"IS BLASH POSSIBLE IN HEDGE FUNDS? AN APROACH TO SEASONALITY"

Mafalda M. Ribeiro [a] & **C. Machado-Santos** [b]

Abstract

Seasonality and behavior patterns are part of our daily life. Several studies have shown that seasonality behavior exists in different financial markets, especially in the spot market of equities and bonds. But, when we consider the monthly returns in hedge funds indexes, thus this occurs also? Many market participants have observed that as year goes by, a December Spike occurs frequently, and that has permeated the financial community to accept this effect as a common occurrence.This paper intends to determine whether seasonality exists across hedge fund strategies, by comparing, for the period of 1998 to 2008, the performance of the EDHEC indexes with another one of the most representative indexes of hedge funds, the CSFB/Tremont index, regarding seven main strategies. The results do not reject the hypothesis of seasonality on every strategy, comparing the two data sources, showing that there are significant higher returns in December, as well as lower and negative returns during the months of August, September and October. These results suggest that BLASH (Buy Low And Sell High) is possible in Hedge Funds management.

Keywords: Hedge funds, average monthly returns, annual returns, management incentive fees, seasonality

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[a] Corresponding author: Universidade Lusófona do Porto (ULP); Rua Augusto Rosa, 24; 4000-098 Porto - Portugal; e-mail mafalda.ribeiro@ulp.pt.

[b] Professor of Finance at UTAD and invited Professor at ULP. Member of the GOVCOPP Research Center

1. Introduction

Seasonality and behavior patterns are present on our daily life. From weather patterns to energy consumption patterns, seasonality is clearly present. Several different studies have demonstrated that seasonality behavior exists in different financial markets, especially in the spot market of equities and bonds.

Seasonality in financial markets implies that in general there are greater returns in some monthly periods than others. This allows the investor to buy during the monthly periods of lower returns and sell in the periods of higher returns. But this occurs when we consider the monthly returns in hedge funds indexes?

Many market participants have observed that as year goes by, a December Spike occurs frequently, and that has permeated the financial community to accept this effect as a common occurrence.

Taking into account the positive effect of the December Spike, what other patterns may we consider through the year?

The purpose of this paper is to determine if seasonality exists across hedge fund indexes, in all seven strategies considered, and if so, can hedge fund managers perform BLASH (Buy Low And Sell High) strategy? In this context, we address two questions: Do the widely variety of hedge funds strategies follows seasonality? Is seasonality an opportunity for major gains in managing hedge funds?

To address these questions we study the performance of the "index of the existing indexes", the EDHEC indexes[1] and compare it with another one of the most representative indexes of hedge funds, the CSFB/Tremont indexes[2], regarding seven main strategies: Equity Market Neutral, Long/Short Equity,

[1] Source: EDHEC RISK

[2] Source: CREDIT SUISSE / TREMONT HEDGE INDEX

Global Macro, Fixed Income Arbitrage, Event Driven, Emerging Markets and Convertible Arbitrage, during the period of January 1998 to December 2008.

This paper is structured as follows. The next Section presents a literature review on the main issues of seasonality in hedge funds. Section three describes the data, Section four refers the methodology and Section five reports the results of our empirical analysis providing concluding remarks. Section six provides the concluding remarks.

2. Literature Review

The issue of extreme hedge funds returns is well documented in the winner article of the 2005 AIMA Canada Research Award, by Brulhart, T. & Klein P., (2005).The market participants long assume a common perception that consistent and substantial returns from hedge funds come hand by hand with high risk and potential substantial losses. These authors looked at the extreme event risk of hedge funds and found that the skew and kurtosis in hedge funds returns do not necessarily imply exposing to undue risks. Comparing hedge funds and traditional asset distributions, they found that it does not appear to be any evidence of undue risks in hedge funds, at least relative to equity indexes. They conclude that, based in historical data, from January 1994 till December 2004, hedge fund investors have experienced higher returns without taking on undue risks and that the use of leverage in a portfolio of hedge funds does not necessarily results in risk greater than that of equities.

The subject of seasonality in hedge funds is quite recent in the academic research. One of the first papers that assume clearly the study of seasonality in hedge funds is the study of Agarwal et al., (2007), which documented that hedge funds returns during December are significantly higher than those during the rest of the year.

Assuming the positive effect of December in hedge funds monthly returns, see Annex B, Figure 1. to Figure 2.B, we question if there are other seasonality effects during the year, positive or negative.

Considering the database of the Hedge Fund Research Indexes, from January 1990 till December 2005, as representative of most hedge fund strategies, Olszewski,(2006) demonstrated through quarterly and monthly dummy variable regressions that various months have different effects on the various hedge funds strategies. He found that certain quarters had a greater positive effect on hedge funds strategies returns than others and that during various months hedge funds strategies have different characteristics. He demonstrated that in

December and January, the percentage of hedge funds strategies with positive and significant coefficients was highest while from August to October it was the lowest.

In their last paper Agarwal et al., (2007) documented that hedge funds returns during December are significantly higher than average returns from January to November. They used a comprehensive database of hedge funds, from January 1994 to December 2002, constructed from a combination of four large databases, namely, Center for International Securities and Derivative Markets (CISDM), Hedge Fund Research (HFR), Morgan Stanley Capital International (MSCI) and Tremont Advisory Shareholder Services (TASS). They found that a risk-based explanation could not fully explain the December spike, consistent with the opinion of Brulhart, et al., (2005). Therefore they explored another reason for the potential inflation of December returns, such as Management Incentives. In the mentioned paper (Agarwal et al., (2007) investigate the relation between incentives and the December spike, and showed that the spike is driven by incentives to improve performance. There are two main incentives for management performance: the first one relates to the promise of rewards for good performance and the second one relates to the threat that poor performance funds induce capital withdrawals. Accepting these two types of incentives, it is clear that funds ought to have opportunity to manage returns. Hedge funds managers have more opportunity to manage returns when the fund's volatility and exposure to illiquidity risk are higher.

