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# The Investment in Hedge Funds as an Alternative Investment

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## 1. Introduction

One of the most relevant industries of the modern financial management is the investment in hedge funds. The hedge fund industry is a heterogeneous group. One way to classify hedge funds is according to the investment strategy used, each offering a different degree of return and risk. Their historical return distributions provide with key information in order to understand the strategies behaviour.

In this Chapter, we briefly introduce the basic concepts about investment in hedge funds. We will provide some general definitions and introduction to hedge funds, their analysis and strategies. For a more extensive guide over hedge funds analysis please refer to López Pascual, J and Cuellar, R.D. (2010): "Assessment and Selection of Hedge Funds and Funds of Hedge Funds" Working Paper N°5 2010, *Cunef*.

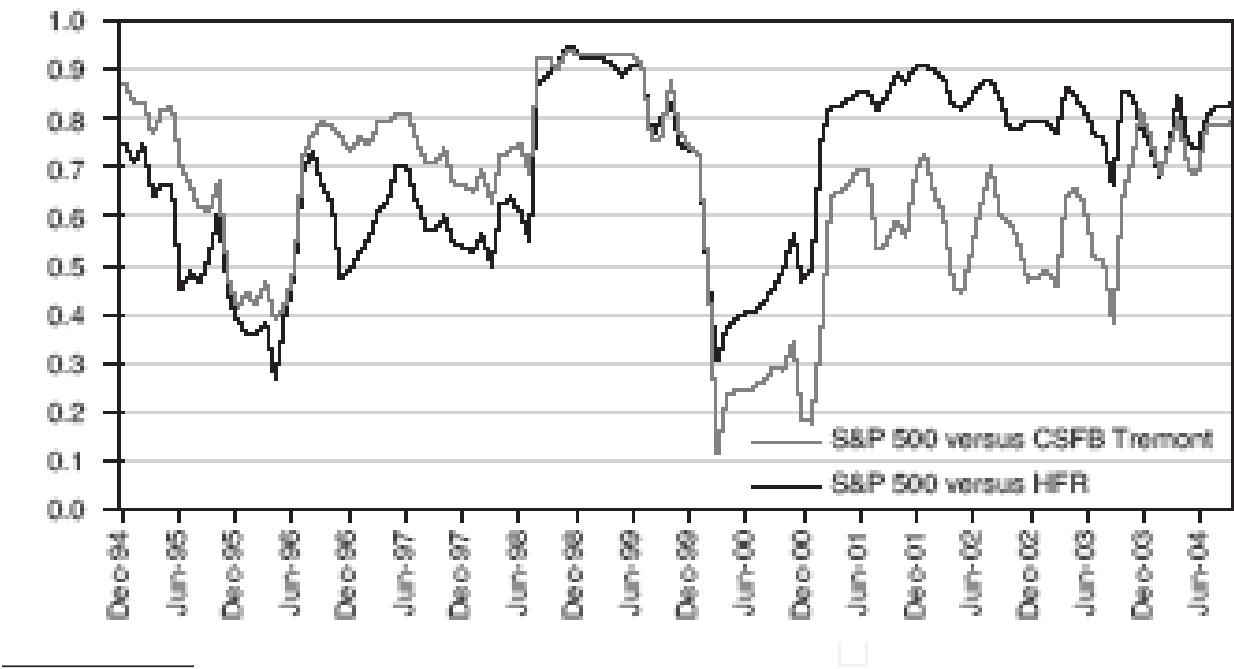
We present here the problems related to risk analysis in hedge funds and problems related to accounting or valuation of illiquid assets. Moreover, we introduce the various most common hedge fund strategies and their expected risks. Can we reach a market neutral investment strategy by investing in hedge funds? How can we build a diversified portfolio of hedge funds? How can we measure risk adjusted returns and total risk in hedge funds? These are some of the questions to which we aim to respond in this Chapter.

Finally, we will show inherent characteristics of different hedge fund strategies and illustrate how popular analysis tools such as; Sharpe ratio, Sortino ratio or other techniques, that take high moments as inputs, systematically overestimate or underestimate the risks of certain strategies. This corroborates our point that manager selection has to be contextualized according to the strategy employed

One of the most important attributes of a hedge fund is the ability to perform above a certain hurdle rate at all times no matter what market conditions prevail. This attribute has been called market neutral, which under no circumstances should be considered as neutral to the markets. As the LTCM (Long Term Capital Management) experience has demonstrated, there is no hedge fund that can be completely unaffected by a general adverse prevailing market condition. However, some managers are able to turn an adverse market condition into an opportunity, delivering extraordinary returns during market turmoil.

