

*Systematic Factors Driving the Return of Swedish  
Long/Short Equity Hedge Funds: Separating Betas  
and Alpha*

Mikael Haglund, CAIA  
Altevo Research

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Mikael Haglund is the founder of Altevo Research in Zug, Switzerland and he can be reached at +41 44 586 30 54 or [mh@altevoresearch.com](mailto:mh@altevoresearch.com). Mikael is a CAIA charter holder.

## **Abstract**

With an asset based factor analysis we study the development of betas and alpha of Swedish Long/Short Equity hedge funds, domiciled in- and managed from Sweden with an investment emphasis on the Swedish equity market. Our analysis shows that the risk- and return of the funds are mainly a result of exposure to the broad Swedish equity market and to the spread between small capitalization stocks and large capitalization stocks. The ability to adjust the beta exposures to changes in the stock market environment is limited and alpha is mainly a result of security selection during periods with a strong equity market.

## 1. Introduction

In a European perspective, Sweden can be seen as an early adopter of hedge funds with several funds established during the second half of the 1990s. This trend has continued and Sweden is now one of the countries in Europe where hedge funds have gained the most popularity, both among institutional- and retail investors. Today, the whole Nordic region is demonstrating strong growth both in terms of number of new funds and assets under management, with Sweden still being the dominating area but strong growth is now also seen in Denmark and Finland.

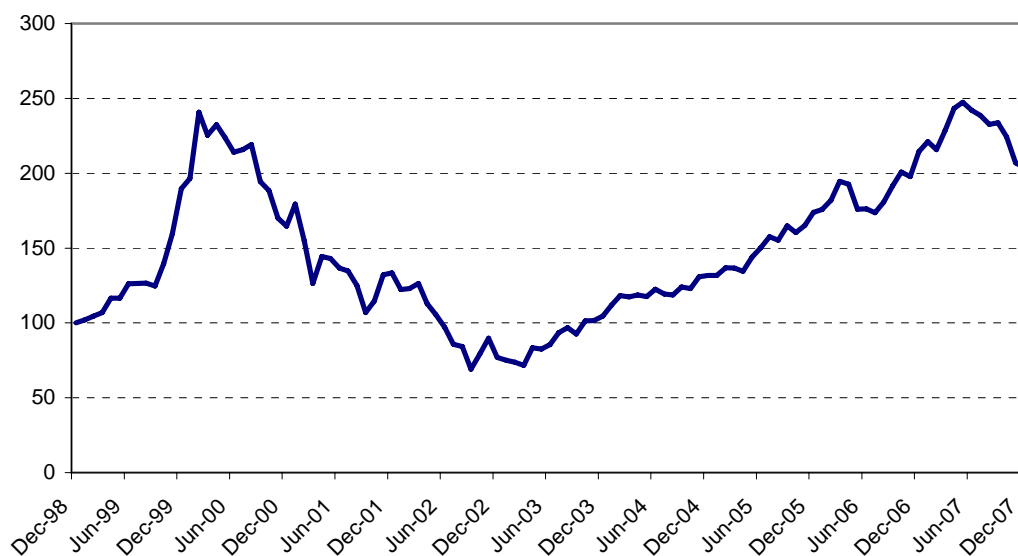
Another interesting feature of the Swedish market is the level of retail investors invested in hedge funds. Both the minimum investment and the fees charged by hedge funds domiciled in Sweden are generally significantly lower than compared to the rest of Europe and U.S. Instead of a minimum of EUR or USD 100,000 and the standard fee structure of 2% management fee and 20% performance fee, we often see a 1% and 20% fee structure and a minimum investment as low as a few thousand Swedish Kronor. The liquidity is also on a high level in an international perspective, with several funds offering a daily trading in the fund. Furthermore, a hurdle rate set at for example the 3-months SSVX, is utilized by many funds and a yearly reset of the hurdle rate is normally not applied. Besides from the demand side driving the growth in the Swedish hedge fund market, there is also much lower entry barriers as the cost of setting up a domestic fund is significantly lower compared to an off-shore fund.