The phenomenon of "returns management" in hedge funds is very resembling to the well-know "earnings management" phenomenon in corporations. In the context of earnings management in corporate firms there is a large literature (v.g. DeGeorge et al, (1999), Murphy, K., (1999), Core et al., (2003), Efendi et al., (2006) and Bergstresser et al, (2006)).These papers defend the strong possibility of managing financial statements when the manager have personal interests in good performance at the year end. Carhart et al., (2002) defends

that mutual fund managers' also trade strategically in the securities they hold to inflate the year end prices.

Agarwal et al., (2007) found that the magnitude of spike at year-end relative to that at quarter-ends is much higher for hedge funds compared to mutual funds. This is consistent with their theory that incentives at year-end have a strong effect in managing returns. Another important cause for returns management is the possibility of return smoothing by hedge funds. This hypothesis is consistent with the findings of Getmansky et al., (2004) of positive autocorrelations in monthly returns attributing it to hedge funds' exposure to illiquidity and potential smoothing of returns. On the opposite, Bollen et al., (2007) demonstrated that it is difficult to detect intentional smoothing of returns by looking at autocorrelations.

However, according to Agarwal et al., (2007) hedge funds can intentionally smooth returns to present higher returns at the year-end, mainly because the timing of financial auditing. They defined four main hypotheses;

Hypothesis 1: All else equal, December returns should be higher than the returns during other months.

Hypothesis 2: All else equal, funds that have higher incentives (higher moneyness, higher delta, higher relative performance, higher lockup restriction periods, and higher dollar management fee) should exhibit greater December spikes. Further, funds with greater opportunities (higher volatility and greater illiquidity) should also exhibit greater December spikes.

Hypothesis 3 (Savings hypothesis): All else equal, December returns should be higher when reserves leading up to December are higher.

Hypothesis 4 (Borrowing Hypothesis): All else equal, higher hedge fund returns in December should be followed by lower returns in January of the following year.

The results of these hypotheses reveal that:

-there is a new empirical regularity of hedge fund returns in December being systematically higher than their average returns during the rest of the year;

-the management incentives motivate funds to inflate returns at the year-end, and funds with greater incentives (higher moneyness, higher delta, higher relative performance, higher lockup restriction periods, and higher dollar management fee) exhibit a larger December spike; also, the funds with greater opportunities (higher volatility and greater illiquidity) exhibit a larger December spike.

-there is evidence that funds underreport their returns in the early part of the year in order to create reserves for possible poor performance later in the year;

-there is also evidence that funds push up the security prices at December-end by last-minute buying in derivatives markets, which is followed by price reversals in January.

Taking the two first results into account it suggests that hedge funds may be engaging in returns management, similar to the already documented phenomena of earnings management in corporations.

The last two findings imply that saving reserves left unutilized are added to December returns inflating the December NAV, and that there is effective borrowing from January returns.

Considering the four hypotheses and the implication upon the spot market of this borrowing effect, there is an interesting paper by Chen et al, (2001) about the January effect in US equity markets, i.e., where some stocks experience large returns. Early research about the January effect in the spot equity market includes several researchers, namely Roll, (1983), Keim, (1983) and Reinunganum, (1983), among many others. Keim, (1983) and Reinunganum, (1983) found that the January effect applies mainly to small firms. Roll, (1983)

suggest that this is due to the fact that small firms are more likely to be subjected to volatile and extreme prices.

Chen et al, (2001) study covers the period from 1987 through January 1999, considering a sample from of the mainly stocks traded on NYSE, AMEX and NASDAQ. He examined various hypotheses relating the January effect, namely window dressing, information availability and tax loss-selling.

It was not supported the hypotheses of window dressing being the solely cause of the January effect. According to Haugen et al, (1988) and Lakonishok et al, (1991) the January effect means that institutional managers are evaluated on their performance and philosophy investment. So they replace stock losers with winners in December and at the beginning of January, investment managers reverse the process by selling winners, large stocks and low risk stocks replacing them with other smaller and riskier stocks, which includes typically past losers with great potential for a near future. This behavior, in particular of mutual fund managers, has been studied by Chevalier et al, (1997) who present a model concerning fund manager behavior, once again based on incentives that are typically related to the amount that funds can attract mainly due to the returns they present in the end of the year.

Other important hypotheses studied by Chen et al, (2001) are the Tax-Loss Selling Hypotheses and Tax-Gain Selling Hypotheses, jointly referred to as the Tax-Selling Hypothesis. They conclude that investors sell losers in December due to the tax benefit of capital losses. In January, theses losers earn high returns because the selling pressure has ceased, resulting in the January effect. After rearranging the sample based on Potential for Tax-Loss Selling, simply referred as PTS, and comparing the difference between the last days returns in December and the first days returns in January, Chen et al, (2001) found evidence consistent with the Tax-Loss Selling Hypotheses, implying that the higher the PTS the lower is the December return or the lower the PTS the higher is the December return. This is even more significant when considering

smaller and riskier stocks. Evidence in support of the Tax-Loss Selling includes abnormally high returns (6,3%) in the first five trading days of January for stocks with the greatest PTS.

