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Global Standards and Ethical Stock Indexes: the case of the Dow Jones Sustainability Stoxx Index

Costanza Consolandi,[a] Ameeta Jaiswal-Dale,[b] Elisa Poggiani,[a] and Alessandro Vercelli[c]

Abstract

The increased scrutiny of investors regarding the non-financial aspects of corporate performance have placed portfolio managers in the position of having to weigh the benefits of "holding the market" against the cost of having positions in companies that are subsequently found to have questionable business practices. The availability of stock indexes based on sustainability screening makes increasingly viable for institutional investors the transition to a portfolio based on a Socially Responsible Investment (SRI) benchmark at relatively low cost. The increasing share of socially responsible investments may play a role in providing incentives towards a continuous upgrading of sustainability standards to the extent that their performance is not systematically inferior to that of the other funds. This paper examines whether these incentives have been so far detectable with particular reference to the Dow Jones Sustainability Stoxx Index (DJSSI) that focuses on the European corporations with the highest CSR scores among those included in the Dow Jones Stoxx 600 Index. The aim of the paper is twofold. First, we analyse the performance of the DJSSI over the period 2001-2006 compared to that of the Surrogate Complementary Index (SCI), a new benchmark that includes only the components of the DJ Stoxx 600 that do not belong to the ethical index in order to evaluate more correctly the size of possible divergent performances.Second, we perform an event study on the same data set to analyse whether the stock market evaluation reacts to the inclusion (deletion) in the DJSSI. In both cases the results suggest that the evaluation of the CSR performance of a firm is a significant criterion for asset allocation activities.

KEYWORDS: Dow Jones Sustainability Stock Index, Ethical stock indexes, SRI (Socially Responsible Investing), SRI funds
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1 Introduction

The increasing globalisation of economic activity has weakened the ability of stakeholders to monitor the CSR standards of a corporation. This has eroded the incentives of the top management to adopt satisfactory and homogeneous global CSR standards, and has induced the temptation of exploiting the economic opportunities offered by shortcomings in local market regulations and in their enforcement.

A reaction to this trend came from the emergence and progressive growth of Socially Responsible Investment (SRI). The share of the SRI over the total of mutual funds has reached the conspicuous value of 11% in the USA while in Europe the share is growing but is still not superior to 0.5%. The increasing share of SRI funds may play a role in providing incentives towards a continuous upgrading of SR standards to the extent that their performance is not systematically inferior to that of the other funds.

The analysis of the performance of SRI funds as compared to that of the other mutual funds started long ago (a pioneering study was that of Moskovitz, 1972). The number of studies on this issue progressively increased in the last years but their results have been so far rather mixed. A few of them found that SRI screening leads to a significant out-performance over the benchmarks (see, e.g., Derwall et al., 2005, Bauer, Koedijk and Otten, 2005). Others found that investors who allocate their wealth to SR equity mutual funds have to pay a price (see, e.g., Geczi, Stambaugh, and Levin, 2003). The meta-study by Orlitzky, Schmidt and Rynes (2003) suggests that the prevailing results of empirical studies show a slightly significant out-performance of SRI funds. These results are quite surprising from the point of view of economic and finance theory. Economic theory argues that the choice from a restricted set is likely to reduce the optimal results and can never improve them. Analogously, finance theory maintains that the use of SR filters leads to a restraint of the investment options and thus to a downwards shift of the line of efficient portfolios so that the trade-off between expected returns and risk deteriorates.

The recent diffusion of SRI (or "ethical") stock indexes (such as the DJSI family, FTSE4Good and Domini Social Index) may offer new insights on the influence of SR standards on the performance of corporate stocks. In principle SRI stock indexes could

also offer further opportunities for strengthening the incentives to upgrade global standards, since the inclusion of the stock of a certain corporation in one of these indexes could signal to stakeholders the compliance with satisfactory global CSR standards and encourage the investors to select such a company.

This paper aims to examine whether these incentives have been so far detectable with particular reference to one of the SRI indexes: the Dow Jones Sustainability Stoxx Index (from now on DJSSI) that focuses on European corporations selecting the companies with the highest CSR scores among those included in the Dow Jones Stoxx 600 Index.

Although there is a large body of literature that focuses on the performance of SRI mutual funds, there is a limited set of studies focusing on the performance of SRI indexes, probably because they have been introduced only recently. This lack of interest depended also on the shortness of the available time series that has seriously jeopardized the reliability of the empirical findings. As the length of these time series increases, it is worthwhile to focus more on the performance of SRI indexes also because the analysis of their performance may have significant advantages over the analysis of the performance of SRI funds. In particular, with SRI indexes we can evaluate directly the consequences of SRI screening on the risk-return profile of [SRI] stocks without having to filter their performance from the transaction costs of funds, their management skills, and their timing activities (see Schröder, 2003).