Sweden has had a long tradition of long only equity investments in the form of mutual funds, and this has been an important factor which has formed the development of the hedge fund industry in the Nordic area. Long/Short Equity is the dominating investment strategy, both in terms of number of funds and assets under management, and the majority of new launches the last few years have also been in this strategy. The number of senior brokers and long only fund managers who have departed to start up Long/Short Equity hedge funds have been quite significant during the last three years. As a result of this common background, the investment strategy of a majority of these funds is similar with a focus on fundamental stock picking among Nordic, and especially Swedish, small- and mid cap stocks.

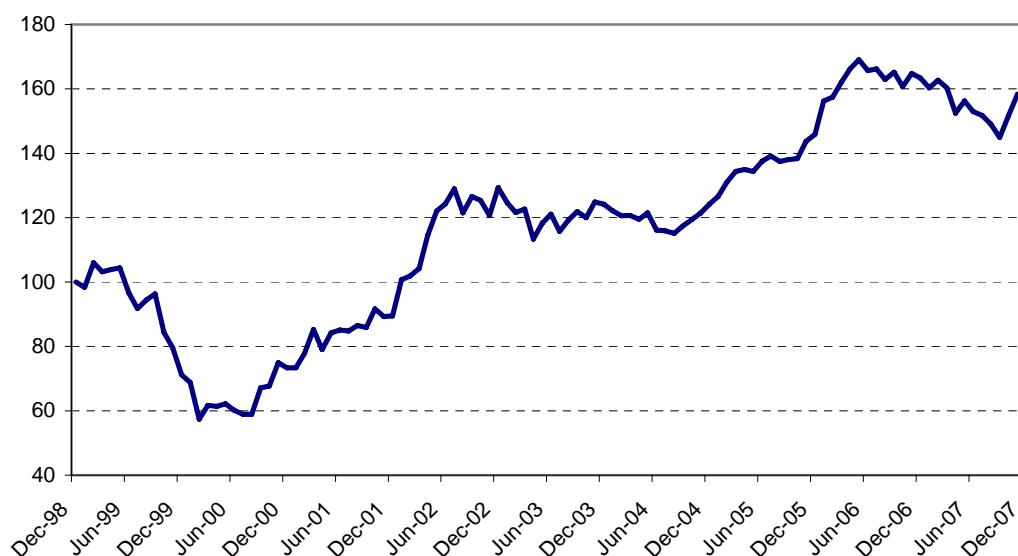
Several studies, for example Fung and Hsieh (2004a) and Agarwal and Naik (2004), have shown that the main factors driving the return of Long/Short Equity hedge funds are a broad stock market factor and the spread between small- and large capitalization stocks. The identification of these factors is natural since most Long/Short Equity hedge funds operate with a net long bias and utilize a fundamental stock picking approach with focus on finding undervalued stocks. The long side of the portfolio generally consists of stocks with a higher market capitalization than the short side of the portfolio, due to stock borrowing restrictions and an increased opportunity set among small- and mid cap stocks as a result of less attention from traditional equity investors and brokers.

Many of the Long/Short Equity funds currently active in Sweden have been launched during the period 2003-2006, and as a result there are a plenty of managers with track records covering mainly a period of favourable equity market, as seen in Exhibit 1. With the correction in the equity market in May 2006 and the declining market from June – December 2007 due to the U.S credit crisis, we have now entered a more challenging market environment. In addition to the positive trend in the equity market during spring 2003 until spring 2007, the performance of small capitalization stocks minus large capitalization stocks has been an equally important and significant factor in driving the return of the funds. As seen in Exhibit 2, the small – large cap spread performed very strong from summer 2004 until May 2006, helping the typical fundamentally focused Long/Short fund.

*Exhibit 1 MSCI Sweden including dividends net of taxes*



*Exhibit 2 MSCI Sweden Small – Large capitalization spread including dividends net of taxes*



Both Haglund (2006) and Jaeger and Wagner (2005) study the development of alpha generated by Long/Short Equity hedge funds with a multi-factor rolling window analysis, and their results point towards a trend of decreasing alpha from the end of 2001 and onwards. The authors of the latter study explain this with a decreasing average quality of managers launching new funds as a more mature industry has resulted in lower entry barriers. In the study conducted by Haglund there is some evidence that there are structural breaks in the alpha and beta exposures of Long/Short Equity funds. The alpha is generally at a higher level during periods of a strong equity market and a negative alpha is seen during the period March – October 2004, when the market traded sideways. The presence of structural breaks in returns of hedge funds have also been identified by Agarwal et al (2007) for Convertible Arbitrage hedge funds and by Fung et al (2007) for diversified hedge fund portfolios.

