

**THE IMPACT OF HEDGE FUNDS  
ON FINANCIAL MARKETS SINCE 1990**

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## **Abstract**

In the last 20 years, we have been assisting to the emergence of new financial instruments, more and more complex and with more influence on financial markets. In this new financial universe, radically transformed during the 1990's, hedge funds, alternative investment funds with absolute return targets, appear for many as a financial institution with negative impact on financial markets. Hedge funds had been criticized for the first time in the early 1990's during the ERM crisis, as the Quantum fund of George Soros was accused of speculating on several European currencies.

In this thesis, we analyze the various investment strategies followed by hedge funds, as well as their performances during the main financial crises since the 1990's.

The results show that non directional strategies are the most performing, in particular, Event Driven strategies (seeking to benefit from "special" situations in companies like mergers/acquisitions, IPOs). With a relatively low volatility and large returns, the Distressed Securities strategy seems the best alternative as it presents the best return/risk ratio. However, Global Macro strategy appears to register the highest return but is penalized by its high volatility.

When going back to the events on those financial crises, we find that hedge funds have influenced the financial markets in some crises (ERM, Asian crisis) even though this did not happen as a rule. Moreover, because of the characteristics of this financial industry (not concentrated, small amount under management), hedge funds cannot move entire markets and the influence of individual hedge funds on markets is clearly limited.

**Keywords:** Hedge funds, Performance Measures, Investment Strategies, Financial Crisis

**JEL Classification:** G01, G23

## Resumo

Nos últimos 20 anos, tem-se assistido à criação constante de novos instrumentos financeiros, cada vez mais complexos e mais influentes nos mercados financeiros. Neste novo universo financeiro que se transformou radicalmente na década de 1990, os *hedge funds*, fundos de investimento alternativo, aparecem na praça pública como instituição financeira que têm um impacto negativo nos mercados financeiros. Os *hedge funds* mereceram destaque pela primeira vez no início dos anos 1990 com a crise da libra, em que o fundo *Quantum* de George Soros foi acusado de especular sobre algumas divisas europeias.

Nesta tese são analisadas as diferentes estratégias de investimento seguidas por estes fundos e os seus desempenhos durante as principais crises financeiras que abalaram o universo financeiro a partir de 1990.

Os resultados mostram que as estratégias não direccionais são as que registam melhor rendimento, sobretudo as estratégias *Event Driven* (que procuram tirar partido de acontecimentos “especiais” em empresas). A estratégia *Distressed Securities* apresenta-se como a melhor solução com retornos altíssimos e uma baixa volatilidade. No entanto, a estratégia *Global Macro* regista a maior taxa de rendimento.

Destaque ainda para o estudo destas crises financeiras, a partir do qual concluímos que os *hedge funds* influenciaram os mercados financeiros em algumas crises (crise do libra, crise asiática), embora não ocorra na generalidade dos casos. Além disso, devido às características da indústria (pouca concentração, baixo total de activos geridos), os *hedge funds* não podem movimentar mercados inteiros e a influência nos mercados de um só *hedge fund* é claramente limitada.

**Palavras-chave:** *Hedge funds*, Medidas de performance, Estratégias de investimento, Crises financeiras

**Classificação JEL:** G01, G23

## **Executive Summary**

In the last 20 years, we have assisted to a multiplication of financial and economical crises that has been affecting economies worldwide. In general, this is the consequence of the globalization of the economy and the financial markets as well as the constant emergence of new financial instruments. These instruments are more and more complex and with more influence on financial markets. In this new financial universe, radically transformed during the 90's, hedge funds, alternative investment funds with absolute return targets, appear for many as a financial institution with negative impact on financial markets. Hedge funds had been criticized for the first time in the early 90's during the ERM crisis, as the Quantum fund of George Soros was accused of speculating on several European currencies. In 1997, during the Asian crisis, hedge funds were accused by Asian government officials of attacking currencies by the IMF study carried out decided by Eichengreen demonstrated that hedge funds did not play a central role.

In this thesis, we analyze the various investment strategies followed by hedge funds, as well as their performances during the main financial crises since the 90's.

The results show that non directional strategies are the most performing, in particular, Event Driven strategies (seeking to benefit from "special" situations in companies like mergers/acquisitions, IPOs). With a relatively low volatility and large returns, the Distressed Securities strategy seems the best alternative as it presents the best return/risk ratio. However, Global Macro strategy (consisting on leveraged bets on aspects of the global macro economy) appears to register the highest return but is penalized by its high volatility. The results also demonstrates that the Event-Driven (26%) and the Long/Short Equity (22%) are the two most used strategies .By focusing on the historical weights, we see that the main evolution is the decline of the Global Macro weight (linked to the increase of the Long/Short Equity weight) and that there was any major changes in the division of the industry's weighs.

When going back to the events on those financial crises, we find out that hedge funds have influenced the financial markets in some crises (ERM, Asian crisis) even though it did not happen as a rule. It appears the ERM crisis and the Asian crisis were likely the result of fundamental and structural disparities in both European and Asian financial

systems. Concerning the ongoing financial crisis, it has damaged hedge funds more than this industry has affected the crisis.

In a general way, it seems that because of the characteristics of the hedge funds industry (not concentrated, small amount under management), hedge funds cannot move entire markets and the influence of individual hedge funds on markets is clearly limited.

After drawing these conclusions, we discussed the role of Sovereign Wealth Funds to demonstrate that there are others financial institutions who represent a greater threat to market stability than hedge funds. From the transformation of the financial market emerged those government investment funds that are little regulated, very secretive and responsible of speculative transactions during the recent financial crisis.

We noticed that they manage almost twice the capital managed by hedge funds and that the industry is highly concentrated shared by a few large SWFs.

Finally, we raise the question about the need for regulation within the hedge fund industry and give some perspectives for its future.

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## Contents

<b>Abstract .....</b>	<b>i</b>
<b>Resumo .....</b>	<b>ii</b>
<b>Executive Summary.....</b>	<b>iii</b>
<b>Acknowledgements .....</b>	<b>v</b>
<b>Contents.....</b>	<b>vi</b>
<b>List of Tables.....</b>	<b>viii</b>
<b>List of Figures .....</b>	<b>ix</b>
<b>Chapter 1 Introduction .....</b>	<b>1</b>
<b>Chapter 2 Introduction to Hedge Funds .....</b>	<b>3</b>
2.1 Evolution of the hedge fund Industry .....	3
2.1.1 The raise of hedge funds .....	3
2.1.2 Key historical figures on hedge funds.....	3
2.2 Main features of hedge funds and differences with mutual funds .....	4
2.3 Theoretical effects of hedge funds on financial markets .....	6
2.3.1 Benefits.....	6
2.3.2 Drawbacks.....	7
2.4 Performance measure ratios .....	8
2.4.1Skewness .....	9
2.4.2 Kurtosis .....	9
2.4.3 Sharpe Ratio .....	10
2.4.4 Sortino Ratio .....	11
2.4.5Treynor Ratio .....	11
2.4.6 Calmar Ratio .....	12
2.4.7 Sharpe-Omega Ratio .....	12
2.4.8 Modified Sharpe Ratio .....	13

<b>Chapter 3 Empirical application.....</b>	<b>14</b>
3. 1 Choice of the database .....	14
3.1.1 Hedge fund databases.....	14
3.1.2 Benchmarks indexes.....	15
3.2 Investment strategies.....	16
3.2.1 Event Driven .....	16
3.2.2 Event Driven - Distressed Securities.....	18
3.2.3 Event Driven - Risk Arbitrage .....	19
3.2.4 Equity long/short .....	19
3.2.5 Convertible Arbitrage.....	20
3.2.6 Fixed Income Securities .....	21
3.2.7 Equity Market Neutral.....	22
3.2.8 Global Macro.....	24
3.2.9 Managed Future (or Commodity Trading Advisor, CTA).....	25
3.2.10 Dedicated Short Bias .....	26
3.2.11 Emerging Markets .....	27
3.2.12 Multi Strategy.....	28
3.2.13 Comments.....	29
<b>Chapter 4 Financial crises of the last twenty years .....</b>	<b>31</b>
4.1 The ERM sterling crisis (1992-1993) .....	31
4.2 The Bond Crisis (1994).....	33
4.3 The Mexican Peso Crisis (1994-1995) .....	33
4.4 The Asian Financial crisis (1997) .....	34
4.5 The Russian financial crisis and the collapse of LTCM (1998) .....	37
4.6 The IT Bubble (2000-2001) .....	38
4.7 The ongoing financial crises (2007- ) .....	39
4.8 The Sovereign Wealth Funds threat.....	42
<b>Chapter 5 Conclusion.....</b>	<b>44</b>
<b>Chapter 6 References .....</b>	<b>46</b>
<b>Appendix .....</b>	<b>50</b>



## List of Tables

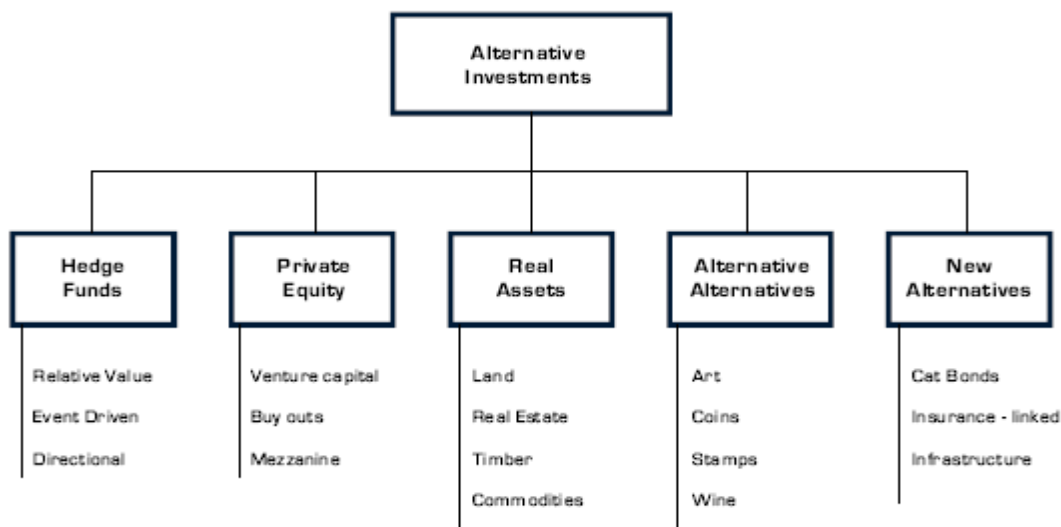
Appendix 1:Top 10 Hedge Fund Manager Pay Outs in 1997 .....	50
Appendix 2 :Event Driven.....	51
Appendix 3:Distressed Securities .....	53
Appendix 4:Risk Arbitrage.....	55
Appendix 5:Long/Short Equity .....	57
Appendix 6:Convertible Arbitrage .....	59
Appendix 7:Fixed Income Arbitrage.....	61
Appendix 8:Equity Market Neutral .....	63
Appendix 9:Global Macro .....	65
Appendix 10:Managed Future .....	67
Appendix 11:Dedicated Short Bias .....	69
Appendix 12:Emerging Markets .....	71
Appendix 13:Multi-Strategy.....	73
Appendix 14: Quaterly Net Performance of benchmarks' and strategies' indexes.....	75

## List of Figures

Figure 1: Categories of Alternative Investments .....	1
Figure 2: Skewness measure .....	9
Figure 3: Current sector weights (February 2010) (Source: Credit Suisse Tremont) ....	29
Figure 4: Historical sector weights (1994-2010) (Source: Credit Suisse Tremont) .....	30
Figure 5: Asian Exchange Rates variation (1997) with Index (31/12/1997=100) (Source: Datastream) .....	35
Figure 6: Cumulative return during the Asian crisis (1997–1999) with Index (01/01/1997=100) (Compiled from MSCI Barra and Strömqvist) .....	36
Figure 7: Cumulative returns on the hedge fund market and stock markets (1994-2010) (Source: Credit Suisse Tremont) .....	41
Figure 8: AUM by institutional investor groups (December 2007) (Source: The Economist, January 17 <sup>th</sup> 2008) .....	43

## Chapter 1 Introduction

The term “Hedge Fund” is a collective term for different types of investment fund, included in the “alternative investments” category, as we see in Figure 1. Generally speaking, a hedge fund is a fund with absolute return targets for financially sophisticated investors because it uses advanced investment strategies such as leveraged, long, short and derivative positions in both domestic and international markets.



**Figure 1: Categories of Alternative Investments (Source: AIMA’s road map to hedge funds)**

Defining a hedge fund has been over the years a difficult task, more problematic than it appears. As Garbaravicius states, in an occasional paper for the European Central bank (ECB): “There is no common definition of what constitutes a hedge fund; it can be described as an unregulated or loosely regulated fund which can freely use various active investment strategies to achieve positive absolute returns”.

Indeed, there is no consensus on its exact definition and there is not much literature dedicated to the hedge fund industry and its variety of investment techniques.

There are still a lot of myths about hedge funds, built sometimes on anecdotal support, oversimplification or misrepresentation of facts. They are often criticized because of their alleged negative impact on financial markets and because they thrive on unregulated aspects. Others consider that they just use other strategies than those used

by relative return managers more focused on long-term and that they do not harm markets more than others financial institutions.

The purpose of this thesis is to fully understand what a hedge fund is, what a hedge fund does and essentially, whether hedge funds had great impact and any responsibilities in financial crises since the 1990's. As a matter of fact, we are going to focus our analysis on the principal crises since 1990, as many crises occurred since then but mostly because relevant information on hedge funds is only dated from the early 1990's.

Firstly, we will make an introduction to hedge funds, dwelling upon the history and the evolution of the hedge fund industry and describing the main features of hedge funds as well as the differences compared to mutual funds. Then we will present some theoretical ideas about the benefits and drawbacks of hedge funds and their effects on financial markets.

Still within this introduction to hedge funds, we will choose what kind of ratio is the best to measure hedge funds performance.

In the second part, after choosing an appropriate database compiled by Credit Suisse Tremont (tracking more than 5000 funds with a minimum of \$50 million under management), we analyze the different investment strategies followed by hedge funds, as well as their performances during the financial crises considered. This will be carried out with the help of tables (on net performance, statistics and correlations) as well as cumulative returns graphs and drawdown graphs. From this analysis, we will be able to designate the best strategies.

Finally, in the final part, we will review in details the events related to each financial crisis analyzed and illustrate the behavior of hedge funds during those periods, in order to draw a conclusion on the supposed impact and responsibility during those financial crisis. Finally, we will introduce some ideas about Sovereign Wealth Funds (SWF) and we will try to show that these new investment funds can be as threatening as hedge funds for financial markets.

## **Chapter 2 Introduction to Hedge Funds**

### 2.1 Evolution of the hedge fund Industry

#### 2.1.1 The raise of hedge funds

First and foremost, as observed by Laeger (2001), it is important to note that the word “hedge” in hedge funds has become a misnomer: hedging is actually the act of removing risk in some investment by taking an investment in another typically related. But the goal of most hedge funds is to generate high returns either in an absolute sense or over a specified market benchmark. The name is mostly historical, as first hedge funds tried to hedge against the downside risk of a bear market by shorting the market. Nowadays, hedge funds use many different investment strategies and, although many of them still do the so-called hedging, it is not common practice anymore among the industry.

According to Fung (1999), it is generally believed that the first hedge fund was formed in 1949 by Albert Wislow Jones (a PhD in sociology who was a writer for *Forbes*) so called as the main investment strategy was to take hedged equity investments in order to eliminate some market risks. However hedge funds became well-known only after the publication of an article in the famous magazine Fortune in 1966 mentioning Jones’s fund significantly outperforming other mutual funds (Fung, 1999).

But the bear market periods between 1969 and 1974 will eclipse the latest interest in hedge funds that will come back years later with the Tiger Fund of Robertson (+43% from 1980 to 1986). The number of investors in hedge funds began to grow while new hedge funds strategies, more complex including the use of different instruments, started to appear.

#### 2.1.2 Key historical figures on hedge funds

Back in 1949, Jones invested \$40000 of his own capital and managed to raise \$60000 to create the first hedge fund ever which he ran into the early 1970's. From this start, and particularly since 2000, the hedge fund market has grown exponentially.

At the end of 1993, the amount under management (AUM) of hedge funds was less than 4% of the total amount managed by mutual funds. Later in 2005, those assets already represented more than 10% of the assets managed by mutual funds.

When comparing absolute numbers, we may assert that in 1990, less than \$ 50 billion were invested in hedge funds whereas six years later this amount had already reached \$ 130 billion, split by almost 2000 funds. In 2006, more than \$1 trillion was invested in hedge funds (according to a famous data provider, Hedge Fund Research (HFR)).

In his AIMA's road map to hedge funds, Alexander Ineichen (2008) estimates that the industry managed approximately \$ 2.5 trillion at its peak in the summer of 2008.

More recently and based on the information provided by the 2009 Credit/Suisse Tremont Industry Review, the estimated hedge fund assets under management is \$1.5 trillion as of December 31st 2008.

In addition to the fact that the hedge funds have grown in size, the range of strategies adopted has also changed during the period. While the global macro strategy was the most frequent strategy in the industry (over 30%) back in 1998, we will determine later within the practical case that it does not apply anymore.

Nowadays, and because almost 2,500 hedge funds closed down in the last two years, the number of hedge funds is 9,050, as estimated by HFR in December 2009, which is way inferior than other financial institutions like mutual funds for instance.

## 2.2 Main features of hedge funds and differences with mutual funds

One way of defining a hedge fund is by comparing the similarities with differences from mutual funds. Indeed, hedge funds have a number of common characteristics that distinguish them from the well-known mutual funds.

Generally speaking, hedge funds employ more flexible investment strategies. A more liberal regulatory framework than for mutual funds enables more dynamic investment strategies with both long and short positions and the use of derivatives (Lhabitant, 2003). Hedge funds can also choose to have a high level of leverage. Unlike mutual funds that have relative return targets (compared to an index), hedge funds have

absolute return targets irrespective of the development of the market as a whole, as we already mentioned before.

Furthermore, the fee structure in hedge funds also differs from what is taken in mutual funds. In a mutual fund, the management fee is a few per cent of the managed capital. In hedge funds, it normally consists of a fixed fee of 2% of the managed capital (the management fee) and then a variable fee of 20% of any earnings over the return target (the performance fee).

Yet, some managers can charge higher performance fees like Jim Simons' Medallion Fund (45%) or Steven Cohen's SAC Capital Partners (35%) according to Forbes magazine. These high performance fees have been often condemned, even by Warren Buffett, who considers them a lethal incentive for managers to take extreme risks instead of seeking high long-term returns. This is common practice for managers as they do not “share” losses and are willing to take elevated risks.

Some hedge funds also apply a “high water mark” which sets a limit for when the performance fee may be levied. This means that the performance fee is only charged if the value of the fund exceeds its highest previous value, irrespective of the earnings realized in the period concerned.

In cases when the investors get huge returns, hedge fund managers may obtain extremely high compensations. For example, the 2005 Hedge Fund Compensation Report shows that “the average take-home pay of the top 25 hedge fund earners in 2004 was over \$250 million. Appendix 1 (Top 10 Hedge Fund Manager Pay Outs in 1997), shows that in 2007 (one of the best years for hedge fund managers) each of the top ten earners got over \$ 500 million and five of them even exceed the symbolic barrier of \$1 billion, like John Paulson who gained \$ 3.7 billion, or George Soros who earned \$ 2.9 billion.

In addition, with a high minimum amount for investments, hedge funds are primarily intended for institutional investors (like pension funds) or high net worth individuals. In the U.S.A, laws require the majority of investors in the fund to be accredited. In other words, they must earn a minimum amount of money per year and must have a net worth of more than \$1 million, plus considerable investment knowledge. That is the reason why hedge funds are often seen as mutual funds for wealthy people.

A typical feature of hedge funds is also that investors can only withdraw their money from the fund on a monthly or quarterly basis, in contrast to mutual funds, which

provide liquidity on a daily basis. Investors in hedge funds are often required to keep their money in the fund for at least one year. This approach facilitates investments in less liquid assets.

So, in a nutshell, hedge funds are typically characterized by high leverage, derivatives trading and short selling and financially strong investors due to the high minimum limit for investments and the high fee structure for clients, when compared to mutual funds. Anyhow, hedge funds are similar to any other portfolio investment in some ways, as they are funded by capital from investors, rather than bank loans or other sources of capital, they invest in publicly traded securities and the capital is managed or invested by expert fund managers.

Those differences between hedge funds and mutual funds come mostly from a divergence in the degree of regulation, the level and the variety of risky investment strategies. Hedge funds are allowed to employ any investment strategy with any level of risk, whereas mutual funds are required to hold on to heavy financial regulations (including types and levels of risks) because they normally target the general public, or at least any investor who can meet the minimum investment limit.

A hedge fund is typically a collection of funds managed by the hedge fund manager, because the tax status of investors differs and each fund is designed to optimize taxation for investors. Usually, a regular hedge fund with a US based management company has an offshore fund for foreign investors and an onshore fund for American investors.

Around the world, there are some examples of hedge funds listed on smaller stock exchanges, such as the Irish Stock Exchange, with the advantage for some investors to benefit from a low level of regulatory oversight. However, shares in listed hedge fund can not normally be dealt.

## 2.3 Theoretical effects of hedge funds on financial markets

### 2.3.1 Benefits

We have seen previously the hedge funds potential to offer considerable returns thanks to more liberal investment rules. However, some argue that they do not contribute to markets functioning and that their influence on financial markets is negative.



We will attempt then to present some theoretical ideas about the benefits and drawbacks of hedge funds and their effects on financial markets.

It is often argued that hedge funds provide several economic benefits to the markets. First and foremost, they help price discovery. Playing their role of arbitrageur, their managers exploit mispricing. So by buying undervalued assets or selling overvalued instruments, they improve pricing (prices get closer to their fundamental values) which leads to a more effective market as argue Amec N., Martellini L. and Vaissié M. (2002). Moreover, hedge funds do not follow “herd-mentality” trading (are not influenced by others financial institutions to adopt trading decisions) unlike mutual funds.

Secondly, research from J. Danielsson, A. Taylor, and J.P. Zigrand (1995) shows that hedge funds help the market competition and enhance the concept of the “invisible hand”. When hedge funds benefit from arbitrage opportunities (because traders do not have instantaneous information and have costs to access market information), they drive prices to their no-arbitrage price.

The third economic advantage is the help to improve liquidity within the markets, as they tend to be very active. Generally, hedge funds investors are more able than other investors to invest in less liquid assets or riskier assets.

