



universität
wien

DIPLOMARBEIT

Titel der Diplomarbeit

“Hedge Funds in the Subprime Credit Crisis”

Verfasser

Marcus Hofer

Angestrebter akademischer Grad

Magister der Sozial- und Wirtschaftswissenschaften
(Mag. rer. soc. oec.)

Wien, im August 2010

Studienkennzahl lt. Studienblatt:

A157

Studienrichtung lt. Studienblatt:

Internationale Betriebswirtschaft

Betreuerin:

Ao. Univ.-Prof. Mag. Dr. Andrea Gaunersdorfer

Eidesstattliche Erklärung

Hiermit erkläre ich an Eides statt:

dass ich die Diplomarbeit selbstständig verfasst, andere als die angegebenen Quellen und Hilfsmittel nicht benutzt und mich auch sonst keiner unerlaubten Hilfen bedient habe,

dass ich dieses Diplomarbeitsthema bisher weder im In- noch im Ausland in irgendeiner Form als Prüfungsarbeit vorgelegt habe.

A handwritten signature in black ink, reading "Marcus Hofer". The signature is written in a cursive, flowing style.

Wien, im August 2010

Marcus Hofer

Acknowledgements

I am very grateful to Ao. Univ.-Prof. Mag. Dr. Andrea Gaunersdorfer for accepting my topic for this thesis and her guidance and support throughout this work. Professor Gaunersdorfer's precise comments resulted in a considerable improvement of my thesis.

Furthermore I want to thank my family for their encouragement during the long creation of this thesis.

Thank You!

Table of Contents

Table of Figures	iii
Table of Tables.....	iii
Abbreviations.....	iv
1. Introduction.....	1
2. What are Hedge Funds?	3
2.1 Definition of Hedge Funds.....	3
2.2 History of Hedge Funds	4
2.3 Reasons to invest in Hedge Funds	6
2.4 Disadvantages of Hedge Fund Investments	8
3. Characteristics of Hedge Funds	9
3.1 Short Selling.....	9
3.2 Leverage	12
3.3 Limited Liquidity	14
3.4 Conduct of Hedge Fund Managers	16
3.5 Minimum Investments	18
3.6 Fees and Management Compensation	18
3.7 Legal Environment	21
3.7.1 Legal Environment for U.S. Hedge Funds	22
3.7.2 Legal Environment for Hedge Funds outside the U.S.....	25
4. Classification of Hedge Funds.....	27
4.1 Convertible Arbitrage	31
4.2 Dedicated Short Bias	31
4.3 Emerging Markets.....	32
4.4 Equity Market Neutral.....	32
4.5 Event Driven Strategies	32
4.5.1 Distressed.....	32
4.5.2 Event Driven Multi-Strategy	33
4.5.3 Risk Arbitrage	33
4.6 Fixed Income Arbitrage	34
4.7 Global Macro.....	34
4.8 Long/Short Equity	35
4.9 Managed Futures.....	35

4.10 Multi-Strategy	36
4.11 Fund of Funds	36
5. Valuation of Hedge Funds	37
5.1 Measuring Returns	37
5.2 Measuring Risk.....	39
5.2.1 Standard Deviation and Volatility	39
5.2.2 Skewness and Kurtosis.....	41
5.2.3 Alternative Risk Measures	45
5.2.4 Covariance and Correlation	47
5.2.5 Beta.....	49
5.3 Risk-adjusted Performance Measures.....	49
5.3.1 Sharpe Ratio	50
5.3.2 Sortino Ratio	51
5.3.3 Treynor Ratio	52
5.3.4 Jensen's Alpha.....	53
5.3.5 Comparing Risk-adjusted Performance Measures.....	54
6. Databases and Biases	56
6.1 Self-selection Bias	57
6.2 Survivorship Bias.....	57
6.3 Backfill Bias	58
6.4 Infrequent Pricing	59
7. Hedge Funds in the Subprime Credit Crisis.....	60
7.1 Industry Overview.....	60
7.2 Short Selling in the Subprime Credit Crisis.....	65
7.3 Changes in the Legal Environment due to the Subprime Credit Crisis.....	67
7.4 Performance of Hedge Funds in the Subprime Credit Crisis	71
7.4.1 The Database	72
7.4.2 Hedge Fund Performance in 2007	72
7.4.3 Hedge Fund Performance in 2008	74
7.4.4 Hedge Fund Performance in the first half of 2009.....	78
7.4.5 Summary of the Performance Analysis	80
8. Conclusions	82
9. Bibliography	83
10. Appendix: Abstract in German	94

Table of Figures

Figure 1: Amount and Performance of Hedge Funds from 1998 to 2008	6
Figure 2: Onshore and Offshore Domiciles of Hedge Funds	22
Figure 3: Distribution of Sources for the Classification of Hedge Funds.....	27
Figure 4: Distribution of External Classification Sources	28
Figure 5: Sources of Classification by Category of Participants	29
Figure 6: Hedge Fund Strategies	30
Figure 7: Negatively skewed Distribution	42
Figure 8: Symmetrical Distribution: Zero Skewness	42
Figure 9: Positively skewed Distribution	42
Figure 10: Illustration of Kurtosis	44
Figure 11: Security Market Line.....	53
Figure 12: Number and Assets under Management of Global Hedge Funds	60
Figure 13: Management Location of Global Hedge Fund Assets	62
Figure 14: Frequency of each Hedge Fund Strategy in January 2009	64
Figure 15: Volatility Index, MSCI World Index and Credit Suisse/Tremont Hedge Fund Index	77

Table of Tables

Table 1: Reasons for Institutional Investors to invest in Hedge Funds.....	7
Table 2: Comparison of monthly Hedge Fund Returns when Hedge Funds have different Redemption Intervals and Investment Intervals.....	16
Table 3: Monthly Hedge Fund Returns from January 2000 to March 2009.....	67
Table 4: Index Returns in 2007.....	73
Table 5: Index Returns in 2008.....	75
Table 6: Index Returns in the first half of 2009.....	79

Abbreviations

CAPM	Capital Asset Pricing Model
CFTC	Commodities Futures Trading Commission
CISDM	Center for International Securities and Derivatives Markets
CSFB/Tremont	Credit Suisse First Boston/Tremont
HFR	Hedge Fund Research
IFSL	International Financial Services London
IMD	International Institute for Management Development
JB	Jarque-Bera
LTCM	Long Term Capital Management
MFA	Managed Funds Association
MSCI	Morgan Stanley Capital International
S&P 500	Standard & Poor's 500
SEC	Securities and Exchange Commission
TASS	Trading Advisors Selection System
UBS	Union Bank of Switzerland
VaR	Value at Risk
VIX	Volatility Index

1. Introduction

Wealthy individuals and institutional investors have been involved in hedge fund investments for a long time.¹ Hedge funds offer various characteristics such as limited regulatory oversight, flexible investment strategies and strong managerial incentives that might have a positive influence on the performance of investments.²

Their popularity reached its peak in 2007 when about 11,000 funds existed with almost US\$2,200 billion of assets under management. However the consequences of the subprime credit crisis also affected the hedge fund industry. In 2008 the number of hedge funds decreased to around 10,000 and assets under management declined by 30% to around US\$1,500 billion.³ The subprime credit crisis started in February 2007⁴ in the U.S. subprime mortgage market and has consequently not only reached the global financial markets but also negatively influenced the real economy.⁵

Simply explained, subprime mortgages are loans to “house borrowers with weak credit.”⁶ 25% of the entire U.S. housing mortgage market consists of subprime loans.⁷ During booming periods in housing markets and when interest rates are not rising the high percentage rate of subprime loans is not a problem, but as these circumstances disappeared, subprime borrowers were the first ones to default. Their default induced an implosion of credit structured products such as mortgage-backed securities or collateralized debt obligations and was the beginning of the subprime credit crisis.⁸

Financial institutions create mortgage-backed securities by selling parts of their “residential mortgage portfolio to investors. The mortgages sold are put into a pool and investors acquire a stake in the pool by buying units. The units are known as mortgage-backed securities.”⁹

¹ Fung et al.(1999)

² Ackermann et al. (1999)

³ Maslakov (2009)

⁴ Ryan (2008)

⁵ Crouhy et al. (2008)

⁶ Mah-Hui Lim (2008), p. 4

⁷ Capell (2007)

⁸ Mah-Hui Lim (2008)

⁹ Hull (2006), p. 692

Collateralized debt obligations are asset-backed securities¹⁰ whose underlying collateral is usually a portfolio of bank loans or bonds.¹¹

Although hedge funds exist in the financial environment since 60 years, it seems that never before that much attention was paid to them as in the subprime credit crisis. The reason for this is to a lesser extent the fact that some of them made devastating losses but to a greater extent their impact on the overall stability of financial markets.

Hedge funds have not had a major impact on the emergence of the subprime credit crisis, as they had only approximately 5% of their overall assets “invested in mortgage-backed securities in September 2007”¹², but the general proposition is that they contributed severely to financial instability in 2008 due to trading activities.¹³ Consequently, some actions to change the legal treatment of hedge funds have been taken but further changes are definitely to come in the future.¹⁴

The motivation behind this thesis is to give a profound insight on hedge funds and the changes they will face due to the subprime credit crisis. Furthermore, I am going to compare the performance of different hedge fund strategies to the performance of different stock market indices during the subprime credit crisis. This analysis will identify whether the investment in hedge funds during the subprime credit crisis was generally a good or bad investment decision.

The thesis is structured as follows. In the next section I explain the meaning of hedge funds, illustrate their history and discuss their advantages and disadvantages. Section 3 determines in detail the different characteristics of hedge funds. In section 4 I describe different hedge fund strategies and section 5 provides information on how hedge funds are evaluated. Section 6 explains hedge fund databases and its biases, and section 7 discusses in detail the hedge fund industry in the subprime credit crisis, short selling in this crisis and possible legal changes for hedge funds triggered by the subprime credit crisis. In this section I also analyze the performance of different hedge fund strategies during the subprime credit crisis and compare it to the performance of stock market indices during the subprime credit crisis. Section 8 concludes my thesis and provides implications for the future of hedge funds.

¹⁰ “An asset-backed security is a special type of bond backed by a collection of income-generating securities such as mortgages, car loans, or even claims on royalties from music.” (Reilly et al., 2006, p. 64)

¹¹ Duffie (2001)

¹² Maslakovic (2009), p. 7

¹³ Maslakovic (2009)

¹⁴ Please note that this thesis is based on legal provisions and a legal environment as of May 1st, 2009.

2. What are Hedge Funds?

2.1 Definition of Hedge Funds

In the literature an overall accepted definition of hedge funds cannot be found, but to me the description of a hedge fund by Caslin (2004) is the most descriptive and best comprehensible one. He defines a hedge fund as an investment that is “characterised by some or all of the following features:

1. hedge fund investment vehicles may not be open to the general public;
2. the minimum investment may be very high by the standards of mutual funds;
3. there may be a general lack of transparency regarding the investment strategy;
4. long and short positions can be taken as a part of the investment strategy;”¹⁵
5. leverage, which is the use of debt in order to acquire assets¹⁶, may be applied;
6. “there may be capacity constraints on the amount of money that can be managed within a hedge fund investment strategy;
7. the level of regulatory supervision of the investment vehicle may be low relative to long-only funds;
8. fees are structured at two levels, namely, an annual management fee and a performance fee; and
9. there may be a minimum investment time horizon before investors can withdraw their money or a rolling minimum notice period.”¹⁷

Many of these characteristics of hedge funds are going to be explained in more detail later in this thesis.

As we are going through severe changes in the financial industry, some of the characteristics of hedge funds will not be valid in the future any more. For instance, more restrictive provisions in order to better regulate hedge funds are considered to be introduced. Hence hedge funds will not be able to trade with such a lack of transparency, with respect to their investment strategies.

¹⁵ Caslin (2004), p. 2

¹⁶ de Brouwer (2001)

¹⁷ Caslin (2004), p. 2

2.2 History of Hedge Funds

Although lots of people believe hedge funds are a recent phenomenon in financial industries, the first hedge fund was set up almost 60 years ago in 1949 by Alfred Winslow Jones, an investment manager on Wall Street. He applied a strategy which is still used frequently, where he bought stocks that seemed to be undervalued as well as “sold short”¹⁸ stocks which had been perceived as overvalued. He used this strategy in order to neutralise (hedge) investment risk and combined it with leverage and a highly performance based compensation structure which was unusual for those days but is one of the trademarks of hedge funds.¹⁹

Due to its structure his hedge fund was exempted from the Investment Company Act (1940). Without this exemption he would not have been allowed to use short selling and concentration in certain assets of his portfolio or leverage. The Investment Company Act (1940) and other parts of the legal environment of hedge funds are going to be explained in section 3.7. According to Connor et al. (2003) Jones charged a 20% performance fee which is still a frequently used percentage rate that has to be paid to hedge fund managers. In order to increase the management abilities of the fund he also hired other managers and founded the first multi-manager hedge fund.²⁰

After some time Jones believed to be better off by changing the structure of his fund and transformed it into a fund of funds which invested also in other hedge funds.²¹ His fund gained a lot of attention in 1966, when an article was published about it in the Fortune magazine, which reported on its great performance. It outperformed traditional mutual funds such as the five year best fidelity trend fund by 44% and the ten year best Dreyfus Fund by 87%. These results already included the performance fees that had to be paid to the hedge fund managers.²²

¹⁸ Short selling is defined and explained in detail in section 3.1.

¹⁹ Fano-Leszczynski (2002)

²⁰ Connor et al. (2003)

²¹ Fano-Leszczynski (2002)

²² Loomis (1966)

According to the Securities and Exchange Commission (SEC) two years after the article about Alfred Winslow Jones' hedge fund had been published, 140 hedge funds already existed.²³

New hedge funds tried to copy the strategy of Alfred Winslow Jones, but most of the hedge fund managers were not consistent enough and changed their long-short equity positions into mainly long positions with a lot of leverage to take advantage of the booming stock markets of the late 1960's. When it came to the bearish markets of 1972-1974 (the Standard & Poor's 500 Index²⁴ decreased by a third) many hedge funds made huge losses due to the changes in their strategy and dropped out of the hedge fund industry.²⁵

After 1974 the hedge fund industry declined and the public almost stopped paying attention to the industry, but due to the big success of Julian Robertson's Tiger and Jaguar funds, hedge funds reappeared in headlines in 1986.²⁶ According to the journal "Institutional Investor", Robertson's Tiger Fund earned 43% of compounded annual returns after incentive fees and expenses during the first six years of its existence.²⁷

Since then the interest in hedge fund investments grew rapidly until the year 2008 which was a horrifying year for many hedge funds. Figure 1 points out hedge funds' gains and losses in the period 1998-2008 and illustrates that most hedge funds made devastating losses in 2008.

²³ Fano-Leszczyński (2002)

²⁴ The Standard & Poor's 500 (S&P 500) is a stock market index which "includes 500 leading companies in leading industries of the U.S. economy." (Standard & Poor's, link: <http://www.standardandpoors.com/indices/sp-500/en/us/?indexId=spusa-500-usdof-p-us-l->, accessed: 22/01/10)

²⁵ Connor et al. (2003)

²⁶ Fano-Leszczyński (2002)

²⁷ Rohrer (1986)

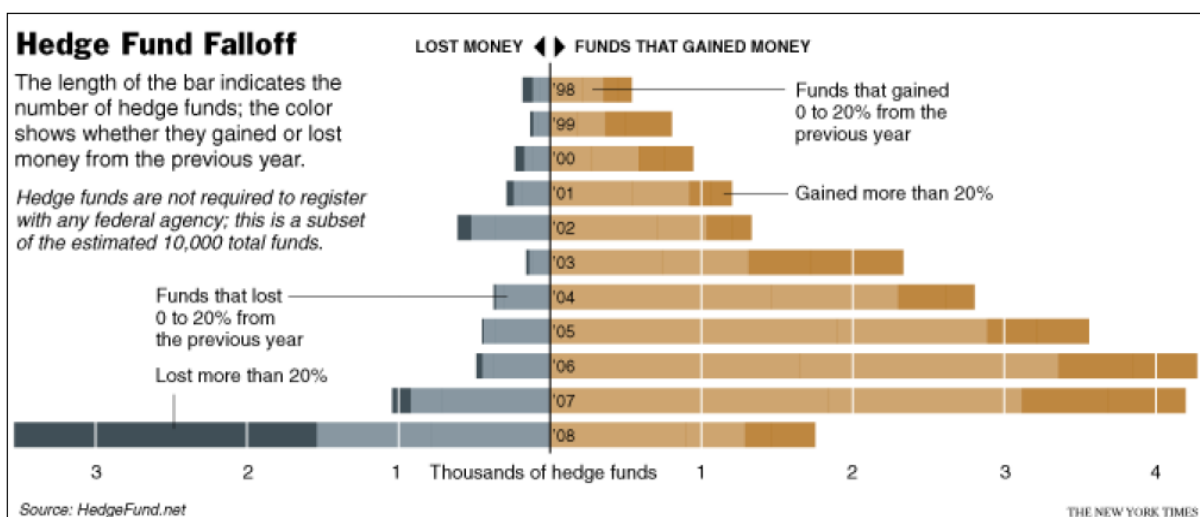


Figure 1: Amount and Performance of Hedge Funds from 1998 to 2008

Source: New York Times²⁸

In the first half of 2009 many hedge funds recovered from the previous year and performed positively again. The Credit Suisse/Tremont Hedge Index returned 7.2%.²⁹

Recently, hedge funds are one of the main subjects of discussion for politicians and economists because they are considered as a threat to financial systems.³⁰ Before the subprime credit crisis the discussions on hedge funds were mainly based on particular cases as for instance, George Soros' Quantum fund and the Long Term Capital Management hedge fund, but since the beginning of the subprime credit crisis the whole hedge fund industry became a subject for discussion. Section 7.1 explains the recent situation in the hedge fund industry in more detail.

2.3 Reasons to invest in Hedge Funds

According to Alexander M. Ineichen (2003) the value of any investment should be determined by prospective returns, risk and correlation to other investments. His opinion is that the diversification benefits and the potential to achieve high risk-adjusted returns of hedge funds cannot be achieved with traditional investments.³¹

²⁸ New York Times, link: http://www.nytimes.com/imagepages/2009/01/17/business/20090118_HEDGE_GRAPHIC.html, accessed: 04/04/09

²⁹ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf, accessed: 08/01/10

³⁰ Lutton (2008)

³¹ Ineichen (2003)

Magnum Funds mentions the following benefits of hedge fund investments:

- “Many hedge fund strategies have the ability to generate positive returns in both rising and falling equity and bond markets.
- Inclusion of hedge funds in a balanced portfolio reduces overall portfolio risk and volatility and increases returns.
- The huge variety of hedge fund investment styles – many uncorrelated with each other – provides investors with a wide choice of hedge fund strategies to meet individual investment objectives.
- Academic research shows hedge funds have higher returns and lower overall risk than traditional investment funds.
- Hedge funds can provide an ideal long-term investment solution, eliminating the need to correctly time entry and exit from markets.
- Adding hedge funds to an investment portfolio provides diversification not otherwise available in traditional investing.”³²

In a survey by Institutional Investor in 1994, institutional investors were asked for the reasons why they invested in hedge funds. Table 1 shows their results:

Rank	Reason
1	Superior performance
2	Diversification/hedging
3	Access to modern techniques and markets
4	Little regulation/high flexibility

Table 1: Reasons for Institutional Investors to invest in Hedge Funds

Source: Ineichen (2003), p. 135

Apart from all the advantages of hedge fund investments, we should always keep in mind that they also have some disadvantages.

³² Magnum Funds, link: <http://www.magnum.com/About.aspx?RowID=14>, accessed: 06/04/09

2.4 Disadvantages of Hedge Fund Investments

- The general aim of hedge funds is to deliver positive returns in rising and in falling markets. Therefore hedge funds do not always take advantage of growing markets but rather try to hedge long positions with short positions in order to be secure in falling markets. Hedge funds usually do not reach as high returns as long-only funds in rising markets but they still strive to achieve positive returns.³³
- Another drawback of hedge funds is the substantial manager-specific risk.³⁴ Hedge fund managers need a lot of knowledge, experience and discipline to manage such big pools of money with complex strategies and in even more complex markets. As positive market conditions do not challenge hedge fund managers to show their true abilities, it is very difficult to differentiate between a good and a bad performer. The greed of hedge fund managers can also be problematic for investors. The biggest part of a hedge fund manager's compensation depends on the performance of the fund, which gives the manager an incentive to increase risk in order to achieve better performance, but often the increase in risk does not result in higher performance but leads to devastating losses of the fund.³⁵
- Hedge funds are usually run by only one or two key managers who are able to coordinate quickly and to make quick investment decisions. The disadvantage of a low number of managers is that one of them or even the only existing hedge fund manager might leave the company which would have a very bad effect on the hedge fund.³⁶
- The last drawbacks hedge fund investors are confronted with are low liquidity and low transparency in the actions of hedge fund managers.³⁷ Those two characteristics of hedge funds are going to be explained in section 3.3 and 3.4.

³³ Frush (2006)

³⁴ Frush (2006)

³⁵ Fano-Leszczynski (2002)

³⁶ Frush (2006)

³⁷ Frush (2006)

3. Characteristics of Hedge Funds

I mentioned above that I prefer the hedge fund definition by Caslin (2004) over others. It includes all important characteristics and those in the need of more detailed explanations are described in this section.

