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Abstract

Shareholder activism generally refers to practices pursued by individuals, mutual funds, pension funds and hedge funds to influence a given firm’s policy, with the aim of effecting a number of changes at the corporate level. Shareholder activism has evolved over time, being influenced by changes in the external regulatory environment as well as firms’ internal factors.

Generally speaking, hedge fund activism falls at the more aggressive end of the spectrum of shareholder activism, since it actively seeks to enforce changes to management or boards or to a firm’s strategy.

Activists such as Carl Icahn and Nelson Peltz have long been engaged in activist practices. Since 2000 the number of activist hedge funds across the globe has increased significantly, with 383 new activist hedge funds launched by the end of December, 2014, according to Preqin data. In recent years, hedge fund activists have played an increasingly important role in influencing the governance structure of targeted firms and in value creation. In the last few years, new players have entered the activist spectrum (among others, John Paulson’s Paulson & Co. and Andrew Shapiro’s Lawndale Capital), launching investment vehicles to raise money from investors and leveraging minority board representation to actively influence the corporate strategy of targeted firms.

Shareholder activism and corporate governance have been the focus of an intense debate in recent years among market participants and academics. The findings of studies on the effects of shareholder activism are controversial. Nonetheless, they appear to support the statistical significance of abnormal returns around an announcement window. Also, some analyses document the existence of positive changes in profitability, operating performance and corporate structure of targeted firms as well as positive intra-industry effects.

This research paper broadly reviews the topic of hedge fund activism. It focuses on the specific case of the STOXX® Activist Index, analyzing its risk/return profile and performance drivers. The goal is to identify the most significant performance-contribution factors that may justify investing in an activist index concept.
HEDGE FUND ACTIVISM

"ALL IS CHANGE; ALL YIELDS ITS PLACE AND GOES."
Euripides (c. 480 BC-406 BC)

1 Hedge Fund Activism–An Overview

The term “shareholder activism” refers to a series of actions and practices put in place by one or more shareholders of a given firm to actively influence firm policy and practices, with the ultimate goal of enhancing shareholder value in the long term.

Agency problems between management and shareholders call into question firms’ corporate governance, introducing the need for shareholder monitoring. Activist strategies and their effectiveness are bound by legislation, which differs across jurisdictions. While the setting is more confrontational in the US, in Europe the process is more consensual and statutory. Within Europe, the UK and The Netherlands add a certain level of complication to corporate rules. In France, the trade unions’ mandatory seat on certain boards adds a layer of protection that works against strategies that seek significant changes to a firm’s board.

Recently, some activist investors have voiced doubts about whether the term “activist” truly represents the underlying strategy pursued. Event-driven hedge fund Amber Capital co-founder Joseph Oughourlian has formulated the new term of “suggestivist” investor. Knight Vinke CEO Eric Knight, speaking at a conference, recently said he considers himself an “engaged investor.”

Recently, hedge funds have been blamed for not pursuing diversity in their activist strategies. They have been cited as one of the sources for the decline of representation by African-Americans within boards of directors of US firms. According to the annual Board Index study by Spencer Stuart, in 2015 African-Americans, who account for about 13% of the US population, represent only 8.6% of the directors on the boards of the largest 200 companies by revenue in the S&P 500. The reading for 2015 declined from 9.6% for 2010. The figure was 9% in 2006, the year in which time-series data started.

Shareholder activism has been booming in recent years. The year 2014 recorded more than 250 US companies targeted by activists as well as a number of nonpublic engagements. In 2014, icons of corporate America were targeted by activist investors. Those included Allergan, Amgen, Apple, Bank of New York Mellon, DuPont, PepsiCo, Walgreens, Yahoo! and Hertz Global Holdings.

At the end of October, 2015, the market value of shareholdings held by activist investors stood at USD253 billion, up from USD237 billion at 2014 year-end. In terms of sector representation, financial firms publicly subjected to activist demands as a proportion of all activism grew by 6.4 percentage points for 2015 compared to a year earlier. All other sectors posted a decline year on year.
According to the most recent data from Activist Insight, the type of activist actions has evolved since 2010. Nowadays, it appears to be more focused on business strategy rather than on board-related activism.

Several studies have investigated whether shareholder activism prompts significant changes in target firms’ operations, profitability or governance. The key question behind academic studies is whether shareholders’ activism creates value.
Different forms of shareholders activism can be identified. Generally speaking, shareholder activism can be classified into four different categories: shareholder proposals, negotiations, hedge fund activism and proxy fights. Within the broad category of proxy fights fall those investor activities triggered by Dodd-Frank’s "say on pay" advisory vote.