### 2.3.2 Drawbacks

Unlike the general idea, hedge funds are able to cut overall risk rather than amplify it. Hedge funds normally invest on risky assets, thereby absorbing some of the risk. They also capture some effects of market shocks because they are more willing to invest in volatile markets. Hedge funds are also interesting from an investor’s perspective. Because of its own characteristics, a hedge fund is another option for more sophisticated investors seeking high returns as well as diversification (thus reducing risk).

In their research, Danielsson, Taylor, and Zigrand (1995) pointed out that Hedge funds were engaged in “herding” in particular during the ERM crisis and the Asian crisis, examples that we will discuss later. These authors also blamed hedge funds for exhausting liquidity in markets. Fung and Hsieh (2001) support that hedge funds cause massive price moves due to the lack of liquidity, because of the strategies they employ

and the large positions they invest in. By defending this theory about market price distortions, these authors totally reject the idea that hedge funds aid price discovery.

As we will confer later, the high degree of leverage is a critical risk even if it also enables hedge funds to register large returns. A high leverage amplifies the possibility of collapse in case of incorrect investments, which could have consequences on counterparties or worse, have contagion effects in financial markets.

Nevertheless, Gupta and Liang (2005) studied capital adequacy using VaR measures and came to the conclusion that most Hedge Funds are adequately funded.

Furthermore, hedge fund as a viable alternative investment has also been strongly criticized even by leading academics on hedge funds. Eugene Fama (2001) said about hedge funds "If you want to invest in something where they steal your money and don't tell you what they're doing, be my guest" whereas Burton Malkiel (2001) declared "If there's a license to steal, it's in the hedge fund arena". Bernard Condon (2004) even alleged that "You would do better giving your money to a monkey" than investing in Hedge Funds. Some defend that the use of derivatives (for speculation or even for risk protection) exposes hedge funds to certain risks. Borrowing and using derivatives in order to adopt larger positions can lead to bigger fluctuations in share prices.

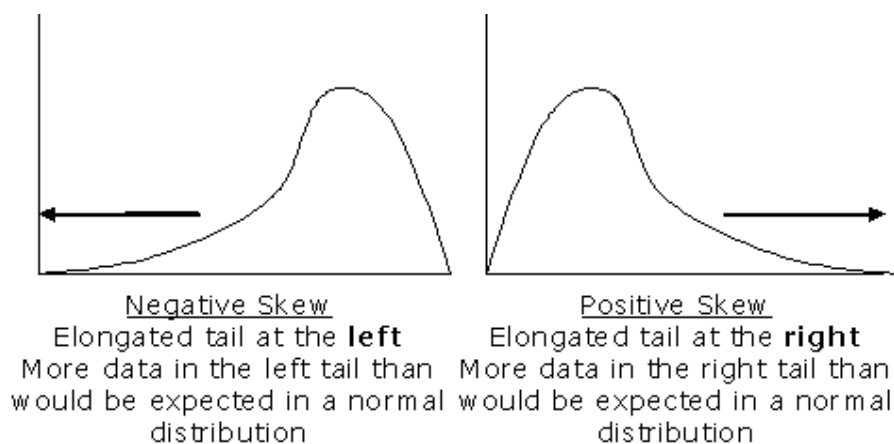
In fact, there are clearly divergent opinions about the theoretical effects of hedge funds. It is difficult to differentiate what is an advantage and what is a drawback.

#### 2.4 Performance measure ratios

The classic performance measures are based on the Markowitz theory (1952), whereby investors have mean-variance preferences, i.e. for which the choice of their investments depends only on their return averages and volatility. The classic performance measures use the entire distribution of returns (symmetrical distribution of returns). In this section, we will introduce some basic performance measurement indicators for analyzing hedge funds. The evaluation of hedge fund performance differs considerably from the analysis of other investments because of their characteristics and unique strategies. Hedge funds managers and investors have to considerate other indicators, not only the rate of return and the standard deviation.

### 2.4.1 Skewness

Skewness is a measure of the asymmetry of the probability distribution of a real-valued random variable (in this case, an investment return).



**Figure 2: Skewness measure (Source: [www.nist.gov/itl/](http://www.nist.gov/itl/))**

A negative skew (when the left tail is longer and the mass of the distribution is concentrated on the right of the figure) indicates that the variable has few low values. On the other hand, a positive skew (when the right tail is longer and the mass of the distribution is concentrated on the left of the Figure) means the variable has rather few high values. The normal distribution has a skewness of zero.

### 2.4.2 Kurtosis

Kurtosis is a measure of the peakedness of the probability distribution of a real-valued random variable. Higher kurtosis means more of the variance is the result of infrequent extreme deviations, as opposed to frequent modestly sized deviations. A distribution with positive excess kurtosis is called leptokurtic, with a more acute peak around the mean and fatter tails (meaning a higher probability than a normally distributed variable of extreme values). This is the case of hedge funds who have a low probability of loss or gain, but when a loss or a gain occurs, they are generally high.

### 2.4.3 Sharpe Ratio

The Sharpe ratio (Sharpe, 1966) is a measure of the excess return (risk premium) in an investment asset or a trading strategy:

$$S_h = \frac{R - R_f}{\sigma} = \frac{E[R - R_f]}{\sqrt{\text{var}[R - R_f]}} \quad (1)$$

Where  $R$  is the asset return,  $R_f$  is the return on the benchmark asset (the risk free rate of return) and  $\sigma$  is the standard deviation of the asset.

$E[R - R_f]$  is the expected value of the excess of the asset return over the benchmark return.

This ratio is used to characterize how well the return of an asset compensates the investor for the risk taken. The investment is better when the Sharpe ratio is higher, for a risk-averse investor.

When calculating the variance, no distinction is made between upside and downside deviation. This ratio employs a non directionally-biased measurement of volatility to adjust for risk (return minus the risk free divided by the standard deviation) whereas standard deviation is simply the square root of variance.

This is the main weakness of the ratio, because as we pointed out above it may penalize a fund for a month of excellent performance. A hedge fund manager could also optimize the Sharpe ratio of his fund by having risky positions as illustrated by the Integral Investment Management case.

This hedge fund lost 90% of the entrusted funds, despite having one of the best Sharpe ratios among the hedge fund industry. It could yield to its investors a monthly return between 1% and 2% on the assumption that the stock market would show a null or positive growth and losses only in the event of a major fall (higher than 10%). It was mainly shorting put options out of the money. If the option would stay out of the money, the hedge fund would cash in the premium amount. This strategy allowed the fund to obtain a steady profitability (with the premium pay off) as well as displaying a great Sharpe ratio, all this with an increase in risk of extreme losses.

In the case of extreme events, the strategy fails and the investors lose a great part or even the totality of their money. That is what happened to those investors as the fund managers focused on the Sharpe ratio and volatility, forgetting to take into account skewness and kurtosis.

The Sharpe ratio remains a useful indicator for a first analysis but is only appropriate if the returns follow a symmetrical distribution, by representing the risk by the standard deviation of the return.

#### 2.4.4 Sortino Ratio

The Sortino ratio (Sortino e Price, 1994) is a more relevant version of the Sharpe ratio because instead of using standard deviation in the denominator, this ratio uses downside semi-variance:

$$So = \frac{R-T}{DR} \quad (2)$$

where R is the return of the asset, T is the target rate of return (also known as MAR, minimum acceptable return, introduced by Jeynes in 1964) and DR is the measure of the downside risk.

This ratio penalizes only returns falling below the target rate of return, while the Sharpe ratio penalizes both upside and downside volatility equally. The ratio provides a solution to the asymmetry of the return distribution, occurring with the Sharpe ratio, but it is inaccurate when taking into account higher moments. Funds that mention their Sortino ratio are usually those with the least tolerance for risk.

#### 2.4.5 Treynor Ratio

The Treynor ratio (Treynor, 1966) is a lesser well known portfolio measure ratio, quite similar to the Sharpe ratio, but evaluating the portfolio performance on a CAPM model basis, as the difference is that the denominator used in the formula is Beta instead of the standard deviation:

$$T = \frac{r_i - r_f}{\beta_i} \quad (3)$$

where  $r_i$  is the portfolio return,  $r_f$  is the risk free rate and  $\beta_i$  is the portfolio beta.

The Treynor ratio measures the excess return of a portfolio (with respect to the free rate). As it happens with the Sharpe ratio, the higher this ratio is, the better the performance of the portfolio.

Furthermore, this ratio does not quantify the value added; it is a ranking measure only. Steiner (2007) argued that a ranking of portfolios based on the Treynor ratio or the Sharpe ratio is only useful if the portfolios under consideration are sub-portfolios of a broader, fully diversified portfolio

#### 2.4.6 Calmar Ratio

The Calmar ratio (Jones and Baehr, 2003) is a performance measurement commonly used to evaluate CTAs and hedge funds. Like the Sharpe ratio, this ratio reports excess return but this ratio uses the concept of Drawdown (loss compared to the maximum level) as a measure of risk:

$$Calmar = \frac{ER}{MaxDD} \quad (4)$$

with ER being Excess Return and Max DD representing the maximum Drawdown.

To properly use this ratio, and to be able to compare it, every fund or strategy from which the Calmar ratio is calculated, must have the same historic data.

#### 2.4.7 Sharpe-Omega Ratio

The Sharpe-Omega ratio is more difficult to put in place since it brings up option pricing notions from the Black & Scholes method. This measure was introduced by Keating and Shadwick (2002) with the main advantage of incorporating all the moments of the return distribution, including the skewness and the kurtosis.

$$S_hO = \frac{(E_r - TH)}{put} \quad (5)$$

where  $E_r$  is the expected return, TH is the threshold and put represents the put option price.

In addition, in 2003, Bacmann and Scholz tried to improve the risk approach in the context of hedge funds by comparing the results of the Sharpe ratio and the Sortino ratio to the results obtained with the Omega measure and the Stutzer index, a measure that rewards portfolios with a lower probability of underperforming a benchmark and penalizes negative skewness and high kurtosis.

The disparities between the Sharpe ratio and the other measures come out when analyzing the higher moments. It emphasizes the tendency of the Sharpe ratio to underestimate or overestimate the performance of hedge funds.

#### 2.4.8 Modified Sharpe Ratio

The Modified Sharpe ratio is another correction of the Sharpe ratio proposed by Gregoriou and Gueyie (2003). The improvement of the Sharpe ratio is done through the use of the modified Value-at-Risk (MVaR), suggested by Favre and Galeano (2000), instead of the standard deviation.

$$MS_h = \frac{R - R_f}{MVaR} \quad (6)$$

where R is the return of the portfolio,  $R_f$  is the risk-free rate and MVaR is the modified VaR which take into account the skewness and kurtosis in addition to mean and standard deviation.

As argued by Gregoriou and Gueyie (2004) “Applied to the hedge fund universe, traditional performance measures that assume a mean-variance framework suffer from some limitations, mainly due to the non-normality of returns.” That is the reason why alternative ratios like the Sharpe-Omega ratio and the Modified Sharpe ratio have been created, fixing the limitations of the Sharpe ratio and the Sortino ratio.

However, Eling and Schuhmacher (2007) conclude in their paper that “it does not matter too much which performance measure one chooses to evaluate hedge funds [...] use of the classic Sharpe ratio (even if it displays some undesirable features) is justified, at least from a practical perspective.”

## **Chapter 3 Empirical application**

### 3. 1 Choice of the database

#### 3.1.1 Hedge fund databases

Studying hedge fund is not an easy task, as we described before. The main issue here is to correctly define the strategies used, as they can be slightly different from one hedge fund manager to another. We will focus particularly on the performance and risks taken by hedge fund managers when they apply each strategy. Nowadays, hedge funds specialists as well as database providers make their own evaluation according to the type of strategy. From the several sources we had access to, we selected the most representative strategies, not only those most frequently used but also those who have a common definition admitted by all the database providers. Indeed, a strategy can differ slightly depending on the way in which it is applied, which can cause sometimes very different results.

When gathering information on hedge funds, the first issue encountered is the little historic information available because although hedge funds exist since 1949, it is rare to find relevant database dating from before 1994. During the last years, information about hedge funds has gradually multiplied but unfortunately it is still tough to access this kind of information for non institutional investors, especially information on individual funds.

However, as we are only interested on the strategies used, we will focus on the overall funds and not on funds individually.

We are not able to get as much information as we would get for other more classical financial instruments (for instance for mutual funds). Hedge funds are not obliged to disclose financial information thanks to a more liberal regulatory framework.



Besides, hedge funds are not allowed to advertise their services and products in any way (written, spoken or even presented in a regular seminar). Should this happen, they would simply become a “normal” fund and would have to respect management constraints (some investment strategies could not be used), legal obligations (financial closure) and the absolute return targets would be impossible to obtain.

Therefore, the regulatory framework on hedge funds can explain partially the lack of information. Moreover, advertising would be useful just at the creation of a hedge fund in order to attract the initial investors, since they are limited to a maximum of 99 investors. In fact, the only possible promotion is done via the publication of their indexes and benchmarks.

The hedge fund industry has five major database providers from which we are able to draw detailed information for each strategy. Each of these database providers calculates his very own index that was at first internal information but then started to be published on a regular basis. The most frequently considered providers are the following:

- i. Hedge Fund Research Inc (HFRI)
- ii. CASAM/CISDM Hedge Fund Database (formerly the MAR Database, the oldest hedge fund database)
- iii. Van Hedge Fund Advisors International Inc
- iv. EDHEC Asset Management Research (calculate their own index from other indexes since they do not have their own database)
- v. And the Credit Suisse/Tremont Hedge Fund Index, compiled by Credit Suisse Tremont, a cooperation between Credit Suisse and Tremont Capital Management. It tracks more than 5000 funds, and consists only of funds with a minimum of \$50 million under management and with a one year track record.

### 3.1.2 Benchmarks indexes

For the analysis of the investment strategies for hedge funds, we will be using information from the Credit Suisse/Tremont Hedge Fund Index, as it is the database provider with more information and it includes the most representative strategies, with a

common definitions admitted by all the database providers. It will be necessary to compare the performance of each index to several benchmarks indexes. Analysts usually operate with an index reflecting the stock market performance, a bond index and a specific index depending on the type of analysis.

In this case, and given the global dimension of the hedge funds industry, it is more appropriate to use global indices in USD, represented by the Dow Jones World Index, the Credit Suisse High Yield II index and the S&P 500. As regards the Credit Suisse/Tremont Hedge Fund Index, it will represent the evolution of the hedge fund industry as a whole.

However, we will also use other more appropriate indexes for some strategies, like the Merrill Lynch All US convertible index for the Convertible Arbitrage strategy. Cumulative returns graphs and drawdown graphs will illustrate the evolution over time and the Sharpe ratio is calculated using a rolling 90-Day T-bill rate. We must also refer that all this statistics date from January 1994 to February 2010.

## 3.2 Investment strategies

The Credit Suisse Tremont Hedge Fund Index considers 12 main strategies that are divided in three major categories: non directional strategies (the more represented category, with seven strategies), directional strategies and finally the multi-strategy.

### *Non directional strategies*

#### 3.2.1 Event Driven

The Event Driven strategy seeks to take advantage of situations that may affect the life of a company like recapitalizations, mergers/acquisitions, IPOs, social crises... Some managers are specialized within the Event Driven strategy by focusing only on companies in difficulty (Distressed Securities) or even on mergers/acquisitions (Risk Arbitrage). In Event Driven management, managers will acquire positions on securities issued by the company concerned, to take advantage of the uncertainty that emanates from the outcome of these events.

These managers use a common method that consists globally in four steps. Firstly, hold an event publication considered interesting in the sense that it may end on a profit operation. Secondly, define the time resolution of the event in order to implement a fair timing for the investment decision. Managers also perform an advanced search (press, contacts, experts, statistical studies) on the event. Then, they assess the potential gains with a calculation between the current market value and the value expected after resolution, among other calculations. Finally, they take the selected positions based on the first three steps. In general, managers diversify their investments due to the high degree of risk on event driven strategies.

Managers will especially have to cover the market risk by purchasing options and will not use much leverage. This strategy has the main advantage to be very little correlated to the market variations as the positions are taken on firms going through an unusual situation. However, the strategy still follows economic growth cycles, given that during periods of economic growth, managers will be more interested in situations of mergers/acquisitions whereas during periods of decline, companies in trouble will be the center of their attentions.

According to Appendix 2, since 1994, the Event Driven strategy has been registering a 10.26% annual rate of return, outperforming each benchmark index (7.49% for the S&P 500, 7.2% for the CSHY and 4.32% for the DJW). It also beats the industry average that rose 9.28% in average per year. During the period considered, the Event Driven index increased almost 400% against 320% for the hedge fund index and has performed almost twice better than the S&P 500. Despite a decline verified in 2008, due to the current crisis, the performance of this index is still better than the performance of stock indices and the hedge fund index.

This strategy with high returns does not register a high volatility (6.04%) comparing to the benchmark indexes, including the hedge fund index. The drawdown analysis shows that this strategy had four major periods of decrease. In 1994, it experienced a slight correction due to the turmoil of the bond market. A large decline occurred in 1998, with a 16% decrease, as a result of the Asian crisis and the LTCM collapse. Between 2000 and 2002, when severe correction on the stock market happened, this strategy succeeded in taking advantage of the situation to ensure a minimum return. But the most important decrease remains linked to the current crisis, reaching -20%.

In terms of correlation, this strategy is partially correlated with the markets with a 0.54 coefficient with the S&P 500, 0.52 with the CSHY and 0.60 with the DJW. Indeed, for example, the number of mergers acquisitions increase strongly in a bull market period.

### 3.2.2 Event Driven - Distressed Securities

Distressed Securities strategies focus on securities (shares or bonds) from companies in bankruptcy or restructuring. Generally, these organizations suffer from financial or operational difficulties concerning the capital structure or because of externalities. The fund manager's goal is to find undervalued debts, with a higher potential of recovery than the one estimated by the market price. In this type of management, the intrinsic quality of the manager is central, since he or she must be capable of evaluating poorly rated bonds (like Junk Bonds).

This strategy requires medium/long term investment because the manager has to stay alongside the firm management during the restructuring period to follow the firm situation (sell the position or make additional investment).

As we can see in Appendix 3, Distressed Securities strategy rose 460% since 1994 (11.24% per year) which beats traditional indexes and the hedge fund index. It is also higher than the Event Driven strategy (9.28%). However, Distressed Securities funds have been more affected by the current crisis (-20.48% in 2008) than the Event Driven funds and the hedge fund index (-17.74 and -19.07% respectively) but recovered better in 2009 (+20.95%). This strategy has experienced contrasting performances. Except in 1998 and 2002 (negative returns), the returns has been growing even more since 2003 until the decline in 2008.

Its volatility is quite low (6.77%) comparing to the other benchmarks indexes but slightly superior to the Event Driven volatility. Associated to a high return, this confers a pretty good Sharpe ratio (1.15) as considered by Morningstar, a global investment research firm. Concerning the drawdown, the strongest declines occurred in 1994, 1998-1999 and obviously in 2008. The strategy has a coefficient of 0.60 with the S&P 500 and 0.64 with DJW market which seems normal since the strategy requires investing in listed companies in trouble.

### 3.2.3 Event Driven - Risk Arbitrage

This strategy is considered as Event Driven, but focusing on processes of mergers/acquisitions. In most common cases, the fund manager will acquire a long position on the targeted company and take a short position on the firm launching the acquisition. By using a long position and short selling, the manager benefits from a dual movement since the titles of the two companies usually evolve in opposite direction. To maximize these movements, a leverage effect (going up to 2 maximum) is used. The strategy is quite cyclic because it follows the acquisitions/mergers events that are more common in market growth periods.

With an annual return rate of 7.32% (213% since 1994, as illustrated in Appendix 4), the Risk Arbitrage strategy clearly underperforms the hedge funds industry and the Event Driven strategy. Nevertheless, it has a quite regular return but never exceptionally positive, with the second lowest “best month” return of all strategies (3.81%), even if its worst monthly return, in August 1998 during the Asian Crisis, is largely better (-6.15% comparing to -19.96% for the DJW for instance). This strategy resists much better in the ongoing crisis than the other indexes (+12% in 2009 and only -3.27% in 2008).

Indeed, this strategy is less risky, displaying a 4.19% volatility, almost four times less than the equity markets. The drawdown analysis confirms that, with maximum losses not extremely high. Despite a low return, its low-risk profile permits an interesting Sharpe ratio (0.90). Levels of correlation with the equity markets are lower than with the two strategies seen before.

### 3.2.4 Equity long/short

This strategy is designed to minimize exposure to the market by profiting from a change in the spread between two stocks. One position from an undervalued stock has to be bought and one position from an overvalued one has to be sold. The short position will help out in several ways: by acting as a hedge against a possible market decline, by giving managers an opportunity to add value by selecting stocks that are expected to underperform the market and by collecting interest on the short amount. However, it is crucial that the long position outperforms the short position on a relative basis. Therefore, the long position may remain profitable if both stocks decrease.

In General, Equity long/Short funds are exposed to the market, they are not neutral in terms of positions. It means that the short positions and the long positions are not held each with the same amount, unlike Equity Market Neutral funds. Managers may differ in their level of exposure to the market.

There are lots of Equity long/short strategies due to various factors, such as the preference for a geographic area, the investment style (value, fundamental, quantitative...) or the investment sector (financial, healthcare...). Leverage is also critical as managers trading in volatile sectors (as technology stocks), or with less liquid securities (like European small Caps) will avoid leverage, whereas managers trading in a diverse and large international Cap can go up to a 2.5 leverage. Meanwhile, the difference between the long positions and the short ones can go from -100% to +150%, although most managers choose between 0 and 75%. This exposure clearly defines the systematic risk that managers are ready to support.

Appendix 5 demonstrates that the Equity long/short strategy provides an average return rate of 10.18% outperforming the other indexes. Its monthly performance is in the range between -11.43% (August 1998) and +13.01% (December 1999). The explosion of the internet bubble in 2000-2001 didn't affect much its return. Even if its performance has been weaker than the hedge fund index performance since 2008, the Long/Short Equity strategy performs much better than the stock markets since 2007.

The 10.01% standard deviation displayed by the Long/Short Equity strategy is high given that the annual return is 10.18%. As regards the maximum drawdown, it must be recognized that the strategy is disappointing as it exceeded 20% during the current crisis and registered also a - 15% dip in 2002. Finally, it is not surprising that this strategy is more correlated with the market than the three previous ones, especially with the hedge fund index (0.82) which can be explained by the fact that this strategy accounts for 22% of the total AUM of the whole hedge fund industry.