According to Chen et al, (2001) stock return results and volume results are consistent with both window dressing and tax-related selling hypotheses.

The other hypothesis referred by Chen et al, (2001) regards the effect of differential information available. Rozeff et al, (1976) found that the excess in January returns are the effect of significant information releases that occur in the first few days of January. Barry et al, (1984, 1985) suggest that stocks with less information available produce higher non-systematic risk, although the systematic risk remains unchanged. Brennan et al, (1995) also present an interesting hypothesis related to the number of analyst covering each stock. They found that the information hypothesis related to the number of analysts is consistent and, if the information hypotheses is correct, the January return should be negatively related to the number of analysts: the fewer the analysts, the greater should be the January returns.

Chen et al, (2001) provide evidence of the January effect, after examined three main hypotheses relating the January effect, namely window dressing, information availability and tax loss-selling, suggesting that the Tax-Related Selling is the primary cause of the January effect, consistent with the findings of Constantinides, (1984). The first two hypotheses do not provide much support, once they should be clearly stated both in December and in June. The PTS hypothesis is also supported by changes in volume in December and in January. It is clearly obviously that with this strategy investors are able to postpone payment of taxes by up to a year.

This research based on the spot markets is crucial to understand the behavior of hedge funds returns, since hedge funds depend in large proportion on the spot prices, and on the factors that motivate mutual funds managers' strategies.

This approach to the behavior of mutual funds managers helps us to better understand the results of Agarwal et al., (2007), namely their last Hypothesis.

3. Data

Our decision to use EDHEC Risk Alternative Indexes and the CSFB/TREMONT Indexes was based in Lhabitant, (2006) where he states that, according to many researchers and investors, they may even be classified as potential benchmarks. For a short description of the main alternative strategies, accordingly to Amenc, Bied & Martellini, (2002), see Appendix A.

EDHEC Alternative Indexes are able to capture a very large fraction of the information contained in the competing indexes (v.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, have a built-in element of optimality, since there is no other linear combination of competing indexes that implies a lower 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, as a result, easily replicable.

CSFB/TREMONT Hedge Fund Indexes are compiled by Credit Suisse Tremont Index LLC. They are asset-weighted hedge fund indexes and include only funds, as opposed to separate accounts. The Indexes use the Credit Suisse/Tremont database, which tracks over 5000 funds, and consist 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. They are the exclusive property of Credit Suisse Tremont Index LLC.

Our data base includes monthly returns from January 1998 till December 2008 (eleven years of monthly observations).

An important remark must be made regarding the CSFB information about the monthly returns on the strategy of Equity Market Neutral. In November 2008, a major correction was made in this index, displaying a monthly return of about minus 40% (-40%). This is an abnormal return for Equity Market Neutral strategy so we decided to work with two types of data for this strategy. A first approach considers the real values and the other one, expressly mentioned in the Tables and Figures of the paper, considers the monthly return of November 2008 null.

4. Methodology

In financial mathematics a time series is a sequence of data points measured typically at successive times spaced at uniform time intervals. Time series analysis comprises methods for analyzing time series data in order to extract meaningful statistics and other characteristics of the data. Time series data have a natural temporal ordering. This makes time series analysis distinct from other common data analysis problems, in which there is no natural ordering of the observations. A time series model will generally reflect the fact that observations close together in time will be more closely related than observations further apart. In addition, time series models will often make use of the natural one-way ordering of time so that values for a given period will be expressed as deriving in some way from past values, rather than from future values.

Seasonality is defined as the repetitive and predictable movement around the trend line in one year or less. In our situation, it is detected by measuring the returns for monthly time intervals, for the total period of 11 years, with 132 observations. The description of the seasonal effect provides a better understanding of the impact that this component has upon a particular time

series. Financial managers are often interested in knowing their performance relative to the normal seasonal variation. The moot point is whether the increase/decrease is more or less than expected.

If we accept the hypothesis that monthly returns through years are affected by seasonal variation, we need to identify and measure this seasonality to help planning the best possible BLASH strategy. It is useful to know if the past increases/decreases would be expected given the usual seasonal variations. Projecting the past patterns into the future knowledge of the seasonal variations is very helpful to predict the future trends.

We are going to assume that when treating the seasonal component, the impact of the seasonal component is constant from year to year.

Seasonal variation is measured in terms of an index, called a seasonal index. It is an average that can be used to compare an actual observation relative to what it would be if there was no seasonal variation. An index value is attached to each period of the time series within a year. This implies that if monthly data is considered there are 12 separate seasonal indexes, one for each month. We will use the method of simple average to measure seasonal variations of a time-series data.

In the additive time-series model used, the seasonal component is estimated as

(1)

where:

S= seasonal values

Y= actual data values of the time-series

T= trend values

C= cyclical values

I= irregular values.

The deseasonalized time-series data will have only trend (T) cyclical(C) and irregular (I) components and is expressed as:

(2)

where variables are as defined above.

We are aware that this first approach on methodology might be insufficient and a lot has yet to be done to statistically confirm these results. Nevertheless, we assume that this is a simple but important methodology, which enables us to capture a general view of the seasonality present in the main seven strategies considered, through the two databases used.

5. Empirical Findings

These results must be taken with precaution, since the period from August 2007 till December 2008, can be classified as an abnormal situation, in sequence of the subprime crises in USA, as well as the years of 1998 and following, due mainly to the debt market crisis.