Understanding hedge funds is not a very easy task. There are a number of complexities involved in investments related to hedge funds. Legal and compliance, operations, qualitative analysis and quantitative analysis, and technology related questions means that operational due diligence is a very important concept in the allocation to hedge funds.

In general, it is considered that hedge funds have to be beta neutral or that the level of correlation with the performance benchmark of the market where the fund is involved should be as close to zero as possible. The principal function of the hedge fund in this conceptual frame would be of at least capital preservation in bear markets and capital appreciation in bullish markets.



Source: Bloomberg

**Figure 1.** Rolling 12 month correlation between the S&P 500 and the HFR Equity Hedge Index and the CSFB Tremont Long/Short Equity Index from the period 1993-2004

This definition calls for reviewing the concept of absolute returns, which have been in the area of investment since the inception of hedge funds into the arena of investment vehicles. Recent research (Waring and Siegel, 2006) explores the frontiers of alpha generation. It is considered that a portfolio manager is exposed to beta, but returns exceeding beta exposure can be attributed to manager’s skills as measured by the alpha. However, as already

mentioned, hedge fund managers are not always able to generate alpha and they are even sometimes not able to beat passively managed investment portfolios, such as index funds, which does not necessarily mean that they are not alpha generators given their non-directional investment style. As we know, beta can be obtained in the market to significantly cheaper prices than hedge fund fees, just by investing in an index replicating an investment portfolio or by using derivatives or, most recently ETFs, which are very liquid actively managed instruments and are able to provide a number of products for beta generation. Beyond the beta, the most important aspect in hedge fund selection is the manager's abilities to generate returns by his skills because, as demonstrated by the research mentioned above, there is no such thing as an absolute-return investor, but a relative return investor. It is correct to assess that a well managed hedge fund is one that has a zero or nearly close to zero beta coefficient, as we can observe in the Figure 1., while enjoying a high degree of alpha in its portfolio returns.

The question is how an investor can be able to assess the level of alpha generation by a hedge fund manager. Analysing the track record of the fund is a possible answer. However, in doing so, investors should be aware that historical performance is not a guarantee of future returns. The consistencies between historical and future returns have to be carefully assessed considering a number of parameters that result in higher and consistent alpha creation. However, one should consider that linear factor models such as the ones developed by Markowitz or Sharpe are unable to capture hedge fund's nonlinear return features.

In line with this assessment, Fung and Hsie (2001) have developed a model based on asset-based style factors. These factors with statistical significance may not necessarily be associated to any strategy or specific investment style. The statistical clustering created by using principal component analysis (PCA) is able to group common risk and returns characteristics of the sample. This is very important because hedge funds are actively managed investment organizations, so timing and leverage are relevant influential factors of the investment style and strategy. The attractiveness of the non-correlated returns generated by hedge funds bearing low or neutral beta and a high alpha should be assessed in the context of portfolio diversification. Kat (2005) established that the undesired effects of hedge funds that are attributable to negative skewness and high kurtosis can be eliminated through the use of out-of-the-money put options or by investing in other hedging strategies. In this context, it is clear that hedge fund returns are not "superior", but different than returns generated by other asset classes. Needless to mention, a diversified hedge fund portfolio has for a retail investor a prohibitive cost, given the fact that the minimal investment in an average hedge fund is in the order of USD 1 million and a diversified portfolio should have about 10 to 15 underlying vehicles.

The search for superior, and uncorrelated, returns leads investors to seek "alternative" investments. This term is certainly not precise but a high level of interest has been concentrated on the hedge fund industry as a paradigm of alternative investments; however this asset class is a heterogeneous group.

One way to classify hedge funds is according to the investment strategies employed. The strategies perform differently according to the economic cycle, each offering a different degree

of return and risk. Therefore performance, generated in a specific part of an economic cycle, that seem to have achieved consistent high excess returns could underperform systematically once that the economic cycle changes.