### 3.2.5 Convertible Arbitrage

This strategy, also known as arbitrage on CBS, is one of the most complex strategies of hedge funds industry that exploits under pricing of convertible bonds. Indeed, it combines a multitude of products and tools used in modern finance. The general principle is the combination of long positions on a convertible bond, with short

positions on the underlying stock to benefit from an absolute return thanks to the growth of the price gap between these two instruments. The equity option embedded in the convertible may be a source of cheap volatility, which convertible arbitrageurs can exploit.

There are two elements that managers have to analyze carefully: the conversion ratio and the coverage ratio. The coverage ratio is determined based on the number of positions to sell short whereas the conversion ratio determines the number of common shares received for each convertible security.

This strategy has a major advantage which is that regardless of market conditions, there will always be a guaranteed yield (coupons and short sales compensation). The main risk of this strategy is the scenario when the bond issuer defaults.

In Appendix 6, we can observe that the Convertible Arbitrage strategy has offered a 7.69% annualized return, outperforming the benchmark indexes except the hedge funds industry index, mainly thanks to an outstanding performance in 2009 (+47.35%). After a poor start, this strategy overtook the equity and hedge fund industries and just declined twice (-4.4% in 1998 and -2.5% in 2005) before the current crisis. Given these weak performances, the 7.18% volatility penalizes the return/risk ratio. The drawdown observation highlights the presence of two main moments: first in 1994 after the disruption of the bond market and then the current crisis. The study of the correlation coefficients indicates that this strategy is little correlated with the equity markets (0.35 with S&P 500 and 0.42 with DJW) and moderately correlated with the Hedge Funds and the convertible bonds industries (0.53 and 0.55 respectively).

### 3.2.6 Fixed Income Securities

This strategy exploits pricing differentials between fixed income securities. Yield curve arbitrage, capital structure arbitrage, swap-spread arbitrage and mortgage-backed securities arbitrage are the most frequent fixed income arbitrage strategies as they all try to exploit perceived mispricing among one or more fixed income instruments. The strategy consists in leveraging long and short positions in similar fixed income securities related either mathematically or economically. LTCM is probably the most famous fixed income arbitrageur. According to Richard Wilson (2006), who runs the

Hedge Fund Group (providing hedge fund training, capital raising tools and educational resources), the hedge fund registered annual returns of over 40% before losing \$ 4.6 billion in September 1998. Troubles from the past (in 1998 for instance) lies in the mismatch between the degree of leverage used and the liquidity of the underlying assets. Indeed, when a financial crisis occurs, investors seek the most secure instruments. This leak to quality is also known as "Flight to quality". It creates a dislocation between financial assets and causes often an unreasonable amplification of the arbitrage strategies elaborated by managers. If the fund portfolio is built too aggressively (focusing risk on few instruments or on little liquid instruments), the manager may be forced to sell its positions with the wrong timing. Unusual high degree of leverage often exists in fixed income arbitrage.

The Fixed Income Arbitrage strategy proposes a low performance (4.91 % per year) but a steady one (just a decline in 1998 before the current crisis) as Appendix 7 illustrates. It is crucial to state that in 2008, this strategy registered a poor performance (-28.82%) whereas the Citigroup World Government Bond Index did pretty well (+10.89%).

The 6.04% volatility is smaller than the one for the hedge fund index and the Government Bond index, but its low performance is the one responsible for its mediocre Sharpe ratio. The drawdown analysis shows a decline in 1999, but especially a collapse in 2008 to nearly -30%. In this strategy, operations should be performed only on instruments that are available in abundance and above all, easy to negotiate. When this lack of liquidity is unexpected and sudden, related to the "flight to quality", arbitrations relocations can become important and have a negative impact on the portfolio, if the manager does not anticipate this situation properly. For the fixed income arbitrage funds, the high leverage used has been fatal during the current crisis.

This strategy is totally not correlated with the bond market (-0.01) and moderately correlated with the equity markets. This was expected given the nature of its operations (arbitrage on punctual positions or on short term).

### 3.2.7 Equity Market Neutral

Equity market neutral tries to exploit investment opportunities unique to some specific group of stocks while maintaining a neutral exposure to groups of stocks defined for



instance by sector, industry, country... The strategy consists on holding long positions hedged with short positions in the same and related sectors, in order to be less affected by sector wide events. This is somehow forecasting that the long positions will outperform (or that the short positions will underperform) their sectors not considering the strength of the sectors. Investment portfolio is generally composed by large caps since the use of short selling is essential. Stock picking will be performed within the same sector to keep neutral market exposure in terms of market, sector and geographical area. Those portfolios will then include large amounts of investment, which leads the managers to frequently use thresholds set in advance (Take Profit / Stop Loss) given the difficulty of tracking each investment individually.

Considering the neutral exposure to the market, this strategy has the advantage of creating profits in every situation (growing and declining cycles) even if it will be less efficient than directional strategies in a bull market.

According to Appendix 8, with a 5.33% annual return and a 132% total return since 1994, this strategy demonstrates a disappointing performance, only beating the DJW performance. After an unusual steady growth (the return has not declined during any of the previous crises considered), it has been much more affected by the current crisis than the benchmark indexes. Collapsing by 40.32% in 2008, it has some trouble recovering (only +4.05% in 2009 and -1.26% so far in 2010).

The fall in net performance since inception in the last fourteen months (from almost 300% to only 132%) is the responsible for its low annual return.

Its low volatility, without any serious decline before 2008, reached 10.79% with the current financial crisis. The drawdown data is remarkable until 2008 when a decline exceeding 40% happened.

The year 2008 turned out terrible for equity markets as well but they recovered in 2009 (+26% and +32%) unlike the equity market neutral funds. The Equity Market Neutral strategy seems little market correlated (0.25) but during the current crisis, it registered huge declines like the equity markets did. This neutral strategy worked until a sizeable crisis, the biggest financial crisis since 1929, took place and ruined this strategy's performance.

## *Directional Strategies*

### 3.2.8 Global Macro

The Global Macro approach to investing consists on making leveraged bets on aspects of the global macro economy. We can say that they have a macroeconomic approach to investment. Most of the managers applying this method seek to minimize downside risk while still getting outstanding returns. Most of the time, they can choose any instrument in almost any market to generate their profits (leveraged investments on currencies, interest rates, equities, commodities...).

As argues Richard Wilson, this strategy can be performed with no limit of markets that is why managers are less controlled than other fund managers who could have most of the capital invested in one market. Thus, Global Macro funds have been able to sometimes avoid the bear markets in one country and take advantage of bull markets in another.

Here the purpose is not, as in arbitrage, to take advantage of small price differences, but to take directional positions in order to benefit from an anticipated movement. These strategies are simpler to understand because they only deal with the markets evolution, not their microstructure. In addition, these funds got famous thanks to “gurus” of finance like George Soros (Quantum fund) and Julian Robertson (Tiger Asset Management who has counted approximately \$ 20 billion in assets in 1998).

As Appendix 9 explains, this strategy is among the best strategies, with a 564% increase since 1994 which makes an annual return of 12.42%. The Global Macro index is outstanding essentially since 2001, a crisis period on equity markets, and only had two years of negative return in 1994 and 1998. It proves that Global Macro fund managers have demonstrated skill to not follow the collapse of the stock markets. Global Macro index was also slightly affected by the current crisis (-4.62% in 2008), comparing to the other benchmarks, but since 2009, it has been unexpectedly outperformed by the Hedge Fund and the equity indexes.

Global Macro strategy has a 10.25% annual volatility, which is less than for the equity markets (15.6%). Yet this level of volatility is rather worrying, even if its performance is great. Their maximum drawdowns are concentrated especially on the periods 1994-

1995 and 1998-2000, as well as 2008. Most of the time, these maximum losses largely exceed 10% (which is supported partially by a volatility with double-digits), with a maximum that goes beyond - 25%. In the end, thanks to a high performance, the strategy has a fine Sharpe ratio (0.87).

Global Macro strategy has a low correlation with the equity markets since the coefficients for the S&P 500 and the DJW are respectively 0.25 and 0.24.

### 3.2.9 Managed Future (or Commodity Trading Advisor, CTA)

In this strategy, managers take long or short positions in futures contracts in various areas such as equity indexes (e.g. Dow futures, S&P futures), metals (e.g. gold, silver), grains (e.g. soybeans, corn), soft commodities (e.g. coffee, cotton) as well as foreign currency.

The key factor in this strategy is the prediction of future trends based on available data. Some managers will rather tend to have a different vision, relying on a trend reversal, while others will instead be tempted to follow the trend.

As defends Lintner (1983), a major advantage for diversifying into managed futures is their potential to lower portfolio risk. Managed futures are largely inversely correlated with stocks and bonds. It implicates that during periods of high inflation (during which stocks and bonds normally underperform), investing in managed futures tracking the metals markets or foreign currency futures can be interesting as they might outperform in these same market conditions. High degree of leverage is employed since the strategy involves the use of futures contracts. The strategy does not have a particular bias towards being net long or net short on any particular market.

Managed Futures strategy has a 6.09% average annual return which is way less than the hedge fund index (9.28%). It is also less than the S&P 500, but better than the Commodities index (4.70%) as confirms Appendix 10. Extreme monthly returns are divided by nearly 20 % (9.35% and + 9.95%) which illustrates the ability of this strategy to generate elevated gains as well as deep losses. We should also refer that its performance has been generally irregular over the year, alternating increases and short declines. Given its irregular yields, this strategy underperformed all benchmarks studied for approximately 7 years (1995-2002) but has been growing faster since 2002.

Concerning the current crisis, this strategy did exceptionally well in 2008 (+18.33%) but failed in 2009 (-6.57%) while other benchmark indexes already recovered registering large returns (31.97% for the DJW).

With an 11.79% annual volatility, Managed Futures have a risk profile more alike stock market profile than hedge funds. The drawdown analysis confirms irregularities in the performance, like between 1995 and 1996 by reaching down -18%. In 2000, 2002 and 2004, this strategy also had significant corrections. But Managed Futures suffered much less from the current crisis than the hedge fund industry. As predicted, the CTA index is not correlated with the stock market indexes. Similarly, the correlation with the hedge funds industry is little significant (+ 0.15) just as the correlation with the commodities market.

### 3.2.10 Dedicated Short Bias

This strategy consists on betting on the decline of a company stock price. Managers will establish the most overvalued securities on the market, and then will short sell these securities. Another method is to use derivatives to bet on the decline of a security, like for example by buying a put option. The difference with the long/short strategy regards the long positions that are almost non-existent.

This strategy is often used as part of an overall strategy, but it is rarely used as the main part in a hedge fund, especially during long bull market cycles (like the 1990's).

Besides, it is quite difficult to implement because of several constraints: it is sometimes necessary to obtain a legal authorization to use short selling; not every country accepts its exercise anymore (several countries have either partially or fully forbidden the practice of short selling in September 2008); and publications compiled by analysts follow from now on a buying logic more than a selling logic. Nevertheless, this strategy suffers from a key drawback that is the limited benefit potential (100% of the stock price) whereas potential losses are unlimited (given that a stock has no upper bound). Though, it must be acknowledged that the inverse correlation with the market is a plus and that the strategy is theoretically more profitable in a general market decrease period.

This strategy is the worst performing of all those studied based on Appendix 11. Its rate of return is negative since 1994. Since then, its net performance is -35.73% which

represents a -2.70% annual rate. Yet, its best monthly performance is quite exceptional (+ 22.7%) during August 1998. In a quick glance, it seems clear that its evolution has been quite contrary to the stock market evolution. Between 1995-1998 or 2003- 2007, it was the only index that has offered negative annual yields while other benchmark indexes on these periods had been widely profitable.

This strategy has a very high volatility (16.89%), even higher than the equity markets. Drawdown levels observed support our previous analysis, as they were amplifying from year to year reaching a 46.5% maximum loss in December 2004. The correlation coefficient with the stock market is largely negative (-0.73), which is also the case with the hedge fund industry (-0.46).

### 3.2.11 Emerging Markets

Emerging Markets strategy consists on investing in shares and/or obligations of companies undervalued compared to their growth potential, and located exclusively in emerging countries. An emerging market is difficult to define; Morgan Stanley describes it, as a country that is in the process of building a market-based economy. Others incorporate the idea of large productivity gains due to a political or technological change. Though, the characteristics of many emerging nations have altered deeply since the Asian financial crisis. These changes have contributed to the recent success and lower volatility of many emerging market hedge funds, as well as the creation of entities such as sovereign wealth funds. The strategy is principally industry neutral within each country, seeking the best stocks within each industry. The portfolio construction is risk-controlled, with a well-diversified portfolio but investing in priority in foreign common stocks expected to offer the greatest value in countries determined to be the most attractive.

The analysis performed by the fund manager is "Bottom-Up" type, which means that he studies first the firm, the market and then potential macroeconomic factors that may affect the performance of the firm.

Focusing on Appendix 12, we can see that the Emerging Markets strategy displays a 7.86% annual return, which is lower than the hedge funds industry, but much higher than the emerging markets index as well as the equity market index. Emerging markets

are causing significant losses for these specialized hedge funds. With a 16.42% monthly peak performance in August 1994 and a 23% maximum monthly drop in August 1998, the returns range is very wide. While most of the strategies registered a decline in their performance in 1994 during the bond crisis, Emerging Markets performance rose thanks to the expansion of the Asians "Tigers" and "Dragons". Strongly dependent on the Asian countries performance, the index fell harshly in 1998 because of the Asian crisis. However, the Emerging Markets strategy recovered gradually and since 2001, had constantly positive performances even outperforming the stock market indexes since 2002. Emerging Markets volatility is very high (15.48%) but not higher than the DJW volatility and the DJW emerging markets (25.73%). The drawdown graph shows continuous periods of strong drops, with a particularly affected period (late 1997 until 2003). Thus, the maximum drawdown was registered in late 1998 declining -45.15%, almost as down as the Dedicated Short Bias strategy fell. This strategy index is significantly correlated with the stock markets, hence the drops experienced in the past.

### 3.2.12 Multi Strategy

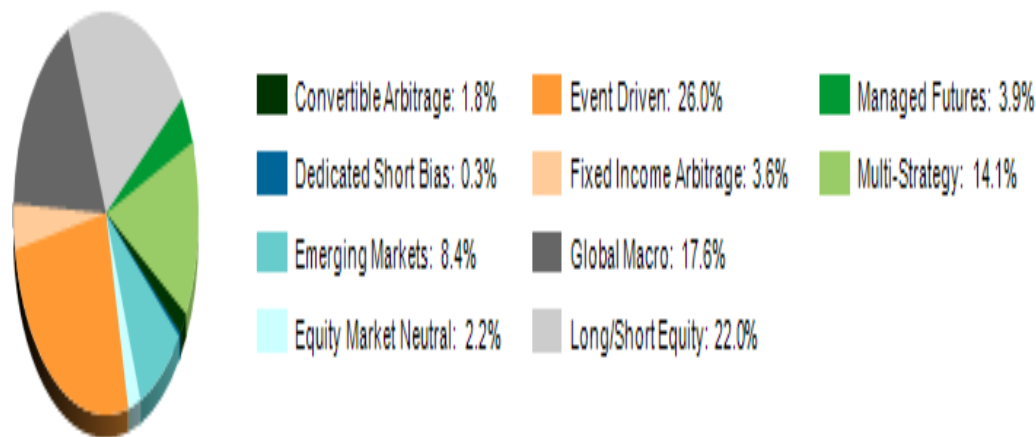
Multi Strategy hedge funds use different investment strategies within the same pool of assets to distribute positive returns regardless of the directional movement in equity, interest rate or currency markets. A Multi-Strategy fund can be considered like a diversified instrument which enables investors to bet on a single "vehicle" that uses various alternative strategies. Generally, those "diversified instruments" combine a maximum of five strategies that are each ran totally independently by different managers. Within a multi-strategy fund, strategies as convertible bond arbitrage, equity long/short, among others, can be included but cannot be exclusive. Usually, this strategy is much less risky than the equity market risk. As we know, the diversification effect enables to smooth returns, reduces volatility and risk. A downside to this strategy is that it rarely registers the highest performance over a short time period.

As described by Capocci (2003), the main advantage of this strategy is to diversify the risks in the same manner as a fund of hedge funds. However, Multi-Strategy funds are quite rare as only the large funds have the resources to effectively employ this strategy. Besides, even if fees are cheaper, investors seeking diversification normally go for a fund of hedge fund product.

According to Appendix 13, the Multi-Strategy index offers an 8.14% annual return which is lower than the hedge fund index (9.89%). Moreover, this strategy had a relatively steady progression that was not affected by the global fall in 2000-2001. We may emphasize its correct evolution during the current crisis as its decline in 2008 (-23.63%) was way lower than the equity markets fall. Furthermore, it has been performing quite well since then (+24.62% in 2009), been one of the best strategies in 2010 (according to the provisional quarterly returns). Multi-Strategy is little risky (5.48%), way less than the Hedge Fund index. Nevertheless, Multi-Strategy funds suffered a 7.11% fall (compared to the highest recorded) in November 1994. After this episode, we notice that drawdowns are extremely limited except since the beginning of the ongoing crisis.

Risks operating in a Multi-Strategy are difficult to identify since this index is slightly correlated with the stock markets (0.32 and 0.42) and especially with the bond market (0.07). This is due to the composition of these funds, which may take between two and five strategies.

### 3.2.13 Comments



**Figure 3: Current sector weights (February 2010) (Source: Credit Suisse Tremont)**

Through the analysis of these different strategies, we may conclude that Event Driven strategies offer the best compromise since these non-directional strategies have interesting returns while controlling well risk. However, the Global Macro strategy distances itself with the highest return since inception (564.17%) but is penalized by its

high volatility (10.25%), which makes its Sharpe ratio smaller than 1 (0.87) . With an annualized Standard Deviation even lower than the hedge fund industry's one (6.67%), the Distressed Securities strategy seems the best alternative with large returns (459.60%) and a great Sharpe ratio (1.15).

It also should be noted that the Equity Market Neutral strategy is disappointing. With good results before the current crisis, it has not supported the collapse of the equity markets, from which the Equity Market neutral strategy has suffered whereas it is supposed to be neutral. Furthermore, the Dedicated Short Bias strategy displays the worst results of this study, having a negative profitability all over the period considered, as well as fully inverted performances comparing to the benchmark indexes.

In terms of strategy weigh within the industry, Figure 3 shows that non-directional strategies have the lead, with the Event-Driven (26%) and the long/Short Equity (22%) being the two most used strategies .Global Macro strategy (directional) and Multi-Strategy also represent a large part (17.6% and 14.1% respectively). Given their relative poor performance, Dedicated Short Bias, Convertible Arbitrage and Equity Market Neutral are the least used strategies.

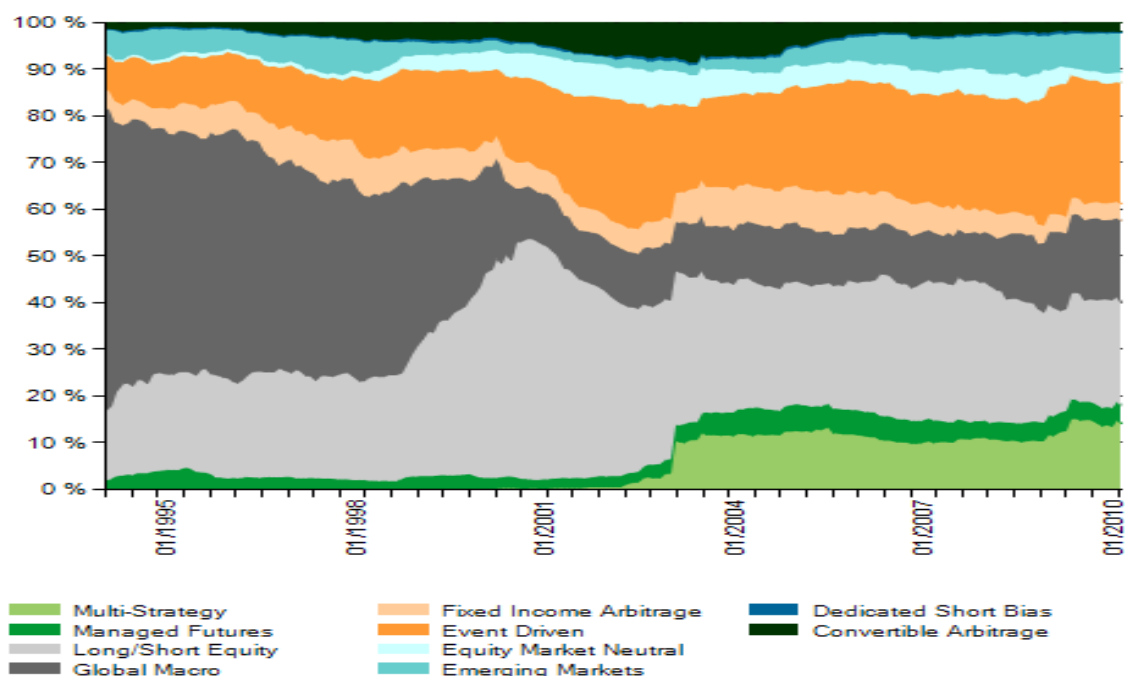


Figure 4: Historical sector weights (1994-2010) (Source: Credit Suisse Tremont)



Now, focusing on the historical weights (Figure 4), we can draw some conclusions. In the first place, the decline of the Global Macro weight is linked to the increase of the Long/Short Equity weight although this strategy had lost influence since the IT bubble crisis. Indeed, in nine years, its weight in the industry has been divided by more than two, falling from 50% to 22%. We also notice a consequent increase (more than 10%) of the Multi-Strategy since 2003. Finally, we cannot help to notice that the Event Driven industry weight has been rising slowly but steadily since 1994 (except in 2003), taking recently the first place regarding sector weights.

## **Chapter 4 Financial crises of the last twenty years**

### 4.1 The ERM sterling crisis (1992-1993)

Firstly, it is essential to recall that since 1987, each country member of the EMS had its currency exchange rate fixed, within a narrow margin ( $\pm 2.25\%$  compared with the ECU) as fixed by the Exchange Rate Mechanism (ERM). This floating exchange rate mechanism had been defined by the European monetary system created years before in 1979. This system aimed to strengthen monetary stability and to reduce exchange rate variations between European currencies. This mechanism stabilized currency fluctuations between European countries during many years. But this system had a clear flaw, the differential rate of interest between different countries, from which some market players took advantage. Nowadays, this type of position is usually called a Carry Trade. The strategy used by the speculators was quite simple.

On the one hand, borrowing from a low-interest-rate currency (in Germany, for example). On the other hand, lending the capital obtained in the first country, in a country where interest rates are much higher (in Italy, for instance).