3.1 Short Selling

Short selling became one of the main characteristics of hedge funds and even if hedge fund managers do not use short selling actively, they hold options to short sell in order to hedge risk.³⁸

According to de Brouwer (2001) "Short selling is the sale of an asset, such as a bond, equity or foreign currency that the vendor does not own. The vendor first borrows the asset from another party, with the promise of repaying it back at some future time, and then sells it. If the price of the asset has fallen by the time the vendor is due to repay it to the lender then he can buy it back in the market for less than he initially sold it. The profit is the selling price less the buying price and the cost of borrowing the asset."³⁹

The goal of short sellers is to buy cheaply and to sell at a high price whereas the unusual part about it is the fact that the sale comes before the purchase. Generally, short selling has been used since commodity markets exist. Whenever organized commodity markets were set up, traders tried to reduce risk by hedging prices. Some of the most legendary short sellers are Jesse Livermore, Bernard Baruch and Joseph Kennedy who actively started using short selling already at the beginning of the 20th century. In 1906 Livermore sold the stock of Union Pacific short one day before the terrible earthquake of San Francisco took place. He earned huge benefits from this horrifying event.⁴⁰

When stock markets are stable, short selling is seen as a mechanism to drive down economy's welfare, as short sellers bet on negative development and falling stock

³⁸ Fano-Leszczyński (2002)

³⁹ de Brouwer (2001), p. 9

⁴⁰ Fano-Leszczyński (2002)

prices and therefore harm the stockholders and the company.⁴¹ In times when stock markets fall, short sellers are seen as parasites who are the only ones who profit from the crisis. Short sellers are definitely not the most “popular” traders in the market because they take advantage of negative trends.⁴²

Proponents of short selling claim that it increases liquidity, facilitates information transfer and “improves risk sharing in the economy.”⁴³

Private investors as well as professional investors view short selling as highly speculative. In booming stock markets, losses for short sellers can be enormously high (far beyond 100%). Compared to short selling the biggest loss caused by long positions is 100% of the value of the stock because the stock price cannot fall below zero. The gain of the short seller is also limited to 100% although 100% gains are very unusual and even 50% gains are not very common. Due to the high risk of short selling the decision whether to short sell or not has to be thoroughly analyzed. Especially the overall market situation and the financial analysis of the company are important components of the decision making process.⁴⁴

The most difficult part of short selling is to forecast the exact point in time when the stock price is going to fall. Many short sellers carry out fundamental analyses and estimate the exact trend that the stock price is going to fall but often they short sell too early because they do not take into account that markets often react slowly.⁴⁵

As the short seller does not own the asset that he wants to sell, he is required to borrow it from some third party. This third party is usually a broker.⁴⁶ In the hedge fund environment these brokers are usually prime brokers like investment banks which offer tremendous amounts of assets to hedge funds. Besides brokerage, these prime brokers also offer further services to hedge funds such as financing, settlements of trades, risk management or operational support facilities. Apart from the earnings from stock lending for short selling activities they also earn from the lending of cash to support leverage.⁴⁷

⁴¹ Fano-Leszczynski (2002)

⁴² Fano-Leszczynski (2002)

⁴³ Charoenrook et al. (2008), p. 2

⁴⁴ Fano-Leszczynski (2002)

⁴⁵ Fano-Leszczynski (2002)

⁴⁶ Fano-Leszczynski (2002)

⁴⁷ Maslakov (2009)

Generally, the short seller is not required to make any new investments. He only has to hold cash or some other assets with high liquidity as collateral to the broker. If the stock price falls, also the collateral falls and the short seller can use the free assets and cash from the collateral to make new investments, but if the stock price rises the collateral that has to be provided by the short seller rises as well. The short seller has to pay all dividends during the period of borrowing the stock. For this reason he usually prefers to short sell stocks that pay low dividends. Mostly the broker is not the owner of the stocks but is also borrowing them from his clients.

There are mainly two risks arising from short selling⁴⁸

1. The price of the short sold stock does not fall but rises.
2. The short seller has to return the stock to the broker before he can close the position.

The three biggest mistakes of inferior short sellers are⁴⁹

1. They analyze companies and the market situation too superficially before choosing the stocks.
2. They short sell stocks of basically good corporations just because they are not performing well during a certain period of time.
3. Bad Timing – They start selling stocks too early or in order to signal to the public that the corporation will perform badly and this way try to make the stock prices drop.⁵⁰

Problems of short selling⁵¹

1. Historically, the natural market trend is a rising one which makes short selling more difficult.
2. The short seller has to find someone he can borrow the stock from.
3. The stock market introduces regulations to avoid short selling.

⁴⁸ Fano-Leszczyński (2002)

⁴⁹ Fano-Leszczyński (2002)

⁵⁰ Signalling information to the public is only possible if the short seller has lots of market power.

⁵¹ Fano-Leszczyński (2002)

Until 2007 the New York Stock Exchange only allowed the short sale of stocks which had already made an uptick (upward movement). This regulation was abolished, but the SEC thinks about reintroducing it in order to bring more stability into financial markets during the financial crisis.⁵²

The up-bid rule is an adaptation of the uptick rule, which only permits the short sale of a stock if a positive offer has been made. This rule was abolished as well, but due to the financial crisis the SEC is about to introduce it again. The SEC also considers introducing the so-called “circuit breakers” which come into effect when the stock price of a firm falls more than 10% in a short period of time. In this case the up-bid or the uptick rule would be applied for the stock.⁵³

Further aspects on short selling are discussed in section 7.2.

3.2 Leverage

As already mentioned before, the term leverage is commonly defined as the use of debt in order to acquire assets.⁵⁴ Leverage is a powerful component of most hedge funds because it intensifies gains as well as losses. The use of leverage is one of the most typical characteristics of hedge funds. Most hedge fund managers use leverage actively to realize their strategies while others who do not use it actively at least hold options to be able to make use of it.⁵⁵

According to Liang (1999) leverage is used by 83% of all hedge funds.⁵⁶

Well used leverage can significantly increase the performance of many hedge fund strategies compared to the same strategies without leverage. Some strategies even have to use leverage in order to reach their performance goals. The more leverage the hedge fund manager uses the more he should hedge in order not to increase the market exposure of his portfolio. Hedging the portfolio triggers a negative correlation to the market, the returns will be more predictable and the portfolio should achieve a better performance in falling markets. Most of the hedge fund managers' income is

⁵² HFN, link: <http://www.hedgefund.net/publicnews/default.aspx?story=9937>, accessed: 12/04/09

⁵³ HFN, link: <http://www.hedgefund.net/publicnews/default.aspx?story=9937>, accessed: 12/04/09

⁵⁴ de Brouwer (2001)

⁵⁵ Fano-Leszczynski (2002)

⁵⁶ Liang (1999)

predominantly based on performance. The more leverage they use the bigger is the potential that they will increase the returns of their funds and this way they receive a higher compensation. Therefore lots of hedge fund managers have the negative incentive to use too much leverage which causes huge trouble for themselves and for their investors if their strategies fail. Leverage cannot be evaluated as good or bad but it definitely increases risk and is a very powerful instrument which allows hedge fund managers' strategies to have a stronger impact.⁵⁷

To express leverage usually the ratio of assets to capital is applied. For instance, a ratio of four means that for every dollar of capital, the fund has 3 dollars of debt or every four dollars of assets are supported by one dollar of capital. This defines on-balance-sheet leverage, since capital, debt and assets are balance-sheet items. Providers of hedge fund data usually document leverage with the on-balance-sheet definition.⁵⁸

Another type of leverage is called economic leverage and arises from off-balance-sheet transactions. Such off-balance-sheet transactions are for example short positions. If a fund does a short sale on an asset, its corresponding liability does not appear on the balance sheet because the fund borrows the asset and sells it, although it still has an off-balance-sheet position or an exposure. Economic leverage is used as a measure of risk. Many hedge funds do not have much on-balance-sheet leverage but possibly lots of economic leverage due to a high off-balance-sheet exposure. There is no comprehensive information available about hedge funds' economic leverage.⁵⁹

Long Term Capital Management (LTCM), which was one of the most famous hedge funds in history, had a leverage ratio of 25 just before it collapsed.⁶⁰ LTCM tried to take advantage of small interest rate spreads between debt securities within European countries. Its strategy was mainly designed to pay off small returns but with very low volatility. Hence, it had to use a lot of leverage to reach its performance goals. As the fund was managed by renowned people from academia and Wall Street, banks were willing to provide LTCM with almost limitless credit to a very low cost. "From 1995-1997, LTCM had an annual average return of 33.7% after fees"⁶¹

⁵⁷ Fano-Leszczynski (2002)

⁵⁸ de Brouwer (2001)

⁵⁹ de Brouwer (2001)

⁶⁰ Connor et al. (2003)

⁶¹ Connor et al. (2003), p. 10

but during the Russian debt crisis of 1998 it “lost 90% of its value and experienced a severe liquidity crisis.”⁶² Due to the significant losses and the huge amount of borrowed capital that it used to realize its strategies an “emergency credit had to be arranged to avoid bankruptcy, the default of billions of dollars of loans, and the possible destabilisation of global financial markets.”⁶³ 14 investment houses and banks provided LTCM with this further credit in order to liquidate its holdings.⁶⁴

3.3 Limited Liquidity

Most hedge funds sell shares monthly.⁶⁵ The liquidation of these shares usually takes longer. Hedge funds only allow their clients to liquidate shares after a pre-specified period of time. At the start of the investment, the hedge fund usually imposes a lockup period, which defines the period during which the investor is not allowed to liquidate his share.⁶⁶

The duration of the lockup period is usually one year but some hedge funds invest in venture capital, which have lockup periods of up to five years.⁶⁷ According to the Union Bank of Switzerland (UBS), venture capital is invested to finance the initial stages of firms which seem to have major growth potential. The investment horizon for such investments is usually above three years which is the reason for longer lockup periods.⁶⁸

After the lockup period has expired the investor can withdraw his share by giving an advanced notice. As soon as the notice is given the investor has to wait until the pre-specified redemption period. The notice period is usually 30 days and in most cases redemption is possible at the end of every quarter.⁶⁹

⁶² Connor et al. (2003), p. 11

⁶³ Connor et al. (2003), p. 11

⁶⁴ Connor et al. (2003)

⁶⁵ Fano-Leszczyński (2002)

⁶⁶ Joenväärä et al. (2008)

⁶⁷ Fano-Leszczyński (2002)

⁶⁸ UBS, link: http://www.ubs.com/1/e/ubs_ch/kmu/foundation/capital.html, accessed: 23/04/09

⁶⁹ Joenväärä et al. (2008)

The market tends to shorter liquidation periods in order to attract more investors to invest in hedge funds. Compared to hedge funds, traditional investment funds normally allow liquidation on a daily basis.⁷⁰

One year lockup periods are common for U.S. hedge funds, but offshore hedge funds, which are funds that are established in countries with tax neutral jurisdictions,⁷¹ usually have shorter lockup periods and therefore offer more liquidity to their investors. The reason for long lockup and redemption periods is that most hedge fund strategies would not be applicable if the manager has to consider liquidating unlimited shares of the fund on a daily basis. Hedge funds use less liquid financial instruments than traditional investment funds. They even invest in stocks and bonds in a way which would lead to huge losses if the contracts would have to be terminated preliminary.⁷²

Another clause which is often included in hedge fund subscription contracts is that on a single day no more than, for instance, 25% of the overall assets of the hedge fund can be liquidated. If investors would like to liquidate more than 25%, then the rest would be paid out on a later date or the liquidation would happen in instalments.⁷³

An advantage for investors is the so called “key man” clause which allows investors of hedge funds to liquidate their shares immediately (enough time should be left to terminate the positions in accordance with the regulations) if a manager in a key position dropped out, died or could not continue his work due to health reasons.⁷⁴

Liang (1998) estimated that hedge funds with longer redemption and investment intervals perform better than those with shorter redemption and investment intervals as table 2 shows.

⁷⁰ Fano-Leszczyński (2002)

⁷¹ Maslakovic (2009)

⁷² Fano-Leszczyński (2002)

⁷³ Fano-Leszczyński (2002)

⁷⁴ Fano-Leszczyński (2002)

Monthly Returns and Investment Intervals and Redemption Intervals			
All 921 hedge funds have monthly returns that are net of all fees. There are 92 disappeared funds. Not all funds report the following descriptive statistics. 48 hedge fund indexes are excluded from the sample. All information is as of June 1997			
Panel A: Redemption interval			
Redemption Interval	Funds	Return	Std. Dev.
Semi-annual	33	1.96	1.69
Quarterly	269	1.53	1.66
Monthly	308	1.26	1.09
Weekly	48	0.79	0.96
Panel B: Investment interval			
Investment interval	Funds	Return	Std. dev.
Quarterly	198	1.57	1.10
Monthly	473	1.39	1.30
Weekly	49	1.17	2.31

Table 2: Comparison of monthly Hedge Fund Returns when Hedge Funds have different Redemption Intervals and Investment Intervals

Source: Liang (1998), p. 30

On the other hand Joenväärä et al. (2008) found that longer lockup and redemption periods lead to excessive risk taken by hedge fund managers which results in a lower Sharpe ratio⁷⁵ for these funds.⁷⁶

3.4 Conduct of Hedge Fund Managers

Hedge fund managers try to keep their positions as secret as possible in order not to tempt other money managers to imitate their strategies.⁷⁷ Keeping positions secret was possible before the subprime credit crisis because hedge funds were and still are treated differently legally than pension funds and mutual funds. But as a result of the subprime credit crisis additional disclosures for a better surveillance of hedge funds are under consideration.

⁷⁵ Sharpe ratio: Important performance measure for hedge funds which will be explained in section 5.3.1.

⁷⁶ Joenväärä et al. (2008)

⁷⁷ Ineichen (2003)

Institutional money managers have to report new short sales of particular publicly traded securities and they have already been required to disclose their long positions in those securities.⁷⁸

I already mentioned above that short positions have to be treated in a more sensitive way than long positions. Many hedge funds hold short positions in illiquid markets which offer better earning opportunities. The risk of illiquid markets and holding short positions in those markets is to be squeezed out of short positions which might end in a disaster for the overall portfolio performance.⁷⁹

“A short squeeze occurs when the lender of the borrowed shares wants to sell the stock. If the short-seller is unable to find an alternative lender, the short-seller must repurchase the shares in the open market to repay the loan and close the position.”⁸⁰ The risk of a short squeeze can generally be reduced and controlled by not disclosing the positions to the market.⁸¹

As a consequence of the subprime credit crisis, hedge funds will have fewer opportunities with short positions in illiquid markets because they will not be able to keep many of the new short positions secret.

In normal market situations hedge fund investors do not receive confidential information from the hedge fund manager; especially not the current positions the hedge fund manager holds. Stockholders are in a similar relationship to a company, because they also do not receive important information like the company's contracts with suppliers and its future projects.⁸²

Most future legal changes will aim to increase the transparency of hedge funds by forcing them to report on their actions. More transparency was already created before the financial crisis by institutional investors as they asked for more information about the actions of hedge funds due to their big portion of investments in these funds.⁸³

⁷⁸ SEC, link: <http://www.sec.gov/news/press/2008/2008-211.htm>, accessed: 09/04/09

⁷⁹ Ineichen (2003)

⁸⁰ Dechow et al. (2001), p. 80

⁸¹ Ineichen (2003)

⁸² Ineichen (2003)

⁸³ Ineichen (2003)

3.5 Minimum Investments

Minimum investments for hedge funds are generally high because “the number of investors who are not high net worth individuals”⁸⁴ is limited legally.⁸⁵ A frequently used minimum initial investment is US\$250,000 and subsequent investments are usually US\$100,000.⁸⁶ Hedge fund managers’ servicing costs are usually low because they have a small number of clients – all of them with large investments. This allows hedge fund managers to concentrate mainly on the trading and spend less time on fund promotion and client servicing.⁸⁷ Fund promotion and advertising is in any case prohibited for many hedge funds because they are often organized as private partnerships which are not allowed to promote.⁸⁸

3.6 Fees and Management Compensation

The high fees of hedge funds and the high management compensation for their managers are two of the main characteristics of hedge funds compared to traditional investment funds. They have a deterrent effect on many thrifty investors. Especially incentive fees, which do not exist for mutual fund managers make a huge difference because they are usually around 20% of the annual profits. Mutual fund managers usually receive their compensation from the management fee, which does not depend on the performance of the fund but on its volume. Therefore mutual fund managers generally receive a more stable compensation than hedge fund managers. Nevertheless, performance also matters for mutual fund managers as bad performance will lead to a loss of investors and consequently reduces the volume of the fund. In general, the volumes of most mutual funds are higher than those of hedge funds.⁸⁹

According to Stulz (2007), at year-end 2006 the largest mutual fund managed US\$161 billion of assets and the largest hedge fund US\$10 billion of assets.⁹⁰

⁸⁴ Connor et al. (2003), p. 16

⁸⁵ Connor et al. (2003)

⁸⁶ Liang (1999)

⁸⁷ Connor et al. (2003)

⁸⁸ Ineichen (2003)

⁸⁹ Fano-Leszczynski (2002)

⁹⁰ Stulz (2007)

The main focus of interest in hedge funds is the ability of hedge fund managers to achieve a good performance also in bad markets. The hedge fund manager therefore compensates himself with a big premium. In order to receive a big performance premium, managers might have an incentive to invest more aggressively and take excessive risk, however most managers have big portions of their own fortune in the fund. This leads to less risk taken by the managers as they are affected by the gains and losses of the fund as well.⁹¹

Generally, hedge fund investors have to pay three different types of fees:

1. Upfront Fee or Selling Fee

This fee has to be paid in order to undertake an investment in a hedge fund but in most cases bigger investors do not have to pay it. It also has to be paid when investing in traditional investment funds and is usually around 3-5%.⁹²

2. Management Fee

The management fee is usually around 1 or 2% of the volume of the fund. It does not depend on the performance of the fund and also exists for traditional investment funds.⁹³

3. Performance Fee

The percentage rate of performance fees for hedge fund managers is often around 20% of the hedge funds profits. In many cases a hurdle rate is used which only pays off a performance fee to the manager after a certain percentage rate of interest has been reached by the hedge fund.⁹⁴ Often the return of risk-free investments, such as short-term government bonds, is used as a hurdle rate.⁹⁵

⁹¹ Fano-Leschczynski (2002)

⁹² Fano-Leschczynski (2002)

⁹³ Fano-Leschczynski (2002)

⁹⁴ Fano-Leschczynski (2002)

⁹⁵ Connor et al. (2003)

We can distinguish between soft and hard hurdle rates:

1. Soft hurdle rate

In the case of soft hurdle rates the performance fee is calculated on the overall return of the hedge fund after the hurdle rate has been reached.⁹⁶

2. Hard hurdle rate

In the case of hard hurdle rates the performance fee is calculated by basing it only on the rate of return above the hurdle rate.⁹⁷

Therefore the hedge fund manager receives a bigger performance fee if a soft hurdle rate is used instead of a hard one.

Another frequently used term in connection with hedge fund managers' compensation is the **high water mark principle** which only pays a performance fee to hedge fund managers after the losses of their fund have been made up.⁹⁸ This principle guarantees that the manager of the fund does not receive a performance fee for gains which recover losses from previous time periods.⁹⁹

In comparison to the high watermark principle, hurdle rates are single period mechanisms.¹⁰⁰ Many hedge funds make use of the high water mark principle but only few have hurdle rates.¹⁰¹

According to the New York Times in the year 2008, 66% of all hedge funds made losses which obviously also reduced the earnings of their managers tremendously. The pool of earnings for the 25 best earning hedge fund managers was reduced to half the size in comparison to 2007. In 2008 they earned together US\$11.6 billion compared to US\$22.5 billion in 2007.¹⁰²

These are still tremendous amounts of money for the best compensated group of managers but we have to consider that the earnings in 2008 were small for most other managers compared to their usual earnings from previous years. According to the Alpha Magazine the average wage at a hedge fund in 2008 was US\$794,000

⁹⁶ Fano-Leszczynski (2002)

⁹⁷ Fano-Leszczynski (2002)

⁹⁸ Fano-Leszczynski (2002)

⁹⁹ Connor et al. (2003)

¹⁰⁰ Connor et al. (2003)

¹⁰¹ Henyep Wealth, link: http://www.hywealth.com/en/images/insight/hedge_fund_outlook.pdf, accessed: 30/03/09

¹⁰² Story (2009)

whereas in 2007 the average pay had been US\$940,000.¹⁰³ In 2008 the Credit Suisse/Tremont Hedge Fund Index lost 19.1% whereas in 2007 the Index gained 12.56%.¹⁰⁴

Due to the high water mark principle, managers' compensation in the coming years might continue to be low although hedge funds returned to perform positively in the first half of 2009.

A problem with incentive fees is their asymmetry with respect to the performance of hedge fund managers. They pay off a premium to the hedge fund manager if the fund performs well but if it makes losses the manager is not penalized. For this reason some hedge fund managers are inclined to excessive risk taking which led to a legal prohibition on asymmetric incentive fees for consumer-regulated investment funds in many countries.¹⁰⁵

3.7 Legal Environment

Since the beginning of the financial crisis in February 2007 the regulation of hedge funds has become a constant subject of daily economic news. One reason for the development of the crisis is definitely the superficial regulation of financial markets and the opportunity for financial managers to avoid regulations. Many people assume "that hedge funds are completely unregulated"¹⁰⁶, but fact is that hedge fund managers take advantage of exceptions in regulations.¹⁰⁷ Politicians all around the world are already looking for plans to regulate hedge funds and to make them more transparent to the public since they are seen as a threat to the stability of financial markets.¹⁰⁸ Many hedge funds are founded offshore in order to take advantage of the legal regulations of tax havens and of countries¹⁰⁹ which allow freedom in setting up the hedge fund.