The returns generated by a hedge fund have to be understood in the context of the strategy used and the economic cycle. This implies a double problem for investors:

- The allocation strategy will depend on what investors are looking for. For instance, are they looking for a dynamic hedge to the equity market? In this case a negative beta strategy as “short bias” could be the right decision. It will be more complicated if the investors looks for absolute returns. In this case, the first decision is to decide between a passive or a dynamic approach. Another complicated choice would be a hedge fund that enhances portfolio efficiency.
- In the quest for the right hedge fund, a key factor to understand is the intrinsic behaviour of the strategy followed by the manager. Then, the investors have to look for a manager with an “edge” in the specific strategy.

## 2. Definitions

### 2.1. What is a hedge fund?

There is no an universally accepted definition of *hedge fund*. However, the common characteristics of the term *hedge fund* are; private investment fund that invest in a wide range of assets and employs a great variety of investment strategies. Due to their nature hedge funds have almost no restrictions in the use of derivatives, leverage or short-selling. This combination of capacity, instruments and flexibility in their investment decisions makes a significant difference relative to the more regulated, mutual funds.

Also, the combination of these resources has allowed hedge funds to exploit new market opportunities through investment strategies.

### 2.2. Investment strategies

There is also no consensus regarding the number of investment strategies used by hedge funds. Financial technology evolves and the universe of investment assets is constantly growing. Therefore new investment strategies are continually developing to exploit market opportunities. Even hedge funds that invest in the same type of assets can try to make money taking exposure to different risk factors. For example a hedge fund investing in convertible bonds could be aiming to get equity, credit, volatility, liquidity, interest rate exposure, or a combination of several of them. The exposure to each of these factors could be exploited through different strategies. Therefore, it is important to note that different strategies provide a different degree of return and risk.

### 2.3. Hedge fund indexes

Hedge funds have no formal obligation to disclose their results, however most of the funds release, at least monthly, their returns to attract new investors. With this information some data vendors have built performance hedge fund indexes, as well as sub indexes according to the fund strategy.

Some of these data providers are;

- Hedge Fund Research (HFR)
- Zurich Capital Markets
- CSFB Tremont
- Hennesse
- Tuna
- Barclays

### 2.4. Historical return analysis

The historical return analysis provides an important source of information for evaluating and understanding hedge funds investment styles.

Through explicit or implicit analysis we can try to explain the funds performances and to classify investment styles.

- *Explicit analysis.* The aim is to identify and measure the sensitivity of real factors that explain the historical returns. An example could be to model the returns as a linear function of various macro economic factors or indexes.
- *Implicit analysis.* The idea is to identify certain statistical factors that explain the historical returns. One the most used methods is the principal component analysis (PCA). The PCA ranks explanatory factors with the highest possible variance with the constraint that each one has to be orthogonal to the previous components.

In addition, comparing the time series returns of a hedge fund against the returns of its peer group will allow us to assess the investment skills of the manager.

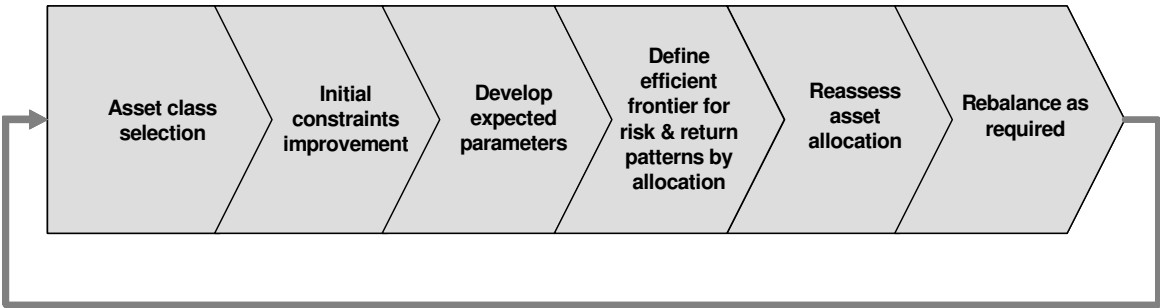
From an investor's perspective, it is important to maintain a clear view of the risk exposure gained by a hedge fund investment in relation not only to the returns but also with the investment vehicle strategy. Different strategies yield not only different risk exposures but expose the investment to different risk classes. In this respect, it is important to conceptualize the risk. Some investors wrongly believe that by investing in bonds or in an investment fund, which invests in fixed income securities, they are only exposed to interest rate risk or credit risk. A brief list of possible risks that investors face in financial markets can be summarised as follows:

<b>Accounting risk</b>	<b>Fiduciary risk</b>	<b>Political risk</b>
Bankruptcy risk	Hedging risk	Prepayment risk
Basis risk	Horizon risk	Publicity risk
Call risk	Iceberg risk	Regulatory risk
Capital risk	Interest rate risk	Reinvestment risk
Collateral risk	Knowledge risk	Rollover risk
Commodity risk	Legal risk	Spread risk
Concentration risk	Limit risk	Systemic risk
Contract risk	Liquidity risk	Taxation risk
Currency risk	Market risk	Technology risk
Curve construction risk	Maverick risk	Time lag risk
Daylight risk	Modeling risk	Volatility risk
Equity risk	Netting risk	Yield curve risk
Extrapolation risk	Optional risk	

Source: Author based on CMRA

**Figure 2.** Partial listing of risk universe in relation to hedge funds

Institutional investors have traditionally used asset allocation as the core process in order to determine their investment strategy. The process of asset allocation is important; however, it does not take into account the dynamic changes in risk appetite and the changing dynamics of risk in the investment portfolio. Risk budget monitoring introduces a different dimension in the investment process as a function of volatility, correlation, and investment volume itself.



Source: Author

**Figure 3.** Asset allocation process

Risk budgeting is a tool that should not be seen as an optimization process, because the optimization process in asset allocation uses a traditional mean-variance approach to efficiently allocate assets in a trade-off process of risk and returns. The objective of optimal investment risk management has to be such that it allows the investor to acquire less risk for a larger return or more return in exchange for the current risk exposure.

Other than the universe of possible risks mentioned in Figure 2, hedge funds gain exposure through poor market liquidity, use of leverage, high turnover, heavy use of derivatives



instruments, correlation to unrelated assets and transparency risk, to mention just a few. Risk measurement in traditional investment vehicles or asset classes seems to be a very straightforward exercise when compared with hedge funds.

Asset allocation is concerned with optimal asset combination, thus mathematically it is equivalent to a constrained optimization process. The process of asset allocation is much simpler than portfolio construction. Brinson et al. (1986, 1991) established that more than 90 percent of the variability of an investment portfolio is due to asset allocation. The advantage of the asset allocation process is that we resolve the optimization process at the asset class level instead of at the single security level. This is simpler because it is easier to estimate expected future returns at the asset class level than at the single security level and because the correlations are clearly established in order to build a diversified allocation. In this frame, we should consider investment in alternative funds as an asset class problem within the optimization process of asset allocation. Empirical research (Lintner, 1983) has robustly established the virtues of including alternative assets in the allocation process given the low and even negative correlations with traditional asset classes.

One of the main challenges for investors is the poor transparency of hedge funds, which allows for very important risk misspecifications. The non-stationarity of risk due to the dynamic asset allocation of hedge fund managers is another challenge in risk measurement. Under these circumstances, it is very difficult to reduce measurement error to near zero. Identifying risk in a dynamic investment environment requires high frequency assessment and great accuracy. Factor analysis can not only assist in identifying risk factors but also the rate of change of those factors. Factor analysis can determine the aggregate factors explaining investment returns. This analysis can be used either as forward risk modelling or as inverse modelling.

Forward risk modelling uses assumed pre-existing risk factors to assess the risk universe of the investment portfolio. If the investor has allocated investments to hedge funds using a convertible arbitrage strategy, we can assume risk factors correlated to fixed income securities as well as stocks, because such an investment strategy is exposed not only to risk factors related to the yield curve but also because when the hedge fund manager exercises his option in a convertible bond, he is automatically gaining exposure to stock market risks.

Static forward modelling (SFM) analyses the returns and finds the factors that can fit in the return's model. By definition, SFM is a replication strategy using future contracts or other trading assets. The modelling eliminates sequentially uncorrelated factors that assist in explaining the stream of returns. In practice, SFM is used as an early warning system for the fund of funds manager, because when the manager sees a new factor emerging which can affect the returns directly or indirectly, the manager should try to rebalance the portfolio eliminating the style drifting underlying position.