Currencies were associated between themselves via a relatively narrow fluctuation band. Therefore, the investor had very little risk of losing money because the return on the differential rate widely covered the potential loss of an exchange rate variation between the Italian lira and the German mark.

Thus, in 1992 and 1993, continual speculative attacks on the ERM system, with massive capital outflows, led eventually to the exit of the British pound and the Italian lira out of the ERM, as argued Fung and Hsieh (2000).

According to the International Monetary Fund (IMF), hedge funds had a significant role in this European crisis. Furthermore, according to Eichengreen and Mathieson (1998), Global Macro funds were the first to use a short selling method on FX positions they appraised overvalued. They speculated on an exchange rate devaluation of the local currency by taking short positions in that currency.

Therefore, the currency of a country with a severely overvalued exchange rate becomes a prime target for a speculative attack by hedge funds. Because plenty of hedge funds are highly leveraged, they seem to have the financial power to take the risk and to act as leaders in generating capital inflows and outflows with the latter often precipitating the currency crisis. The Quantum Fund of George Soros is a perfect example. In the autumn 1992, this Global Macro fund sold huge volumes of the British pound and other currencies, against the US dollar forward rate (short positions reaching 6.5 billion pounds). As it was too costly for the respective central banks to defend their fixed exchange rates, they had to abandon them, which led to the depreciation of the currencies traded by Quantum Fund. According to Fung and Hsieh (2000), the Quantum Fund made a profit of one billion pounds only on its short positions in the British pound.

However, W.Fung, D.Hsieh, and K. Tsatsaronis (2000) believe that hedge funds had no predominant role in the increase of the convergence plays (carry trades), because only “few hedge funds were trading globally outside of traditional equity markets during the late 1980s and early 1990s”. But more importantly, these authors claim that the limited supply of leverage from the banking community is the best evidence to defend the hedge fund cause.

In the end, we should put into perspective the impact of the hedge funds in this crisis, since the currency collapse happened mainly because the exchange rate mechanism had reached its limits. But we must acknowledge that Global Macro funds, like the Quantum Fund, may have helped trigger the ERM crisis.

#### 4.2 The Bond Crisis (1994)

At the end of the 1980's, the sovereign bond market was quite popular among investors seeking relatively high returns with low risk involved. These investors had anticipated at the beginning of 1994 a decline on interest rates of the European Central banks, thereby strengthening positions on government bonds, especially in Japan where interest rates were already very low.

Indeed, a bet on lower interest rates implies a rise in bond prices, hence the long positions on this type of instrument. However, their forecasts turned out to be incorrect since the European Central Bank decided to leave its rates unchanged in early 1994, and days later, on 4 February 1994, the U.S. Federal Reserve decided to increase its interest rates. Investors, including hedge funds that had taken more importance given the rapid growth of AUM, unwind their positions. Hedge funds have also increased their positions by short selling government obligations. The consequence of these price declines was the increase of interest rates in the countries concerned, like in the U.S.A where long term rates (10 years) reached 8% in November 1994.

In this crisis, hedge funds had clearly an amplifier role since their short selling positions pushed more traditional investors to sell bonds they had previously acquired. Ultimately, hedge funds did not actually profit because European interest rates remained stable, imposing significant losses to several funds (George Soros lost \$ 500 million the day of the Fed announcement).

#### 4.3 The Mexican Peso Crisis (1994-1995)

The economic crisis of 1994 in Mexico, also known as the Mexican peso crisis, started in December 1994 when its government announced the sudden devaluation of the peso (15%) towards the dollar.

According to Whitt (1996), during the 1980's, Mexico engaged a number of major structural reforms like a wide privatization of public enterprises, the opening of the economy to international competition as well as a deregulation of the financial industry.

As early as 1993, the Mexican peso, which was indexed to the American Dollar, was somewhat overvalued relative to the purchasing power parity benchmark rate.

The current account deficit of the country was almost 7% of its GDP. However, the government decided to ignore those signals and maintained the exchange rate peg while leaving other elements of policy unchanged. Until the financial markets reacted on December 1994, when political instability was growing in the region which led to a massive capital outflows and to the collapse of the peso, as described by Sachs, Tornell and Velasco (1995).

As argue the economists Hufbauer and Schott (2005), four major macroeconomic policy mistakes precipitate the crisis: launching a high spending splurge on an election year, issuing *Tesobonos* (debt instrument denominated in pesos but indexed to dollars), tolerating corrupt practices, tolerating an insurgent rebellion who threatened national security.

As expected, the possibility that foreign investors (such as mutual funds, hedge funds...) started out the crisis by withdrawing funds from Mexico, has been discussed a lot. Nonetheless, the available data, even if limited, suggest that local residents put the most pressure on the peso as the crisis approached. Several factors such as the target market, the narrowness of the market and its lack of liquidity limit hedge funds responsibility. Thus, it seems that hedge fund managers did not predict the Mexican peso crisis and that the hedge fund actions were more of the herding rather than the leading variety.

#### 4.4 The Asian Financial crisis (1997)

The Asian Crisis started in July 1997 in Thailand with the financial collapse of the Thai baht. Most South East Asian currencies (including the Thai baht) were loosely pegged to the American dollar which contributed to domestic borrowing in foreign currencies and then led to exposure to currency risk.

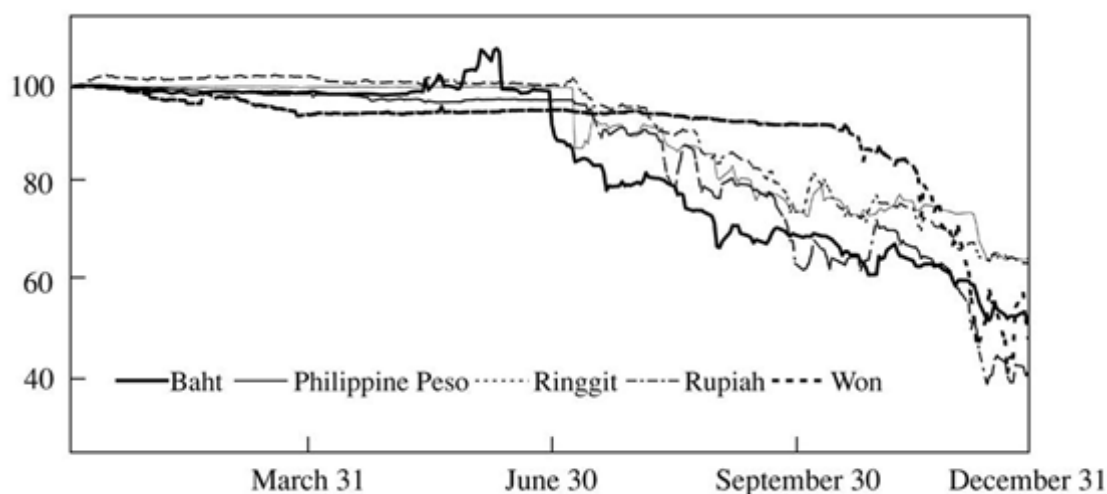
These countries were emerging economies growing quickly. But in 1995, these countries had large deficits in their current accounts (8% of the GDP in Thailand) according to Lim (1999).

In addition, investors in South East Asian countries began to worry about the deceleration in export growth (partly because of a rise in European interest rates, the appreciation of the dollar against the yen and the competition from China) until they opened a massive turnaround of capital flows.

In order to illustrate this impact, we can compare the size of net capital inflows into the 5 ASEAN nations (Thailand, Malaysia, South Korea, Philippines and Indonesia).

In 1996, the total amount was situated around \$ US 73 billion whereas in 1997, the size of net capital outflows was only \$US 11 billion.

The central bank of Thailand spent almost \$US 30 billion to defend the baht with no luck. Then on July 2<sup>nd</sup> 1997, they allowed the baht to float which rapidly depreciated overnight by more than 15%, pressuring other Asian currencies like the Malaysian ringgit, the Korean won, the Indonesian rupiah and the Philippine peso. By the end of 1997, these currencies had lost between 44% and 56% of their value against the U.S. dollar (see Figure 5). This episode led to the bankruptcy of many Asian companies and banks that had borrowed in foreign currencies.



**Figure 5: Asian Exchange Rates variation (1997) with Index (31/12/1997=100) (Source: Datastream)**

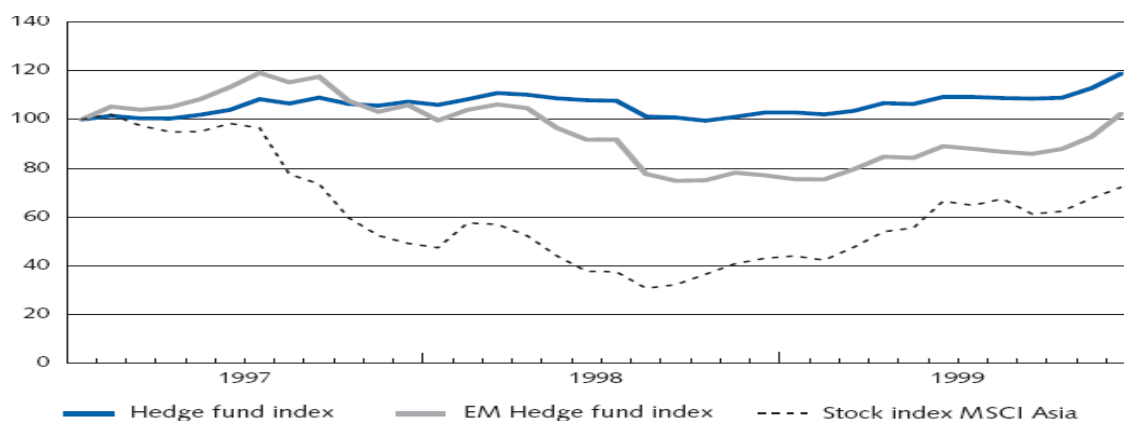
During this crisis, some Asian government officials accused hedge funds of attacking the currencies. That is why the IMF decided to scrutinize the role of hedge funds in the crisis. The resulting study by Eichengreen and his coauthors (1998) conclude that hedge

funds did not play a central role in causing the Asian currency crisis, providing quantitative support for their conclusions.

The authors argue that "The Thai baht is the only currency on which the hedge funds appear to have collectively taken a short position. The one other simultaneous buildup of hedge fund positions appears to have been on the Indonesian rupiah. These positions, were, however, taken after its initial depreciation and were long position, reflecting the view that the rupiah had overshot and the expectation that it would appreciate."

Another study performed by Brown, Goetzmann, and Park (1998), estimated the exposure of ten currency hedge funds by using monthly returns and that the exposure of two hedge funds by using weekly returns. They concluded later that neither the net positions nor the profits of major funds were unusual during the Asian crisis.

By analyzing Figure 6 displaying the cumulative return on a hedge fund industry index, an index for an emerging markets fund, and the Asian stock market, we can confirm previous conclusions. The general hedge fund index registered a weak positive return during the crisis which does not corroborate the hypothesis of a collective speculating movement against the Asian economies.



**Figure 6: Cumulative return during the Asian crisis (1997–1999) with Index (01/01/1997=100) (Compiled from MSCI Barra and Strömqvist)**

Applying directly what we examined before about the Emerging Markets strategy, we can see clearly that those hedge funds lost 20% of their value up to the middle of 1998. So, we can affirm that this crisis had a negative impact on those hedge funds.

As it happened in the ERM crisis, it was the result of fundamental and structural disparities in the financial system. Besides, unlike the crisis of 1992, investors who may have contributed more to the crisis had not been identified.

Last but not least, we can add that in their work, Fung and Hsieh (2000), by means of regression analysis, find a negative correlation between hedge fund returns and changes in the value of the Asian currencies.

#### 4.5 The Russian financial crisis and the collapse of LTCM (1998)

Unlike the crises we have presented before in which hedge funds registered a better return than the overall market, we are now focusing on a fund that collapsed in August 1998 because of a high degree of leverage.

The Long-Term Capital Management example shows that even with a history of low volatility (even lower than the S&P 500 volatility), a hedge fund can end up losing lots of money. Because of high leverage, if its assets register a huge decline and the market for these assets lacks liquidity, a hedge fund might not be able to exit its positions. According to Edwards (1999), LTCM had at that time approximately \$ 5 billion in equity positions but had borrowed \$ 125 billion, which entails an extremely high degree of leverage (25). If this leverage degree before the crisis appears extremely elevated, it became even worse as the leverage ratio eventually reached 100.

Serious mistakes in risk modeling precipitated LTCM's fall: in July and August 1998, LTCM forecasted a daily P&L volatility of \$35 million but it proved to be much higher (over \$100 million). The fund's portfolio had become much more illiquid than managers thought.

The LTCM strategy was successful from 1994 to 1998 until the financial markets in Russia fell into crisis. LTCM even afforded to give back to investors \$2.7 billion in 1997. The reasons generally evoked to explain the "Ruble Crisis" are a declining productivity, an artificially high fixed exchange rate mechanism between the Russian ruble and foreign currencies, and a persistent fiscal deficit.

After the Asian financial crisis, a decline in world commodity prices started to penalize heavily countries dependent on the export of raw materials. As the Russian exports depend mainly (80%) on Petroleum, natural gas, metals, and timber, Russia was vulnerable to swings in world prices.

Nevertheless, LTCM had speculated that the situation would rapidly return back to normality, so the fund took large, not hedged positions. Unfortunately, the Russian financial crisis resulted in the Ruble devaluation and the Russian government started to default on its debts in August 1998. In May and June 1998, LTCM's returns were already negative (-6.42% and -10.14% respectively) reducing LTCM's capital by \$ 461 million. Just after the Russian default announcement, the fund had lost \$ 1.85 billion in capital, reaching later losses approaching \$4 billion, given its high leverage and its positions in derivatives. Like J.Kolman (1999), some people argue that with less leverage and more capital, LTCM would have survived. The American Government then organized the bailout of LTCM to avoid a financial crisis in the USA.

#### 4.6 The IT Bubble (2000-2001)

The IT bubble crisis occurred with the bursting of the new technologies speculative bubble. Indeed, the 1990's are strongly marked by the rise of IT companies. We can actually speak of "speculative bubble" by the end of 1998 even if the Nasdaq index (technology index) had started to grow extraordinarily since January 1996 (from this date until March 2000, the index multiplied by 30). The bubble bursting happened rather slowly because investors reacted in different manners. Many kept their positions thinking that they would eventually rise.

In 1999, the increase in value of IT related shares resulted in record market values comparing to the companies' book values. In March 2000, the trend inverted which led to a deep fall of IT related shares' prices. Between March 2000 and July 2003, the Nasdaq index fell 75% while in Paris the CAC40 lost around 50%.

Research by Brunnermeier and Nagel (2004) has provided evidence that hedge funds held extensive long positions in IT related shares during the bubble and then reduced these positions just before the crash happened. They clearly did not play the role of arbitrageurs as they did not counteract the price increases by taking short positions in those shares. These authors also believe that the hedge funds knew that there was a bubble and the finest strategy was to "ride the wave" rather than to correct prices.



In this crisis, there is not much to blame hedge funds for. However, it is possible that by buying IT related shares, as other investors such as banks or pension funds did, they help to drive up prices and thus amplify the financial bubble.

We may ask whether they provoked the fall by selling first their IT related shares. Though, it is unlikely because they did not have sufficient influence on the financial markets to be able to burst the bubble themselves.

Moreover, Brunnermeier and Nagel (2004) found that hedge funds did not sell their entire holdings in IT related shares before the crash. Yet, they deemed that hedge funds did not assume short positions in these shares in order to drive prices downwards.

Last but not least, we must assert that even nowadays, there is a certain excitement for IT related shares.

Considerable amounts are involved in these investments, like for instance, in the acquisition of the website YouTube by Google for \$ 1.65 billion. This is the reason why some specialists consider that a second IT bubble may emerge in the future.

#### 4.7 The ongoing financial crises (2007- )

Although being the consequence of serious malpractice occurred years ago, it is generally considered that the ongoing financial crisis started during the summer 2007. As explained by Morris (2008), the beginning of the crisis is the collapse of two hedge funds (High - Grade Structured Credit Strategies Enhanced Leverage Fund and High Grade Structured Credit Strategies Fund) owned by the American investment bank Bear Stearns. They had purchased \$ 20 billion of highly leveraged portfolios related to the American market for housing (like subprime mortgages, those loans granted to individuals with poor credit histories with bad credit ratings that present a higher risk for lenders).

Their bet was to take possession of those extremely below undervalued titles and waiting for an escalate in prices. Upon the initial losses, they quickly realized that the entire assets would be lost given the high leverage degree (more than 20). These two falls intervened immediately after an internal hedge fund of UBS (Dillon Read Capital Management) was shut down in May 2007 due to very heavy losses. All of these events would lead to a serious crisis of confidence among the investors. Eventually, other funds would know the same fate worldwide.

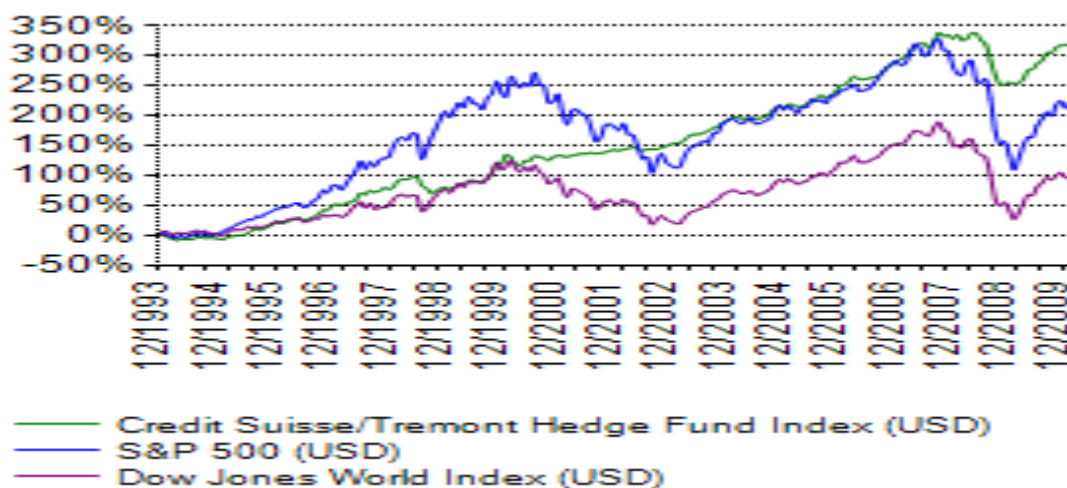
At first, the corporations more affected were those related to mortgage lending (like Northern Rock) and home construction, because they were not able to get financing through the credit markets. Concerns about other collapses began to augment so in March 2008, Bear Stearns (deeply affected by the two hedge funds collapses) was taken over by JP Morgan Chase. Later, in September/October 2008, the crisis reached its peak when stock markets fell all over the world.

Major financial institutions either collapsed (Lehman Brothers), were bailed-out by governments (like AIG, whereas Fannie Mae and Freddie Mac were being placed into conservatorship of the FHFA), or merged (Merrill Lynch acquired by Bank of America) during the crisis. Even some governments from the wealthiest countries made use of rescue packages to bail out their financial systems in order to avoid social crisis.

There are other examples linking hedge funds to the current crisis. In addition to the Bear Sterns' hedge funds collapse, Iceland pointed the finger at hedge funds for speculating against the Icelandic currency (Affärsvärlden, 31 March 2008). According to the Swedish financial newspaper "Dagens Industri" from September 26th 2008, London-based hedge funds were spreading inaccurate rumors about Swedbank in order to provoke its stock price decline, as these hedge funds had been shortselling Swedbank shares.

Instead of dwelling upon the causes of the crisis (securitization, house market fall, liquidity crisis...), we will focus on the responsibility of hedge funds as we have done with the previous crisis. Analyzing Figure 7 representing cumulative returns on the hedge fund market and stock markets, we can say that Hedge funds remained quite stable between mid 2007 and mid 2008 whereas stock markets were already falling.

Afterward, both hedge fund index and share indexes declined although the share markets dropped deeper.



**Figure 7: Cumulative returns on the hedge fund market and stock markets (1994-2010)**  
(Source: Credit Suisse Tremont)

By focusing on each strategy (Appendix 2 to 13), we can infer that the fall of the hedge fund index is not the responsibility of a particular strategy (which differs from the Asian crisis, when the emerging markets strategy registered a large fall).

However, we can say that Risk Arbitrage and Convertible Arbitrage were the strategies that performed the best (considering cumulative returns since 2008 in the Appendix 4 and 6). On the other hand, equity market neutral and dedicated short bias were the strategies that experienced the worst performances (Appendix 8 and 11).

One aspect of the crisis that is unique is the change of regulations governing the markets. Indeed, in September 2008, shortselling was forbidden in many markets because it was used to accelerate decline in stock prices. This decision had obviously negative consequences on hedge funds that employ strategies in which shortselling is essential or in those highly exposed to the financial sector.

Unlike the previous crises, the ongoing crisis has been affecting many different types of assets at the same time and at a global level, as advanced by Strömquist (2009).

Hedge funds took higher risks in order to increase risk premiums (which represent an important part of their profit) but this did not result on higher profits and even did not cover for the losses registered. Actually, by reaching different markets and instruments, the crisis erased the premiums previously received.

The Swedish author also noticed that a unique feature of this crisis is that it was initially caused by a bank crisis. She states that “the banks’ problems have had a direct impact on the hedge funds in the form of more restrictive lending, higher borrowing costs and

assets tied up in connection with bankruptcies. The funds have been forced to sell off assets in a falling market and this has had a negative effect on their returns.”