The list of the existing studies on the performance of SRI indexes compared to that of general stock indexes is rather short. The comparative performance of the Domini 400 Social index has been studied by Kurtz and Di Bartolomeo (1996), Sauer (1997), Di Bartolomeo and Kurtz (1999) and Statman (2000); the comparative performance of the DJSSI has been studied by Garz, Volk and Gilles (2002) and Volk (2003). In the most comprehensive study so far, Schröder (2003) analysed the performance of 29 SRI equity indexes. The results have been rather mixed. The studies on the Domini 400 Social index found a performance similar to that of the benchmark index. Di Bartolomeo and Kurtz (1999) found a slight out-performance of the Domini 400-index over the benchmark accompanied by a higher risk exposure[of the SRI index as compared to that of the

benchmark]. Garz et al. (2002) found a limited out-performance of the DJSSI index as compared to the DJ Stoxx 600 index. These results were challenged by Schröder (2003) who found a tenuous underperformance of the DJSSI as compared to that of the benchmark, and confirmed by Volk (2003) who used a different model. Finally Schröder (2003) drew from his comprehensive study the conclusion that SRI stock indexes do not exhibit in general risk-adjusted returns significantly different from the benchmarks, although many of them exhibit a higher risk exposure.

Our analysis is focused on the DJSSI, as we believe that each of the SRI indexes has its own peculiarities that must be carefully considered before being in the position of performing a significant comparative analysis (or meta-analysis) on a set of them. The DJSSI, launched in October 2001, tracks the performance of the top 20% DJ Stoxx 600 companies that lead the field in term of corporate sustainability[1].

The research methodology proceeds in two steps. We first analyse in the second section, the market performance of the DJSSI over time as compared to its official benchmark, in order to draw insights on the relationship between global CSR standards and the financial performance of European corporations. The results of this comparative analysis, however, are blurred by the fact that the official benchmark includes also the companies of the derived ethical index so that the performance of the DJSSI and that of its benchmark are not well discriminated. To remedy this shortcoming, typical of preceding research, we build an index that includes only the components of the benchmark that do not belong to the ethical index and we call it Surrogate Complementary Index (SCI). The comparison between the performance of the DJSSI and that of the SCI is thus meant to evaluate more correctly also the size of possible divergent performances.

Secondly, in the third section, we perform an event study on the same data set to analyse whether the stock market evaluation reacts to the inclusion (deletion) in the DJSSI. Therefore, we analyze the evolution of abnormal stock returns over a short-term period, from 10 working days before the announcement to 10 working days after the effective index change. To account for the return patterns of new entrants, prior to their inclusion in the index, we first estimate a simple market model for each of the included stocks

during the 250 trading days preceding the start of the test period. From this, we estimate the Cumulative Average Abnormal Returns (CAAR) for a given stock over the test period. Section 4 concludes by briefly discussing some theoretic and pragmatic implications of the empirical evidence produced.

2. The performance of the Dow Jones Sustainability Stoxx Index

The existing literature on the comparative performance of the DJSSI [Garz et al. (2002), Volk (2003) and Schroeder (2003)] did not distinguish between the backtracking period and the period following its official inception, probably because at the time of their publication the time series were too short to allow such a distinction. This is, however, an element of confusion since the results referring to the backtracking period are likely to suffer from a "backward-looking bias" (or "post-selection bias"), namely an apparently better performance due to information that was not yet available in earlier periods. We believe that the distinction between the period before and that after the inception of the index is now starting to be viable and may contribute to clarifying the issues at stake[2].

We first perform the analysis of the two official indexes starting from January 1999 including three years of backtracking of the DJSSI that has been calculated by the Dow Jones by applying the index composition of the starting date.

In the period January 1999-December 2006 the average daily return of the DJSSI was 0,009%, the risk (standard deviation of the daily return) was 1.24%, showing a poorer return/risk trade-off as compared to that of its benchmark (whose average daily return was 0.011%, with a lower standard deviation 1.15%). The results are different, however, once we consider separately the sub-periods of the time series: in the interval 1999-2001, covering only the backtracking period, we observe a constant out-performance of the sustainability index, although with a higher level of the standard deviation, while –on the contrary- the DJSSI underperforms since its inception as compared to the benchmark maintaining a higher level of risk. We may thus observe that the out-performance found by Garz et al. (2002) and Volk (2003) is influenced by the fact that the period considered by them overlapped with the backtracking period.

To explore further the issue, we measured the risk-adjusted returns of the two indexes by using the Sharpe ratio (*SR*) which allows a direct two-dimensional performance comparison as it measures the return above the risk-free interest rate (= excess return) divided by the total risk of the investment.[3] For the first three years, the value of the Sharpe ratio is higher than the benchmark; for the other years (and for the full period) it is slightly lower.

Table 1 provides an overview of the time series main characteristics, i.e. the average daily returns, standard deviations, average excess daily returns, and Sharpe ratios of the DJSSI and its official benchmark. At a first sight, for an investor primarily interested in socially responsible investments these results could mean that that he or she does have to accept negative differences in risk or return compared to the benchmark.