Inverse risk modelling uses principal component analysis (PCA) in order to analyse time series of returns and establishes all possible patterns with exposure to risk factors explaining the returns. Using the covariance matrix, the manager extracts the eigenvectors with maximum explanatory power in statistical terms, but because these eigenvectors are not the real economic variables such as actual gold price or the exchange parity of currencies, the manager must



correlate the characteristics of those statistical factors to real factors. Interpretation is in this case absolutely critical but many times is not even possible.

Non-stationary or dynamic factor analysis takes into consideration relative changes of exposure along a time series of factors or combination of factors and their weights in explaining the returns of a portfolio. Managers have to take into account a sufficiently long horizon that explains the trade-off between risk and returns. When the factors and the returns converge in a time series, there is an alignment in the risk factors and the established strategy. Observation has to be maintained for a certain period of time because at a certain point the exposures could be subject to variations and diversions, letting the manager without knowledge of the new risk factors. The use of multi-scale correlation methods can assist portfolio managers in establishing the right time horizon for the analysis. Two significant risks in the analysis can be found. The first is that the time horizon of the assessment is too short and the point of divergence between the explaining factors and the portfolio return streams cannot be evaluated with a certain degree of accuracy, and the second is that the established time horizon is too long diluting the effects so much that the factors combination and the moment relation can hardly be visualized.

Detecting changes in correlations or non-stationarities across time is very useful for the investor because with assistance of this multi-scale correlation method, we can build an error map. If the error map becomes non-zero, it is because the correlation between the explaining factors and the returns has collapsed. Collapse in return attributions are a warning indicator that the fund manager has changed the strategy or is entering into a strategy shifting process that should trigger an immediate explanation by the fund manager to the investor about this change and the new risk factors implicated in such a strategy move. Another indicator of strategy shifting is sudden factor dispersion, which is given through introduction of new explanatory factors or alterations in the eigenvectors of the covariance matrix, which again we insist are statistical factors that have to be correlated to real economically relevant factors such as interest rate risk, volatility index (VIX), or gold price, to mention a few examples.

The practice of investment portfolio risk budgeting in the context of hedge fund management is to align risk budgeting with a coherent risk measurement methodology in order to obtain an appropriate risk amount. There are a number of variations of VaR methodologies of which the most utilized in the hedge fund industry is certainly CVaR (Rockefeller and Uryasev, 2000 and 2001).

A key factor to successful risk management in the context of hedge fund investment management and monitoring is to include a stress test in the risk to be budgeted and allocated. In this context, it is important to remember that VaR does not capture all the essence of risk in hedge funds. An example is that VaR has failed to capture the risks of instability related to the euro-convergence during the 1990s. Stress analysis instead tries to resolve questions such as:

1. Which variables, given a certain variation, affect and to what degree the price of an asset
2. Which are the variables, given a rate of change, can affect the valuation of the portfolio and to what extend and for how long

3. How wide is the variance established by the fund manager for the relevant variables affecting the portfolio and how these divert from other portfolio managers
4. How accepted and valid is the approach used by the portfolio manager compared to other peers

Stress test results need to be integrated into the denominator of the risk adjusted reward equation. In stress testing results should be included not only variations in market moves but also assumptions underlying strategies, as well as the possible adverse effects on the portfolio of liquidity premium, on-the-run and off-the-run differential credit spread sensitivities, haircut sensitivity, and sensitivity to correlations. Investment managers control risks by closely monitoring the variety and level of exposures to different risk categories. In hedge fund management, one of the most critical risks is liquidity risk. Managers and investors need to understand that valuing positions at mid-market when positions are large and market liquidity is poor can be very misleading. A natural reflex in market turmoil scenarios is always to liquidate the most liquid instruments in the portfolio to meet margin demands by prime brokerages. As we have seen in the case of LTCM, this is normally the equivalent of a death sentence because it constrains the portfolio to the most illiquid instruments leaving the managers in a very vulnerable position in a distressed market.

Different hedge fund strategies deliver not only different returns but also different risk exposures. Investors investing in a portfolio of hedge funds should visualize clearly their exposures and the level of concentration to those at any given time. As mentioned, there are a variety of hedge fund strategies that give investors different exposures to different risks. Lhabitant (2004) uses an adapted version of the Herfindahl-Hirschman index to assess the level of concentration to certain strategies by an investor:

In this case, the investor clearly understands the normalized sum of squared styles concentration. Moreover, as we know, investors have to visualize their exposure to different sets of risks, which are implied in each hedge fund strategy. Different data vendors providing style benchmarks have classified different hedge fund strategies, as described in Figure 4.