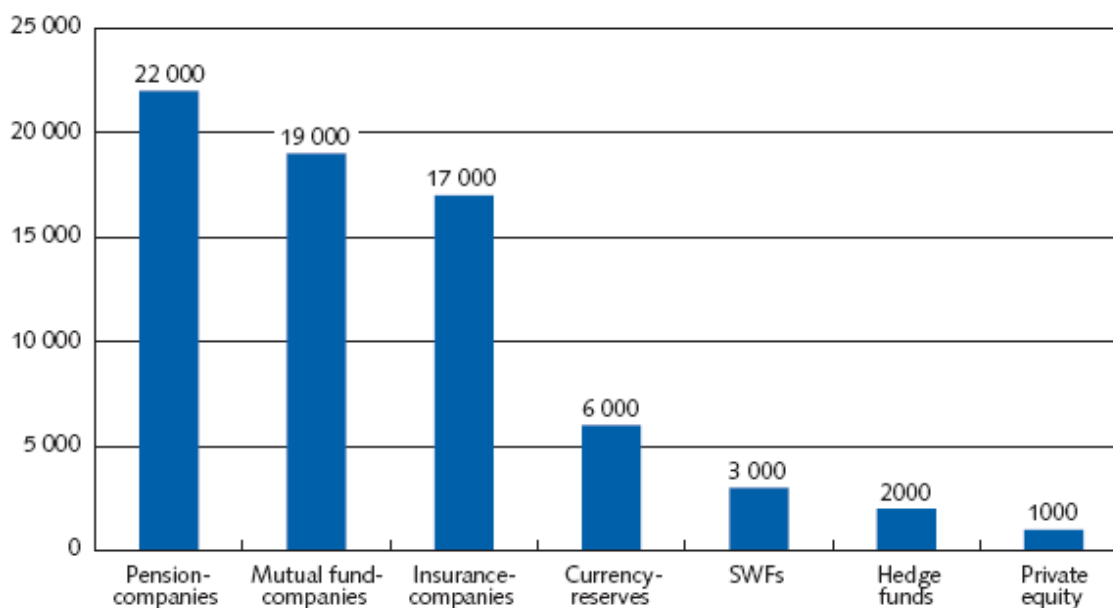
Finally, we can state that the ongoing crisis has damaged hedge funds more than this industry has affected the crisis. To reinforce this opinion, we just need to have in mind that this is the crisis hedge funds handled with the most difficulties.

#### 4.8 The Sovereign Wealth Funds threat

Moreover, as suggested by Sveriges Riksbank (2009), it must be acknowledged that the size of the hedge fund industry is another piece of evidence that as a group, hedge funds could not move entire markets. Indeed, as Figure 8 illustrates, hedge funds still represent a little part of the total AUM, ridiculously smaller than pension companies and mutual fund weights. We may also remind ourselves that during the IT bubble, hedge funds did not try to correct prices probably because they thought they were not large enough to influence the stock market.

In addition to its small amount managed, we may add that the hedge fund industry is not much concentrated, thereby less risk of collective cooperation. The influence of individual hedge funds on the market is also limited.

Indeed, according to the journal Alpha Magazine (2007), the largest hedge fund JP Morgan Asset Management controlled \$ 45 billion just before 2008 which is just a few per cent of the capital managed by the largest pension companies.



**Figure 8: AUM by institutional investor groups (December 2007) (Source: The Economist, January 17<sup>th</sup> 2008)**

It may be relevant to bring in the discussion another type of financial institution that we briefly presented: Sovereign Wealth Funds (SWF), also known as government investment funds. Indeed, many SWFs have emerged lately and they have some similarities with hedge funds since they are little regulated and they do not have to reveal information about their holdings and transactions. There are also examples of speculative transactions (like did the Norwegian SWF by shortselling on bonds issued by Icelandic banks) as described by The Economist, 17 January 2008. There is as well a constant risk to see SWFs investments governed by political decisions.

But most importantly, they manage more capital than hedge funds. Indeed, in early 2008, the amount of capital managed was around \$ 3 trillion whereas hedge funds had \$ 2 trillion back then. This industry is also highly concentrated, shared by a few large SWFs. The world's largest one is Abu Dhabi Investment Authority (ADIA), also considered the most famous. On the same article of Alpha Magazine, the estimation for ADIA's assets under management (as ADIA has never been published any AUM number) is \$ 875 billion but a recent article published in March 2010 by Reuters, reduced this number between \$ 500 billion and \$700 billion.

This clearly proves that there are other market players who represent a greater threat to market stability than hedge funds.

## Chapter 5 Conclusion

Hedge funds are alternative investment institutions, created more than 60 years ago, typically characterized by high leverage, use of derivatives and many advanced investment strategies. They target financially strong investors due to the high minimum limit for investments and the high fee structure for clients, when compared to mutual funds. Hedge funds' success over the years relies on large investment returns (absolute return target) thanks to its more liberal regulatory framework.

When focusing on performance assessment, we have seen that traditional ratios that assume a mean-variance framework suffer from some limitations; this is why new ratios like the Sharpe-Omega ratio and the Modified Sharpe ratio were created.

However, according to Eling and Schuhmacher (2007), it does not matter too much which performance measure is chosen to evaluate hedge funds. Although it displays some undesirable features, using the classic Sharpe ratio is still justified from a practical perspective.

Then, we used the Credit Suisse/Tremont Hedge Fund database in order to evaluate the performance of investment strategies since January 1994 until February 2010. Through the observation of tables as well as cumulative returns graphs and drawdown graphs, each strategy's performance index has been analyzed and compared to several benchmarks indexes. In the end, it appears that non directional strategies are the most performing, in particular, Event driven strategies which present the best return/risk ratio. With the lowest volatility of all strategies (6.67%), the Distressed Securities strategy (one of the three Event Driven strategies) seems the best alternative with large returns (459.60%) and a great Sharpe ratio (1.15).

However, Global Macro strategy has been performing the best since 1994 (564%) but has volatility quite elevated. In terms of strategy weight within the industry, non-directional strategies are the most used, with Event-Driven (26%) and Long/Short Equity (22%) in the first places.

Finally, in the last part, we reviewed the events on the principal financial crisis of the last twenty years (we did not consider the crises happened in Sweden, Brazil, Argentina and Chile) as well as the fall of LTCM, and tried to figure out which actions triggered each crisis. In the ERM crisis, we conclude that the exchange rate mechanism had clear

limits and that Global Macro funds, like the Quantum Fund, took advantage of it. So, it is acceptable to say that few hedge funds triggered this crisis, a crisis that would have happened eventually though.

Like happened in the ERM crisis, structural disparities in the financial system were the main responsible. However, hedge funds were not clearly responsible and most of all they did not profit as occurred in 1992. In this bond crisis of 1994, hedge funds amplified the crisis by short selling positions. Still, they did not benefit from their positions and several funds lost huge amounts of capital.

As regards the IT bubble crisis and the Mexican Crisis, the majority of the opinions indicate that hedge fund managers are not to blame. Concerning the ongoing crisis, hedge funds have been accused to speculate but their poor performances during the crisis are somehow proof of their non responsibility.

Even if the implication of hedge funds in those crises is often criticized (essentially in the ERM crisis, the Asian crisis and the ongoing global crisis), many opinions defend the hedge fund cause. Calomiris (1997) is one of them. He claims that “the key variables triggering the economic downfalls in the 1980s and 1990s [...] were not the hedge funds, but rather weaknesses in domestic financial systems and improper incentives for foreign banks to lend excessively in foreign currencies.”

We also showed that SWFs are an example of market players that can represent a greater threat for financial markets than hedge funds, as they manage much more capital than hedge funds and because individual SWFs can influence directly financial markets.

Whatever the opinion on the impact of hedge funds on financial crisis, its regulation became a recurring question. Many believe that large hedge funds will probably become more regulated and more institutionalized, more alike classic financial institutions (mutual funds...).

Those hypothetical changes will probably affect investment strategies that will have to adapt while new investment strategies will continue to emerge. However, as points out Richard Wilson (2007), there are some hedge fund strategies already being applied that will explode in popularity in 5 years (e.g. 130/30, Carbon Credit Trading, Socially Responsible and Green Hedge Funds, Litigation Funding, Intellectual Property (Patents, Domains and Licensing Rights)..)

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## Appendix

**Appendix 1: Top 10 Hedge Fund Manager Pay Outs in 1997, one of the best years for hedge fund managers)**

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**1. John Paulson (Harbinger Capital) - \$3 billion**

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**2. Phil Falcone (Harbinger Capital) - \$1.5-2 billion**

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**3. Jim Simons (Renaissance Technologies) - \$1.5-2 billion**

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**4. Steve Cohen (SAC Capital) - \$1-1.5 billion**

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**5. Ken Griffin (Citadel Investment) - \$1-1.5 billion**

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**6. Chris Hohn (TCI) - \$800-900 million**

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**7. Noam Gottesman (GLG Partners) - \$700-800 million**

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**8. Pierre Lagrange (GLG Partners) - \$700-800 million**

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**9. Alan Howard (Brevan Howard) - \$700-800 million**

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**10. Paul Tudor Jones (Tudor Investment) - \$600-700 million**

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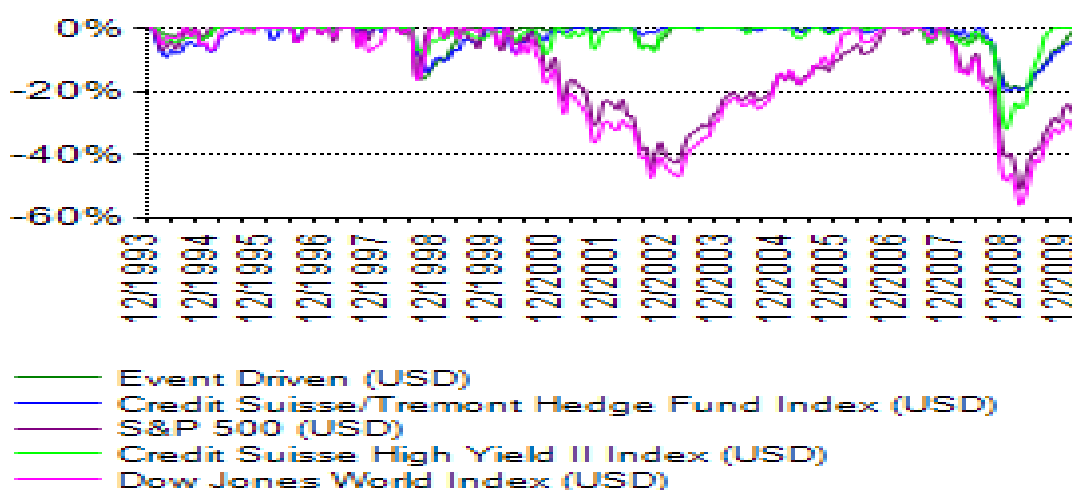
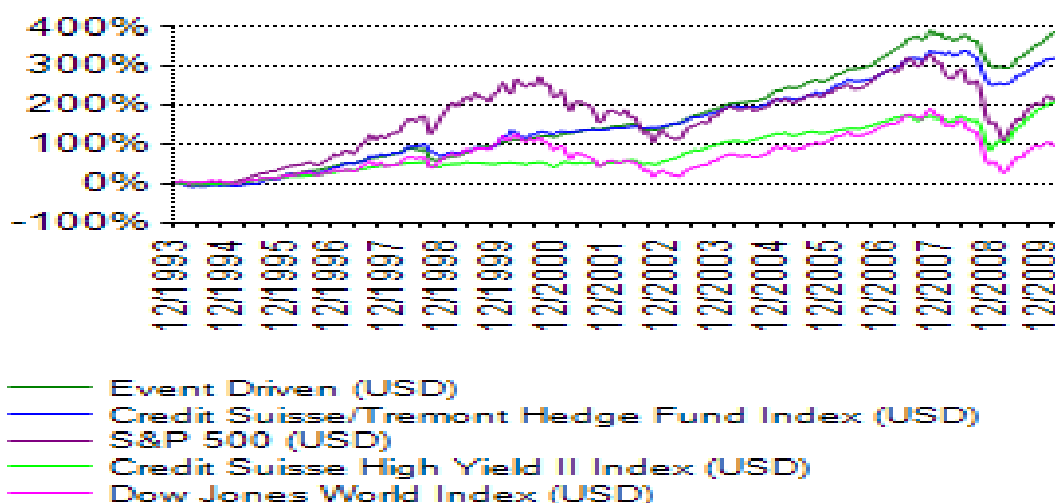
**Appendix 2 :Event Driven**

Cumulative returns of the Event Driven strategy, the S&P 500, the CS High Yield II Index and the DJW Index, for different periods of time.

Net Performance	Event Driven (USD)	CS/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	CS High Yield II Index (USD)	Dow Jones World Index (USD)
<b>1 Month</b>	0.44%	0.68%	3.10%	0.30%	1.13%
<b>3 Months</b>	4.18%	1.74%	1.31%	4.53%	-0.96%
<b>6 Months</b>	9.99%	7.18%	9.32%	13.99%	5.39%
<b>1 Year</b>	23.06%	19.34%	53.62%	51.06%	55.57%
<b>2 Year Cumulative</b>	2.53%	-3.33%	-12.93%	18.83%	-20.75%
<b>3 Year Cumulative</b>	10.17%	6.71%	-16.06%	15.58%	-21.34%
<b>3 Year Avg Annual</b>	3.28%	2.19%	-5.67%	4.95%	-7.69%
<b>5 Year Cumulative</b>	41.44%	32.03%	1.88%	34.12%	1.70%
<b>5 Year Avg Annual</b>	7.18%	5.71%	0.37%	6.05%	0.34%
<b>Since Inception</b>	384.99%	319.82%	221.41%	207.65%	98.01%
<b>Since Inception Avg Annual</b>	10.26%	9.28%	7.49%	7.20%	4.32%

Statistics of the Event Driven strategy, the CS Tremont Index the S&P 500, the CS High Yield II Index and the DJW Index, since 1994.

Statistics	Event Driven (USD)	CS/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Credit Suisse High Yield II Index (USD)	Dow Jones World Index (USD)
<b>Avg Month</b>	0.83%	0.77%	0.70%	0.61%	0.46%
<b>Best Month</b>	4.22%	8.53%	9.78%	10.08%	11.77%
<b>Worst Month</b>	-11.77%	-7.55%	- 16.79%	-15.84%	-19.96%
<b>Monthly Standard Deviation</b>	1.74%	2.24%	4.47%	2.48%	4.52%
<b>Annualized Standard Deviation</b>	6.04%	7.77%	15.49%	8.58%	15.66%
<b>Sharpe Ratio</b>	1.11	0.74	0.25	0.43	0.05



Correlations	Event Driven (USD)	CS/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	CS High Yield II Index (USD)	Dow Jones World Index (USD)
<b>CS/Tremont Hedge Fund Index (USD)</b>	0.75	1.00	0.54	0.52	0.60
<b>S&amp;P 500 (USD)</b>	0.60	0.54	1.00	0.59	0.93
<b>CS High Yield II Index (USD)</b>	0.65	0.52	0.59	1.00	0.65
<b>Dow Jones World Index (USD)</b>	0.67	0.60	0.93	0.65	1.00

Correlation coefficients between the Event Driven strategy, the CS Tremont Index, the S&P 500, the CS High Yield II Index and the DJW Index.

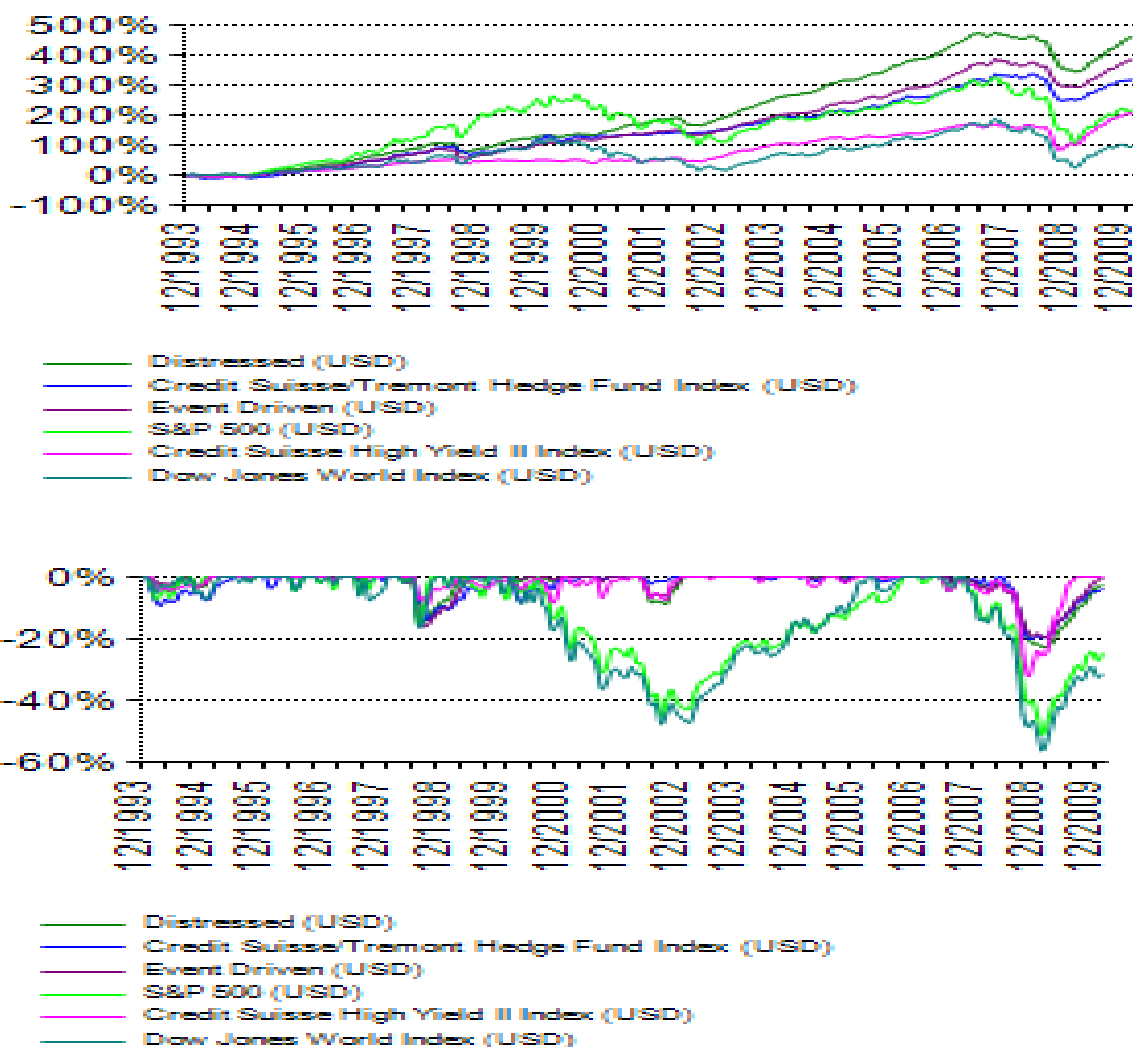
Net Performance	Distressed (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Event Driven (USD)	S&P 500 (USD)	Credit Suisse High Yield II Index (USD)	Dow Jones World Index (USD)
1 Month	0.29%	0.68%	0.44%	3.10%	0.30%	1.13%
3 Months	4.88%	1.74%	4.18%	1.31%	4.53%	-0.96%
6 Months	11.47%	7.18%	9.99%	9.32%	13.99%	5.39%
1 Year	25.32%	19.34%	23.06%	53.62%	51.06%	55.57%
2 Year Cumulative	-0.06%	-3.33%	2.53%	-12.93%	18.83%	-20.75%
3 Year Cumulative	3.59%	6.71%	10.17%	-16.06%	15.58%	-21.34%
3 Year Avg Annual	1.18%	2.19%	3.28%	-5.67%	4.95%	-7.69%
5 Year Cumulative	34.89%	32.03%	41.44%	1.88%	34.12%	1.70%
5 Year Avg Annual	6.17%	5.71%	7.18%	0.37%	6.05%	0.34%
Since Inception	459.60%	319.82%	384.99%	221.41%	207.65%	98.01%
Since Inception Avg Annual	11.24%	9.28%	10.26%	7.49%	7.20%	4.32%

### Appendix 3: Distressed Securities

Cumulative returns of the Distressed Securities strategy, the Event Driven strategy, the CS Tremont Index the S&P 500, the CS High Yield II Index and the DJW Index, for different periods of time.

Statistics	Distressed (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Event Driven (USD)	S&P 500 (USD)	Credit Suisse High Yield II Index (USD)	Dow Jones World Index (USD)
Avg Month	0.91%	0.77%	0.83%	0.70%	0.61%	0.46%
Best Month	4.15%	8.53%	4.22%	9.78%	10.08%	11.77%
Worst Month	-12.45%	-7.55%	-11.77%	-16.79%	-15.84%	-19.96%
Monthly Standard Deviation	1.92%	2.24%	1.74%	4.47%	2.48%	4.52%
Annualized Standard Deviation	6.67%	7.77%	6.04%	15.49%	8.58%	15.66%
Sharpe Ratio	1.15	0.74	1.11	0.25	0.43	0.05

Statistics of the Distressed Securities strategy, the S&P 500, the CS High Yield II Index and the DJW Index, since 1994.



Correlation coefficients between the Distressed Securities strategy, the Event Driven strategy, the CS Tremont Index, the S&P 500, the CS High Yield II Index and the DJW Index.

