 2005.

- Most strategies were below their mean at the end of last year and, in most cases, well within the 90%-range.

Chart 3 shows a distribution of return expectations from institutional investors surveyed in mid-2004 for a diversified portfolio of hedge funds net of one layer of fees.

Chart 3: Return expectations



Source: Casey, Quirk & Acito and The Bank of New York [2004]. Based on survey of Institutional Investor conference attendees (June 2004) and individual CQA/BNY interviewees.

- Nearly three-quarters of interviewees’ return expectations are between 6.5 and 9.5 percent. According to the CQA/BNY [2004] report, three years ago a similar estimate revealed an expectation that was higher by around 400 basis points.
- Roughly 82 percent of institutional investors expect future returns net of one layer of fees not to exceed 9.5 percent.
- These estimates, we believe, are ‘high-ish’ but not exuberantly unrealistic.

Active versus passive risk management

'If everything is under control, you're driving too slow.'

Mario Andretti

- *Active risk management means that the risk-neutral position is cash, whereas in passive risk management the risk-neutral position is a benchmark. Compounding capital is the major objective of the former.*
- *We believe that in active risk management it is important to apply a skill that carries a reward in the market place within an opportunity set where the risk/reward trade-off is skewed in favour of the risk-taker.*
- *The reward from skill is not constant. Profitable ideas, approaches and techniques get copied and markets become immune to the applicability of the skill, i.e., markets become more efficient. Skill needs to be dynamic, i.e., to evolve.*

Tracking risk versus total risk

Different investors can have different investment objectives that can result in different ways they define, perceive and subsequently manage and control risk. In a relative return context, risk is defined, perceived and managed as tracking risk. In the absolute return space, risk is defined, perceived and managed as total risk (as mentioned earlier).¹ Risk management of the former is driven by a benchmark (asset or liability benchmark), while risk management of the latter by a P&L (profit and loss). Defining risk against an absolute yardstick (i.e., capital depreciation) is different from the relative return approach, in the sense that the capital preservation function under the relative return approach is not part of the mandate. In institutional investment management, the mandate to manage total risk was taken away from the manager in the 1970s (explicitly in the US and UK), as it yielded unsatisfactory results and amplified the agency problem.

Table 4 contrasts the two relative return models with the absolute return model in investment management.

When risk is defined as tracking risk, the control and management of total risk is left to the end investor

¹ Note that relative return managers also have an incentive to manage total risk, as a halving of assets under management roughly halves revenues (assuming profit margins stay constant).

Table 4: Relative versus absolute returns and tracking versus total risk

	Relative-return models		Absolute-return model
	(Passive)	(Active)	
Return objective	Relative returns		Absolute returns
General idea is to	Replicate benchmark	Beat benchmark	Compound capital positively
Risk management	Tracking risk		Total risk
General idea is to	Replicate benchmark	Beat benchmark	Avoid compounding capital negatively

Source: UBS

Defining risk as tracking risk means that the risk-neutral position of the manager is the benchmark and risk is perceived as deviations from the benchmark. A benchmarked equity long-only manager (active or passive) moving, for example, into cash (yielding the risk-free rate) is *increasing* (tracking) risk as the probability of underperforming the benchmark increases. In other words, the probability of meeting the (return) objective declines—hence the perception of increased risk. In the absolute return space, the risk-neutral position is cash. A move from a long equities position into cash means *reducing* total risk as the probability of capital depreciation decreases.

Put simply, under the absolute return approach, there is an investment process for the upside (return-seeking by taking risk) and for the downside (some sort of contingency plan if something surprisingly goes wrong). This could be a sudden exogenous market impact, excess valuations, heavily overbought market conditions, a concentration of capital at risk, a change in liquidity, marginal dollar being funny money, the sudden death of marginal buyer, etc. Absolute returns therefore means thinking not only about *entry* but about *exit* too.

As Warren Buffett, arguably an absolute return investor, puts it:

‘When we can’t find anything exciting in which to invest, our ‘default’ position is U.S. Treasuries...Charlie and I detest taking even small risks unless we feel we are being adequately compensated for doing so. About as far as we will go down that path is to occasionally eat cottage cheese a day after the expiration date on the carton.’¹

Defining the return objective and risk management relative to an asset benchmark essentially means that the manager provides access (beta) to the asset class—that is, risk and return are nearly entirely explained by the underlying asset class. This means the investor is exposed (has access) to the asset class on the way up as well as on the way down. Transparency under the relative return model is high, because a change in market circumstances does not materially affect the investment process and the asset allocation. Access to the benchmark is always close to 100 percent (hence the transparency).

Depending on how a manager defines risk, moving into cash can mean increasing as well as reducing risk

Managing total risk means having both, an entry as well as an exit strategy

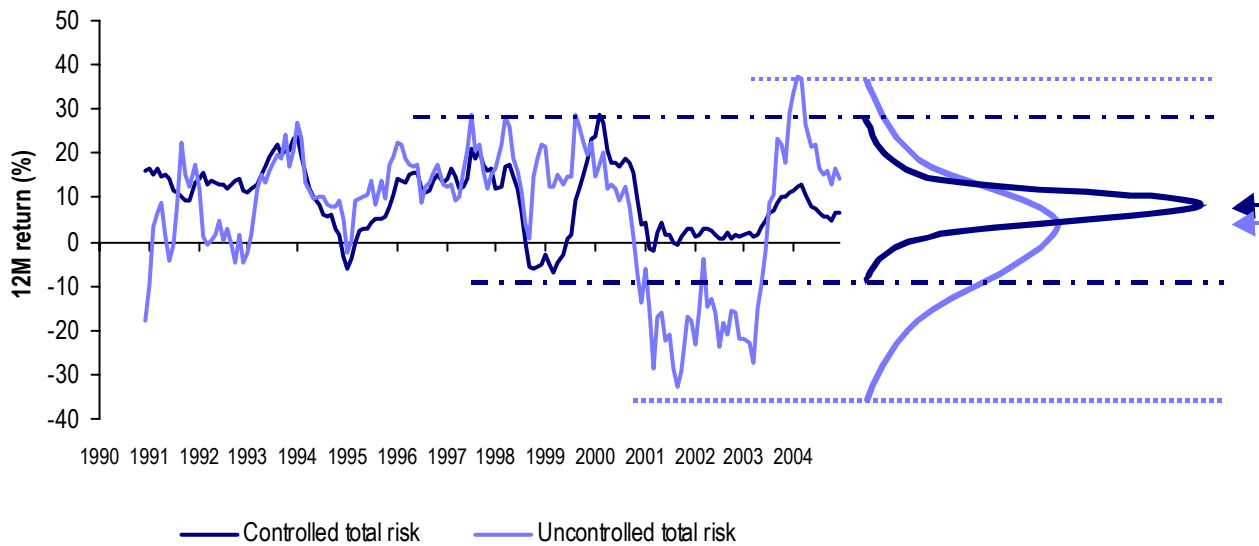
Under the relative return model, the end investor is exposed to mood swings in the asset class in an uncontrolled fashion

¹ Berkshire Hathaway, annual report, 2003

Chart 4 compares what we believe is uncontrolled exposure to risk with controlled exposure to risk. We believe managing total risk means having a higher compounding rate of return with lower downside risk. It is therefore not a big surprise that hedge funds have been on some investors' agenda since the equity market fell in 2000-02. Under normal market conditions of positively trending returns, the difference between controlled and uncontrolled total risk is somewhat difficult to spot (by just examining returns, that is).

Myopic investors have difficulties differentiating between exposure to uncontrolled and controlled risk

Chart 4: Controlled versus uncontrolled exposure to risk



Source: UBS (raw data from Bloomberg and Thomson Financial Datastream)
 Controlled total risk: HFRI Fund of Funds Composite index in US\$; Uncontrolled total risk: MSCI World index in US\$;
 December 2004 inclusive. Based on log total returns. Distributions are conceptual. Arrow indicates mean.

- **Controlled total risk:** Lower downside swings (and hence lower overall volatility) and a higher compound rate of return. The compound annual rate of return, volatility and maximum 12-month drawdown for the HFRI Fund of Funds Composite Index from 1990 to 2004 were 10.2 percent, 5.6 percent and -6.6 percent. In 2001, we called this risk/return profile to be the future of active investment management, as we believed (and still do) that *all* investors have positive utility from compounding capital and negative utility from large absolute financial losses.
- **Uncontrolled total risk:** Erratic swings on both sides (positive as well as negative) and a lower compound rate of return. The compound annual rate of return, volatility and maximum 12-month drawdown for the MSCI World Index were 7.1 percent, 14.6 percent and -27.9 percent. (Note that two-thirds of the observation period is from one of financial history's greatest bull markets.)
- **Asymmetry:** The highest returns from equities are higher than those from diversified hedge fund exposure while the lowest returns are lower. However, the lowest returns are much lower, while the highest returns are only somewhat higher. (Hence lower compounding.)

Asymmetric returns as a function of active risk management

Our interpretation of the idea of ‘absolute returns’ is, in the simplest of terms, about compounding wealth or capital positively while avoiding compounding capital negatively. We use the term ‘asymmetric return profile’, which goes further than just managing portfolio volatility. If the objective were to reduce portfolio volatility, one could easily just combine any volatile asset class with cash to reduce portfolio volatility. Reducing volatility by adding cash to a risky asset reduces the return distribution in a *symmetrical* fashion. Both positive and negative returns are lowered, so compounding is lower. However, we believe the idea behind an investment process focusing on absolute returns is to have an idea generation process for the upside (i.e., the returns) and a risk management process for the downside (i.e., the avoidance of negative absolute returns – especially large ones)¹. The separation of the upside and the downside should result in some form of call-option-like feature, i.e., an *asymmetry*.

By ‘asymmetry’ we actually mean two things: an asymmetry with respect to the magnitude of positive versus negative returns *as well as* an asymmetry with respect to the frequency of positive versus negative returns. If positive, smooth and sustainable compounding of capital is an objective, one needs a combination of both. Raw exposure to a stochastic return generation process might not be ideal when compounding capital sustainably is a major objective. Note that these remarks refer to absolute return portfolios where single manager risk (arguably idiosyncratic risk) has been diversified.

The following graphs show this asymmetry versus a symmetric return profile. We show one strategy from the three main groups: relative-value, event-driven and opportunistic/directional. The dark bars measure the average positive and average negative return of a monthly-rebalanced portfolio of equities (MSCI World index) and bonds (JPM Global Government Bond index) from January 1995 to December 2004. (HFRI indices are calculated live since 1995.²) The light bars measure the average positive and negative returns of a hedge fund index. The different bar sizes visualise the symmetry of returns (traditional asset classes) and the asymmetry (active risk management). The percentages printed in the bars measure the relative frequency of positive and negative returns.

‘Few things are impossible to diligence and skill.’

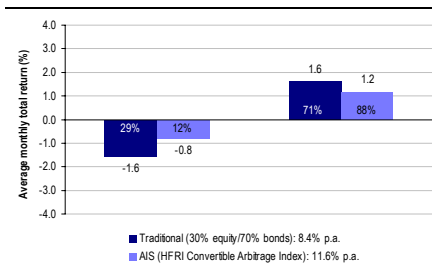
Samuel Johnson (author)

Frequent positive returns are rather important if compounding capital positively is an objective

¹ Notice that by ‘large’ we mean large in percentage terms, not in standard deviation terms. A relative value absolute return manager might have a five standard deviation loss because portfolio volatility is actively controlled and hence low. However, the five standard deviation could be ‘only’ a 3-4 percent loss in a month. See UBS ‘European rainmakers’ [2004], page 88-91.

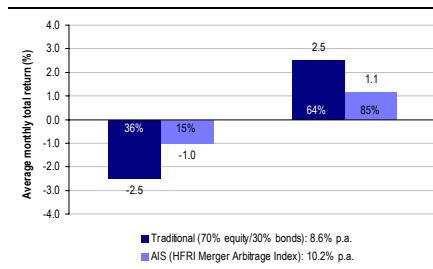
² Note that it does not really matter which period we choose. In UBS [2000] we have chosen the period from 1990 to March 2000 (bull market only) and in UBS [2004] the period was from 1998 to August 2003 (full equity cycle).

Chart 5: Relative value



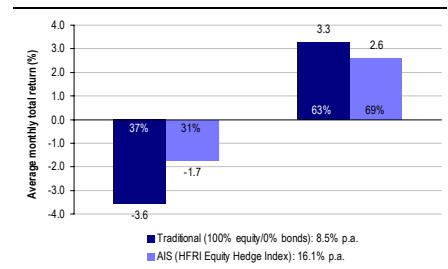
Source: UBS (data from Bloomberg, Thomson Financial Datastream)

Chart 6: Event-driven



Source: UBS (data from Bloomberg, Thomson Financial Datastream)

Chart 7: Opportunistic/directional

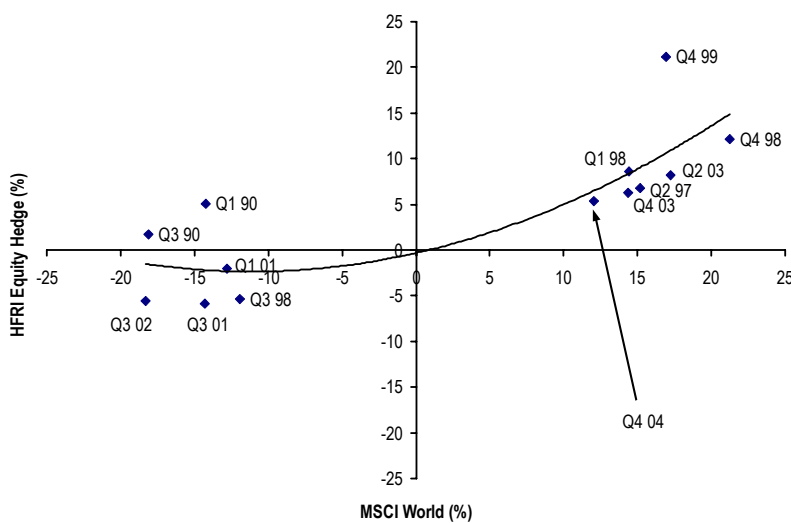


Source: UBS (data from Bloomberg, Thomson Financial Datastream)

- **Symmetry:** The dark bars in all three graphs show a symmetry with respect to magnitude (positive returns are roughly the same as negative returns) and a slight asymmetry with respect to return frequency (as the mean return of equities and bonds have been positive in the observation period).
- **Asymmetry:** The light bars are asymmetric with respect to frequency as well as magnitude. These asymmetries explain why the compound annual rates of return are higher (displayed in the legends of the graphs) and the volatility of monthly returns is lower (visualised through the size of the bars). We believe these asymmetries, and hence higher risk-adjusted returns, to be a function of active risk management. The dark bars show uncontrolled exposure to the ‘elements’, and are hence passive, in our view.

There are many differing ways in which these asymmetries can be presented. Chart 8 below shows an alternative way of capturing the above-mentioned asymmetry. The chart shows all double-digit quarterly total returns of the MSCI World from 1990 to 2004 and the corresponding quarterly total return in the HFRI Equity Hedge index.

Chart 8: Double-digit quarterly returns of MSCI World (1990-2004)



Source: UBS (data from Bloomberg, Thomson Financial Datastream)

- Correlation between equities and equity long/short is clearly positive. The correlation coefficient between the two time series (based on monthly log

returns) was 0.63 for the period from 1990 to 2004 and 0.72 for both the periods from 1995 to 2004 and 2000 to 2004. However, a correlation coefficient does not pick up the option-like feature displayed in the graph.

Note that hedge funds are not only criticised when they lose money (as, for example, in Q3 98 or Q2 04), but occasionally also when they make it, as happened in Q4 04. Hedge funds were—sort of—criticised by ending 2004 in positive territory ‘only’ by being long the stock market in the last quarter of the year. The criticism was based on the notion that not all of the returns are attributed to pure alpha.

Applicability and adaptability of skill

Another way of putting it is to argue that absolute return managers seek an investment approach where the returns are not attributed to a stochastic process. The original idea of a hedge fund, i.e., the Alfred Jones model, was to have an investment process where the return is a function of the managers’ skill rather than the swings of the equity market (which are fairly random or at least very difficult to predict in a sustainable fashion). If the investment process is indeed a function of skill, the return is somewhat predictable (as opposed to random), as long as the particular skill is applicable and rewarded in the market place and the ‘skill’ doesn’t get run over by a bus.

We believe these latter points to be important. Skill is skill, but might or might not be rewarded in the market place, i.e., the applicability of skill is subject to change. For example, fundamental stock research was a brilliant idea on the advent of the mutual fund a couple of decades ago. The reward from fundamental stock analysis was huge for the few who rigorously applied the analysis to investment management, as a large proportion of the investment community was ignorant about the valuation of stocks. It was the catalyst for a whole new industry: the professional investment management industry. However, that particular skill got copied *because* it carried a large reward. Today, applying simple fundamental stock research might not carry as high a reward as it used to.¹ In other words, markets become more efficient, i.e., they adapt and become somewhat ‘immune’ to the skill. The skill gets somewhat ‘commoditized’. This is probably true for many other skills, too. Simply gamma trading in convertibles or buying the target and selling the acquirer’s stock in an announced merger might not carry as high a premium as it used to.² In other words, if alpha is supposed to be sustainable, the skill has to evolve as the opportunity set adapts to the applicability of the skill.

‘I don’t know the key to success, but the key to failure is trying to please everybody.’

Bill Cosby

Performance in absolute return space should—in an ideal world—be attributed to skill and not a function of randomness

‘Being ignorant is not so much a shame, as being unwilling to learn.’

Benjamin Franklin

¹ Many large financial (buy-side and, as a result, sell-side) organisations have grown in a way that fundamental stock research and credit research are separated. Potentially an example of applying skill to changing market circumstances is by bringing the two closer together. (The importance of which convertible folks knew all along.)

² Many merger arbitrage managers migrated away from the traditional application of the strategy over the past couple of years and moved into other areas, typically by becoming ‘multi-strategy’ and getting involved in corporate restructuring arbitrage, distressed loans, etc. A negative interpretation of this move is calling it ‘style drift’. A more positive perspective (and our view) is that those managers evolved, i.e., noticed that their skill might not yield as high a reward under changing market conditions and applied their skill elsewhere. In other words, they changed the applicability of the skill set to changes in the opportunity set. To us who believe everything always changes (‘change’ being the only constant in the universe), this actually makes a lot of sense.

Lo [2004] uses the term 'maladaptive' to describe an action that once worked but does not work anymore in an environment that has changed. Suboptimal behaviour in capital markets, one could argue, is not derived from irrationality but from applying a skill that worked optimally in a different evolutionary context. Lo:

'The flopping of a fish on dry land may seem strange and unproductive, but underwater, the same motions are capable of propelling the fish away from its predators.'

The law of active management

We believe there is a relationship between market inefficiencies and whether an active approach is warranted or not. Furthermore, our interpretation of Grinold's [1989] law of active management is that the value added of an active manager is a function of his skill times the number of independent decisions (the opportunity set) the manager can make per year. If one of these two variables (skill or number of opportunities) is zero the ex-ante value added must be zero as any number multiplied with zero equals zero. The number of independent decisions can be either zero or positive while the skill can be a positive as well as a negative figure. It is because of our interpretation of this 'law' that we believe the current hedge fund phenomenon is not a short term phenomenon: If we compare two managers with identical *positive* skill but two different opportunity sets, one is constrained within his area of expertise and the other unconstrained, the latter will add more value (gross of fees) by definition.¹ In other words, we believe searching for investment skill, finding it, and then constraining it are somewhat paradoxical.² Note that an absolute return manager is constrained too; either through his discipline and process (endogenous constraint) or through the investor's mandate (exogenous constraint). One therefore could argue, that traditional and alternative asset management are not that far apart as both managers should be only doing what they have signed up to do with their investors. In other words, the constraint in absolute return space is somewhat looser (no formal benchmark) and more self-inflicted but not non-existent.