¹⁰³ Rose-Smith (2009)

¹⁰⁴ Credit Suisse/Tremont Hedge Index, link: <http://www.hedgeindex.com>, accessed: 08/01/10

¹⁰⁵ Connor et al. (2003)

¹⁰⁶ Connor et al. (2003), p. 4

¹⁰⁷ Connor et al. (2003)

¹⁰⁸ Lutton (2008)

¹⁰⁹ Connor et al. (2003)

According to Fung and Hsieh (1999) the regulations are developed for the general public and are favourable for well financed and well informed hedge fund investors who enjoy exemptions from the regulations.¹¹⁰

3.7.1 Legal Environment for U.S. Hedge Funds

I am going to discuss the regulation of hedge funds in the U.S. in more detail because the U.S. is the centre of activities of hedge funds although according to International Financial Services London (IFSL) about half of the number of hedge funds was registered offshore at the end of 2008. The U.S. was the favoured onshore location, as it accounted for almost two-thirds of all onshore registrations, as displayed in figure 2.¹¹¹

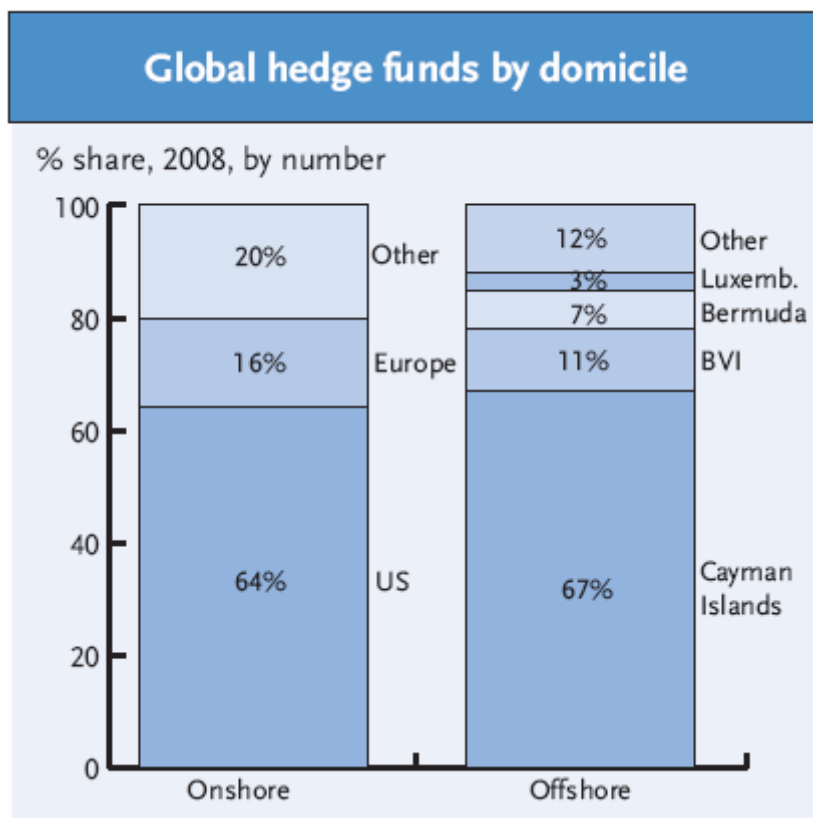


Figure 2: Onshore and Offshore Domiciles of Hedge Funds

Source: Maslakovic (2009), p. 7

¹¹⁰ Fung et al. (1999)

¹¹¹ Maslakovic (2009)

Almost all American hedge funds are organized as limited liability companies or limited partnerships.¹¹² Compared to most American hedge funds most offshore hedge funds with connections to the U.S. are established as corporations in Bermuda, the British Virgin Islands or in the Cayman Islands.¹¹³

Limited liability companies and limited partnerships allow pass-through tax treatment which means that the fund does not need to pay taxes on its returns, but the investment returns are passed through to the investors who bear the personal tax burdens. In the United States, hedge funds usually try to find exemptions from different SEC laws.¹¹⁴

Besides the SEC there also exists the Commodities Futures Trading Commission (CFTC) and the Federal Reserve to oversee the financial industries. The SEC is in charge of supervising publicly traded securities, the broker-dealers which help making the markets for securities and the corporations which issue securities. The CFTC oversees the industry for futures¹¹⁵ and the Federal Reserve supervises thrift industry and commercial banking. Hedge funds are not governed by the direct jurisdiction of the above three regulators because they are private investment partnerships for most institutional investors and other wealthy “investors who are regarded as “sophisticated”¹¹⁶ and are treated differently from the general investing public.”¹¹⁷

U.S. hedge funds look for exemptions from the Investment Company Act (1940), the Securities Act (1933), the Securities Exchange Act (1934) and the Investment Advisor Act (1940).¹¹⁸ The Investment Company Act (1940) was set up for mutual funds in order to protect investors from careless investment managers who would use too risky investment techniques (e.g. leverage). Exemptions from the Investment Company Act and its registration and disclosure requirements existed for funds which

¹¹² Fung et al. (1999)

¹¹³ Lutton (2008)

¹¹⁴ Connor et al. (2003)

¹¹⁵ A future is a standardized exchange-traded contract, which requires the delivery of a stock, bond, commodity or currency, at a predetermined price, on a predetermined future date. (InvestorWords, link: <http://www.investorwords.com/2134/futures.html>, accessed: 22/06/10)

¹¹⁶ Sophisticated investors are “investors whose ability to make informed investment decisions and to impose their own demands for information generally obviate federally-imposed disclosure requirements.” (Fraser, 2006, p. 806)

¹¹⁷ Fung et al. (1999), p. 315

¹¹⁸ Fung et al. (1999)

had less than 100 investors.¹¹⁹ A change in the legislation “increased the exemption to 499 investors, provided each has more than US\$5 million in assets.”¹²⁰

The most important law concerning hedge funds in the U.S. is the Securities Act from 1933¹²¹, which requires companies “issuing publicly traded securities to register with the SEC and file disclosure reports, to ensure that these firms provide the general public with all relevant information.”¹²² A hedge fund is exempted from most disclosure and registration requirements when it claims to be a private placement. To obtain this exemption the hedge fund is limited to 35 “nonaccredited” investors who do not achieve minimum wealth requirements.¹²³

According to Fraser (2006) accredited investors are:¹²⁴

- Registered broker-dealers
- Certain institutional investors
- The Employee Retirement Income Security Act and other employee benefit plans
- Organizations with tax exemptions and assets over US\$5 million
- Private business development companies
- Trusts with US\$5 million in total assets and investment decisions taken by a sophisticated investor
- Certain individuals who are associated with the issuer of the private offerings
- Individual investors whose net worth exceeds US\$1 million
- Individuals who had an income above US\$200,000 in each of the two most recent years

The easiest way to meet the requirements of the exemption is to make offerings only to wealthy investors.¹²⁵

The Securities Exchange Act (1934) empowers the SEC to regulate securities brokerage companies which trade on their own accounts and which face potential conflicts in the execution of customer orders. Therefore broker-dealers have the obligation to maintain records of their own as well as their customers' trades. Hedge

¹¹⁹ Connor et al. (2003)

¹²⁰ Fung et al. (1999), p. 316

¹²¹ Fano-Leszczynski (2002)

¹²² Fung et al. (1999), p. 315

¹²³ Connor et al. (2003)

¹²⁴ Fraser (2006), pp. 804-805

¹²⁵ Connor et al. (2003)

funds are exempted from the broker-dealer registration and its expensive reporting requirements, as long as their trades are on their own investment accounts.¹²⁶

The Investment Advisers Act (1940) requires managers of hedge funds or other firms and persons who give advice about security investments to register as investment advisers. Managers who are registered to this act are only allowed to “charge a performance-based incentive fee if the fund is limited to high net-worth individuals.”¹²⁷ As stated previously the performance-based incentive fee is the main remuneration for hedge fund managers. Therefore they try to find an exemption from the Investment Advisers Act or to offer only to high net-worth individuals. A hedge fund manager is exempted from the registration of the Investment Advisers Act as long as he does not offer business to the general public or not to more than 14 clients.¹²⁸ The costs arising from the registration to the Investment Advisers Act are fairly high due to reporting requirements and associated annual fees.¹²⁹ As a result of the increased activities of hedge funds, the SEC expanded the regulation of 1940’s Investment Advisers Act in 2004 by creating a compulsory registration provision for lots of hedge fund advisors.¹³⁰

Hedge funds which significantly use futures and commodities have to register at the CFTC. However, many hedge funds are exempted from several rules within the CFTC.¹³¹

3.7.2 Legal Environment for Hedge Funds outside the U.S.

As already mentioned, many of the non U.S. hedge funds are domiciled in tax-sheltering countries as Bermuda, the British Virgin Islands, Luxembourg, or the Bahamas. U.S. hedge funds often establish a complementary offshore fund in order to attract more capital without exceeding the limits of the SEC on U.S. investors.¹³²

In the U.K., the Financial Services Act of 1986 and the Public Offers of Securities Regulations of 1995 influence the establishment of U.K. situated hedge funds. The

¹²⁶ Fung et al. (1999)

¹²⁷ Connor et al. (2003), p. 5

¹²⁸ Fung et al. (1999)

¹²⁹ Fraser (2006)

¹³⁰ Fraser (2006)

¹³¹ Fano-Leszczyński (2002)

¹³² Brown et al. (1999)

Public Offers of Securities Regulations make restrictions on how hedge funds are structured to be private placements and the Financial Services Act concentrates on restrictions for marketing actions of hedge funds.¹³³

Legal structures for hedge funds in other countries deviate significantly. For instance, in Switzerland a hedge fund has few legal restrictions as soon as it is authorized by the Federal Banking Commission whereas French hedge funds are greatly restricted.¹³⁴

¹³³ Connor et al. (2003)

¹³⁴ Connor et al. (2003)

4. Classification of Hedge Funds

Hedge funds are very heterogeneous entities which are difficult to classify. Instead of a generally accepted classification of hedge funds, many different parties set up their own classification methods.¹³⁵

In 2003 a working group was established by the Alternative Investment Management Association in order to approach a more uniform hedge fund definition. The working group consisted of 72 members but only 36 participated in a survey on the classification of hedge funds.¹³⁶

The results in figure 3 show that most of the participants used an internal strategy to classify hedge funds (50% of the participants applied their own strategy classification, 47% used one or more classification systems from outside and 3% did not use any classification system because in their opinion they could not be classified). Entities which used internal classification strategies classified by geographical criteria, qualitative analysis and by many other standards.¹³⁷

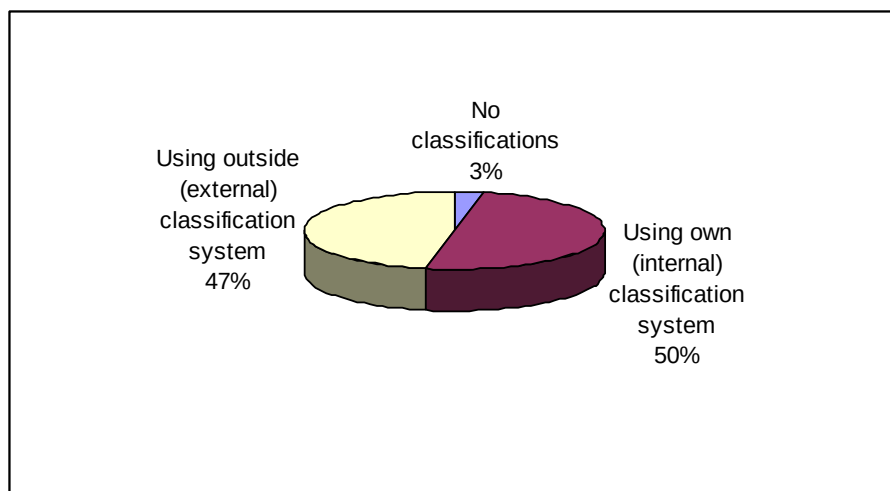


Figure 3: Distribution of Sources for the Classification of Hedge Funds

Source: Indjic et al. (2003), p. 2

¹³⁵ Ineichen (2003)

¹³⁶ Indjic et al. (2003)

¹³⁷ Indjic et al. (2003)

Most of the participants, who used outside classification, relied on one classification source whereas just a minority used two or more hedge fund classification sources.¹³⁸

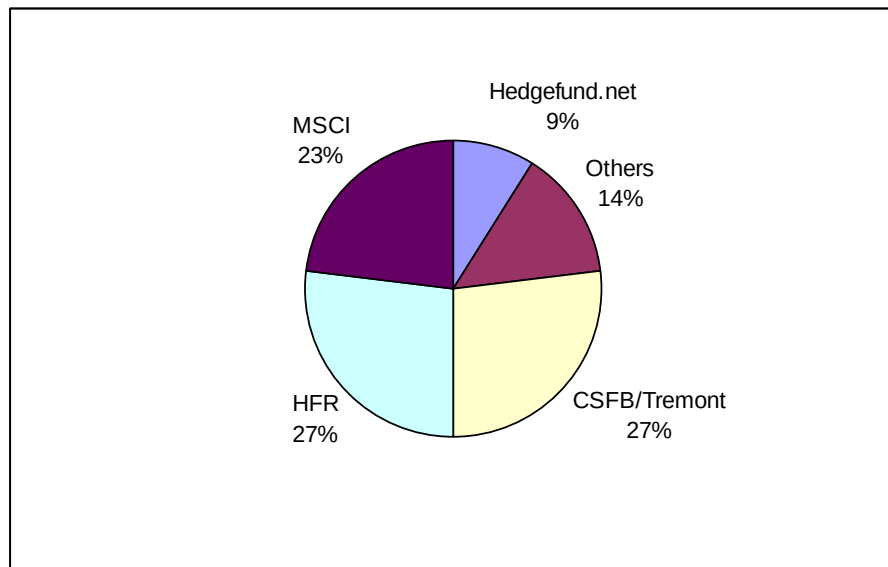


Figure 4: Distribution of External Classification Sources

Source: Indjic et al. (2003), p. 3

Figure 4 shows that most of the participants of the survey used Hedge Fund Research (HFR) and Credit Suisse First Boston/Tremont (CSFB/Tremont) as outside classification sources for hedge funds. Morgan Stanley Capital International (MSCI) was also used frequently as classification source. The “Others” category included Eurekahedge, the Center for International Securities and Derivatives¹³⁹ Markets (CISDM) and the Cogent Hedge database.¹⁴⁰ These outside classification sources categorise hedge funds by their investment strategies. Figure 6 illustrates the classification of hedge funds into different investment strategies by Credit Suisse/Tremont which was formerly CSFB/Tremont. These different investment strategies are going to be discussed subsequently in detail.

¹³⁸ Indjic et al. (2003)

¹³⁹ Derivatives are instruments that have their “value determined by, or derived from, the value of another investment vehicle, called the underlying asset or security.” (Reilly et al., 2006, p. 548), e.g. options and futures.

¹⁴⁰ Indjic et al. (2003)

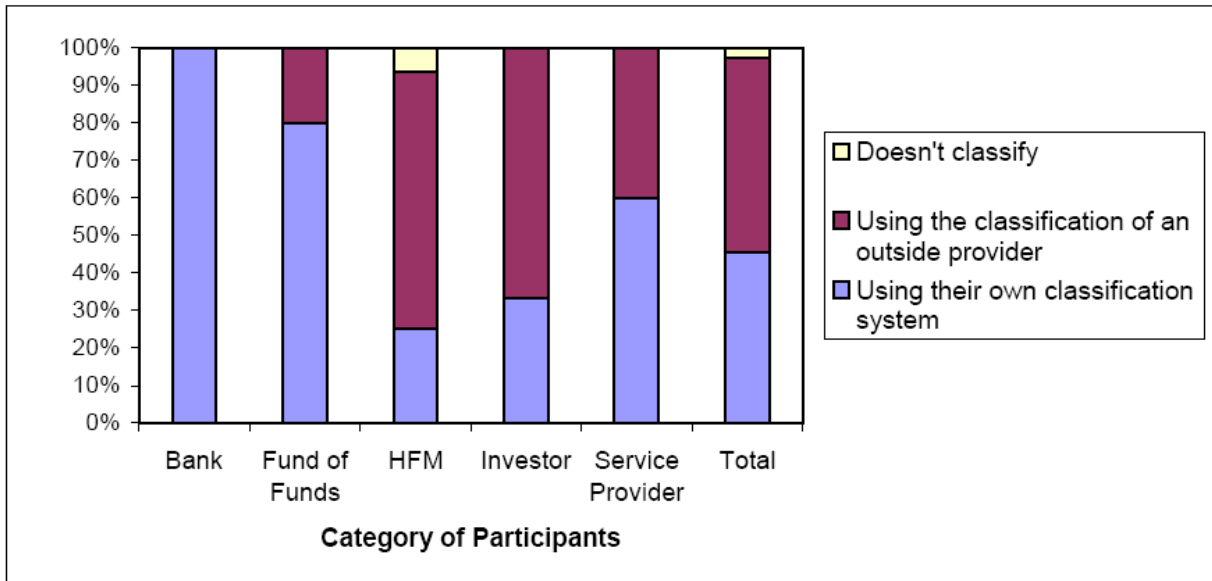


Figure 5: Sources of Classification by Category of Participants

Source: Indjic et al. (2003), p. 4

Figure 5 shows which group of participants of the survey used which kind of classifications and to what extent. Investors and hedge fund managers mainly relied on outside classification systems, while service providers (accountants, data vendors, lawyers, etc.) and fund of funds, which are funds that invest in different hedge funds, preferred to use internal sources.¹⁴¹

I am pursuing a style classification of Credit Suisse/Tremont which, in my opinion, is clear and explanatory. Section 7.4 provides a performance analysis of hedge funds in the subprime credit crisis which is also based on the style classification of Credit Suisse/Tremont.

¹⁴¹ Indjic et al. (2003)

Credit Suisse/Tremont divides hedge funds in the following strategies and sub-strategies¹⁴²

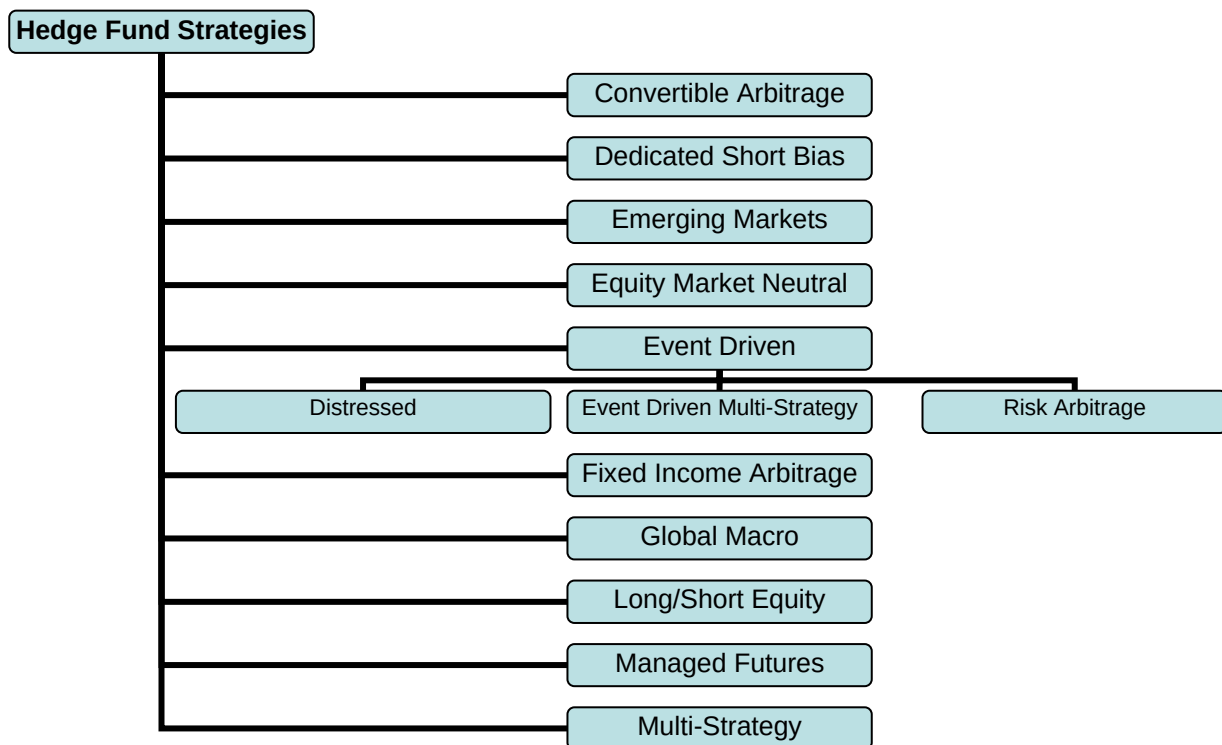


Figure 6: Hedge Fund Strategies

Source: <http://www.hedgeindex.com>

Some providers of hedge fund data, as for instance HFR, divide fund strategies in more sub-strategies in order to be more precise. In my opinion it is too sophisticated to divide hedge funds into 34 strategies and sub-strategies as HFR conducts it.¹⁴³

One tends to lose focus on the overall selected hedge fund strategy when hedge funds are divided into too many sub-strategies. The advantage of dividing into more strategies and sub-strategies is definitely the fact that more precise strategy returns can be calculated.¹⁴⁴ Hence there is a trade-off between the focus on the overall strategy and the preciseness of the individual strategy returns when the amount of strategies is chosen.

¹⁴² Credit Suisse/Tremont Hedge Index, link:

<http://www.hedgeindex.com/hedgeindex/en/indexoverview.aspx?indexname=HEDG&cy=USD>, accessed: 12/11/09

¹⁴³ Hedge Fund Research, link: <https://www.hedgefundresearch.com/index.php?fuse=indices-str&1239734719>, accessed: 14/04/09

¹⁴⁴ Hedge Fund Research, link: <https://www.hedgefundresearch.com/index.php?fuse=indices-str&1239734719>, accessed: 14/04/09

4.1 Convertible Arbitrage

Convertible arbitrage investors realize hedged investments in convertible securities of companies.¹⁴⁵ The concept of convertible securities is fairly simple: “A convertible bond is a regular corporate bond that has the added feature of being converted into a fixed number of shares of common stock.”¹⁴⁶ The terms and conditions of conversion are determined by the issuing company at issuance.¹⁴⁷

If the corporation’s stock price and the price of the convertible security “are not rising and falling together, there is an opportunity for the arbitrageur to take a long position in the convertible security, and a short position in the stock into which the convertible security is convertible. When the convertible security is selling at a price close to its investment value, and the price of the stock into which it is convertible is not at great discount, the arbitrageur may buy the convertible security and sell one-half of the stock short, leaving himself in the position of being theoretically long and short at the same time.”¹⁴⁸ By applying this form of arbitrage the investor is hedged against both a rise and “a fall of the stock, and any rise in the convertible security will be a profit.”¹⁴⁹

4.2 Dedicated Short Bias

“Dedicated short bias funds take more short positions than long positions and earn returns by maintaining net short exposure in long and short equities.”¹⁵⁰ This strategy does not try to take advantage of companies that perform well but instead looks for companies in trouble or tries to uncover fraudulent firms.¹⁵¹

¹⁴⁵ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 16/04/09

¹⁴⁶ Calamos (2003), p. 2

¹⁴⁷ Calamos (2003)

¹⁴⁸ Calamos (2003), p. 2

¹⁴⁹ Calamos (2003), p. 3

¹⁵⁰ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/secure/en/indexperformance.aspx?indexname=HEDG_DEDSH&cy=USD, accessed: 12/11/09

¹⁵¹ Black (2004)

4.3 Emerging Markets

An emerging market strategy specializes in equity and/or fixed income investments in emerging markets around the world. Many emerging markets prohibit short selling and do not offer derivative products or futures which accomplish the hedging. Therefore emerging market investments often employ long-only strategies.¹⁵²

4.4 Equity Market Neutral

Equity market neutral investors take advantage of inefficiencies in equity markets and usually their investment strategy involves having a balanced proportion of long and short equity portfolios within a country. Managers of market neutral portfolios intend to design the portfolio to be either currency neutral¹⁵³, beta¹⁵⁴ neutral, or both.¹⁵⁵ Well designed portfolios ordinarily control for market capitalization, sector, industry, and other exposures. This strategy also applies leverage to enhance returns.¹⁵⁶

4.5 Event Driven Strategies

Event driven strategies seek to profit from special events in the life of a company, such as reorganisations, bankruptcies or mergers and acquisitions. Considering the entire range of hedge fund strategies, event driven strategies have medium volatility and medium or low leverage.¹⁵⁷

4.5.1 Distressed

The distressed strategy refers to a strategy where the hedge fund manager invests in equity, debt or trade claims of firms in financial distress.¹⁵⁸ Typically these securities are bank debt, corporate bonds and trade claims, and to a lesser degree preferred

¹⁵² Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 17/04/09

¹⁵³ Currency neutral funds try to eliminate the fund's foreign currency exposure. (TD Mutual Funds, link: <http://www.tdam.com/Download/656-I.pdf>, accessed: 28/09/09)

¹⁵⁴ Beta measures the systematic risk of an asset. (Hull, 2006, p. 742)

¹⁵⁵ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 16/04/09

¹⁵⁶ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 16/04/09

¹⁵⁷ Garbaravicius et al. (2005)

¹⁵⁸ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 16/04/09

and common stock.¹⁵⁹ Hedge fund managers using this strategy prefer the use of debt securities to the use of equity securities because debt securities are treated senior to equity securities which in the case of bankruptcy would make debt investors better off.¹⁶⁰

The securities of firms which require restructuring or legal action to revitalize financial stability usually trade at considerable discount and therefore attract managers to invest if they believe that a turn-around of the company is at hand.¹⁶¹ Managers investing in this segment should have sophisticated knowledge in the area of distressed securities because those investments definitely bear significant risk as many companies issuing distressed securities end up filing for bankruptcy. In this case some of the distressed securities such as common stock become worthless. Sometimes large investors like hedge funds try to have an influence on the reorganization process of the company by injecting new capital in the company.¹⁶²

4.5.2 Event Driven Multi-Strategy

Event driven multi-strategy managers have the flexibility to invest in a number of event driven strategies. They take advantage of changes in economic cycles.¹⁶³ In this thesis I am explaining in detail the distressed and the risk arbitrage strategy which is described in section 4.5.3. A combination of these two strategies in a hedge fund would be an example for an event driven multi-strategy fund.