Our aim is quite simple for now: to observe if Hedge Funds display higher/lower returns in some defined months of the year.

The first set of findings we would like to mention consider the highest Seasonality coefficients in the month of December.

Based on the results presented on Table 1. (EDHEC databases) and Table 2.A.and 2.B (CSFB databases), we can verify that the Seasonality coefficients present their **highest values in December** for **five** of the seven strategies,

except for small deviations, but not significant as it is the case of Market Neutral Model in CSFB (0,5683 in March vs. 0,5267 in December, not relevant), and Event Driven Strategy in CSFB (0,6950 in January vs. 0,5884 in December, not relevant).

The **exception** here is clearly on two strategies regarding **Arbitrage**, namely: Fixed Income Arbitrage and Convertible Arbitrage. The first Strategy, Fixed Income Arbitrage presents significant high Seasonality coefficients in April on both databases and the Convertible Arbitrage Strategy present significant high Seasonality coefficients in January on both databases.

The second set of findings we would like to mention consider the lowest Seasonality coefficients in the months of August, September and October.

Analyzing the results presented in Table 1. from EDHEC database, we can verify that the **Seasonality coefficients** present **negative values** for the months of **August, September and October** for **all of the seven strategies**. Although the seasonality coefficients vary from strategy to strategy, we can state that the industry of hedge funds present negative seasonality coefficients for this three months.

Considering the CSFB results in Tables 2.A. and 2.B., we can verify that the **Seasonality coefficients** present **negative values** for the months of **August, September and October** for **all of the seven strategies**. Although the seasonality coefficients vary from strategy to strategy, we can state that the industry of hedge funds present negative seasonality coefficients for this three months.

6. Concluding Remarks

Seasonality is present in the Hedge Funds Indexes, based on monthly returns data.

The December spike occurs frequently in almost every strategy studied, except pure arbitrage strategies.

For all seven strategies studied, the months of August, September and October present negative seasonality coefficients.

It is our strongest conviction that the results presented here will be helpful in performing BLASH strategies in Hedge Funds Management.

ANNEX A

TABLE 1.: EDHEC SEASONALITY COEFICIENTS ON SEVEN STRATEGIES (1998-2008)

	EDHEC EMN	EDHEC L SH EQ	EDHEC GLB MACR	EDHEC FX INC ARB	EDHEC EV DRIV	EDHEC EMEG MKT	EDHEC CONC ARB
Jan	0,064321039	-0,024138052	0,131104531	0,422464932	0,597227733	0,180378844	**1,111358697**
Feb	0,230270932	0,22748209	0,349223266	0,469014008	0,436588531	1,327472498	0,319279705
Mar	0,065311735	-0,13271595	-0,263567089	-0,144436916	0,169585692	0,554566152	0,089018895
Apr	0,023988902	0,214358737	-0,192721081	**0,527566705**	0,506219217	0,601659805	0,348758085
May	0,147211523	-0,147657485	-0,055511436	0,468661235	0,304670924	-1,119428359	0,143042730
Jun	0,293161417	0,138508111	0,018970935	-0,000244235	-0,012331914	0,063119840	-0,243581716
Jul	-0,271797780	-1,008962656	-0,722910329	0,066304841	-0,692971116	-0,854331961	-0,281115253
Aug	-0,354938796	-0,785524333	-0,707518867	-0,060782447	-0,952701227	-1,854511035	-0,379557882
Sep	-0,217170720	-0,695722373	-0,463036495	-0,626051553	-0,972431339	-1,696508290	-0,545273237
Oct	-0,042129917	-0,085920413	-0,322190487	-1,360411568	-0,408525086	-0,393960091	-1,076443138
Nov	-0,396180023	0,758427001	0,653200976	-0,196589766	0,278108439	1,044951744	0,14056878
Dec	**0,457951689**	**1,541865324**	**1,574956075**	0,434504765	**0,746560146**	**2,146590853**	0,373944333

Table 2.A.: CSFB SEASONALITY COEFFICIENTS ON SEVEN STRATEGIES (1998-2008)

	CSFB EMN	CSFB L SH EQ	CSFB GLB MACR	CSFB FX INC ARB	CSFB EV DRIV	CSFB EMERG MKT	CSFB CONC ARB
Jan	0,326236471	-0,297886301	0,270061291	0,573713891	**0,695057335**	-0,172941627	**1,061271099**
Feb	0,210915239	0,712280354	0,551344913	0,514471145	0,431148838	1,304314977	0,264882966
Mar	**0,568321280**	-0,290280263	0,078083081	-0,272044328	0,244513070	1,151571582	-0,109686986
Apr	0,336636412	-0,299204517	-0,306087843	**0,955985653**	0,344240937	0,006100913	0,569379425
May	0,447678817	-0,633583316	0,529741234	0,360379271	0,289423350	-1,453006119	0,327536746
Jun	0,286903040	0,592037884	0,686479401	0,099318343	0,050969400	0,306977758	-0,170669569
Jul	0,294309081	-1,173250006	-0,258600613	0,064621051	-0,546575460	-0,536674728	-0,222512249
Aug	0,121715122	-1,182174259	-1,170044264	-0,174621695	-1,258665774	-2,215781760	-0,437991292
Sep	-0,049969746	-0,482916695	-1,236033369	-0,806591713	-0,844392452	-2,007616065	-0,656197607
Oct	0,269254477	-0,399113676	-1,423840656	-1,621289005	-0,331028221	-0,126723097	-1,122585741
Nov	-3,338794027	0,822871161	0,530170238	-0,214168115	0,336881465	1,526897144	0,193753398
Dec	0,526793832	**2,631219635**	**1,748726587**	0,520225503	0,588427514	**2,216881021**	0,302819810