Chart 9 relates the increased potential to add value to an increasing degree of inefficiencies. The figure implies that the marketplace has more difficulty in pricing complex stuff than it does more simple stuff. Note that the strong form

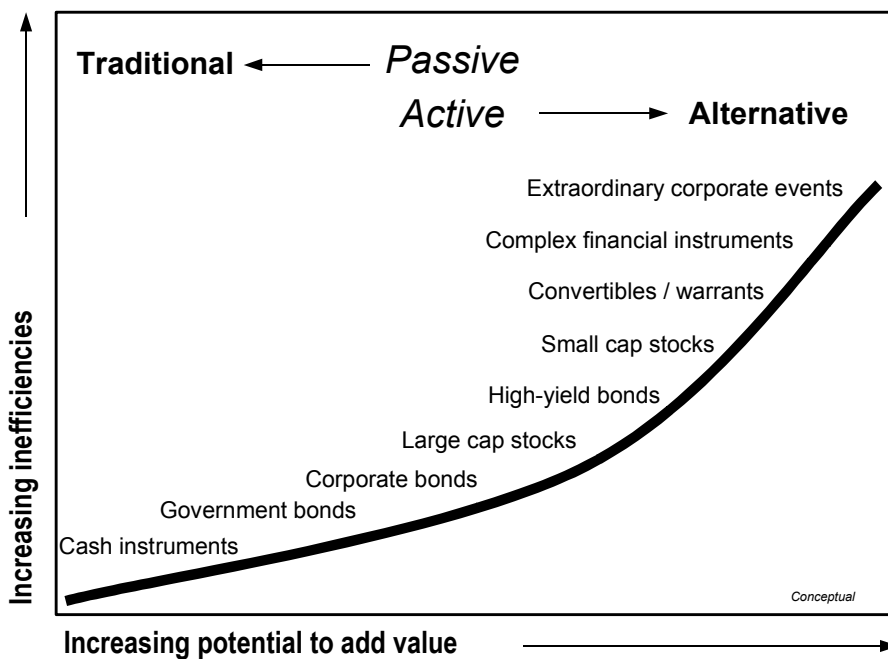
The law of active management suggests that value added from active management is a function of both skill and opportunity set

¹ Note that the term 'within his area of expertise' is quite important. In the early days of the asset management industry, the manager was more or less unconstrained. The early days of the hedge fund industry was to some extent built on the 'trust me' principle – i.e., managers here were also unconstrained. Traditional managers became constrained through the introduction of benchmarks, whereby hedge fund managers remained only self-constrained. Today, many traditional managers are trying to loosen up their constraints to be able to add more value (because their interpretation of 'the law' is similar to our own). It is, we believe, not entirely without irony that hedge funds are going the other way, i.e., are potentially becoming more constrained: hedge funds who want to cater to institutional investors and want to build franchise value need to become more transparent. This (among other things) means becoming more process driven (as opposed to key guru driven). We expect the two groups of managers to meet somewhere in the middle.

² One could counter-argue and say the absence of constraints implies a manager being able to operate inside as well as outside his core competency. With constraint being paradoxical, we therefore mean constraint in a narrow sense, i.e., constraint of the manager's flexibility within his core or related competency.

of EMH suggests that the price is always right. Chart 9 is (as is, we believe, the whole hedge funds industry) inconsistent with the strong form of EMH.

Chart 9: Investment approach in relation to potential to add value



Source: UBS 'The Search for Alpha Continues' [2001] (Original from Quellos)

- The potential to add value from actively managing assets is positively related to the degree of price inefficiency. The greater the inefficiency, the larger the prospective reward.
- In a market with low price efficiency or high complexity, an active approach makes more sense, as the potential to add value is larger.

We believe time pushes the line in Chart 9 downwards, i.e., markets become more efficient over time as ‘the market’ learns and adapts. In other words, markets become ‘aware’ of how pioneers exploit market inefficiencies.¹ While skill may remain constant, the reward from applying the skill falls over time: One needs to adapt the skill to changing market circumstances, i.e., one needs to evolve to survive. It goes without saying that a business model that allows for manoeuvrability and adaptability is more sustainable than one suffering from the ‘one-trick-pony’ syndrome.

One needs to evolve to survive

¹ We believe the above to be true. However, one could also argue that there is ‘constant’ market malfunction caused by investors with different utility functions. Convertible arbitrage, one could argue, has been around for decades and has rewarded the arbitrageur handsomely for decades. A large part of the returns is attributed to issuance that is brought to market too cheaply. The reason for bringing the paper to market too cheaply is that the issuer has a different utility function – i.e., the benefits of launching mispriced convertibles is larger than funding through launching fairly priced equity or debt. The cyclical in the degree of mispricing stems from shifts in the supply and demand imbalances. Currently, demand for cheap issuance is much larger than supply, so inefficiency is smaller and returns are therefore below norm.

Our point: we believe one can find arguments for both: (1) convertible arbitrage has structurally changed and does not work any more because the inefficiency was crowded out; or (2) convertible arbitrage is in a cyclical low. We lean towards the latter, although we believe convertible arbitrage has to some extent changed structurally in the sense that the rapid expansion of credit derivatives opened new avenues of return for the arbitrageur to exploit.

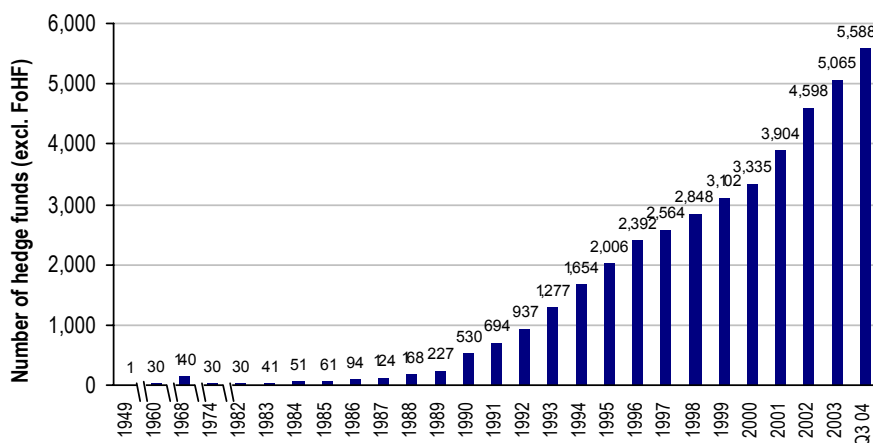
Beta is back

As mentioned earlier, there are some incidences of hedge funds launching long-only (beta) products. As equities have risen recently, the appetite for equity beta seems to be on the rise, too. It is not entirely unthinkable that there is positive correlation between markets going up (the cause) and appetite for that market's assets (the effect). Potentially, there are also hedge fund managers and/or investors who question the value added of the short book through the full cycle, i.e., they view the short book as just some sort of short-term 'volatility dampener'. We believe there are two points worth mentioning in this context: one related to risk, and one related to the history of hedge funds.

'In order to be irreplaceable one must always be different.'
Coco Chanel

- **Risk:** The original idea of a hedge fund was to achieve continuous absolute returns where the return is a function of skill, not randomness. If this can be achieved, the return stream is fairly smooth and revenues a function of success. Financial progress is hence to some extent predictable, as opposed to random.
- **Remember:** Hedge funds have already departed from the Alfred Jones model once before. At the end of the 1960s bull market, hedge funds were long and levered. During the two subsequent bear markets (1969-70 and 1973-74), around two-thirds closed down (Chart 10). For the 28 largest hedge funds in a SEC survey from 1968, assets under management declined 70 percent due to losses and withdrawals.¹

Chart 10: Number of hedge funds (1949-2004)



Source: UBS (1990-2004 from Hedge Fund Research, 1982-1989 from Quellos, prior to 1982 from Elden [2001] and Caldwell [1995]).

- According to Caldwell [1995], the near extinction of hedge funds three decades ago was largely explained through managers departing from the idea of hedging certain bets and leveraging up equity market risk. Could history repeat itself?

¹ From Caldwell [1995].

Leverage—a tool for the active risk manager

We understand the use of leverage as a tool to actively manage risk. Generally speaking, and everything held equal, risk increases as leverage increases and is reduced when leverage decreases. When exploiting market inefficiencies, leverage is often used because the inefficiencies are too small to be economically meaningful without the use of leverage. The relevant question for the investor is to know which risk factors have been amplified and which have been reduced as a function of the manager using leverage.

We believe leverage can be used in three ways: to amplify or add exposure, to diversify exposure, and to hedge exposure. By ‘exposure’, we mean risk exposure, i.e., a financial position that potentially could move against the investor’s best (financial) interest. In the following, we give an example for the three different uses of leverage. (None of the three examples contains exposure to idiosyncratic risk.)

Assume an investor with an equity base of 100. If the investor has invested 100 in German large-cap stocks, and borrows 100 to invest in French large-cap stocks, the investor would be considered levered by 2:1, i.e., the gross exposure is 2 or 200% while the equity is 1 or 100%. The net exposure would be considered as 200%, too (i.e., the investor has levered up). The use of leverage has certainly increased the risk exposure.¹

The second example is an investor with the same capital base of 100 invested 30 in US large caps, 30 in a CDO of subordinated debt of Chinese bicycle manufacturers, a notional 30 in Kazakh wheat forward contracts, and 30 in a collection of marble sculptures by a series of Icelandic artists. (For the sake of argument, we assume here that the investor’s expected return is positive for all four investments and there are no differences in terms of liquidity.) The leverage in this example is 1.2:1. However, the portfolio is diversified. The portfolio is diversified because the returns are expected to be volatile over time, but to be fairly independent of one another. In other words, there should not be a causal relationship between US stocks and Icelandic art (at least not an obvious one)². We believe that the total risk (here defined as the probability of losing large amounts of money) with this portfolio is lower than with a (unleveraged) long-only portfolio 100 percent in US stocks. In other words, it is not the leverage per se that tells us something about risk, but the exposure to factor bets³, portfolio

Leveraging and de-leveraging as a risk management tool

First use: to lever up

Second use: to diversify

¹ A (purely hypothetical) out-of-control bank employee loading up Nikkei futures would also fall in this category.

² Correlation and causality are not the same. In what is becoming an infamous example, David Leinweber went searching for random correlations to the S&P 500. Peter Coy described Leinweber’s findings in a Business Week article entitled “He who mines data may strike fool’s gold” (6/16/97). The article discussed data mining and the fact that patterns will occur in data by pure chance, particularly if one considers many factors. Many cases of data mining are immune to statistical verification or rebuttal. In describing the pitfalls of data mining, Leinweber “sifted through a United Nations CD-ROM and discovered that historically, the single best predictor of the Standard & Poor’s 500-stock index was butter production in Bangladesh.” The lesson to learn, according to Coy, is that a “formula that happens to fit the data of the past won’t necessarily have any predictive value.”

³ Note that the term ‘bet’ in finance is not necessarily equivalent to its colloquial meaning of ‘gamble’. Although we believe the inference of gambling is not correct, it is easily made by the popular press when viewed in the context of financial tools such as derivatives, short selling and leverage. Quite often these tools are viewed as speculative, whereas we view these tools as mere instruments to actively manage risk efficiently.

concentrations, liquidity, volatility, etc. that have been altered through the use of leverage.¹ Our point: additional information (other than leverage) is required to assess risk.

The third example is an investor with a capital base of 100 invested 100 in UK large-cap stocks and short 100 notional FTSE 100 futures. The (accounting) leverage is again 2:1, as the gross exposure is 200 percent. However, this investor used leverage to hedge. The idea of hedging is to find an instrument to mirror-image the original position, in this case UK large caps. A short position in FTSE 100 futures has a correlation to a UK large cap portfolio of around -1 , while the expected return of the short futures position is negative—that is, the opposite of the long position. The two expected returns cancel each other out—hence the term ‘hedging’. The difference between hedging and diversifying is that when diversifying the expected return of all investments is positive and the correlation normally between 0 and 1. Note that it is not the use of leverage that has reduced risk, but the reduction of the exposure to a volatile factor (in this case the stock market). The use of leverage is just a tool.

Third use: to hedge

The art of generating alpha

For his Statue of David in 1501, Michelangelo used a single block of marble. For Michelangelo, to sculpt meant to take away, not to add, because the sculpture already existed inside the block of marble. The stone was just the covering of a work of art; the sculptor only had to take away the part in excess. The sculptor's hand, guided by intellect and experience, could only take out what was already extant inside the block of marble, and needed only to free the ‘idea’ inside from the superfluous matter surrounding it. One could argue that the alpha in capital markets is already there. One just needs to hedge (‘take away’) all the various unwanted risks in order to carve it out. As markets become more and more efficient, this will be increasingly difficult without using all risk management tools available. Constraining (positively skilled) managers in their field of expertise and the use of the tools to execute their craft, therefore, cannot be optimal.² It's like giving Michelangelo only a hammer.

‘If you knew how much work went into it, you wouldn't call it genius.’

Michelangelo

We believe the term ‘hedge fund’ is perceived as a misnomer because there are no hedge funds that hedge all risks. If all risks were hedged, so would all the returns. Ex-ante, returns are a function of taking risk. Absolute return investing implies that the risk-neutral position is cash (i.e., no risky positions at all). Generating alpha, we believe, by definition means to take some risk. However, there are risks that are more likely to carry a reward, and risks that are less likely. Some bets follow a Brownian motion; some do not. The process of differentiating the two, the ‘sculpting’, is then a function of intelligence, savvy-ness, effort, experience and skill.

No risk, no return

¹ Although this statement can easily be challenged: If, for example, extraterrestrials attacked Earth, and ‘nationalised’ (or more precisely ‘extraterrestrialised’) all tangible assets, then the investor would owe them money – i.e., ‘risk’ could be perceived as higher than if the investor was unleveraged in just equities and bonds in an unleveraged long-only fashion.

² Constraining negatively skilled managers is unwise, too - they should not receive any money in the first place.

Hedge funds are involved in all three ways of using leverage discussed above. Given that the three examples differ widely, we find it inappropriate to generalise the use of leverage as universally bad. The realisation among many participants in the financial community that there are hedge funds that have portfolios that are less risky (because well diversified) than, for example, some pension fund portfolios (because risk is highly concentrated), is a change in perception that we believe is structural, more than it is cyclical.

Current change in risk perception: a period of enlightenment?

Bottom line

We believe that in active asset management it is important to apply a skill that carries a reward in the marketplace within an opportunity set where the risk/reward trade-off is skewed in favour of the risk-taker. What we keep referring to as structural change in the asset management industry is about finding skill (which is difficult enough), as well as the optimal set-up for that skill to be operational in a value-added fashion. In terms of applying skill, we believe there is a trade-off between transparency and standardisation on the one hand, and entrepreneurial manoeuvrability on the other. Interestingly, traditional asset managers are becoming somewhat more entrepreneurial by venturing into the absolute return space while hedge funds by and large are moving in the opposite direction, i.e., they are becoming more transparent (as in self-constrained, disciplined, and process driven) to cater more to high-quality (quite often institutional) investors.¹

We believe this to be consistent with our story of hedge fund land merging with traditional asset management land. In other words, from now on we should be talking about product differentiation in asset management—i.e., distinguishing between *active* and *passive* risk management—and not between hedge funds and non-hedge funds.

¹ Note, however, that there is some anecdotal evidence of billions of dollars raised purely on the 'trust-me' principle.

A hedge fund is a business

'I wish Karl would acquire some capital, instead of just writing about it.'

Mother of Karl Marx

- *The current institutional quest for more efficient portfolios in the form of higher return for the same risk (adding alpha) or the same return with lower risk (diversifying systematic risk) is unlikely to end soon.*
- *Generating alpha is becoming more difficult over time. This means an entrepreneurial approach that is innovative and adapts to changing market conditions probably works better than an administrative, non-adaptive approach.*
- *The investor will probably continue having to share the pure alpha (where it exists) with the generator. Efficiency gains through diversification are probably the only free lunch in financial economics accessible for all investors.*

An alternative way of defining alternative investment strategies (hedge funds)

We believe hedge funds are not a separate asset class, in that characteristics of the average or index return may be different from those expected of any one fund.¹ Normally there is wide dispersion of returns among funds, following the same strategy. Equities, bonds and other traditional asset classes have an economic rationale for giving positive mean returns. Hedge funds have no economic theory underlying their positive performance. There is no risk premium in the classic economic sense. The returns are achieved by the managers' ability to exploit inefficiencies left behind by other (less informed, less intelligent, less savvy, ignorant, or uneconomically motivated) investors in what is largely considered a zero or negative sum game.

As we will point out in this section, predictability (herein used as the opposite of randomness) of some sort is important when a favourably skewed risk/reward trade-off is the objective. Whether it is central banks trying to adhere to a multiple set of conflicting objectives, or asset managers indexing and benchmarking to asset benchmarks, or liability managers immunising duration risk according to liability benchmarks, or regulatory/accounting changes, or outright foolishness causing predictable market behaviour does not really

Hedge funds are not a separate asset class

System is held in equilibrium by impact of prey and predator being balanced

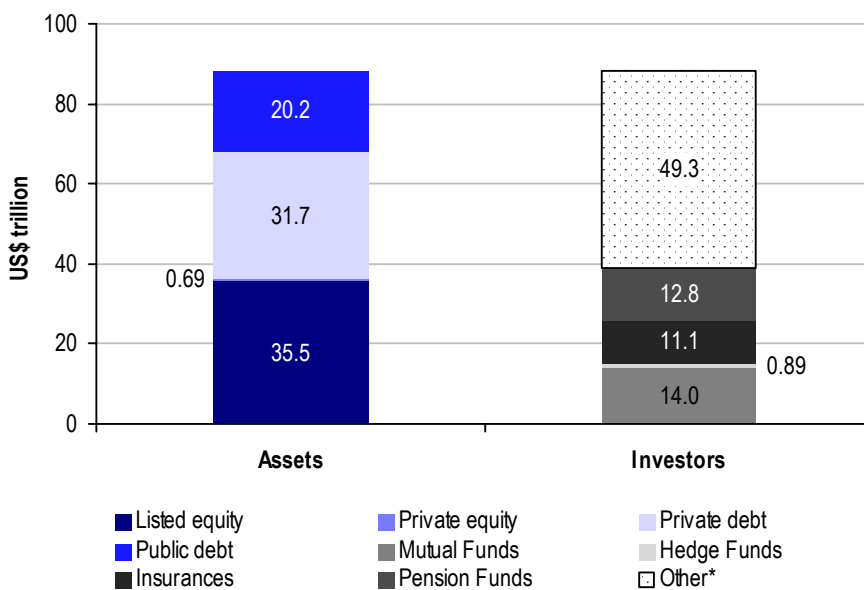
¹ Speaking of asset classes: Some define a hedge fund as 'a compensation scheme masquerading as an asset class'.

matter. The investors causing the inefficiencies need not be irrational. All investors could be acting rationally relative to their set of objectives, best knowledge and incentive structures. However, an uneconomic, suboptimal, or unrealistic set of objectives can be the cause of uneconomic behaviour in the market place. In a zero-sum game, the predictability stems from the roles of predator and prey being fairly straightforward.

Chart 11 contrasts assets with investors. The first bar is an estimate of equity and debt, the second bar an estimate of who owns these assets, i.e., the investors. The two bars should be identical. If assets grow by x percent, all investors' capital grows by x percent too. If an investor grows at 2x, someone else or a group of other investors got less than x. (Whether the 2x are a function of skill or luck is beside the point at this stage.)

'If the misery of the poor be caused not by the laws of nature, but by our institutions, great is our sin.'
Charles Darwin

Chart 11: Global asset base versus investor base (2004)



Source: UBS (HFRI, ICI, OECD, PricewaterhouseCoopers)

* Other: Mainly governmental (supranational) bodies, corporate treasuries, banks, and private investors investing directly. The US\$49.3tr was assumed for the two bars to be the same size.

Note that we have ignored investments related to property, commodities, currencies, art, wine, etc in this graph.

- When presenting the data like this one is inclined to ask what the fuss over hedge funds is all about. When compared to the aggregate asset base or other investors, the hedge funds industry, with around US\$0.89 trillion assets under management, seems still rather miniscule.
- If, for example, equities halve from US\$36 trillion to US\$18 trillion, someone is going to lose that kind of capital or wealth. Not all investors can be hedged; only some can. Essentially, those investors can be hedged who transfer that risk to other investors, presumably—or ideally—to those consciously indifferent to short-term market swings.

If the Sharpe ratio were a good measure for risk-adjusted returns, the analysis of hedge funds would be rather simple. A majority of hedge funds have Sharpe ratios in excess of 1.0 while equity and bond portfolios (as a proxy for long-only strategies) do not.¹ We believe that Sharpe ratios (and brethren measures) are, at best, a good measure for the *investment* risk of a portfolio. However, an investor investing in a hedge fund is also exposed to *operational* or *business* risk. Sharpe ratios are not designed to measure business risk.

Sharpe ratios do not measure business risk

An airline company's stock, for example, is exposed to various types of risk, some of which are measured by volatility of its stock price. However, equity volatility might not be a good measure to assess default probability of its bonds. A credit rating by a neutral agency conducting due diligence and analysing balance sheet dynamics is probably more appropriate. The same logic should apply to assessing risk of hedge funds. The investment risk should be assessed differently to the business risk, despite the two being interrelated.

Investment risk and business risk should be assessed differently

We believe a (well balanced) market neutral or a long/short investment style (both of which use leverage) is less risky than a (well balanced) long-only investment style, almost by definition. However, while a market-neutral investment *style* is of little 'risk', it does not follow, that an investment in a market neutral *fund* is safe. At the end of the day, a hedge fund is a business. Occasionally businesses fail. Accidents happen. This is true in the stock market, corporate bond market as well as hedge funds.

'Many people who are smart, articulate and admired have no real understanding of business. That's no sin; they may shine elsewhere.'
Warren Buffett

The best business model—ever

Every business carries risk. Every business is based on some form of business model. Every business model is based on some form of expectations about the future. Assessing hedge fund investments, therefore, has a lot to do with assessing business models.