In this paper we study the beta exposures and the generated alpha of Swedish Long/Short Equity funds domiciled in- and managed from Sweden and with an investment strategy emphasising Swedish equities. Our results show that the return of the funds is mainly coming from a long position to the broad Swedish equity market and an exposure to the spread between small – and large capitalisation stocks.

The rest of this paper is structured as follows; in section 2 we describe the factor analysis process, section 3 deals with the data used in the study, in section 4 we present the results from the study and the paper ends in section 5 with conclusions.

## 2. Methodology

In order to study the return drivers, and as a result the systematic risk factors (betas) and the skill based part of the return (alpha) of the hedge funds, we use a multi-factor based analysis. We run a static as well as a 24-months rolling window regression analysis on the constructed index series.

A general version of a multi-factor model takes the following form:

$$R_i = \alpha_i + \sum_{j=1}^K \beta_{i,j} \cdot F_j + \varepsilon_i \quad (1)$$

where  $R_i$  is the return on fund  $i$ ,  $K$  is the number of factors,  $F_1, \dots, F_K$  are the values of the factors,  $\beta_{i,1}, \dots, \beta_{i,K}$  are the corresponding sensitivities and  $\varepsilon_i$  is a zero mean random variable.

The model we use to study the betas and alpha of the Swedish Long/Short Equity hedge funds is structured as follows:

$$R_i = \alpha_i + \beta_M X_{M,t} + \beta_{SL} X_{SL,t} + \varepsilon_i \quad (2)$$

where  $R_i$  is the return on fund  $i$ ,  $X_{M,t}$  and  $X_{SL,t}$  are the values of the stock market factor and the small- large cap factor respectively,  $\beta_M$  and  $\beta_{SL}$  are the corresponding sensitivities and  $\varepsilon_i$  is a zero mean random variable.

### 3. Data

There is currently no suitable benchmark tracking the performance of Long/Short Equity hedge funds domiciled in Sweden, managed from Sweden and with an investment strategy with focus on the Nordic area with a special emphasis on Sweden. We therefore create an own benchmark covering these funds. We construct an equally weighted index series of funds matching the above mentioned criteria and without any restrictions on assets under management or length of track record and with all funds denominated in Swedish Kronor. Funds that have ceased operation, been bought by another firm or changed the portfolio manager are still part of the created index series with their historic returns. In order not to give too much weight to investment advisors managing funds with a very similar investment strategy, or funds that are a leveraged version of an existing fund, we have excluded funds falling into these categories from the analysis. We set the starting date of the index series as the date when we have a minimum of 10 included hedge funds and that is November 2002. As per end of December 2007, 24 funds fit the criteria for inclusion as outlined above. With this construction methodology we should get an aggregated picture of the return of Swedish Long/Short Equity funds. As a result of this process we also avoid some of the many biases normally inherent in public hedge fund indexes. For more on the construction of hedge fund indexes and the various biases in index construction we refer to Fung and Hsieh (2004b) and Amin and Kat (2003).

As equity market benchmark we have chosen MSCI Sweden and MSCI Sweden Small cap index, and both indexes are including dividends net of taxes.

### 4. Empirical results

#### *Static regression analysis*

As shown in Exhibit 3 below, we can explain 60% of the return of the hedge fund portfolio with the model in equation 2 above when we study the whole period from November 2002 – December 2007. The most significant factor in explaining the return of the hedge fund portfolio is MSCI Sweden, with a t-statistic of 9.67. This confirms that the Swedish Long/Short Equity funds generally are maintaining a net long position against the broad market. The spread between small- and large caps is also a significant factor, confirming that the funds employ an investment strategy where they are long small- and mid cap stocks and hedge these with short positions in large cap stocks or index positions.