Table 2.B.: CSFB SEASONALITY COEFFICIENTS ON SEVEN STRATEGIES (1998-2008) excluding abnormal return of November 2008 for the Equity Market Neutral Strategy

	CSFB EMN	CSFB L SH EQ	CSFB GLB MACR	CSFB FX INC ARB	CSFB EV DRIV	CSFB EMERG MKT	CSFB CONC ARB
Jan	0,094670090	-0,297886301	0,270061291	0,573713891	**0,695057335**	-0,172941627	**1,061271099**
Feb	-0,034264417	0,712280354	0,551344913	0,514471145	0,431148838	1,304314977	0,264882966
Mar	**0,309528349**	-0,290280263	0,078083081	-0,272044328	0,244513070	1,151571582	-0,109686986
Apr	0,064230206	-0,299204517	-0,306087843	**0,955985653**	0,344240937	0,006100913	0,569379425
May	0,161659336	*-0,633583316*	0,529741234	0,360379271	0,289423350	*-1,453006119*	0,327536746
Jun	-0,012729716	0,592037884	0,686479401	0,099318343	0,050969400	0,306977758	-0,170669569
Jul	-0,018936950	*-1,173250006*	-0,258600613	0,064621051	*-0,546575460*	-0,536674728	-0,222512249
Aug	-0,205144184	*-1,182174259*	-1,170044264	-0,174621695	*-1,258665774*	*-2,215781760*	*-0,437991292*
Sep	-0,390442327	-0,482916695	-1,236033369	-0,806591713	*-0,844392452*	*-2,007616065*	*-0,656197607*
Oct	-0,084831379	-0,399113676	-1,423840656	-1,621289005	-0,331028221	-0,126723097	*-1,122585741*
Nov	-0,029220431	0,822871161	0,530170238	-0,214168115	0,336881465	1,526897144	0,193753398
Dec	0,145481426	**2,631219635**	**1,748726587**	0,520225503	0,588427514	**2,216881021**	0,302819810

TABLE 3: EDHEC AVERAGE RETURNS (%) ON SEVEN STRATEGIES (1998-2008)

	EDHEC EMN	EDHEC L SH EQ	EDHEC GLB MACR	EDHEC FX INC ARB	EDHEC EV DRIV	EDHEC EMEG MKT	EDHEC CONC ARB	**GLOBAL AVERAGE**
Jan	0,668182	0,687273	0,819091	0,740000	1,257273	0,813636	**1,600000**	0,940779
Feb	0,825455	0,926364	1,033636	0,780909	1,088182	1,957273	0,790909	1,057532
Mar	0,651818	0,553636	0,417273	0,161818	0,812727	1,180909	0,543636	0,617403
Apr	0,601818	0,888182	0,484545	**0,828182**	1,140909	1,224545	0,786364	0,850649
May	0,716364	0,513636	0,618182	0,763636	0,930909	-0,500000	0,563636	0,515195
Jun	0,853636	0,787273	0,689091	0,289091	0,605455	0,679091	0,160000	0,580519
Jul	0,280000	-0,372727	-0,056364	0,350000	-0,083636	-0,241818	0,105455	-0,002730
Aug	0,188182	-0,161818	-0,044545	0,217273	-0,351818	-1,245455	-0,010000	-0,201170
Sep	0,317273	-0,084545	0,196364	-0,353636	-0,380000	-1,090909	-0,192727	-0,226880
Oct	0,483636	0,512727	0,333636	-1,093636	0,175455	0,208182	-0,740909	-0,017270
Nov	0,120909	1,344545	1,305455	0,064545	0,853636	1,643636	0,459091	0,827403
Dec	**0,966364**	**2,115455**	**2,223636**	0,690000	**1,313636**	**2,741818**	0,675455	**1,532338**

Table 4.A.: CSFB AVERAGE RETURNS (%) ON SEVEN STRATEGIES (1998-2008)

	CSFB EMN	CSFB L SH EQ	CSFB GLB MACR	CSFB FX INC ARB	CSFB EV DRIV	CSFB EMEG MKT	CSFB CONC ARB	**GLOBAL AVERAGE**
Jan	0,859091	0,522727	1,068182	0,768182	**1,357273**	0,286364	**1,505455**	0,909610
Feb	0,723636	1,519091	1,350000	0,698182	1,088182	1,767273	0,691818	1,119740
Mar	**1,060909**	0,502727	0,877273	-0,099091	0,896364	1,618182	0,300000	0,736623
Apr	0,809091	0,480000	0,493636	**1,118182**	0,990909	0,476364	0,961818	0,761429
May	0,900000	0,131818	1,330000	0,511818	0,930909	-0,979091	0,702727	0,504026
Jun	0,719091	1,343636	1,487273	0,240000	0,687273	0,784545	0,187273	0,778442
Jul	0,706364	-0,435455	0,542727	0,194545	0,084545	-0,055455	0,118182	0,165065
Aug	0,513636	-0,458182	-0,368182	-0,055455	-0,632727	-1,730909	-0,114545	-0,406620
Sep	0,321818	0,227273	-0,433636	-0,698182	-0,223636	-1,519091	-0,350000	-0,382210
Oct	0,620909	0,297273	-0,620909	-1,523636	0,284545	0,365455	-0,833636	-0,201430
Nov	-3,007273	1,505455	1,333636	-0,127273	0,947273	2,022727	0,465455	0,448571
Dec	0,838182	**3,300000**	**2,552727**	0,596364	1,193636	**2,716364**	0,557273	**1,679221**