'Risk, to state the obvious, is inherent in all business and financial activity.'
Alan Greenspan

What is the best business model—ever?

We believe the best business is to run a lottery. Running a lottery, in our view, is an ultra-high margin business in which the margins are more or less stable and sustainable and therefore predictable. The provider of a lottery sells lottery tickets whereby the economic value (fair value) of the ticket is a fraction of the price the buyer pays. As a matter of fact, running a lottery, as a business, is so attractive that most often the government runs it.

Running a lottery is statistical arbitrage with high margins

Ask yourself the following question: If you sell lottery tickets for US\$1 per ticket whereby every one millionth ticket pays out US\$100,000 to one lucky winner, how many tickets, as an entrepreneur, do you want to sell? Answer: as many as possible. This is statistical arbitrage at its best: For every round, you take in (on average) US\$1 million (roughly your gross earnings) and pay out US\$100,000 (your cost). That's a high-margin operation. Occasionally there will be outliers. For example, it is possible that you sell 11 US\$100,000 winning

'Entertainment is our Biz. Luck is yours.'
Print advertisement of European casino operator

¹ Comparing Sharpe ratios of two investments with different liquidity characteristics is somewhat unfair, as returns are often smoothed in the case of the less liquid investment. See for example Getmansky, Lo, and Makarov [2003].

tickets in one round. This would result in a loss (paying out US\$1.1m and only taking in US\$1m). Statistically the US\$100,000 loss would be a far-from-equilibrium event, i.e., a statistical outlier on the wrong side of the return or cash flow distribution. The reason for it to be ‘far-from-equilibrium’ is not because US\$100,000 is a lot of money but because the equilibrium (mean cash flow or mean return) is so high and the volatility around the mean is so low. Empiricists, analysing your business model with highly sophisticated quantitative techniques on your cash flow stream (read: historical returns), would—finding an inflated excess kurtosis statistic—probably come to the conclusion that you are doomed because you are picking up nickels in front of a steamroller.¹

There are three points that we believe are important: stability, sustainability, and predictability of earnings or returns or cash flows or revenues. We believe the three are interrelated.

Departing from randomness

Running a lottery is an extreme example. To understand why a lottery has stable cash flows that are sustainable over time and, therefore, are predictable, we need to understand the fundamentals of the trade (as opposed to examine historical time series with the help a computer). The reason a lottery works is because there are so many fools. From a neo-classical economic perspective, the buyer of a lottery ticket is a fool. He spends US\$1 for something that is worth, say, US\$0.001. The beauty of the business model is that the buyer quite often knows that the value is not even close to US\$1 but still continues to spend US\$1 or more per week on lottery tickets.²

The reason the cash flows are stable is because the sample of fools buying lottery tickets is fairly stable. There might be some cyclical variation in their spending habits due to changing economic conditions. However, these variations cannot be huge. Hope for ‘more’ probably always sells well. The reason why the cash flows are sustainable is because the world is not going to run out of—again, purely economically speaking—fools any time soon. Neither will the buyers smarten up as they already (presumably) know that their purchase is uneconomical from a probability-weighted expected return (rational expectations) point of view. Given that the entrepreneur’s returns are stable and sustainable, they are fairly predictable (especially in the absence of competition). The cash flows of a provider running a lottery operation do not

The more a business generates its revenues from a predictable, non-random source, the better

‘People think I’m a gambler. I’ve never gambled in my life. To me, a gambler is someone who plays slot machines. I prefer to own slot machines.’
Donald J. Trump

¹ A lot of the hedge fund research stresses that some relative value strategies are informationless and that managers are selling far-out-of-the-money or disaster put options, i.e., picking up nickels in front of a steamroller. Note that risk measurement and risk management are not the same. Robert Gumerlock, a former head of risk at Swiss Bank Corporation and O’Connor, on risk measurement: ‘When O’Connor set up in London at Big Bang, I built an option risk control system incorporating all the Greek letters – deltas, gammas, vegas, thetas and even some higher order ones as well (the delta of the gamma and the gamma of the vega). And I’ll tell you that during the crash it was about as useful as a US theme park on the outskirts of Paris.’ Found in Alexander, Carol [1996] *The Handbook of Risk Management and Analysis*, Chichester: John Wiley & Sons.

² Behaviouralists try to explain the utility of the lottery ticket buyer hedonistically - i.e., in non-financial terms. Perhaps (the author wouldn’t know) the ticket buyer’s utility from briefly thinking of what one would say to his or her boss when handing in one’s resignation, makes up for the US\$0.999 difference per ticket. Note that one could also explain the rationale for buying a lottery ticket with a utility function with an extraordinary preference for skewness.

follow a random walk.¹ A licence to run a lottery is a licence to print money. If there is such a thing as a benchmark in the absolute return world, it is, in our view, running a lottery operation.²

What is the second best business model? We believe running a casino must rank pretty high on the scale of attractive business models.³ The idea is the same as with running a lottery operation. Economic agents behaving uneconomically are also a prerequisite. Someone has to give (read: lose). One could argue, as with active management, it's a zero-sum game, as resources (in this case money) are simply transferred from losers to winners.⁴

Assume a casino has 10 roulette wheels. Every roulette wheel has 36 numbers and one zero (sometime even two zeros). The gambler's gain is 36 times his capital at risk by betting on a number or 100% in case of betting on a colour (red or black). The casino gets all the capital at risk if the ball stops at zero. The casino, on average, makes nothing in 36 out of 37 spins of the wheel. However, every 37th spin it wins. This relationship is stable; the cash flow sustainable and fairly predictable.

Empiricists, analysing the business model with highly sophisticated quantitative techniques on the cash flow stream, would—finding a negative skew statistic—probably come to the conclusion that the strategy is highly unattractive; in our view, missing the point entirely. They cannot be blamed. One of the standard assumptions in finance is the random walk and the notion that returns are distributed normally. However, potentially the tools and techniques from standard financial theory might not capture the essence of what is going on, i.e., the objective to create and run a business where fairly predictable positive compounding is the major purpose. If positive compounding is an objective, randomness needs to be, we believe, curtailed and controlled. (Speaking of randomness: we try to predict the year-end value of the S&P 500 in the Appendix on page 56.)

Assuming continuous solvency (and ignoring 'protection tax'), the casino always wins in the medium to long term

Positive compounding is major business objective

¹ It goes without saying that the statistical tools and techniques that were designed to assess distributions of random variables are inappropriate to assess the attractiveness of a business where cash flows (returns) are not randomly distributed.

² Note that we have ignored social/ethical considerations while discussing lotteries. Lotteries are potentially controlled to mitigate cash flowing from loser (the gambler) to winner (the entrepreneur). Given that active asset management is a zero-sum-game, i.e., a transfer of cash flow from losers to winners, active asset management could one day be banned too.

³ The last time the author thought it was attractive to run a casino was during a recent (and first) visit to the casino in Monte Carlo. More than one player was playing roulette and taking notes of the sequence of numbers, presumably trying to find a strategy that works (potentially in an attempt to corner the house). What a great business indeed.

⁴ Counter-argument: In theory we could assume that all investors could 'win' if we assume that 'winning' means perfectly matching objectives with outcome. In a sense we could assume that the casino gambler is not a loser because he has utility from losing money in form of entertainment and sensation. The same could apply to asset management: We could argue that, for example, a pension fund with a relative return perspective causing market inefficiencies has utility from losing money in the form of perfectly immunising duration risk. In other words, everyone could be happy—the gambler, as he has sensation, the liability-benchmarking pension fund, as he has a perfect match between assets and liabilities (i.e., no risk for the sponsor), and the absolute return investor, as he has, well, absolute returns.

Note that one of our cardinal assumptions in our AIS research is that all investors experience disutility from capital depreciation—it's just that it is more obvious after a loss.

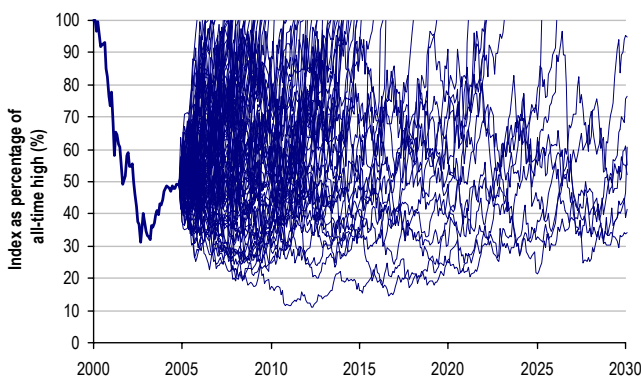
The random and the non-random way to recover from a loss

There is also the potential for excess kurtosis in the above casino example. For example, a gambler who is betting with above-average sums could get lucky and win 36 times his capital. It is also possible that a gambler wins a couple of times in a row (and the casino unfortunate enough to only have one or two roulette tables (read: concentration of risk)). However, the business is still attractive. The cash flows are still sustainable and predictable and, if well diversified, stable as well. This means the cash flow pattern after a large drawdown is not random, but predictably mean reverting, most likely, the next day. A large drawdown in the stock market, for example, is (one could argue) also mean reverting. The difference being that one does not know if it halves before it mean reverts and by when the mean reversion will have been completed. We find this distinction to be material.

In the case of a casino, the recovery from a large loss is not a function of randomness

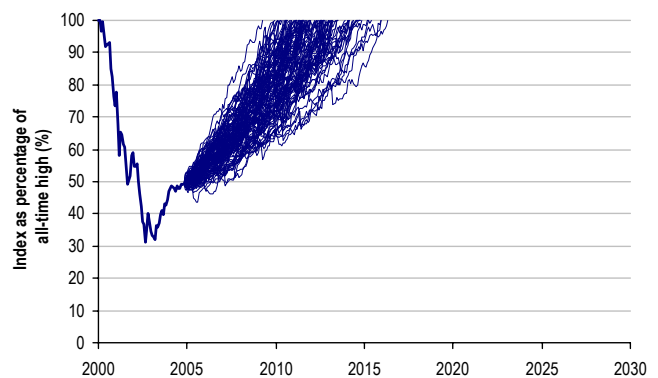
A random recovery from a loss or a predictable recovery from a loss are, we believe, very different. The following two graphs show the under-water perspective (index as percentage of previous all-time high) of the OMX index that was under water by 50 percent at the end of October 2004. In both graphs we have run a bootstrapping approach, i.e., the nonparametric generation of random scenarios by drawing returns with replacement, to simulate 100 possible paths of recovery. Chart 12 shows the potential OMX recovery by re-sampling OMX returns, while Chart 13 shows 100 potential recoveries using (what we believe are) non-random returns of the HFRI Fund of Funds Composite index. We believe the two graphs visualise what we referred to as ‘very different’.¹

Chart 12: OMX recovery with OMX returns



Source: UBS (raw data from Thomson Financial Datastream)
Graph shows OMX from January 2000 to October 2004 and 100 randomly created paths using OMX price returns in SEK from January 1990 to October 2004.

Chart 13: OMX recovery with HFRI FoHF returns



Source: UBS (raw data from Thomson Financial Datastream and Bloomberg)
Graph shows OMX from January 2000 to October 2004 and 100 randomly created paths using HFRI Fund of Funds Composite total returns in USD from January 1990 to October 2004.

- Both recoveries have positive mean returns, i.e., both samples are upwardly biased (as the return distributions from which we draw returns have, historically, a positive mean).

¹ The situation does not change materially if we normalise the mean of the HFRI FoHF index to the mean of the OMX index. The reason for this has to do with what we called an 'asymmetric return profile'. See earlier sections of this report or UBS [2002b, 2003].

- Chart 12 shows that recovery simulated with volatile returns can be short and gradual (akin to post 1987) as well as long and choppy (akin to post 1929).
- Note that there is always light at the end of the tunnel. Chart 12 just somewhat implies that there is uncertainty as to whether the light stems from daylight at the end of the tunnel or from another train's headlights.

Assuming statistical arbitrage is attractive because cash flows are stable, sustainable and predictable, what is the next best business model? We believe it is running a bank. The original business model of running a lending bank was statistical arbitrage. The idea is to take in money and pay a low return and lend money and charge a higher return. Probability of default of creditors can easily be managed through diversification, as it is idiosyncratic risk. Insurers too were early players in statistical arbitrage. The idea is to structure the policies so that, on average, the cash inflows are larger than cash outflow, one just needs to get ones statistics right.¹

Foundation of banks and insurers is statistical arbitrage

There is a problem with all this. The banking business, insurers, or any other form of statistical arbitrage is not necessarily a milk and honey business. The problem can be summarised in one word: competition.

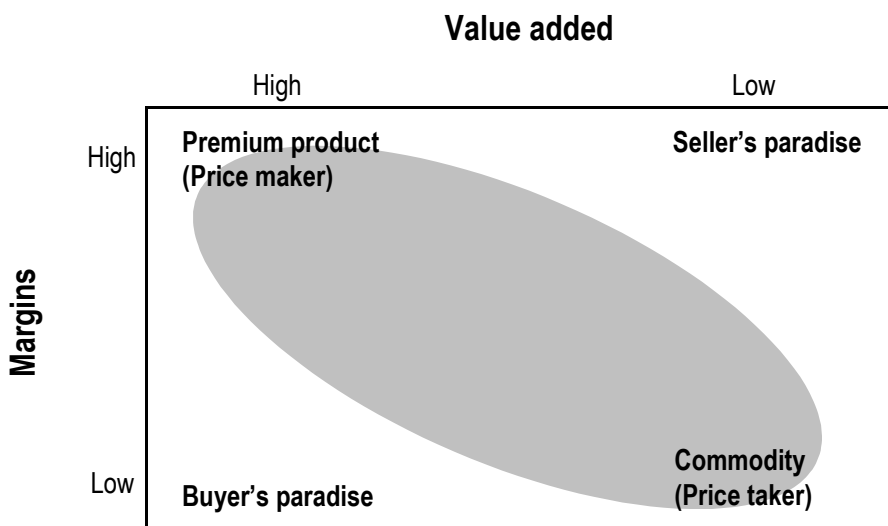
¹ Which is obviously easier said than done. In the past couple of years, mortality rates have declined at a faster pace than anticipated and 100-year floods seem to happen almost annually.

Honey, I've shrunk the margins

During the equity bull market, insurers generated returns from having invested assets in the stock market but not necessarily from statistical arbitrage, i.e., their core business. The fact that there are many insurers with a more or less homogeneous products competing with each other means that margins have shrunk. Buyers' demand, in combination with positive margins, falling production costs and falling barriers to entry, increase suppliers' competition and put margins under pressure. It is unlikely that an industry or sub-industry is exempt from this mechanism. Note that in this section we use the term 'margin' for fees as opposed to spreads, fully aware that in hedge fund space the two have evolved in diametrically opposite directions.

Chart 15 shows different possible positions, with respect to margins (as in fees) and value added (somewhat adopting and modifying Boston Consulting Group's growth/market share matrix (Chart 14)).

Chart 15: Buyer/seller paradise

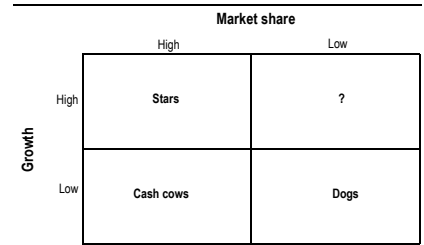


Source: UBS

The grey area shows normal business activity, whereby those who add value command a high margin and those who offer a commoditised product do not. Normal business activity should be within that area. The exceptions are high margin/low value added (essentially a seller's paradise) and low margin/high value added combinations (arguably a buyer's paradise). An example of a seller's paradise is, we believe, premium ball pens. Production costs are low (how much does it cost to produce a ball pen these days?), the product homogeneous and easily replaceable. A cheaper alternative can always be found quickly. It can command a premium because it (we assume) inflates the self-confidence or perceived social status of the buyer (displaying the pen visibly). (In marketing this is known as the 'snob effect'.) Running a lottery, as pointed out earlier, is also a seller's paradise. An example of a buyer's paradise would be airline tickets. Competition has forced margins close to zero, while the service is of great value to the buyer. A London-New York airline ticket costs a couple of hundred dollars and takes a few hours. The next alternative costs

Competition doesn't necessarily increase margins

Chart 14: Growth/market share matrix



Source: BCG

There is a positive relationship between value added and margins

either much more (private jet) or takes much longer (taking a boat, swimming, etc).

How are products in the asset management industry positioned in this matrix? Potentially most products have a tendency to start in the upper-left, migrate to the upper-right and then fall to the lower-right hand corner. Active large-cap long-only products, we believe, were in the upper-left when a research-driven process was new and the reward from simple fundamental analysis was high, i.e., the reward from applying that particular skill was high and the product was an innovation. Over time, we believe competition pushed the product to the right as the reward from applying the skill got reduced or even crowded out. The upper-right hand corner in Chart 15 is unlikely to be a sustainable position unless market forces are artificially and/or uneconomically disturbed, such as in lotteries (government essentially running a monopoly) or premium pens (snobs remaining snobs). The product's journey continued south, accelerated through cheaper alternatives (competition) and potentially the equity bear market (sudden reality-kick). In institutional investment management there is a good chance that active long-only products are going to stay in the lower-right as there are cheaper alternatives, the potential value added is sometimes considered to be fairly random, i.e., rarely sustainable and hardly predictable. Beta is not scarce and access therefore does not carry or warrant a huge premium.¹ (We have tried to estimate aggregate fees in hedge fund space and traditional asset management in the Appendix on page 62.)

How are hedge funds positioned in the matrix?² It is not entirely unthinkable that hedge funds will go the same way as mutual funds, just delayed by a couple of decades. We believe hedge funds today capture large parts of the upper part of the matrix, i.e., margins (as in fees) are high. There are hedge funds that are adding value and charging high fees as well as hedge funds that are not adding value but still are charging high fees. (Note that with 'high fees' we account for the general perception that fees in hedge fund space are high. Based on the concept of dead weight, it is quite easy—if need be—to make the point that hedge funds charge low fees while traditional active long-only managers charge high fees.³) Potentially, all products have a tendency to meet in the lower-right hand corner of Chart 16. How is one to escape?

Commoditised products do not (or should not) command a high margin

'I do it on behalf of my brothers Schubert and Mozart, who died in poverty.'
Igor Stravinsky in response to the notion that his fees were outrageous

¹ Note that one could easily argue that an active long-only fund is still of great value when compared with the portfolio of the average individual investor rather than a benchmark. Empirical research suggests that on average active large-cap long-only funds do not beat the benchmark net of fees, missing the benchmark by a couple of basis points. However, Barber and Odean [2000] demonstrate that private investors underperform by much more than a 'couple of basis points'. In theory, private investors could invest in ETFs or other indexed vehicles. In practice, which might or might not be a relief to the reader, only a small minority want their wealth compound on 'auto-pilot'. In other words, many private investors would be better off if they invested in actively managed long-only funds than trying to do it themselves.

Note further that one of our assumptions in all our research is that performance matters. Today, we are pretty convinced that this assumption does not apply to all investors.

² Note that we do not perceive hedge funds as a separate asset class. We view hedge funds as asset management companies that launch products that, in the past, have differed widely from traditional products. We believe, in five years time, product differentiation will be key and not, as today, differentiation of regulatory status of the provider.

³ See UBS *In Search of Alpha* [2000], page 63.

The role of innovation and marketing

Schumpeter's [1937] creative destruction suggests that competition erodes the entrepreneurs' margins over time. It is extremely unlikely that hedge funds are exempt from this law. (Although the most recent past might actually suggest otherwise.) We could call it a 'gravitational force' pulling products to the lower part of our margin/value added matrix. There are probably two legal ways to stop this 'natural' force: innovation and marketing.

- **Innovation:** Innovative products can command a premium, i.e., higher margins, as there temporarily is no cheaper alternative. Innovation can come in various forms: new products creating their own new demand, product improvement, new design, new distribution channel, etc.
- **Marketing:** Good product marketing gives the buyer the illusion of a premium product, i.e., some form of feel-good factor or snob effect, allowing the provider to withstand gravity in the margin/value added matrix for a finite amount of time.¹ Continuous marketing can keep product demand positive. With a commoditised product, increasing market share² is key, i.e., trying to move to the left in BCGs growth/market share matrix (Chart 14). In some countries, mutual fund TV advertisements are broadcast next to ads for washing powder, suggesting a fairly commoditised consumer product.

Innovation in the hedge funds industry can mean two things: the search for new sources of returns for the fund as well as the search for new sources of revenue for the business. The two are obviously correlated but not necessarily synonymous.