Hedge fund activism is characterized by an approach that usually differs from other forms of fund activism. First of all, hedge fund activism is more confrontational than hostile. Generally speaking, hedge funds do not aim to achieve control in target companies\(^1\), and in the first stage of their intervention, they tend to cooperate with a firm’s management. Usually, conflicts with management arise when hedge funds clash about a CEO’s pay and turnover.

Hedge fund activists tend to target companies that feature “value” characteristics—firms with low market capitalization relative to book value, although profitable, with solid operating cash flow and return on assets. Usually, payout at firms before hedge fund intervention is lower than that of peer firms.

According to the February, 2015 edition of *Preqin Hedge Fund Spotlight*, 37% of activist hedge funds focus their activities on North America, and 30% have a focus that spans global regions. The others focus on specific regions, which include Asia-Pacific (15%), Europe (10%), and emerging markets (9%).

A number of studies did not find any significant benefits for shareholders when an activist strategy was pursued by institutional investors such as pension funds and mutual funds\(^2\).

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1. Brav, Jiang, Partnoy and Thomas (please refer to note 3 below) found a 9.1% median maximum ownership stake of the sample analyzed. The ownership stake stood at 31.5% at the 95\(^{th}\) percentile in the full sample, well below the threshold for majority control.

Conversely, findings of Brav, Jiang, Partnoy and Thomas\(^3\), who worked on a large-scale sample for 2001 through 2006, were consistent with the view that informed shareholder monitoring contributes to reduce agency costs at targeted firms. In other words, hedge fund activism proved to be effective in addressing the cost of shirking. Market response to hedge fund activism was remarkable and was sustained by expectations that it created value. Large positive abnormal returns in the seven- to eight-percentage-point range were observed during the announcement window (-20 days, +20 days) around a Schedule 13D's filing, revealing an activist fund's investment in a target firm. It was observed that target firms' stock market prices declined after an unsuccessful exit of a hedge fund, which was consistent with expectations of the success of activism as reflected in the positive-announcement returns.

The authors' findings offered support to the view that positive market reaction was consistent with *ex post facto* evidence of improved performance at target firms. They concluded that "on average, from the year before to the year after an announcement, total payout increases by 0.3 to 0.5 percentage points (as a percentage of the market value of equity, relative to an all-sample mean of 2.2 percentage points), and book value leverage increases by 1.3 to 1.4 percentage points (relative to an all-sample mean of 33.5 percentage points). Both changes are consistent with a reduction of agency problems associated with free cash flow and subject managers to increased market discipline."

STOXX recently launched an activist index series. The STOXX Activist Indices, in both the equal- and cap-weighted versions, capture the performance of public companies in which the top activist hedge funds have a significant investment stake. The indices are designed to reflect the activists' main goals of increasing shareholder value and outperforming markets. The indices' constituents are selected from the pool of publicly traded companies in the FactSet Corporate Activism database. In order to be eligible for inclusion, target firms have to be traded on a STOXX-eligible exchange.

Firms are eligible to enter the index to the extent they meet the following criteria:

1. Shareholder activism on target firms has been announced in the past two years, and the related activism is not of the type "short position/bear raid."
2. Specific liquidity and size screening criteria have to be met: three months' average daily traded value equal to or greater than USD1 million and a free-float market capitalization equal to or greater than USD250 million.
3. Firms that are targeted by shareholder activists should be included in the SharkWatch 50-member top list (top activists as defined by FactSet).
4. Target firms have to be exchange-listed and must not be mutual funds.

Firms in which the related activist investor holds at least 7% of the market capitalization or share participation with an absolute value to the tune of at least USD500 million at the time of the announcement are selected for inclusion in the index. Index reviews are conducted on a quarterly basis.

The figures below show the ICB industry allocations at Dec. 21, 2015, for both the STOXX Activist Index and the STOXX® USA 900 Index.

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As a result of activist strategy targeting, allocation overweightings to basic materials and consumer services were noticeable for the STOXX Activist Index compared to the STOXX USA 900 Index. The STOXX Activist Index significantly underweighted industry allocations to consumer goods, health care, industrials, oil & gas, telecommunications and utilities compared to the STOXX USA 900 Index.

Changes in ICB industry-allocation weightings of the STOXX Activist Index for the period July, 2015 through December, 2015 reflected sector composition of targeted firms. Changes in industry allocation weightings of the STOXX Activist Index were almost in line with annual changes for the period 2014-2015 in the target sector of firms publicly subjected to activist demands as a proportion of all activism, as recently published by Activist Insight. It is noteworthy that at Dec. 21, 2015, compared to the July, 2015 month-end reading, sector allocation weightings to oil and gas almost halved, with technology, telecommunications, utilities and basic materials declining 38, 17, 38 and 12 percentage points, respectively. At the same time, sector allocations to industrials climbed 176% compared to July's reading. Industry weightings of consumer goods (+31.65%), health care (+29.72%), consumer services (+20.47%) and financials (+16.08%) also rose for the period from July-December, 2015.
FIGURE 5A  STOXX ACTIVIST INDEX, ICB INDUSTRY HISTORICAL ALLOCATION WEIGHTINGS (JULY-DECEMBER, 2015, USD GROSS RETURN)