Table 4.B.: CSFB AVERAGE RETURNS (%) ON SEVEN STRATEGIES (1998-2008) excluding abnormal return of November 2008 for the Equity Market Neutral Strategy

	CSFB EMN	CSFB L SH EQ	CSFB GLB MACR	CSFB FX INC ARB	CSFB EV DRIV	CSFB EMEG MKT	CSFB CONC ARB	**GLOBAL AVERAGE**
Jan	0,859091	0,522727	1,068182	0,768182	**1,357273**	0,286364	**1,505455**	0,909610
Feb	0,723636	1,519091	1,350000	0,698182	1,088182	1,767273	0,691818	1,119740
Mar	**1,060909**	0,502727	0,877273	-0,099091	0,896364	1,618182	0,300000	0,736623
Apr	0,809091	0,480000	0,493636	**1,118182**	0,990909	0,476364	0,961818	0,761429
May	0,900000	0,131818	1,330000	0,511818	0,930909	-0,979091	0,702727	0,504026
Jun	0,719091	1,343636	1,487273	0,240000	0,687273	0,784545	0,187273	0,778442
Jul	0,706364	-0,435455	0,542727	0,194545	0,084545	-0,055455	0,118182	0,165065
Aug	0,513636	-0,458182	-0,368182	-0,055455	-0,632727	-1,730909	-0,114545	-0,406620
Sep	0,321818	0,227273	-0,433636	-0,698182	-0,223636	-1,519091	-0,350000	-0,382210
Oct	0,620909	0,297273	-0,620909	-1,523636	0,284545	0,365455	-0,833636	-0,201430
Nov	0,670000	1,505455	1,333636	-0,127273	0,947273	2,022727	0,465455	0,973896
Dec	0,838182	**3,300000**	**2,552727**	0,596364	1,193636	**2,716364**	0,557273	**1,679221**

ANNEX B

FIGURE 1: EDHEC AVERAGE RETURNS (%) BY STRATEGY (1998-2008)

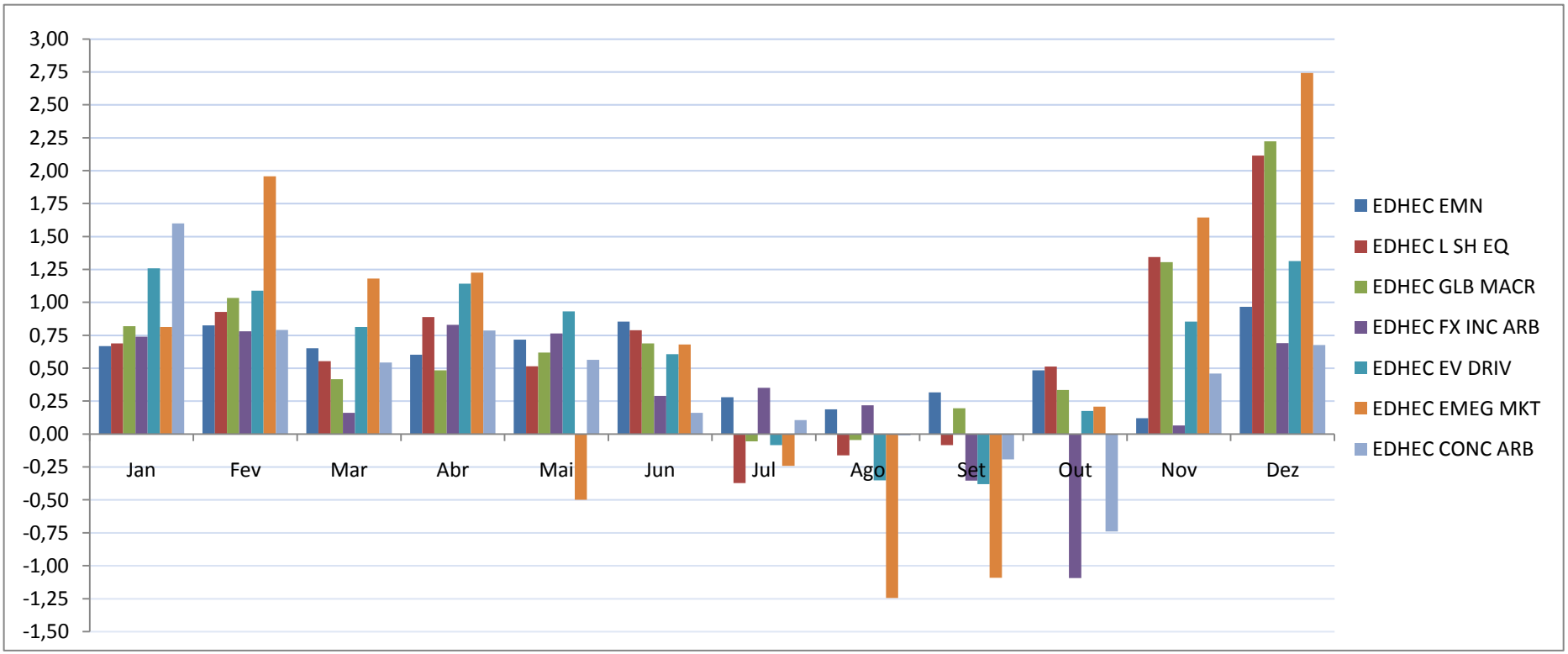


FIGURE 2.A.: CSFB AVERAGE RETURNS (%) BY STRATEGY (1998-2008)