----------Insert Table 1 around here ----------

However, the preceding analysis compares the performance of the ethical index with the performance of its official benchmark, which –*de facto*- contains the ethical index itself, so that the different causal determinants are not well separated. In order to better understand the role played by CSR factors on market performance, we therefore define a new surrogate benchmark whose constituents are –for each year of the period analyzed- those stocks which are included in the DJ Stoxx 600 but not in DJSSI. We call this new index *Surrogate Complementary Index* (SCI) as it includes the elements of the benchmark not included in the subset of the DJSSI firms. The number of stocks included in each index and the relative free float market value are displayed in Table 2

----------Insert Table 2 around here ----------

We computed the value of the SCI by using the Laspeyres Formula, which is the methodology adopted by Dow Jones in computing the official indexes. [4]

To test the reliability of this methodology, we first computed the daily index value of both DJ Stoxx 600 and DJSSI from September 2001 to September 2006. The correlation coefficient of almost 1 for each year, between the value of our "computed" indexes and the official ones confirmed the soundness of our methodology (Table 3).

----------Insert Table 3 around here ----------

Time series characteristics from the effective index launch date (October 2001) are displayed in Table 4, where also the SCI is included[5]. The results are not surprising: since the new index is computed as a difference between the benchmark and the sustainable index, the figures show how the differences between the DJSSI and the SCI are amplified compared to those between the two official indexes.

----------Insert Table 4 around here ----------

As a large-cap bias for the DJSSI could be considered one of the possible explanations of our first results[6], we computed, for each year of the interval 2001-2006, three equally-weighted portfolios whose stocks are represented by the constituents of the DJSSI, DJ Stoxx600 and SCI. We observe that, once we consider the size effect, there is no sign of a systematically poorer return/risk trade-off ensuing from the use of a socially responsible filter: the average daily return of the DJSSI (0.031%) are above that of the STOXX600 (-0.026%) and of the SCI (0.025%). In four of the five years of the time series, the higher average return is even achieved with a lower risk (dominance relationship). Only in 2006 the two benchmarks performed better, but with no dominance relationship, since the out-performance had been achieved with a higher level of risk (see Table 5).

----------Insert Table 5 around here ----------

These preliminary findings seem to contradict the idea that social responsibility at a corporate level might represent mainly a cost factor and thus a sterile burden on financial

performance. In the next section we want to verify whether an event analysis applied to the inclusion or exclusion of a certain company stock corroborates our preliminary findings.

3. Corporate social responsibility and stock returns: an event study approach

In this part of the study, in order to investigate whether the inclusion (deletion) in the sustainability index gave to the company a strategic price advantage (disadvantage) we determine the price impact of new survey announcements using a standard event study approach. We limit our analysis to the market response in the short-run in order to clarify the signalling effects of these announcements.

The annual review methodology implemented by SAM GmbH, selects the leading sustainability companies from the DJ Stoxx stocks universe, which is reviewed annually. The resulting changes to the index composition are announced on the annual review date in September. Following a minimum 2-week notification period, these changes are implemented - after the official closing prices have been determined - on the third Friday of September of each year.

This means that it is necessary to take into account both the announcement's effect and the inclusion's effect on stock market performance and on stock trading volumes: i.e. the event window must be referred to the announcement date (AD) and to the date in which the index is effectively changed (ED).

In our analysis, following the methodology suggested by Caparrelli and D'Arcangelis (2003) in a different context, we divide the event window in the following sub-periods:

- ✓ pre announcement (AD-10:AD-1) to determine whether there could be any anticipation or leakage of information contained in the survey results;
- ✓ announcement (AD): the first trading day after the announcement of the new index composition;
- ✓ post-announcement (AD+1:ED-1): to verify the existence of a "game effect";
- ✓ effective (ED): the date of the effective index revision;

- ✓ post-effective (ED+1:ED+10): to determine whether there is any lagged impact or slow assimilation of any information contained in the survey data

----------Insert Table 6 around here ----------

For stock *i* on day *t* abnormal returns $Ar_{i,t}$ are calculated as the difference between actual ($R_{i,t}$) and expected returns $E(R_{i,t})$:

$$Ar_{i,t} = R_{i,t} - E(R_{i,t})$$

In order to obtain the expected returns, we used the *Market and Risk Adjusted Model* where they are calculated as follows, taking into consideration systematic risk:

$$E(R_{i,t}) = \alpha_{i,t} + \beta_{i,t} R_{M,t}$$

where $E(R_{i,t})$ is the expected return for security *i* on day *t*, $R_{i,t}$ is the return for security *i* on day *t*, $R_{M,t}$ is the market return on day *t*, α_i and β_i are the coefficients determined through an OLS regression model of security logarithmic daily returns on market logarithmic daily returns during the fifty-two weeks previous to the analysis period , i.e. from –53 week to –1 week (see table 6).

For each day of the event window, we computed the average abnormal return as:

$$\overline{AR}_t = \left(\frac{1}{n}\right)\sum_{i=1}^{n} AR_{it}$$

The cumulative average abnormal return (CAAR) is calculated by summing up abnormal returns over the event window:

$$CAAR = \sum \overline{AR}_t$$

We tested the significance of the model using both a parametric (*Student t*) and a non-parametric test (*Sign Test*).

a)The sample

We considered all the companies included in (deleted from) the DJSSI in the yearly annual revisions of the interval 2002-2006. Once we excluded the outliers and firms deleted from the sustainability index for mergers and acquisitions, the final sample consists of 113 companies included in the index and 95 deleted from it.