The correlation between the actual return of the hedge fund portfolio and the model is 0.78 and as indicated by the Durbin-Watson test, there is no significant serial correlation among the error terms in the model.<sup>1</sup>

*Exhibit 3 Static multi-factor regression analysis November 2002 – December 2007*

<i>Regression Statistics</i>		<i>Durbin-Watson test</i>					
Multiple R	0.785101341	1.85					
R <sup>2</sup>	0.616384116						
Adjusted R <sup>2</sup>	0.603380188						
Standard Error	0.008110822						
Observations	62						

<i>ANOVA</i>						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	2	0.00623644	0.003118219	47.39984	5.30822E-13	
Residual	59	0.00388134	6.57854E-05			
Total	61	0.01011778				

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Critical t value</i>
Intercept	0.001593003	0.00114344	1.3932		-0.0006	0.0038	2.000995361
MSCI Swe	0.227711964	0.02352512	9.6795		0.1816	0.2738	
MSCI SL	0.157644991	0.04172454	3.7782		0.0759	0.2394	

***Rolling window regression analysis***

To examine how the beta exposures and the alpha have developed over time we also conduct a 24-month rolling window analysis with a jump of one month at a time based on the model in equation 2. The beta exposures over time are displayed in Exhibit 4, and as shown we can see a clear trend towards higher betas both against the broad Swedish equity market and to the small cap- large cap spread. It is interesting to note that the turbulent equity market during summer 2006, and the hefty decline in the Swedish market from August 2007 to December 2007, has not resulted in a decrease in the beta exposures of the equally weighted hedge fund index. The likely explanation is twofold; the normal stance of the funds is a net long position against the stock market and the ability to foresee the decline in the market was very limited, secondly; a number of new funds started during 2006 and 2007 with an outspoken net long bias to the Swedish equity market.

As seen in Exhibit 5, the model has a low explanatory power until autumn 2005, but a very high explanatory power thereafter. From October 2005 to December 2007 the model can explain around 80% of the return of the hedge fund portfolio and the correlation between the actual return and the model is around 90%.

<sup>1</sup> A value of the Durbin-Watson test close to 2 indicates no serial correlation among the error terms of the regression model. Generally, the value should be between 1.5 and 2.5 to indicate that the observations are independent of each other.

Exhibit 4 Beta to MSCI Sweden and MSCI Sweden Small cap – Large cap spread

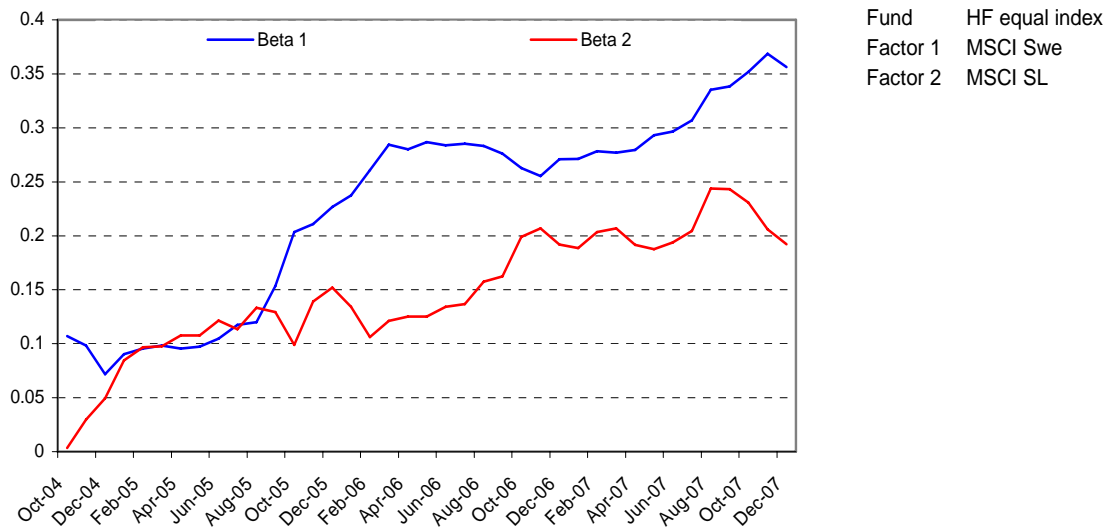
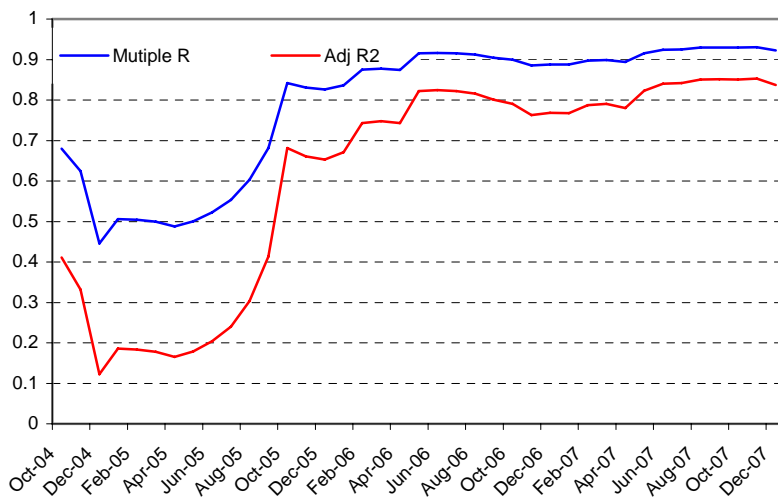


