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**Working Paper**

## Corporate social responsibility and shareholder's value: An event study analysis

Working Paper, No. 2007-6

**Provided in Cooperation with:**

Federal Reserve Bank of Atlanta

*Suggested Citation:* Becchetti, Leonardo; Ciciretti, Rocco; Hasan, Iftekhar (2007) : Corporate social responsibility and shareholder's value: An event study analysis, Working Paper, No. 2007-6, Federal Reserve Bank of Atlanta, Atlanta, GA

This Version is available at:

<https://hdl.handle.net/10419/70692>

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Corporate Social Responsibility and  
Shareholder's Value: An Event Study Analysis

Leonardo Becchetti, Rocco Ciciretti, and Iftekhar Hasan

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## Corporate Social Responsibility and Shareholder's Value: An Event Study Analysis

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**Abstract:** Corporate social responsibility (CSR) is increasingly a core component of corporate strategy in the global economy. In recent years its importance has become even greater, primarily because of the financial scandals, investors' losses, and reputational damage to listed companies. While corporations are busy adopting and enhancing CSR practices, there is (beyond very few notable exceptions) no established empirical research on CSR's impact and relevance in the capital market. This paper investigates this issue by tracing the market reaction to corporate entry and exit from the Domini 400 Social Index, recognized as a CSR benchmark, between 1990 and 2004. The paper highlights two main findings: a significant upward trend in absolute value abnormal returns, irrespective of the type of event (for example, addition or deletion from the index), and a significant negative effect on abnormal returns after exit announcements from the Domini index. The latter effect persists even after controlling for concurring financial distress shocks and stock market seasonality.

JEL classification: G14, D21, L21

Key words: corporate social responsibility, event study

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The authors thank Tiziana Croce for valuable research assistance. The views expressed here are the authors' and not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System. Any remaining errors are the authors' responsibility.

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## 1. Introduction

The recent financial scandals - e.g., Enron, Parmalat, Worldcom etc. - globally have forced the corporate executives to give more attention to a broader strategy beyond the focused view of stockholders' wealth maximization. A general understanding is that the reputation of the company and the welfare of different stakeholders are crucial to both stockholders wealth maximization and long-term survival. Tirole (2001) argues that the concept of stakeholder value recognizes that corporate activity may create negative externalities which need to be counterbalanced, either by institutional rules or by corporations themselves. In such scenario, the ultimate value of shareholders' wealth may be linked to the "maximizing *the sum of various stakeholder surpluses.*" The studies by Geczy, Stambaugh and Levin (2005) and Bauer, Koedijk and Otten (2006) reveal that the investors are equally interested in such initiatives as documented by the increased flow of funds in the industry of ethically managed mutual funds. Contemporary reports show that one out of nine dollars invested in the market funds are invested in so called "socially responsible" investment portfolios.<sup>2</sup> Similar trends are revealed in Europe where, in recent years, the number of socially screened mutual funds has nearly doubled mainly in United Kingdom, Sweden, France, and Belgium. None of these studies and reports however focuses on the investors' perception or on the potential reaction in the capital market associated with such socially responsible actions/non-actions undertaken by the corporate actions. This paper attempts to void the gap in the literature by investigating the potential link between CSR initiatives and the change in market value or price movements of companies following/rejecting the CSR activities. We do so by investigating one of the most renowned stock market indexes of social responsibility, the Domini 400 Social Index,<sup>3</sup> while

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<sup>2</sup> See, Report on [Socially Responsible Investing Trends in the United States](#), 2003 and [Cerulli Associate's European SRI Reports](#) respectively for further details.

<sup>3</sup> The Domini 400 Social Index <sup>SM</sup> is a market capitalization-weighted common stock index. It monitors the performance of 400 US corporations that pass multiple, broad-based social screens. The Index consists of approximately 250 companies included in the Standard & Poor's 500 Index, approximately 100 additional large companies not included in the S&P 500 but providing industry representation, and approximately 50 additional companies with particularly strong social characteristics. Inclusion in the index is based on the SR screening of Kinder, Lydenberg and Domini Research & Analytics, Inc. (KLD), the leading research group in providing ratings of corporate social performance to investors. KLD screens around 3,000 firms accounting for 98% of total market value of US public equities (Barnea-Rubin, 2005) . The screening approach is in two steps. In the first step a group of firms is excluded if their activity is for a significant share in controversial industries (alcohol, tobacco, or gambling; companies that derive more than 2% of gross revenues from the production of military weapons; and electric utilities that own interests in nuclear power plants or derive electricity from nuclear power plants in which

tracking and evaluating the impact of a series of events - of inclusion and deletion from the index – on in the financial market.<sup>4</sup> We posit that investors do track these socially responsible companies and the indices and any substantial deviation or change announcement in the index are reflected in the abnormal return of these firms in the capital market. Employing an event study analysis during the 1990-2004 era we measure the financial investors' perception and expectation and test about the net effect of entry/exit from the CSR index thus provide evidence on the CSR-corporate performance nexus. Our evidence portrays a significant upward trend in absolute value abnormal returns of the sample events, irrespective of changes (addition or deletion) in the index. Importantly, we also find a significant negative effect on abnormal returns after the exit announcements from the Domini index. This negative relationship continues to persist even after controlling for concurring financial distress shocks and stock market seasonality.

The rest of the paper is organized as follows. In the second section, we briefly summarize key the theoretical and empirical literature. In the third section, we report data, methodology and results. In this section we also perform a series of robustness checks on our findings with nonparametric tests, abnormal returns based on alternative estimation models and exclusion of deletion rationales related to financial distress shocks. The final section concludes the paper.

## **2. CSR and corporate performance: the state of art**

Stock market prices should reflect the fundamental expected value of the stock, i.e. the discounted sum of the expected dividends accruing to the owners of shares. When investors are rational and fully informed, expected values are instantaneously revised upon news' arrivals if the announcement refers to an event affecting one or more factors determining the fundamental value of the stock (expected future cash flows, interest rates, risk premia, stock betas, etc.). In this perspective the impact of events such as

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they have an interest). From the remaining group of firms a subset of SR firms is selected according to a series of qualitative indicators (community relations, product quality, workforce diversity, employee relations, environment, human rights, non-US operations, and product safety and use). The definition of the Domini CSR criteria is obviously questionable and open to debate. At the moment Domini information represents one of the most reliable sources on CSR and is therefore the reference for our econometric analysis.

<sup>4</sup> Entries or exits from the index are announced by the Domini the same day in which the event occurs. Hence, news and event timing coincide.

entries or exits from the Domini index should be predicted based on a theoretical framework which evaluates the impact of the event itself on the different components of the formula of the fundamental value of the stock.

A crucial issue to consider when formulating our hypothesis on the effects of the announcement of an event related to the CSR choice is therefore the investigation of the nexus between corporate social responsibility and corporate performance and, more specifically, in our case, the specific criterion of corporate performance represented by shareholder's value.

Kinder, Lydenberg and Domini Research & Analytics, Inc. (KLD) divide CSR criteria analyzed for inclusion in the Domini 400 index into eight broad categories (see Appendix A): i) *community*; ii) *corporate governance*; iii) *diversity*; iv) *employee relations*; v) *environment*; vi) *human rights*; vii) *product quality*; viii) *controversial business issues*. For each of them, the Domini index identifies strengths and weaknesses and indicates a series of corporate actions falling under one of the two categories.