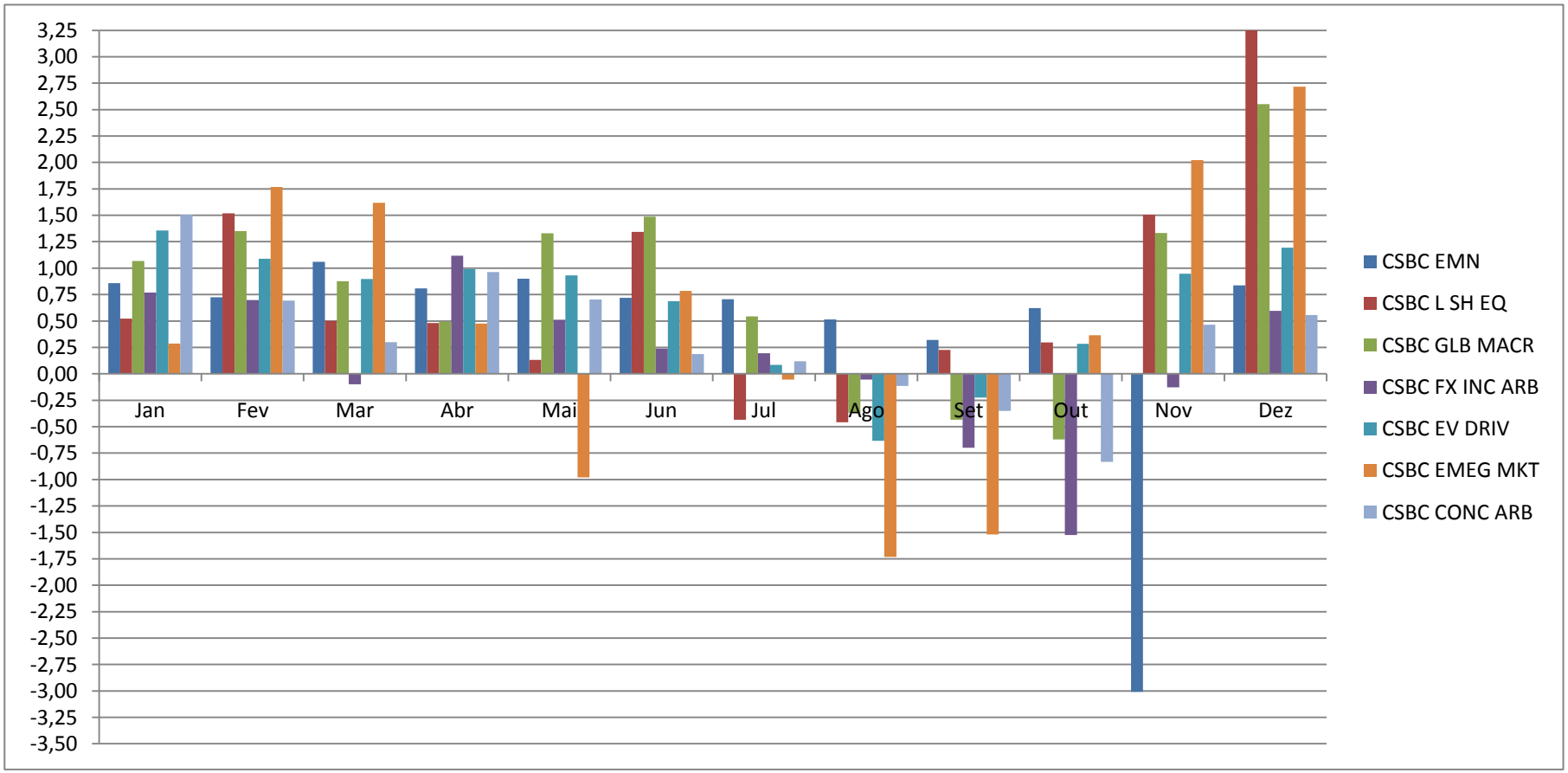
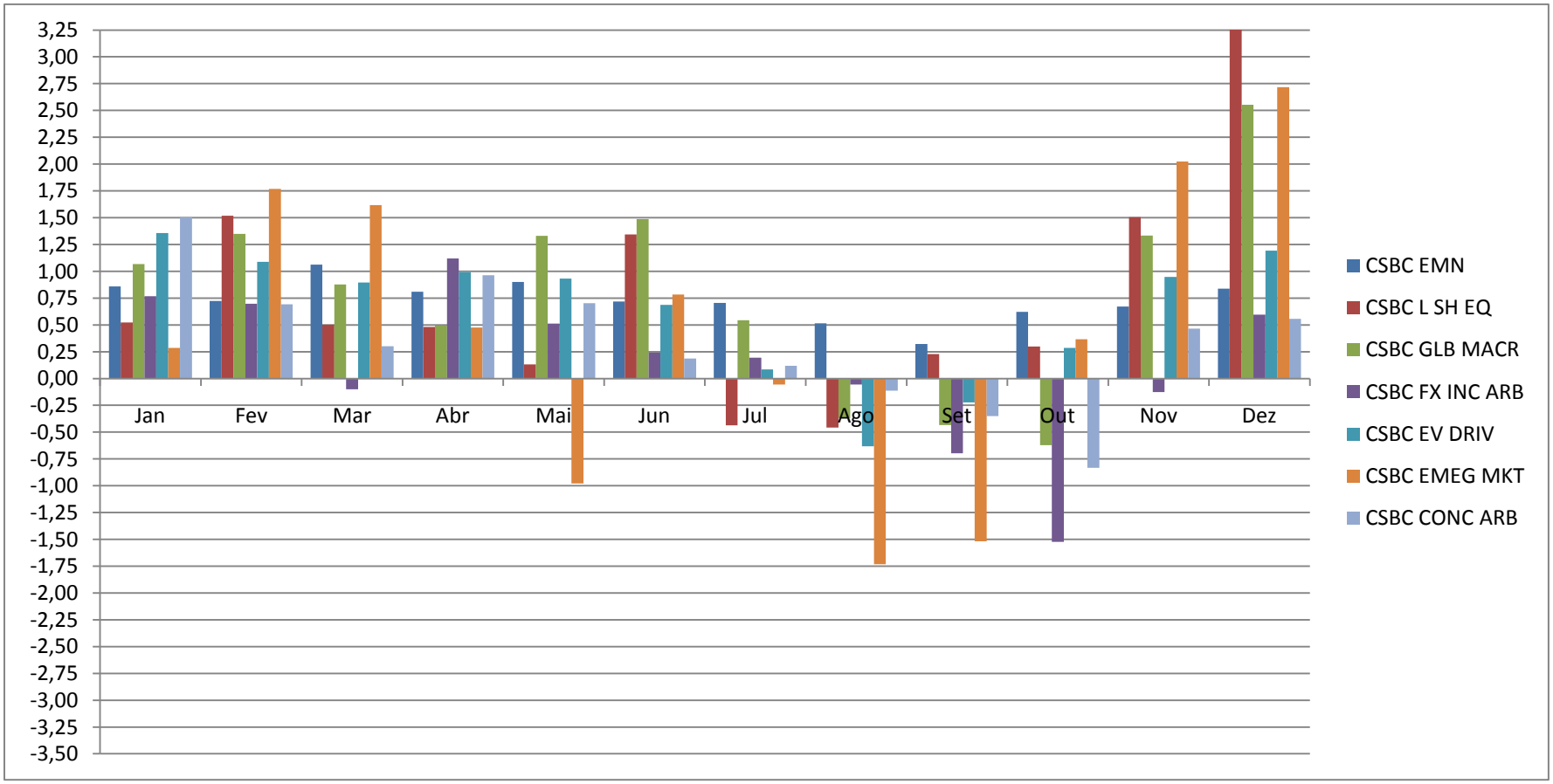