FIGURE 5B  STOXX USA 900 INDEX, ICB INDUSTRY HISTORICAL ALLOCATION WEIGHTINGS (JULY-DECEMBER, 2015, USD GROSS RETURN)

Source: STOXX
2 Risk-Return Analysis and Benchmarking

An analysis of the performance of the STOXX Activist Index confirmed that the index outperformed both the key equity market-cap benchmarks for the US market and the peer hedge fund strategy indices in both absolute and risk-adjusted terms over longer measurement periods. The STOXX Activist Index also posted superior performance against the hedge fund peer indices for the one-year period ended Dec. 7, 2015.

### TABLE 1 STOXX ACTIVIST INDEX, S&P500 COMPOSITE INDEX AND STOXX USA 900 INDEX, SUMMARY OF RISK/RETURN MEASURES (DEC. 15, 2006-DEC. 7, 2015, DAILY US-DOLLAR GROSS-RETURN INDICES)

<table>
<thead>
<tr>
<th></th>
<th>S&amp;P 500 Composite - Total Return</th>
<th>STOXX USA 900 - Gross Return</th>
<th>STOXX Activist - Gross Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized Return (%)</td>
<td>-0.84</td>
<td>-1.04</td>
<td>-3.36</td>
</tr>
<tr>
<td>Annualized Volatility (%)</td>
<td>15.27</td>
<td>15.04</td>
<td>14.62</td>
</tr>
<tr>
<td>Return/Risk Annualized</td>
<td>0.86</td>
<td>0.83</td>
<td>2.81</td>
</tr>
<tr>
<td>Tracking Error Annualized</td>
<td>15.27</td>
<td>15.04</td>
<td>14.62</td>
</tr>
<tr>
<td>1-Month</td>
<td>2.01</td>
<td>0.15</td>
<td>0.77</td>
</tr>
<tr>
<td>Year to date</td>
<td>2.89</td>
<td>15.02</td>
<td>16.28</td>
</tr>
<tr>
<td>5-Year</td>
<td>15.75</td>
<td>14.99</td>
<td>10.04</td>
</tr>
<tr>
<td>Since 15/12/2006</td>
<td>10.54</td>
<td>15.17</td>
<td>16.40</td>
</tr>
</tbody>
</table>

Since 15/12/2006

| Max Drawdown (%)      | -55.25                           | -54.80                         | -40.28                         |
| Beta                 | 1.02                             | 1.00                           | 1.02                           |

Source: STOXX

### TABLE 2 STOXX ACTIVIST INDEX, HFRX EQUITY HEDGE INDEX AND HFRX EVENT-DRIVEN INDEX, SUMMARY OF RISK/RETURN MEASURES (DEC. 15, 2006-DEC. 7, 2015, DAILY US-DOLLAR GROSS-RETURN INDICES)

<table>
<thead>
<tr>
<th></th>
<th>STOXX Activist - Gross Return</th>
<th>HFRX Equity Hedge - Total Return</th>
<th>HFRX Event Driven - Total Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized Return (%)</td>
<td>-3.36</td>
<td>-0.78</td>
<td>-2.07</td>
</tr>
<tr>
<td>Annualized Volatility (%)</td>
<td>14.62</td>
<td>4.06</td>
<td>4.31</td>
</tr>
<tr>
<td>Return/Risk Annualized</td>
<td>-2.81</td>
<td>-1.87</td>
<td>-5.81</td>
</tr>
<tr>
<td>Tracking Error Annualized</td>
<td>10.54</td>
<td>10.56</td>
<td>11.59</td>
</tr>
<tr>
<td>1-Month</td>
<td>-0.71</td>
<td>-1.80</td>
<td>-4.44</td>
</tr>
<tr>
<td>Year to date</td>
<td>16.26</td>
<td>4.32</td>
<td>4.86</td>
</tr>
<tr>
<td>5-Year</td>
<td>10.10</td>
<td>5.31</td>
<td>1.15</td>
</tr>
<tr>
<td>Since 15/12/2006</td>
<td>10.55</td>
<td>5.21</td>
<td>1.15</td>
</tr>
</tbody>
</table>

Since 15/12/2006

| Max Drawdown (%)      | -60.78                         | -31.47                          | -27.33                          |
| Beta                 | 1.02                           | 0.24                            | 0.15                            |