The size of the companies added to the DJSI is constantly increasing over the analysis period and it is, on average, higher than that of the deleted ones (with the only exception of 2002). This confirm that, due to the best-in-class approach adopted by SAM in the composition of the sustainability index, the biggest companies tend to achieve higher standards of corporate social responsibility [so] to be competitive in sustainability on a global basis (see Table 7)

----------Insert Table 7 around here ----------

b) Results

In the event analysis we tested the market reaction of stock prices to the inclusion (deletion) of a company stock in (from) the sustainability index. The hypothesis underlying this part of the study is that the inclusion (exclusion) in (from) the index affects positively (negatively) the market value of the stock. The announcement represents a good new (in the case of inclusion) or a bad new (in the case of deletion) about corporate responsibility practices, which reflect in higher (lower) stock prices.

For companies included in the index, through the analysis based on the single event windows, we can find a clear market reaction for the period preceding the announcement and for the one between the announcement and the effective index change date.

In the first case, our results reveal that the variable CAAR (AD-10:AD-1) is positive and statistically significant, suggesting a possible leakage of the results of the survey resulting

in a pre-announcement price impact. Cumulative abnormal return maintain a positive sign until the date of effective index change (ED); after this, we can notice a reversal effect, suggesting a possible effect of price pressure on the market.

For deleted stocks, our results seem to show a clear trend in stock market reaction. While we cannot detect any anticipation effect, as both CAAR(AD-10;AD-1) and the average abnormal return on the announcement day are positive, we observe negative (and statistically significant) cumulative abnormal return in the event windows following the disclosure of the results of the sustainability assessment.

----------Insert Table 8 around here ----------

Figures 1 and 2 show the trend of the cumulative average abnormal returns for the two sub-samples, computed summing up average abnormal return from the first day of the first event window (AD-10) to the last day of the last event window (ED+10) (see table 9)

----------Insert Table 9 around here ----------

Even if the sign of the abnormal returns is consistent with our hypothesis, we can nevertheless notice that the market seems to punish a deletion from the index more than it appreciates the inclusion in the index.

----------Insert Figure 1 around here ----------

----------Insert Figure 2 around here ----------

Two different hypothesis could be made to explain these results. First, due to the relatively big size of companies included in the DJSI and their consequent particular visibility, the inclusion in the index may have a lower effect. On the other hand, it is possible that the increasing attention on corporate sustainability by the investors' community implies that the company stock price already reflects fairly well the expected

value of sustainability, and hence the market punishes an unexpected deterioration of its ranking in sustainability standards (revealed by the deletion from the index) more than it appreciates the confirmation of its relatively good standards by the inclusion in the index. We must emphasize that the best-in class approach adopted by SAM Group, based on the best practice criteria in term of sustainability for each sector, could lead to a deletion of the company even if it has improved its CSR score (but someone else has performed better within the sector). Therefore, deletion from the index does not mean a deterioration of the sustainability policies of the company in absolute terms.

In order to clarify further this issue, we performed the event study analysis for those companies deleted from the DJSSI over the period 2002-2006 which registered a worst sustainability score compared to the previous year. We could include in our sample only those firms for which results of the assessment were available. Out of the 95 deleted companies of our original sample, only 58 participated to the assessment process both in the year of deletion and in the previous year. Out of these 58 companies, 31 (53%) registered a worst rating, whilst 27 (47%) had a better sustainable performance. Results of this analysis are shown in Table 9 and Figure 3.

----------Insert Figure 3 around here ----------

This confirms that sustainability matters: firms deleted from the index because of their relatively poorer level of sustainability policies show negative cumulative abnormal return for each event window with the higher level on the last day of the analysis (ED+10), confirming a persisting negative market reaction to such a bad new. In particular, we can notice that, whilst in the total sample of deleted companies we did not observe any anticipation effect, in this case, negative CAAR begins from the period preceding the announcement, showing stronger expectations on the results of the sustainability assessment.

----------Insert Table 10 around here ----------

Though the size of abnormal returns is quite low as compared with the results of other event studies related to changes of stock indexes, we must notice that the weight of socially responsible institutional investors in Europe is also very low, with assets invested on average equal to 0,50% of the total assets invested by UCITS[7] funds.

To determine whether trading activity increases when a firm is added to the DJSSI list, we analyse trading volumes, adjusted for market volume, in event-time. Cross-sectional means are computed as follows:

$$AVR_t = \frac{1}{n}\sum_{i=1}^{n} VR_{it}$$

Where

$$VR_{it} = \left(\frac{V_{it}}{V_{mt}}\right) * \left(\frac{\overline{V}_m}{\overline{V}_i}\right).$$

V_{it} and V_{mt} are the trading volumes of security *i* and of the market in event-time period *t*, respectively, and $\overline{V}_i$ and $\overline{V}_m$ are the average trading volumes of the security and of the total market in the 8 weeks preceding the announcement week. The volume ratio, VR_{it}, is, therefore, a standardized measure of period *t* trading volume in security *i*, adjusted for market variation. Its expected value is 1 if there is no change in volume during event-period *t* relative to the prior 8 weeks.

