

## **MARKET NEUTRAL HEDGE FUNDS STRATEGIES: ARE THEY REALLY NEUTRAL? <sup>1</sup>**

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### **ABSTRACT**

The objective of this paper is to examine whether Market Neutral hedge funds strategies are exposed to the equity market or if they are in fact Market Neutral. Using two main database hedge funds indexes, EDHEC and CSFB Tremont, and contrasting them to the MSCI World Index, from January 1998 to December 2008, we performed a comparative analysis on the most representative Market Neutral hedge funds strategies. We examine for its neutrality and analyze what kind of strategies consistently perform differently over time, considering four strategies of Market Neutral hedge funds. The results, based on monthly returns, suggest that neutrality in the so-called arbitrage and pure alpha strategies do not perform differently from the traditional capital market, leading to the conclusion that neutrality in hedge funds, given their investment characteristics, is not as accurate as one may suppose. In such a context, mutual funds' managers should be aware of their hedge funds picking strategies when diversifying portfolios based on the neutrality of these hedge funds.

**Keywords:** hedge funds, market neutral strategies, hedging.

**JEL classification:** G11; G12; G15.

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## **I. INTRODUCTION**

Hedge funds are alternative investment vehicles that share a series of special characteristics, when regarding the traditional investment. Hedge funds are actively managed, with flexible investment policies, provide limited liquidity in general, are often accused of lack of transparency, target a specific type of investors and all this is due to a relatively freedom from regulatory controls.

Regarding some of their characteristic mentioned, an active management and flexible investment policies, the industry of hedge funds has been somehow misunderstood by the investors and regulators. The lack of transparency, due not only to the fact that they are not allow to advertise and solicit investors, but also to their exemption to provide regular information, is actually becoming a major concern of the global players in this industry. The main difficulty regards the biases that such vehicles suffer, in a direct consequence of their freedom of action.

Recently, major databases, such as EDHEC and CSFB/TREMONT, started publishing alternative Indexes, including different styles of strategies. With the access to this information, some important studies have been published.

Over the past fifteen years, the study of hedge funds strategies increased. More recently, there has been increased research regarding the style and purity of those strategies as well as the study of the behavior of monthly returns of hedge funds and hedge funds' indexes.

Important conclusions in the literature point to the notion that hedge funds do not contribute to excess in risk taking and that they are proper instruments to include in a diversified portfolio; particularly because they have a stabilizing role in the performance of portfolios. According to the latest research, hedge funds perform better in bear markets situations than the traditional mutual funds and do not perform as well in situations of bull market, were the mutual funds present higher returns.

Many practitioners of market neutral long/short equity trading balance their longs and shorts in the same sector or industry. By being sector neutral, they avoid the risk of market swings affecting some industries or sectors differently than others.

In this study, we make several important contributions to existing research. First our approach includes two major indexes of hedge funds instead of studying individual hedge funds and relating the results to a major index of capital markets. Previous studies focused on hedge funds while the present study focuses on indexes, providing a vaster and broader view of market investment. Second, the analysis provides a detailed study

about the strategies that may be considered as Market Neutral in the hedge funds industry in a global context. Finally, there is a presentation of statistical results based on the monthly returns of these indexes.

Therefore, the purpose of this paper is to examine the extent to which hedge funds Market Neutral strategies perform differently from the traditional investment industry, specifically regarding the behaviour of a major World Capital Index. In such a context, we address two research questions: Do Market Neutral Hedge Funds Indexes perform differently from Capital Indexes? And, that being the case, can we find significant differences considering the hedge funds market and the traditional market?

To study these questions we take a two-fold approach. First, the analysis focuses on the performance of two of the most representative indexes of hedge funds, the EDHEC and the CSFB/Tremont, regarding four main strategies of arbitrage and pure alpha: Equity Market Neutral, Convertible Arbitrage, Fixed Income Arbitrage and Global Macro. Second, we compared the results with one of the most relevant indexes in traditional investment: the MSCI World Index.

This paper is structured as follows: the next section presents a literature review on the main issues of Hedge Funds Neutrality, considering their performance behaviour and the behaviour of traditional investment strategies. Section three describes the data and methodology. Section four reports the results of our empirical analysis and Section five concludes.