Overall, we find that most of the strengths and weaknesses in each of the eight domains are cost increasing, with the notable exception of the *product quality* section and of rules limiting managerial compensation (in the *employee relations* section). Hence, we may be led to conclude that most of the SR criteria (see in particular those in the *employee relations*, *environment*, *community* and *human right* sections) involve a *shift of focus* from the maximization of shareholders' value to the satisfaction of the interests of a broader set of stakeholders (shareholders but also local communities, workers, domestic and foreign subcontractors)<sup>5</sup>.

On the other side, we must nonetheless consider that the CSR choice may have positive effects on market value by enhancing workers productivity, especially when it involves wage and non wage benefits for firm employees. The productivity enhancing effect of such benefits is widely analyzed by the efficiency wage literature (Yellen, 1984) in shirking (Stiglitz-Shapiro, 1984) and gift exchange models (Akerlof, 1982). Furthermore, the importance of intrinsic motivations in productivity, and the availability

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<sup>5</sup> For a reference on the most famous positions in the historical debate evaluating causes and consequences of CSR see Friedman (1962) and Freeman (1984), while on the methodological problems arising when pursuing the goal of maximization of multiple stakeholders interests see Jensen (1986) and Tirole (2001).

of workers to accept lower wages (and even voluntary work) when intrinsic motivations<sup>6</sup> are strong, suggests that the latter are partial substitutes for pecuniary transfers. Intrinsic motivations are therefore a channel through which corporate social responsibility, by fostering alignment between corporate goals and workers' motivations, may reduce costs and increase productivity.

Another "value increasing" argument is set forth by Freeman (1984) who considers that CSR may be an optimal choice to minimize transaction costs and potential conflicts with stakeholders.<sup>7</sup> In this perspective, CSR may be seen as an effective tool for improving firm reputation and reducing the risk of remaining victims of consumers' activism and legal actions.

The nexus between CSR and corporate performance is therefore complex and its complexity is confirmed by the empirical literature in the field which does not provide clear cut results.

In favor of a positive link are those studies showing that: i) costs of having a high level of CSR are more than compensated by benefits in employee morale and productivity (Soloman and Hansen, 1985); ii) CSR is positively associated with financial performance (Pava and Krausz, 1996 and Preston and O'Bannon, 1997); iii) positive synergies exist between corporate performance and good stakeholders relationships (Stanwick and Stanwick, 1998; Verschoor, 1998); iv) change in CSR is positively associated with growth in sales and returns on sales are positively associated with CSR for three financial periods (Ruf et al., 2001). Consider that many of these papers find evidence of a positive effect on economic and not on financial performance (with the exception of Pava and Krausz, 1996 and Preston and O'Bannon, 1997). Hence, the corporate SR choice may be beneficial in terms of net sales or value added per worker, but not necessarily in terms of shareholder's value.

On the negative side, we have contributions of Preston and O'Bannon (1997) Freedman and Jaggi (1982), Ingram and Frazier (1983) and Waddock and Graves (1997).

Inconclusive results are those of McWilliams and Siegel (2001) Anderson and Frankle (1980), Freedman and Jaggi (1986) and Aupperle, Carroll and Hatfield (1985). The limit common to most of these

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<sup>6</sup> On the relationship between workers' intrinsic motivation and productivity see Ryan et al. (1991), Frey and Oberholzer-Gee (1997) and Kreps (1997).

<sup>7</sup> By summing up information from various sources it is possible to calculate that, only in the year 2005, the top corporations in the US paid around 9 billion dollar settlements to avoid court judgement when sued by investors for financial scandals ([www.endgame.org/corpfines3.html](http://www.endgame.org/corpfines3.html)).

papers is in the adoption of estimation techniques which do not take into account problems of endogeneity and stationarity of time series and panel data.

A more recent vintage of papers refines significantly the empirical methodology and presents interesting findings. Among them, Barnea and Rubin (2005) show that the decision to invest in CSR is negatively related to insiders' ownership and interpret this finding in the light of an overinvestment hypothesis. CSR is good for shareholders' value up to a given level, but insiders may have an interest to overinvest in it to improve their reputation and they are more likely to do so when their ownership share is lower.

Two recent papers highlight the increasing diffusion of ethically managed funds and provide theoretical framework and empirical analyses of their relative performance. Bauer, Koedijk and Otten (2002) compare active strategies of ethical and traditional investment funds finding mixed results (not univocal prevalence of one over the other), but observing a learning process which gradually improves the performance of ethical investment fund managers. Geczy, Stambaugh and Levin (2003) calculate the cost of imposing socially responsible investment constraints in terms of risk adjusted returns and show how they depend on the share of SR investment, on views about asset pricing models (SR funds are less able to offer exposure to size and value factors than to the standard one CAPM factor) and on stock managers ability.

By considering the above mentioned theoretical and empirical considerations we expect different, and potentially conflicting, effects of addition and deletion from the Domini index. If the *shift of focus* hypothesis holds (and the cost increasing dominate over the cost decreasing effects), we should expect a negative (positive) abnormal return in case of an addition (deletion) announcement. If, on the other hand, we consider the growing volume of financial assets intermediated by socially responsible funds (and we take into account that a relevant part of them follows the passive strategy of tracking a SR index) we would expect the opposite effect of a negative (positive) abnormal return in case of a deletion (addition) announcement, with such effect becoming stronger in the more recent years when the role of SR funds has become more significant.



As already observed, one of the main limits of all the above mentioned analyses based on balance sheet data is the difficulty of controlling for endogeneity. In the CSR-corporate performance relationship the problem is particularly severe as it is important to discern, for instance, in case of positive relationship, whether the move to CSR is an autonomous driver of improvement in corporate performance or, quite to the opposite, high cash flow and better performing firms are more likely to choose CSR, due to their higher cash flow availability. A second, almost insurmountable, limit is that balance sheet based analyses on the CSR-corporate performance nexus do not provide a risk adjusted measure of performance.

The two advantages of investigating the impact of CSR on corporate performance in financial markets are that, by calculating abnormal returns at the announcement date, i) we pick up the expected net effect of entry into/exit from CSR – and hence we separate the effect of change in CSR on corporate performance from the reverse causality effect - and ii) we may calculate it net of measurable risk factors.

Of course, as it is well known, an event study analysis may present problems such as the sensitivity to waves of market optimism or pessimism and the restrictive assumption that stock market reaction arises from rational fully informed investors taking their choices on the basis of the maximization of their expected wealth. For the first point, an analysis in which events are scattered over a long time spell (13 years) and a robustness check in which dummies for stock market seasonality are included in the estimate of the determinants of abnormal returns should avoid this problem. On the second point we will see that, when interpreting our findings, the case of SR investing is exactly one in which the hypothesis of investors choosing only on the basis of the maximization of their expected wealth may not apply. SR investors may in fact decide to sell a stock not because it is not going to be profitable, but because it does not comply anymore to CSR standards.

Finally, in our event study analysis an observational equivalence issue related to the endogeneity problem in the relationship between CSR and corporate performance may still persist if exit from the Domini Index coincides with a financial distress shock. In such case the rationale of the observed negative abnormal returns would not be the exit from the Index as both events would be jointly determined by the concurring financial distress shock. To rule out this possibility we perform a robustness

check by carefully examining the rationales for exclusion from the Domini 400 index and by excluding from the analysis those likely to be related to financial distress.

### **3. Empirical findings**

#### **3.1 Empirical findings from the market model**

We create a sample of 327 events of entries or exits from the Domini 400 Social Index concerning 278 firms (27 firms register a double event of entry and exit from the index in the sample period).