Source: STOXX

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**Note:** The STOXX Activist Index was launched on Jul. 16, 2015 (hereinafter, launch date). Index values calculated for any date or period prior to the index’s launch date are considered backtested. Beta in Tables 1, 2 and 3 is computed taking into account the S&P 500 Total Return Index as the market benchmark and a risk-free rate given by the three-month US T-bill total return index; returns for the one-month and year-to-date periods are period returns and are not annualized. In the same tables, rather than the traditional standard deviation of active returns, a more robust measure of tracking error has been computed to take into account both the drift component and the stochastic term of the active returns’ distribution. Tracking error has been computed as the root mean square of the active returns against the S&P 500 Composite Total Return Index.
In particular, Tables 1 and 2 above show that the daily US dollar gross-return version of the STOXX Activist Index generated superior returns—in both absolute and risk-adjusted terms. That was against the STOXX USA 900 market-cap benchmark, the S&P 500 Composite, the HFRX Equity Hedge and the HFRX Event-Driven for various measurement periods. The outperformance of the STOXX Activist Index came at higher risk levels (as proxied by the annualized volatility measure) relative to the underlying market-cap benchmarks and the hedge fund strategy indices.

For the three-year period at Dec. 7, 2015’s close in terms of US-dollar annualized daily returns, the STOXX Activist Index outperformed the S&P 500 Composite Total Return Index by 213 basis points, the STOXX USA 900 Gross Return Index by 235 basis points, the HFRX Equity Hedge Index by 1,459 basis points and the HFRX Event-Driven Index by 1,695 basis points.

Despite higher volatility readings, outperformance was also evident for risk-adjusted measures; those measures can be particularly appealing for institutional investors, who are traditionally risk-averse. The traditional risk/return annualized measure of 1.18 for the STOXX Activist Gross Return Index over the three-year period ended Dec. 7, 2015, compared favorably to 1.13 for the STOXX USA 900 Gross Return Index, 1.15 for the S&P 500 Total Return Index, 0.63 for the HFRX Equity Hedge Index and 0.24 for the HFRX Event-Driven Index.

Similarly, for the period Dec. 7, 2010, to Dec. 7, 2015, the risk/return annualized reading of 0.81 for the STOXX Activist Gross Return Index compared favorably to 0.75 for the STOXX USA 900 Gross Return Index, 0.81 for the S&P 500 Total Return Index, minus 0.14 for the HFRX Equity Hedge Index and 0.18 for the HFRX Event-Driven Index.

Finally, for the period since inception of time-series data on Dec. 15, 2006, until Dec. 7, 2015, the risk/return annualized reading of 0.42 for the STOXX Activist Gross Return Index compared favorably to 0.28 for the STOXX USA 900 Gross Return Index, 0.29 for the S&P 500 Total Return Index, minus 0.18 for the HFRX Equity Hedge Index and minus 0.003 for the HFRX Event-Driven Index.

The charts below plot indexed performance, 20-day annualized rolling window log-return volatility, 20-day rolling window correlation and trailing maximum drawdown of the STOXX Activist USD Gross Return Index, the S&P 500 Composite Total Return Index, the STOXX USA 900 USD Gross Return Index, the HFRX Equity Hedge Index and the HFRX Event-Driven Index for the period Dec. 15, 2006-Dec. 7, 2015.

The remarkable 146.21% indexed performance (10.55% annualized) in US-dollar gross-return terms (with an annualized log-return volatility of 23.12%) of the STOXX Activist Gross Return Index stood against the 72.93% of the STOXX USA 900 USD Gross Return Index (with an annualized log-return volatility of 21.38%), the 76.44% of the S&P 500 Composite Total Return Index (with an annualized log-return volatility of 21.25%), the negative 10.65% (with an annualized log-return volatility of 6.82%) of the HFRX Equity Hedge Index and the negative 0.14% (with an annualized log-return volatility of 5.08%) of the HFRX Event-Driven Index.

For the same period, the STOXX Activist Gross Return Index recorded a maximum drawdown of 60.28% in US-dollar terms, while the STOXX USA 900 Gross Return Index and the S&P 500 Composite Total Return Index posted drawdowns of 55.25% and 54.80%, respectively. The two hedge fund indices, the HFRX Equity Hedge and the HFRX Event-Driven, recorded for the same period maximum drawdowns of 31.47% and 27.33%.

The STOXX Activist Gross Return Index showed a mixed correlation pattern for the overall period with both the S&P 500 Composite Total Return Index and the HFRX Event-Driven Index. Generally speaking, periods of higher volatility were associated with higher correlations between the STOXX Activist Gross
Return Index and either the S&P 500 Composite Total Return Index or the HFRX Event-Driven Index. Other than a few noticeable exceptions, such as during the period of volatility clustering for summer 2015, since the end of 2012 the correlation of the STOXX Activist Gross Return Index with the S&P 500 Total Return Index appeared to oscillate within a 75%-95% range. Similarly, although with a lower degree of co-occurrence in the pattern of changes between the two indices, the correlation of the STOXX Activist Gross Return Index with the HFRX index appeared to move within a 45%-82% range since the end of 2010, with spikes below the lower bound of the range.