- **Returns:** We believe that innovation with respect to new strategies or new nuances within existing strategies is an imperative. Market inefficiencies do not last forever, some inefficiencies are cyclical, while others are one-off opportunities. In any case, adapting to changing market circumstances is important, as the infusion of capital always changes circumstances, i.e., the risk/reward relationship of the opportunity set.³ (In capital markets, feedback loops and the *Greater Fool Theory* have wide application.)
- **Revenues:** We believe that the hedge fund business model is not as easily scalable as that of a traditional manager, as maximising assets is normally not an optimal strategy. Some hedge fund managers scale their business by migrating from a core strategy to a multi-strategy approach. An alternative to this is the multi-product approach, where new strategies are put into separate vehicles as opposed into a master fund (thereby changing performance characteristics, i.e., reducing volatility as well as, in most cases, returns too).

'The trouble with the rat race is that even if you win, you're still a rat.'

Lily Tomlin (actress)

The search for alpha and access

¹ Although if you are 'betamax' in a 'VHS' world, all the marketing in the world will not help. We recently came across the term 'being betamax'd', implying a business idea or model that has run its course. We have not yet come across the term 'being alphamax'd'. (Note that betamax was largely considered as technically the better format.)

² In most cases, increasing profitable market share is probably more advisable than increasing market share for its own sake.

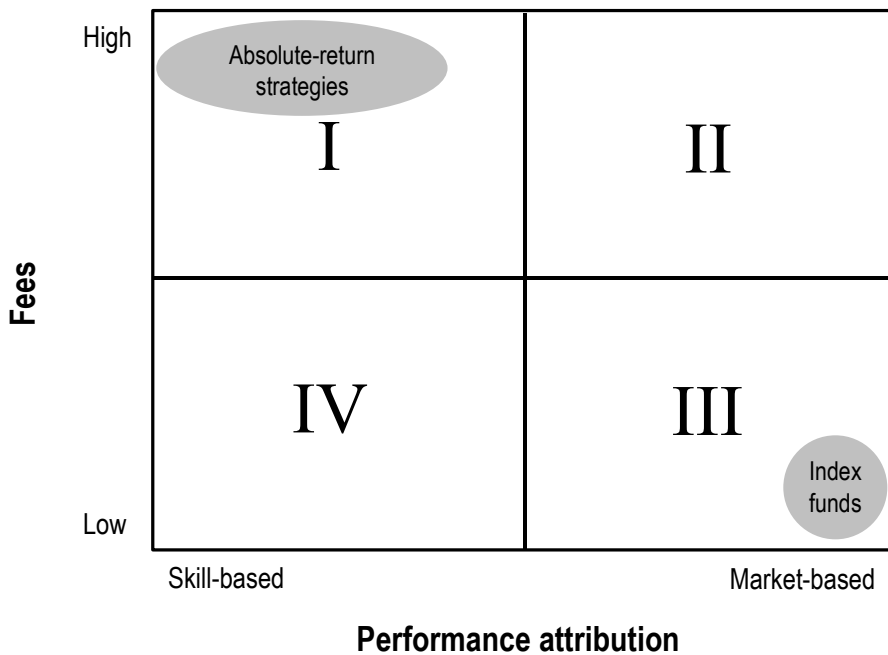
³ Some call the lack of adaptability to a changing environment the 'boiling frog' syndrome: the gradual warming of the comfortable water that finishes off the unsuspecting creature.

An interesting recent development within the hedge funds industry in this respect is the launch of long-only vehicles by some managers (as mentioned earlier). Typically, this is done by taking the long book out of the long/short portfolio and launching it as a separate fund. This is attractive from the manager’s point of view for two reasons. First, we believe that a long-only fund is more scalable than a long/short fund. Second, with a new fund the manager can leverage the existing brand value (where it exists) at low incremental cost.

Performance attribution and fees

In 2001 we phrased changes in the investment management industry as follows. In Chart 16 we classified the most active and most passive investment styles into a two-dimensional grid, where the vertical axis is the level of fees and the horizontal axis the performance attribution. Absolute-return strategies are in quadrant I: Fees are high and performance is, in theory and to some extent practice, determined by the manager’s skill. The other extreme is quadrant III, where margins are low and performance is attributed to the market.

Chart 16: Different business models



Source: UBS *The Search for Alpha Continues* [2001]

At UBS in 2001 we wrote (footnotes from original):

Alpha-generating strategies are normally skill-based strategies. If the flexibility of the manager is reduced to zero, the ex-ante alpha is zero as a result. However, as with every other industry, the asset management as well as the hedge fund industry will most likely transform (or converge) over time. A possible future scenario is that those asset managers with a competitive advantage will be offering

skill-based strategies.¹ One of the pillars supporting this belief is that a competitive advantage, to some extent, is determinable in advance whereas the path of a market is not.² A firm with prudent, intelligent, experienced and hardworking managers will have an advantage over a firm with fraudulent, uneducated hooligans.³

Today the bifurcation between alpha and beta is undeniable. However, this, we believe, is also a temporary phase in financial history. Just because it (combining indexing with active overlay) is currently happening and more and more investors seem to be doing/talking about it, it does not automatically follow that it's the pinnacle of investment wisdom for all times. We still believe that indexing and benchmarking is, putting it mildly, not the last word as to how institutional investors manage their assets.⁴ Until quite recently in the UK for example, pension funds had roughly 75 percent of their assets in equities, of which most was either benchmarked or indexed to the FTSE All-Share index. A couple of years ago one particular stock was roughly 13 percent of the index. In other words, UK pensioners had quite a concentrated exposure to one stock. (Note that modern portfolio theory suggests that non-systematic risk should be properly diversified as its exposure does not carry a risk premium. Note too, however, the problem sort of solved itself on its own, as the stock lost 80 percent of its value and therefore, by underperforming the average, became a smaller proportion of the index and, hence, of UK pensioners' portfolio).⁵

Indexing can cause predictable as well as absurd market behaviour

¹ Note that the subindustry for indexed investment products is oligopolistic, ie, there are only a few large organisations dominating the market. These companies, today, most likely have a competitive advantage over other asset managers. In the UK, some traditionally active managers have already departed the passive investment arena. This could mean that the positioning of asset managers into separate quadrants in the chart is in the process of unfolding. In other words, the specialisation in investment management mentioned earlier is simply continuing.

² We assumed here that the future is uncertain and that there are no market participants with a model with an R^2 of 1.0. We apologise to all those readers who know the level at which the Nasdaq will end the year.

³ However, if both are long-only, the latter can outperform the former due to luck.

⁴ Indexing causes some predictability. Brunnermeier and Nagel [2003] examined hedge fund behaviour during the technology bubble. Their findings are that (1) many hedge funds were riding the bubble, not attacking it, (2) hedge funds reduced exposure before prices collapsed, (3) their holdings outperformed characteristics-matched benchmarks. The authors highlight that their findings are inconsistent with the efficient market's view of rational speculation, but are consistent with models in which rational investors can find it optimal to ride bubbles because of predictable investor sentiment and limits to arbitrage. (In addition, they note that friction, such as short-sales constraints, do not appear to be sufficient to explain why the presence of sophisticated investors failed to contain the bubble.) We believe being predictable in secondary markets causes one to be on the wrong side of the alpha-generation process. It's potentially like bleeding in a shark pond: pretty hazardous and potentially unhealthy, assuming long-term survival is an objective.

⁵ Stocks from the European peer group fell by between 90 and 95 percent. In other words, UK pensioners were lucky. (In relative return space, that is.)

Alpha? What alpha?

We believe it is pretty safe to say, that not all that is marketed as alpha is alpha; neither in the hedge fund industry nor elsewhere. Clifford Asness [2004a,b] recommends we should distinguish not between alpha and beta but between *traditional betas*, *hedge fund betas* and *true alpha*. Traditional beta and true alpha are at opposing ends of the spectrum. Traditional beta refers to the traditional asset classes where a long-only strategy is sufficient to capture the yield or risk premium. True alpha (as opposed to marketing alpha or promised alpha) then, is a source of return that is entirely explained by the managers' investment skill and is not compensation for any systematic risk. Hedge fund beta is something in between the two extremes. Hedge fund betas are systematic risk premiums that require a slightly more sophisticated strategy than a long-only strategy. Skilled investors can pick up the risk premiums (while unskilled investors cannot). In other words, the premiums are compensation for some form of systematic risk, i.e., is not risk free. It distinguishes from traditional beta in a sense that it requires a higher degree of sophistication than the pursuit of a long-only style to capture the premium.

In a related context, Lars Jaeger [2002] uses the terms 'risk premium strategies' and 'complexity premium'. What he means is that there are risk premiums that are easily captured and others that are not so easily captured. The equity risk premium, for example, can easily be picked up through a long-only buy-and-hold strategy. However, picking up a premium around systematically mis-priced stocks after an announced merger requires other, more complex strategies.¹ The proverbial 'Belgian dentist' can easily pick up the equity risk premium but might or might not be advised to risk arb money. As Jaeger puts it:

'I believe that many AIS earn their return by assuming risk in a risk averse financial world, rather than from the identification of market inefficiencies. By taking these risks the investor is compensated with an expected return, the risk premium. I therefore refer to these strategies as 'risk premium strategies'. ... premiums in financial markets are positive expected returns that exceed the risk free interest rate in exchange for accepting the possibility of a financial loss. Over time, risk premiums provide an inherent and permanent positive expected return, the source of which does not disappear if spotted by other investors (although it can fluctuate over time). The nature of its underlying risk premium is directly related to a strategy's risk profile. The risks and premiums vary among different strategies. It is important to understand the economic rationales for the premiums of each individual strategy sector. ... For 'risk premium strategies', manager skill primarily expresses itself through premium identification, proper timing and the appropriate risk management.'

Distinguishing between traditional betas, hedge fund betas and true alpha

'Art is making something out of nothing and selling it.'

Frank Zappa

Hedge fund beta could be carrying a complexity premium

¹ Mitchell and Pulvino [2001], for example, suggest that there is a premium for putting on every announced deal passively.

In our previous research we only distinguished between alpha and beta. We are very sympathetic to the way Asness [2004a,b] and Jaeger [2002] put it. However, we also still believe that ‘manager skill’ that spots the premium, times the premium and manages risk appropriately, is essentially alpha; at least in a wider sense. What else? First, the proverbial dart-throwing chimpanzee cannot do it. There is no passive alternative, i.e., a purely non-adaptive way to capture the premium. Both the ‘premium’, as well as the proper skill to exploit the varying premium, change over time. Second, someone else is on the other side of the trade losing out.

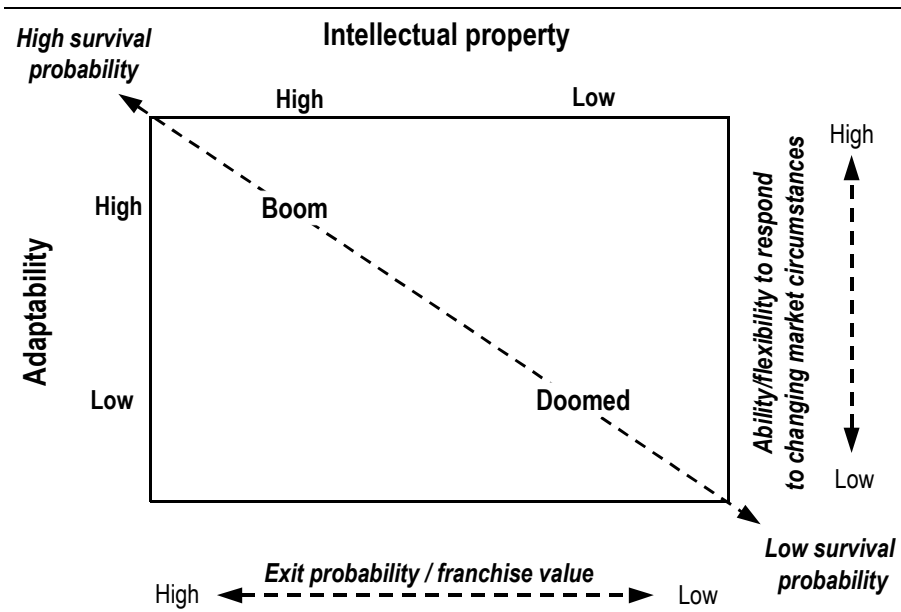
Today’s use of the term ‘alpha’ is far from unambiguous

Intellectual property versus adaptability of skill¹

We suspect that the belief and confidence in a purely mechanical, non-adaptive way to make money is potentially disastrous, as circumstances always change (initial opportunity changing due to increased attention, feedback loops, etc).² It's the source of bubble-and-bust sequences. Potentially, raw intelligence without some form of market-savvy is probably as short an out-of-the-money-put option as the opposite, i.e., an unintelligent, ignorant trader. In the pursuit of pure and sustainable alpha, as well as survival probability, a balance between the two—intellectual property and adaptability—is probably best.

In Chart 17 we try to systematise the investment management landscape with regard to intellectual property and adaptability in an ever-changing market environment. With intellectual property we mean an investment process that is based on some form of research as opposed to pure intuition. With adaptability we mean the ability and flexibility to respond to change.³

Chart 17: Intellectual property versus adaptability



Source: UBS

- We believe ranking high on intellectual property as well as adaptability is the best of all worlds. As a matter of fact, we believe what we call ‘active risk management’ and ‘asymmetric return profile’ arrives from not being ignorant about one of the two (or both), i.e., having a fundamental

¹ This section benefited hugely from discussions with Charlotte Burkeman, UBS IB.

² Unless you have a monopoly to run lotteries, that is.

³ Note that 'over-adaptedness' is a risk to survival too. A species of birds for example might have fended off predators in its natural habitat and survived because, over generations, they grew a large beak. However, at one stage the beak might become so heavy that they cannot fly anymore. If flying to the next island for food is a prerequisite for survival, they die and become extinct. In other words, the beak was an advantage in one regime but is a disadvantage in another. Variation in the gene pool which allows rapid innovation and mutation of disciplines forms the building blocks of survival. The parallel to the asset management industry is that, potentially, many investment companies have over-adapted themselves to rising stock markets and the doctrine of relative returns.

‘The best way to lose your shirt is to think that you have discovered a pattern in a game of chance.’
Warren Weaver, author of *Lady Luck - The Theory of Probability*

understanding of what is going on *as well as* understanding short-term relevancies and market dynamics. Note that we do not suggest that combining the two is easy. The spread of differing personalities executing different crafts is, in our experience and putting it politely, wide. However, the rewards for investment firms that foster a culture of excellence as well as continuous improvement could be high.

- The worst process is probably where both intellectual property as well as adaptability, are low, as for example with most day-traders: survival is low and most likely a function of randomness (and how deep the pockets were at the beginning of the activity). There is no such thing as building franchise value. (Suffering from the ‘one-trick-pony’ syndrome essentially means dying when the pony dies.)
- Note that the term ‘hedge fund’ was never a good term but it is becoming even less useful as time passes. We believe one does not need the legal structure of hedge funds to occupy the upper left hand corner of Chart 17. However, we do find the ability and flexibility to respond to changing market circumstances, i.e., manage total risk, rather crucial if longevity (or an exit price tag) is a business objective.

For a business to have a valuation there needs to be some form of continuity of the revenue drivers, i.e., sustainability of some sort. In addition, the drivers need to be transferable; otherwise the business is not scalable and cannot grow. High-quality earnings are perceived as earnings with lower volatility. In other words, earnings that are continuously reoccurring are preferred over erratically random earnings, and hence deserve a higher multiple.¹ Departing from randomness and migrating towards a value proposition built on the idea of sustainable earnings could be key. This brings us back to alpha, the ultimate value proposition in active investment management.

Departure from randomness is key if sustainability of earnings is a major objective

Something has to move and someone has to lose

For an absolute return manager to generate alpha, something has to move (positive contribution to P&L) and someone else has to lose (pursuit of alpha being a zero-sum-game before cost). We believe the origins of hedge fund investing were to find strategies where the probabilities were non-random, i.e., predictable to some degree, or skewed in favour of the investor (read: asymmetric return profile). As mentioned earlier, the goal of an absolute return business is to have stable, sustainable and hence predictable returns and cash flows. To the founders of the first hedge fund and to many other investment professionals, the future path of the stock market is a fairly random endeavour. The idea of absolute return investing is to try to take randomness out of the equation, by putting capital at risk where one’s fortune is skewed on the upside, while hedging out the random bit. Compounding capital as a function of randomness is not an attractive proposition to an absolute-return investor.

Active risk management could be termed as seeking non-randomness under uncertainty

¹ In the late 1990s banks could increase their P/E ratio by getting rid of volatile earnings from trading activity. Judging from some recent anecdotal evidence in 2004, banks now want those earnings back.

If it requires skill to unlock the value of ‘hedge fund beta’, then calling it ‘beta’ might not be appropriate. The author’s mother-in-law will not be able to identify the ‘beta’, find an optimal entry point, manage risk over the duration of the trade, find an optimal exit, and, at the same time, keep transaction costs low. We believe investment skill is required to do that. The identification and distinction of the ‘random bit’ and the predictable part is, we believe, a function of investment skill, savvy-ness or, most likely, a combination of the two. Whether we should call these skills ‘alpha’ is, we believe, open to debate.

Exploiting hedge fund betas requires skill

Jaeger [2002] argues that ‘risk premiums provide an inherent and permanent positive expected return, the source of which does not disappear if spotted by other investors (although it can fluctuate over time)’. We are not convinced that there is such a thing as a permanent risk premium¹ that does not go away when spotted by other investors. We believe there must always be crowding-out effects and feedback loops. And if the premium fluctuates over time, some investors will try hard to find non-randomness by trying to optimise entry as well as exit points, a task inadvisable in the absence of any form of skill related to investment management. (Note that large historical returns do not prove investment skill. Some people call the relationship between financial success and randomness, i.e., making a lot of money in the absence of talent, the ‘Spice Girls effect’.)

Making a lot of money in the absence of talent

So, in the end we might be left with just alpha and beta after all. Alpha depends on skill, the scarcity of skill and how the skill is rewarded in the market place. If the skill becomes commoditised it turns into beta. Overall, we find talking about alpha much easier than generating it.

Easier said than done

Difference between generating alpha and talking about it

We believe the task of marketers in active asset management is to sell alpha, irrespective of whether it is true alpha or not. We also believe that hedge funds have benefited hugely from various factors over the past couple of years. One is that these hedge fund betas (assuming we want to call these time-varying risk premiums that) are not perfectly correlated with traditional beta, i.e., addition to a traditional portfolio adds value on a portfolio level by definition. (This is the reason why we believe ignoring hedge funds all together is or soon will be considered imprudent from the perspective of an institutional investor with fiduciary responsibility, i.e., an economic agent managing someone else’s money and subject to the prudent expert rule.³)

**‘The determining question in structuring a portfolio is the consequence of loss; this is far more important than the chance of loss.’
Peter Bernstein²**

¹ The ‘risk’ bit in the term ‘risk premium’ means that there is the risk that you might not get the premium but lose out. US investors in the past decades, for example, picked up the an equity risk premium over bonds while Portuguese equity investors in the 1970s or Argentine investors in the 1950s (or Imperial Russian, Chinese, Egyptian, German investors, etc) did not. Survivors garner the ‘premium’, while non-survivors get the ‘risk’. Hence, the term ‘risk premium’.

² Bernstein, Peter L. (1975) *Management of Individual Portfolios, Financial Analyst Handbook* (S. Levine, ed.), Homewood, Illinois: Dow Jones-Irwin, Inc.

³ See UBS *In Search of Alpha* [2000], page 71.

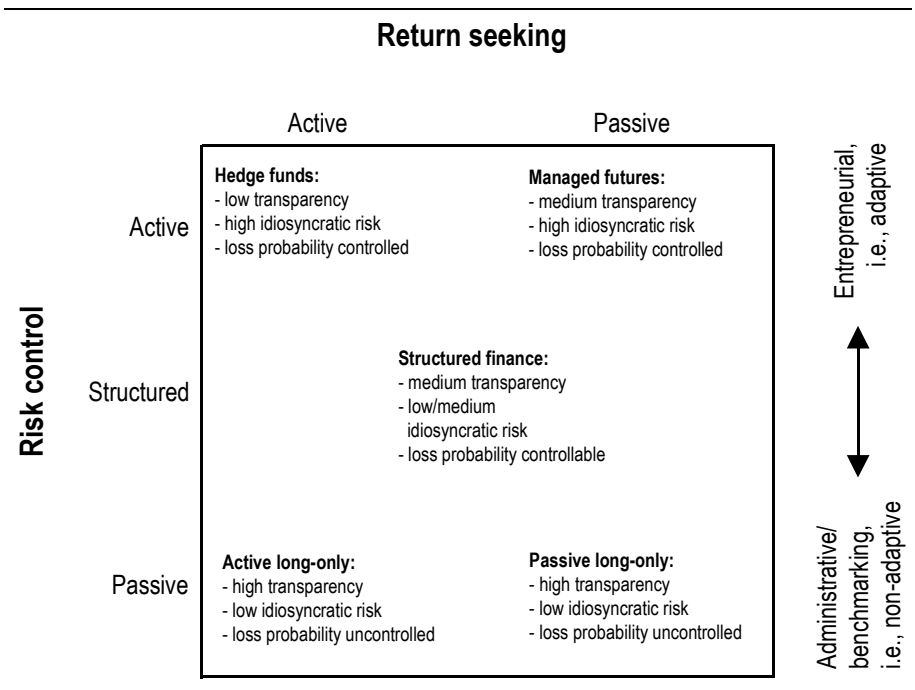
In the following exhibit (Chart 18) we have another go at describing how the asset management industry is changing. First we distinguish between the upside, i.e., the search for yield and returns, and the downside, i.e., risk control. Then we distinguish between an active and a passive approach. The reason for this distinction is that our previous verbiage occasionally landed us in trouble with active asset managers (which we classified as passive). An active manager sees himself as active when compared to an index fund. This is fair. However, an ‘active’ long-only manager is still passive when compared to an absolute return manager, i.e., when controlling total risk (as opposed to tracking risk) is concerned. The mandate to control total risk in traditional active asset management still sits with the end investor, not with the manager.