The Domini corporate screening identifies strengths and weakness for each of the following eight broad categories: i) *community*; ii) *corporate governance*; iii) *diversity*; iv) *employee relations*; v) *environment*; vi) *human rights*; vii) *product quality*; viii) *controversial business issues*, (for details on the Domini criteria see Appendix A, for details on chronology and motivation of entries and exists see Appendix B). When the stock does not pass anymore the qualitative screening process (described in footnote 5) the stock is excluded from the index.

By looking at reasons for deletion we find that the most frequent one is *lack of financial and social representation* (12 cases), followed by *South Africa* (6 cases), *product concerns* (6 cases), *bankruptcy* (5 cases), *military* (3 cases). On the entry side we find, among CSR strengths which motivate the event, *diversity* (85 times), *employee* (76), *environment* (40) and *community* (26).

We eliminate from the sample for obvious reasons deletions determined by mergers and acquisitions, changes of ticker, changes of name and going private decisions.

It is important to consider that the index, by construction, has to maintain a constant number of constituents. It is therefore evident that, while deletion is directly related to the information on the breach of the SR criteria, addition is possible only after a deletion.<sup>8</sup> As a consequence, while deletion is always directly related to the breach of the Domini SR criteria, there may be lags between compliance of such criteria and addition to the index. For this reason, in case of addition, our event study is more likely to

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<sup>8</sup> This creates an additional problem in balance sheet analyses on the impact of CSR on corporate performance based on Domini affiliation since some of the (control sample) non Domini firms may possess all requirements needed to pass the Domini screen, but are not included in the index until a constituent is excluded.

isolate the effect that inclusion in the index may generate on passive buy-and-hold strategies of ethically responsible investment funds.

To calculate abnormal returns we use the market model under the following specification

$$R_t - R_f = \alpha_0 + \beta_o(R_m - R_f) + \varepsilon_t \quad (1)$$

where  $R_t$  is the one-day compounded return,  $R_f$  is the riskfree rate proxied by the one month yield of the US Treasury Bill and  $(R_m - R_f)$  is the excess return of the stock market index. The advantage of this simple model is that its coefficients are generally always statistically significant and therefore the calculated abnormal returns are highly reliable. More sophisticated models (multi factor models, models which include day of the week effects, etc.) do not share this advantage and scarcely improve goodness of fit with respect to the former. (Brown-Warner, 1985, Campbell et al., 1997).

To estimate the market model we use an eight month window but we perform a robustness check to control whether our results are confirmed with a different (2 month) window.

The first hypothesis we test here is whether the impact of announcements of addition and deletion from the Domini index has risen over time. The rationale is that financial markets should be increasingly sensitive to CSR news for several reasons: i) the interest of investors is becoming higher over time; ii) the expected effects are higher since investors perceive the increased interdependence between CSR and corporate performance or anticipate the higher reaction of concerned investors/consumers to the event; iii) the volume of funds intermediated by “ethical funds” with active or passive strategies on the Domini index has grown over time.

The estimated model is

$$|CAR|_i = \alpha_0 + \alpha_1 Trendyear + \varepsilon_i \quad (2)$$

where the dependent variable is the absolute (event window) CAR of the i-th stock for which an event of entry or exit from the Domini occurred and *Trendyear* is a linear trend variable.

Since informational spillovers may occur before the announcement date we calculate abnormal returns in the following different intervals - AR(0), CAR(-1,0) -, with 0 being the event date.

Our findings do not reject the hypothesis that the role of CSR funds has risen over time since the trend coefficient is positive and significant for three out of four combinations of event windows and estimation periods considered (Table I).

The second hypothesis we want to test is whether addition or deletion is associated to significant abnormal returns.

A graphical inspection of the dynamics of cumulative abnormal returns, aggregated for deletion and addition events under different estimation windows, shows that deletion CARs, calculated with the market model, generally exhibit a drop (up to 4 percent) in the proximity of the event date (Figures Ia-Ij). The drop is reabsorbed in a period ranging between 11 and 24 days. Addition event CARs remain quite stable around zero before and after the event date.

To test whether the observed patterns document significant differences in stock market reaction to deletion and addition events, we regress in a cross-sectional estimate the (cumulative) abnormal returns for each event on a constant and on a dummy taking the value of one if the event is a deletion and zero otherwise (Table II). We calculate abnormal returns in the following different event windows - AR(0), AR(-1), CAR(-1,+3), CAR(-1,+1) and CAR(-1,0) - with 0 being the event date.

Our findings document that deletion from the Domini index has a significant and negative effect around the announcement date for all the different event windows considered, while the same does not occur for addition events.<sup>9</sup> The significance of the deletion event is weaker in the (-1,3) estimation window, consistently with the hypothesis that financial markets efficiently incorporate new information without large time delays. When we split our sample in two periods we find that the deletion effect is significant only in the second interval (1999-2004) and not in the first (Tables IIIB-IIIC). This last finding does not contradict the evidence on the increasing significance of CSR events over time.

The result of the significance of the deletion events in the cross-sectional regression estimate in which (cumulative) abnormal returns are the dependent variable is confirmed when we alternatively test the hypothesis with  $J_1$  and  $J_2$  tests (Table II). Remember that in the  $J_1$  test abnormal returns are first aggregated within the event window for each individual stock, then aggregated across stocks and finally

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<sup>9</sup> Results are omitted and available upon request.

standardized, while in the  $J_2$  test the last two operations (aggregation across stocks and standardization) are inverted. The consequence is that the  $J_2$  test gives more weight to low variance securities with respect to the  $J_1$  test.

### **3.2 Robustness check on the model used for estimating abnormal returns**

As already mentioned the market model is usually the most followed estimation benchmark for calculating abnormal returns in event studies. The rationale for using it is that more sophisticated approaches do not add much in terms of goodness of fit, with the risk of introducing regressors which are, in many cases, weakly or not at all significant. The consequence (especially in event studies in which we need to obtain reliable abnormal returns) is the introduction of undesired noise originated by the excessive weight given to factors which are actually not significant in the calculation of predicted returns.

In spite of these considerations, it is not possible to ignore that model misspecification may generate autocorrelated residuals and biased abnormal returns and that, at least for a robustness check of our previous findings, the base market return model could be implemented in two main directions: i) introduction of additional risk factors orthogonal to systematic nondiversifiable risk represented by market excess returns; ii) consideration of autoregressive conditional heteroskedasticity of stock market returns.

To this purpose we recompute abnormal returns by adopting the following procedure for each event: i) LM test of the null hypothesis of homoskedastic and non autocorrelated residuals in the market model; ii) in case of rejection of the above tested hypothesis, estimation of a multi-CAPM GARCH (p,q) model in which the mean equation includes the three Fama-French (1995) risk factors as regressors; iii) identification of a parsimonious specification for the final model by eliminating regressors which are not significant in the mean equation and by selecting the proper lag for the GARCH (p,q) model;<sup>10</sup> iv) LM test on the standardized residuals of the GARCH (p,q) model to check for the validity of the GARCH structure of the model.

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<sup>10</sup> The default is the GARCH (1,1) model. If residuals from the model pass the ARCH LM test we stop here. If not, we choose the proper parsimonious lag structure for regressors of the variance equation leading to successful postestimate diagnostics at step iv).