The STOXX Activist Gross Return Index underperformed in US-dollar gross-return terms year to date at the Dec. 7, 2015 close against both the S&P 500 Composite Total Return Index (-309 basis points) and the STOXX USA 900 Gross Return Index (-238 basis points). Conversely, for the same period, it outperformed the HFRX Equity Hedge Index and the HFRX Event-Driven Index by 159 basis points and 623 basis points, respectively.

**FIGURE 6** STOXX ACTIVIST INDEX, S&P 500 COMPOSITE INDEX, STOXX USA 900 INDEX, HFRX EQUITY HEDGE INDEX AND HFRX EVENT-DRIVEN INDEX, INDEXED PERFORMANCE (DEC. 15, 2006-DEC. 7, 2015, DAILY US-DOLLAR GROSS RETURN)

Source: STOXX
FIGURE 7 STOXX ACTIVIST INDEX AND S&P 500 COMPOSITE INDEX, ROLLING WINDOW LOG-RETURN VOLATILITY VERSUS ROLLING WINDOW LOG-RETURN CORRELATION (JAN. 12, 2007-DEC. 7, 2015, DAILY US-DOLLAR GROSS RETURN)

Source: STOXX

FIGURE 8 STOXX ACTIVIST INDEX AND HFRX EVENT-DRIVEN INDEX, ROLLING WINDOW LOG-RETURN VOLATILITY VERSUS ROLLING WINDOW LOG-RETURN CORRELATION (JAN. 12, 2007-DEC. 7, 2015, DAILY US-DOLLAR GROSS RETURN)

Source: STOXX
In order to compare the STOXX Activist Gross Return Index with its peer strategy in the hedge fund space, the HFRX ED: Activist Index was considered in the analysis. Given the lower frequency of calculation of the peer hedge fund index, the risk-return analysis focused on monthly data for the period Dec. 31, 2006, through Nov. 30, 2015.

In this case also, the analysis confirmed that the STOXX Activist Gross Return Index outperformed the peer hedge fund strategy index in both absolute and risk-adjusted terms over longer measurement periods.

In particular, Table 3 below shows that the monthly US-dollar gross-return version of the STOXX Activist Index generated superior returns—in both absolute and risk-adjusted terms—against the HFRX ED: Activist Index over various measurement periods. The outperformance of the STOXX Activist Index came at higher risk levels (as proxied by the annualized volatility measure) relative to the underlying hedge fund strategy index.

For the three-year period at Nov. 30, 2015’s close in US-dollar annualized monthly return terms, the STOXX Activist Index outperformed the HFRX ED: Activist Index by 925 basis points. Similarly, for the five-year period and the period since inception of the time-series data, the STOXX Activist Index outperformed the HFRX ED: Activist Index by 1,106 basis points and 672 basis points, respectively.

Conversely, for the one-month, year-to-date and one-year periods at the end of November, 2015, the STOXX Activist Index underperformed the HFRX ED: Activist Index by 196 basis points, 24 basis points and 622 basis points, respectively.

<table>
<thead>
<tr>
<th>STOXX Activist - Gross Return</th>
<th>HFRX ED: Activist - Total Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized Return (%)</td>
<td>Annualized Volatility (%)</td>
</tr>
<tr>
<td>1-Month</td>
<td>-0.53</td>
</tr>
<tr>
<td>Year to date</td>
<td>1.99</td>
</tr>
<tr>
<td>1-Year</td>
<td>0.97</td>
</tr>
<tr>
<td>3-Year</td>
<td>19.53</td>
</tr>
<tr>
<td>5-Year</td>
<td>16.01</td>
</tr>
<tr>
<td>Since 31/12/2006</td>
<td>10.92</td>
</tr>
<tr>
<td>Max Drawdown (%)</td>
<td>-53.40</td>
</tr>
</tbody>
</table>

Source: STOXX

The charts below plot indexed performance, six-month annualized rolling window log-return volatility, six-month rolling window correlation and trailing maximum drawdown of the STOXX Activist USD Gross Return Index, the S&P 500 Composite Total Return Index, the STOXX USA 900 USD Gross Return Index, the HFRX Equity Hedge Index, the HFRX Event-Driven Index and the HFRX ED: Activist Index for the period Dec. 31, 2006-Nov. 30, 2015.