We continue to believe that the distinction between upside and downside in absolute return space is rather material

We believe there is something in between actively managing risk and passively managing risk. In Chart 18 we have added another layer. We highlighted this in UBS *Fireflies Before The Storm* [2003], where we compared hedge fund portfolios with capital guaranteed structures on equity indices that also give the investor an asymmetric return profile: Normal volatility on the upside and lower or controlled volatility on the downside. We concluded the report by arguing that current (then and now) transformation of the asset management industry is really a merger between the traditional asset management industry and what is largely called the risk management business, i.e., the business of trading and structured products.

Risk management business continues to merge with asset management

Chart 18: Return seeking / risk control matrix



Source: UBS
 Vertical axis: With risk control we mean controlling *total* risk, not *tracking* risk.

- Note that some financial organisations have combined two extremes, the lower right-hand corner with the upper-left—quite successfully one might add.

We believe the traditional asset management industry can be active or passive with respect to seeking returns but is passive with respect to controlling total risk (as mentioned earlier). The products are characterised by a high degree of transparency and low idiosyncratic risk (whereby we mean default risk of the manager and losses for operational, i.e., non-investment reasons). The manager does not control loss probability. The maximum loss is (somewhat theoretical) 100 percent of capital. Note that there are many advantages to the benchmarking approach, i.e., what we called the second stage of asset management. (The benchmarking paradigm is well documented in Siegel [2003].)

Active risk management means actively controlling the probability of an absolute financial loss

Hedge funds, we believe, are in the upper left of this exhibit. Compared to mutual funds, hedge funds are of lower transparency, while we believe idiosyncratic risk, i.e., the probability of default, is typically higher¹ (while investment risk might or might not be higher). The maximum potential loss to the investor is limited to 100 percent of capital (same as with mutual funds and most other investments).² The main difference is that the loss probability of the portfolio is actively controlled by the manager in the case of absolute return managers while it is not in relative return space (or at least it is not the main objective).

Introduction of benchmarks increases transparency and, more often than not, investors' confidence

We have put managed futures (aka systematic trend-followers or directional trading systems)³ into the upper-right hand corner of Chart 18. The return seeking process is perhaps similar to an index fund, just that in the case of trend-following it is not the beta that is captured at lowest possible costs but a series of trends or trend-reversals (essentially time-varying beta). The idea is to create a system that can minimise loss exposure, yet exploit profitable trends. The value added, one could argue, is in actively managing risk through improving systems (improving pattern recognition, entry signals, exit signals, execution, etc).

Managed futures is partly passive (hence passive) and partly controlled (hence active)

As mentioned earlier, we previously compared the asymmetric return profile of well-balanced hedge funds portfolios with products coming out of structured finance. In the return/risk matrix (Chart 18) we classify structured finance somewhere in the middle. The return-seeking process is probably more passive than active, as the future payout is most often pre-determined and/or rule-based. (Although in the recent past there have been structures on actively managed absolute as well as relative-return portfolios.) We consider structured finance more entrepreneurial than benchmarking because innovation and adapting to changing market conditions plays an important role (innovation and adapting to change being, in some ways, the opposite of benchmarking). Different market conditions warrant different structures, exposures and strategies. Transparency, on the other hand, is probably lower than with mutual funds. We believe that to be the case because there are many moving parts in a structure that are

Structured finance seeks to control exposure to randomness

¹ Note that we believe the spread in credit (difference between most and least creditable) in the hedge fund industry is huge and also believe that there are organisations where default probability is low.

² Note that here we are comparing an investment where systematic risk is the main risk to the investor (mutual funds), with investment vehicles where we believe credit risk (which is idiosyncratic, i.e., non-systematic risk) is the main risk to the investor (hedge funds). We therefore sometimes prefer comparing hedge funds to stocks or corporate bonds rather than mutual funds, from an idiosyncratic-risk-to-the-investor point of view.

³ See UBS *European Rainmakers* [2004] for a brief discussion on managed futures.

inexplicable to the options theory illiterate. (In the past, sellers of structures were *wrongly* accused of malpractice because the buyer *did not* understand all the moving parts of the structure and the interaction thereof. In other cases sellers of structures were *rightly* accused of malpractice because the buyer *did* understand all the moving parts of the structure and the interaction thereof.)

Risk control in structured finance is different to hedge funds as well as traditional asset management. The difference between hedge funds and long-only asset management is that managing total risk is active with the former and passive with the latter. Structured finance is something in between. Risk is somewhat pre-defined. The maximum loss in a capital guaranteed structure, for example, can be determined in advance. (The guarantee being as good as the structurer being credible, i.e., default probability of the structurer is never zero.) One could argue, for example, that the buyer of a capital guaranteed product on an equity index is exposed to randomness on the upside, and predictability, i.e., pre-defined controlled risk, on the downside.

Are benchmarking and financial innovation opposites?

We called the current seismic shift rippling through the investment management industry a paradigm shift or structural change in the industry. We also noted that this shift is the second shift after the introduction of market indices as benchmarks, some 30 years ago. However, it is, we believe, reasonable to assume that change and innovation will not stop here, i.e., they will continue to change the investment management landscape going forward. To some long-term hedge fund investors, the topic of what we call asymmetric return profile is, apart from being vastly obvious all along, already outdated. What's next?

Financial textbook theory might or might not be any help. Financial theory, essentially a subcategory of economics, is only roughly 60 years old¹ and economics dates back only around 250 years. It is not entirely absurd to assume that the current line of thinking is subject to paradigm shifts too. In financial theory we are still working with the first set of theories (MPT, APT, CAPM, EMH, etc). The product coming out of this work is essentially the index fund. The index fund, we believe, is most consistent with the Bachelier/Brown-Savage-Fama/Samuelson line of thinking. Taleb [2004] on the above:

'Finance academia, unlike the physics establishment, seems to work like a religion rather than an empirical science with beliefs that have resisted any amount of empirical evidence. Financial theory being a fad, not a science, it may take a fad, and not necessarily a science, to unseat its current set of beliefs.'

Structured finance seeks to provide a return distribution that differs from a symmetrical return distribution accessible through a purely passive investment approach

'Science does not give us absolute and final certainty. It only gives us assurance within the limits of our mental abilities and the prevailing state of scientific thought.'
Ludwig von Mises

'When all men think alike, no one thinks very much.'
Walter Lippmann (American writer)

'If stupidity got us into this mess, then why can't it get us out?'
Will Rogers (1879-1935)

¹ The inaugural issue of the *Financial Analysts Journal* was January 1945. The inaugural issue of the *Journal of Finance* was 1946 and was largely ignored by the economics community. Milton Friedman, sitting on the examination committee of the University of Chicago's economics department, was apparently averse to granting Harry Markowitz a doctorate in economics as his thesis was not economics neither was it business administration. From Holton [2004] referring to Bernstein [1992].

Hedge funds are somewhat an anti-thesis to what has been taught at the finance faculties of business schools in the past. Until quite recently (around 1999) the financial literature on the subject of hedge funds has been quite thin.¹

There has obviously been a lot of fine-tuning going on with respect to the first generation of financial theory. More interesting, there also is a body of research (behavioural finance) that (in essence) stipulates that the theory is wrong, or, phrasing it less extremely, the general assumptions are wrong to a degree that means the theory is of little practical use. Behaviouralists combine economics with psychology to formulate their attacks on orthodox financial theory, essentially arguing that one of the standard assumptions in economics (that of the 'rational economic man' behaves rationally in a neo-classical, i.e., probability-weighted utility maximising sense) is wrong (or too far from reality to be of any practical use).² While we believe behaviouralists have interesting things to say and a strong case to make, they still do not have a better theory. One could easily argue that the most intelligent course of action is to go with the best theory at hand. While combining economics with psychology might not yield a new theory (it certainly increases the entertainment value of economics), combining economics with physics (known as 'econophysics'³) or evolutionary biology⁴ might.

One of the dynamic factors in active asset management, we believe, is the crowding-out effect. Inefficiencies do not persist. In other words, adapting to changing market circumstances and innovating, i.e., finding new opportunities, is part of active asset management. We have a tendency to view adapting to changing market circumstances and innovating somewhat as the opposite of benchmarking. Hence, the two are on opposite ends in Chart 18 on page 48. As Alan Greenspan put it in 1998:

'This decade is strewn with examples of bright people who thought they had built a better mousetrap that could consistently extract an abnormal return from financial markets. Some succeed for a time. But

'Ignorance more frequently begets confidence than does knowledge: it is those who know little, and not those who know much, who so positively assert that this or that problem will never be solved by science.'

Charles Darwin

¹ One could also argue that hedge funds weren't fit for institutional involvement before that date.

² Economist Vilfredo Pareto (and later Ludwig von Mises) thought that much of human activity was driven not by logical action, but rather by non-logical action. On this, of course, economics has nothing to say - which is why, ultimately, economics will always fail empirically.

³ Econophysicists (who, to some extent, are re-inventing the wheel) use power-law distributions to predict markets or assess risk. (Mathematician Benoit Mandelbrot and Chicago economist Eugene Fama found in the 1960s that markets are better described by power-law distributions than normal distributions. Big jumps in market value are more common in power-law systems than normal distributions.) The claim is that markets were not random after all, as fat-tails, i.e., high-standard deviation events, follow a power-law distribution and are clustered. In other words, there is predictive value in studying historical return distributions. The irony is that technical analysis, ie, the attempt to predict future market movement from past market movement, that, to EMH-purists and CAPM-huggers is utter nonsense, might have merit after all.

⁴ See for example Andrew Lo's Adaptive Market Hypothesis (AMH). Lo [2004]: 'Competition, cooperation, market-making behavior, general equilibrium, and disequilibrium dynamics are all adaptations designed to address certain environmental challenges for the human species, and by viewing them through the lens of evolutionary biology, we can better understand the apparent contradictions between the EMH and the presence and persistence of behavioral biases. Specifically, the AMH can be viewed as a new version of the EMH, derived from evolutionary principles. Prices reflect as much information as dictated by the combination of environmental conditions and the number and nature of 'species' in the economy or, to use a more appropriate biological term, the ecology.'

while there may occasionally be misconfigurations among market prices that allow abnormal returns, they do not persist. Indeed, efforts to take advantage of such misalignments force prices into better alignment and are soon emulated by competitors, further narrowing, or eliminating, any gaps. No matter how skilful the trading scheme, over the long haul, abnormal returns are sustained only through abnormal exposure to risk.¹

We would add the following to the last sentence: ‘...or by finding new gaps.’ We find this addition rather material, as we do not believe in permanent premiums that are unaffected by competition. We believe this continuous search for new gaps is difficult. (This is probably why one senior hedge fund manager was quoted saying he only hires PhDs, where PhD stands for poor, hungry and devoted.)

As Lo [2004] puts it:

‘From an evolutionary perspective, the very existence of active liquid financial markets implies that profit opportunities must be present. As they are exploited, they disappear. But new opportunities are also constantly being created as certain species die out, as others are born, and as institutions and business conditions change.’

The bottom line

Even if volatility is not a perfect measure for risk, investors not perfectly rational, markets not perfectly efficient, nor trading frictionless, the concept of diversification—essentially the bottom line of the first generation of financial theory—is still a laudable concept, i.e., a good idea until there is evidence suggesting otherwise (which, as of early 2005, there was not). Efficiency gains through diversification are probably the only free lunch in financial economics accessible to all investors. In other words, we believe the current trend into alternative investments and alternative investment strategies is perfectly consistent with the idea of diversification, i.e., the quest for more efficient portfolios (= more return for same risk or same return for lower risk). Pure alpha on top of an efficient, intelligently structured portfolio is, where it can be found and captured, an additional blessing.

In the face of competition, generating alpha by finding new inefficiencies requires some combination of intelligence, savvy-ness, energy and dedication

¹ Testimony before the Committee on Banking and Financial Services of the US House of Representatives on 1 October 1998.

Closing remarks

‘A safe investment is an investment whose dangers are not at that moment apparent.’

Lord Bauer

The current period in financial history could be viewed as being akin to the period of Enlightenment in western thought. The period of Enlightenment too was characterised by an abandoning of long-held beliefs and intellectually constraining doctrines. The period was the gateway for a period of innovation, both, technical as well as sociological. Immanuel Kant’s *The Critique of Pure Reason* was one of the markers signalling this important inflection point.¹ Peter Bernstein’s [2003, 2004] five inflection points² and Andrew Lo’s [2004] Adaptive Markets Hypothesis (AMH) could potentially be somewhat contemporary equivalent signposts in the field of investment management and finance.

Comparing the current spreading of institutional interest in alternative investment strategies with Kant et al is probably a tick over the top. However, we believe a lot of the recent change in ideas and business models is structural in nature, despite there being some potential over-optimism, with respect to future returns. There is no way back. It is unlikely that commoditised products and services suddenly trade at a premium or that indexing and benchmarking are again perceived as the pinnacle of investment wisdom. Potentially, viewing from a business perspective, we are not, today, witnessing the beginning of the end but have just experienced the end of the beginning. Kuhn [1962] probably was right when arguing ‘that mere disconfirmation or challenge never dislodges a dominant paradigm: only a better alternative does.’

Sustainable wealth is not derived from speculation (here defined as a bet on a random variable) but from entrepreneurialism, i.e., setting up businesses, adapting to change in the face of competition, innovation and hard work, i.e.,

¹ If we were to run fantasy wild, we could easily find further parallels between Kant and AIS: Some of Kant’s work didn’t fit into the prevailing governing body, hence the latter intervened. The same motto seems to prevail today: if you don’t understand it, ban it.

It was important for Kant to stress what was knowable and what was not. This is advisable in AIS space too.

Note that there are differences too. In the *Critique of Practical Reason* Kant went on to state that morality requires the belief in the existence of God, freedom, and immortality, because without their existence there can be no morality. In financial markets the belief in the existence of God, freedom, and immortality is not required—the trust in the Fed pumping liquidity into the market when needed is entirely sufficient.

² Bernstein discusses five changes in perception. In order of appearance these points of inflection touch on: the independence of research, the limitations of indexing, the sins of benchmarking, the absurdity of a long-only constraint, and the open-end format as an antiquity.

building a capital base. It is potentially unreasonable to expect that highly talented and motivated individuals build wealth for someone else while not materially participating in the venture: in the investment management industry as well as elsewhere. To us, absolute-return investing means balancing risk and return and trying to be exposed to non-randomness, at least to some degree, i.e., fairly predictable positive compounding of some sort. A business exposed to large random swings is unlikely to be sustainable. How could it? A business where positive cash flows are stable, sustainable, and, hence, predictable, is likely to be the better business.

In 2001 and 2002, there was the fear that money would be pulled from the hedge fund industry as soon as the equity market started to rise again. However, in 2003 and 2004 we experienced a first indication that this is, in fact, unlikely to happen in institutional investment management. Not only did large parts of the 2001-02 inflows remain in absolute return space, new money followed, eventually, resulting in the spike of capital inflow in Q4 03 and Q1 04. This was despite equity markets rallying (temporarily). We believe large parts of this capital buys into the absolute return investment philosophy and not, or to a lesser extent, into historical returns. If investors were buying historical returns, we would argue that the growth is more cyclical and less structural. We believe, however, that the main driver of the growth is a sustainable change in investors' perception of risk. In other words, growth is driven by investors' enlightenment that short-term volatility, and therefore risk-adjusted returns, now matter to the long-term investor.

We could be wrong. The hedge funds phenomenon in institutional investment management is new and could turn out to be short-lived. A series of negative events could dent or reverse investors' newly found and therefore un-stress-tested confidence for all times. (The proverbial 'weak hand' could be running for the exit, similarly to the way late-comers to Private Equity ran for the doors post the internet bubble bursting, i.e., essentially at the first sign of double-digit negative returns.) Hedge funds could fall back to tailoring to private investors, as they have in the past, and could come to be considered as not suitable for institutional investors and their fiduciaries. A potential tipping point in this regard could be the realisation and subsequent consensus-forming that alpha exists but can only be reliably captured by the few, not the many. In other words, an awakening that pure alpha (net of fees) can only be picked up by the most sophisticated and nimble among institutional investors, i.e., first-movers and early-adapters, but not late-comers and copy-cats. This would need to rest on the belief that the average investor does not get any alpha on a sustainable basis. This would mean that the search for alpha occurs at a net cost to the below-average, as well as the average, institutional investor. For this enlightenment to materialise, say 90 percent of all institutional investors giving up on the search for alpha, investors needed to overcome what behaviouralists call overconfidence, a heuristic bias that skews decision-making under uncertainty away from the von-Neumann-Morgenstern/Savages' maximisation of expected utility doctrine. All investors know that the search for alpha is a zero-sum or negative-sum game after fees. In addition, many investors doubt in the sustainability of pure alpha. So why do they play the game? It could be because they perceive themselves as above-average, i.e., many investors are

probably overconfident with respect to capturing alpha and/or picking alpha-generating managers. Only few investors probably view themselves as below-average or just average investors. (And if they did, they probably wouldn't tell their sponsor.) Institutional investors acknowledging this could be a structural change in itself, reverting the shift we have been witnessing over the past five years. It would set a milestone in institutional investment management. Hedge funds would fall back to lull private investors (most of whom never really cared about relative performance anyhow).

We do not believe in the course of events described in the paragraph above. We believe some of the current changes in relation to absolute returns and risk-adjusted returns in investment management are structural, as opposed to a passing fad. This means the current transformation of hedge funds turning their maverick entrepreneurialism into more institutional entrepreneurialism is, we believe, not going to reverse but will continue to evolve. At the same time, traditional asset management is not sitting on the sidelines watching the fees go elsewhere. The two will probably meet somewhere in the middle. Nevertheless, not all ideas and business models will win and survive. Innovation is a process of renewal as well as destruction.

Appendix

“There can be few fields of human endeavor in which history counts for so little as in the world of finance.”

John Kenneth Galbraith

Predicting the future of the S&P 500

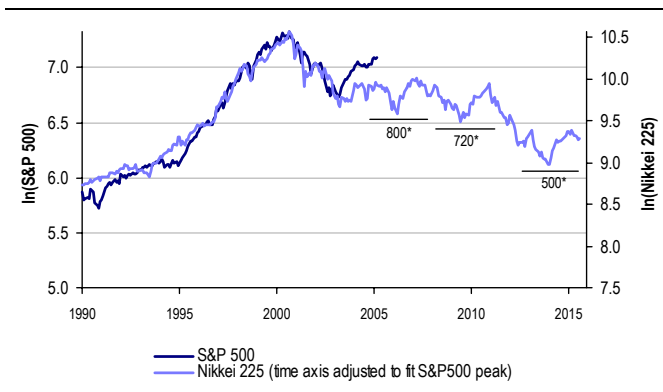
Below we show a couple of attempts to predict the future path of the S&P 500.

In Chart 19 we show the S&P 500 and Nikkei 225, both logged. We have brought the latter forward for the all-time-high to overlay with the all-time high in the S&P 500 index. We then truncated the two vertical axes for visual effect. In Chart 20 we run a bootstrapping approach, i.e., the nonparametric generation of random scenarios by drawing returns with replacement whereby a series of possible future paths are simulated by randomly picking monthly returns from the past. For Chart 20 we used 1,259 monthly returns from January 1900 to November 2004.

‘Jan, the bottom line is, before the end of the year, the NASDAQ and Dow will be at new record highs.’

Myron Kandel, CNN, April 2000¹

Chart 19: ‘History-repeats-itself’ method



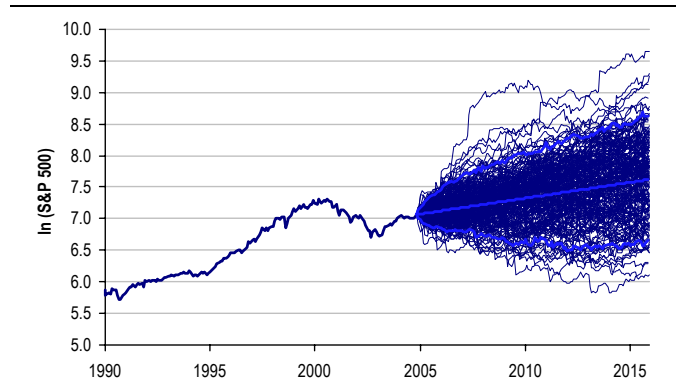
Source: UBS (Thomson Financial Datastream)

* S&P 500 equivalent lows as measured by assuming drawdowns from all-time high are equal to those in the Nikkei 225.