Exhibit 5 Correlation (Multiple R) and explanatory power (Adj R2) of the model



In Exhibit 6, we display the actual monthly return of the hedge fund index plotted against the return of the model (named Replica model). As seen, the return of the model follows the actual return of the hedge fund index, with a higher level of discrepancy seen up to end of 2005. To test the stability of the model we also plot the actual return against the return of the model calculated with a beta from the previous month. For example, the July 2007 return of the model has been calculated with a beta from the 24-month of data ending at the end of June 2007. In this way we can see to what extent we can predict the return of the hedge fund index for the coming month. The correlation between the actual return and the return predicted by the model is 0.90. As can be seen, the difference between Exhibit 6 and 7 is quite small and we can therefore conclude that the model shows signs of stability.

Exhibit 6 Performance of the Replica model versus actual portfolio performance

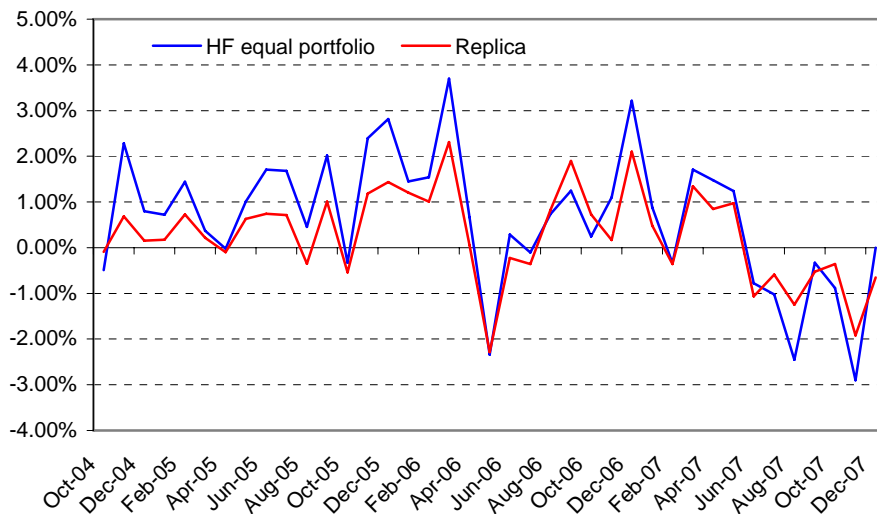
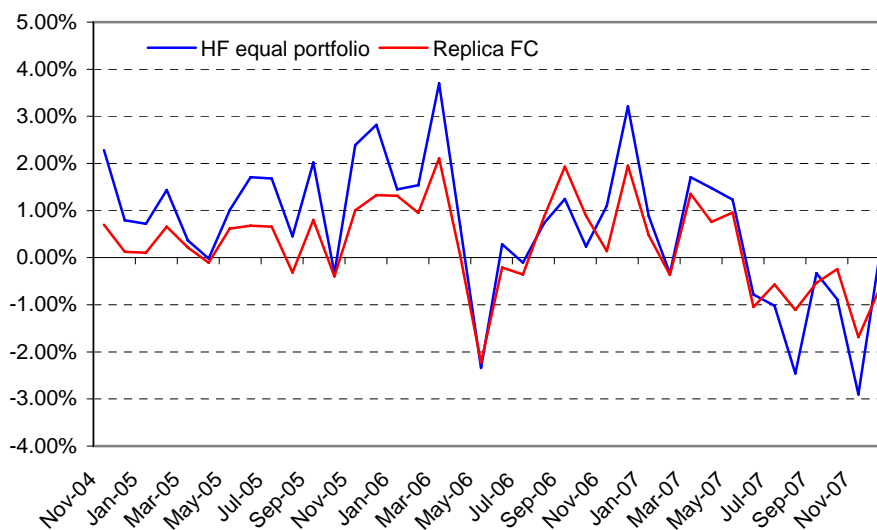