Source: STOXX

FIGURE 12 STOXX ACTIVIST INDEX, STOXX USA 900 INDEX, S&P 500 COMPOSITE INDEX, HFRX EVENT-DRIVEN INDEX, HFRX EQUITY HEDGE INDEX AND HFRX ED: ACTIVIST INDEX, TRAILING MAXIMUM DRAWDOWN (DEC. 18, 2006-OCT. 13, 2015, DAILY US-DOLLAR GROSS RETURN)

Source: STOXX
3 Robust Omega Ratio Measurement

A specific investigation of the return time series of the STOXX Activist Index and the selected market benchmarks and hedge fund strategy indices considered in the analysis was performed to consider higher moments of the distribution of returns. Usually, the analysis of financial instrument series returns focuses on mean and variance, under the hypothesis of “compactness” of the distribution of returns (Samuelson, P. A. [1970], “The Fundamental Approximation Theorem of Portfolio Analysis in Terms of Means, Variances, and Higher Moments,” Review of Economic Studies, Vol. 37).

Compactness represents a continuity or inertia of stock prices. In the absence of particular shocks to the series, the uncertainty of stock returns over increasingly shorter periods decreases. Under these circumstances, investors who can rebalance their portfolios frequently will seek to make higher moments of the stock-return distribution so small as to be negligible. In this way, the action of investors in frequently revising their portfolios limits higher moments (even moments representing bad moments in the utility function for the investor) to negligible levels. However, in the presence of shocks or high volatility, the usual mean/variance analysis is inadequate, and higher moments of the utility function of the investment need to be considered. In particular, odd moments (third moment, i.e., skewness) represent good moments, since they define the measure of asymmetry. Positive numbers are associated with positive skewness and hence are desirable.

Positively skewed return distributions are characterized by more likely but smaller losses and less likely but extreme gains. In other words, “bad surprises” are more likely but are limited in magnitude. In a negatively skewed distribution, on the other hand, bad surprises are more likely to be extreme, even if they occur less frequently. Skewness is important because of its impact on portfolio choices and also because kurtosis (fourth-moment skewness, i.e., bad news) is not independent of skewness—the latter may induce the former.

In a normal market situation based on a portfolio analysis of three moments, investors should have a preference for positive skewness, since they prefer portfolios with a higher probability of greater returns. On the contrary, in episodic market crashes, it is expected the asymmetry would be characterized by negative skewness, with a higher probability of large falls in prices.

The distribution of log returns of the STOXX Activist Index, the selected market benchmarks and the hedge fund strategy indices considered in the analysis exhibited negative skewness with excess kurtosis. The shape of the distribution of the return series was leptokurtic, indicating that a larger portion of the variance of the distribution of the returns was attributable to infrequent extreme deviations as opposed to more frequent modest deviations. The magnitude of the peakedness of the log-return time series considered in the analysis was similar.

As highlighted in Table 4 below, under the null hypothesis of a normal distribution, the Jarque-Bera statistic (distributed as $\chi^2$ with two degrees of freedom) led to the rejection of the null hypothesis of a normal distribution at both the 5% and the 1% significance levels for the whole measurement period.
Interestingly, when restricting the analysis to the post-credit-crisis period (Mar. 31, 2009–Nov. 30, 2015), the Jarque-Bera statistic led to rejection of the null hypothesis of a normal distribution at both the 5% and the 1% significance levels only for the HFRX Event-Driven Index. Conversely, for the HFRX Equity Hedge Index, the probability to accept the null hypothesis for the Jarque-Bera statistic was just above the 5% significance level.

The traditional mean-variance approach to performance measurement and portfolio optimization is based on an approximation of normality in returns. Financial asset returns are at times better represented by hyperbolic distributions. The hyperbolic distribution decreases exponentially—more slowly than the normal distribution—being suitable to model financial patterns where numerically large values are more probable than is the case for the normal distribution. Thus, the hyperbolic distribution provides the possibility of modelling heavier tails.
Since in the traditional Sharpe ratio measurement not all asymmetries of the distribution of returns and risk-averse investors’ preferences are taken into account, some investments may mistakenly appear better or worse than they are. In light of the non-normal distribution of the return time series of the indices considered in the analysis for the full period, in this section we present an alternative and more powerful performance measure—the Omega (Ω) measure (originally presented in a research paper by Keating, C. and F. Shadwick [2002], A Universal Performance Measure, The Journal of Performance Measurement, 6 [3]).

The Omega measure incorporates all the moments of the distribution, since it is a direct transformation of it. The Omega measure splits the distribution of returns into two subparts, according to a return threshold. Thus, returns are divided into losses and gains above and below a return threshold, and then the probability-weighted ratio of returns above and below the partitioning is considered. The relative ranking of the various assets depends on the threshold value. The evaluation of an investment in financial assets with the Omega function should be considered for thresholds between 0% and the risk-free rate. Intuitively, this type of threshold corresponds to the notion of capital protection.