By performing step i) we observe that, in the largest number of cases (around 92 percent of deletion and addition events), regression residuals from the market model exhibit conditional heteroskedasticity.<sup>11</sup> We therefore move to step ii) and choose the following multi CAPM-GARCH (p,q) specification in which the mean equation is represented by:

$$R_t - R_f = \alpha_0 + \beta_o(R_m - R_f) + \beta_1SMB + \beta_2HML + \varepsilon_t \quad (3)$$

where  $R_t$  is the one-day compounded return,  $R_f$  is the riskfree rate proxied by the one month yield of the US treasury bill,  $(R_m - R_f)$  is the excess return of the stock market index and SMB and HML are the two Fama-French (1995) risk factors<sup>12</sup> measuring two additional risk components related to size and book to market value of the firm.<sup>13</sup>  $\varepsilon_t \sim (0, h_t)$  is the zero mean error term whose conditional variance  $h_t$  is modeled by the following equation

$$h_t = \alpha_0 + \sum_{i=1}^p \gamma_i h_{t-i} + \sum_{j=i}^q \delta_j \varepsilon_{t-j}^2 \quad (4)$$

where  $h_t$  is the conditional variance of the error term in (3),  $\varepsilon_{t-1}^2$  measures the impact of squares of lagged shocks on the conditional variance,  $h_{t-1}$  is the first lag of the conditional variance, with its coefficient measuring persistence of the dependent variable.

We estimate the model for each of the event-related stocks in the 8 month estimation window<sup>14</sup> and choose the more parsimonious multi-CAPM conditional heteroskedasticity model by eliminating all

<sup>11</sup> Results of this test are omitted for reasons of space and available from the authors upon request.

<sup>12</sup> The risk factors are computed as follows. We first divide the two samples each month into two subgroups: the 50% largest firms (group B) and the 50% smallest firms (group S). These two subgroups are then divided in turn into three subgroups containing respectively the largest 30% (group BH and SH), the mid 40% (group BM and SM) and the smallest 30% (group BL and SL) market to book values. SMB is then calculated, by using subgroup average returns, as  $((SH+SM+SL)/3) - ((BH+BM+BL)/3)$  and HML as  $(SL+BL)/2 - (SH+BH)/2$ .

<sup>13</sup> The rationale for adopting a multifactor capital asset pricing model is that some risk factors, to which small firms or financially distressed firms are particularly exposed, are not captured by sensitivity to the stock market index. Shocks in asset values may for instance reduce the value of the collateral affecting both solvency of financially distressed firms and the capacity to obtain credit of small firms in a framework of imperfect information (Bernanke and Gertler, 1990). Debt deflation negatively affects financially distressed (low MTBV) firms more than others. Expectations of liquidity squeezes, in economies in which the three Kashyap, Lamont and Stein (1993) conditions for the existence of a “credit channel” may be applied, may generate negative effects on price and quantity of credit available to financially distressed firms, to firms with low earnings per share (and then low self-financing capacity) and to small firms that are more likely to be victims of financial constraints (Devereux and Schiantarelli, 1989).

<sup>14</sup> Results when using the alternative estimation window of 2 months are not substantially different. They are omitted for reasons of space and available upon request.

insignificant regressors from the specification. Our final estimates are shown in Appendix C (Tables C.1 and C.2). We can observe from them that only in some cases the size and book to market variables in the mean equation, and the one period lagged conditional variance in the variance equation, are significant.<sup>15</sup> The LM test performed after the estimate of the GARCH (p,q) multi CAPM model confirms that squared residuals are no more correlated with their lagged values for the large majority of stocks (see Appendix C, Tables C.3 and C.4).

Based on these new estimates we decide to perform a robustness check of the analysis of the effects of entries and exits from the index in the following way: i) we exclude from the sample 10 exit and 19 entry events for which the variance stationarity condition in the conditional variance equation -  $\sum_{i=1}^p \gamma_i + \sum_{j=1}^q \delta_j < 1$  - is not satisfied. ii) we recalculate abnormal returns from the multifactor models and iii) use heteroskedasticity robust standard errors to tackle the conditional heteroskedasticity problem evidenced by GARCH estimates.

Descriptive evidence of CARs obtained from residuals extracted with this robustness check exercise is provided in Figures IIA-IIB. It shows that the pattern of aggregate addition and deletion CARs in proximity of the event date is substantially unchanged with respect to the one extracted from the market model abnormal returns (Figures IIA-IIB). A difference in this case arises when we look at further distances from the event date since the gap between aggregate addition and deletion CARs is bridged only 90 days after the event date. This evidence suggests that the relative performance of deletion stock gets worse when conditional heteroskedasticity is taken into account.

We finally extract from our best GARCH (p,q) multi CAPM specification the series of abnormal returns which are regressed as before on an intercept and on a (deletion/addition) dummy in a cross-sectional estimate. The findings we obtain are quite similar to those shown when using the market model, including those related to subsample splits (Tables IV and VA-VB). Deletion events have a significant negative effect on abnormal returns which remains significant only in the second subsample estimate,

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<sup>15</sup> As it is well known, compounded returns of individual stocks exhibit properties which are different from those of portfolios, and specially much higher heterogeneity in models generating them as it can be noted in the estimates presented in Appendix C (Tables C.1 and C.2) (Campbell et al., 1997).

while addition events are not significant.  $J_1$  and  $J_2$  tests performed on the subgroup of deletion events reject again the null hypothesis confirming the significant negative effect of deletion on abnormal returns (Tables IV and VA-VB).

### **3.3 Robustness check on the determinants of entry and exit from the Domini 400**

In a further robustness check of our findings we explore the impact of different motivations given for entries and exits into the index.

This exercise is important to test whether the significant negative effect of deletion depends on a concurring financial distress shock.

A first obvious candidate among deletion rationales for the concurring shock interpretation is *bankruptcy* (5 cases). A second candidate is the *lack of social and financial representation* (12 cases). In this last category KLD considers two different rationales for exclusion: i) loss of social strength (*lack of social representation*) and ii) fall of market capitalization below the minimum requirement established by KLD to make index constituents financially representative (*lack of financial representation*) (see footnote 5). Both rationales are sufficient conditions for exclusion but the information we have does not allow to specify which of the two rationales applies. To err on the side of caution we perform again our estimates after removing from our sample exclusions caused by these two motivations. Table VI shows that our results are unchanged with the deletion effect remaining negative and significant under both (market and multi CAPM) normal return models.

Furthermore, to rule out that our results are dependent from the functional form assumed for our residuals, we perform nonparametric sign and rank tests on the sub-sample of events excluding the bankruptcy and lack of social and financial representation motivations. Results are provided in Table VII and confirm once more the joint significance of deletion events.

A final robustness check looks at the sensitivity of our findings to stock market seasonality. We introduce two dummies picking up phases of market pessimism and optimism. To do so we follow the approach of the Commodity Research Bureau Stock Market Momentum Indicator focusing on the price strength of the stocks in the S&P 500 Index. We compute the ratio of the percentage of designated stocks



currently trading above their respective 50-day moving averages. On the basis of this indicator we create two dummies denominated bull (bear) which take the value of one when the indicator is above 65 percent (below 40 percent) and zero otherwise.

Tables IX and X show that when we re-estimate for different event period intervals normal returns with the market and multi-CAPM models, with and without inclusion of the deletion rationales of *bankruptcy and lack of social and financial representation*, the significance of the deletion variable on abnormal returns is unchanged after adding the bull and bear dummies. Our main findings therefore do not seem to be affected or determined by stock market seasonality. All these robustness checks confirm that the significance of deletion events is concentrated in the second sample subperiod.

### **3.4 Further interpretation of our findings**

To provide a tentative interpretation of our findings consider again that, in case of deletion, the event of a change in SR coincides with news of corporate exit from the Domini. On the other hand, new entries are allowed only to maintain a constant number of constituents after exits and therefore, in case of addition, the event of a change in SR does not coincide with news of corporate exit from the Domini.