Results of the analysis are displayed in Table 11

----------Insert Table 11 around here ----------

Volume increases before the inclusion announcement, suggesting that the information is partially anticipated by the market: the summed volume for days A-10 to A-1 is 1.13 times as large as the daily mean volume over the 8 weeks prior to the announcement. Tests of whether these mean volume ratios are equal to 1 reject equality, at a level of 95% *(t* =1.92). After the announcement, volume increases as predicted in both the two event windows A+1; E-1 and E+1;E+10 (AVR_t are equal to 1.05 and 1.13 respectively). The

mean volume ratios are not caused by only a few firms; the individual volume ratios are greater than 1 in 47, 36 and 49 percent of the cross-sections, respectively.

We obtained no significant results in the case of deletions of firms from the index.

Summing up, results of the event study analysis show positive (negative) excess returns for companies included in (deleted from) the DJSSI over the period considered. We do not observe any reversal effect. Trading volumes of included companies show positive changes before the announcement (showing an anticipation effect) and after the index change, whilst we do not have any useful insight for deleted companies.

4. Concluding remarks

According to the sceptical view, the focus of management on CSR would increase operating costs, blur the objective function of the firm and reduce its financial performance (Jensen, 2001). According to the positive view, the standards of CSR reached by a firm may be seen as a sign of good management being able to mediate between the interests of different stakeholders in a long-term perspective (Freeman, 1984). According to the second view, differently from the first one, the evaluation of the CSR performance of a firm could be considered, therefore, a useful criterion for asset allocation. The increased demand of a stock characterized by excellent CSR standards would sustain its value and this would provide incentives to managers to strengthen further its SR standards. This virtuous circle may have a growingly positive effect on the sustainability of firms and of the entire economy. From an investors' perspective, this leads to an increased scrutiny regarding the non-financial aspects of corporate performance, placing portfolio managers in the position of having to weight the benefits of "holding the market" against the cost of having positions in companies that could be subsequently found to have questionable business practices.

The main results of our analysis are on the whole more in agreement with the positive view than with the negative one. First of all, we may observe that in the sample analysed the performance of SR firms is in any case very similar to that of the other firms. In fact

the difference of performance between the DJSI and the benchmark (DJ STOXX 600) is very limited. The difference of performance with the surrogate benchmark SCI built to discriminate more rigorously between the performance of the firms included in the ethical index and that of the other firms of the DJ Stoxx 600, is bigger but still quite limited. As for the sign, in the period after the inception of the index (2002-2006), the value-weighted ethical index DJSSI slightly underperformed the benchmarks. We argued, however, that the results change as soon as we take account of the bigger dimension of the firms selected in the ethical index DJSSI as compared to that of the index SCI. In this case we found that the performance of the equally weighted ethical index DJSSI slightly outperforms the benchmarks (with the only exception of the year 2006).

The ambiguous results obtained in the second section of the paper largely depend on the fact that it is difficult to isolate in a clear-cut way the effects of SR from those of other characteristic features of the firm (such as dimension). We drew, however, more specific information on this issue from an event study focused on the inclusion in the ethical index of a company stock or its deletion from it. The Information Hypothesis may contribute to explain our results as it is particularly focused on the effects of new information on the stock index behaviour (Harris and Gurel, 1986). According to this view, changes in a stock index have an impact on the expected value of the firm and, hence, on price long-term equilibrium, which will vary only once a new information is available. This theory contributes thus to explain the market response to changes in sustainability indexes. Contrary to what happens for other index membership (i.e. S&P 500), a firm included in the sustainability index becomes a member of an exclusive group based on superior quality (Lamoreaux, 1987). In the case of inclusion we observed positive cumulated abnormal returns that start already before its announcement (probably due to the information leakages that often precede a positive announcement) and culminate around the day of the effective inclusion and then tend to diminish. In the case of deletion, the cumulated abnormal returns start to diminish shortly after the announcement, become negative shortly before the actual inclusion and continue to diminish till the end of the temporal window considered. We may thus interpret the

inclusion in an ethical index (in our case the DJSSI) as a good new, a sort of "certification" of the relatively high degree of SR reached by the firm, while we may interpret its deletion from the index as a "bad new" certifying the loss of the status of CSR excellence. This interpretation is confirmed by the fact that the negative reaction of the stock market to the bad new (deletion from the index) is significantly stronger than the positive reaction to the good new (inclusion in the index). This result is fully consistent with the results obtained by economic psychology that firmly established since long that the behavioural response to bad news is generally stronger than to good news (see, e.g., Kahneman and Tversky, 1979).

The limited size of the stock market reaction to the inclusion or exclusion of a certain firm's stock could be explained as the net effect of two contradictory pressures exerted by agents entertaining opposite views on the impact of SR on the financial performance of the firm, where the positive view slightly prevails. This hypothesis, however, is falsified by the limited impact of the inclusion or exclusion on the volume of transaction. This suggests that the reaction is limited to few subjects most of which have a positive view of CSR, mainly SRI investors. Financial markets are still confused about the importance of SR and the sign of its impact on financial performance so that the operators not directly involved in managing SRI funds are unlikely to react to this sort of news. The impact of inclusion or exclusion in an ethical index is thus necessarily limited. This is particularly true in Europe where the weight of SRI funds is still under 0.50 of the market. This suggests, however, that the potential of SRI is quite promising. This potential is particularly significant in Europe that has been at the centre of this study to the extent that the share of SRI will increase approaching the percentage already reached in the US. We should thus expect that the growing share of SRI over total asset managed by UCITS funds and the growing awareness of the other investors will reinforce the market incentives in favour of SRI. This should in turn enhance the incentives for corporations to progressively upgrading their CSR standards.