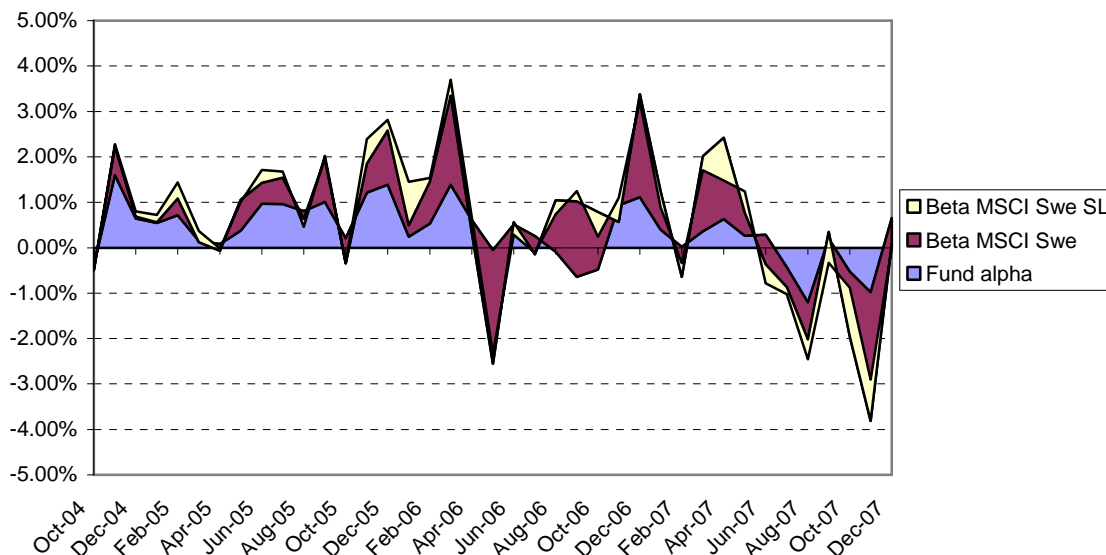
Exhibit 7 Performance of the Replica model with beta at 1-month lag versus actual portfolio performance