Nikkei 225 (rhs) was brought forward for all-time high based on monthly data (1.1.1990) to match all-time high of S&P 500 (1.9.2000). Both axes were truncated for visual effect.

February 2005 inclusive.

Chart 20: Bootstrapping method



Source: UBS (Thomson Financial Datastream, Global Financial Data)

Historical line (1.1990-11.2004) shows log of S&P 500 index.

Bootstrapping method is based on S&P 500 monthly price returns from January 1900 to November 2004. Based on 200 runs with replacement.

Bold light-blue lines (12.2004-12.2015) show mean as well as 90% range of simulation. S&P 500 mean price return was 0.4188% per month from January 1900 to November 2004.

¹ Quoted in Covell, Michael (2004) “Trend Following,” New Jersey: Prentice Hall.

- Chart 19 shows ‘the future path’ of the S&P 500 from a historical comparison perspective, i.e., it suggests that the S&P 500 is going through a very similar boom/bust cycle to the one Japan experienced roughly a decade earlier.² Only in the very recent past has this pattern to some extent diverged from being a good match. This is probably why some people call the recent rise in the US stock market as the longest bear market rally in financial history. If the S&P 500 finds its way back to follow the Nikkei 225 history (measured by the magnitude of the drawdowns), the S&P 500 should hit 800 by year-end 2005 and bounce off 500 during 2014. (Compared to 1,200 at the beginning of 2005.)
- Chart 20 assumes that all returns are independent and random (and we know from which distribution to pick returns from). To get an idea of the future, then, we just need to resample historical returns to get a distribution for future returns. The chart shows 200 possible scenarios, given these assumptions. The best and worst of these runs indicate an index value of something between 15,640 on the upside and 450 on the downside at the end of 2015, with an interim low of 340 in one scenario. The mean at the end of 2015 was calculated at 1,830.
- In other words, the historical ‘method’ in Chart 19 is a very bearish and unlikely scenario but a statistically possible one. The 2005 year-end index values are between 1,831 and 674 with the bootstrapping method. The mean was 1,258 (i.e., up roughly 7.2 percent on the year). When this analysis was done (Q4 04), strategists’ index forecasts for 2005 centred very narrowly around 1,250-1,300.

Chart 21 is another attempt to find historical similarities. The graph compares the S&P 500 index from January 2002 to March 2005 compared with the early 1970s. We have brought the latter forward for the 1970 low to overlay with the 2003 low in the S&P 500 index. We then again truncated the two vertical axes for visual effect.

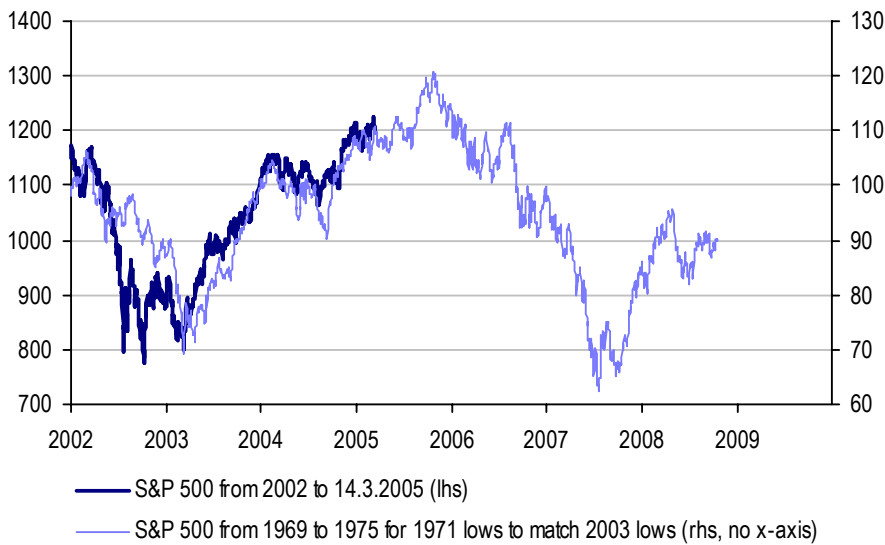
‘I am of the belief that the individual out there is actually not throwing money at things that they do not understand, and is actually using the news and using the information out there to make smart investment decisions.’

Maria Bartiromo, CNBC, March 2001¹

¹ Quoted in Covel, Michael (2004) “Trend Following,” New Jersey: Prentice Hall.

² See also <http://www.ess.ucla.edu/faculty/sornette/prediction/20041117.asp#prediction>

Chart 21: S&P 500 from 2002 to March 2005 compared to early 1970s



Source: UBS (raw data from Thomson Financial Datastream)

- One could argue that the fiscal stimuli ahead of the 1972 presidential election are somewhat comparable to the more recent US history.¹ This would suggest a peak of 1,300 in October 2005.

We could go on and combine the historical with the statistical method. The bootstrapping method in Chart 20 uses returns over the past 100+ years of US history. One could argue that the past 100+ years of US history are not a good indication for the next ten (i.e., the analysis is upwardly biased). From an evolutionary point of view, the US came out on top in a competitive game of survival of the fittest. A historical perspective, however, suggests that at some stage complacency kicks in and the fittest becomes the second fittest, third fittest, etc. (If in doubt, ask an Englishman, an Austro-Hungarian, or—if you know one—an Ottoman.)² A more realistic return set, one could therefore argue, is the return series of post-bubble Japan (or any other return distribution with a lower mean than a distribution from the US stock market)³. Chart 22 shows the same bootstrapping analysis where we replaced the US returns from 1900 to 2004 with Nikkei 225 returns from 1990 to 2004.

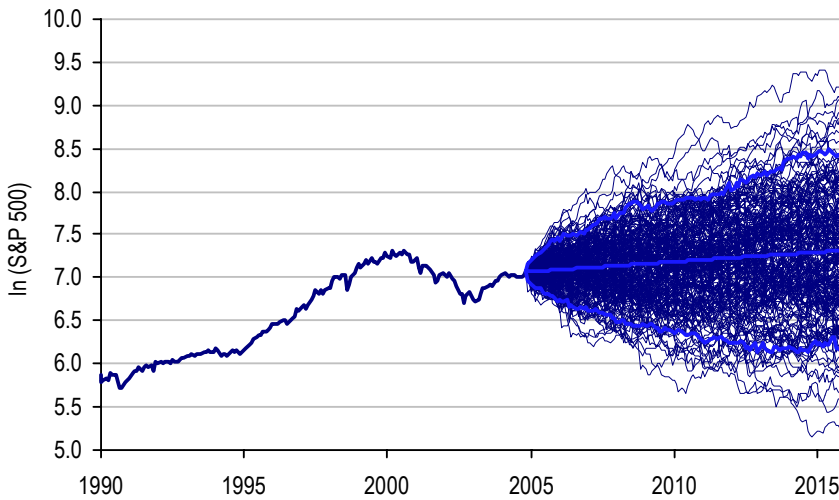
Any equity risk analysis based on US data suffers from survivorship bias

¹ The author would like to thank Andy Lees for pointing this out.

² In 1910, the market capitalisation of Swiss stocks was smaller than that of UK stocks by the factor of 22.5 and smaller than Austria-Hungary by the factor of 3.8. By the end of 2004, Swiss market capitalisation was still smaller than that of UK stocks. However, the factor today is 3.4, while Swiss market capitalisation is 7 times the market cap of Austria and Hungary combined. Lacking the ambition to build an empire might be dull (and might or might not rob its citizens of a sound sense of humour). However, dullness (read: low volatility) is potentially good when compounding capital on a sustainable basis is a major objective. (Data from Thomson Financial Datastream and Goetzmann [2004], quoting Lenin [1917].)

³ It is potentially easy to argue that any return distribution is a function of a random event or occurrence. The 100-year US equity return distribution could look different had, for example, Eli Whitney died from smallpox at 20 instead of inventing the cotton gin in 1793 and pioneering industrial mass manufacturing.

Chart 22: S&P 500 bootstrapping method with Nikkei 225 returns

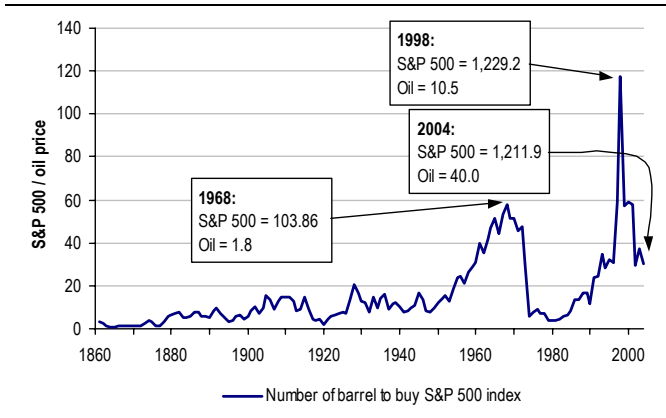


Source: UBS (Thomson Financial Datastream)
 Historical line (1.1990-11.2004) shows log of S&P 500 index.
 Bootstrapping method is based on Nikkei 225 monthly price returns from January 1990 to November 2004. Based on 200 runs with replacement.
 Bold light-blue lines (12.2004-12.2015) show mean as well as 90% range of simulation. Nikkei 225 mean price return was 0.1884% per month from January 1990 to November 2004.

- The extreme values for the end of 2015 were 10,027 and 189 (compared with 15,650 and 450 when run with historical US returns). The mean index level at the end of 2015 came to 1,305 (compared to 1,830 with 100+ plus years of US returns). The year-end 2005 mean return was 1,205. This compares with 1,258 for 2005 using long-term US returns. In other words, the whole long-term distribution of outcomes is lower when we use recent Nikkei 225 returns instead of winner-takes-it-all returns, i.e., long-term S&P 500 returns.

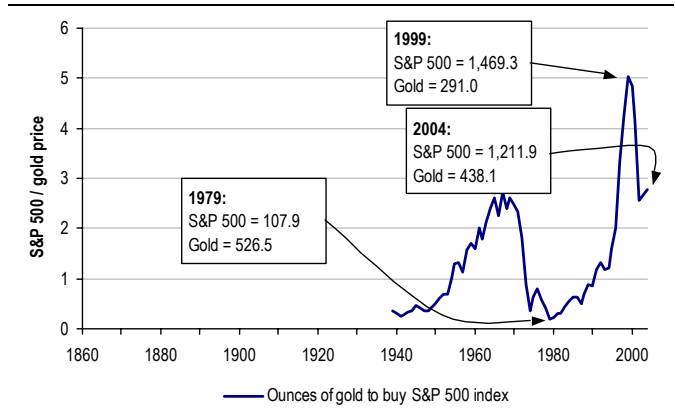
Another (alternative) way of trying to predict the future path is by comparing it to some tangible assets, for example oil and gold, both of which are expressed in the same currency as the US stock index. Chart 23 shows how many barrels of oil it takes to buy one S&P 500 price index. Chart 24 shows how many ounces of gold it takes to buy one stock index. (We simply divide the S&P 500 index by the oil and gold price to get a ratio.)

Chart 23: Barrels of oil to buy one S&P 500 index



Source: UBS (raw data from Thomson Financial Datastream, oil data 1861-1981 from BP)

Chart 24: Ounces of gold to buy one S&P 500 index



Source: UBS (raw data from Thomson Financial Datastream, gold data 1939-1968 from Global Financial Data)

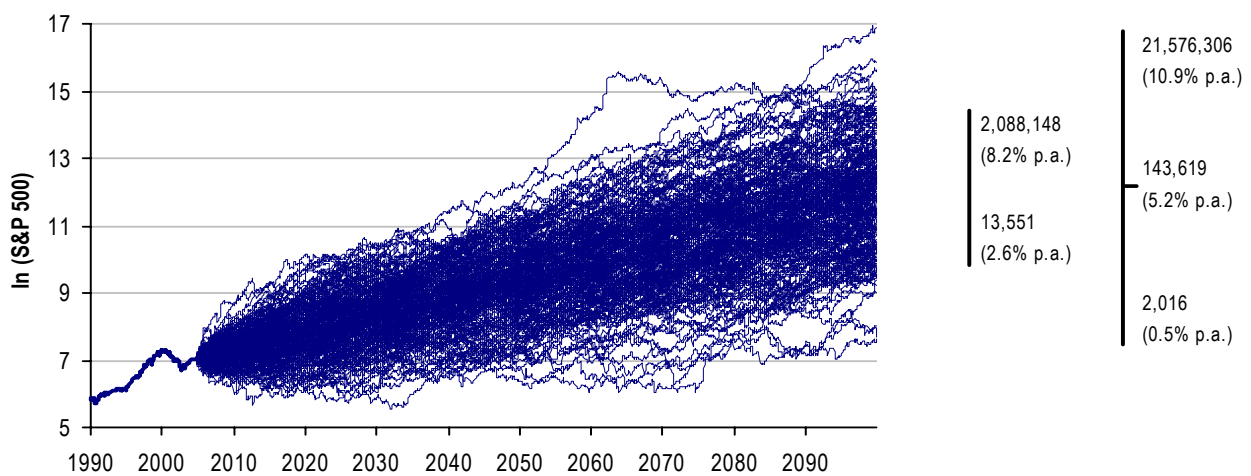
- On average (1861-2004) it took 15.7 barrels of oil to buy one S&P 500 index. At the end of 2004, this relationship was 30.3 (i.e., roughly double the long-term average). If mean-reversion brings the ratio to its long-term average, the S&P 500 could halve with oil remaining at US\$40 per barrel, or oil could double to US\$80 with the S&P 500 remaining around 1,200 (or a combination of the two extremes).
- If the ratio falls to its 1970s low of 3.6 in 1979, the S&P 500 could fall to 144 assuming constant oil prices of US\$40 or to 288 index points assuming oil doubles to US\$80 per barrel. The 3.6 figure implies an oil price of US\$336 assuming the S&P 500 remains at 1,211. If the ratio falls to its all-time low of 0.48...well, you probably don't want to know.
- On average (1939-2004) it took 1.4 ounces of gold to buy one S&P 500. At the end of 2004 it took 2.8 ounces to buy one S&P 500 index. Mean reversion would suggest an S&P 500 of around 613 at a constant gold price of US\$438 or a gold price of US\$ 1,695 at a constant S&P 500 of 1,211 (or a combination somewhere in between).
- The 1979 low of the ratio of 0.21 would imply an S&P 500 price of 92 at constant gold prices or a gold price of US\$5,766 per ounce at constant S&P 500 prices.¹ (Note that we used annual year-end data. Based on yearly data, gold peaked in 1980 at 589.5, based on daily data it peaked on 18 January 1980 at 835.0. On that day, it took only 0.133 ounces to buy one S&P 500.)²

¹ Note that we do not undertake this digression just for entertainment; nor are we recommending a trading strategy. We use this digression to underline some of our main points: that intellectual flexibility is better than historical ignorance, and that controlled total risk is better than uncontrolled total risk (assuming, of course and as always, absolute returns matter).

² A valid criticism of the above bullet points would be that we are comparing something that trends up more than inflation (stocks reflecting real growth in the economy) with something that just about (with some luck) grow with price inflation but does not trend. However, validity in the long-term doesn't necessarily imply irrelevance in the interim.

All these graphs, enlightening or not, strengthen our confidence that long-term investors cannot be indifferent to short-term volatility. We believe the percentage of investors agreeing with this notion is increasing, but that the percentage is also somewhat path- and volatility-dependent (the faster markets fall, the more people seem to agree). In other words, confidence in a particular strategy is highest after the upward sloping path. Note that the notion that equities go up in the long term is still true. In Chart 25 there is not one single S&P 500 path that is under water by the end of 2099. (Note that this chart slightly understates the risk of a long-only investment in equities, as it assumes we know which distribution to draw returns from. In the real world, we don't know the distribution from which the future will pick its returns. There is uncertainty on top of risk.)

Chart 25: The US stock market in the 21st century



Source: UBS (Thomson Financial Datastream, Global Financial Data)
 Historical line (1.1990-11.2004) shows log of S&P 500 index. Bootstrapping method is based on S&P 500 monthly price returns from January 1900 to November 2004. Simulation is based on 200 runs with replacement. Vertical lines on the right show high, low and median index closing value as of December 2099 (with annual compounding rate in brackets) for the full range as well as the 90%-range.

- The S&P 500 compounding at 10.9 percent per year and closing for New Year holidays in December 2099 at an index level of 21,576,306 is a statistical possibility (as is compounding at 0.5 percent and closing at 2,016).
- The lowest reading of this simulation was 254 in 2032. One of the dips was an index reading of 294 during 2012.
- Note that these figures might be unpleasant, but they are not unrealistic. The S&P 500 was under water by 85 percent after the 1929 crash, roughly in line with the simulation's 294 low in 2012 relative to an all-time high of 1,527. This is not a prediction; merely a statistical possibility. We believe the absolute return investment philosophy goes to great lengths not to ignore these possibilities.
- Chart 25 also shows what a long-only investment style partly relies on in the shorter term: luck.

Aggregate fees: AIS versus traditional investment management industry

Recently we came across the notion that the small hedge fund industry is currently generating more revenues than the much larger traditional asset management industry. This motivated us to do a back-of-the-envelope, top-down estimate of revenues in the hedge fund industry.

Table 5 shows a wild estimate of aggregate fees generated by the hedge fund industry. The last line is essentially the gross margin for the whole industry (i.e., single hedge funds as well as fund of funds).

Table 5: Estimate of aggregate fees in the hedge funds industry

US\$bn	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Single hedge funds:														
HF AuM at beginning of year ¹	38.9	58.4	95.7	167.8	167.4	185.8	256.7	367.6	374.8	456.4	487.6	536.9	622.3	817.5
Net HF returns ²	32.2	21.2	30.9	4.1	21.5	21.1	16.8	2.6	31.3	5.0	4.6	-1.4	19.6	8.9
Gross HF return ³	41.5	27.8	39.8	6.4	28.1	27.6	22.2	4.5	40.4	7.5	7.0	0.1	28.1	13.9
Management fee ³	0.4	0.6	1.0	1.7	1.7	1.9	2.6	3.7	3.7	4.6	4.9	8.1	9.3	12.3
Performance fee (no hurdle) ³	3.2	3.2	7.6	2.1	9.4	10.3	11.4	3.3	30.3	6.8	6.9	0.1	43.7	28.4
Total HF fees ⁴	3.6	3.8	8.6	3.8	11.1	12.1	14.0	7.0	34.0	11.4	11.7	8.2	53.0	40.7
Fund of hedge funds:														
FoHF AuM at beginning of year ⁵	9.7	14.6	23.9	41.9	41.8	46.4	64.2	91.9	93.7	114.1	121.9	187.9	217.8	286.1
Net FoHF returns ⁶	14.5	12.3	26.3	-3.5	11.1	14.4	18.0	-5.1	26.5	4.1	2.8	1.0	11.6	6.7
Gross FoHF returns ⁷	17.2	14.8	30.4	-2.8	13.4	17.1	21.1	-4.6	30.5	5.6	4.2	2.2	14.0	8.5
Management fee of 1.0%	0.1	0.1	0.2	0.4	0.4	0.5	0.6	0.9	0.9	1.1	1.2	1.9	2.2	2.9
Performance fee of 5% (no hurdle)	0.1	0.1	0.4	0.0	0.3	0.4	0.7	0.0	1.4	0.3	0.3	0.2	1.5	1.2
Total FoHF fees ⁴	0.2	0.3	0.6	0.4	0.7	0.9	1.3	0.9	2.4	1.5	1.5	2.1	3.7	4.1
Whole hedge funds industry:														
Total Fees ⁸	3.8	4.1	9.2	4.2	11.8	13.0	15.3	7.9	36.4	12.9	13.2	10.3	56.7	44.8
Percentage of HF AuM	9.8%	7.0%	9.6%	2.5%	7.0%	7.0%	6.0%	2.2%	9.7%	2.8%	2.7%	1.9%	9.1%	5.5%

Source: UBS

1 Based on year-end estimates from Hedge Fund Research for preceding year

2 Based on HFRI Fund Weighted Composite Index

3 Assuming 1+20 until 2001 and 1.5+25 from 2002 onwards

4 Ignoring high-water mark, i.e., 1995 and 1999 probably overstated

5 Assuming FoHF control 25% of HF assets until 2001 and 35% from 2002 onwards

6 Based on HFRI Fund of Funds Composite Index

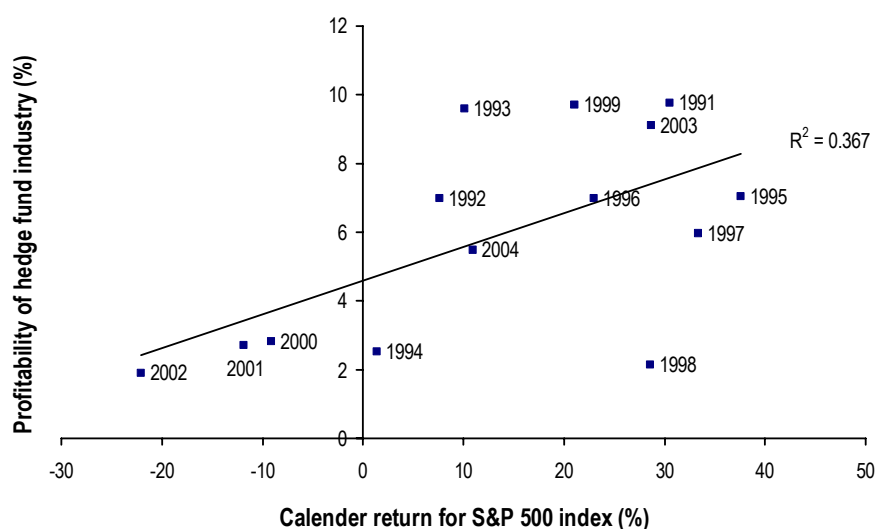
7 Assuming 1+10

8 Sum of fees generated by HF and FoHF

- Based on our rather crude assumptions, the hedge funds industry generated fees of around US\$44.8bn in 2004.
- Profitability over the past 14 years was high, ranging from 1.9 percent of assets under management to 9.7 percent.