ENDNOTES

[1] All the Dow Jones Sustainability Indexes are published and marketed by SAM Indexes GmbH

[2] The available time series of the DJSSI start three years before the official launch date: see the official provider (www.sustainability-indexes.com) and the Datastream-Worldscope database.

[3] As is well known, the Sharpe ratio for a given security *i* is given by:

$$SR_i = \frac{\mu_i - r_f}{\sigma_i}$$

where μ is the mean logarithmic return, *rf* is the risk-free interest rate (Euribor 3-months offered rate), σ is the standard deviation of the logarithmic returns.

[4] The value of the index is thus computed in the following way:

$$INDEX_t = \frac{\sum_{i=1}^{n} p_{it} * s_{it} * ff_{it} * cf_{it} * x_{it}^{EUR}}{\sum_{i=1}^{n} p_{i0} * s_{i0} * ff_{i0} * cf_{i0} * x_{i0}^{EUR}}_{t} !$$

where:

n = number of stocks in the index

p_{it} = share price of company (i) at time t

s_{it} = number of outstanding shares of company (i) at time t

ff_{it} = free float factor of company (i) at time t

cf_{it} = weighting cap factor of company (i) at time t)

X_{it}^{EUR}= exchange rate

[5] To account for homogeneity of the data, as we consider also the new index (which is not available on the market), data referred to both the DJ Stoxx 600 and DJSSI are here derived from the indexes computed with the Laspayres formula

[6] The presence of a large-cap bias in DJSSI is taken into account in Garz et al (2002) and Volk (2003) by estimating the performance of the SRI index through the three-factor model from Fama and French (1996).

[7] Undertakings for Collective Investment Transferable Securities

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Table 1 -Performance characteristics of the official indexes 1999-2006

	Avg.daily return.		*Std. Dev*		*Excess Return*		*Sharpe ratio*	
Year	DJSI	DJ Stoxx600	DJSI	DJ Stoxx600	DJSI	DJ Stoxx600	DJSI	DJ Stoxx600
1999	0.113%	0.107%	1.098%	1.018%	0.065%	0.059%	0.060	0.058
2000	-0.019%	-0.021%	1.227%	1.165%	-0.090%	-0.091%	-0.073	-0.078
2001	-0.068%	-0.071%	1.521%	1.410%	-0.137%	-0.140%	-0.090	-0.099
2002	-0.156%	-0.150%	1.936%	1.753%	-0.210%	-0.204%	-0.108	-0.116
2003	0.044%	0.049%	1.429%	1.311%	0.006%	0.012%	0.004	0.009
2004	0.022%	0.035%	0.741%	0.712%	-0.012%	0.001%	-0.016	0.001
2005	0.082%	0.081%	0.605%	0.583%	0.047%	0.046%	0.078	0.079
2006	0.053%	0.063%	0.782%	0.794%	0.004%	0.013%	0.005	0.017
1999-2006	0.009%	0.011%	1.243%	1.155%	-0.041%	-0.038%	-0.033	-0.033

Source: Datastream

Table 2: Number of constituents and capitalization of the indexes (thousands of Euro)

	2001-2002			*2002-2003*			*2003-2004*			*2004-2005*			*2005-2006*		
	N°of stocks	**FFMV[(a)]**	**Avg FFMV[(b)]**	**N°of stocks**	**FFMV[(a)]**	**Avg FFMV[(b)]**	**N°of stocks**	**FFMV[(a)]**	**Avg FFMV[(b)]**	**N°of stocks**	**FFMV[(a)]**	**Avg FFMV[(b)]**	**N°of stocks**	**FFMV[(a)]**	**Avg FFMV[(b)]**
DJ Stoxx 600	556	4,449,136	6,636	591	2,987,094	5,792	596	4,080,332	7,573	598	3,841,399	7,018	594	5,826,678	10,179
DJSSI	137	2,408,232	17,556	174	1,651,346	12,071	177	2,189,865	14,700	166	2,217,857	14,385	155	3,434,541	22,837
SCI	419	2,040,904	3,563	417	1,335,749	3,590	419	1,890,467	5,158	432	1,623,542	4,277	439	2,392,137	5,631

Source: Datastream, SAM GmbH

(a) Free float market value of the index;

(b) Average free float market value of the index

Table 3 Pearson's correlation coefficients between official and computed index value

Pearson's corr. coefficient	*2001–2002*	*2002–2003*	*2003–2004*	*2004–2005*	*2005–2006*	*2001-2006*
Computed Stoxx600 vs/Stoxx600	.99674	.99534	.99336	.98814	.99868	.99552
Computed DJSI Stoxx vs/ DJSI	.99467	.99454	.99732	.99469	.99847	.99505