4.5.3 Risk Arbitrage

Hedge fund managers using the risk arbitrage strategy take long and short positions at the same time in companies involved in a merger or acquisition. They typically take a long position in the share of the company that is going to be acquired as its value tends to rise upon the happening of the acquisition and a short position in the share

¹⁵⁹ BarclayHedge, link: <http://www.barclayhedge.com/research/educational-articles/hedge-fund-strategy-definition/hedge-fund-strategy-distressed-securities.html>, accessed: 16/04/09

¹⁶⁰ Calamos (2003)

¹⁶¹ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 16/04/09

¹⁶² BarclayHedge, link: <http://www.barclayhedge.com/research/educational-articles/hedge-fund-strategy-definition/hedge-fund-strategy-distressed-securities.html>, accessed: 16/04/09

¹⁶³ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/secure/de/indexperformance.aspx?indexname=HEDG_EVDRV&cy=USD, accessed: 11/01/10

of the acquirer as the share price of the acquirer tends to decrease as the event of the acquisition is taking place.¹⁶⁴ The main risk of the risk arbitrage strategy which is also known as merger arbitrage strategy is the failure of the closing of the deal.¹⁶⁵

4.6 Fixed Income Arbitrage

The aim of fixed income arbitrageurs is to profit from anomalies in prices of related interest rate securities. Commonly managers make trades globally in order to generate solid returns with low volatility.¹⁶⁶ Rather than trying to guess movements in the market direction, fixed income arbitrageurs neutralize changes in interest rates and obtain their profits exclusively from their ability of identifying the mispricing of similar securities. Often the trades of this strategy entail futures and swaps.¹⁶⁷ A swap is “an agreement to exchange cash flows in the future according to a prearranged formula.”¹⁶⁸

4.7 Global Macro

Global macro managers hold “long and short positions in any of the world’s major capital or derivative markets.”¹⁶⁹ Portfolios of global macro funds can include currencies, stocks, bonds, and commodities in form of derivatives or cash instruments. The positions of global macro managers indicate their views and opinions on the overall market direction. Most global macro funds invest in both emerging and developed markets.¹⁷⁰

¹⁶⁴ BarclayHedge, link: <http://www.barclayhedge.com/research/educational-articles/hedge-fund-strategy-definition/hedge-fund-strategy-merger-arbitrage.html>, accessed: 16/04/09

¹⁶⁵ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 16/04/09

¹⁶⁶ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 16/04/09

¹⁶⁷ Nicholas (2005)

¹⁶⁸ Hull (2006), p. 757

¹⁶⁹ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 17/04/09

¹⁷⁰ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 17/04/09

4.8 Long/Short Equity

Long/short equity investors entail equity-oriented investments on the long and the short sides of markets.¹⁷¹ Primarily this investing strategy is used to take long positions in shares perceived undervalued and short positions in shares perceived overvalued.¹⁷² In comparison to the equity market neutral strategy, the aim is not being market neutral. Managers have the capability to shift from growth to value, from net long positions to net short positions, and from small to large capitalization stocks. They might also make use of derivatives for hedging. The focus can be sector specific as for instance long and short positions in healthcare or technology stocks or the concentration might be a regional one as investments in long/short European or U.S. equity. The focus on certain stocks of long/short equity funds tends to be higher than the one of traditional funds investing in stocks.¹⁷³

4.9 Managed Futures

According to some parties managed futures are hedge fund strategies but others classify managed futures as an independent alternative asset class. Although I would not consider managed futures as a hedge fund strategy, I am going to apply the Credit Suisse/Tremont database in section 7.4 which considers it as a hedge fund strategy. Therefore I am going to explain it briefly. Managed futures invest in listed commodity and financial futures markets as well as in currency markets around the world. Managed futures managers are generally known as Commodity Trading Advisors. Trading disciplines can be discretionary as well as systematic. Systematic traders usually use market and price specific information to make their trading decisions (trading decisions are often made by computer models) whereas discretionary traders apply a judgmental approach.¹⁷⁴

¹⁷¹ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 17/04/09

¹⁷² BarclayHedge, link: <http://www.barclyhedge.com/research/educational-articles/hedge-fund-strategy-definition/hedge-fund-strategy-equity-long-short.html>, accessed: 17/04/09

¹⁷³ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 17/04/09

¹⁷⁴ Reuters Hedgeworld, link: http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 22/04/09

4.10 Multi-Strategy

Multi-strategy hedge funds engage a multitude of investment strategies. Strategies employed in a multi-strategy hedge fund may include equity long/short, convertible arbitrage or risk arbitrage, but the fund is not limited to those strategies. The diversification in the strategies helps smoothing returns, reducing volatility and decreasing single strategy and asset-class risk.¹⁷⁵

4.11 Fund of Funds

The fund of funds strategy is not mentioned as a hedge fund strategy in the Credit Suisse/Tremont Hedge Fund Index but has become an interesting alternative to investing in a single hedge fund. This strategy invests in several hedge funds “selected, monitored and usually managed by an individual or a corporate body.”¹⁷⁶ The manager chooses the investment in different hedge funds and the allocation of funds to the fund of funds.¹⁷⁷

¹⁷⁵ EurekaHedge, link: http://www.eurekahedge.com/news/04may_archive_japan_multistrategy.asp, accessed: 22/04/09

¹⁷⁶ Caslin (2004), p. 70

¹⁷⁷ Caslin (2004)

5. Valuation of Hedge Funds

The two fundamental factors when deciding on an investment are risk and return. Each has to be “measured to assess and understand past performance”¹⁷⁸, and to persuade investors to undertake the investment. Of course, past results on risk and return are no guarantee for the later outcome but they might be a guideline for future investment decisions. Measuring past risk and return of investments in the case of hedge funds is difficult, as there is a “lack of standards on how to measure risk and return.”¹⁷⁹ In comparison to hedge funds, in the environment of traditional investments such standards which ensure investors for fair and full disclosure of investment results do exist. Often the lack of standards in the performance evaluation of hedge funds leads to conflicts and disputes between different parties because the views on performance evaluation vary strongly.¹⁸⁰

5.1 Measuring Returns

The simple net return R_{T_1, T_2} on a fund between time T_1 and $T_2 \geq T_1$ is defined as¹⁸¹

$$R_{T_1, T_2} = \frac{(NAV_{T_2} - NAV_{T_1})}{NAV_{T_1}}$$

NAV...Net Asset Value

Even though most investors are used to annual returns, hedge funds usually report monthly returns.¹⁸² To annualize hedge fund returns usually the compound annual growth rate is calculated. This technique is able to calculate annual returns when the holding period differs from a year.¹⁸³

$$\text{annualized return} = (1 + \text{holding period return})^{\text{number of holding periods in one year}} - 1$$

¹⁷⁸ Lhabitant (2004), p. 15

¹⁷⁹ Lhabitant (2004), p. 15

¹⁸⁰ Lhabitant (2004)

¹⁸¹ Lhabitant (2004), p. 27

¹⁸² Black (2004)

¹⁸³ Lhabitant (2004), p. 30

When calculating average returns of funds the question is whether to use arithmetic mean return or geometric mean return.

Arithmetic mean return is calculated as follows:¹⁸⁴

$$AMR = \frac{\sum_{t=1}^T R_t}{T}$$

R_t ...Return in time period t

T ...Total number of annual returns

Geometric mean return is determined as¹⁸⁵

$$GMR = \sqrt[T]{(1 + R_1)(1 + R_2) \dots (1 + R_T)} - 1$$

R_1 ...Return in time period 1

R_2 ...Return in time period 2

R_T ...Return in time period T

T ...Total number of time periods

Geometric and arithmetic mean returns give different results. Fund managers usually favour arithmetic mean returns because their results have higher values which make the fund look better. Yet, if the mean return needs to be calculated over several consecutive periods, the geometric mean works more precisely because it includes compounding effects.¹⁸⁶

According to an empirical analysis of Fung et al. (1997) the returns of hedge funds “have low correlation to the returns of mutual funds and standard asset classes.”¹⁸⁷ Their findings are based on the analysis of 3,327 U.S. mutual funds and on 409 hedge funds. These funds had to disclose return data for at least 36 months in order to become part of the sample.¹⁸⁸

¹⁸⁴ Francis et al. (2000), p. 316

¹⁸⁵ Francis et al. (2000), p. 300

¹⁸⁶ Lhabitant (2004)

¹⁸⁷ Fung et al. (1997), p. 277

¹⁸⁸ Fung et al. (1997)

In Section 7.4 I will discuss in details the return characteristics of the different hedge fund strategies in the subprime credit crisis.

5.2 Measuring Risk

Analyzing funds entirely on the basis of their average returns allows making comparisons but basing decisions on returns alone is not encompassing enough. The behaviour of two funds with equal mean returns may be very different. Hence there is the need for some additional measure(s) which indicate¹⁸⁹ the risk of investments. In finance, risk is “the uncertainty that an investment will earn its expected rate of return.”¹⁹⁰ Generally, higher rates of return can only be expected if higher risks are taken.¹⁹¹ “Risk is often understood to imply that the uncertainty is measurable, meaning that the return has a known probability distribution.”¹⁹² Usually risk is measured by the standard deviation¹⁹³ but there exist also other risk measures. Standard deviation is explained in section 5.2.1 and alternative risk measures such as downside deviation, value at risk and the concept of drawdown are explained in section 5.2.3.

5.2.1 Standard Deviation and Volatility

Standard deviation is the primary measure of risk for traditional investments. It measures the dispersion of a random variable around its mean, is commonly denoted by σ and is defined as¹⁹⁴

$$\sigma_X = \sqrt{E\{X - E(X)\}^2}$$

E ...Expected value

X ...Random variable

¹⁸⁹ Lhabitant (2004)

¹⁹⁰ Reilly et al. (2006), p. 47

¹⁹¹ Dichtl et al. (2000)

¹⁹² Ruppert (2004), p. 457

¹⁹³ Ruppert (2004)

¹⁹⁴ Ruppert (2004), p. 13

The unbiased estimator¹⁹⁵ of the sample standard deviation of returns is¹⁹⁶

$$\sigma = \sqrt{\frac{1}{T-1} \sum_{t=1}^T (R_{t-1,t} - \bar{R})^2}$$

T ...Number of observations

$\bar{R}$...Arithmetic mean of returns

When risk is measured by the standard deviation of the return it is called volatility.¹⁹⁷

Volatilities are usually expressed in annualized terms in order to compare them better.¹⁹⁸

Major drawbacks when calculating risk with volatility are:

1. "Positive and negative deviations from the average are penalized equally in the calculation process."¹⁹⁹
2. The method only makes sense if returns are normally distributed.²⁰⁰ Volatility values for investments can be the same even though these investments might have different skewness²⁰¹ and kurtosis²⁰² values.²⁰³

"Because many financial market returns, especially those used in hedge fund trading strategies, are not normally distributed,"²⁰⁴ analysts should "measure how the returns to their investment deviate from the assumption of a normal distribution."²⁰⁵ In order to do this they have to take the third and the fourth central moment of a distribution into account.²⁰⁶

The n^{th} central moment of a random variable X is defined as²⁰⁷

$$n^{th} \text{ central moment} = E\{X - E(X)\}^n$$

¹⁹⁵ An estimator is called unbiased if its expected value coincides with the real value of the (unknown) parameter which is estimated. (Ruppert, 2004)

¹⁹⁶ Lhabitant (2004), p. 43

¹⁹⁷ Ruppert (2004)

¹⁹⁸ Dichtl et al. (2000)

¹⁹⁹ Lhabitant (2004), p. 50

²⁰⁰ Lhabitant (2004)

²⁰¹ Skewness is explained in section 5.2.2.

²⁰² Kurtosis is explained in section 5.2.2.

²⁰³ Lhabitant (2004)

²⁰⁴ Black (2004), p. 56

²⁰⁵ Black (2004), p. 56

²⁰⁶ Lhabitant (2004)

²⁰⁷ Miller et al. (2004), p. 94

The zeroth central moment is²⁰⁸

$$E\{X - E(X)\}^0 = 1$$

The first central moment is²⁰⁹

$$E\{X - E(X)\}^1 = 0$$

The lowest central moment of real interest is the second central moment, the variance.²¹⁰

$$\sigma_X^2 = E\{X - E(X)\}^2$$

The third central moment is called skewness and the fourth central moment is known as kurtosis.²¹¹

5.2.2 Skewness and Kurtosis

Skewness measures the degree of asymmetry²¹² of a return distribution around its mean.²¹³ The skewness of a random variable X is defined as²¹⁴

$$Sk = \frac{E\{X - E(X)\}^3}{\sigma^3}$$

²⁰⁸ Miller et al. (2004), p. 94

²⁰⁹ Miller et al. (2004), p. 94

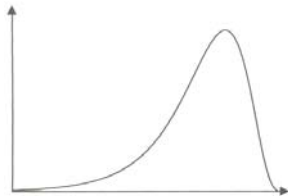
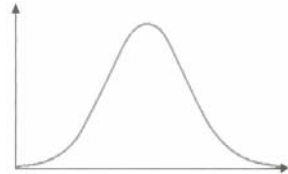
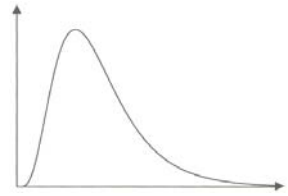
²¹⁰ Miller et al. (2004), p. 94

²¹¹ Miller et al. (2004)

²¹² Ruppert (2004)

²¹³ Lhabitant (2004)

²¹⁴ Ruppert (2004), p. 26

Skewness of the distribution	Explanation	Graph of density function
Negative Skewness	A negatively skewed distribution accrues from many small gains but larger losses ²¹⁵	Figure 7: Negatively skewed Distribution  Source: Dichtl et al. (2000), p.142
Zero Skewness	The skewness of a symmetric distribution is 0 (e.g. normal distribution)	Figure 8: Symmetrical Distribution: Zero Skewness  Source: Kohler (2002), p.259
Positive Skewness	A positively skewed distribution accrues from many small losses but larger gains ²¹⁶	Figure 9: Positively skewed Distribution  Source: Dichtl et al. (2000), p.142

An unbiased estimator of the skewness of returns is²¹⁷

$$Sk = \frac{T}{(T-1)(T-2)} \sum_{t=1}^T \left(\frac{R_{t-1,t} - \bar{R}}{\sigma} \right)^3$$

T Number of observations

²¹⁵ Lhabitant (2004)

²¹⁶ Lhabitant (2004)

²¹⁷ Lhabitant (2004), p. 47

Investors prefer positively skewed return distributions over normally distributed return distributions since positively ones have a higher probability for positive returns. Negative skewness might arise from funds which perceive significant event risk.²¹⁸

According to Kat (2003) the returns of hedge funds tend to deviate significantly from a normal distribution and expose, apart from the global macro strategy, significant negative skewness. These findings are based on returns of individual hedge funds from 1994-2001.²¹⁹

Agarwal et al. (2000) observed that all hedge fund strategies apart from the global macro and the short bias strategy generate negative average skewness. They based their survey on 586 hedge funds from the HFR Database and analysed these funds from January 1990 until October 1998.²²⁰

Kurtosis “measures the degree of peakedness and heaviness of the tails of a distribution.”²²¹ The tails of a distribution are the regions far from the center. The kurtosis of a random variable X is defined as²²²

$$K = \frac{E\{X - E(X)\}^4}{\sigma^4}$$

Every normal distribution has a kurtosis coefficient of 3. The excess kurtosis of a distribution which measures the deviation of a distribution's kurtosis from the kurtosis of a normal distribution is $K-3$.²²³

An unbiased estimator of the excess kurtosis of returns is²²⁴

$$excess\ kurtosis = \frac{T(T+1)}{(T-1)(T-2)(T-3)} \sum_{t=1}^T \left(\frac{R_{t-1,t} - \bar{R}}{\sigma} \right)^4 - \frac{3(T-1)^2}{(T-2)(T-3)}$$

T Number of observations

²¹⁸ Black (2004)

²¹⁹ Kat (2003)

²²⁰ Agarwal (2000)

²²¹ Lhabitant (2004), p. 47

²²² Ruppert (2004), p. 26

²²³ Ruppert (2004)

²²⁴ DeFusco et al. (2007), p. 124

Distributions with positive excess kurtosis are called leptokurtic. In terms of shape, leptokurtic distributions have longer, fatter tails and are more peaked around the mean. A fat-tailed distribution has a higher probability of extreme values than a normal distribution. Distributions with negative excess kurtosis are called platykurtic. In terms of shape, platykurtic distributions have lower, wider peaks around the mean and thinner tails.²²⁵ The normal distribution has a mesokurtic distribution.²²⁶ Figure 10 illustrates kurtosis graphically.

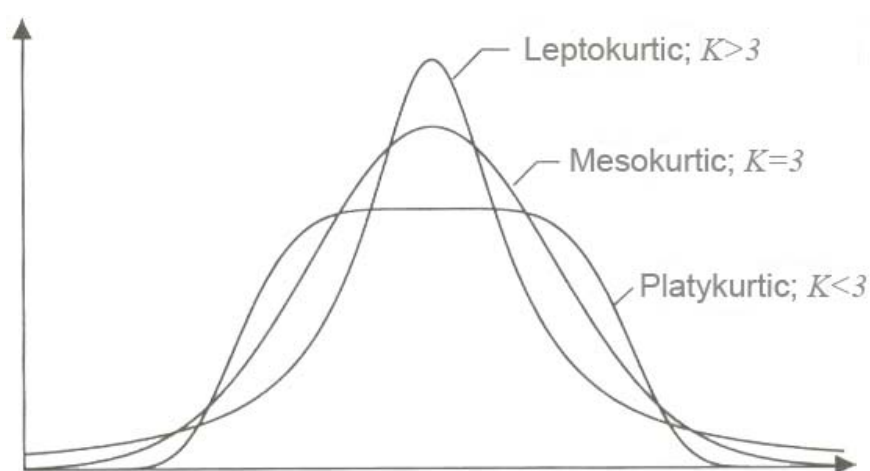


Figure 10: Illustration of Kurtosis

Source: Dichtl et al. (2000), p. 143

According to Agarwal et al. (2000) hedge fund strategies show significant positive kurtosis values which indicate that many return values tend towards the extremes. They based their survey on 586 hedge funds from the HFR Database and analysed these funds from January 1990 until October 1998.²²⁷

Kat (2003) found that the inclusion of hedge funds in traditional investment fund portfolios leads to significantly higher kurtosis. His findings are based on returns of individual hedge funds from 1994-2001.²²⁸

I mentioned above that volatility is a good risk measure for normally distributed returns.²²⁹ Therefore one should check if the returns are normally distributed or not. A number of statistical tests help to solve this problem. A commonly used test is the

²²⁵ Wikipedia, link: <http://en.wikipedia.org/wiki/Kurtosis>, accessed: 07/06/10

²²⁶ Kohler (2002)

²²⁷ Agarwal (2000)

²²⁸ Kat (2003)

²²⁹ Black (2004)

Jarque-Bera (JB) test which includes skewness and excess kurtosis in its calculations and determines whether the data are normally distributed or not.²³⁰

Jarque-Bera Test:²³¹

$$JB = \frac{T}{6} \left[skewness^2 + \frac{excess\ kurtosis^2}{4} \right]$$

This statistical test “follows a chi-square distribution with two degrees of freedom.”^{232, 233} If the value calculated from the JB function is larger than a relevant critical value which depends on the level of significance, “the null hypothesis of asymptotic normality is rejected.”²³⁴ For example, if the level of significance is 5% then the critical value is 5.99 and “for a level of significance of 1%, the critical value is 9.21”²³⁵. The Jarque-Bera test is not appropriate for rather small samples.²³⁶

5.2.3 Alternative Risk Measures

Originating from the disadvantages of volatility as risk measure, researchers and investors developed alternative risk measures.²³⁷

“Downside risk measures attempt to define risk more in accordance with the investor’s perception.”²³⁸ They measure only the variability of returns underneath a prespecified target because returns above this prespecified target describe rather an opportunity than a risk.²³⁹ One of those downside risk measures is downside deviation. The formula for downside deviation “is essentially the formula for standard deviation with the favourable deviations omitted.”²⁴⁰

²³⁰ Lhabitant (2004)

²³¹ Vogelvang (2005), p. 115

²³² The degrees of freedom determine “the number of independent pieces of information that enter the computation of a given statistic.” (Kohler, 2002, p. 510) “For each possible number of degrees of freedom” (Kohler, 2002, p. 603) there exists a different chi square distribution. “Even though all chi-square distributions are skewed” (Kohler, 2002, p. 603) positively, “the extent of skewness decreases with increasing numbers of degrees of freedom.” (Kohler, 2002, p. 603)

²³³ Lhabitant (2004), p. 48

²³⁴ Lhabitant (2004), p. 48

²³⁵ Lhabitant (2004), p. 48

²³⁶ Lhabitant (2004)

²³⁷ Lhabitant (2004)

²³⁸ Lhabitant (2004), p. 50

²³⁹ Lhabitant (2004)

²⁴⁰ McCrary (2005), p. 119

Downside deviation is computed as²⁴¹

$$\text{downside deviation} = \sqrt{\frac{\sum_{t=1}^T \min(R_t - R^*, 0)^2}{T - 1}}$$

T ...Number of observations

R_t ...Return in each period t

R^* ...Treshold return which is often set to the historical mean return²⁴²

Another, quite recent measure of risk used in finance is value at risk (VaR).