In addition to incorporating all the moments of the distribution of returns, the Omega function has two interesting properties: Firstly, when the threshold return is set to the mean of the distribution, the Omega measure is equal to 1.0. Secondly, whatever the threshold return, all financial assets may be ranked. Conversely, in the context of the Sharpe measure, the ranking leads to cumbersome interpretation for negative ratios.

The figure below shows the log Omega values corresponding to a series of monthly return thresholds for the STOXX Activist Index, compared to the STOXX USA 900 Index, the S&P 500 Index and the HFRX hedge fund strategy indices.

**FIGURE 13** STOXX ACTIVIST INDEX VERSUS MARKET BENCHMARKS AND HFRX INDICES—OMEGA FUNCTION VERSUS SHARPE RATIOS (US-DOLLAR GROSS RETURNS, JANUARY, 2007-NOVEMBER, 2015)

Source: STOXX calculations
For the period considered in the Omega analysis above, the STOXX Activist Index provided the best investment choice, since it factored in the positive performance momentum for the activist strategy over the measurement period. At the return threshold of 0.004% monthly or 0.5% annually, the S&P 500 Total Return Index and the STOXX USA 900 Gross Return Index posted 0.8222 and 0.8677 Omega values, respectively. The STOXX Activist Gross Return Index recorded a 0.9822 Omega reading.

Differently from an analysis based merely on the Sharpe ratio, which makes reference to a single reading for the overall period of the analysis, it is interesting to note how the relative ranking depended on the threshold value. For instance, the STOXX Activist Index versus the HFRX hedge fund strategy indices was a typical case where, whatever the threshold return, the financial assets could be graded as benefiting from the use of the Omega function. In fact, the Sharpe ratios for the measurement period were negative for both the HFRX Event-Driven (-0.56) and the HFRX Equity Hedge (-0.20).

Conversely, in the context of the Sharpe measure, any ranking based on the reading for the overall period might have been ambiguous. The HFRX ED: Activist posted a 0.7448 Omega value for the overall period from Jan. 31, 2007-Nov. 30, 2015. Also, the Omega reading of the peer hedge fund strategy was below the value recorded by the STOXX Activist Index (0.9822).

Expanding the Omega function analysis to take into account a higher return threshold (at 1% annually or above), the "best investment choice gap" between the STOXX Activist Index and the remaining benchmarks was maintained. At the 1.5% annual return threshold, the Omega value for the STOXX Activist Index stood at 0.9665 for the overall measurement period. For the same period, the S&P 500 Total Return Index, the STOXX USA 900 Gross Return Index and the HFRX ED: Activist Index posted 0.8082, 0.8483 and 0.7165 Omega readings, respectively.
4 Performance Contribution Analysis

Figure 14 below details the characteristics of a holdings-based performance analysis in US-dollar terms using the Style Research performance-attribution module on the STOXX Activist Index compared to the wider USA benchmark for the period from Jul. 16, 2015-Dec. 11, 2015.

The results of the performance-contribution analysis appeared to be consistent with hedge fund activism’s target strategy. The STOXX Activist Index featured a value strategy. The latest readings at Dec. 11, 2015, showed—a portfolio tilt toward the dividend yield (+0.76%), price-to-book (+0.42%), earnings yield (+0.85%), cash-flow yield (+0.73%) and price-to-EBITDA (+0.56%) factors. The fact that the value portfolio tilt appeared not to be confirmed against two forward-looking measures—the Thomson Reuters I/B/E/S consensus year one forecast annual earnings per share divided by the share price (-0.39%) and the Thomson Reuters I/B/E/S consensus year one forecast annual dividend per share divided by the share price (-0.35%)—was consistent with some findings in the academic literature\(^5\). In fact, analyst expectations generally reflected improved prospects at target firms only after hedge fund intervention. Conversely, it was more common that, during the months prior to Schedule 13D filings, analysts downgraded future activist targets more than they upgraded them.

Among the growth factors—with the exception of earnings growth (+0.23%), return on equity (-0.11%), income to sales (-1.62%), sales growth (-0.95%) and the forward-looking Thomson Reuters I/B/E/S consensus forecast growth of earnings over the next twelve-month period (-1.17%) all detracted from performance for the period.

\[\text{FIGURE 14 PERFORMANCE ATTRIBUTION, STOXX ACTIVIST INDEX VERSUS USA BENCHMARK (US-DOLLAR GROSS RETURN, JUL. 16, 2015-DEC. 11, 2015)}\]

Source: Style Research on STOXX data

A value style orientation was also confirmed when the analysis on a sector-adjusted basis was run to verify whether there were genuine style orientations or whether factor tilts were mostly due to sector characteristics. Despite lowering from the unadjusted style-exposure analysis, the earnings yield (+0.80%), sales-to-price (+0.30%) and price-to-EBITDA (+0.51%) factors still posted a significant contribution for the period. In other cases—such as for the dividend yield (+0.99%), price-to-book (+0.61%) and cash-flow yield (+0.74%) factors—the value tilt was confirmed by higher style exposure readings.