Table 4 -Performance characteristics of the indexes 2001-2006

Year	*Avg daily*			*Standard deviation*			*Excess return*			*Sharpe ratio*		
	DJSI	DJ Stoxx600	SCI	DJSI	DJ Stoxx600	SCI	DJSI	DJ Stoxx600	SCI	DJSI	DJ Stoxx600	SCI
2001-2002	-0.195%	-0.203%	-0.213%	2.246%	2.073%	1.891%	-0.247%	-0.255%	-0.265%	-0.111	-0.127	-0.140
2002-2003	0.051%	0.054%	0.056%	1.478%	1.345%	1.195%	0.013%	0.017%	0.019%	0.009	0.013	0.016
2003-2004	0.022%	0.044%	0.052%	0.756%	0.738%	0.711%	-0.012%	0.010%	0.018%	-0.016	0.014	0.026
2004-2005	0.082%	0.089%	0.094%	0.599%	0.589%	0.587%	0.047%	0.054%	0.059%	0.077	0.092	0.099
2005-2006	0.052%	0.068%	0.079%	0.769%	0.784%	0.818%	0.003%	0.019%	0.030%	0.004	0.023	0.037
2001-2006	0.014%	0.022%	0.028%	1.246%	1.166%	1.084%	-0.027%	-0.019%	-0.014%	-0.023	-0.016	-0.012

Source: Datastream

Table 5 – Performance characteristics of the equally weighted portfolios

	Avg daily return		*Std. Deviation*	
	DJSSI	SCI	DJSSI	SCI
2002	-0.196%	-0.208%	3.099%	3.136%
2003	0.091%	0.089%	2.050%	2.116%
2004	0.075%	0.060%	1.292%	1.495%
2005	0.096%	0.089%	1.244%	1.358%
2006	0.088%	0.093%	1.421%	1.621%

Source: Datastream

Table 6: Event windows of the analysis

	Pre announcement	*Announcement*	*Post-Announcement*	*Effective*	*Post-effective*
2002	21/08 – 03/09	04/09	05/09 – 22/09	23/09	24/09 – 07/10
2003	21/08 – 03/09	04/09	05/09 – 21/09	22/09	23/09 – 06/10
2004	19/08 – 01/09	02/09	03/09 – 19/09	20/09	21/09 – 04/10
2005	24/08 – 06/09	07/09	08/09 – 18/09	19/09	20/09 – 03/10

Source: SAM GmbH

Table 7 – The sample of the event study

		2002	*2003*	*2004*	*2005*	*2006*
Add	number of stocks	30	15	21	19	28
	avg. Free Float MV[(a)]	4131	6224	13729	19358	21462
Del	number of stocks	17	22	21	19	16
	avg. Free Float MV[(a)]	6274	4713	4607	14095	15224

Source: SAM GmbH, Datastream

[(a)] Thousands of Euros

Table 8: Cumulative average abnormal return for companies included and deleted from the DJSI Stoxx over the period 2002-2006 (single event windows)

Event window	*ADD*		*DEL*	
	CAAR Ti:Tn	*t-test*	*CAAR Ti:Tn*	*t-test*
AD-10:AD-1	0.04%	4.35**	0.010%	0.84
AD	-0.006%	-0.89	0.001%	0.13
AD+1:ED-1	0.030%	2.59**	-0.050%	-3.83
ED	-0.008%	-0.94	-0.003%	-0.28
ED+1:ED+10	0.001%	0.16	-0.030%	-4.48

Table 9: Cumulative average abnormal return for companies included and deleted from the DJSI Stoxx over the period 2002-2006

Event window	*ADD*		*DEL*	
	CAAR Ti:Tn	*t-test*	*CAAR Ti:Tn*	*t-test*
AD-10:AD-1	0.040	4.35**	-0.01	0.84
AD-10:ED-1	0.066	5.17**	-0.04	-2.04*
AD-10:ED+10	0.059	7.39**	-0.08	-10.29**

Table 10: Cumulative average abnormal return for companies deleted from the DJSI Stoxx due to a worst sustainability score over the period 2002-2006

Event window	*DEL WORST RATING*	
	CAAR Ti:Tn	*t-test*
AD-10:AD-1	-0.060%	-2.27
AD	-0.040%	-0.97
AD+1:ED-1	-0.010%	-0.40
ED	0.010%	-0.67
ED+1:ED+10	-0.080%	-8.14
AD-10:AD-1	-0.060%	-2.27
AD-10:ED-1	-0.05	-2.17
AD-10:ED+10	-0.12	-11.99

Table 11: Mean post-event increases in trading volume for security added in and deleted from the DJSI Stoxx (2002-2006)

ADD	*AVRt*	*t-test*	*n>1*	*n*	*ST*
A-10; A-1	1.13	1.92(**)	47%	113	-0.54
A+1; E-1	1.05	0.64	36%	113	-2.93(*)
E+1; E+10	1.13	2.33(*)	49%	113	-0.33
DEL					
A-10; A-1	0.94	-1.42	41%	95	-1.59
A+1; E-1	0.93	-1.28	41%	95	-1.59
E+1; E+10	1.08	1.24	44%	95	-1.13