According to Lhabitant (2004) “the value at risk of a position is the maximum amount of capital that the position can expect to lose within a specified holding period (e.g. 10 days or one month) and with a specified confidence level (e.g. 95% or 99%).”²⁴³

VaR is more often displayed in percentage rates than in total dollar amounts. Many financial institutions use VaR as their standard risk management tool. A disadvantage of VaR is that it does not contribute any information on the loss beyond the loss of the expected normal market conditions.²⁴⁴

Another measure of risk is the concept of drawdown, “which is defined as the decline in net asset value from the highest historical point.”²⁴⁵ All historical returns, since the existence of the asset, should be taken into account when the concept of drawdown is calculated. However, when drawdown statistics of different assets are compared, the same time period should be used. Like the VaR approach drawdown statistics are also very often displayed in percentage rates.²⁴⁶

The Credit Suisse/Tremont database includes drawdown statistics since its inception in 1994. It calculates an assets decline from its peak month in percentage rates and the decline duration as well as the recovery duration in months.²⁴⁷

²⁴¹ McCrary (2005), p. 119

²⁴² Scharfen (2008)

²⁴³ Lhabitant (2004), p. 53

²⁴⁴ Lhabitant (2004)

²⁴⁵ Lhabitant (2004), p. 55

²⁴⁶ Lhabitant (2004)

²⁴⁷ Lhabitant (2004)

There are several ways of declaring drawdown statistics. An *individual drawdown* refers generally to each losing period within an investment record. The *maximum drawdown* is the maximum loss that an investor experienced during a specific period of time. The *uninterrupted drawdown* determines the strength and length of an uninterrupted decline. The drawdown duration defines the time it takes to reach the original level after a drawdown. Hedge fund managers often disclose drawdown statistics voluntarily to indicate their track records' quality.²⁴⁸

5.2.4 Covariance and Correlation

Covariance and Correlation are statistical concepts frequently used in finance. They quantify the linear interdependence between two random variables.²⁴⁹

The covariance between two random variables X and Y is²⁵⁰

$$\sigma_{XY} = E[\{X - E(X)\}\{Y - E(Y)\}]$$

Covariance is used "to calculate the variance of a linear combination (weighted average) of two random variables."²⁵¹

The correlation coefficient between X and Y is²⁵²

$$\rho_{XY} = \frac{\sigma_{XY}}{\sigma_X \sigma_Y}$$

Correlation is covariance with the size effect removed.²⁵³ The correlation coefficient always lies between -1 and +1 where -1 would indicate a perfect negative linear relationship between X and Y and +1 indicates a perfect positive linear relationship between X and Y .²⁵⁴

²⁴⁸ Lhabitant (2004)

²⁴⁹ Lhabitant (2004)

²⁵⁰ Ruppert (2004), p. 38

²⁵¹ Ruppert (2004), p. 451

²⁵² Ruppert (2004), p. 38

²⁵³ Ruppert (2004)

²⁵⁴ Reilly et al. (2006)

A positive covariance between the rates of returns of two investments indicates they “tend to move in the same direction relative to their individual means during the same time period.”²⁵⁵ A negative covariance implies “that the rates of return for two investments tend to move in different directions relative to their means during specified time intervals over time.”²⁵⁶

Investors search for investments that are different from the ones they already own in order to benefit from diversification. Correlation identifies diversification benefits and should be taken into account when new assets are chosen for an investor’s portfolio.²⁵⁷ The decrease in correlation reduces the overall portfolio risk.²⁵⁸

The rule of correlation is simple: “low correlation makes for good diversification and highly correlated assets or asset classes”²⁵⁹ should be avoided. To achieve low correlation, investors allocate assets among different asset classes²⁶⁰ and invest on an international basis as the correlation among international stock and bond markets is fairly low.²⁶¹ Some hedge funds attract investors because of their low reported correlations to traditional investment products. Most hedge funds with arbitrage strategies show very little correlation to broad market movements.²⁶²

Correlation is the right measure of dependence if the return distributions of both assets are normally distributed.²⁶³ Many hedge fund strategies do not express normally distributed return distributions, since they employ financial instruments such as put²⁶⁴ and call²⁶⁵ options or short selling which lead to return distributions that have a negative skewness and a positive excess kurtosis.²⁶⁶ Hence the correlation of hedge funds with other asset classes might be notably biased.²⁶⁷

²⁵⁵ Reilly et al. (2006), p. 214

²⁵⁶ Reilly et al. (2006), p. 214

²⁵⁷ Banz et al. (2002)

²⁵⁸ Boucrelle et al. (1996)

²⁵⁹ Kat (2002), p. 2

²⁶⁰ Reilly et al. (2006)

²⁶¹ Boucrelle et al. (1996)

²⁶² Banz et al. (2002)

²⁶³ Kat (2002)

²⁶⁴ “A put option gives the holder the right to sell the underlying asset by a certain date for a certain price.” (Ullrich, 2009, p. 119)

²⁶⁵ “A call option gives the holder the right to buy the underlying asset by a certain date for a certain price.” (Ullrich, 2009, p. 119)

²⁶⁶ Agarwal et al. (2004)

²⁶⁷ Lhabitant (2004)

5.2.5 Beta

An asset's total risk can be divided into unsystematic risk and systematic risk. Unsystematic risk can be eliminated through diversification and systematic risk is "nondiversifiable" as it is related to the movement of a market portfolio and is therefore unavoidable.²⁶⁸ According to Reilly et al. (2006), beta is defined as "a standardized measure of systematic risk based on an asset's covariance with the market portfolio."²⁶⁹

Beta of asset X is defined by the following equation:²⁷⁰

$$\beta_x = \frac{\sigma_{xM}}{\sigma_M^2}$$

σ_{xM} ...Covariance between the returns on the x^{th} asset and the market portfolio

σ_M ...Variance of the market portfolio

Stock market indices are often used as a proxy for the market portfolio. A fund's "beta is calculated through a regression between the returns of the fund and returns on"²⁷¹ a benchmark. If a fund performs identically to the benchmark it has a beta value of 1.0 (e.g.: The fund should increase by 10% when the benchmark increases by 10%).²⁷² Funds with beta values greater than 1.0 are considered as aggressive and funds with beta values less than 1.0 are considered as not aggressive.²⁷³

5.3 Risk-adjusted Performance Measures

Many valuations of hedge funds entirely concentrate on their total returns without considering risk measures or risk-adjusted performance. Risk-adjusted performance measures help to compare funds with different risk characteristics.²⁷⁴ The four most applied risk-adjusted performance measures are the Sharpe ratio, the Sortino ratio, the Treynor ratio and Jensen's alpha.

²⁶⁸ Mullins (1982)

²⁶⁹ Reilly et al. (2006), p. 271

²⁷⁰ Ruppert (2004), p. 230

²⁷¹ Black (2004), p. 56

²⁷² Lhabitant (2004)

²⁷³ Ruppert (2004)

²⁷⁴ Lhabitant (2004)

5.3.1 Sharpe Ratio

The Sharpe ratio, which was formulated in 1966 by Nobel Prize winner William Sharpe is the most frequently used risk-adjusted performance measure.²⁷⁵ It measures the excess return of a portfolio compared to the return on a risk-free asset per unit of volatility. “It is calculated by dividing the excess return of the fund by its volatility.”²⁷⁶

$$\text{Sharpe ratio}_P = \frac{R_P - R_F}{\sigma_P}$$

R_P ...Average Return on portfolio P

R_F ...Return on a risk-free asset

σ_P ...Standard deviation of returns on portfolio P

A high value of the Sharpe ratio indicates that the fund generated “a high return for its level of volatility.”²⁷⁷ If the Sharpe ratio is 1.0, the return is matching the risk taken to achieve that return and if the Sharpe ratio is lower than 1.0, the return on investment is lower than the obtained risk.²⁷⁸ It is very important which risk-free rate is used for the calculation because if different risk-free rates are used, the Sharpe ratios of two funds cannot be compared correctly.²⁷⁹

In theory the risk-free rate is “the rate at which money is borrowed or lent when there is no credit risk, so that the money is certain to be repaid.”²⁸⁰ In practice “the risk-free rate does not exist because even the safest investments carry a very small amount of risk.”²⁸¹ Still, most financial institutions assume that the interest rates on treasury bonds and treasury bills “are the correct benchmark risk-free rates.”²⁸² Risk-free rates of interest vary from market to market.

According to Black (2004) the Sharpe ratios of absolute-return funds such as hedge funds should be significantly higher than the Sharpe ratios of traditional investment funds and relative-return funds.²⁸³ In comparison to traditional investment funds

²⁷⁵ Lhabitant (2004)

²⁷⁶ Lhabitant (2004), p. 65

²⁷⁷ Lhabitant (2004), p. 66

²⁷⁸ Lhabitant (2004)

²⁷⁹ Fano-Leszczynski (2002)

²⁸⁰ Hull (2006), p. 101

²⁸¹ Investopedia, link: <http://www.investopedia.com/terms/r/risk-free-rate.asp>, accessed: 20/01/10

²⁸² Hull (2006), p. 77

²⁸³ Black (2004)

absolute-return funds do not try to achieve investment returns relative to a benchmark, but try to earn positive returns in rising and falling markets.²⁸⁴ Hence absolute-return strategies try to outperform the risk-free rate in every time period. Frequently relative-return strategies are more volatile. Therefore they often fail to outperform the risk-free rate of interest and show negative returns which both produce a negative Sharpe ratio. This implies that the Sharpe ratio of absolute-return funds will be positive in more periods than the Sharpe ratio of relative-return funds.²⁸⁵

According to Liang (1999), the Sharpe ratios of hedge funds are higher than the Sharpe ratios of mutual funds. In his study he found that hedge funds have an average Sharpe ratio of 0,364 and mutual funds of 0,168. His findings are based on 385 hedge funds from the HFR database and 4,776 mutual funds from the Morning Star Inc. database. He analyzed these funds between January 1994 and December 1996.²⁸⁶

5.3.2 Sortino Ratio

The Sortino ratio is “calculated as the returns in excess of the risk-free rate divided by the downside deviation of returns.”²⁸⁷ In comparison to the Sharpe ratio it only includes downside risk in its calculations. The Sortino ratio identifies funds with high upside volatility better than the Sharpe ratio. In comparison to the Sharpe ratio, the Sortino ratio has higher values because the used risk measure includes only a part of the overall deviations from the mean in the calculation.²⁸⁸

²⁸⁴ Macquarie Group, link: http://personal.macquarie.com.au/personal/investment_strategies/accelerate_wealth/alt_long_term/absolute_return_funds_detail.htm, accessed: 02/02/09

²⁸⁵ Black (2004)

²⁸⁶ Liang (1999)

²⁸⁷ Black (2004), p. 53

²⁸⁸ Black (2004)

It is defined by the following expression:²⁸⁹

$$\text{Sortino ratio} = \frac{R_P - R_F}{\text{downside deviation}_P}$$

The Sortino ratio and the Sharpe ratio tend to rank hedge fund strategies in a very similar way.²⁹⁰

5.3.3 Treynor Ratio

The Treynor ratio and Jensen's alpha both are based on the Capital Asset Pricing Model (CAPM).²⁹¹

The Treynor ratio is calculated by "dividing the return in excess of the risk-free rate by the beta of the fund."²⁹²

$$\text{Treynor ratio} = \frac{R_P - R_F}{\beta_P}$$

The Treynor ratio is not an appropriate risk-adjusted performance measure for many hedge funds because many hedge fund strategies do not have a benchmark, or the returns of "these strategies are uncorrelated to traditional benchmarks"²⁹³ which results in a beta that is close to zero. Therefore "a measure that computes the risk of the fund using only beta will be inappropriate."²⁹⁴ Nonetheless, the Treynor ratio is a quite appropriate performance measure for long-only hedge funds which are benchmarked to traditional investment indices.²⁹⁵

²⁸⁹ Black (2004), p. 53

²⁹⁰ Black (2004)

²⁹¹ Black (2004)

²⁹² Black (2004), p. 56

²⁹³ Black (2004), p. 56

²⁹⁴ Black (2004), p. 56

²⁹⁵ Black (2004)

5.3.4 Jensen's Alpha

CAPM declares that in market equilibrium all assets lie on the Security Market Line if they are priced fairly, see figure 11.

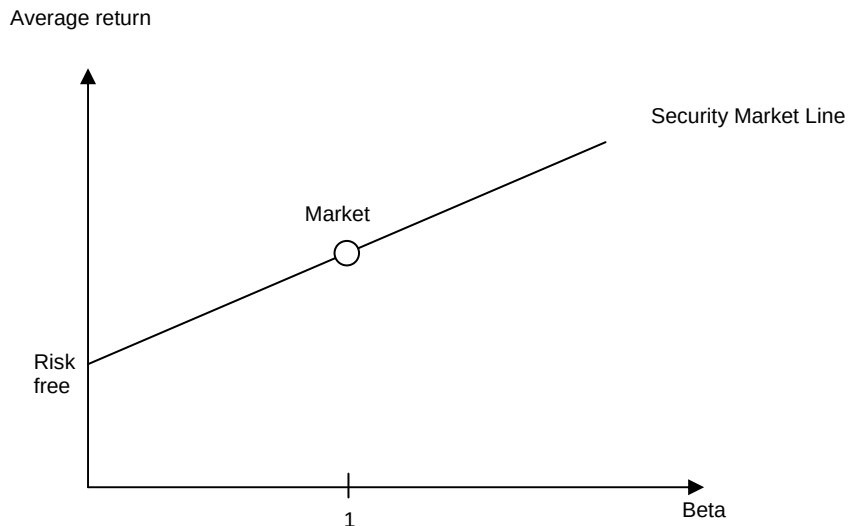


Figure 11: Security Market Line

Source: Lhabitant (2004), p. 71

If the return of an asset is higher than it is supposed to be for the given beta, investors will be inclined to buy the asset, which will drive the price up, lower the return and return it to the Security Market Line. If an asset is located below the Security Market Line, investors will be inclined to sell the asset which will drive the price down, increase the return and return the asset to the Security Market Line.²⁹⁶

Active fund managers typically search for assets which deviate from the Security Market Line. They try to identify these assets and attempt to profit from the mispricing. The returns of successful managers will be above the returns that could be expected for the given level of market risk and the returns of unsuccessful managers will be below the returns that could be expected for the given level of market risk. Consequently the portfolios of good managers will lie above the Security

²⁹⁶ Lhabitant (2004)

Market Line and the portfolios of bad managers will lie below the Security Market Line.²⁹⁷

Jensen's alpha measures performance based on the theory above as it "is defined as the difference between the realized return and the return predicted by the CAPM."²⁹⁸

$$\alpha_p = R_p - E^{CAPM}(R_p)$$

Equivalent to the other ratios a higher value of Jensen's alpha indicates a better risk-adjusted performance than a lower value.²⁹⁹ According to Black (2004) Jensen's alpha is a good measure to find out which manager has the greatest skills.³⁰⁰

5.3.5 Comparing Risk-adjusted Performance Measures

Funds are often ranked differently depending on the used risk-adjusted performance measures.³⁰¹

Treynor ratio and Jensen's alpha evolved "from the CAPM and measure risk the same way."³⁰² Jensen's alpha provides less information than the Treynor ratio. "Two securities with different risk levels that provide the same excess returns over the same period"³⁰³ may have the same Jensen's alpha but may "differ with respect to the Treynor ratio. The difference comes from the fact that the Treynor ratio provides the performance of the portfolio per unit of systematic risk."³⁰⁴

The Sharpe ratio and the Sortino ratio focus on different types of risk. In comparison to the Treynor ratio and Jensen's alpha which concentrate on systematic risk, the Sharpe ratio focuses on total risk and the Sortino ratio concentrates on downside risk.³⁰⁵ The Sharpe ratio ranks funds very similar as the Sortino ratio³⁰⁶ but different

²⁹⁷ Lhabitant (2004)

²⁹⁸ Lhabitant (2004), p. 73

²⁹⁹ Lhabitant (2004)

³⁰⁰ Black (2004)

³⁰¹ Lhabitant (2004)

³⁰² Lhabitant (2004), p. 76

³⁰³ Lhabitant (2004), p. 76

³⁰⁴ Lhabitant (2004), p. 76

³⁰⁵ Lhabitant (2004)

³⁰⁶ Black (2004)

than the Jensen's alpha and the Treynor ratio. The Sharpe ratio "penalizes funds that have a high volatility and therefore funds that have non-systematic risk."³⁰⁷

All four measures will only have similar rankings if well-diversified traditional portfolios are compared to each other as the majority of risk of the portfolios will be systematic.³⁰⁸

Hedge funds usually have a large non-systematic risk component which results in very different rankings of the hedge funds between the performance measures.³⁰⁹

If an entire portfolio is evaluated, the Sharpe ratio should be chosen as performance measure. It does not require beta estimates, penalizes portfolios for not being diversified and is simple to calculate. To evaluate funds or securities for a possible inclusion in a portfolio, either the Jensen's alpha or the Treynor ratio is appropriate. However, the Jensen's alpha and the Treynor ratio require beta estimates "and assume that the master portfolio is well diversified."³¹⁰

³⁰⁷ Lhabitant (2004), p. 76

³⁰⁸ Lhabitant (2004)

³⁰⁹ Lhabitant (2004)

³¹⁰ Lhabitant (2004), p. 77

6. Databases and Biases

As already mentioned before, it is fairly difficult to collect proper information on operations of single hedge funds or accurate statistics on the overall industry. In terms of visibility it is important for hedge funds to be part of databases as advertising is not allowed. Hence many hedge funds send monthly return data to specialized databases like Eurekahedge or HFR. These data providers collect the information and sell it to anyone who is interested in purchasing it. Usually they also calculate various hedge fund indices which are extensively used to validate the superiority over mutual funds, for benchmarking and strategic asset allocation.³¹¹

Unfortunately, these hedge fund databases are not inevitably representative for the whole hedge fund spectrum. Each database and index is set up from different hedge funds and is often constructed in diverse ways. Database providers establish different rules to decide whether a hedge fund is included in the hedge fund index or not. Often these rules are based on a minimum asset size and a minimum track record of the fund.³¹²

In order to be included in the HFRX Index of the HFR database, a hedge fund must have at least US\$50 million of assets under management and a track record of at least 24 months. Furthermore the funds have to report monthly performance and monthly assets under management in US dollar.³¹³

In order to be included in an index of the Credit Suisse/Tremont database, a hedge fund must also have at least US\$50 million of assets under management, but it must only have a track record of at least 12 months. Additionally, the hedge fund must have an audited financial statement.³¹⁴

“The biases in hedge fund data come from two main sources. First, there are the biases in the way each database is constructed”³¹⁵ and second, there are the biases that result from “managed” fund prices. Some of the biases in the construction of the databases result due to inherent data collecting processes. These biases can only be

³¹¹ Lhabitant (2004)

³¹² Hedge Fund Research, link: <https://www.hedgefundresearch.com/index.php?fuse=indices-faq&1263977326>, accessed: 20/01/10

³¹³ Hedge Fund Research, link: <https://www.hedgefundresearch.com/index.php?fuse=indices-faq&1263977326>, accessed: 20/01/10

³¹⁴ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/HFI_Construction_Rules_12_08.pdf, accessed: 20/01/10

³¹⁵ Lhabitant (2004), p. 87

eliminated by costly and complicated calculations but even then some of them will subsist, as it remains impossible to observe the entire spectrum of hedge funds.³¹⁶ “Managed” fund prices are reported directly by the managers and are often biased favourable for the managers.³¹⁷ Section 6.1 to 6.4 explains different biases and their development in detail.

6.1 Self-selection Bias

Hedge funds do not have to disclose information on assets or performance to anyone besides their current investors and hedge fund managers themselves decide which information is provided in prospectuses of the hedge fund. The information offered to data providers is given voluntarily; hence the observed sample of funds will not constitute the “true random sample of the general population.”³¹⁸ As the performance and characteristics of reporting funds might differ from the non-reporting funds, biases are likely to arise. On the one hand, smaller funds with profitable track records certainly have an incentive to be published in databases, in order to increase the visibility of their funds and attract new investors. On the other hand, hedge funds with under average performance will not report to databases as they avoid the comparison with superior performing peers. Therefore we could conclude that good funds report and bad funds do not report, however there is also a large group of extremely good hedge fund managers that do not deliver reports to data providers “because they do not need to or do not want to.”³¹⁹

Another bias accrues from the fact that hedge fund managers normally “report to one or two databases”³²⁰, but hardly to all existing databases.³²¹

6.2 Survivorship Bias

Survivorship bias arises from the fact that historical data from disappeared funds are excluded from performance databases and studies. However, the performance of

³¹⁶ Lhabitant (2004)

³¹⁷ Lhabitant (2004)

³¹⁸ Lhabitant (2004), p. 89

³¹⁹ Lhabitant (2004), p. 89

³²⁰ Lhabitant (2004), p. 90

³²¹ Lhabitant (2004)

disappeared funds should be kept within the database because otherwise the database will be biased. Reasons for funds to disappear from databases might be the liquidation of a fund due to sudden and large losses, the merging of a fund with another fund or the closing of a fund due to a long period of losses.³²² Survivorship bias can be calculated as the difference between the average return of all surviving funds and the average return of all funds of a database within a year.³²³

Liang (2000) found “that the average survivorship bias of hedge funds is over 2% per year.”³²⁴ He based this result on the HFR database and the Trading Advisors Selection System (TASS) database as he analyzed funds of these two databases between 1994 and 1998.³²⁵

Gregoriou (2003) discovered that most large hedge funds survive longer than small hedge funds and that the median lifetime of hedge funds is 5.5 years. He based his findings on the Zurich Capital Markets database as he analyzed funds of this database between 1990 and 2001.³²⁶

Several data providers now retain historical figures about funds that were liquidated or stopped reporting due to other reasons; hence survivorship bias will gradually disappear in the future.³²⁷

6.3 Backfill Bias

Backfill bias occurs when funds that join a given database have the permission to backfill their past returns, even though they have not been part of this database in previous years. The permission of backfilling grants hedge fund managers the option to decide on when to be incorporated into the database and if they want to include the data partly or in total into the hedge funds track record.³²⁸

According to Barry (2002) 80% of hedge funds backfill “at least 6 months of data, around 65% of all funds backfill by at least 12 months and around 50% backfill by

³²² Lhabitant (2004)

³²³ Liang (2000)

³²⁴ Liang (2000), p. 326

³²⁵ Liang (2000)

³²⁶ Gregoriou (2003)

³²⁷ Lhabitant (2004)

³²⁸ Lhabitant (2004)

more than two years.”³²⁹ Data is usually biased upwards, when database providers backfill returns of funds³³⁰ and according to Barry (2002) the yearly backfill bias is on average 1.4%. He analyzed hedge funds of the TASS database between 1994 and 2001.³³¹

6.4 Infrequent Pricing

A further severe problem of hedge fund databases is the typical tendency of managers to represent “optimally their monthly net asset value in order to smooth their returns.”³³² For example, if a hedge fund holds a security that does not trade on the first or “last days of the month, the manager will often assign a price, which could be the price at which the security”³³³ traded last “or, worse, a price which the manager thinks is reasonable.”³³⁴

If managers tend to smooth their returns consciously or unconsciously, it usually results in a systematic overstatement of the returns. The two types of hedge funds where this problem occurs most frequently are hedge funds that hold illiquid securities and U.S. onshore limited partnerships. The estimation of accurate net asset values of illiquid assets is often difficult and therefore subjectivity might influence the pricing decision. The majority of U.S. onshore limited partnerships value their portfolio on their own which often leads to infrequent pricing.³³⁵

Another bias that can occur is the multi-period sampling bias which arises if the analyzed historical period is too short.³³⁶ According to Ackermann et al. (1999) an estimation period should at least consist of 24 monthly observations when risk-adjusted returns and risk are measured.³³⁷

In my opinion there will be a reduction in biases as there are going to be more regulated reporting requirements in the future.