Correlations	Distressed (USD)	CS/T Hedge Fund Index (USD)	Event Driven (USD)	S&P 500 (USD)	Credit Suisse High Yield II Index (USD)	Dow Jones World Index (USD)
Credit Suisse/Tremont Hedge Fund Index (USD)	0.67	1.00	0.75	0.54	0.52	0.60
Event Driven (USD)	0.94	0.75	1.00	0.60	0.65	0.67
S&P 500 (USD)	0.60	0.54	0.60	1.00	0.59	0.93
Credit Suisse High Yield II Index (USD)	0.65	0.52	0.65	0.59	1.00	0.65
Dow Jones World Index (USD)	0.64	0.60	0.67	0.93	0.65	1.00



**Appendix 4: Risk Arbitrage**

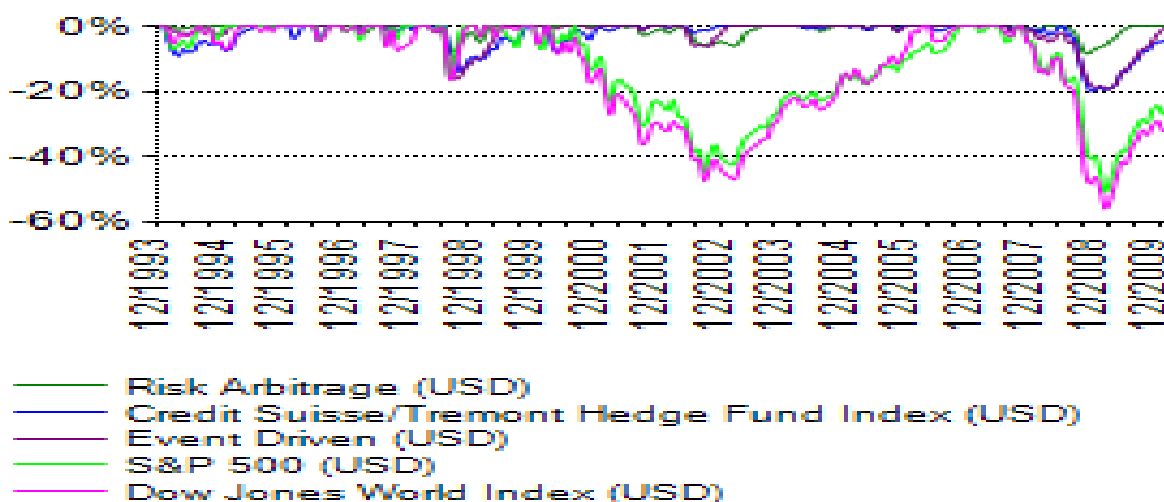
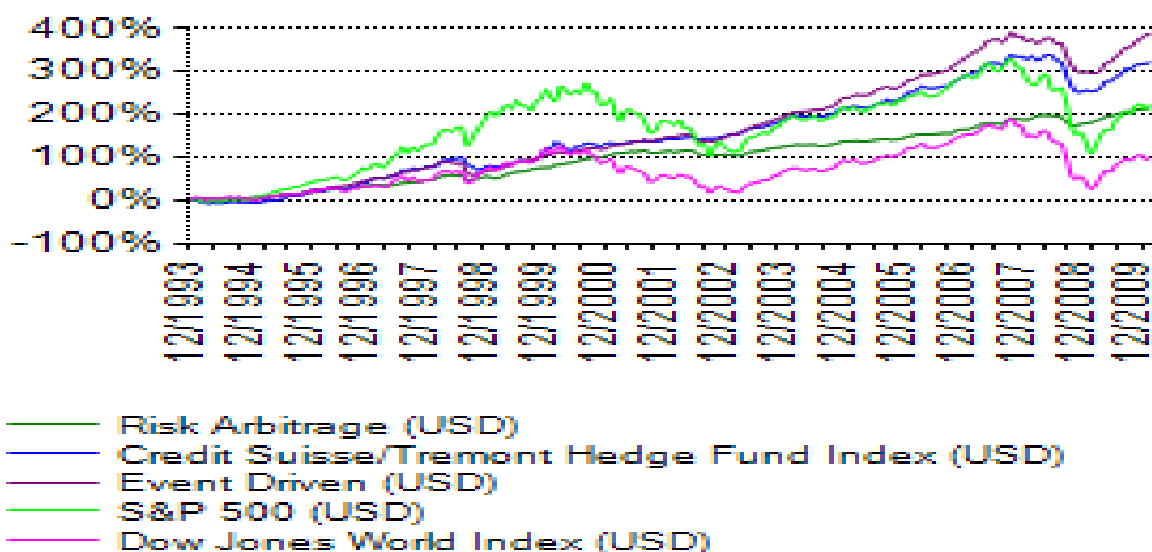
Cumulative returns of the Risk Arbitrage strategy, the Event Driven strategy, the CS Tremont Index the S&P 500 and the DJW Index, for different periods of time

<b>Net Performance</b>	<b>Risk Arbitrage (USD)</b>	<b>Credit Suisse/Tremont Hedge Fund Index (USD)</b>	<b>Event Driven (USD)</b>	<b>S&amp;P 500 (USD)</b>	<b>Dow Jones World Index (USD)</b>
1 Month	0.30%	0.68%	0.44%	3.10%	1.13%
3 Months	1.09%	1.74%	4.18%	1.31%	-0.96%
6 Months	3.93%	7.18%	9.99%	9.32%	5.39%
1 Year	11.60%	19.34%	23.06%	53.62%	55.57%
2 Year Cumulative	7.85%	-3.33%	2.53%	-12.93%	-20.75%
3 Year Cumulative	17.09%	6.71%	10.17%	-16.06%	-21.34%
3 Year Avg Annual	5.40%	2.19%	3.28%	-5.67%	-7.69%
5 Year Cumulative	31.81%	32.03%	41.44%	1.88%	1.70%
5 Year Avg Annual	5.68%	5.71%	7.18%	0.37%	0.34%
Since Inception	213.14%	319.82%	384.99%	221.41%	98.01%
Since Inception Avg Annual	7.32%	9.28%	10.26%	7.49%	4.32%

Statistics of the Risk Arbitrage strategy, the CS Tremont Index the S&P 500 and the DJW Index, since 1994.

<b>Statistics</b>	<b>Risk Arbitrage (USD)</b>	<b>Credit Suisse/Tremont Hedge Fund Index (USD)</b>	<b>Event Driven (USD)</b>	<b>S&amp;P 500 (USD)</b>	<b>Dow Jones World Index (USD)</b>
Avg Month	0.60%	0.77%	0.83%	0.70%	0.46%
Best Month	3.81%	8.53%	4.22%	9.78%	11.77%
Worst Month	-6.15%	-7.55%	-11.77%	-16.79%	-19.96%
Monthly Standard Deviation	1.21%	2.24%	1.74%	4.47%	4.52%
Annualized Standard Deviation	4.19%	7.77%	6.04%	15.49%	15.66%
Sharpe Ratio	0.90	0.74	1.11	0.25	0.05

The impact of hedge funds on financial markets since 1990



Correlations	Risk Arbitrage (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Event Driven (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
Credit Suisse/Tremont Hedge Fund Index (USD)	0.48	1.00	0.75	0.54	0.60
Event Driven (USD)	0.67	0.75	1.00	0.60	0.67
S&P 500 (USD)	0.48	0.54	0.60	1.00	0.93
Dow Jones World Index (USD)	0.55	0.60	0.67	0.93	1.00

Correlation coefficients between the Risk Arbitrage strategy, the Event Driven strategy, the CS Tremont Index, the S&P 500 and the DJW Index.

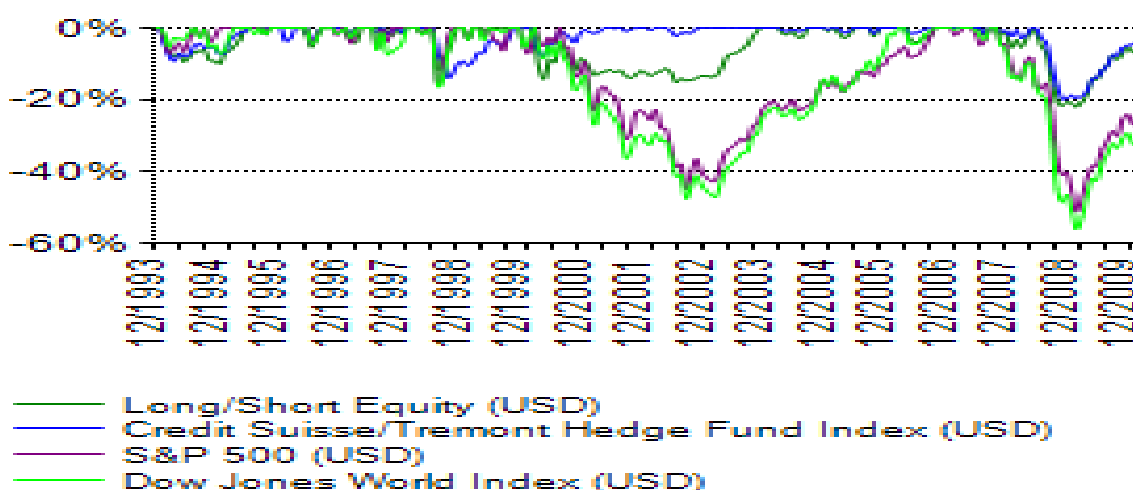
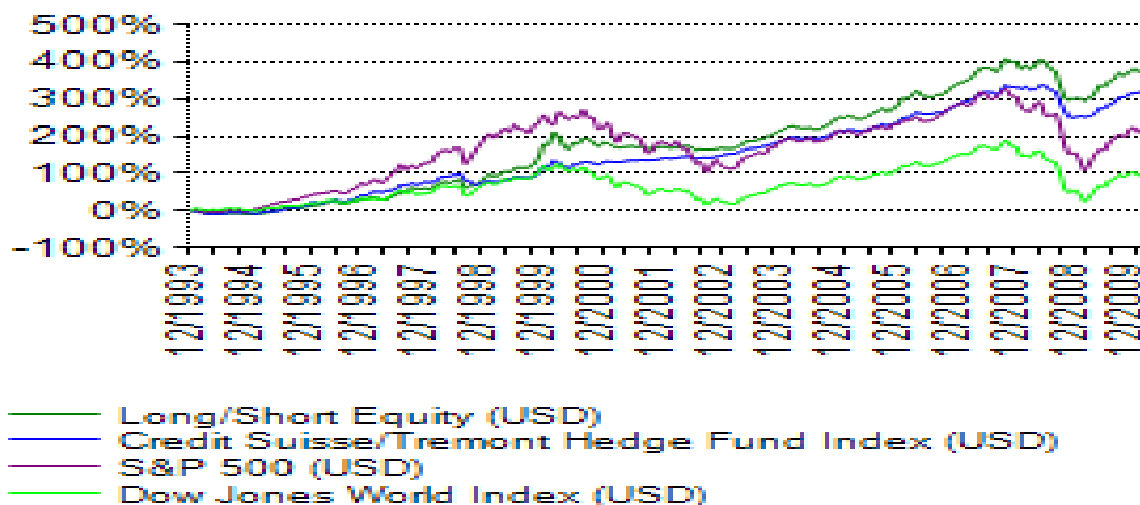
## Appendix 5: Long/Short Equity

Cumulative returns of the Long/Short Equity strategy, the CS Tremont Index the S&P 500 and the DJW Index, for different periods of time

Net Performance	Long/Short Equity (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
1 Month	1.32%	0.68%	3.10%	1.13%
3 Months	1.49%	1.74%	1.31%	-0.96%
6 Months	5.48%	7.18%	9.32%	5.39%
1 Year	21.05%	19.34%	53.62%	55.57%
2 Year Cumulative	-2.30%	-3.33%	-12.93%	-20.75%
3 Year Cumulative	6.74%	6.71%	-16.06%	-21.34%
3 Year Avg Annual	2.20%	2.19%	-5.67%	-7.69%
5 Year Cumulative	34.83%	32.03%	1.88%	1.70%
5 Year Avg Annual	6.16%	5.71%	0.37%	0.34%
Since Inception	379.28%	319.82%	221.41%	98.01%
Since Inception Avg Annual	10.18%	9.28%	7.49%	4.32%

Statistics	Long/Short Equity (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
Avg Month	0.85%	0.77%	0.70%	0.46%
Best Month	13.01%	8.53%	9.78%	11.77%
Worst Month	-11.43%	-7.55%	-16.79%	-19.96%
Monthly Standard Deviation	2.89%	2.24%	4.47%	4.52%
Annualized Standard Deviation	10.01%	7.77%	15.49%	15.66%
Sharpe Ratio	0.66	0.74	0.25	0.05

Statistics of the Long/Short Equity strategy, the S&P 500, the CS Tremont Index and the DJW Index, since 1994.



Correlations	Long/Short Equity (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
Credit Suisse/Tremont Hedge Fund Index (USD)	0.82	1.00	0.54	0.60
S&P 500 (USD)	0.63	0.54	1.00	0.93
Dow Jones World Index (USD)	0.72	0.60	0.93	1.00

Correlation coefficients between the Long/Short Equity strategy, the CS Tremont Index, the S&P 500 and the DJW Index.

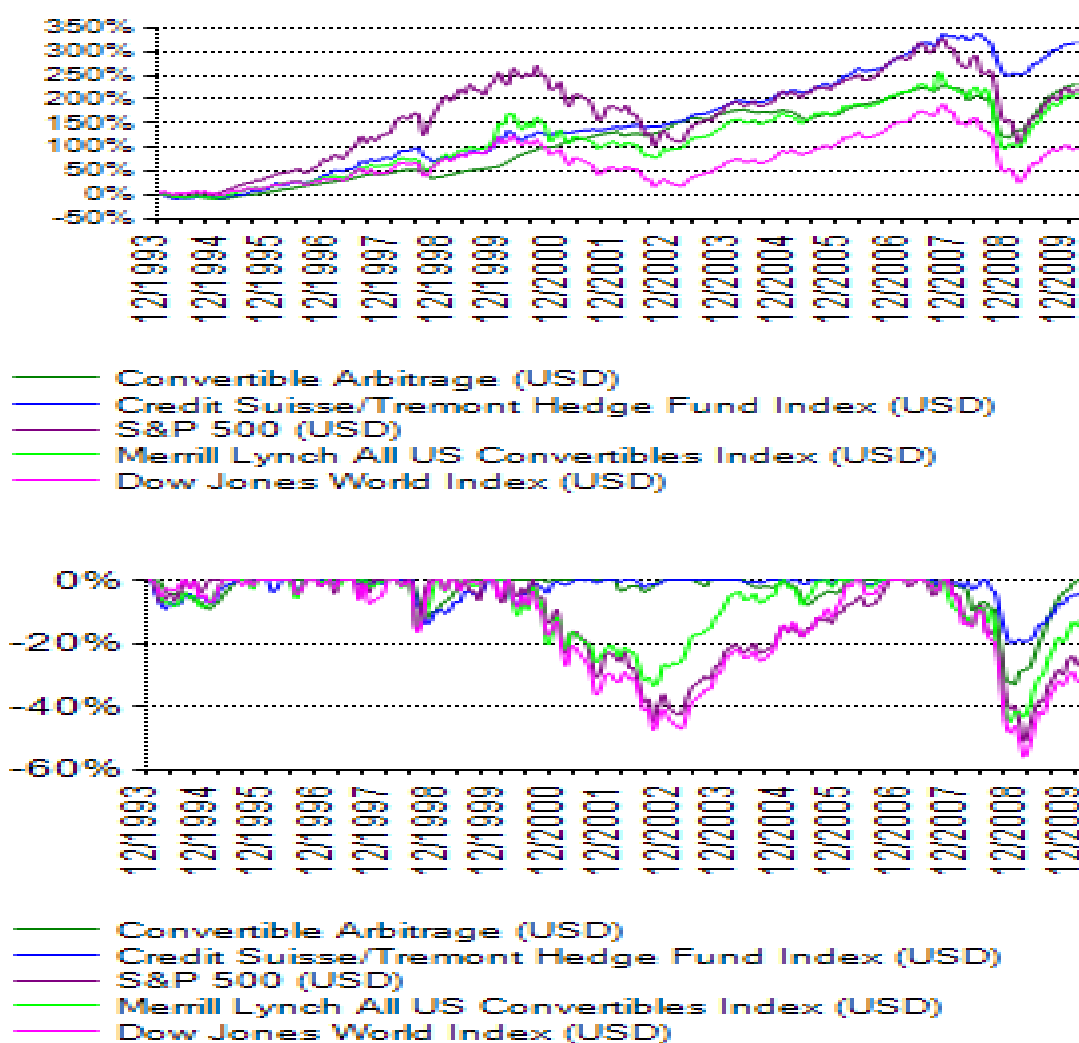
**Appendix 6: Convertible Arbitrage**

Cumulative returns of the Convertible Arbitrage strategy, the CS Tremont Index, the S&P 500, the Merrill Lynch All US Convertibles Index and the DJW Index, for different periods of time

Net Performance	Convertible Arbitrage (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Merrill Lynch All US Convertibles Index (USD)	Dow Jones World Index (USD)
1 Month	0.47%	0.68%	3.10%	2.61%	1.13%
3 Months	3.70%	1.74%	1.31%	5.13%	-0.96%
6 Months	10.25%	7.18%	9.32%	12.11%	5.39%
1 Year	40.34%	19.34%	53.62%	54.42%	55.57%
2 Year Cumulative	4.14%	-3.33%	-12.93%	-0.69%	-20.75%
3 Year Cumulative	5.05%	6.71%	-16.06%	-0.98%	-21.34%
3 Year Avg Annual	1.65%	2.19%	-5.67%	-0.33%	-7.69%
5 Year Cumulative	21.10%	32.03%	1.88%	18.20%	1.70%
5 Year Avg Annual	3.90%	5.71%	0.37%	3.40%	0.34%
Since Inception	231.27%	319.82%	221.41%	212.15%	98.01%
Since Inception Avg Annual	7.69%	9.28%	7.49%	7.30%	4.32%

Statistics	Convertible Arbitrage (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Merrill Lynch All US Convertibles Index (USD)	Dow Jones World Index (USD)
Avg Month	0.64%	0.77%	0.70%	0.67%	0.46%
Best Month	5.81%	8.53%	9.78%	13.55%	11.77%
Worst Month	-12.59%	-7.55%	-16.79%	-17.98%	-19.96%
Monthly Standard Deviation	2.07%	2.24%	4.47%	3.95%	4.52%
Annualized Standard Deviation	7.18%	7.77%	15.49%	13.67%	15.66%
Sharpe Ratio	0.58	0.74	0.25	0.27	0.05

Statistics of the Convertible Arbitrage strategy, the S&P 500, the CS Tremont Index, the Merrill Lynch All US Convertibles Index and the DJW Index, since 1994.



Correlations	Convertible Arbitrage (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Merrill Lynch All US Convertibles Index (USD)	Dow Jones World Index (USD)
Credit Suisse/Tremont Hedge Fund Index (USD)	0.53	1.00	0.54	0.69	0.60
S&P 500 (USD)	0.35	0.54	1.00	0.79	0.93
Merrill Lynch All US Convertibles Index (USD)	0.55	0.69	0.79	1.00	0.84
Dow Jones World Index (USD)	0.42	0.60	0.93	0.84	1.00

Correlation coefficients between the Convertible Arbitrage strategy, the CS Tremont Index, the Merrill Lynch All US Convertibles Index, the S&P 500 and the DJW Index

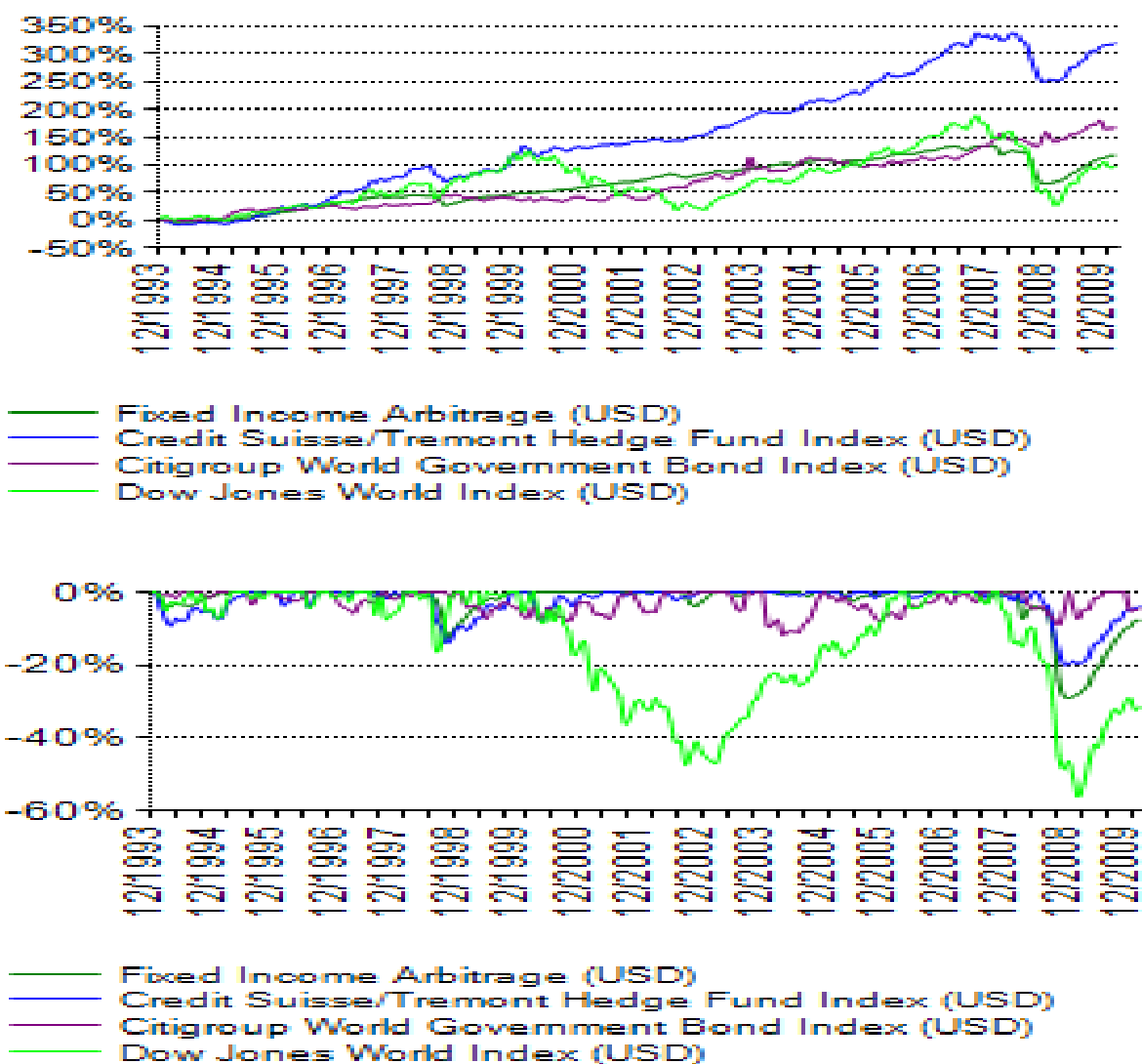
**Appendix 7: Fixed Income Arbitrage**

Cumulative returns of the Fixed Income Arbitrage strategy, the CS Tremont Index, the Citigroup World Government Bond Index and the DJW Index, for different periods of time

Net Performance	Fixed Income Arbitrage (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Citigroup World Government Bond Index (USD)	Dow Jones World Index (USD)
1 Month	0.07%	0.68%	0.29%	1.13%
3 Months	2.87%	1.74%	-4.67%	-0.96%
6 Months	9.61%	7.18%	0.69%	5.39%
1 Year	28.16%	19.34%	10.90%	55.57%
2 Year Cumulative	-7.06%	-3.33%	7.45%	-20.75%
3 Year Cumulative	-5.13%	6.71%	25.49%	-21.34%
3 Year Avg Annual	-1.74%	2.19%	7.86%	-7.69%
5 Year Cumulative	4.08%	32.03%	26.76%	1.70%
5 Year Avg Annual	0.80%	5.71%	4.86%	0.34%
Since Inception	116.95%	319.82%	166.74%	98.01%
Since Inception Avg Annual	4.91%	9.28%	6.26%	4.32%

Statistics	Fixed Income Arbitrage (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Citigroup World Government Bond Index (USD)	Dow Jones World Index (USD)
Avg Month	0.42%	0.77%	0.53%	0.46%
Best Month	4.33%	8.53%	14.60%	11.77%
Worst Month	-14.04%	-7.55%	-9.02%	-19.96%
Monthly Standard Deviation	1.75%	2.24%	2.34%	4.52%
Annualized Standard Deviation	6.04%	7.77%	8.10%	15.66%
Sharpe Ratio	0.23	0.74	0.33	0.05