In this Chapter, we consider that the one of the most reliable data sources is the one provided by Credit Suisse Tremont, Greenwich Alternative Investment (former Van Hedge), Hedge Fund Research, and Barclay Hedge Fund Index.

Moreover, EDHEC Business School has made an index of indexes using PCA in order to homogenize the strategy universe of hedge funds. Based on these strategies and considering the particularities from each hedge fund, investors can use the strategy definitions by the data vendors and correlate every strategy with the typical or specific risks factors of each strategy and according to the operational due diligence performed on the fund strategy.

The fundamental aspects to consider are the visualization of risk, qualification, and quantification of risk exposure. As described before, with the assistance of PCA investors can evaluate the relevant risk factors related to the fund's strategy and then correlate them with real economic risk factors.

Credit Suisse Tremont	Greenwich Alternative Investments	Hedge Fund Research	Barclay Hedge Fund Index
Convertible Arbitrage	Equity Market Neutral	Convertible Arbitrage	Convertible Arbitrage
Dedicated Short-Bias	Event Driven	Distressed Securities	Distressed Securities
Emerging Markets	Distressed Securities	Equity Hedge	Emerging Markets
Market neutral	Merger Arbitrage	Equity Market Neutral	Equity Long Bias
Event Driven:	Special Situations	Event Driven	Equity Long/Short
Distressed	Market Neutral Arbitrage	Macro	Equity Market Neutral
Multi-Strategy	Convertible Arbitrage	Merger Arbitrage	Equity Short Bias
Risk Arbitrage	Fixed Income Arbitrage	Relative Value Arbitrage	European Equities
Fixed Income Arbitrage	Other Arbitrage		Event Driven
Global Macro	Statistical Arbitrage		Fixed Income Arbitrage
Long/Short Equity	Aggressive Growth		Fund of Funds
Managed Futures	Opportunistic		Global Macro
Multi-Strategy	Short Selling		Health Care & Biotechnology
	Value		Merger Arbitrage
	Futures		Multi-Strategy
	Macro		Pacific Rim Equities
	Market Timing		Technology
	Emerging Markets		
	Income		
	Multi-Strategy		

Source: Author

**Figure 4.** Different strategies according to different hedge fund index providers

Investors should consider that short positions are always at risk of liquidity squeeze. This kind of risk is entered when short positions are negatively affected by market prices development, generating potential or real losses in the portfolio and forcing the prime broker to place margin calls to increase collateral in form of cash or securities to cover for possible or effective losses or when the prime broker calls the loaned securities, forcing the fund manager to generate losses from the positions. This is the case when the prices of the short positions are rising above the collateral held by the prime broker in form of cash or cash equivalents. Short positions normally act as a hedging in a long portfolio segment instead or as a complement to derivative instruments, reducing significantly the cost of hedging but exposing the portfolio to its own set of risks.

Since is very difficult to generate ideas in bull markets about possible losers, some hedge funds either outsource to other funds the shorts or they hedge their position with the use of option derivatives of all sorts, which by all means is a more sophisticated hedging but sometimes a very expensive one. In general, it has been established in hedge funds to hedge long positions by shortening others.

### 3. Investment strategies and indexes

We can use some of the HFR sub indexes as proxies for hedge fund strategies performance.

HFR have developed a series of benchmark indexes designed to reflect hedge fund industry performance by constructing equally weighted composites of constituent funds. The funds selected in each index are filtered through manager's due diligence and other qualitative requirements. The classification is done through statistical analysis, cluster analysis, correla-

tion analysis, optimization and Monte Carlo simulations. This information is available on the HFR web site.

One of the main problems with the hedge fund indexes is the survivorship bias. Many hedge funds that were included at some point in the indexes might now not comply with the index requirements or might be defunct. HFR minimizes this problem by trying to receive a fund's performance until the point of the final liquidation of the fund.

HFR has created the following index classification.