³²⁹ Barry (2002), p. 8

³³⁰ Gregoriou (2003)

³³¹ Barry (2002)

³³² Lhabitant (2004), p. 93

³³³ Lhabitant (2004), p. 93

³³⁴ Lhabitant (2004), p. 93

³³⁵ Lhabitant (2004)

³³⁶ Lhabitant (2004)

³³⁷ Ackermann et al. (1999)

7. Hedge Funds in the Subprime Credit Crisis

Even though the subprime credit crisis originated in 2007 its consequences started to have a strong impact in 2008. The following industry overview shall give an explanation on how this financial crisis influenced the hedge fund industry.

7.1 Industry Overview

According to IFSL “assets under management of the hedge fund industry fell by nearly 30% in 2008 to US\$1,500 billion.”³³⁸ This happened to be the largest decline in the hedge fund industry on record and seems to be the result of fund liquidations, a rush of redemptions, and negative fund performances in 2008.³³⁹ Figure 12 illustrates this.

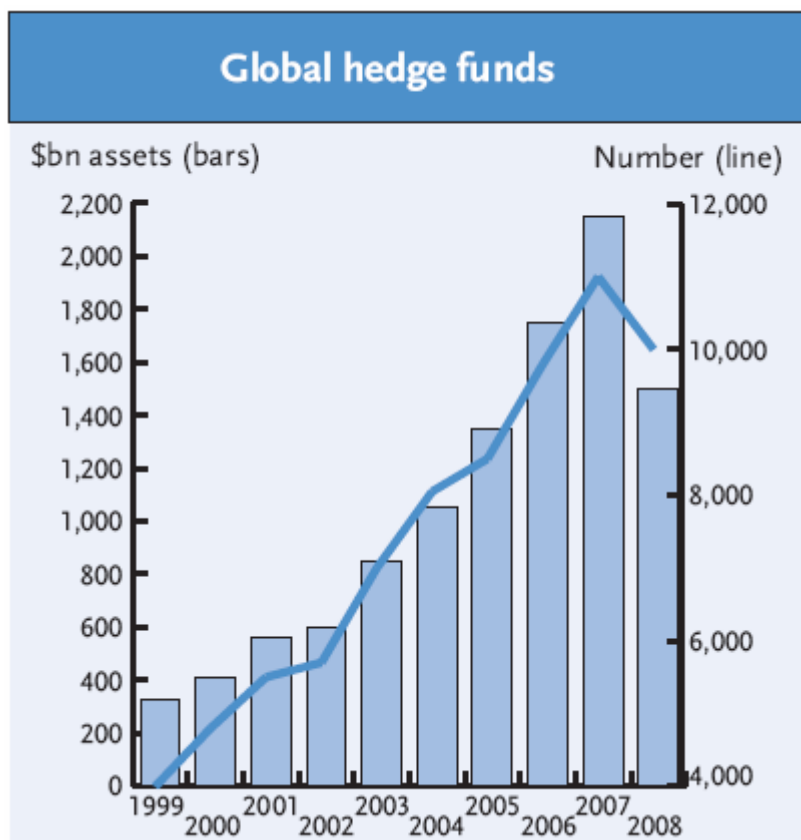


Figure 12: Number and Assets under Management of Global Hedge Funds

Source: Maslakovic (2009), p. 1

³³⁸ Maslakovic (2009), p. 1

³³⁹ Maslakovic (2009)

Some hedge funds, especially in the U.S., suspended redemptions in the last months of 2008,³⁴⁰ which led to a further decline in industry assets to US\$1,300 billion in the first half of 2009.³⁴¹ The decline in assets in 2008 was almost evenly divided between asset outflows and negative performance.³⁴²

According to the Credit Suisse/Tremont Hedge Fund Index, hedge funds lost on average 19.1% in 2008. In spite of the losses, hedge funds outperformed several underlying markets as for instance the S&P 500 Index which dropped by 37%.³⁴³

Major losses accrued between September and November 2008 as U.S. and European banks collapsed, bans on short selling were introduced, equity markets fell and the urgency to liquidate positions in order to meet redemption and margin calls grew. 13.2% of hedge funds overall assets were returned to investors in 2008. Investors were afraid of even bigger losses and therefore turned to less risky investments which led to an annual net outflow of funds. During January and February 2009 another US\$115 billion have been returned to investors.³⁴⁴

Moreover, the amount of hedge funds declined by 10% to around 10,000 hedge funds in 2008 (see figure 12). Most closures occurred in the last months of 2008 which also led to a decrease in employment to about 150,000 people in the worldwide hedge fund industry. In 2007 the hedge fund industry counted 6% more employees.³⁴⁵

In section 3.7 I already pointed out the various possibilities to register hedge funds as well as the fact that about half of the hedge funds were registered onshore and the other half was registered offshore at the end of 2008. The Cayman Islands was the most used offshore location and the U.S. was favoured as onshore location.³⁴⁶

The management of hedge funds was and still is predominately located onshore; the U.S. being the favourite domicile. More than two-thirds of all hedge fund assets were

³⁴⁰ Maslakovic (2009)

³⁴¹ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf,
accessed: 20/01/10

³⁴² Maslakovic (2009)

³⁴³ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf,
accessed: 24/01/10

³⁴⁴ Maslakovic (2009)

³⁴⁵ Maslakovic (2009)

³⁴⁶ Maslakovic (2009)

managed from the U.S. at the end of 2008. In comparison to the year 2002 this is a severe decline of assets under management in the U.S. as shown in figure 13.³⁴⁷

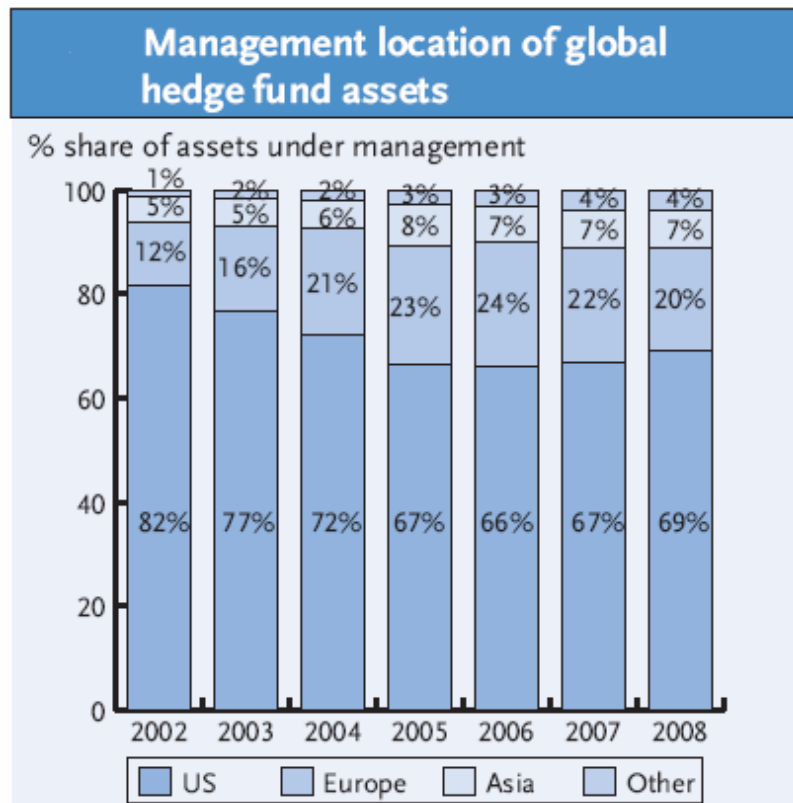


Figure 13: Management Location of Global Hedge Fund Assets

Source: Maslakovic (2009), p. 2

At the end of 2008 the two most important hedge fund management locations were New York (48% of hedge fund management activities) and London with estimated 18% of the global hedge fund management activities. In 2008 about 1,300 hedge funds were based in Europe. Around two-thirds were placed in London. London is still a very popular location for hedge funds as it has great local expertise and a good infrastructure including a high density of prime brokerage, administration, and custody and auditing firms.³⁴⁸

“Institutional investors have overtaken high net worth individuals for the first time to become the biggest source of assets for hedge funds in 2008.”³⁴⁹ It is likely that this will have a significant effect on the regulation in the industry of hedge funds as

³⁴⁷ Maslakovic (2009)

³⁴⁸ Maslakovic (2009)

³⁴⁹ Maslakovic (2009), p. 4

institutional investors will increase the regulation and have an impact on hedge funds' actions.

During the last years the industry of hedge funds has become strongly centralized at the top end, hence a small number of hedge funds holds a large portion of the industries total assets. In 2008 the 100 biggest hedge funds held about three-quarters of the total industry assets which is a big increase in comparison with past years, as for instance, in 2003 the top 100 funds owned 54% of the industries' total assets.³⁵⁰

At the end of 2008 the largest hedge fund was Bridgewater Associates with US\$38 billion under management. Second and third were JP Morgan and Paulson & Co with US\$33 billion and US\$29 billion, respectively.³⁵¹

10% of the hedge funds disappeared from the market in 2008 which is an attrition rate that is significantly higher compared to the previous ten years where the rate was in a range between 3 and 5%.³⁵²

The most applied hedge fund strategy in January 2009 was the event driven strategy, representing 27% of all hedge funds. In January 2008 the long/short equity strategy was the most applied strategy as it represented 30% of all hedge funds. It declined significantly between January 2008 and January 2009 as it represented only 23% of all hedge funds in January 2009. The global macro sector increased by 5% between January 2008 and January 2009.³⁵³ Figure 14 indicates the frequency of every hedge fund strategy in January 2009.

³⁵⁰ Maslakovic (2009)

³⁵¹ Maslakovic (2009)

³⁵² Maslakovic (2009)

³⁵³ Credit Suisse/Tremont Hedge Index, link:

<http://www.hedgeindex.com/hedgeindex/documents/Monthly%20Commentary%20Feb%2009.pdf>, accessed: 20/01/10

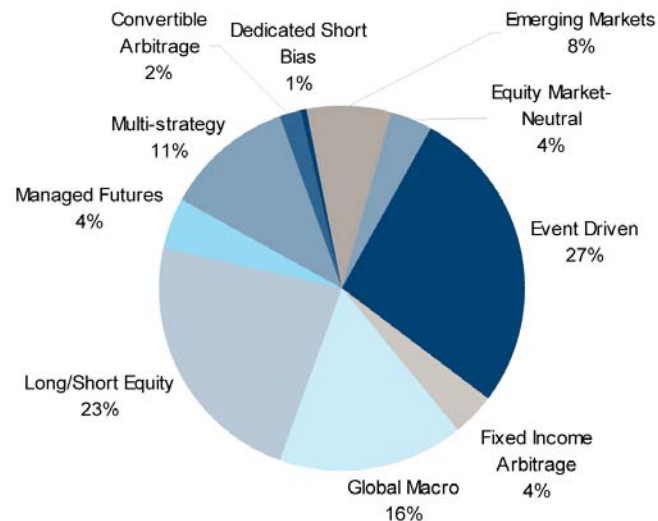


Figure 14: Frequency of each Hedge Fund Strategy in January 2009

Source: <http://www.hedgeindex.com>

The prime brokerage business was also negatively affected by the financial crisis of 2008 as the liquidation rate of hedge funds strongly increased, hedge fund assets severely declined, and many hedge funds decreased leverage. A big portion of prime brokers' income results from lending cash to support leverage; hence the decrease in leverage of hedge funds was harmful for prime brokers. In 2008 the largest prime brokers in terms of the number of clients were JP Morgan, Goldman Sachs, and Morgan Stanley, each accounting for about 10% of the market.³⁵⁴

Some hedge funds outsource fund administration functions, such as investor services, accounting, or risk analysis. The industry for firms which take over the hedge fund administration declined around 30% in 2008, after increasing consistently over the previous ten years. The largest hedge fund administration providers in 2008 were Citco Fund Services, Goldman Sachs Administration Services, and State Street Alternative Investment Solutions.³⁵⁵

Generally, it can be established that the hedge fund industry consistently grew until 2007 but strongly diminished in 2008 in all its facets as a result of the subprime credit crisis.

³⁵⁴ Maslakovic (2009)

³⁵⁵ Maslakovic (2009)

7.2 Short Selling in the Subprime Credit Crisis

According to Charoenrook et al. (2008) the permission of short selling in markets enhances the market quality. In their empirical study they stated that the restriction of short selling does not increase the probability of a market crash but it increases the volatility of aggregate stock returns and decreases the liquidity in markets.³⁵⁶

In section 3.1 I pointed out the unpopularity of short selling, yet one should not forget its positive effects on markets (increase of liquidity and facilitation of information transfer)³⁵⁷ and that it contributes to price efficiency.³⁵⁸

Still, the subprime credit crisis demanded decisions to protect the quality and integrity of securities markets and to strengthen investors' confidence. On September 19th, 2008 the SEC "took temporary emergency action to prohibit short selling in financial companies"³⁵⁹. SEC Chairman Christopher Cox stated,

"The Commission is committed to using every weapon in its arsenal to combat market manipulation that threatens investors and capital markets. The emergency order temporarily banning short selling of financial stocks will restore equilibrium to markets. This action, which would not be necessary in a well-functioning market, is temporary in nature and part of the comprehensive set of steps being taken by the Federal Reserve, the Treasury, and the Congress."³⁶⁰

The SEC prohibited short selling in 799 financial companies until October 2nd, 2008 and if needed the ban would have been extended, lasting 30 calendar days at most.³⁶¹ In the end the ban on short selling expired on October 8th, 2008 and was generally criticised as it added confusion to the market and did not help to halt the slide of financial stocks.³⁶²

According to Charles Jones, a professor at Columbia Business School, the ban on short selling gave financial stocks an artificial support for only a short duration. During the duration of the ban the Dow Jones Industrial Index fell almost 19%. Arturo Bris, a professor at the International Institute for Management Development (IMD) is

³⁵⁶ Charoenrook et al. (2008)

³⁵⁷ Charoenrook et al. (2008)

³⁵⁸ SEC, link: <http://www.sec.gov/news/press/2008/2008-211.htm>, accessed: 09/04/09

³⁵⁹ SEC, link: <http://www.sec.gov/news/press/2008/2008-211.htm>, accessed: 09/04/09

³⁶⁰ SEC, link: <http://www.sec.gov/news/press/2008/2008-211.htm>, accessed: 09/04/09

³⁶¹ SEC, link: <http://www.sec.gov/news/press/2008/2008-211.htm>, accessed: 09/04/09

³⁶² Karmin et al. (2008)

conducting a survey on the ban on short selling in the recent financial crisis and early evidence from the study shows that the ban was counterproductive. He considers short sellers as a cushion and that the market dropped even more by prohibiting short selling.³⁶³

Also U.S. hedge funds disliked the restriction of short selling and America's largest hedge fund lobbying group, the Managed Funds Association (MFA), begged regulators to reconsider the ban on short selling. In a letter to the SEC on September 21st, 2008 the MFA asked to readjust the rule to permit hedging and indicated that in their opinion the causes of the financial crisis were not short selling activities but poor risk management, lending and disclosure decisions made by financial institutions in the past.³⁶⁴

Two further actions of the SEC to address the difficult market situation were:

- Institutional money managers were required to report new short sales of particular publicly traded securities.
- A temporary easing of restrictions for securities issuers to buy back their own securities.³⁶⁵

The U.K. Financial Services Authority took a similar action as the SEC just one day before the SEC had banned short selling. It introduced the ban on short selling on September 18th, 2008³⁶⁶ and lifted it on January 16th, 2009.³⁶⁷

The Alternative Investment Management Society welcomed the abolishment of the ban on short sales in stocks of the 34 financial institutions. According to its chief executive Andrew Baker the ban did not achieve its estimated aims, although he supports efforts of regulators and policymakers to achieve better stability in markets, especially during emergency conditions.³⁶⁸

³⁶³ Karmin et al. (2008)

³⁶⁴ Bloomberg, link: http://www.bloomberg.com/apps/news?pid=20601087&sid=a_zPa591ycSM&refer=home, accessed: 08/04/09

³⁶⁵ SEC, link: <http://www.sec.gov/news/press/2008/2008-211.htm>, accessed: 09/04/09

³⁶⁶ SEC, link: <http://www.sec.gov/news/press/2008/2008-211.htm>, accessed: 09/04/09

³⁶⁷ BBC, link: <http://news.bbc.co.uk/1/hi/business/7812816.stm>, accessed: 08/04/09

³⁶⁸ BBC, link: <http://news.bbc.co.uk/1/hi/business/7812816.stm>, accessed: 08/04/09

According to EurekaHedge³⁶⁹, worldwide hedge funds lost 4.67% of their value in September 2008, see table 3.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2009	0.28	-0.76	1.28*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.79
2008	-2.14	2.49	-1.86	1.30	1.74	-0.58	-2.05	-1.30	-4.67	-4.88	-1.19	0.72	-12.00
2007	1.26	0.69	0.80	1.97	2.14	1.20	0.75	-1.41	2.99	2.92	-1.38	0.92	13.52
2006	3.38	0.50	2.06	2.14	-1.45	-0.32	-0.11	0.99	0.14	1.83	2.25	1.65	13.76
2005	-0.16	1.82	-0.61	-1.21	1.11	1.56	1.74	0.99	2.19	-1.09	2.15	2.14	11.06
2004	1.78	1.65	0.83	-1.40	-0.36	0.32	-0.57	0.08	1.70	1.08	2.93	1.35	9.73
2003	1.28	0.67	-0.24	2.50	3.69	1.13	1.24	2.02	1.33	2.59	0.94	2.08	20.95
2002	0.79	-0.12	1.79	0.63	1.07	0.03	-1.05	0.95	-0.29	0.36	1.69	1.16	7.18
2001	2.89	-0.24	0.58	1.15	1.73	0.71	-0.28	0.61	-1.08	2.00	1.00	1.67	11.25
2000	1.52	5.49	1.58	-1.22	0.03	2.44	0.32	3.71	-0.26	-0.15	-0.52	3.48	17.46

Table 3: Monthly hedge fund returns from January 2000 to March 2009

Source: <http://www.eurekahedge.com>

Since EurekaHedge started collecting data in 2000 this was the biggest monthly loss so far and the first time that the sector of hedge funds performed an annual loss in the history of EurekaHedge. It is assumed that the ban on short selling and the high volatility in markets were the main reasons for the strongly declining hedge fund returns in September 2008.³⁷⁰

I conclude from the above information that the ban on short selling did not help to recover markets in the subprime credit crisis.³⁷¹

7.3 Changes in the Legal Environment due to the Subprime Credit Crisis

I already mentioned the restrictions on short selling that were introduced as a consequence of the financial crisis, yet more changes in the legal environment are to come for both hedge fund managers and hedge funds.³⁷² Compared to the restrictions on short selling which were temporary actions, the other recommended rules introduced in this part of my thesis will likely be long-term actions. I am chiefly going to explain the upcoming changes in U.S. laws that influence hedge funds since the U.S. is the country where most of the hedge fund activities are occurring. Apart

³⁶⁹ Link: <http://www.eurekahedge.com/indices/default.asp>, accessed: 08/04/09

³⁷⁰ Timesonline, link: http://business.timesonline.co.uk/tol/business/industry_sectors/banking_and_finance/article4996136.ece, accessed: 08/04/09

³⁷¹ Karmin et al. (2008)

³⁷² Cohen et al. (2009)

from that recent history shows that the U.S. is a country which is very active in finding ways to improve the regulation of financial markets and hedge funds.

According to the President of the United States Barack Obama, hedge funds are entities that have to be subject to “proper oversight”³⁷³ and he “called for a new, 21st century regulatory framework to restore accountability, transparency, and trust in our financial markets.”³⁷⁴

The Emergency Economic Stabilization Act of 2008 was established to charge the administration with reviewing current states of the regulatory system and of the financial markets. Besides that, the President's Economic Recovery Advisory Board was created by President Obama on February 6th, 2009 to analyze and inform about operations and regulations of the banking and financial system.³⁷⁵

The Group of Thirty which is a consultative group on international economic and monetary affairs released a report, which focuses on recommended changes in the global framework of the financial regulation, on January 15th, 2009. This report is intended for policymakers of all countries which experienced damage due to the financial crisis. On the regulation of private pools of capital such as hedge funds the report recommends.³⁷⁶

“a. Managers of private pools of capital that employ substantial borrowed funds should be required to register with an appropriate national prudential regulator. There should be some minimum size and venture capital exemptions from such registration requirement.

b. The prudential regulator of such managers should have authority to require periodic regulatory reports and public disclosures of appropriate information regarding the size, investment style, borrowing, and performance of the funds under management. Since introduction of even a modest system of registration and regulation can create a false impression of lower investment risk, disclosure, and suitability standards will have to be reevaluated.

³⁷³ Cohen et al. (2009)

³⁷⁴ Obama (2008), link: http://www.barackobama.com/2008/09/16/remarks_of_senator_barack_obam_113.php, accessed: 13/04/09

³⁷⁵ Cohen et al. (2009)

³⁷⁶ The Group of Thirty (2009), link: <http://www.group30.org/pubs/recommendations.pdf>, accessed: 13/04/09

c. For funds above a size judged to be potentially systemically significant, the prudential regulator should have authority to establish appropriate standards for capital, liquidity, and risk management.

d. For these purposes, the jurisdiction of the appropriate prudential regulator should be based on the primary business location of the manager of such funds, regardless of the legal domicile of the funds themselves. Given the global nature of the markets in which such managers and funds operate, it is imperative that a regulatory framework be applied on an internationally consistent basis.”³⁷⁷

In my opinion all the recommendations to improve the regulation of hedge funds make sense and will in some ways be soon included in the laws of many countries or even in one international rule. Especially the idea to regulate hedge funds in those countries where they execute most business activities and not where the funds’ legal domicile itself is will have a positive impact even though this situation will definitely demand an international legal environment since it will not be possible to restrict hedge fund actions to specific countries.

According to Cohen et al. (2009) the recommendations also have some weak points as they are only applied to hedge funds which have a minimum size and which use potential borrowed funds. Even though the goal of the recommendations is to avoid systematic risk which is “the risk of a broad-based breakdown in the financial system”³⁷⁸ occurring from overleveraging of large hedge funds there are no recommendations on the ratio of leverage. The recommendations attempt to lower systematic risk by obligating hedge funds to public disclosures of key information.³⁷⁹ For hedge funds this might end harmful hence they will again seek exemptions.