Profitability is not a function of randomness but, at least to some extent, the stock market. Chart 26 puts our crude estimate for the hedge fund industry's profitability (last line in Table 5) in relation to stock market performance.

Chart 26: HF industry profitability in relation to equity market



Source: UBS

- Profitability, not too surprisingly, is below average when equity markets free-fall (2000-2002) or hedge funds free-fall (1994 and 1998).

How does the US\$44.8 billion figure for hedge funds revenues in 2004 compare with that for the traditional asset management industry? The Economist (19.2.2005) quotes research suggesting that the hedge funds industry is a sixth of the mutual fund industry (probably comparing global hedge funds with US mutual funds), while generating more revenues.

We find aggregate global data on the asset management industry notoriously difficult to come by. In Table 6 we try to estimate aggregate fees in the traditional asset management industry (active and passive) as a function of assets under management and average profit margin.

Table 6: Estimated revenues from traditional asset management

Margin	Assets under management in mutual funds (US\$tr)				
	7	8	10	12	14
0.20%	14.0	16.0	20.0	24.0	28.0
0.40%	28.0	32.0	40.0	48.0	56.0
0.60%	42.0	48.0	60.0	72.0	84.0
0.80%	56.0	64.0	80.0	96.0	112.0
1.00%	70.0	80.0	100.0	120.0	140.0
1.20%	84.0	96.0	120.0	144.0	168.0

Source: UBS

- If we assume the US mutual fund industry to be around US\$7 trillion and the average management fee to be 60 basis points, the aggregate gross fee income would be (simplifying to the extreme) around US\$42 billion. In other words, it is not entirely unthinkable that the global hedge funds industry is generating more fees than the much larger US mutual fund industry.

- Based on our estimate of aggregate assets under management in global long-only active and passive asset management of US\$14 trillion, and an assumed average gross margin of 60 basis points, the revenues of the traditional asset management industry amount to around US\$84 billion, which is higher than the US\$44.8 billion of the US\$1 trillion hedge funds industry.

Some updates from previous research

On change

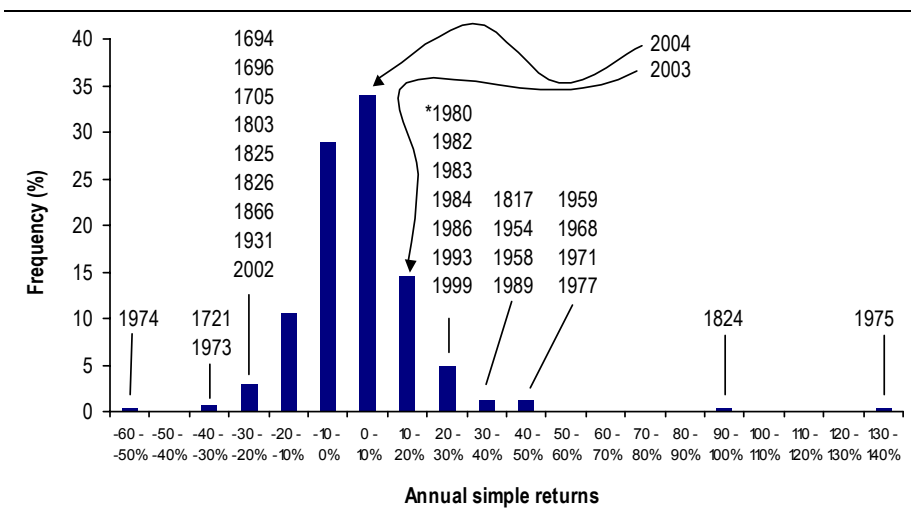
In UBS *Fireflies before the storm* [2003] we defined risk as ‘exposure to change’. More recently, Holton in *Defining Risk* [2004]¹ makes the point:

*‘It seems that risk entails two essential components:
 - exposure and
 - uncertainty.
 Risk, then, is exposure to a proposition of which one is uncertain.’*

We therefore could redefine our definition of risk as ‘exposure to unexpected change’.

Chart 13 from page 55 from UBS [2003] shows a frequency distribution of annual stock market returns of the UK stock market from 1694 to 2004. The returns are simple returns (not log returns) and nominal, i.e., not adjusted for inflation.

Chart 13 (page 55): Frequency distribution of annual UK stock returns, 1694-2004



Source: UBS (update from UBS [2003], raw data from Thomson Financial Datastream and Global Financial Data)

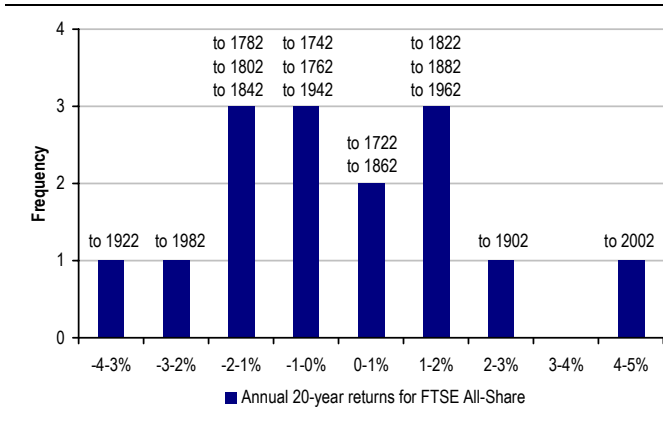
* Other observations in the 20-30% bucket prior to 1980: 1967, 1941, 1933, 1896, 1785, 1762, 1707, 1697.

■ 2003 and 2004 were quite regular years, at least statistically.

Chart 15 from page 57 shows a frequency distribution of annual 20-year real returns (compound annual return before dividends over a 20-year period adjusted for consumer price inflation) for the UK stock market as of 2002. Chart 27 is an update as of close 2004. Note that we needed to expand the horizontal axis by one notch on the right hand side of the distribution chart.

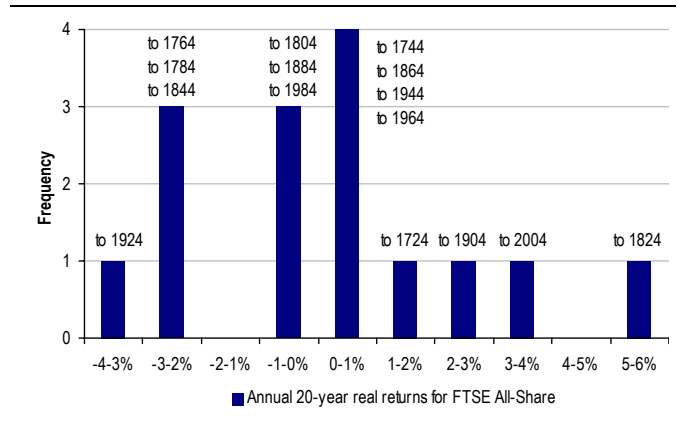
¹ An article we strongly recommend (as it agrees with our own view).

Chart 15 (page 57): Original as of 2002



Source: UBS *Fireflies before the storm* [2003] (raw data from Global Financial Data and Thomson Financial Datastream)

Chart 27: Update as of 2004

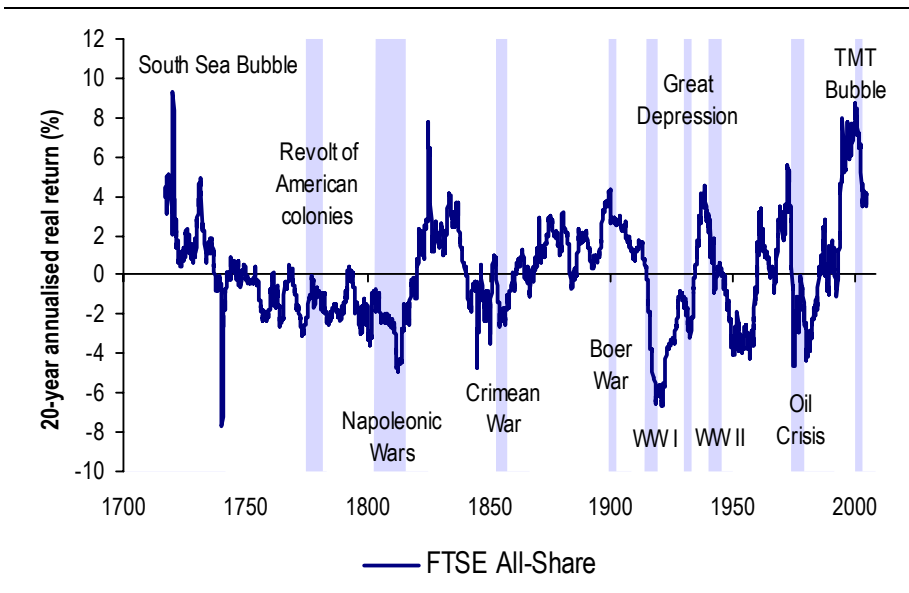


Source: UBS (raw data from Global Financial Data and Thomson Financial Datastream)

- Winning Waterloo probably helps to explain the outlier on the right—at first sight, that is (Chart 27). In reality, stocks rallied in 1824 after the government repealed the Bubble Act of 1720, a piece of legislation that restricted the purchase of stocks, introduced after the South Sea Bubble popped. (It seems that over-ambitious regulation after the bursting of a bubble is not a new phenomena.)
- The comparison of these two graphs shows that moving the 20-year window by only two years has a material impact on the distribution of long-term returns.

On a cumulative 20-year real return basis, very little has changed:

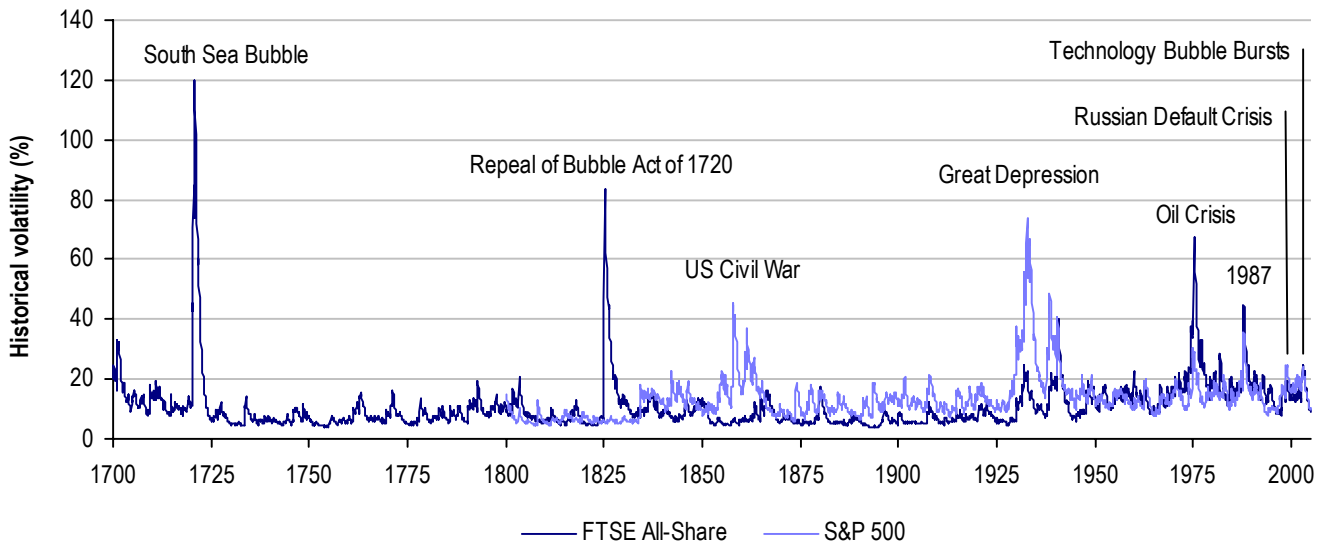
Chart 14 (page 56): Rolling 20-year real returns of UK stock market



Source: UBS *Fireflies before the storm* [2003] (raw data from Global Financial Data and Thomson Financial Datastream)

Below is an update from a volatility graph from earlier research.

Chart 28: Historical volatility for UK and US stock market (1700-2004)



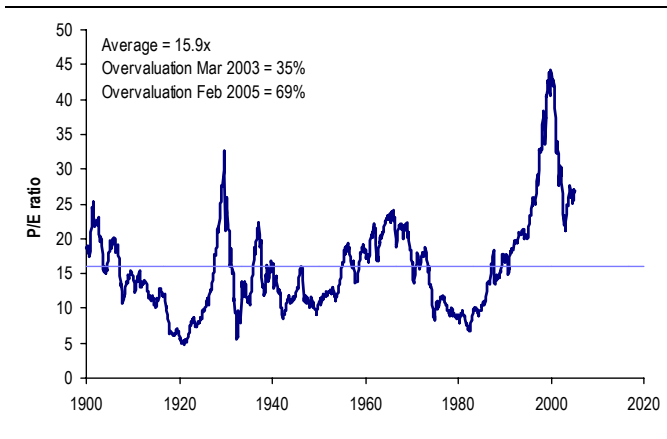
Source: UBS (update from UBS *20th Century Volatility* [1999], based on raw data from Global Financial Data and Thomson Financial Datastream)
 Historical volatility based on monthly price returns using a Garch model.

- Average of the two time series in Chart 28 were 11.2 percent for the UK market and 13.7 for the US market.
- The three averages for the two markets from 1990 to 1949, from 1950 to 1999 and from 2000 to 2004 for the UK and US were 9.6 and 18.1 percent, 17.2 and 14.3 percent, and 15.7 and 17.1 percent. The last two readings in December 2004 were 8.9 and 10.1, respectively (i.e., low by historical averages).

On valuation

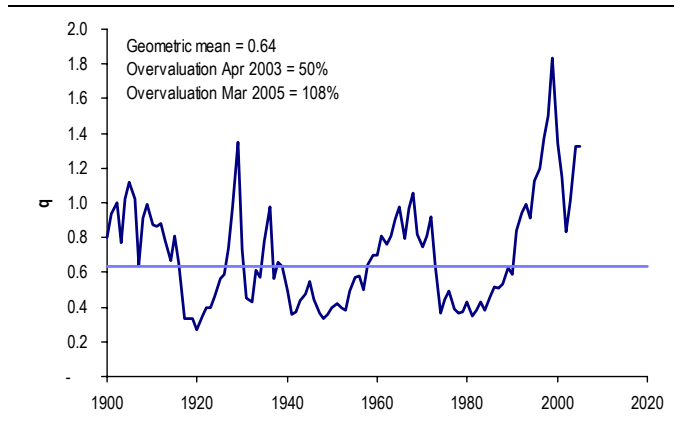
Chart 16 and Chart 17 from UBS [2003] show two similar valuation methods for the US stock market from 1900 to the first quarter of 2005. As both methods have stock market prices in the numerator, the two graphs look alike. Chart 16 shows cyclically adjusted PE for the S&P 500 index and is from Robert Shiller’s *Irrational Exuberance* [2000], and Chart 17 shows Smithers and Wright’s ‘q’ [2000]. ‘q’ refers to Nobel Laureate James Tobin’s ‘q’. Smithers and Wright define ‘q’ (or ‘equity q’) as the ratio between the value of companies according to the stock market and their net worth measured at replacement cost. Tobin’s q includes corporate debt.

Chart 16 (page 61): Cyclically adjusted PE, 1900-2005



Source: Shiller [2000] (data from <http://www.irrationalexuberance.com/index.htm>)
Graph based on monthly data

Chart 29: q



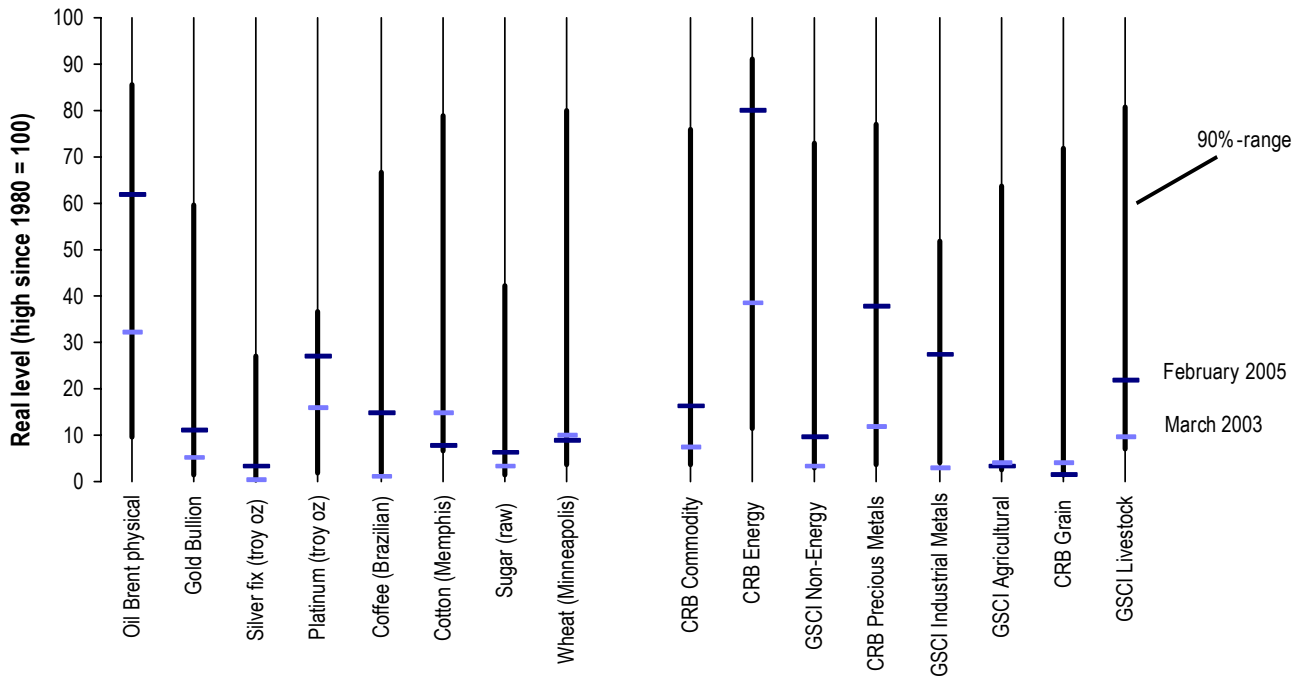
Source: Smithers and Wright [2000] (data from www.valuingwallstreet.com)
Based on annual data

- Only history will tell whether gravity is suspended for good and ‘this time it’s different.’

On commodities

Chart 20 from page 65 shows the trading range of a selection of commodities and commodity (price) indices. The trading range has been normalised between 0 and 100 for comparability. The thin vertical line shows the high and low between January 1980 and February 2005 in real terms (adjusted for US inflation). The bold vertical line shows the 90% range. The horizontal light-blue tick shows the level as of March 2003 (as shown in UBS [2003]) while the dark-blue larger tick show the reading as of February 2005.