Consequently, in correspondence of deletion announcements, we may have i) a selling reaction of individual SR savers, ii) a portfolio rebalance of SR investment fund portfolios using passive strategies on the Domini index or following different criteria related to CSR indicators, iii) a concurring negative shock (i.e. financial distress requiring layoffs) coinciding or anticipating exit from the index. Each of these three effects is consistent with a drop in the stock market price.

On the other hand, in correspondence of entry announcements we may have purchases from individuals and investment funds adopting passive strategies on the Domini 400 Social Index, but not from those following other SR criteria given that the change in SR of the observed stock anticipates and does not coincide with the event of entry into the index. Furthermore, the concurring shock rationale does not apply to entry events.

These considerations should explain why the impact of exits is much stronger than that of entries. Finally, it does not seem that the concurring shock rationale can entirely explain exit findings. In the large

majority of event definitions we do not find reference to a concurring shock and the strong recovery of deletion CARs in the month following the announcement date is not consistent with it. Furthermore, to exclude that the concurring shock rationale may explain the deletion result, we discriminate between different exit motivations and observe that, net of the effect of those which are likely to be related to financial distress (bankruptcy and lack of social and financial representation), the negative effect of exits on abnormal returns still applies.

#### **4. Conclusions**

Corporations are increasingly more involved in CSR activities however, with few notable exceptions discussed above, the finance literature lacks of any significant empirical research on this topic, especially from the perspectives of investors and capital market. This paper contributes to the literature by tracing the stock market reaction to entries and exits from an established SR index. The attempt provides interesting insights on the impact of CSR on shareholders' value and the preferences of financial investors.

Our main findings document that the impact of SR-related events (and, more specifically, additions and deletions from the Domini index) has risen over time and that the abnormal returns around the event date are significantly negative in case of exit from the Domini index. This result is robust to i) the adoption of different parametric/non parametric methods; ii) stock market seasonality; changes in iii) the estimation window, iv) the event window and v) the model used for estimating abnormal returns and persists when calculated net of the impact of exits presumably related to financial distress.

When tracking the dynamics of cumulative abnormal returns after the event date we also find that the gap between CARs from deletion and addition events tends to bridge in an interval of between 11 and 24 days when we estimate the market model and of around 90 days when we use the GARCH (p,q) multi-CAPM model.

These findings, when considered together, suggest that the penalty for exit from social responsibility might depend more from the reaction of ethically screened funds than from an expected negative shock on shareholders' value. This interpretation is consistent with the growth of volumes

intermediated by SR funds, with their behavior on financial markets (violation of ethical criteria should lead to sell a stock independently from its expected performance) and with the *shift of focus* hypothesis. The findings establish that CSR leads corporations to refocus their strategic goals from the maximization of shareholders' value to the maximization of the goals of a broader set of stakeholders.

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**FIGURES Ia-Ij. The dynamics of addition/deletion CARs around the event date (normal returns estimated with the market model)**

Figures Ia-Ib: (-4;+4) addition/deletion CARs; Figures Ic-Id: (-4;+8) addition/deletion CARs; Figures Ie-Ij: (-4;+12) addition/deletion CARs;

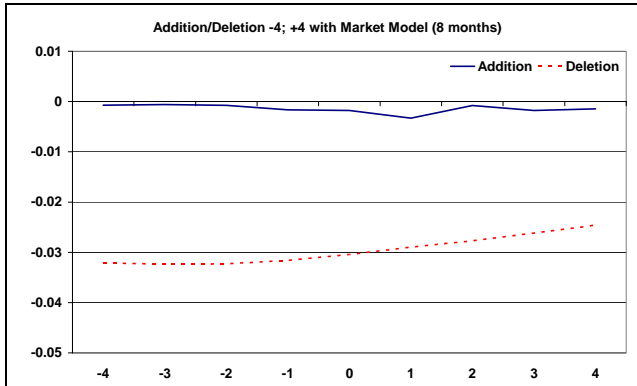


Figure Ia

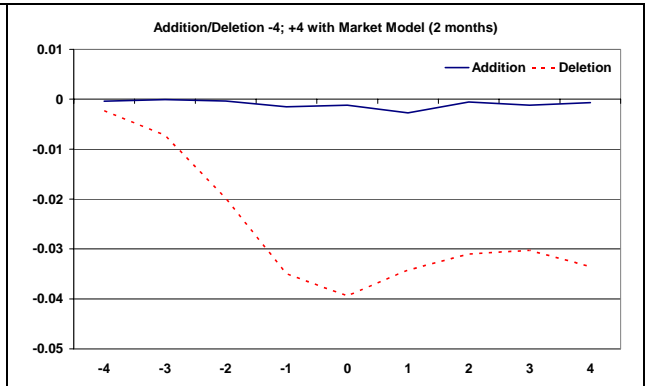


Figure Ib

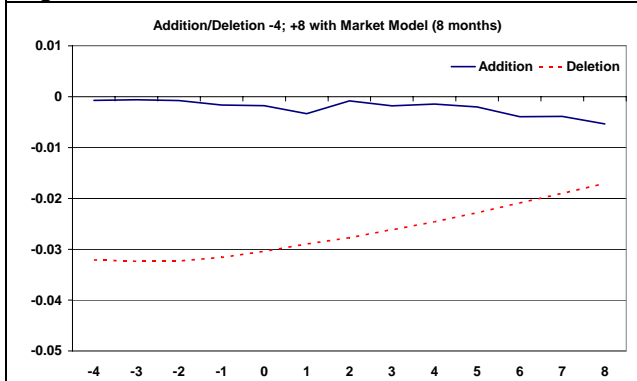


Figure Ic

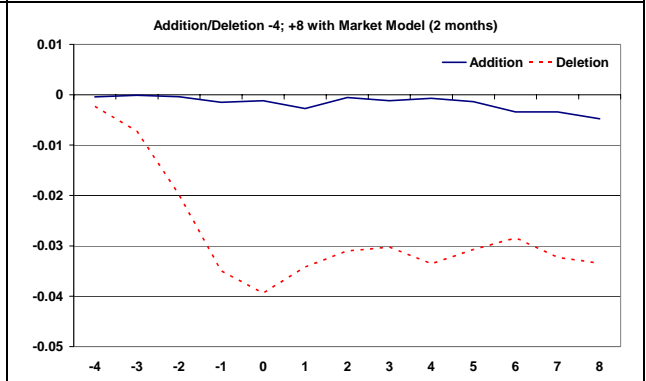


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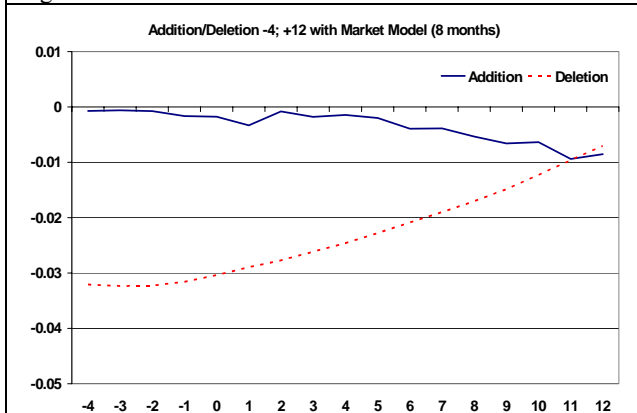


Figure Ie

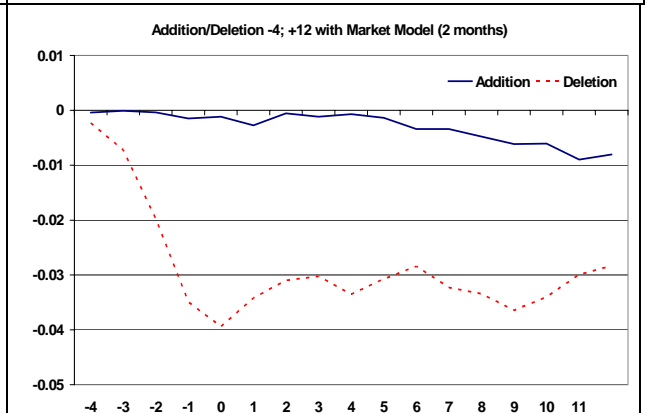


Figure If

**Table I. The impact of time trend on absolute abnormal returns for events of addition and deletion from the Domini 400 Social Index**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on the chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini 400 Social Index are illustrated in the Appendix A.