## II. LITERATURE REVIEW

The review of current research on hedge funds suggests several implications that are relevant in the analysis of the seemingly neutrality of neutral hedge funds.

As a general definition, Market Neutral funds must have a limited exposure to the market. As hedge funds are self-described according to the investment strategies or styles, the strategy “equity market neutral” is a broad category and one of the largest, representing about 20% of funds under management of hedge funds (Fung & Hsieh (1999)).

In general, important remarks have been made about the strategies of arbitrage and creating alpha, regardless of market conditions, such as: *Equity Market Neutral* that are hedge strategies that take long and short positions in such away that the impact of the overall market is minimized, *Fixed-Income Arbitrage* which attempts to hedge out most interest rate risk by taking offsetting positions, *Convertible Arbitrage* that exploits anomalies in prices of corporate securities that are convertible into common stocks, and *Global Macro* that aims to profit from changes in global economies.<sup>4</sup>

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<sup>4</sup> For a detailed definition of these strategies, see Amenc & Martellini (2003).

The specific research about hedge funds started to appear more recently, in the last years of the decade of 1990. The first relevant results regarding hedge fund performance analysis, their correlation with mutual fund performance, and the persistence of hedge funds returns through time, were presented by several researchers, namely, among others: Fung & Hsieh (1997), who discover a higher survivorship bias in alternative investment; Ackerman *et al.* (1999), who defend that hedge funds outperform but are more volatile than mutual funds; Fung & Hsieh (2001), who studied the “trend -following” strategy, to model hedge funds returns and found positive effects in using this strategy; Liang (2001; 2003), who showed that during some periods hedge funds returns as a whole are less volatile than a global market index (S&P500; Brown & Goetzmann (2003), who studied hedge funds styles and conclude that differences in investment styles contribute for about 20% of the cross sectional variability in hedge fund performance; Amenc *et al.* (2002), who found strong evidence of very significant predictability in hedge funds returns, and the mixing of traditional and alternative investment vehicles in tactical allocation has positive effects; and finally Smedts & Smedts (2006), who suggest that particular hedge funds add alpha return through the skill of timing alternative beta risk.

Ribeiro & Santos (2009) through the analysis of monthly returns of seven main hedge funds strategies, which included Market Neutral Strategies, presents results that suggest that the purity in each studied style is not as developed and accurate as it may look at first glance. In a subsequent analysis with the same data sample, Ribeiro & Santos (2010) present a study on “seasonality” of monthly returns of hedge funds. Interesting results emerged for different investment strategies, namely “market neutral” and “arbitrage”.

The most relevant studies specifically regarding market neutrality are presented by Ackerman *et al.* (1999), Brown *et al.* (1999), Liang (1999; 2000; 2001), Agarwal & Naik (2004), Capocci *et al.* (2004), and Patton (2009). In comparing the performance of hedge funds with the mutual funds, Ackerman *et al.* (1999) and Liang (1999) suggest that hedge funds present lower returns and are more volatile than the reference market indexes considered, but perform better than mutual funds.

In a more strict sense, some authors developed this same analysis in bear market conditions. Edwards & Caglayan (2001) found that only three hedge funds strategies, namely *Equity Market Neutral*, *Event Driven* and *Global Macro*, could provide protection to investors for the period of 1990-1998. By contrast, the most recent results of Ennis & Sebastian (2003) highlight that after the market downturn of March 2000, hedge funds in general did not provide protection to investors.

Other authors focus on the correlation of hedge funds and other investment products, trying to determine if the inclusion of hedge funds in a diversified portfolio could improve its risk-return profile. Fung & Hsieh (1997) and Schneeweis & Spurgin (1998) defended exactly this improvement, due to the weak correlation with other financial securities. On the other hand, Amenc *et al.* (2002) proved that the diversification of a portfolio with the inclusion of hedge funds provides stronger risk control without a significant decrease in the returns.