Chart 20 (page 65): Commodities and commodity indices, 1980-2005



Source: UBS (raw data from Thomson Financial Datastream)

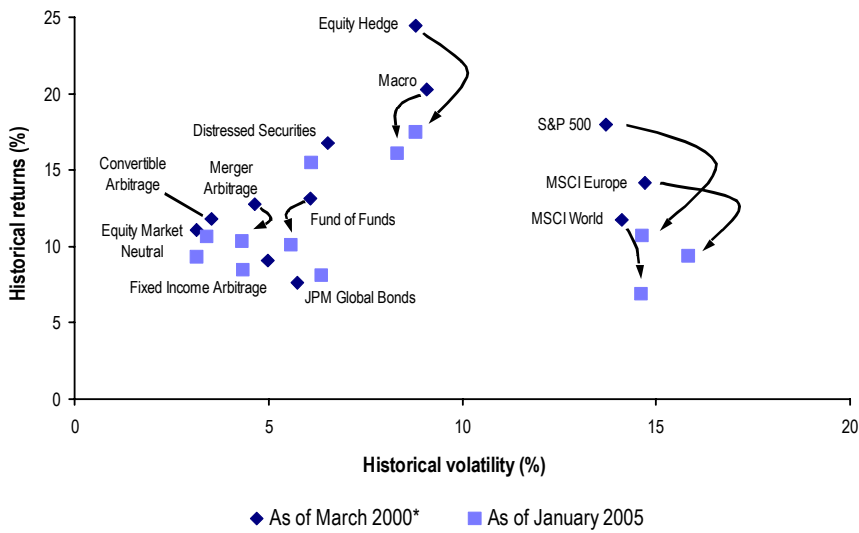
Notes: GSCI indices are spot return indices, Oil since 1982, CRB Energy since 1983, CRB Precious Metals since 1986.

- When presenting the data like this, there still seems to be some room for upside.

Hedge funds performance update

This section shows some graphs and tables that appeared in previous documents.

Chart 30: Historical return versus historical volatility for two time periods

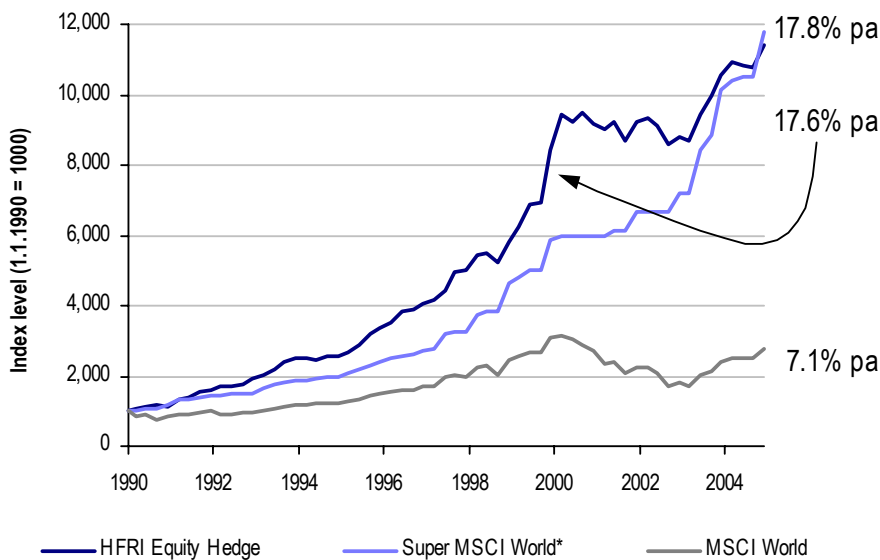


Source: UBS (raw data from Thomson Financial Datastream and Bloomberg)

* March 2000 was data cut-off date for UBS *In Search of Alpha* [2000].

Graph based on monthly total returns in US\$, volatility based on log returns, starting January 1990 in both cases.

Chart 31: HFRI Equity Hedge versus MSCI World and Super MSCI World* (1990-2004)

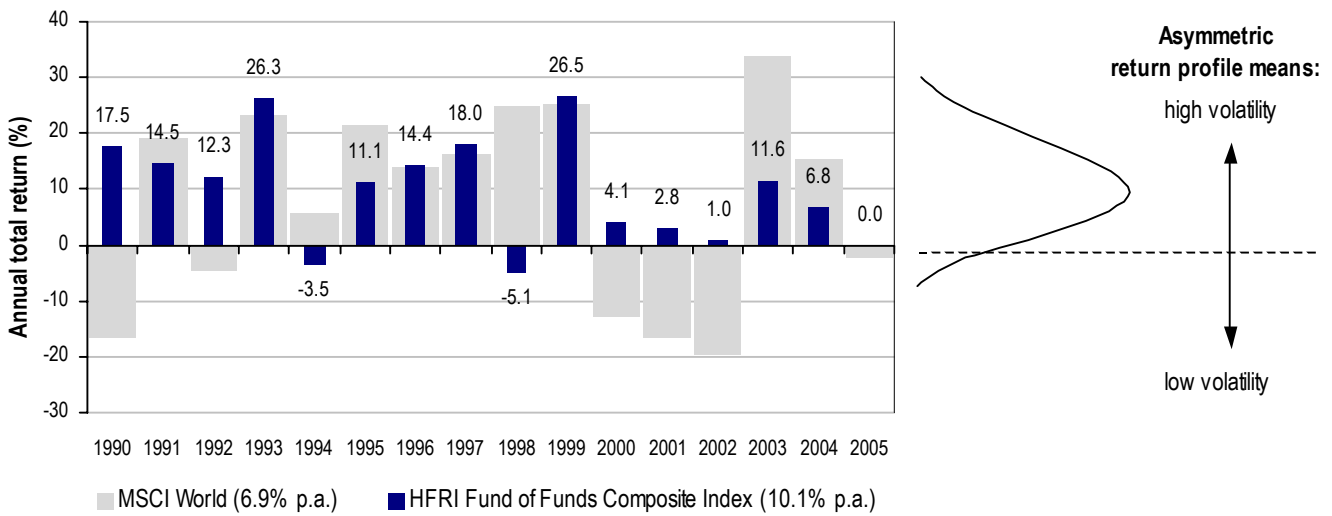


Source: UBS (raw data from Thomson Financial Datastream and Bloomberg)

* Time series calculated by assuming one is only exposed to the index when the quarterly return is positive.

Based on quarterly total returns in US\$.

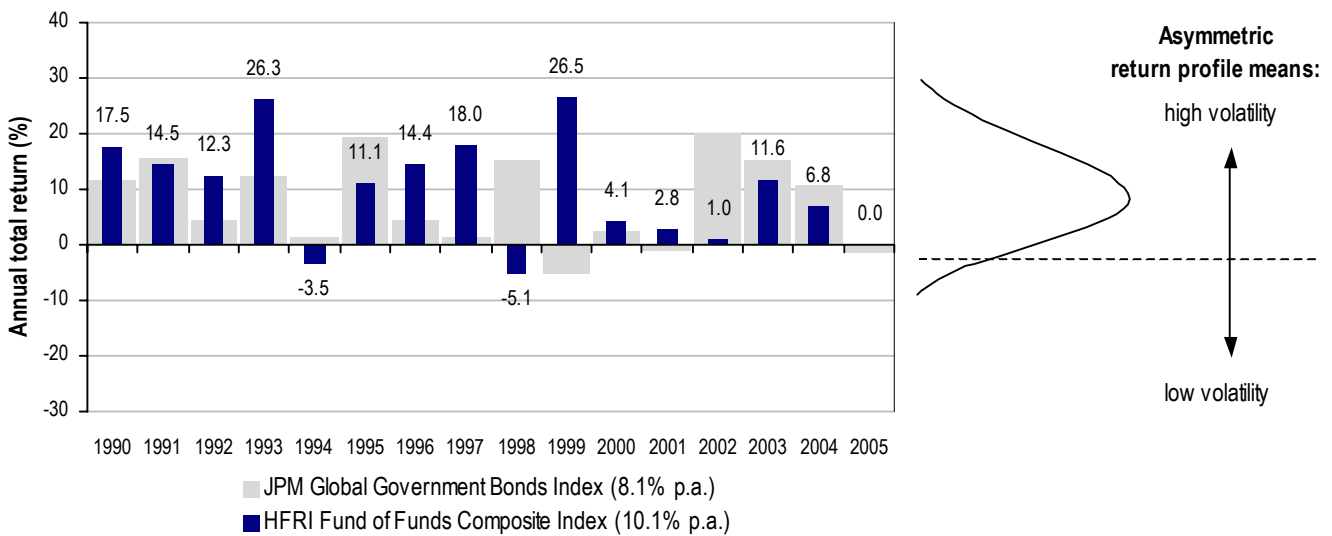
Chart 32: HFRI Fund of Funds Composite Index versus MSCI World Index (1.90-1.05)



Source: UBS (raw data from Thomson Financial Datastream and Bloomberg)

■ Diversified hedge funds portfolios display an asymmetric return profile...

Chart 33: HFRI FoF Composite Index versus JPM Global Government Bonds Index (1.90-1.05)



Source: UBS (raw data from Thomson Financial Datastream and Bloomberg)

■ ... as do bonds (in a dis-inflationary market environment, that is).

Table 7: Historical performance HFRI hedge funds indices (1.1990–1.2005)

	Number of returns	Annual return (%)	Volatility (%)	Sharpe ratio (5%)	Highest 1M loss (%)	Negative months (%)	Worst 1Y return (%)	Correl. MSCI World	Correl. JPM Bonds
S&P 500 (Total return)	181	10.7	14.6	0.39	-14.5	36	-26.6	0.864	0.070
MSCI World (Total return)	181	6.9	14.6	0.13	-13.3	39	-27.9	1.000	0.209
MSCI EAFE (Total return)	181	4.4	16.7	<0	-13.9	41	-28.3	0.939	0.298
MSCI Europe (Total return)	181	9.4	15.8	0.28	-13.2	39	-25.5	0.883	0.260
JPM Global Bond Index (Total return)	181	8.1	6.4	0.49	-4.3	38	-6.2	0.209	1.000
HFRI Convertible Arbitrage Index	181	10.7	3.4	1.66	-3.2	15	-3.8	0.254	0.033
HFRI Distressed Securities Index	181	15.5	6.1	1.73	-8.5	19	-6.4	0.375	-0.081
HFRI Emerging Markets (Total) Index	181	15.4	15.0	0.69	-21.0	31	-42.5	0.620	-0.036
HFRI Emerging Markets: Asia Index	181	10.4	13.5	0.40	-12.1	39	-30.8	0.591	0.022
HFRI Emerging Markets: Eur/CIS Index	129	22.3	31.3	0.55	-38.6	36	-69.5	0.408	-0.149
HFRI Emerging Markets: Global Index	157	15.4	15.2	0.68	-27.5	32	-44.4	0.519	-0.155
HFRI Emerging Markets: Latin Am Index	168	18.6	19.9	0.68	-15.6	35	-28.5	0.516	-0.014
HFRI Equity Hedge Index	181	17.5	8.8	1.42	-7.7	29	-8.3	0.620	0.017
HFRI Equity Non-Hedge Index	181	16.1	14.3	0.78	-13.3	35	-21.7	0.730	0.014
HFRI Equity Market Neutral Index	181	9.3	3.2	1.38	-1.7	18	-0.2	0.086	0.128
HFRI Event-Driven Index	181	14.9	6.6	1.49	-8.9	19	-4.8	0.595	-0.036
HFRI Fixed Income (Total) Index	181	10.8	3.4	1.69	-3.3	12	-3.1	0.428	0.017
HFRI Fixed Income: Arbitrage Index	181	8.5	4.3	0.80	-6.5	18	-10.4	-0.001	-0.180
HFRI Fixed Income: Convertible Bonds Index	144	9.6	12.4	0.37	-11.5	35	-22.7	0.716	-0.094
HFRI Fixed Income: Diversified Index	121	8.7	3.7	0.99	-1.6	25	-1.1	0.063	0.375
HFRI Fixed Income: High Yield Index	181	9.8	6.4	0.76	-7.2	23	-12.1	0.397	-0.019
HFRI Fixed Income: Mortgage-Backed Index	144	10.4	4.6	1.18	-9.2	10	-9.8	0.028	-0.071
HFRI Macro Index	181	16.1	8.3	1.34	-6.4	30	-7.1	0.402	0.157
HFRI Market Timing Index	181	12.8	6.7	1.16	-3.3	34	-5.2	0.663	0.072
HFRI Merger Arbitrage Index	181	10.3	4.3	1.24	-6.5	15	-2.8	0.408	0.030
HFRI Regulation D Index	109	15.0	7.1	1.41	-4.0	28	-11.2	0.157	-0.158
HFRI Relative Value Arbitrage Index	181	12.3	3.6	2.01	-5.8	12	1.1	0.331	-0.056
HFRI Sector (Total)	181	19.1	13.4	1.05	-13.0	27	-24.7	0.566	0.009
HFRI Sector: Energy Index	121	25.7	19.3	1.07	-11.8	36	-37.1	0.361	0.151
HFRI Sector: Financial Index	157	19.3	11.7	1.23	-18.7	24	-17.7	0.479	-0.033
HFRI Sector: Health Care/Biotechnology Index	145	17.4	21.4	0.58	-17.7	40	-20.4	0.342	-0.062
HFRI Sector: Miscellaneous	169	15.4	10.4	1.01	-8.9	33	-12.6	0.237	0.085
HFRI Sector: Real Estate Index	133	11.5	6.6	0.99	-6.1	33	-0.8	0.185	0.118
HFRI Sector: Technology Index	169	18.4	19.0	0.70	-15.2	40	-37.6	0.611	-0.028
HFRI Short Selling Index	181	1.4	21.4	<0	-21.2	51	-38.0	-0.662	-0.008
HFRI Statistical Arbitrage Index	181	8.7	3.9	0.94	-2.7	26	-3.4	0.461	0.105

Source: UBS (raw data from Thomson Financial Datastream and Bloomberg)

Table 8: HFRI fund of hedge funds indices (1.1990-1.2005)

	Number of returns	Annual return (%)	Volatility (%)	Sharpe ratio (5%)	Highest 1M loss (%)	Negative months (%)	Worst 1Y return (%)	Correl. MSCI World	Correl. JPM Bonds
S&P 500 (Total return)	181	10.7	14.6	0.39	-14.5	36	-26.6	0.864	0.070
MSCI World (Total return)	181	6.9	14.6	0.13	-13.3	39	-27.9	1.000	0.209
MSCI EAFE (Total return)	181	4.4	16.7	<0	-13.9	41	-28.3	0.939	0.298
MSCI Europe (Total return)	181	9.4	15.8	0.28	-13.2	39	-25.5	0.883	0.260
JPM Global Bond Index (Total return)	181	8.1	6.4	0.49	-4.3	38	-6.2	0.209	1.000
HFRI Fund Weighted Composite Index	181	14.3	6.9	1.35	-8.7	26	-6.4	0.675	-0.006
HFRI Fund of Funds: Composite Index	181	10.1	5.6	0.92	-7.5	26	-6.6	0.432	-0.038
HFRI Fund of Funds: Conservative Index	181	8.8	3.2	1.17	-3.9	17	-1.6	0.436	0.013
HFRI Fund of Funds: Diversified Index	181	9.3	6.0	0.71	-7.8	28	-8.7	0.434	-0.040
HFRI Fund of Funds: Market Defensive Index	181	9.8	5.9	0.81	-5.4	30	-7.1	0.033	0.116
HFRI Fund of Funds: Strategic Index	181	13.3	9.0	0.92	-12.1	30	-13.2	0.458	-0.044

Source: UBS (raw data from Thomson Financial Datastream and Bloomberg)

Table 9: CSFB/Tremont indices (1.1994-1.2005)

	Number of returns	Annual return (%)	Volatility (%)	Sharpe ratio (5%)	Highest 1M loss (%)	Negative months (%)	Worst 1Y return (%)	Correl. MSCI World	Correl. JPM Bonds
S&P 500 (Total return)	133	10.4	15.2	0.35	-14.5	36	-26.6	0.941	-0.005
MSCI World (Total return)	133	7.4	14.2	0.17	-13.3	38	-27.9	1.000	0.081
MSCI EAFE (Total return)	133	5.1	14.8	0.01	-12.4	39	-28.3	0.938	0.181
MSCI Europe (Total return)	133	9.4	15.6	0.28	-13.2	37	-25.5	0.898	0.147
JPM Global Bond Index (Total return)	133	7.0	6.4	0.31	-4.3	41	-6.2	0.081	1.000
CSFB/Tremont Hedge Fund Index	133	10.9	8.1	0.73	-7.5	29	-7.3	0.474	-0.055
CSFB/Tremont Convertible Arbitrage	133	9.5	4.7	0.97	-4.7	21	-9.0	0.108	-0.088
CSFB/Tremont Dedicated Short Bias	133	-3.0	17.4	-0.46	-8.7	55	-33.1	-0.757	0.002
CSFB/Tremont Emerging Markets	133	7.6	17.2	0.15	-23.0	39	-44.2	0.528	-0.158
CSFB/Tremont Equity Market Neutral	133	10.2	3.0	1.75	-1.1	16	-2.0	0.354	0.063
CSFB/Tremont Event Driven	133	11.6	6.0	1.11	-11.8	18	-7.2	0.587	-0.100
CSFB/Tremont Fixed Income Arbitrage	133	6.8	3.9	0.46	-7.0	19	-10.1	0.034	-0.094
CSFB/Tremont Global Macro	133	13.9	11.4	0.78	-11.6	28	-22.2	0.184	-0.089
CSFB/Tremont Long / Short Equity	133	11.9	10.5	0.66	-11.4	33	-11.4	0.614	0.068
CSFB/Tremont Managed Futures	133	6.4	12.2	0.11	-9.4	45	-15.4	-0.119	0.400

Source: UBS (raw data from Thomson Financial Datastream and Bloomberg).

Note that CSFB/Tremont indices are cap-weighted indices.

Table 10: Annual returns CSFB/Tremont indices (1994-2005)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
MSCI World (Total return)	5.6	21.3	14.0	16.2	24.8	25.3	-12.9	-16.5	-19.5	33.8	15.2	-2.2
JPM Global Bond Index (Total return)	1.3	19.5	4.3	1.4	15.1	-5.1	2.3	-0.9	20.1	15.1	10.8	-1.4
CSFB/Tremont Hedge Fund Index	-4.4	21.7	22.2	25.9	-0.4	23.4	4.8	4.4	3.0	15.4	9.6	-0.3
Convertible Arbitrage	-8.1	16.6	17.9	14.5	-4.4	16.0	25.6	14.6	4.0	12.9	2.0	-0.8
Dedicated Short Bias	14.9	-7.4	-5.5	0.4	-6.0	-14.2	15.8	-3.6	18.1	-32.6	-7.7	7.0
Emerging Markets	12.5	-16.9	34.5	26.6	-37.7	44.8	-5.5	5.8	7.4	28.8	12.5	1.1
Equity Market Neutral	-2.0	11.0	16.6	14.8	13.3	15.3	15.0	9.3	7.4	7.1	6.5	0.4
Event Driven	0.8	18.3	23.1	20.0	-4.9	22.3	7.3	11.5	0.2	20.0	14.5	0.2
Fixed Income Arbitrage	0.3	12.5	15.9	9.3	-8.2	12.1	6.3	8.0	5.8	8.0	6.9	0.1
Global Macro	-5.7	30.7	25.6	37.1	-3.6	5.8	11.7	18.4	14.7	18.0	8.5	0.7
Long / Short Equity	-8.1	23.0	17.1	21.5	17.2	47.2	2.1	-3.7	-1.6	17.3	11.6	-0.8
Managed Futures	12.0	-7.1	12.0	3.1	20.6	-4.7	4.2	1.9	18.3	14.1	6.0	-5.4

Source: UBS (raw data from Thomson Financial Datastream and Bloomberg)

Note that CSFB/Tremont indices are cap-weighted indices.

January 2005 inclusive.

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■ **Statement of Risk**

Our beliefs continuously evolve. One day, this piece will be obsolete.

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UBS Investment Research: Global Equity Ratings Definitions and Allocations

UBS rating	Definition	UBS rating	Definition	Rating category	Coverage ¹	IB services ²
Buy 1	FSR is > 10% above the MRA, higher degree of predictability	Buy 2	FSR is > 10% above the MRA, lower degree of predictability	Buy	36%	32%
Neutral 1	FSR is between -10% and 10% of the MRA, higher degree of predictability	Neutral 2	FSR is between -10% and 10% of the MRA, lower degree of predictability	Hold/Neutral	53%	35%
Reduce 1	FSR is > 10% below the MRA, higher degree of predictability	Reduce 2	FSR is > 10% below the MRA, lower degree of predictability	Sell	11%	29%

1: Percentage of companies under coverage globally within this rating category.

2: Percentage of companies within this rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS; as of 31 December 2004.

KEY DEFINITIONS

Forecast Stock Return (FSR) is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months.

Market Return Assumption (MRA) is defined as the one-year local market interest rate plus 5% (an approximation of the equity risk premium).

Predictability Level The predictability level indicates an analyst's conviction in the FSR. A predictability level of '1' means that the analyst's estimate of FSR is in the middle of a narrower, or smaller, range of possibilities. A predictability level of '2' means that the analyst's estimate of FSR is in the middle of a broader, or larger, range of possibilities.

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Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report.

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