The estimated model is

$$|CAR|_i = \alpha_0 + \alpha_1 Trendyear + \varepsilon_i$$

where the dependent variable is the absolute AR (CAR) of the i-th stock for which an event of entry or exit from the Domini occurred and *Trendyear* is a linear trend variable.

AR(-1)	2 months	8 months	CAR(-1,0)	2 months	8 months
Trendyear	0.001 (1.99)	0.001 (1.69)	Trendyear	0.001 (2.08)	0.001 (1.26)
Constant	0.0001 (0.24)	0.01 (1.02)	Constant	0.0001 (0.42)	0.05 (1.26)
<i>Adj. R<sup>2</sup></i>	0.01	0.01	<i>Adj. R<sup>2</sup></i>	0.01	0.00
<i>Obs</i>	275	263	<i>Obs</i>	275	263
<i>F-test</i>	3.94	2.86	<i>F-test</i>	4.32	1.59
<i>(Prob&gt;F)</i>	0.05	0.09	<i>(Prob&gt;F)</i>	0.04	0.21



**Table II. The effects of deletion from the Domini index**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on the chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini 400 Social Index are illustrated in the Appendix A.

The Table illustrates regression findings of the model when the abnormal return is calculated with the market model according to different windows (AR=abnormal return; CAR = cumulative abnormal return). *Del* is a dummy taking the value of one if the event is a deletion from the Domini 400 Social Index and zero otherwise. T-stats on heteroskedasticity robust standard errors are reported in round brackets. We alternatively test the significance of (cumulative) abnormal returns on the subgroup of deletion events with  $J_1$  and  $J_2$  tests, whose formulas are, respectively

$$J_1 = \frac{\overline{CAR}(\tau_1, \tau_2)}{\left[ \frac{\sigma^2(\tau_1, \tau_2)}{L_1 - 2} \right]^{1/2}} \approx N(0,1) \quad \text{and} \quad J_2 = \left( \frac{N(L_1 - 4)}{L_1 - 2} \right)^{1/2} \overline{SCAR}(\tau_1, \tau_2) \approx N(0,1)$$

where  $CAR_i(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} AR_i$ , with  $AR_i$  being the abnormal return of a given day in the event window

considered for the  $i$ -th event and  $\tau_1$  and  $\tau_2$  are the two extremes of the event window,

$\overline{CAR}(\tau_1, \tau_2) = \frac{1}{N} \sum_{i=1}^N CAR_i(\tau_1, \tau_2)$  and  $VAR[\overline{CAR}(\tau_1, \tau_2)] = \overline{\sigma^2}(\tau_1, \tau_2) = \frac{1}{N^2} \sum_{i=1}^N \sigma_i^2(\tau_1, \tau_2)$ . For the

definition of the  $J_2$  test consider that the “standardized” CAR calculated for each security is

$$SCAR_i(\tau_1, \tau_2) = \frac{CAR_i(\tau_1, \tau_2)}{\hat{\sigma}_i(\tau_1, \tau_2)} \quad \text{and} \quad \overline{SCAR}(\tau_1, \tau_2) = \frac{1}{N} \sum_{i=1}^N SCAR_i(\tau_1, \tau_2).$$

Consider that in the  $J_1$  test abnormal returns are first aggregated within the event window for each individual stock, then aggregated across stocks and finally standardised, while in the  $J_2$  test the last two operations (aggregation across stocks and standardisation) are inverted. The consequence is that the  $J_2$  test gives more weight to low variance securities with respect to the  $J_1$  test.

Abnormal return	Cons	Del	Adj. R <sup>2</sup>	Obs	F-test	(Prob>F)	J <sub>1</sub> *	J <sub>2</sub> *
AR(-1)	0.0001 (-0.21)	-0.02 (-3.04)	0.03	289	9.24	0.00		
AR(0)	0.0001 (-1.59)	-0.01 (-3.97)	0.05	289	15.77	0.00		
CAR(-1;+3)	0.0001 (-0.05)	-0.01 (-1.77)	0.01	289	3.13	0.08	-0.61	-3.07
CAR(-1;+1)	0.0001 (-0.08)	-0.03 (-3.98)	0.05	289	15.86	0.00	-2.03	-11.91
CAR(-1;0)	0.0001 (-0.44)	-0.02 (-4.87)	0.05	289	16.58	0.00	-4.83	-29.09

\*Deletion events only

**Table III The effects of deletion from the Domini index - subsample split (market model)**

Our sample is represented by 263 events of addition and deletion from the Domini index occurred between January 1990 and December 2004 (for details on the chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A.

The Table illustrates regression findings of the model when the abnormal return is calculated with the market model according to different event windows (AR=abnormal return; CAR = cumulative abnormal return). *Del* is a dummy taking the value of one if the event is a deletion from the Domini 400 Social Index and zero otherwise. T-stats on heteroskedasticity robust standard errors are reported in round brackets.

Cross-sectional estimates are run on on two subsample splits (1990-1998, Table IIIA, and 1999-2004, Table IIIB). For the specification of the  $J_1$  and  $J_2$  tests see Table II legend.

**Table IIIA (sample period 1990-1998)**

<b>Abnormal return</b>	<b>Cons</b>	<b>Del</b>	<b>Adj. R<sup>2</sup></b>	<b>Obs</b>	<b>F-test</b>	<b>(Prob&gt;F)</b>	<b>J<sub>1</sub>*</b>	<b>J<sub>2</sub>*</b>
AR(-1)	0.001 (-0.03)	0.001 (-0.1)	0.00	134	0.01	0.94		
AR(0)	0.001 -0.13	0.001 (-0.61)	0.00	134	0.37	0.54		
CAR(-1;+3)	0.001 (-0.65)	0.011 (-0.7)	0.00	134	0.49	0.49	-1.2	-7.3
CAR(-1;+1)	0.001 (-0.03)	0.001 (-0.37)	-0.01	134	0.14	0.71	-2.8	-1.23
CAR(-1;0)	0.0001 (-0.94)	0.0001 (-0.76)	0.00	134	0.58	0.45	-1.46	-6.59