The Neutrality of “market neutral funds” is documented in a paper of Capocci (2005). His analysis leads to the conclusion that most market neutral funds are not significantly exposed to the equity market. However, without being negatively impacted, they tend to be more exposed during bear market than in bull market contexts. To understand the importance of market neutral strategies, we must understand that their prime objective is to create alpha while completely or almost hedging the exposure to the market. Capocci *et al.* (2004) defend that market neutral hedge funds need further research since they represent a high percentage of the hedge funds industry.

The studies described above focused on single strategies. Mitchell & Pulvino (2001) focused on “risk arbitrage”, Fung & Hsieh (2000) on “fixed income arbitrage”, and Capocci (2004) analysed “convertible arbitrage”. This is a stand-alone approach, which considers the particularities of market neutral strategies that would benefit from the inclusion of additional market neutral strategies, in order to understand their particularities.

In a recent paper, Patton (2009) considers the concept of market neutrality in a more general sense, defining several different aspects of market neutrality. According to the author, there are five different concepts of market neutrality: *mean neutrality, variance neutrality, value-at-risk neutrality, tail neutrality and complete neutrality*, which are relevant for hedge fund return and risk analysis. The author defends that the risk reward and the nature of the dependence between each fund and the market is of interest to the investors. He found that the proportion of market neutral funds exhibiting some significant neutrality is lower than for other categories of hedge funds. As he contends: “Thus the market neutral style category is the most neutral, and the equity non-hedge category is easily the least neutral.” Another important aspect of Patton (2009) study is the benefits to diversification using hedge funds. If the neutrality of the so called “market neutral” funds is not a certainty, the full diversification that investors seek and rely by introducing hedge funds in a portfolio may not be as efficient as they would like. Patton (2009) asserts that “...*the dependence between hedge fund returns and market returns is often significant and positive, even for market neutral funds. The widely cited diversification benefits from investing in hedge funds thus may not be as great as first thought.*”

Another interesting and worth mentioning study regards a different aspect concerning neutrality. Siegmann & Stefanova (2009) studied the time-varying market neutrality of hedge funds through limits to arbitrage. They formulated and tested the hypothesis that market neutrality is affected by market-wide liquidity. They defend that the effectiveness of arbitrage strategies in hedge funds depends on the existence of sufficient liquidity to enable arbitrage trades and on funding liquidity, the last one depending on an efficient repo market. The authors found an important relationship between market-wide liquidity and time-varying neutrality of hedge funds. During times of low liquidity, the result is a higher market exposure. However, this relationship seems to be most relevant for indices/portfolios that have higher beta. Therefore, they conclude that their findings are contrary to their arguments and further research is need.

When liquidity is mentioned, the shocks through time must be considered. A recent study by Boyson *et al.* (2010) presents some interesting and new approaches regarding liquidity shocks in hedge funds contagion. The definition of contagion in hedge funds returns comes from Bekaert *et al.* (2005): "... as the correlation over and above what one would expect from economic fundamentals". The authors used index data and found contagion across hedge fund styles. When assets liquidity suffers by the impact of strong decrease in funding liquidity, this causes deterioration on both funding liquidity and asset liquidity. They found that large adverse shocks to assets and hedge fund liquidity are likely to improve hedge fund contagion. After controlling for autocorrelation and common risk factors, they defend the existence of contagion in hedge funds returns.

Therefore, they provide evidence of a strong link between hedge fund contagion and liquidity shocks. A possible explanation is that liquidity itself is a risk factor in hedge fund performance, but after testing for this idea, they found little evidence to support it. Thus, their conclusion supports the idea that only large shocks to liquidity are associated to hedge fund contagion.

### III. DATA AND METHODOLOGY

This study analyses the performance of the two most representative indexes of hedge funds, the EDHEC indexes<sup>5</sup> and the CSFB/Tremont indexes<sup>6</sup>, regarding four investment strategies: (1) Equity Market Neutral, (2) Convertible Arbitrage, (3) Fixed Income Arbitrage, and (4) Global Macro, for the period of 1998 to 2008. We compare them with one of the most relevant index in traditional investment, the MSCI World Index<sup>7</sup>.