Statistics of the Fixed Income Arbitrage strategy, the CS Tremont Index, the Citigroup World Government Bond Index and the DJW Index, for different periods of time



Correlations	Fixed Income Arbitrage (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Citigroup World Government Bond Index (USD)	Dow Jones World Index (USD)
Credit Suisse/Tremont Hedge Fund Index (USD)	0.54	1.00	-0.02	0.60
Citigroup World Government Bond Index (USD)	-0.01	-0.02	1.00	0.14
Dow Jones World Index (USD)	0.40	0.60	0.14	1.00

Correlation coefficients between the Fixed Income Arbitrage strategy, the CS Tremont Index, the Citigroup Government Bond Index and the DJW Index



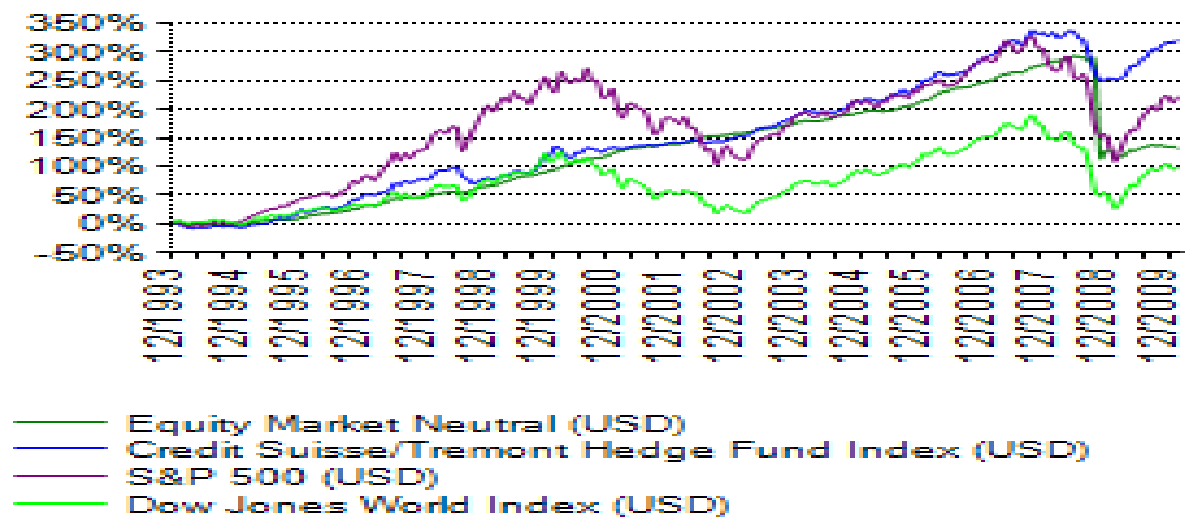
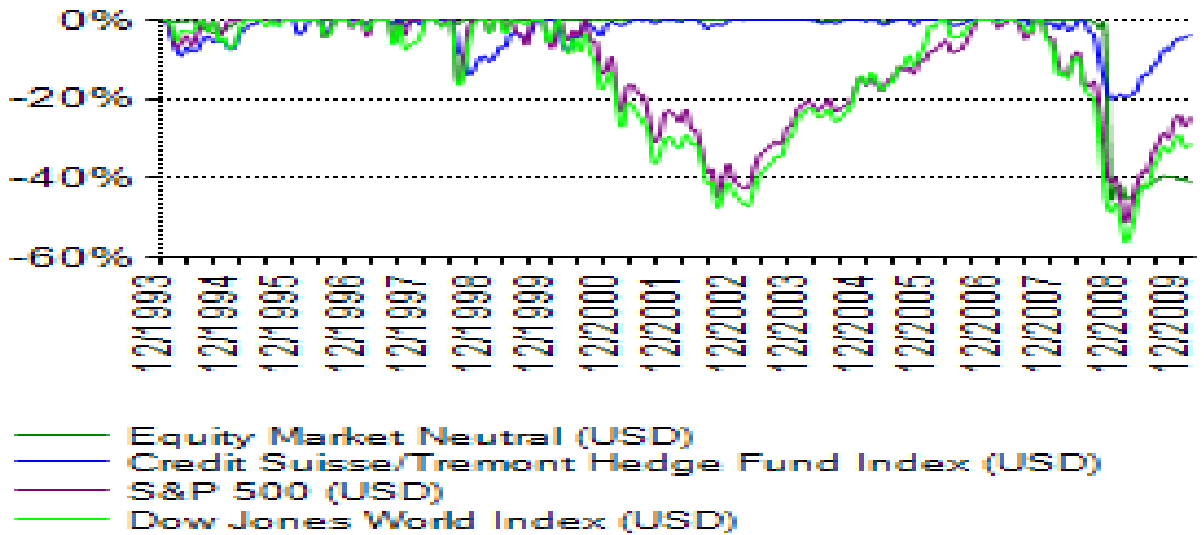
**Appendix 8:Equity Market Neutral**

Cumulative returns of the Equity Market Neutral strategy, the CS Tremont Index, the Citigroup World Government Bond Index and the DJW Index, for different periods of time

Net Performance	Equity Market Neutral (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
1 Month	-1.35%	0.68%	3.10%	1.13%
3 Months	-2.12%	1.74%	1.31%	-0.96%
6 Months	-1.45%	7.18%	9.32%	5.39%
1 Year	7.62%	19.34%	53.62%	55.57%
2 Year Cumulative	-39.74%	-3.33%	-12.93%	-20.75%
3 Year Cumulative	-33.71%	6.71%	-16.06%	-21.34%
3 Year Avg Annual	-12.81%	2.19%	-5.67%	-7.69%
5 Year Cumulative	-22.03%	32.03%	1.88%	1.70%
5 Year Avg Annual	-4.85%	5.71%	0.37%	0.34%
Since Inception	131.66%	319.82%	221.41%	98.01%
Since Inception Avg Annual	5.33%	9.28%	7.49%	4.32%

Statistics	Equity Market Neutral (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
Avg Month	0.50%	0.77%	0.70%	0.46%
Best Month	3.63%	8.53%	9.78%	11.77%
Worst Month	-40.45%	-7.55%	-16.79%	-19.96%
Monthly Standard Deviation	3.11%	2.24%	4.47%	4.52%
Annualized Standard Deviation	10.79%	7.77%	15.49%	15.66%
Sharpe Ratio	0.17	0.74	0.25	0.05

Statistics of the Equity Market Neutral strategy, the CS Tremont Index, the S&P 500 and the DJW Index, since 1994



Correlations	Equity Market Neutral (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
Credit Suisse/Tremont Hedge Fund Index (USD)	0.28	1.00	0.54	0.60
S&P 500 (USD)	0.26	0.54	1.00	0.93
Dow Jones World Index (USD)	0.25	0.60	0.93	1.00

Correlation coefficients between the Equity Market Neutral strategy, the CS Tremont Index, the S&P 500 and the DJW Index

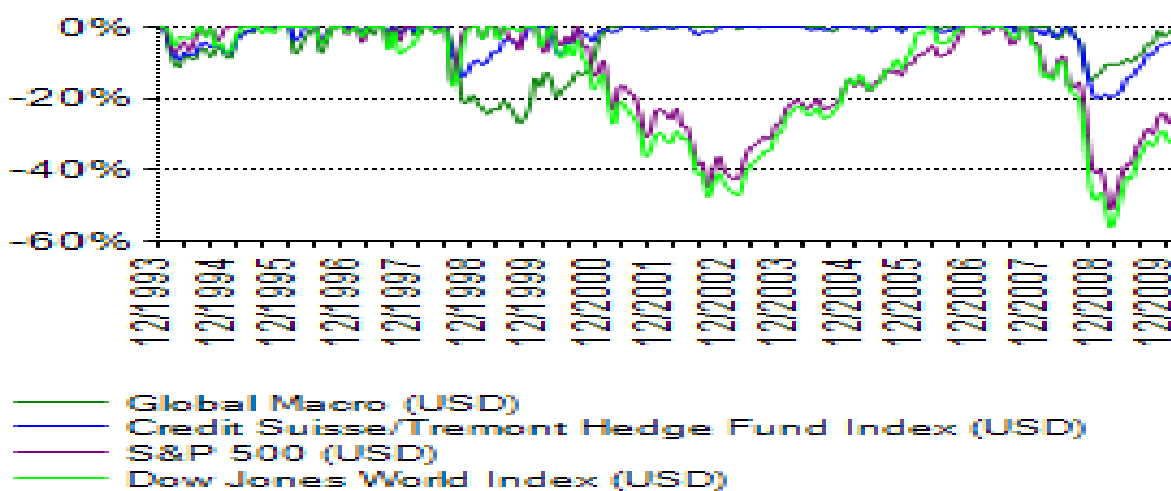
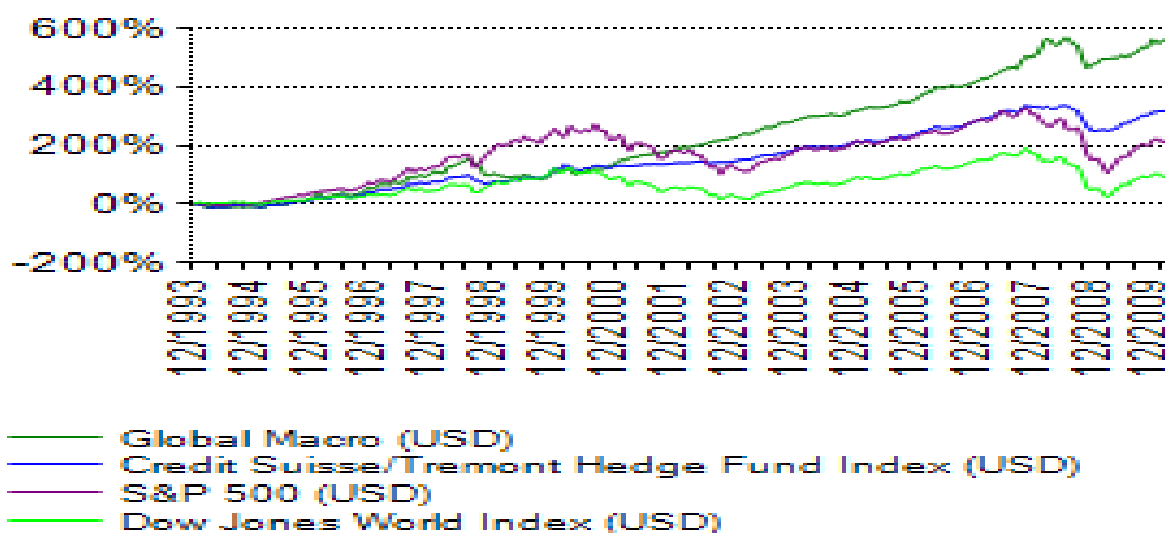
**Appendix 9: Global Macro**

Cumulative returns of the Global Macro strategy, the CS Tremont Index, the S&P 500 and the DJW Index, for different periods of time

<b>Net Performance</b>	<b>Global Macro (USD)</b>	<b>Credit Suisse/Tremont Hedge Fund Index (USD)</b>	<b>S&amp;P 500 (USD)</b>	<b>Dow Jones World Index (USD)</b>
1 Month	1.10%	0.68%	3.10%	1.13%
3 Months	0.72%	1.74%	1.31%	-0.96%
6 Months	7.38%	7.18%	9.32%	5.39%
1 Year	11.15%	19.34%	53.62%	55.57%
2 Year Cumulative	-0.01%	-3.33%	-12.93%	-20.75%
3 Year Cumulative	25.35%	6.71%	-16.06%	-21.34%
3 Year Avg Annual	7.82%	2.19%	-5.67%	-7.69%
5 Year Cumulative	55.00%	32.03%	1.88%	1.70%
5 Year Avg Annual	9.16%	5.71%	0.37%	0.34%
Since Inception	564.17%	319.82%	221.41%	98.01%
Since Inception Avg Annual	12.42%	9.28%	7.49%	4.32%

<b>Statistics</b>	<b>Global Macro (USD)</b>	<b>Credit Suisse/Tremont Hedge Fund Index (USD)</b>	<b>S&amp;P 500 (USD)</b>	<b>Dow Jones World Index (USD)</b>
Avg Month	1.02%	0.77%	0.70%	0.46%
Best Month	10.60%	8.53%	9.78%	11.77%
Worst Month	-11.55%	-7.55%	-16.79%	-19.96%
Monthly Standard Deviation	2.96%	2.24%	4.47%	4.52%
Annualized Standard Deviation	10.25%	7.77%	15.49%	15.66%
Sharpe Ratio	0.87	0.74	0.25	0.05

Statistics of the Global Macro strategy, the CS Tremont Index, the S&P 500 and the DJW Index, since 1994



Correlations	Global Macro (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
Credit Suisse/Tremont Hedge Fund Index (USD)	0.83	1.00	0.54	0.60
S&P 500 (USD)	0.25	0.54	1.00	0.93
Dow Jones World Index (USD)	0.24	0.60	0.93	1.00

Correlation coefficients between the Global Macro strategy, the CS Tremont Index, the S&P 500 and the DJW Index

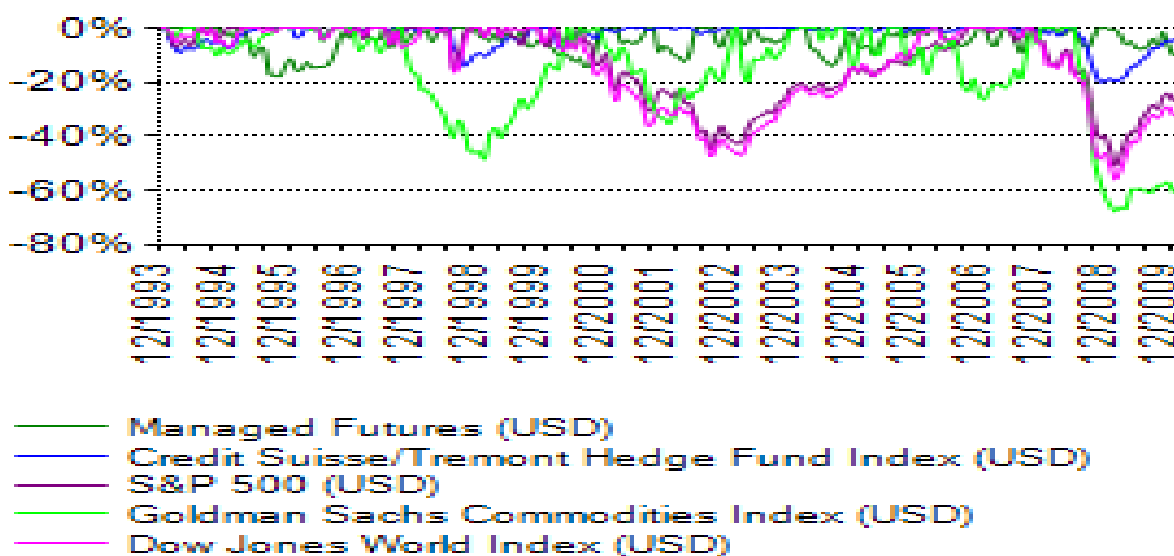
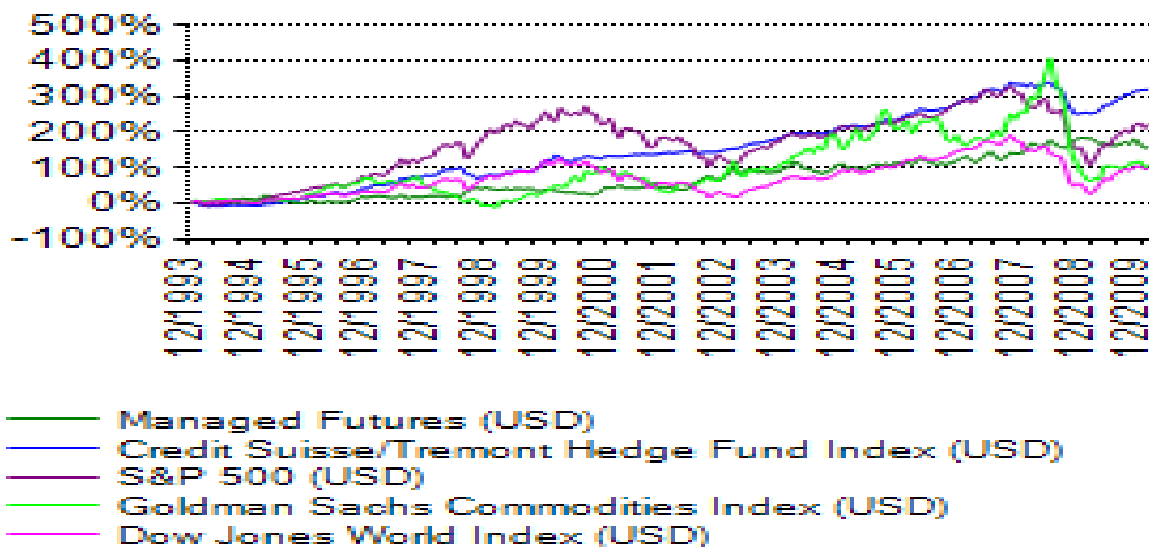
**Appendix 10: Managed Future**

Cumulative returns of the Managed Futures strategy, the CS Tremont Index, the S&P 500, the Goldman Sachs Commodities Index and the DJW Index, for different periods of time

Performance	Managed Futures (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Goldman Sachs Commodities Index (USD)	Dow Jones World Index (USD)
1 Month	1.81%	0.68%	3.10%	5.56%	1.13%
3 Months	-6.97%	1.74%	1.31%	-0.79%	-0.96%
6 Months	-1.65%	7.18%	9.32%	5.59%	5.39%
1 Year	-7.84%	19.34%	53.62%	29.04%	55.57%
2 Year Cumulative	-2.47%	-3.33%	-12.93%	-46.92%	-20.75%
3 Year Cumulative	17.38%	6.71%	-16.06%	-23.13%	-21.34%
3 Year Avg Annual	5.49%	2.19%	-5.67%	-8.40%	-7.69%
5 Year Cumulative	30.85%	32.03%	1.88%	-26.36%	1.70%
5 Year Avg Annual	5.52%	5.71%	0.37%	-5.94%	0.34%
Since Inception	160.03%	319.82%	221.41%	110.10%	98.01%
Since Inception Avg Annual	6.09%	9.28%	7.49%	4.70%	4.32%

Statistics	Managed Futures (USD)	CS/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Goldman Sachs Commodities Index (USD)	Dow Jones World Index (USD)
Avg Month	0.55%	0.77%	0.70%	0.60%	0.46%
Best Month	9.95%	8.53%	9.78%	19.67%	11.77%
Worst Month	-9.35%	-7.55%	-16.79%	-28.20%	-19.96%
Monthly SD	3.40%	2.24%	4.47%	6.53%	4.52%
Annualized SD	11.79%	7.77%	15.49%	22.63%	15.66%
Sharpe Ratio	0.22	0.74	0.25	0.05	0.05

Statistics of the Managed Futures strategy, the CS Tremont Index, the S&P 500, the Goldman Sachs Commodities Index and the DJW Index, since 1994



Correlations	Managed Futures (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Goldman Sachs Commodities Index (USD)	DJW Index (USD)
CS/Tremont Hedge Fund Index (USD)	0.15	1.00	0.54	0.33	0.60
S&P 500 (USD)	-0.13	0.54	1.00	0.18	0.93
Goldman Sachs Commodities Index (USD)	0.17	0.33	0.18	1.00	0.29
Dow Jones World Index (USD)	-0.07	0.60	0.93	0.29	1.00

Correlation coefficients between the Managed Futures strategy, the CS Tremont Index, the S&P 500, the Goldman Sachs Commodities Index and the DJW Index, since 1994

**Appendix 11: Dedicated Short Bias**

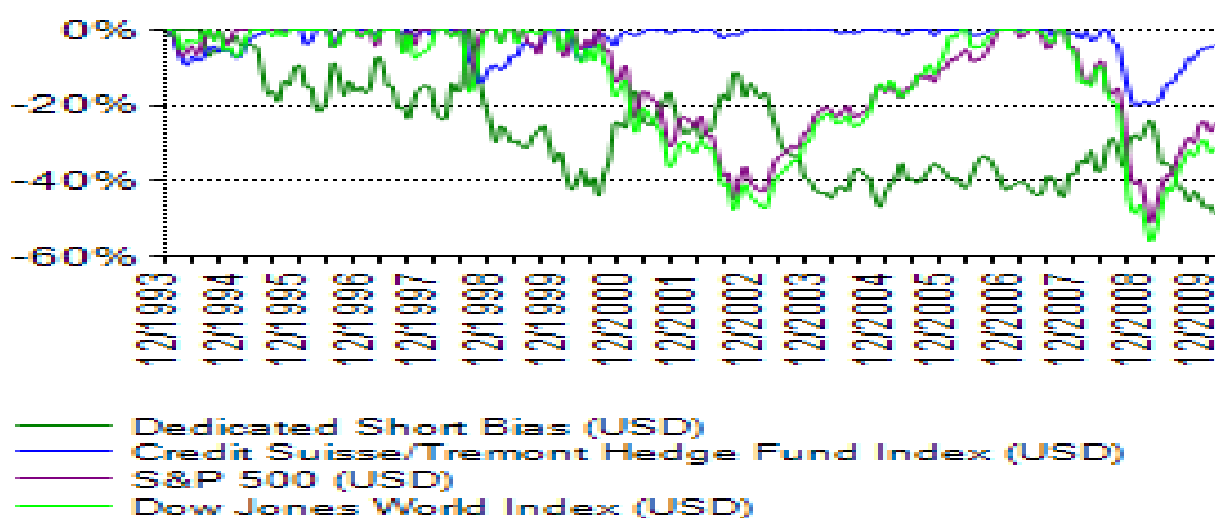
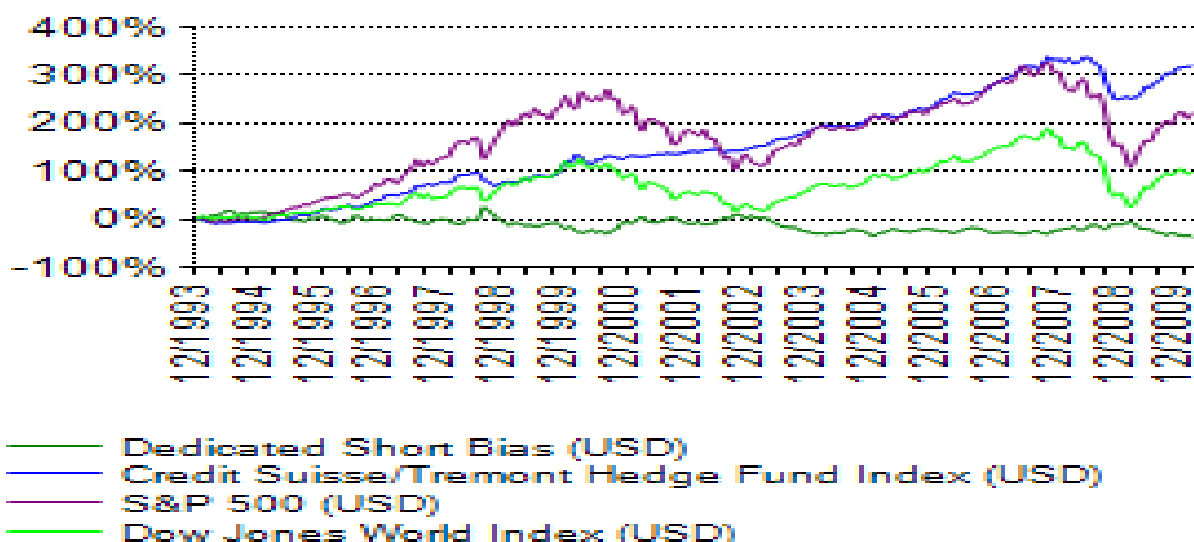
Cumulative returns of the Dedicated Short Bias strategy, the CS Tremont Index, the S&P 500 and the DJW Index, for different periods of time