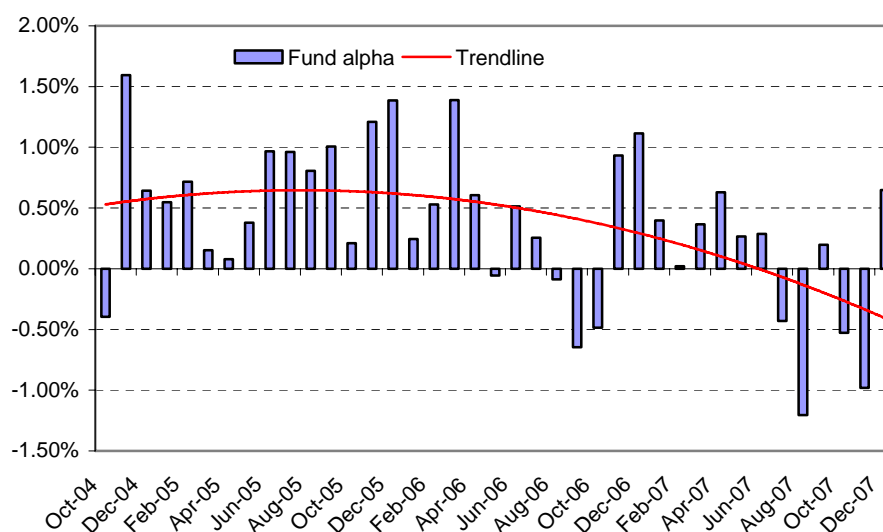
We now analyse the return of the hedge fund portfolio in terms of systematic risk exposures (betas) and skill-based return due to security selection (alpha). As shown in Exhibit 8, the majority of the return is due to an exposure to the Swedish equity market and the Swedish small – large cap spread. It appears that the alpha was higher during the period October 2004 to May 2006 and as seen in Exhibit 1 and 2, this was a period of strong returns for both the Swedish equity market and the small-large cap spread. From June 2006 until December 2007 less alpha is generated and the security selection by the portfolio managers of the funds even contributed negatively to the returns during the second half of 2007, as displayed in Exhibit 8 and 9. Visible is also the trend towards a lower alpha and, as discussed earlier, this can be the result of a net long bias, lower entry barriers in starting a hedge fund as institutional and retail investors have become more familiar with the investment

form and that most portfolio managers come from a broker- or long only investment environment where stock picking generally is focused on generating long ideas that outperform the market.

*Exhibit 8 Return of equally weighted hedge fund index split in alpha and beta contributions*



*Exhibit 9 Monthly alpha of equally weighted hedge fund index*



The low or negative return generated during 2007 by a number of funds, together with the limited capability of generating alpha when the equity market is not showing positive returns, will most likely further contribute to the already initiated consolidation process where a number of funds have closed or been taken over by other market participants. We can also expect a higher diversion in terms of future assets under management, where funds that do not possess the skill to manage their beta exposures during adverse market conditions will see growing outflows. This will lead to a less attractive business model since the cost of running a Long/Short fund is fairly static and the number of closures can therefore be expected to grow in the near future. Another factor that will impact the attrition rate among the funds is

related to the performance fee and the use of high water marks. As a number of funds now are well below their previous peak performance levels they need to first produce a positive return during a period in order to be able to charge the performance based fee. A yearly reset of the high water mark is not common, and a period of low fees earned by the funds can therefore be expected for the near future.

A study by Goetzmann et al (2001), conclude that the use of a high water mark can result in an increased risk appetite since the performance fee can be seen as an out-of-the money call option when the fund's performance is well below its previous peak. This will be an issue of some importance going forward, since some managers might be will willing to increase the risk in order to reach the level where they once again can start to charge performance fee.

As a result of more hedge fund closures, we also predict a tougher environment for new participants without a solid background and track record in managing money on an absolute return basis to raise assets to form new funds.

## **5. Conclusions**

In this paper, we analyse the risk- and return drivers of Swedish Long/Short Equity funds domiciled and managed from Sweden and with an investment bias to the Swedish equity market. Our results show that the return and risk of the funds are mainly driven by a long exposure to the Swedish stock market and the spread between Swedish small- and large capitalization stocks.

Furthermore, we also identify a trend towards higher beta against the Swedish equity market as well as towards the Swedish small- large cap spread, even during the more turbulent market in 2006 and 2007. This is likely the result of that several of the new funds that started during 2006 and 2007 operate with a net long bias to the equity market. At an aggregated basis the funds show a limited ability to be able to adjust the beta exposures due to a change in market environment, a fact that had a negative impact on the returns during the second half of 2007.

As an aggregated group, the Swedish Long/Short Equity funds should therefore be seen as mainly a beta (broad stock market) and alternative beta (the performance of the spread between small- and large capitalization stocks) play, rather than pure alpha plays. As shown here, the ability to generate a continuous alpha is fairly limited. Here, a discussion of the normal hedge fund fee structure among Swedish Long/Short Equity funds of 1% fixed fee and 20% performance is also justified. Paying full hedge fund fees for a fund that is to a very large extent driven by static beta and alternative beta exposures is, in our view, not fully justified. An analysis of each manager's ability to adjust the beta exposures and thereby preserve capital in periods of a negative equity market, coupled with a study of the alpha capabilities in form of security selection is therefore necessary.

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