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<sup>5</sup> Source: EDHEC RISK

<sup>6</sup> Source: CSFB/TREMONT INDEXES

<sup>7</sup> Source: MSCI INDEX DATA

According to AIMA (Alternative Investment Management Association) 2008 Report, assets under management are concentrated in few firms. 390 hedge funds firms each manage more than \$1 billion and, together, control 80% or \$2.1 trillion of the global assets as of early 2008, according to HFI (Hedge Fund Intelligence Global Composite Index). The oft-touted fact that there are thousands of hedge funds has very little relevance for most investors. The industry has become more concentrated at the top end. The largest 100 hedge funds accounted for three-quarters of industry assets in 2007, up from 54% in 2003 according to IFSL (International Financial Service London).

Hedge funds Indexes are often accused of heterogeneity and lack of representativeness. Amenc & Martellini (2003) and the EDHEC Risk and Asset Management Research Center suggested an original solution using the relevant information contained in all the competing indexes producing a set of stable, more representative, easy to replicate, non-commercial and with fewer biases indexes. On average, Amenc & Martellini (2003) conclude that pure style indexes are able to capture about 80% of the behavior of the time-series of competing indexes.

Our decision to use EDHEC Risk Alternative Indexes and CSFB/TREMONT Indexes was based in Lhabitant (2006) that studied the tracking errors for seven strategies and concluded that the tracking error was stable over time and remains at acceptable levels. He defends that, according to many researchers and investors, they should be classified as potential benchmarks.

EDHEC Alternative Indexes are able to capture a very large fraction of the information contained in the competing indexes (e.g. the average percentage of variance explained by the Indexes is 79.12% across all sub-universes). EDHEC Alternative Indexes generated, as the first component in a factor analysis, a built-in element of optimality, since there is no other linear combination of competing indexes that implies a decrease in information loss. Since competing indexes are affected differently by measurement biases, searching for the linear combination of competing indexes that implies a maximization of the variance explained, leads implicitly to a minimization of the bias. As a result, EDHEC Alternative Indexes tend to be very stable over time and easily replicable.

CSFB/Tremont Hedge Funds Indexes are compiled by Credit Suisse Tremont Index LLC. They are asset-weighted hedge funds indexes and include only funds, as opposed to separate accounts. The Indexes use the Credit Suisse/Tremont database, which tracks over 5000 funds, and consists only of funds with a minimum of US\$50 million under management, a 12-month track record and audited financial statements. They are calculated and rebalanced on a monthly basis and shown net of all performance fees and expenses.

The MSCI World Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets. As of May 27, 2010 the MSCI World Index consisted of the 24 developed market country indices<sup>8</sup>.

Our main objective is to determine if different hedge funds market neutral strategies achieve statistical significant different mean monthly returns through time compared to a global index of traditional investment, the MCSI World Index. Therefore, we start with a t-test for comparison of means of paired samples, for the following hypotheses at the 5% significance level.

$$H_0 : \mu_{\Delta_{i,j}} = 0$$

$$H_1 : \mu_{\Delta_{i,j}} \neq 0$$

Where:

$\Delta_{i,j}$  =  $X_{i,j} - Y$ ; and  $X_{i,j}$  are the values of the pair number  $i,j$  to compare;

$Y$  = Monthly returns of the MSCI World Index;

$X_i$  = 1 to 4, resulting from EDHEC database;

$X_j$  = 1 to 4, resulting from CSFB database;

being: (1) Equity Market Neutral; (2) Convertible Arbitrage; (3) Fixed Income Arbitrage; and (4) Global Macro.

This test has been applied to compare the two different sources of hedge funds data with the global world index used.

#### IV. EMPIRICAL RESULTS

The estimate results presented on Tables 1 and 2 gives us relevant statistical information about the “neutrality” of the four hedge funds strategies.

**Table 1. Statistical results for EDHEC versus MSCI (Jan. 98 to Dec. 08)**

	Equity Market Neutral	Global Macro	Fixed Income Arbitrage	Convertible Arbitrage
<b>T-Stat</b> (p-value)	1,252 (0,213)	1,635 (0,104)	0,517 (0,606)	0,873 (0,384)
<b>Paired sample correlations</b> (p-value)	0,423 (0,000)	0,478 (0,000)	0,326 (0,000)	0,492 (0,000)

<sup>8</sup> Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

For the Equity Market Neutral strategy and based on the statistical results of table 1 (T-stat of 1,252 and p-value of 0,213), we cannot reject the null hypothesis of equal mean monthly returns between the EDHEC Index and the MSCI World Index.