Net Performance	Dedicated Short Bias (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
1 Month	-3.87%	0.68%	3.10%	1.13%
3 Months	-7.72%	1.74%	1.31%	-0.96%
6 Months	-11.14%	7.18%	9.32%	5.39%
1 Year	-32.48%	19.34%	53.62%	55.57%
2 Year Cumulative	-20.75%	-3.33%	-12.93%	-20.75%
3 Year Cumulative	-13.94%	6.71%	-16.06%	-21.34%
3 Year Avg Annual	-4.88%	2.19%	-5.67%	-7.69%
5 Year Cumulative	-13.04%	32.03%	1.88%	1.70%
5 Year Avg Annual	-2.76%	5.71%	0.37%	0.34%
Since Inception	-35.73%	319.82%	221.41%	98.01%
Since Inception Avg Annual	-2.70%	9.28%	7.49%	4.32%

Statistics	Dedicated Short Bias (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
Avg Month	-0.11%	0.77%	0.70%	0.46%
Best Month	22.71%	8.53%	9.78%	11.77%
Worst Month	-9.57%	-7.55%	-16.79%	-19.96%
Monthly Standard Deviation	4.88%	2.24%	4.47%	4.52%
Annualized Standard Deviation	16.89%	7.77%	15.49%	15.66%
Sharpe Ratio	-0.37	0.74	0.25	0.05

Statistics of the Dedicated Short Bias strategy, the CS Tremont Index, the S&P 500 and the DJW Index since 1994

The impact of hedge funds on financial markets since 1990



Correlations	Dedicated Short Bias (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Dow Jones World Index (USD)
Credit Suisse/Tremont Hedge Fund Index (USD)	-0.46	1.00	0.54	0.60
S&P 500 (USD)	-0.74	0.54	1.00	0.93
Dow Jones World Index (USD)	-0.73	0.60	0.93	1.00

Correlation coefficients between the Dedicated Short Bias strategy, the CS Tremont Index, the S&P 500 and the DJW Index



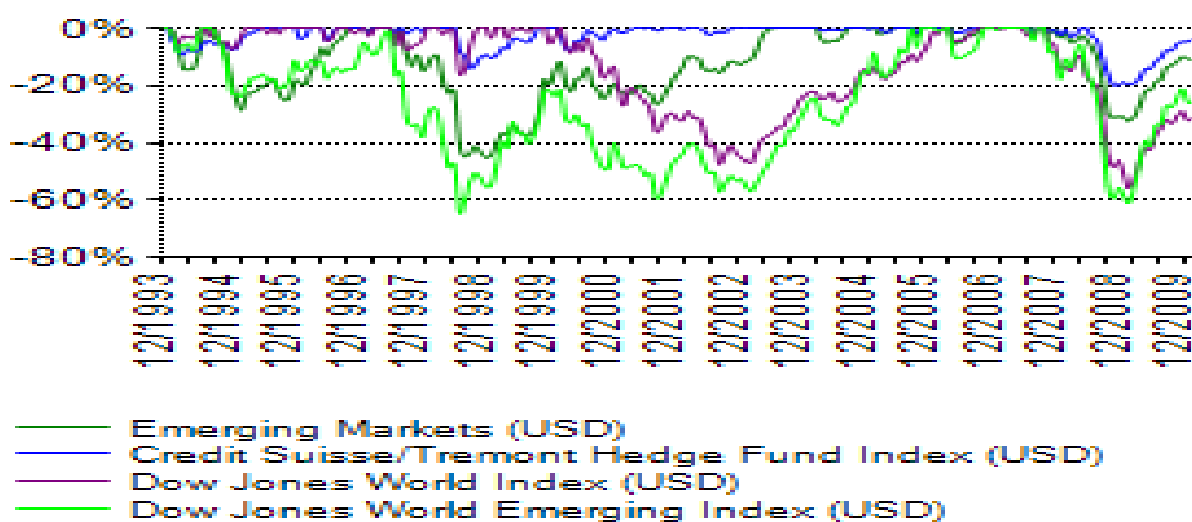
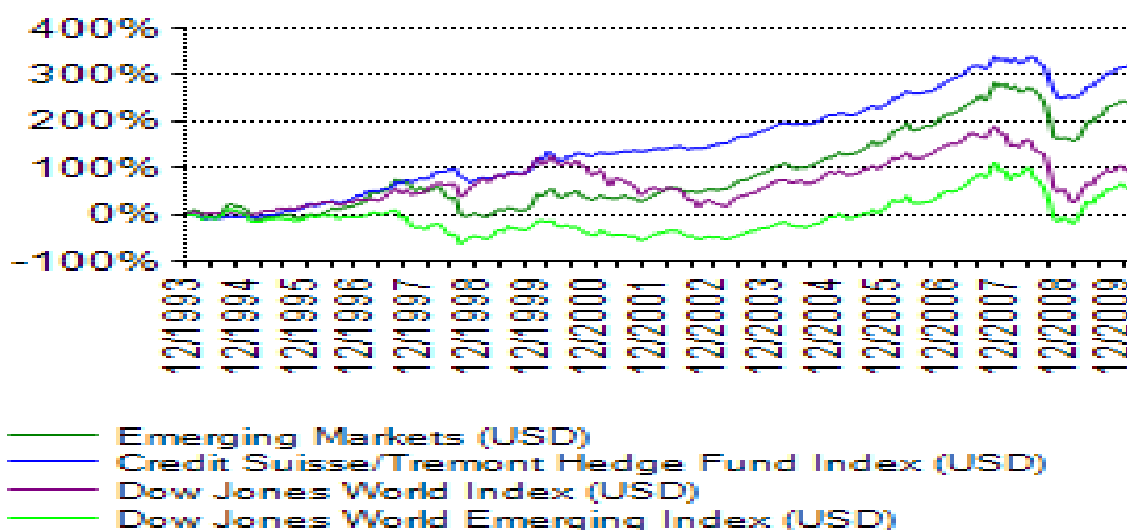
## Appendix 12: Emerging Markets

Cumulative returns of the Emerging Markets strategy, the CS Tremont Index, the DJW Index and the DJW Emerging Index, for different periods of time

Net Performance	Emerging Markets (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Dow Jones World Index (USD)	Dow Jones World Emerging Index (USD)
1 Month	-0.45%	0.68%	1.13%	-0.16%
3 Months	0.74%	1.74%	-0.96%	-1.90%
6 Months	8.13%	7.18%	5.39%	11.59%
1 Year	31.40%	19.34%	55.57%	90.72%
2 Year Cumulative	-9.76%	-3.33%	-20.75%	-16.71%
3 Year Cumulative	6.22%	6.71%	-21.34%	4.30%
3 Year Avg Annual	2.03%	2.19%	-7.69%	1.41%
5 Year Cumulative	45.49%	32.03%	1.70%	54.08%
5 Year Avg Annual	7.79%	5.71%	0.34%	9.03%
Since Inception	239.75%	319.82%	98.01%	57.43%
Since Inception Avg Annual	7.86%	9.28%	4.32%	2.85%

Statistics	Emerging Markets (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Dow Jones World Index (USD)	Dow Jones World Emerging Index (USD)
Avg Month	0.73%	0.77%	0.46%	0.52%
Best Month	16.42%	8.53%	11.77%	18.30%
Worst Month	-23.03%	-7.55%	-19.96%	-31.65%
Monthly Standard Deviation	4.47%	2.24%	4.52%	7.43%
Annualized Standard Deviation	15.48%	7.77%	15.66%	25.73%
Sharpe Ratio	0.28	0.74	0.05	-0.03

Statistics of the Emerging Markets strategy, the CS Tremont Index, the DJW Index and the DJW Emerging Index, since 1994



Correlations	Emerging Markets (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	Dow Jones World Index (USD)	Dow Jones World Emerging Index (USD)
CS/Tremont Hedge Fund Index (USD)	0.70	1.00	0.60	0.55
Dow Jones World Index (USD)	0.62	0.60	1.00	0.81
Dow Jones World Emerging Index (USD)	0.76	0.55	0.81	1.00

Correlation coefficients between the Emerging Markets strategy, the CS Tremont Index, the DJW Index and the DJW Emerging Index

**Appendix 13: Multi-Strategy**

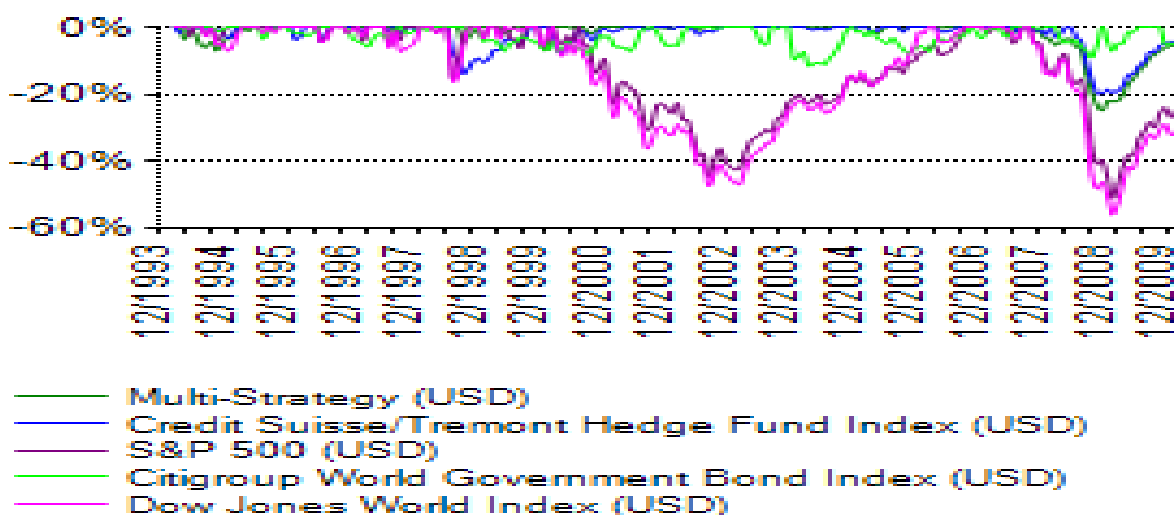
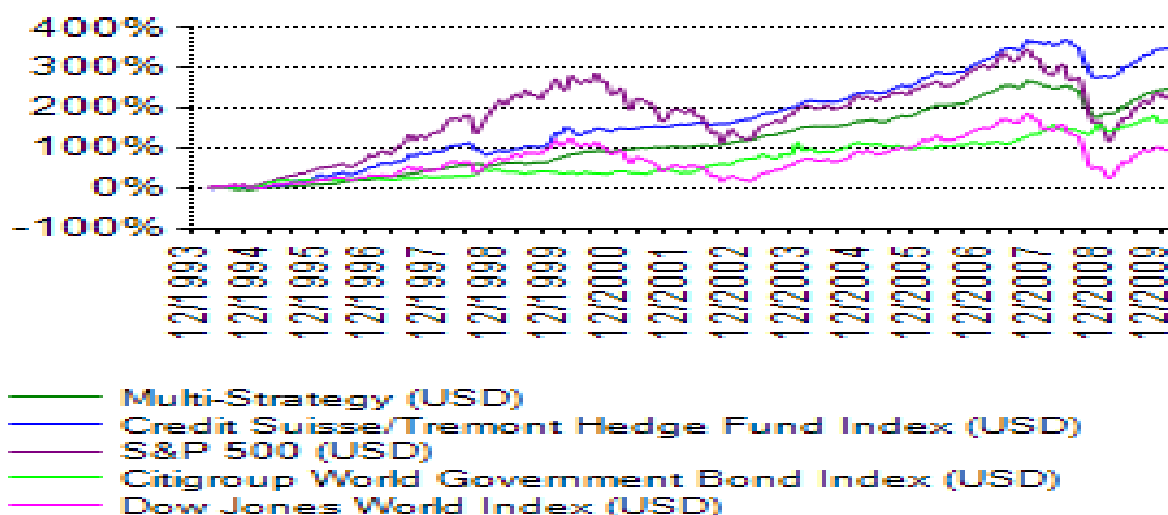
Cumulative returns of the Multi-strategy, the CS Tremont Index, the S&P 500, the Citigroup World Government Bond Index and the DJW Index, for different periods of time

Net Performance	Multi-Strategy (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Citigroup World Government Bond Index (USD)	Dow Jones World Index (USD)
1 Month	0.56%	0.68%	3.10%	0.29%	1.13%
3 Months	2.32%	1.74%	1.31%	-4.67%	-0.96%
6 Months	7.44%	7.18%	9.32%	0.69%	5.39%
1 Year	22.06%	19.34%	53.62%	10.90%	55.57%
2 Year Cumulative	-1.71%	-3.33%	-12.93%	7.45%	-20.75%
3 Year Cumulative	2.98%	6.71%	-16.06%	25.49%	-21.34%
3 Year Avg Annual	0.98%	2.19%	-5.67%	7.86%	-7.69%
5 Year Cumulative	29.23%	32.03%	1.88%	26.76%	1.70%
5 Year Avg Annual	5.26%	5.71%	0.37%	4.86%	0.34%
Since Inception	247.59%	348.81%	234.08%	166.70%	95.65%
Since Inception Avg Annual	8.14%	9.89%	7.87%	6.36%	4.31%

Statistics	Multi-Strategy (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Citigroup World Government Bond Index (USD)	Dow Jones World Index (USD)
Avg Month	0.67%	0.81%	0.74%	0.54%	0.46%
Best Month	4.28%	8.53%	9.78%	14.60%	11.77%
Worst Month	-7.35%	-7.55%	-16.79%	-9.02%	-19.96%
Monthly Standard Deviation	1.58%	2.21%	4.48%	2.35%	4.52%
Annualized Standard Deviation	5.48%	7.66%	15.52%	8.15%	15.66%
Sharpe Ratio	0.84	0.83	0.28	0.34	0.05

Statistics of the Multi-strategy, the CS Tremont Index, the S&P 500, the Citigroup World Government Bond Index and the DJW Index, since 1994

The impact of hedge funds on financial markets since 1990



Correlations	Multi-Strategy (USD)	Credit Suisse/Tremont Hedge Fund Index (USD)	S&P 500 (USD)	Citigroup World Government Bond Index (USD)	Dow Jones World Index (USD)
CS/Tremont Hedge Fund Index (USD)	0.47	1.00	0.54	-0.03	0.60
S&P 500 (USD)	0.32	0.54	1.00	0.06	0.93
Citigroup World Government Bond Index (USD)	0.07	-0.03	0.06	1.00	0.14
Dow Jones World Index (USD)	0.42	0.60	0.93	0.14	1.00

Correlation coefficients between the Multi-strategy, the CS Tremont Index, the S&P 500, the Citigroup World Government Bond Index and the DJW Index

Appendix 14: Quarterly Net Performance of benchmarks' and strategies' indexes

	Quarterly	2010	2009	2008	2007	2006
<b>Convertible Arbitrage</b>	1st Quarter*	3.53%	7.72%	-7.64%	3.06%	5.51%
	2nd Quarter	N/A	15.06%	2.25%	2.04%	1.87%
	3rd Quarter	N/A	12.92%	-14.71%	-0.26%	2.98%
	4th Quarter	N/A	5.27%	-15.08%	0.26%	3.26%
	Annual	3.53%	47.35%	-31.59%	5.17%	14.30%
<b>Dedicated Short Bias</b>	1st Quarter*	-9.36%	1.17%	9.83%	1.64%	-5.83%
	2nd Quarter	N/A	-11.84%	1.93%	-3.73%	9.99%
	3rd Quarter	N/A	-13.63%	-7.64%	0.69%	-1.02%
	4th Quarter	N/A	-2.69%	11.09%	7.63%	-8.91%
	Annual	-9.36%	-25.03%	14.87%	6.04%	-6.61%
<b>Emerging Markets</b>	1st Quarter*	2.63%	-0.05%	-4.20%	3.20%	8.89%
	2nd Quarter	N/A	13.26%	0.68%	5.91%	-1.53%
	3rd Quarter	N/A	10.12%	-15.06%	4.90%	2.98%
	4th Quarter	N/A	4.30%	-15.06%	4.89%	9.12%
	Annual	2.63%	30.03%	-30.41%	20.26%	20.49%
<b>Equity Market Neutral</b>	1st Quarter*	-0.72%	-3.49%	1.78%	2.75%	3.56%
	2nd Quarter	N/A	4.75%	1.98%	2.34%	3.13%
	3rd Quarter	N/A	4.11%	-2.04%	1.31%	1.78%
	4th Quarter	N/A	-1.15%	-41.30%	2.56%	2.26%
	Annual	-0.72%	4.05%	-40.32%	9.27%	11.15%
<b>Event Driven</b>	1st Quarter*	4.76%	-0.19%	-3.30%	4.96%	4.81%
	2nd Quarter	N/A	6.83%	2.26%	5.57%	2.42%
	3rd Quarter	N/A	7.58%	-8.28%	0.66%	1.69%
	4th Quarter	N/A	4.95%	-9.29%	1.50%	6.01%
	Annual	4.76%	20.38%	-17.74%	13.20%	15.73%
<b>Distressed</b>	1st Quarter*	5.02%	-1.13%	-2.56%	4.25%	4.51%
	2nd Quarter	N/A	7.55%	1.23%	4.67%	2.69%
	3rd Quarter	N/A	7.94%	-7.70%	-0.85%	1.57%
	4th Quarter	N/A	5.38%	-12.65%	0.15%	6.04%
	Annual	5.02%	20.95%	-20.48%	8.35%	15.58%
<b>Risk arbitrage</b>	1st Quarter*	0.71%	2.73%	2.80%	2.66%	3.20%
	2nd Quarter	N/A	3.49%	0.58%	2.19%	0.36%
	3rd Quarter	N/A	3.71%	-4.99%	2.98%	1.03%
	4th Quarter	N/A	1.58%	-1.53%	0.68%	3.35%
	Annual	0.71%	12.00%	-3.27%	8.77%	8.15%
<b>Fixed Income Arbitrage</b>	1st Quarter*	3.59%	3.26%	-6.78%	2.25%	2.06%
	2nd Quarter	N/A	8.29%	2.87%	1.46%	3.52%
	3rd Quarter	N/A	9.06%	-7.79%	-1.02%	0.20%
	4th Quarter	N/A	4.47%	-19.50%	1.11%	2.65%
	Annual	3.59%	27.41%	-28.82%	3.83%	8.66%
<b>Global Macro</b>	1st Quarter*	2.57%	2.58%	6.88%	3.02%	5.75%
	2nd Quarter	N/A	0.81%	2.19%	4.79%	2.69%
	3rd Quarter	N/A	5.50%	-10.34%	4.45%	0.60%
	4th Quarter	N/A	2.26%	-2.61%	4.08%	3.93%
	Annual	2.57%	11.55%	-4.62%	17.36%	13.53%
<b>Long/Short Equity</b>	1st Quarter*	2.79%	0.32%	-4.10%	3.77%	6.88%
	2nd Quarter	N/A	7.87%	3.78%	5.72%	-1.57%
	3rd Quarter	N/A	7.82%	-12.86%	1.19%	1.58%

The impact of hedge funds on financial markets since 1990

	4th Quarter	N/A	2.39%	-7.48%	2.39%	7.04%
	Annual	2.79%	19.47%	-19.76%	13.66%	14.38%
<b>Managed Futures</b>	1st Quarter*	2.09%	-2.88%	10.42%	-4.70%	4.11%
	2nd Quarter	N/A	-4.68%	4.02%	12.67%	-1.90%
	3rd Quarter	N/A	3.48%	-7.11%	-4.51%	-2.21%
	4th Quarter	N/A	-2.47%	10.91%	3.40%	8.20%
	Annual	2.09%	-6.57%	18.33%	6.01%	8.05%
<b>Multi Strategy</b>	1st Quarter*	2.59%	3.64%	-3.92%	3.76%	5.59%
	2nd Quarter	N/A	8.34%	1.92%	4.40%	1.47%
	3rd Quarter	N/A	7.45%	-10.77%	0.10%	1.10%
	4th Quarter	N/A	3.29%	-12.59%	1.54%	5.74%
	Annual	2.59%	24.62%	-23.63%	10.10%	14.54%
<b>Benchmark Indexes (annual return)</b>	Credit Suisse/Tremont Hedge Fund Index (USD)	3.09%	18.57%	-19.07%	12.56%	13.86%
	S&P 500 (USD)	5.39%	26.46%	-37.00%	5.49%	15.79%
	Citigroup World Government Bond Index (USD)	-1.33%	2.55%	10.89%	10.95%	5.99%
	Dow Jones World Index (USD)	3.02%	31.97%	-42.85%	8.43%	18.52%
	Merrill Lynch All US Convertibles Index	5.64%	49.13%	-35.73%	4.53%	12.83%
	Dow Jones World Emerging Index (USD)	2.04%	77.69%	-51.64%	28.79%	26.15%
	Credit Suisse High Yield II Index (USD)	4.47%	54.22%	-26.17%	2.65%	11.92%
	Goldman Sachs Commodities Index (USD)	-0.89%	13.49%	-46.49%	32.67%	-15.09%