*significant at a level of 90%

** significant at a level of 95%

Figure 1: Cumulative average abnormal return for the included companies sub-sample

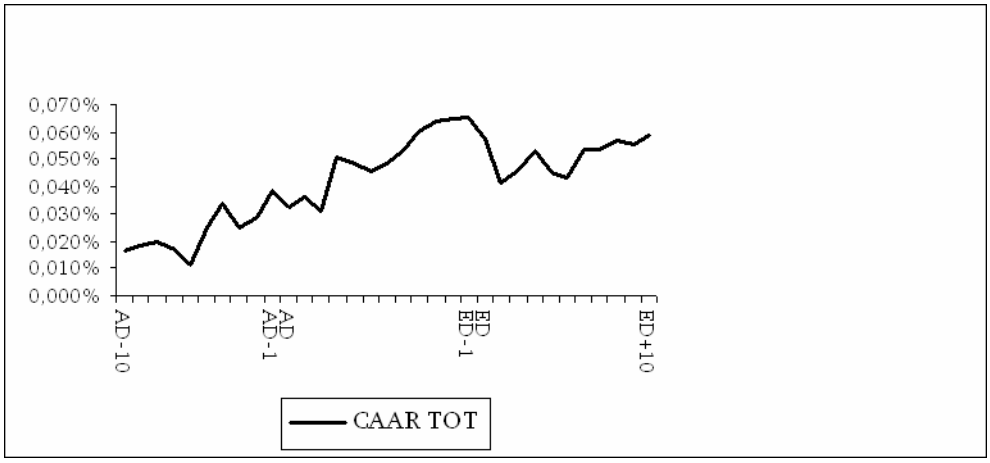


Figure 2: Cumulative average abnormal return for the deleted companies sub-sample

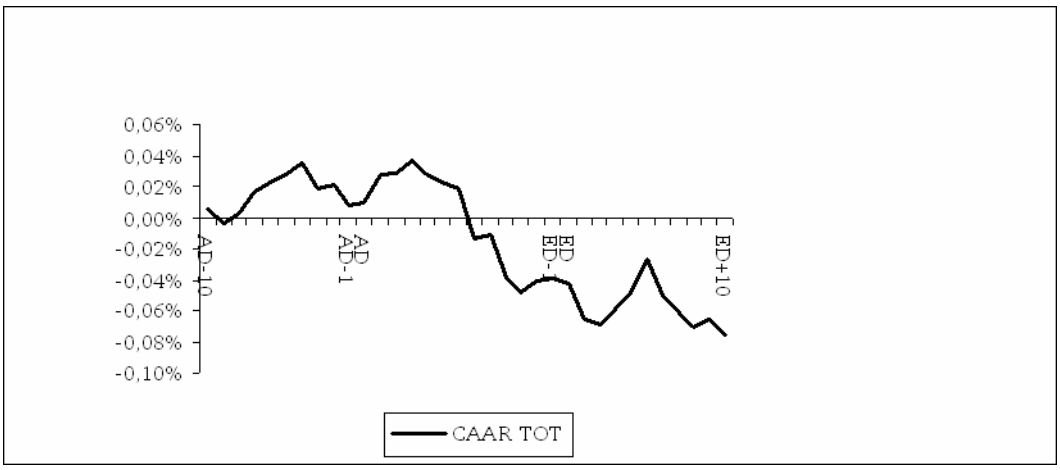
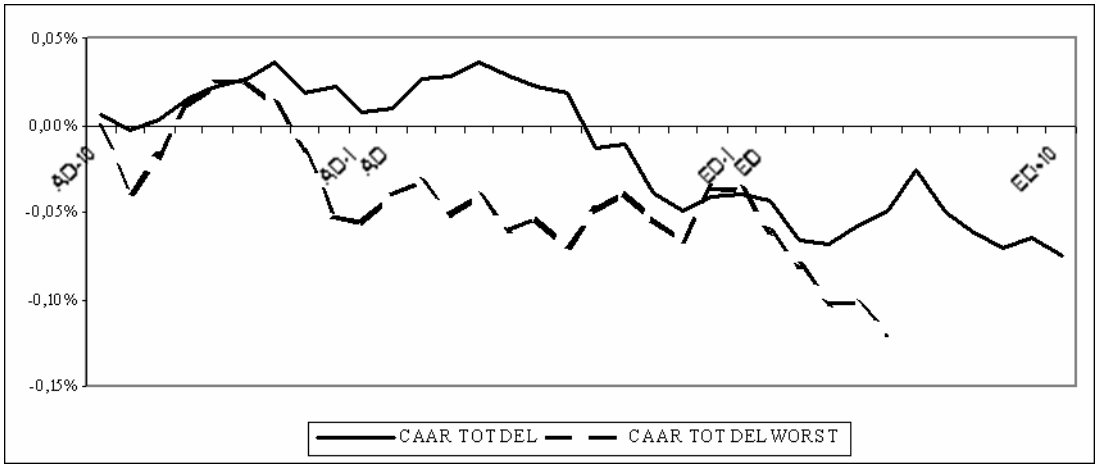


Figure 3: Cumulative average abnormal return for the deleted companies-worst score sub-sample



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