This result still valid when, regarding the same strategy, we consider the comparison between the CSFB Index and the MSCI World Index on table 2.

**Table 2. Statistical results for CSFB versus MSCI (Jan. 98 to Dec. 08)**

	Equity Market Neutral	Global Macro	Fixed Income Arbitrage	Convertible Arbitrage
<b>T-Stat</b> (p-value)	0,731 (0,466)	1,718 (0,088)	0,115 (0,908)	0,716 (0,475)
<b>Paired sample correlations</b> (p-value)	0,220 (0,011)	0,207 (0,017)	0,377 (0,000)	0,432 (0,000)

The statistical results (T-stat of 0,731 and p-value of 0,466) lead us to the conclusion that equity market neutral strategies in hedge funds are not as accurate as their name may imply and, therefore, their neutrality may be compromised.

Regarding the Global Macro strategy the results of table 1 (T-stat of 1,635 and p-value of 0,104), show that we cannot reject the null hypothesis of equal mean monthly returns, between the EDHEC Index and the MSCI World Index. This result is also valid when, regarding the same Global Macro strategy, we consider the estimates of Table 2 for the CSFB Index and the MSCI World Index. The statistical results for this comparison (T-stat of 1,718 with a p-value of 0,088) lead us to the conclusion that global macro strategies in hedge funds may also have their market neutrality compromised.

Let us consider now the arbitrage strategies, namely, Fixed Income Arbitrage and Convertible Arbitrage. For the Fixed Income Arbitrage, the statistical results of table 1 (T-stat of 0,517 and p-value of 0,606), shows that we cannot reject the null hypothesis of equal mean monthly returns, between the EDHEC Index and the MSCI World Index.

This is also the case when, regarding the same strategy, we consider the comparison between the CSFB Index and the MSCI World Index on table 2. The statistical results (T-stat of 0,115 and p-value of 0,908) allow us to conclude that Fixed Income Arbitrage strategy is, in fact, not a market neutral strategy.

Concerning the Convertible Arbitrage and based on the estimates of table 1 (T-stat of 0,873 and p-value of 0,384), we cannot reject the null hypothesis of equal mean monthly returns, between the EDHEC Index and the MSCI World Index.

This conclusion is also valid when, regarding the same strategy, we consider the comparison between the CSFB Index and the MSCI World Index. Once more, the results contained on table 2 (T-stat of 0,716 and p-value of 0,475) reveal a similar lack of accuracy of its market neutrality.

As a result of the relevant statistical parameters, we may conclude that the four main market neutral strategies, seeking for alpha and arbitrage, are not as accurate as their name and intrinsic characteristics may imply, and the neutrality, regarding the mean monthly returns analysed, appears to be clearly compromised.

## **V. CONCLUDING REMARKS**

The subject of neutrality in hedge funds is present in a vast academic research, defending that hedge funds do not contribute to excess in risk taking, and that they are proper instruments to include in a diversified portfolio, namely to stabilize the performance of the portfolio. According to latest research, hedge funds perform better in bear markets situations than the traditional mutual funds and do not perform so well in conditions of bull market, where the mutual funds tend to present higher returns.

There are a large number of hedge funds strategies available to managers, making their choice on investing more complex. The inclusion of hedge funds in an equity portfolio or a mutual fund usually implies that the intention of the manager is to diversify risk and not risk taking. Therefore, managers need to consider arbitrage and pure alpha strategies. Our results lead us to conclude that arbitrage and pure alpha strategies in hedge funds are not as accurate as their name and investment styles may imply, and their neutrality facing the securities market seems compromised.

The results presented in this analysis are as revealing as they are surprising. They demonstrate that neutrality in hedge funds strategies appears to be less developed than one may suppose, given their investment characteristics.

In this context, we suggest that mutual funds' managers should be aware of their hedge funds picking strategies when their decisions about diversifying portfolios rely on the neutrality of these hedge funds.

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