The recommendations are very general and do not go into detail at all which might help hedge funds to find loopholes if laws are not going to be developed in detail.³⁸⁰

On January 29th, 2009 an updated proposition on hedge fund regulation has been presented by the U.S. Congress. The so-called Hedge Fund Transparency Act is a bill which obligates hedge funds and other private investment companies with more than US\$50 million of assets under management to disclose with the SEC. This act

³⁷⁷ The Group of Thirty (2009), link: <http://www.group30.org/pubs/recommendations.pdf>, p. 9, accessed: 13/04/09

³⁷⁸ Lo (2008), p. 3

³⁷⁹ Cohen et al. (2009)

³⁸⁰ Cohen et al. (2009)

would remove loopholes which hedge funds used earlier to escape the Investment Company Act.³⁸¹

On March 26th, 2009 the administration released the framework for regulatory reform³⁸² which also focuses on the financial systems' systematic risk and suggests regulating entities. According to the administration there should only be one regulator of systematic risk which should supervise firms "based on what they do and not the form they take."³⁸³

The administration defined systematically important firms which might also include hedge funds by the following 3 characteristics:

- "The financial system's interdependence with the firm;
- The firm's size, leverage (including off-balance sheet exposures), and degree of reliance on short-term funding;
- The firm's importance as a source of credit for households, businesses, and governments and as a source of liquidity for the financial system."³⁸⁴

Apart from that, the administration also proposed new rules for hedge funds:

1. "Requiring Registration of All Hedge Funds: All advisers to hedge funds (and other private pools of capital, including private equity funds and venture capital funds) whose assets under management exceed a certain threshold should be required to register with the SEC.
2. Mandating Investor and Counterparty Disclosure: All such funds advised by an SEC-registered investment adviser should be subject to investor and counterparty disclosure requirements and regulatory reporting requirements.
3. Providing Information Necessary to Assess Threats to Financial Stability: The regulatory reporting requirements for such funds should require reporting, on a confidential basis, information necessary to assess whether the fund or fund family is so large or highly leveraged that it poses a threat to financial stability.

³⁸¹ Cohen et al. (2009)

³⁸² U.S. Department of the Treasury (2009), link: <http://www.ustreas.gov/press/releases/tg72.htm>, accessed: 13/04/09

³⁸³ Cohen et al. (2009), link: <http://www.finalalternatives.com/node/7460>, accessed: 13/04/09

³⁸⁴ U.S. Department of the Treasury (2009), link: <http://www.ustreas.gov/press/releases/tg72.htm>, accessed: 13/04/09

4. Sharing Reports With Systemic Risk Regulator: The SEC should share the reports that it receives from the funds with the systemic risk regulator, which would then determine whether any hedge³⁸⁵ fund “could pose a systemic threat and should be subjected to the prudential standards outlined above.”³⁸⁶

To me it seems that the approach towards controlling systematic risk is a start in the right direction even though the hedge fund lobby might not be pleased by this action of the administration.

According to the U.S. Treasury Secretary other regulatory reforms for investor and consumer protection will be introduced.³⁸⁷ The changes in the regulation of hedge funds will be a global movement which also encourages the interactions between countries and will soon lead to an enhanced regulatory system.

The most important aspect of a newly revised regulatory framework will be its gapless oversight and regulation of financial products, participants and markets without any exceptions and disregarding of the country of domicile. Especially private investment pools such as hedge funds which contain severe systematic risk have to be regulated efficiently.³⁸⁸

7.4 Performance of Hedge Funds in the Subprime Credit Crisis

The following performance evaluation of hedge funds is based on the Credit Suisse/Tremont Hedge Fund database which was established in 1994.³⁸⁹ I illustrate performance data from January 2007 (the subprime credit crisis started in February 2007) until June 2009. These performance data are compared to the S&P 500 Index and the MSCI World Index³⁹⁰ in order to find out the differences in the performance of a hedge fund index and stock market indices. I also connect the data to events in the subprime credit crisis in order to find out which event might have triggered changes in the indices.

³⁸⁵ U.S. Department of the Treasury (2009), link: <http://www.ustreas.gov/press/releases/tg72.htm>, accessed: 13/04/09

³⁸⁶ U.S. Department of the Treasury (2009), link: <http://www.ustreas.gov/press/releases/tg72.htm>, accessed: 13/04/09

³⁸⁷ Cohen et al. (2009)

³⁸⁸ Cohen et al. (2009)

³⁸⁹ Lhabitant (2004)

³⁹⁰ The MSCI World Index “is designed to measure the equity market performance of developed markets. As of June 2007 the MSCI World Index consisted” (MSCI Barra) of the market indices of 23 developed countries. (MSCI Barra, link: http://www.msccibarra.com/products/indices/international_equity_indices/definitions.html#WORLD, accessed: 22/01/10)

7.4.1 The Database

The Credit Suisse/Tremont database which follows track records of over 5000 funds is used to establish the Credit Suisse/Tremont Hedge Fund Index. This database only includes funds with at least US\$50 million of assets under management, audited financial statements and a track record of at least 12 months. The index is calculated monthly and the returns are expressed net of all expenses and performance fees.³⁹¹ The Credit Suisse/Tremont Hedge Fund Index is an asset-weighted index.³⁹² In comparison to an equal-weighted index, an asset-weighted index “provides a more accurate depiction of an investment in the asset class.”³⁹³

As illustrated in figure 6 on page 30, Credit Suisse/Tremont divides hedge funds into ten primary categories of investment styles. The event driven strategy is further divided into the distressed category, the multi-strategy category and the risk arbitrage category. The Credit Suisse/Tremont hedge fund database minimizes the survivorship bias by not removing funds “from the index until they are fully liquidated or fail to meet the financial reporting requirements.”³⁹⁴

7.4.2 Hedge Fund Performance in 2007

As stated in table 4, the three best performing types of hedge funds in 2007 were funds investing in emerging markets, global macro funds and multi-strategy funds. The three worst performing types of hedge funds were fixed income arbitrage funds, convertible arbitrage funds and managed futures.³⁹⁵

³⁹¹ Credit Suisse/Tremont Hedge Index, link:

<http://www.hedgeindex.com/hedgeindex/secure/de/indexperformance.aspx?cy=USD&indexname=HEDG>, accessed: 05/05/09

³⁹² Credit Suisse/Tremont Hedge Index, link:

<http://www.hedgeindex.com/hedgeindex/secure/de/indexperformance.aspx?cy=USD&indexname=HEDG>, accessed: 05/11/09

³⁹³ Credit Suisse/Tremont Hedge Index, link:

<http://www.hedgeindex.com/hedgeindex/en/indexmethodology.aspx?cy=USD&indexname=HEDG>, accessed: 11/11/09

³⁹⁴ Credit Suisse/Tremont Hedge Index, link:

<http://www.hedgeindex.com/hedgeindex/en/indexmethodology.aspx?cy=USD&indexname=HEDG>, accessed: 13/11/09

³⁹⁵ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS_Tremont_Hedge_Fund_Index_2007_Year_in_Review.pdf, accessed: 22/01/10

<i>Credit Suisse/Tremont Hedge Fund Index Return in 2007</i>		12.56%
<i>Best performing hedge fund strategies in the first half of 2007</i>		
Emerging Markets		20.26%
Global Macro		17.36%
Multi-Strategy		16.82%
<i>Worst performing hedge fund strategies in 2007</i>		
Fixed Income Arbitrage		3.83%
Convertible Arbitrage		5.17%
Managed Futures		6.01%
<i>Stock Market Indices Performance in 2007</i>		
S&P 500		5.49%
MSCI World		8.6% ³⁹⁶

Table 4: Index Returns in 2007

Source: <http://www.hedgeindex.com>

All hedge fund strategies performed positively in 2007. The Credit Suisse/Tremont Hedge Fund Index gained 12.56%, while having a volatility of 1.5%. In the same period the S&P 500 Index gained only 5.49% while having a volatility of 2.9%. The only strategy which had a lower risk and a higher return than the overall Credit Suisse/Tremont Hedge Fund Index was the global macro strategy. The global macro strategy took advantage of large amplitudes in the currency market, in the cost of energy and gold prices. Returns in 2007 showed unusually high volatility levels. Besides the managed futures strategy and the convertible arbitrage strategy all other strategies perceived higher volatility in 2007 compared to the average volatility of the 5 year period ending December 2006.³⁹⁷

Events influencing the markets in 2007

Some hedge funds, which invested large portions of their assets in securities tied to subprime mortgages, collapsed in the summer of 2007 as the values of these securities dropped extensively. Despite this turmoil in the second and third quarter of 2007 the Credit Suisse/Tremont Hedge Fund Index returned 5.2% since other hedge funds took advantage of strong stock markets and positive economic outlooks. Even though two hedge funds in the fixed income arbitrage sector collapsed, the overall return by this sector was positive and equalled 1.5% in the second quarter of 2007. In the third quarter of 2007 the pressure for liquidity forced many hedge funds to reduce

³⁹⁶ Cumulative monthly returns from January 2007 until November 2007.

³⁹⁷ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS_Tremont_Hedge_Fund_Index_2007_Year_in_Review.pdf, accessed: 22/01/10

leverage and to liquidate positions which created a market environment that challenged the hedge fund industry. However the Credit Suisse/Tremont Hedge Fund Index returned 1.1% while 7 out of 10 strategies performed positively during the third quarter of 2007.³⁹⁸

In the fourth quarter the U.S. housing market “downturned” further and the subsequent credit squeeze increased the probability of a recession. Due to the outcome of a US\$40 billion loss because of further defaults of subprime creditors, Federal Reserve chairman Ben Bernanke recognized that tightened financial conditions could hurt the economy.³⁹⁹ Despite these circumstances the Credit Suisse/Tremont Hedge Fund Index returned 2%, all 10 hedge fund sectors being positive in the fourth quarter of 2007. The Emerging Markets Sector returned 3.8% since investors were looking for opportunities in Asia and Latin America with only limited correlation to the U.S. economy.⁴⁰⁰

In spite of the credit crunch in 2007 and increased borrowing rates, hedge funds were still able to attract capital to allow themselves an active leveraging of positions. The Credit Suisse/Tremont Hedge Fund Index performed more consistently than many leading equity indices, including S&P 500, MSCI World or the Dow Jones Industrial Index. Well-diversified assets contributed to the better performance and lower volatility.⁴⁰¹

7.4.3 Hedge Fund Performance in 2008

As illustrated in table 5, the three best performing hedge fund strategies in 2008 were the managed futures strategy, the dedicated short bias strategy and the risk arbitrage

³⁹⁸ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS_Tremont_Hedge_Fund_Index_2007_Year_in_Review.pdf, accessed: 22/01/10

³⁹⁹ Federal Reserve, link: <http://www.federalreserve.gov/newsevents/speech/bernanke20071129a.htm>, accessed: 24/01/10

⁴⁰⁰ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS_Tremont_Hedge_Fund_Index_2007_Year_in_Review.pdf, accessed: 24/01/10

⁴⁰¹ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS_Tremont_Hedge_Fund_Index_2007_Year_in_Review.pdf, accessed: 24/01/10

strategy. The three worst performing strategies were the equity market neutral strategy, the convertible arbitrage strategy and the emerging markets strategy.⁴⁰²

<i>Credit Suisse/Tremont Hedge Fund Index Return in 2008</i>		-19.1%
<i>Best performing hedge fund strategies in 2008</i>		
Managed Futures		18.3%
Dedicated Short Bias		14.9%
Risk Arbitrage		-3.27%
<i>Worst performing hedge fund strategies in 2008</i>		
Equity Market Neutral		-40.3%
Convertible Arbitrage		-31.6%
Emerging Markets		-30.4%
<i>Stock Market Indices Performance in 2008</i>		
S&P 500		-37.0%
MSCI World		-42.1%

Table 5: Index Returns in 2008

Source: <http://www.hedgeindex.com>

In the year 2008 the Credit Suisse/Tremont Hedge Fund Index declined by 19% while having a volatility of 2.8%. In the same year the S&P 500 Index dropped by 37% while having a volatility of 6.1% and the MSCI World Index dropped by 42.1% while having a volatility of 6.8%. As stock markets fell, many investors shifted their investments to fixed income categories as bond markets. This had a positive effect on the overall bond market. For instance the Barclays Global Aggregate Bond Index⁴⁰³ showed a gain of 5% while having a volatility of 1.8% in 2008. The biggest drop of the Credit Suisse/Tremont Hedge Fund Index occurred in the months September and October. Even though it declined tremendously in 2008 it still outperformed broad equity indices as hedge funds maintained considerably less volatility. As the overall hedge fund industry performed negatively, the managed futures strategy and the dedicated short bias strategy were the only two strategies with positive returns. The managed futures strategy returned 18.3% and the dedicated short bias strategy returned 14.9%.⁴⁰⁴

⁴⁰² Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

⁴⁰³ "Barclays Aggregate Bond Index: A combination of several bond indexes, Barclays indexes are among the most widely used benchmarks of bond market total returns." (Standard & Poor's, link: http://fc.standardandpoors.com/srl/srl_v35/library_article.jsp?tid=0005#004, accessed: 24/01/10)

⁴⁰⁴ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

Events influencing the market in 2008

The credit market squeeze that began in 2007 intensified during 2008. In addition to this underlying trend, 2008 showed further unprecedented market events, which led to an extraordinary market volatility and finally also to government interventions on a concerted international basis to prevent the banking system of collapsing by floating markets with liquidity and cutting interest rates.⁴⁰⁵

Lehman Brothers controlled about “5% of the global prime brokerage business”⁴⁰⁶ before it filed for bankruptcy on September 15th 2008.⁴⁰⁷ Its bankruptcy hit small funds that relied on fewer prime brokers harder than large funds which usually have a bigger diversification of prime brokers.⁴⁰⁸

The fall of Bear Stearns occurring in September 2008 as well, was the first of a number of crucial events in the banking sector. The following events were the acquisition of Merrill Lynch by Bank of America, the approval of Goldman Sachs and Morgan Stanley to change from investment banks to commercial banks, and the end of their “stand-alone broker-dealer model.”⁴⁰⁹ The U.S. government had to bail out the Federal National Mortgage Association and Freddie Mac as the U.S. housing market continued the downturn.⁴¹⁰

All the events stated above happened in September and October 2008 which caused a sharp fall in equity indices. The MSCI World Index lost 31.1% in September and October 2008 whereas the Credit Suisse/Tremont Hedge Fund Index lost only 12% during those two months. “The Volatility Index (VIX), a common measure of market risk, experienced its largest swing on record in the third quarter after jumping 40

⁴⁰⁵ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf,
accessed: 24/01/10

⁴⁰⁶ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf,
accessed: 24/01/10

⁴⁰⁷ Lehman Brothers Holdings Inc., link: http://www.lehman.com/press/pdf_2008/091508_lbhi_chapter11_announce.pdf,
accessed: 24/01/10

⁴⁰⁸ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf,
accessed: 24/01/10

⁴⁰⁹ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf,
accessed: 24/01/10

⁴¹⁰ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf,
accessed: 24/01/10

points between beginning of September and end of October.”⁴¹¹ The VIX, the performance of the MSCI World Index and the performance of the Credit Suisse/Tremont Hedge Fund Index are illustrated in figure 15.

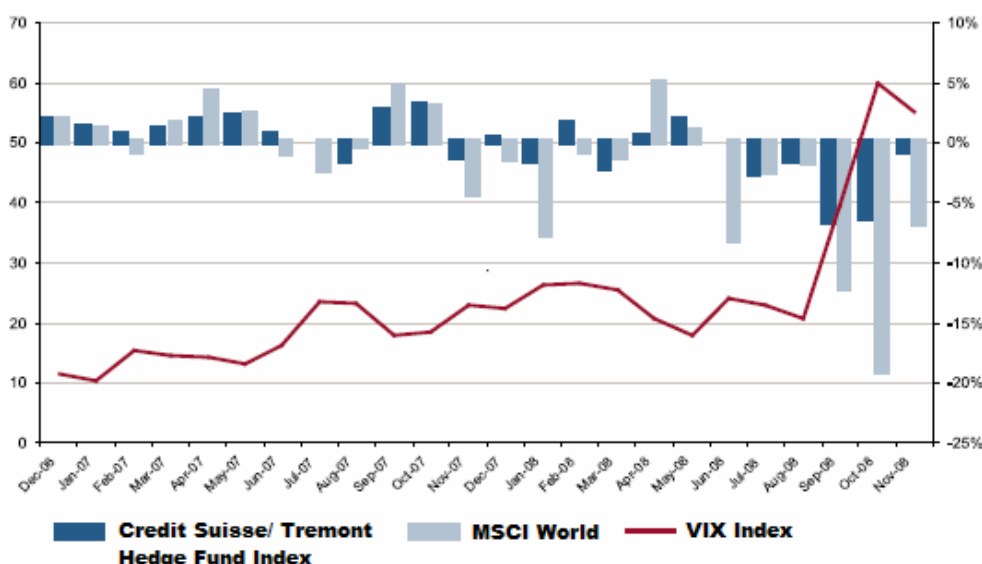


Figure 15: Volatility Index, MSCI World Index and Credit Suisse/Tremont Hedge Fund Index

Source: www.hedgeindex.com⁴¹²

The best and the worst performing hedge fund strategies of 2008 in detail

Hedge funds in the managed futures sector usually perform well during downturns of markets. When the LTCM fund collapsed between August 1998 and August 1999 the managed futures strategy showed a 16% return. During March 2001 and March 2003 it gained 28%, as the technology bubble burst and the crisis of September 11th occurred. In 2008, funds with a managed futures strategy generally benefited from long exposure to US dollar trades and treasury bonds as well as short exposure to stocks and commodities.⁴¹³

⁴¹¹ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

⁴¹² Link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

⁴¹³ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

The significant downturn in stock markets resulted in a strong positive return for funds with a dedicated short bias strategy. This sector returned 14.9% in 2008, as shown in table 5.⁴¹⁴

All other strategies performed negative returns in 2008.

The equity market neutral sector lost 40.3% in 2008. The losses occurred primarily due to the scandal of Bernard Madoff, as he managed some hedge funds with this strategy. Bernard Madoff “was sued by the SEC for an alleged multi-billion dollar Ponzi scheme”^{415, 416} on December 11th, 2008. Before the Bernard Madoff scandal, equity market neutral funds performed only slightly negatively in 2008.⁴¹⁷

Funds in the emerging market sector lost 30.4% in 2008 as commodity prices fell, the US dollar strengthened and emerging stock markets fell around the world. However, in December this sector performed positively as emerging markets currencies strengthened because of efforts to improve conditions. Another factor that helped improving the performance of the emerging markets strategy in December 2008 and further on in 2009 were the decreasing inflation rates which had reached record lows. This helped to boost spending as well as it strengthened the economies of emerging market nations.⁴¹⁸

7.4.4 Hedge Fund Performance in the first half of 2009

As illustrated in table 6, the three best performing types of hedge funds in the first half of 2009 were convertible arbitrage funds, emerging markets funds and multi-strategy funds. The three worst performing types of hedge funds were dedicated

⁴¹⁴ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

⁴¹⁵ “A Ponzi scheme is an investment fraud that involves the payment of purported returns to existing investors from funds contributed by new investors. Ponzi scheme organizers often solicit new investors by promising to invest funds in opportunities claimed to generate high returns with little or no risk. In many Ponzi schemes, the fraudsters focus on attracting new money to make promised payments to earlier-stage investors and to use for personal expenses, instead of engaging in any legitimate investment activity.” (SEC, link: <http://www.sec.gov/answers/ponzi.htm>, accessed: 10/05/10)

⁴¹⁶ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

⁴¹⁷ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

⁴¹⁸ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10

short bias funds, funds with a managed futures strategy and equity market neutral funds.⁴¹⁹

<i>Credit Suisse/Tremont Hedge Fund Index Return in the first half of 2009</i>		7.2%
<i>Best performing hedge fund strategies in the first half of 2009</i>		
Convertible Arbitrage		23.9%
Emerging Markets		13.2%
Multi-Strategy		12.3%
<i>Worst performing hedge fund strategies in 2009</i>		
Dedicated Short Bias		-10.8%
Managed Futures		-7.4%
Equity Market Neutral		1.1%
<i>Stock Market Indices Performance in 2009</i>		
S&P 500		3.2%
MSCI World		4.8%

Table 6: Index Returns in the first half of 2009

Source: <http://www.hedgeindex.com>

The actions introduced by governments in 2008 proved to be effective. The Credit Suisse/Tremont Hedge Fund Index performed 7.2% in the first half of 2009. Hedge funds have been able to reposition themselves and 80% of the funds performed positively in the second quarter of 2009. Investors shifted towards more risky investments and many hedge fund managers took the opportunity to buy valuable securities that have been oversold. In the first quarter of 2009 the Credit Suisse/Tremont Hedge Fund Index finished slightly positive with a return of 0.9%. Many major equity markets performed double digit losses in the first quarter of 2009. For instance the S&P 500 Index returned -11%. However, in the second quarter of 2009 equity markets recovered and most of them returned significant gains. The S&P 500 Index returned 15.9% and outperformed the Credit Suisse/Tremont Hedge Fund Index as it returned 6.2%. During the beginning of the second quarter of 2009, hedge funds maintained relatively defensive positions to limit the effects of high volatility and financial disturbance on their funds. Still, in May 2009 the Credit Suisse/Tremont Hedge Fund Index returned 4.1% which was the highest return within the last nine years. The high return in May 2009 can be explained by the increased affinity of hedge fund managers towards higher risk taking. Overall hedge funds outperformed equity and bond markets during the first six months of 2009, while maintaining lower

⁴¹⁹ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf, accessed: 24/01/10

volatility. During the first two quarters of 2009 the Credit Suisse/Tremont Hedge Fund Index had a volatility of 1.7% and the S&P 500 Index had a volatility of 8.7%. Eight of the ten hedge fund strategy sectors performed positive returns during the first six months of 2009.⁴²⁰

The convertible arbitrage sector was the best performing sector, as it returned 23.9%. The significant increase in returns compared to the year before when it lost 31.6% happened due to the profits from “mispricings” and also from new issuances of convertible securities.⁴²¹

Optimism about global recovery led to a rise in commodities prices and strongly performing stock markets in developing nations in the first half of 2009. This had a positive effect on hedge funds with an emerging markets strategy and enforced managers of this strategy to increase the risk in their investments. Consequently they were rewarded with positive returns in the first and second quarter of 2009.⁴²²

7.4.5 Summary of the Performance Analysis

The Credit Suisse/Tremont Hedge Fund Index outperformed the MSCI World Index and the S&P 500 Index in 2007, 2008 and the first half of 2009, while having had a lower volatility in each of the 3 periods.⁴²³ When the turmoil of the subprime credit crisis had reached its peak in September and October 2008, the MSCI World Index decreased by 31.1% and the S&P 500 Index decreased by 24.8%. In comparison to equity market indices hedge funds were on average able to limit their losses during those two months as the Credit Suisse/Tremont Hedge Fund Index returned -12%.⁴²⁴

⁴²⁰ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf, accessed: 26/01/10

⁴²¹ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf, accessed: 26/01/10

⁴²² Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf, accessed: 26/01/10

⁴²³ Credit Suisse/Tremont Hedge Index, link: <http://www.hedgeindex.com>, accessed: 28/01/10

⁴²⁴ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 28/01/10

Overall, more than one out of every five hedge funds in the Credit Suisse/Tremont Hedge Fund Index performed positively in 2008.⁴²⁵ The majority of these funds were funds with a dedicated short bias strategy or funds with a managed futures strategy as these two strategies usually perform well during market downturns. In 2008 the managed futures sector returned 18.3% and the dedicated short bias sector returned 14.9%.⁴²⁶

In the first half of 2009 hedge funds have been able to reposition themselves and the Credit Suisse/Tremont Hedge Fund Index returned 7.2%. It outperformed the MSCI World Index and the S&P 500 Index as these returned 4.8% and 3.2%, respectively. Despite that, equity market indices rallied in the second quarter of 2009 and outperformed the Credit Suisse/Tremont Hedge Fund Index as hedge funds maintained relatively defensive positions.⁴²⁷

⁴²⁵ Credit Suisse/Tremont Hedge Index, link:
http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf,
accessed: 28/01/10

⁴²⁶ Credit Suisse/Tremont Hedge Index, link:
http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf,
accessed: 28/01/10

⁴²⁷ Credit Suisse/Tremont Hedge Index, link:
http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf,
accessed: 26/01/10

8. Conclusions

As hedge funds only held a small portion of mortgage-backed securities when the subprime credit crisis emerged in 2007, they were not considered to be the trigger of the crisis. However, the general assumption is that trading activities of hedge funds increased financial instability in 2008⁴²⁸ which resulted in the development of new regulatory frameworks. Most of the recommended changes in the regulatory frameworks aim to increase the transparency of hedge funds. Especially hedge funds which might have an influence on the systematic risk of financial markets will face more detailed reporting requirements on their investment style, their size, their amount of borrowed funds and their performance.⁴²⁹ The approach towards controlling systematic risk and increasing reporting requirements for hedge funds is a start in the right direction although hedge fund managers will dislike the increase in regulation as they try to keep their strategies as secret as possible.⁴³⁰ An additional advantage of the increase in hedge fund regulation might be the increase in confidence of investors which could attract new capital towards hedge fund investments.⁴³¹

This thesis concludes that during the subprime credit crisis investments in hedge funds have on average been better investment decisions than investments in equity market indices. As hedge funds are actively managed by hedge fund managers it allowed better protection against falling markets. Further many hedge fund managers repositioned their portfolios by “holding higher cash levels”⁴³² and holding more defensive stocks, which led to a limitation of losses compared to equity market indices during the worst turmoil of the subprime credit crisis in 2008. In particular investments in hedge funds with a dedicated short bias strategy or a managed futures strategy were profitable investment decisions in 2008 as they performed significantly positively during the market downturn.⁴³³

⁴²⁸ Maslakovic (2009)

⁴²⁹ The Group of Thirty (2009), link: <http://www.group30.org/pubs/recommendations.pdf>, accessed: 13/04/09

⁴³⁰ Ineichen (2003)

⁴³¹ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf, accessed: 26/01/10

⁴³² Rubin (2009), p. 2

⁴³³ Credit Suisse/Tremont Hedge Index, link: http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 28/01/10

9. Bibliography

Ackermann, Carl, Richard McEnally, and David Ravenscraft (1999), "The Performance of Hedge Funds: Risk, Return, and Incentives", *The Journal of Finance*, Volume 54, Issue 3, pp. 833-1197.