\*Deletion events only

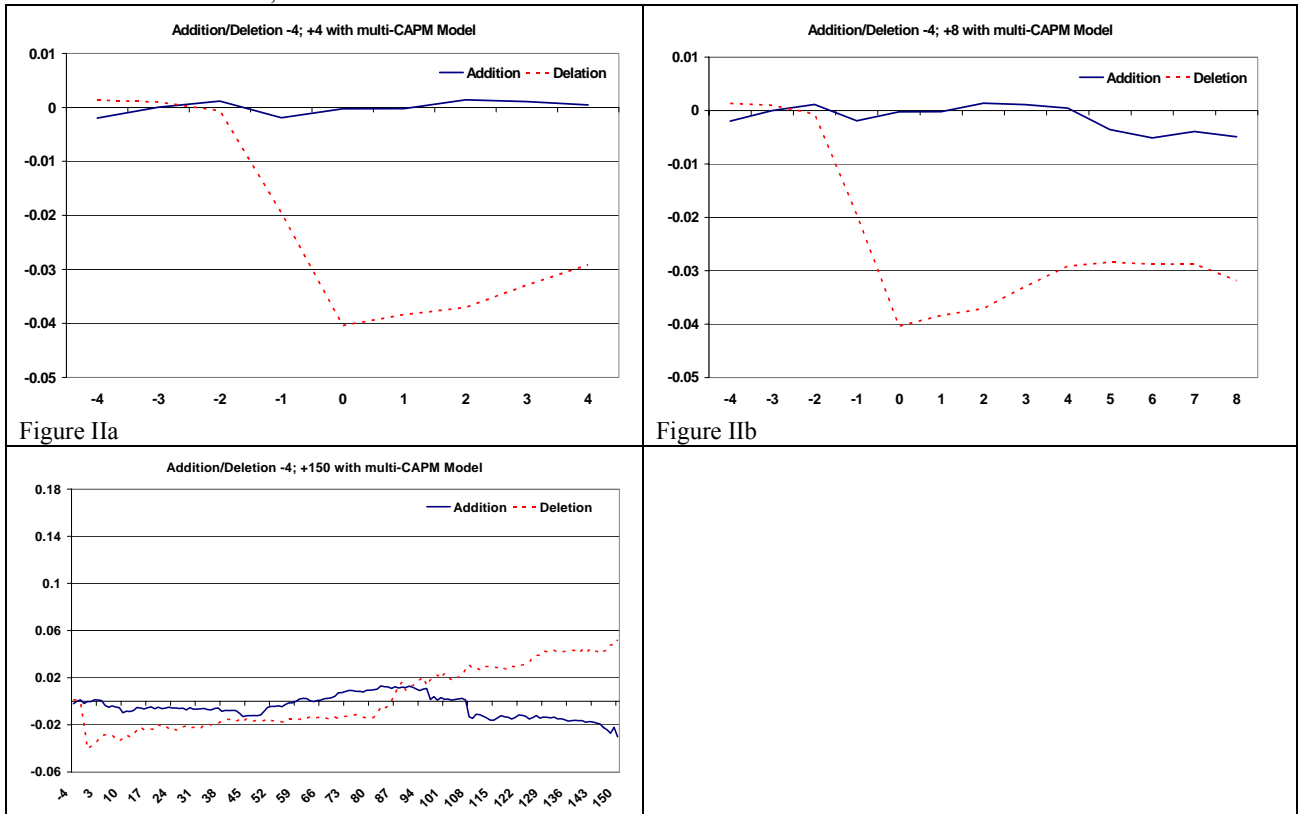
**Table IIIB (sample period 1999-2004)**

<b>Abnormal return</b>	<b>Cons</b>	<b>Del</b>	<b>R-sq adjusted</b>	<b>Obs</b>	<b>F-test</b>	<b>(Prob&gt;F)</b>	<b>J<sub>1</sub>*</b>	<b>J<sub>2</sub>*</b>
AR(-1)	0.0001 (-0.46)	-0.02 (-2.88)	0.05	155	8.30	0.00		
AR(0)	0.0001 (0.91)	-0.02 (-4.18)	0.10	155	17.48	0.00		
CAR(-1;+3)	0.0001 (0.6)	-0.02 (-2.95)	0.05	155	8.68	0.00	-7.9	-3.28
CAR(-1;+1)	0.0001 (-0.07)	-0.04 (-4.46)	0.11	155	19.93	0.00	-2.70	-13.86
CAR(-1;0)	0.0001 (0.15)	-0.04 (-4.24)	0.10	155	17.95	0.00	-6.13	-31.23

\*Deletion events only

**FIGURES IIA-IIB. The dynamics of addition/deletion CARs around the event date (normal returns estimated with the multi-CAPM GARCH (p,q) model):**

Figure Iia: (-4;+4) Addition/Deletion CARs; Figure Iib: (-4;+8) Addition/Deletion CARs; Figure Iic: (-4;+150) Addition/Deletion CARs;



**Table IV The effects of deletion from the Domini 400 Social Index (multi CAPM model)**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on the chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A. *Del* is a dummy taking the value of one if the event is a deletion from the Domini 400 Social Index and zero otherwise. The Table illustrates regression findings when the abnormal return is calculated with a multi CAPM specification which takes into account the conditional heteroskedasticity of the residuals in the market model (for details see section 3.2). For the specification of the  $J_1$  and  $J_2$  tests see Table II legend.

Abnormal return	Cons	Del	Adj. R <sup>2</sup>	Obs	F-test	(Prob>F)	J <sub>1</sub> *	J <sub>2</sub> *
AR(-1)	0.0001	-0.03	0.03	260	12.58	0.00		
	(-0.13)	(-3.66)						
AR(0)	0.0001	-0.01	0.05	260	16.06	0.00		
	(-1.18)	(-4.05)						
CAR(-1;+3)	0.0001	-0.01	0.01	260	2.98	0.09	-31	-5.53
	(-0.03)	(-1.62)						
CAR(-1;+1)	0.0001	-0.03	0.05	260	15.12	0.00	-98	-10.08
	(-0.09)	(-3.94)						
CAR(-1;0)	0.0001	-0.03	0.05	260	16.82	0.00	-1.81	-14.78
	(-0.38)	(-4.98)						

\*Deletion events only

**Table V The effects of addition and deletion from the Domini 400 Social Index - subsample split (multi CAPM model)**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on the chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A. *Del* is a dummy taking the value of one if the event is a deletion from the Domini 400 Social Index and zero otherwise.

The Table reports regression findings when the abnormal return is calculated with a multi CAPM specification which takes into account the conditional heteroskedasticity of the residuals in the market model (see section 3.2). Cross-sectional estimates are run on the overall period (Table I.A) and on two subsample splits (1990-1998 and 1999-2004) (Tables IIA-IIB).

Cross-sectional estimates are run on on two subsample splits (1990-1998, Table V.A, and 1999-2004, Table V.B) . For the specification of the  $J_1$  and  $J_2$  tests see Table II legend.

**Table V.A (sample period 1990-1998)**

<b>Abnormal return</b>	<b>Cons</b>	<b>Del</b>	<b>Adj. R<sup>2</sup></b>	<b>Obs</b>	<b>F-test</b>	<b>(Prob&gt;F)</b>	<b>J<sub>1</sub>*</b>	<b>J<sub>2</sub>*</b>
AR(-1)	0.001 (-0.06)	0.001 (-0.08)	0.00	122	0.01	0.94		
AR(0)	0.001 (-0.1)	0.001 (-0.48)	0.00	122	0.37	0.54		
CAR(-1;+3)	0.001 (-0.7)	0.01 (-0.98)	0.00	122	0.49	0.49	.10	-1.9
CAR(-1;+1)	0.001 (-0.03)	0.001 (-0.54)	-0.01	122	0.14	0.71	.03	-1.80
CAR(-1;0)	0.001 (-0.86)	0.001 (-0.64)	0.00	122	0.58	0.45	.37	.93

\*Deletion events only

**Table V.B (sample period 1999-2004)**

<b>Abnormal return</b>	<b>Cons</b>	<b>Del</b>	<b>Adj. R<sup>2</sup></b>	<b>Obs</b>	<b>F-test</b>	<b>(Prob&gt;F)</b>	<b>J<sub>1</sub>*</b>	<b>J<sub>2</sub>*</b>
AR(-1)	0.0001 (-0.46)	-0.02 (-2.98)	0.05	138	8.30	0.00		
AR(0)	0.0001 (-0.62)	-0.03 (-4.22)	0.10	138	17.48	0.00		
CAR(-1;+3)	0.0001 (-0.64)	-0.03 (-3.18)	0.05	138	8.68	0.00	-.56	-7.03
CAR(-1;+1)	0.0001 (-0.07)	-0.04 (-4.22)	0.11	138	19.93	0.00	-1.58	-11.62
CAR(-1;0)	0.0001 (-0.12)	-0.04 (-4.12)	0.10	138	17.95	0.00	-1.92	-20.01

\*Deletion events only

**Table VI. Robustness check on the effects of deletion from the Domini 400 Social Index (market model and multi-CAPM model)**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A.