FIGURE 2.B.: CSFB AVERAGE RETURNS (%) BY STRATEGY (1998-2008) excluding abnormal return of November 2008 for the Equity Market Neutral Strategy



APPENDIX A

Information on hedge fund strategies accordingly with Martellini, Bied & Amenc (2002]

Convertible Arbitrage: Attempts to exploit anomalies in prices of corporate securities that are convertible into common stocks (convertible bonds, warrants, convertible preferred stocks). Convertible bonds tend to be under-priced because of market segmentation; investors discount securities that are likely to change types: if issuer does well, convertible bond behaves like a stock; if issuer does poorly, convertible bond behaves like distressed debt. Managers typically buy (or sometimes sell) these securities and then hedge part of or all of associated risks by shorting the stock. Delta neutrality is often targeted. Over-hedging is appropriate when there is concern about default as the excess short position may partially hedge against a reduction in credit quality.

Emerging Markets: Invests in equity or debt of emerging (less mature) markets that tend to have higher inflation and volatile growth. Short selling is not permitted in many emerging markets, and, therefore, effective hedging is often not available, although Brady debt can be partially hedged via U.S. Treasury futures and currency markets.

Equity Market Neutral: Hedge strategies that take long and short positions in such a way that the impact of the overall market is minimized. Market neutral can imply dollar neutral, beta neutral or both.

– Dollar neutral strategy has zero net investment (i.e., equal dollar amounts in long and short positions).

– Beta neutral strategy targets a zero total portfolio beta (i.e., the beta of the long side equals the beta of the short side). While dollar neutrality has the virtue

of simplicity, beta neutrality better defines a strategy uncorrelated with the market return.

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.

Event Driven: corporate transactions and special situations

– Deal Arbitrage (long/short equity securities of companies involved in corporate transactions)

– Bankruptcy/Distressed (long undervalued securities of companies usually in financial distress)

– Multi-strategy (deals in both deal arbitrage and bankruptcy)

Fixed-Income Arbitrage: Attempts to hedge out most interest rate risk by taking offsetting positions. May also use futures to hedge out interest rate risk.

Global Macro: Aims to profit from changes in global economies, typically brought about by shifts in government policy that impact interest rates, in turn affecting currency, stock, and bond markets. Participates in all major markets – equities, bonds, currencies and commodities – though not always at the same time. Uses leverage and derivatives to accentuate the impact of market moves. Utilizes hedging, but the leveraged directional investments tend to make the largest impact on performance.

Long/Short Equity: Invests equally in long and short equity portfolios generally in the same sectors of the market. Market risk is greatly reduced, but effective stock analysis and stock picking is essential to obtaining meaningful results. Leverage may be used to enhance returns. Usually low or no correlation to the market. Sometimes uses market index futures to hedge out systematic (market) risk. Relative benchmark index is usually T-bill.

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