Source: Style Research on STOXX data
As highlighted above, the STOXX Activist Index showed significant exposure—with the expected sign—to some pure factors. In some cases, an index may also have had significant exposure to factors other than the intended factors. For instance, the STOXX Activist Index had a significant exposure to a mid-cap portfolio (76.49% in its latest reading, ranging between 63.95% and 76.49%) as seen by its positive exposure to the size factor in the same percentage. (Institutional investors should be aware of these potential secondary exposures and manage them appropriately.) The wider USA benchmark exposure to the mid-cap factor stood at 40.40% in its latest reading. At the same time, the STOXX Activist Index had an exposure to a large-cap portfolio to the tune of 9.68% in its latest reading, ranging between 9.49% and 21.42%, against a benchmark tilt of 40.40%.

In terms of style segment, the STOXX Activist Index holdings portfolio confirmed a large value bias compared to the wider USA benchmark, with an allocation of 54.75% in its latest reading, ranging between 45.94% and 54.78%. The reading stood against a benchmark exposure of 40.29% for the same style segment.

In risk-attribution terms, the largest contributions to tracking error, standing at 4.1% for the period analysed, came mainly from specific equity allocation (68.55%) and sector tilt (15.82%). The main contributions to sector risk came from basic materials (+0.53%, with an active weighting of 13.07%), utilities (+0.09%, with an active weighting of -2.21%), and healthcare (+0.08%, with an active weighting of -4.69%).
FIGURE 17A  STOXX ACTIVIST INDEX, CONTRIBUTION TO SECTOR RISK (US-DOLLAR GROSS RETURN, JUL. 16, 2015-DEC. 11, 2015)

FIGURE 17B  STOXX ACTIVIST INDEX, SECTOR ACTIVE WEIGHTINGS (US-DOLLAR GROSS RETURN, JUL. 16, 2015-DEC. 11, 2015)

Source: Style Research on STOXX data
5 Conclusions

An analysis of the performance of the STOXX Activist Index confirmed that the index outperformed both the key equity market-cap benchmarks for the US market and the peer hedge fund strategy indices in both absolute and risk-adjusted terms over longer measurement periods.

Despite higher volatility readings, the outperformance of the STOXX Activist Index was also evident for risk-adjusted measures; those measures can be particularly appealing for institutional investors, who are traditionally risk-averse. The traditional risk/return annualized measure of 1.18 for the STOXX Activist Gross Return Index over the three-year period ended Dec. 7, 2015, compared favorably to 1.13 for the STOXX USA 900 Gross Return Index, 1.15 for the S&P 500 Total Return Index, 0.63 for the HFRX Equity Hedge Index and 0.24 for the HFRX Event-Driven Index.

A specific investigation of the return time series of the STOXX Activist Index and the selected market benchmarks and hedge fund strategy indices considered in the analysis was performed to evaluate higher moments of the distribution of returns. A robust Omega ratio analysis for the period January, 2007 through November, 2015 confirmed that the STOXX Activist Index provided the best investment choice, since it factored in the positive performance momentum for the activist strategy over the measurement period. At the return threshold of 0.004% monthly or 0.5% annually, the S&P 500 Total Return Index and the STOXX USA 900 Gross Return Index posted 0.8222 and 0.8677 Omega values, respectively. The STOXX Activist Gross Return Index recorded a 0.9822 Omega reading. The HFRX ED: Activist posted a 0.7448 Omega value for the same measurement period.
Results of a performance-contribution analysis appeared to be consistent with the hedge fund activism’s target strategy in that the STOXX Activist Index featured a value strategy (reflected in its portfolio tilt toward a number of fundamental measures). The latest readings at Dec. 11, 2015, showed—among others—a portfolio tilt toward the dividend yield (+0.76%), price-to-book (+0.42%), earnings yield (+0.85%), cash-flow yield (+0.73%) and price-to-EBITDA (+0.56%) factors. The fact that the value portfolio tilt appeared not to be confirmed against two forward-looking measures—the Thomson Reuters I/B/E/S consensus year one forecast annual earnings per share divided by the share price (-0.39%) and the Thomson Reuters I/B/E/S consensus year one forecast annual dividend per share divided by the share price (-0.35%)—was consistent with some findings in the academic literature.

A value style orientation was also confirmed when the analysis on a sector-adjusted basis was run to verify whether there were genuine style orientations or whether the factor tilts were mostly due to sector characteristics.
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