Hedge Fund Strategy Classifications			
Equity Hedge	Event Driven	Macro	Relative Value
Equity Market Neutral	Activist	Active Trading	Fixed Income - Asset Backed
Fundamental Growth	Credit Arbitrage	Commodity: Agriculture	Fixed Income - Convertible Arbitrage
Fundamental Value	Distressed / Restructuring	Commodity: Energy	Fixed Income - Corporate
Quantitative Directional	Merger Arbitrage	Commodity: Metals	Fixed Income - Sovereign
Sector: Energy/Basic Materials	Private Issue/ Regulation D	Commodity: Multi	Volatility
Sector: Technology/Healthcare	Special Situations	Currency: Discretionary	Yield Alternatives: Energy Infrastructure
Short Bias	Multi-Strategy	Currency: Systematic	Yield Alternatives: Real Estate
Multi-Strategy		Discretionary Thematic	Multi-Strategy
		Systematic Diversified	
		Multi-Strategy	

Source: [www.hedgefundresearch.com](http://www.hedgefundresearch.com)

**Table 1.** Add caption

Based on these indexes we could show inherent characteristics of some of the most relevant hedge fund strategies and we would assimilate the historical returns of each investment strategy taking a long or short positions in plain vanilla options.

## 4. Return distributions and ratios

Most of the strategies, except *Short Bias*, show common characteristics as negative skewness, positive excess kurtosis and serial correlation.

The main consequence of these characteristics is that left tail of the return distribution is longer than the right side; therefore large losses are bigger than the suggested by the standard

deviation. Furthermore, the serial correlation of the returns hide that the model underestimates the true variance and reduce the effective number of degrees of freedom in a time series. In the case of hedge funds analysis, it means that we will be, underestimating the true risk of our investment and, over allocating to hedge funds when we undertake a mean variance portfolio analysis.

#### **4.1. Effect of the serial correlation in a distribution**

Brooks and Kat (2002) argued that the serial correlation of the hedge funds returns seems inconsistent with the notion of efficient markets. According with them, one possible explanation could be the fact that many hedge funds invest in illiquid or complex assets. To find update valuations of these assets is not always an easy task; therefore sometimes they use the last reported transaction price or model valuations. López and Cuellar (2007), explained the hedge fund returns serial correlation with similar arguments, appointing that real state valuations show the same problem due to the illiquid securities to appraise. These explanations are also consistent with Agarwal, V., Daniel, N.D and Naik, N.Y findings. They found that hedge funds, up to a certain extent, manage the reported returns in order to “smooth” their return distributions.

#### **4.2. Ratios**

The analysis of hedge funds performances through ratios is an easy and intuitive way to measure the efficiency of an investment. López de Prado (2008) appoints that the Sharpe ratio has become the ‘gold standard’ of performance evaluation. Although many researchers, Sharpe himself, study the deficiencies and limitations of the ratio, rating agencies and institutional investors include this ratio in their performance and risk measurements as appointed López and Cuellar (2007).

The two most used ratios are; Sharpe and Sortino, both measure the excess returns of an investment per unit of risk. In the case of the Sharpe ratio, the unit of risk is calculated as the standard deviation of the investment returns. For the Sortino ratio, the unit of risk is measure as the standard deviation of the negative returns. In other words, a measure of excess return against downward price volatility.

The statistical characteristics of the hedge funds returns result in overestimated Sharpe or Sortino ratios, therefore these ratios tend to overvalue the efficiency of hedge funds and drive to over allocation in this asset class. This technology has limitations therefore the results have to be understood in the context of the selected strategy and the inherent risks. In this direction, López and Cuellar (2010) propose a complementary system for evaluating the inherent risks of each hedge fund through a radar visualization of strategy exposure.

### **5. Conclusions**

Understanding the statistical behaviour of hedge fund strategies is a key factor in order to select hedge fund investments. Study of their historical returns will provide us with a lot of



information; however it is important to understand the limitations of the technology used. Performances generated in a specific part of an economic cycle, that seem to have achieved consistent high excess returns could underperform systematically once that the economic cycle changes, therefore the returns generated by a hedge fund has to be understood in the context of the strategy used and the economic cycle.

Our conclusion is reached for the hedge fund industry as a whole; this conclusion is not in conflict with the fact that many hedge fund managers consistently attain returns for their investors that amply justify the fees charged. However the fact that certain hedge fund managers are worth the current structure of fees is not a justification for the fees charged across the whole industry.

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