Agarwal, Vikas and Narayan Y. Naik (2000), "Performance Evaluation of Hedge Funds with Option-Based and Buy-and-Hold Strategies", *Working Paper, London Business School, August 2000*.

Agarwal, Vikas and Narayan Y. Naik (2004), "Risks and Portfolio Decisions Involving Hedge Funds", *Review of Financial Studies*, Volume 17, Issue 1, pp. 63-98.

Banz, Rolf and Renaud de Planta (2002), "Hedge funds: All that glitters is not gold - Seven questions for prospective investors", *Financial Markets and Portfolio Management*, Volume 16, Issue 3, pp. 316-336.

Barry, Ross (2002), "Hedge Funds: A Walk Through the Graveyard", *Applied Finance Centre, Macquarie University, September 2002*.

Black, Keith H. (2004), "Managing a Hedge Fund: A Complete Guide to Trading, Business Strategies, Operations, and Regulations", *McGraw-Hill Professional*.

Boucrelle, Cyril, Bruno Solnik, and Yann Le Fur (1996), "International Market Correlation and Volatility", *Financial Analysts Journal*, Volume 52, Issue 5, pp. 17-34.

Brown, Steven J., William N. Goetzmann, and Roger G. Ibbotson (1999), "Offshore Hedge Funds: Survival and Performance, 1989-95", *The Journal of Business*, Volume 72, Issue 1, pp. 91-118.

Calamos, Nick (2003), "Convertible arbitrage: insights and techniques for successful hedging", *John Wiley & Sons*.

Capell, Kerry (2007), "Britain's Coming Credit Crisis", *Business Week*, September 17th, 2007, link:

http://www.businessweek.com/globalbiz/content/sep2007/gb2007096_631472.htm, accessed: 04/05/09.

Caslin, John J. (2004), "Hedge funds", *Institute of Actuaries and Faculty of Actuaries*.

Charoenrook, Anchada and Hazem Daouk (2008), "A Study of Market-Wide Short-Selling Restrictions", *Working Paper, Cornell University*, November 2008.

Cohen, Lawrence and Mark Stoutenburg (2009), "Looming Changes in Hedge Fund Regulation", *FINalternatives*, April 2nd, 2009, link:

<http://www.finalternatives.com/node/7460>, accessed: 13/04/09.

Connor, Gregory and Mason Woo (2003), "An Introduction to Hedge Funds", *Financial Markets Group*, link: <http://www.hedgefundprofler.com/Documents/01.pdf>, accessed 12/06/10.

Crouhy, Michel G., Robert A. Jarrow, and Stuart M. Turnbull (2008), "The Subprime Credit Crisis of 07", *Journal of Derivatives*, Volume 16, Issue 1, pp. 81-110.

de Brouwer, Gordon (2001), "Hedge Funds in Emerging Markets", *Cambridge University Press*.

Dechow, Patricia M., Amy P. Hutton, Lisa Meulbroek, and Richard G. Sloan (2001), "Short-Sellers, fundamental analysis, and stock returns", *Journal of Financial Economics*, Volume 61, Issue 1, pp. 77-106.

DeFusco, Richard A., Dennis W. McLeavey, Jerald E. Pinto, and David E. Runkle (2007), "Quantitative Investment Analysis", *John Wiley & Sons*.

Dichtl, Hubert, Kerstin Petersmeier, and Thorsten Poddig (2000), "Statistik, Ökonometrie, Optimierung: Methoden und praktische Anwendungen in Finanzanalyse und Portfoliomanagement", *Uhlenbruch Verlag GmbH*.

Duffie, Darrell and Nicolae Garleanu (2001), "Risk and Valuation of Collateralized Debt Obligations", *Financial Analysts Journal*, Volume 57, Issue 1, pp. 41-59.

Fano-Leszczyński, Ursula (2002), "Hedgefonds, Erfolgreich investieren, Risiko minimieren", *Manz Verlag*.

Francis, Jack Clark and Richard W. Taylor (2000), "Investments", *McGraw-Hill*.

Fraser, Alison S. (2006), "The SEC's Ineffective Move toward Greater Regulation of Offshore Hedge Funds: The Failure of the Hedge Fund Registration Requirement", *Cornell Law review*, Volume 92, pp. 795-832.

Frush, Scott (2006), "Understanding Hedge Funds", *McGraw-Hill Professional*.

Fung, William and David A. Hsieh (1997), "Empirical Characteristics of Dynamic Trading Strategies: The Case of Hedge Funds", *The Review of Financial Studies*, Volume 10, Issue 2, pp. 275-302.

Fung, William and David A. Hsieh (1999), "A primer on hedge funds", *Journal of Empirical Finance*, Volume 6, Issue 3, pp. 309-331.

Garbaravicius, Tomas and Frank Dierick (2005), "Hedge Funds and Their Implications for Financial Stability", *European Central Bank, Occasional Paper 34*.

Gregoriou, Greg N. (2003), "Hedge Funds: Strategies, Risk Assessment, and Returns", *Beard Books*.

Hull, John C. (2006), "Options, Futures and Other Derivatives", *Pearson Education Inc.*

Indjić, Drago and Aasmund Heen (2003), "AIMA survey of hedge fund classification practice", *The Alternative Investment Management Association Ltd (AIMA)*.

Ineichen, Alexander M. (2003), "Absolute Returns: The Risk and Opportunities of Hedge Fund Investing", *John Wiley & Sons*.

Joenväärä, Juha and Pekka Tolonen (2008), "Share Restrictions, Risk Taking and Hedge Fund Performance", *Working Paper, University of Oulu, December 2008*.

Karmin, Craig and Kara Scannell (2008), "Short-Sale Ban Ends to Poor Reviews", *The Wall Street Journal, October 9th, 2008*, link: <http://online.wsj.com/article/SB122351280409217645.html>, accessed: 23/04/09.

Kat, Harry M. (2002), "The Dangers of using Correlation to measure Dependence", *ISMA Centre Discussion Papers in Finance 2002-23, University of Reading, October 2002*.

Kat, Harry M. (2003), "10 Things Investors should know about Hedge Funds", *Alternative Investment Research Centre Working Paper Series, Working Paper Number 0015, Cass Business School, City University, January 2003*.

Kohler, Heinz (2002), "Statistics for Business and Economics", *Thomson Learning Inc.*

Lhabitant, Francois-Serge (2004), "Hedge Funds, Quantitative Insights", *John Wiley & Sons*.

Liang, Bing (1998), "On the Performance of Hedge Funds", *Weatherhead School of Management, Case Western Reserve University, Version: May 1998*, link: <http://www.hedgefundprofler.com/Documents/132.pdf>, accessed: 30/07/10.

Liang, Bing (1999), "On the Performance of Hedge Funds", *Financial Analyst Journal, Volume 55, Issue 4, pp. 72-85*.

Liang, Bing (2000), "Hedge Funds: The Living and the Dead", *Journal of Financial and Quantitative Analysis, Volume 35, Issue 3, pp. 309-336*.

Lo, Andrew (2008), "Hedge Funds, Systematic Risk, and the Financial Crisis of 2007-2008", *Written Testimony of Andrew W. Lo Prepared for the U.S. House of Representatives Committee on Oversight and Government Reform November 13th, 2008 Hearing on Hedge Funds*.

Loomis, Carol J. (1966), "The Jones Nobody Keeps Up With", *Fortune*, April 1966, pp. 237-247.

Lutton, David (2008), "The European Union, Financial Crises and the Regulation of Hedge Funds: A Policy Cul-de-Sac or a Policy Window?", *Journal of Contemporary European Research*, Volume 4, Issue 3, pp. 167-178.

Mah-Hui Lim, Michael (2008), "Old Wine in New Bottles: Subprime Mortgage Crisis – Causes and Consequences", *The Journal of Applied Research in Accounting and Finance*, Volume 3, Issue 1, pp. 3-13.

Maslakovic, Marko (2009), "Hedge Funds 2009", *International Financial Services London*, April 2009.

McCrary, Stuart A. (2005), "Hedge Fund Course", *John Wiley & Sons*.

Miller, Scott L. and Donald G. Childers (2004), "Probability and Random Processes", *Elsevier Academic Press*.

Mullins, David W. Jr (1982), "Does the capital asset pricing model work", *Harvard Business Review*, January 1st, 1982.

Nicholas, Joseph G. (2005), "Investing in hedge funds", *Bloomberg Press*.

Reilly, Frank K. and Edgar A. Norton (2006), "Investments", *Thomson South-Western*
Rohrer, Julie (1986), "The Red-Hot World of Julian Robertson", *Institutional Investor*, Volume 20, Issue 5, pp. 86-92.

Rose-Smith, Imogen (2009), "That Shrinking Paycheck", *The Alpha Magazine*, March 19th, 2009, link:

<http://www.iimagazine.com/Article.aspx?articleID=2163097&HideRelated=1&SearchResult=1>, accessed: 30/03/09.

Rubin, Matthew L. (2009), "Active Portfolio Management: An Attractive Option for Today's Markets", *Neuberger Berman LLC*.

Ruppert, David (2004), "Statistics and Finance", *Springer-Verlag New York, LLC*.

Ryan, Stephen G. (2008), "Accounting in and for the Subprime Crisis", *The Accounting Review*, Volume 83, Issue 6, pp. 1605-1638.

Scharfen, Katharina (2008), "Performance- und Risikomessung bei Hedgefonds", *Diplomica Verlag GmbH*.

Story, Louise (2009), "Top Hedge Fund Managers Do Well in a Down Year", *The New York Times*, March 24th, 2009,

link: http://www.nytimes.com/2009/03/25/business/25hedge.html?_r=1, accessed 02/04/09.

Stulz, René M. (2007), "Hedge Funds: Past, Present, and Future", *Journal of Economic Perspectives*, Volume 21, Issue 2, pp. 175-194.

The Group of Thirty (2009), "Financial Reform: A Framework for Financial Stability", *The Group of Thirty*, link: <http://www.group30.org/pubs/recommendations.pdf>, accessed 13/04/09.

Ullrich, Christian (2009), "Forecasting and Hedging in the Foreign Exchange Markets", *Springer Verlag Berlin Heidelberg*.

U.S. Department of the Treasury (2009), "Treasury Outlines Framework For Regulatory Reform", *Press Room U.S. Department of the Treasury*, March 26th, link: <http://www.ustreas.gov/press/releases/tg72.htm>, accessed: 13/04/09.

Vogelvang, Ben (2005), "Econometrics, Theory and Applications with EViews",
Pearson Education Limited.

Internet References

Barack Obama

<http://www.barackobama.com>

http://www.barackobama.com/2008/09/16/remarks_of_senator_barack_obam_113.php, accessed: 13/04/09.

BarklayHedge

<http://www.barclayhedge.com>

<http://www.barclayhedge.com/research/educational-articles/hedge-fund-strategy-definition/hedge-fund-strategy-merger-arbitrage.html>, accessed: 16/04/09.

<http://www.barclayhedge.com/research/educational-articles/hedge-fund-strategy-definition/hedge-fund-strategy-equity-long-short.html>, accessed: 17/04/09.

<http://www.barclayhedge.com/research/educational-articles/hedge-fund-strategy-definition/hedge-fund-strategy-distressed-securities.html>, accessed: 16/04/09.

BBC

<http://www.bbc.co.uk>

<http://news.bbc.co.uk/1/hi/business/7812816.stm>, accessed: 08/04/09.

Bloomberg

<http://www.bloomberg.com>

http://www.bloomberg.com/apps/news?pid=20601087&sid=a_zPa591ycSM&refer=home, accessed: 08/04/09.

Credit Suisse/Tremont Hedge Index

<http://www.hedgeindex.com>

<http://www.hedgeindex.com/hedgeindex/secure/de/indexperformance.aspx?cy=USD&indexname=HEDG>, accessed: 05/05/09.

<http://www.hedgeindex.com/hedgeindex/en/indexmethodology.aspx?cy=USD&indexname=HEDG>, accessed: 13/11/09.

<http://www.hedgeindex.com/hedgeindex/en/indexoverview.aspx?indexname=HEDG&cy=USD>, accessed: 12/11/09.

http://www.hedgeindex.com/hedgeindex/secure/en/indexperformance.aspx?indexname=HEDG_DEDSH&cy=USD, accessed: 12/11/09.

http://www.hedgeindex.com/hedgeindex/secure/de/indexperformance.aspx?indexname=HEDG_EVDRV&cy=USD, accessed: 11/01/10.

http://www.hedgeindex.com/hedgeindex/documents/HFI_Construction_Rules_12_08.pdf, accessed: 20/01/10.

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Mid%20Year%20Hedge%20Analysis_Final.pdf, accessed: 20/01/10.

<http://www.hedgeindex.com/hedgeindex/documents/Monthly%20Commentary%20Feb%2009.pdf>, accessed: 20/01/10.

http://www.hedgeindex.com/hedgeindex/documents/CS_Tremont_Hedge_Fund_Index_2007_Year_in_Review.pdf, accessed: 22/01/10.

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed: 24/01/10.

Eurekahedge

<http://www.eurekahedge.com>

<http://www.eurekahedge.com/indices/default.asp>, accessed: 08/04/09.

http://www.eurekahedge.com/news/04may_archive_japan_multistrategy.asp, accessed: 22/04/09.

Federal Reserve

<http://www.federalreserve.gov>

<http://www.federalreserve.gov/newsevents/speech/bernanke20071129a.htm>, accessed: 24/01/10.

Hedge Fund Research

<http://www.hedgefundresearch.com>

<https://www.hedgefundresearch.com/index.php?fuse=indices-str&1239734719>,
accessed: 14/04/09.

<https://www.hedgefundresearch.com/index.php?fuse=indices-faq&1263977326>,
accessed: 20/01/10.

Henry Wealth

<http://www.hywealth.com>

http://www.hywealth.com/en/images/insight/hedge_fund_outlook.pdf, accessed:
30/03/09.

HFN

<http://www.hedgefund.net>

<http://www.hedgefund.net/publicnews/default.aspx?story=9937>, accessed: 12/04/09.

Investopedia

<http://www.investopedia.com>

<http://www.investopedia.com/terms/r/risk-freerate.asp>, accessed: 20/01/10.

InvestorWords

<http://www.investorwords.com>

<http://www.investorwords.com/2134/futures.html>, accessed: 22/06/10.

Lehman Brothers Holdings Inc.

<http://www.lehman.com>

http://www.lehman.com/press/pdf_2008/091508_lbhi_chapter11_announce.pdf,
accessed: 24/01/10.

Macquarie Group

<http://personal.macquarie.com.au>

[http://personal.macquarie.com.au/personal/investment_strategies/accelerate_wealth/
alt_long_term/absolute_return_funds_detail.htm](http://personal.macquarie.com.au/personal/investment_strategies/accelerate_wealth/alt_long_term/absolute_return_funds_detail.htm), accessed: 02/02/09.

Magnum Funds

<http://www.magnum.com>

<http://www.magnum.com/About.aspx?RowID=14>, accessed: 06/04/09.

MSCI Barra

<http://www.ms cibarra.com>

http://www.ms cibarra.com/products/indices/international_equity_indices/definitions.html#WORLD, accessed: 22/01/10.

New York Times

<http://www.nytimes.com>

http://www.nytimes.com/imagepages/2009/01/17/business/20090118_HEDGE_GRAPHIC.html, accessed: 04/04/09.

Reuters Hedgeworld

<http://www.hedgeworld.com>

http://www.hedgeworld.com/education/index.cgi?page=hedge_fund_styles, accessed: 22/04/09.

Securities and Exchange Commission

<http://www.sec.gov>

<http://www.sec.gov/news/press/2008/2008-211.htm>, accessed: 09/04/09.

<http://www.sec.gov/answers/ponzi.htm>, accessed: 10/05/10.

Standard & Poor's

<http://www.standardandpoors.com>

<http://www.standardandpoors.com/indices/sp-500/en/us/?indexId=spusa-500-usdof--p-us-l-->, accessed: 22/01/09.

http://fc.standardandpoors.com/srl/srl_v35/library_article.jsp?tid=0005#004, accessed: 24/01/10.

TD Mutual Funds

<http://www.tdam.com/>

<http://www.tdam.com/Download/656-l.pdf>, accessed: 28/09/09.

TimesOnline

<http://business.timesonline.co.uk>

http://business.timesonline.co.uk/tol/business/industry_sectors/banking_and_finance/article4996136.ece, accessed: 08/04/09.

UBS

<http://www.ubs.com>

http://www.ubs.com/1/e/ubs_ch/kmu/foundation/capital.html, accessed: 23/04/09.

Wikipedia

<http://www.wikipedia.org>

<http://en.wikipedia.org/wiki/Kurtosis>, accessed: 07/06/10.

10. Appendix: Abstract in German

Diese Diplomarbeit behandelt Hedge Fonds und im Besonderen, Hedge Fonds in der Subprime-Kreditkrise. Diese Krise brach im Februar 2007 aus und beeinträchtigte neben der Weltwirtschaft auch die Hedge Fond Industrie.

Nicht nur die Eigenschaften von Hedge Fonds, deren Klassifizierung und deren Bewertung werden in dieser Arbeit beschrieben sondern auch die Veränderungen der Hedge Fond Industrie durch die Subprime-Kreditkrise werden beleuchtet. Darüber hinaus wird ein Vergleich zwischen dem Ertrag eines Hedge Fond Indizes zu dem Ertrag von Aktienindizes während dieser Krise dargestellt.

Hedge Fonds waren kein Auslöser der Subprime-Kreditkrise, da sie während des Ausbruchs der Krise in 2007 nur einen geringen Anteil ihres Vermögens in hypothekarisch gesicherten Wertpapieren angelegt hatten. Jedoch besteht die generelle Annahme, dass die Handelsaktivitäten von Hedge Fonds in 2008, Turbulenzen auf den internationalen Finanzmärkten auslösten.⁴³⁴ Diese Turbulenzen veranlassten nationale und internationale Organisationen zu reagieren und die rechtlichen Rahmenbedingungen dieser Fonds zu überdenken. Die geplanten Änderungen in der rechtlichen Behandlung von Hedge Fonds zielen darauf ab, Hedge Fonds und deren Aktionen transparenter zu machen. Vor allem Hedge Fonds, die das systematische Risiko von Finanzmärkten beeinträchtigen werden genaueren Überwachungen unterzogen.⁴³⁵

Diese Arbeit kommt zu dem Ergebnis, dass Hedge Fonds während der Subprime-Kreditkrise im Durchschnitt bessere Renditen erzielten als Aktienindizes. Das aktive Management dieser Fonds erlaubte ihnen sich gegen fallende Märkte abzusichern.⁴³⁶ Insbesondere Hedge Fonds mit „Dedicated Short Bias“ und „Managed Futures“ Strategien erzielten deutlich positive Renditen während den Turbulenzen auf den Finanzmärkten in 2008.⁴³⁷

⁴³⁴ Maslakovic (2009)

⁴³⁵ The Group of Thirty (2009), link: <http://www.group30.org/pubs/recommendations.pdf>, accessed: 13/04/09

⁴³⁶ Rubin (2009)

⁴³⁷ Credit Suisse/Tremont Hedge Index, link:

http://www.hedgeindex.com/hedgeindex/documents/CS%20Tremont%20Hedge%20Fund%2008%20Recap_Final.pdf, accessed 28/01/10

Curriculum Vitae

Marcus Hofer

General

April 20, 1984 Born in Graz, Austria

Education

September 1994 – June 2002 Sacré Coeur Secondary School, Graz, Austria

September 2000 – June 2001 Robert Bateman Secondary School, Abbotsford, Canada (Rotary Exchange Programme)

since October 2003 University of Vienna, Austria, International Business Administration

September 2006 – June 2007 University of Valencia, Spain (Erasmus Exchange Programme University of Vienna)

Work Experience

September 2004 Internship at AVL/MTC, Haninge, Sweden

September 2005 Internship at AVL/MTC, Haninge, Sweden

August 2006 Internship at Bank Austria Creditanstalt, Vienna, Austria