We exclude from the sample deletions caused by bankruptcy (5 cases) and lack of social and financial representation (12 cases) to eliminate deletion events which are likely to be generated by concurring financial distress.

The Table illustrates regression findings of the model when the abnormal return is calculated with the market model according to different windows (AR=abnormal return; CAR = cumulative abnormal return). T-stats on heteroskedasticity robust standard errors are reported in round brackets.

For details on the construction of the  $J_1$  and  $J_2$  tests see Table II legend

Market model

	1990 – 2004				1999 – 2004			
	AR(-1)	CAR(-1,0)	AR(0)	CAR(-1,1)	AR(-1)	CAR(-1,0)	AR(0)	CAR(-1,1)
Del	-0.02 (-2.54)	-0.08 (-2.30)	-0.04 (-2.14)	-0.01 (-1.69)	-0.02 (-2.28)	-0.11 (-2.05)	-0.05 (-2.07)	-0.01 (-1.98)
Constant	-0.001 (-0.23)	-0.01 (-0.45)	-0.001 (-0.57)	-0.001 (-0.55)	-0.001 (-0.55)	-0.01 (-0.40)	-0.01 (-0.49)	-0.001 (-0.10)
$R^2$	0.03	0.02	0.02	0.01	0.03	0.02	0.02	0.02
Adj. $R^2$	0.02	0.02	0.01	0.00	0.02	0.02	0.02	0.02
Obs.	247	247	247	247	171	171	171	171
F-test	6.45	5.28	4.60	2.84	5.22	4.21	4.30	3.92
(Prob>F)	0.01	0.02	0.03	0.01	0.02	0.04	0.04	0.05
$J_1^*$	-	-4.84	-	-1.84	-	-7.34	-	-3.00
$J_2^*$	-	-21.88	-	-8.15	-	-23.66	-	-9.94

\*Deletion events only

Multi-CAPM model

	1990 - 2004				1999 – 2004			
	AR(-1)	CAR(-1,0)	AR(0)	CAR(-1,1)	AR(-1)	CAR(-1,0)	AR(0)	CAR(-1,1)
Del	-0.01 (-3.04)	-0.02 (-4.07)	-0.01 (-3.94)	-0.03 (-3.98)	-0.02 (-2.87)	-0.05 (-4.21)	-0.03 (-4.01)	-0.04 (-4.01)
Constant	0.001 (-0.21)	0.001 (0.44)	0.001 (1.57)	0.001 (-0.08)	0.001 (-0.58)	0.001 (-0.01)	0.001 0.65	0.001 -0.35
$R^2$	0.03	0.05	0.05	0.05	0.06	0.12	0.11	0.11
Adj. $R^2$	0.03	0.05	0.05	0.05	0.05	0.11	0.10	0.10
Obs.	289	289	289	289	131	131	131	131
F-test	9.24	16.58	15.55	15.86	8.24	17.71	16.10	16.09
(Prob>F)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$J_1^*$	-	-1.81	-	-0.98	-	-1.92	-	-1.58
$J_2^*$	-	-14.78	-	-10.08	-	-20.01	-	-11.62

\*Deletion events only

**Table VII. Robustness check with nonparametric sign and rank tests on the effects of deletion from the Domini 400 Social Index (market model – 8 months estimation window)**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A.

We exclude from the sample deletions caused by bankruptcy (5 cases) and lack of social and financial representation (12 cases) to eliminate negative abnormal returns which are likely to be generated by concurring financial distress.

The nonparametric sign test ( $J_3$ ) is calculated as  $J_3 = \left[ \frac{N^{*(-)}}{N} - 0,5 \right] \frac{N^{1/2}}{0,5} \approx N(0,1)$ . Where N is the total number of events and  $N^{(*)}$  is the number of events with negative (cumulative) abnormal returns. The null hypothesis of the absence of significant abnormal returns in presence of deletion events is rejected when  $J_3 > \Phi^{-1}(\alpha)$  or  $J_3 > 1.645$ .

The Corrado rank test is calculated as  $J_4 = \frac{1}{N} \sum_{i=1}^N \left( K_{iCAR(\tau_1, \tau_2)} - \frac{L_2 + 1}{2} \right) / S(L_2)$  where  $K_{iCAR(\tau_1, \tau_2)}$  is the rank of the CAR in the  $\tau_1 - \tau_2$  interval for the i-th event,

$$S(L_2) = \sqrt{\frac{1}{L_2} \sum_{t=T_0+1}^{T_2} \left( \frac{1}{N} \sum_{i=1}^N \left( K_{iCAR(\tau_1, \tau_2)} - \frac{L_2 + 1}{2} \right) \right)^2} \quad \text{and} \quad \frac{1}{N} \sum_{i=1}^N \left( K_{iCAR(\tau_1, \tau_2)} - \frac{L_2 + 1}{2} \right)$$

is the average of the differences between the rank of the abnormal return at the announcement date and the security median rank, with all event and estimation window abnormal returns being ranked.  $L_2$  is the number of ranks

varying according to the event window. N is the number of events and  $\frac{1}{L_2} \sum_{t=T_0+1}^{T_2} \left( \frac{1}{N} \sum_{i=1}^N \left( K_{iCAR(\tau_1, \tau_2)} - \frac{L_2 + 1}{2} \right) \right)$  is

the average of the differences between the rank of the abnormal returns and the security median rank in the  $T_0+1, T_2$  (estimation window + event window) interval.

**8 months estimation window – All deletions**

Overall sample period			1990 < t ≤ 1998		1998 < t ≤ 2004	
AR/Car	$J_3^*$	$J_4^*$	$J_3^*$	$J_4^*$	$J_3^*$	$J_4^*$
AR(-1)	1.64	-1.14	1.64	1.40	1.72	-2.18
AR(0)	2.14	-3.28	2.14	.53	1.41	-4.42
CAR(-1;+3)	-1.12	-1.87	-1.12	-1.59	-4.46	-1.18
CAR(-1;+1)	1.38	-1.49	1.38	-.21	1.41	-1.70
CAR(-1;0)	1.89	-2.83	1.89	-.91	1.09	-2.94

\* Deletion events only

**8 months estimation window – Bankruptcy and loss of financial and social representation deletion excluded**

Overall sample period			1990 < t ≤ 1998		1998 < t ≤ 2004	
AR/Car	$J_3^*$	$J_4^*$	$J_3^*$	$J_4^*$	$J_3^*$	$J_4^*$
AR(-1)	1.73	-.29	.43	1.66	1.97	-2.18
AR(0)	2.59	-1.76	1.70	.53	1.96	-2.95
CAR(-1;+3)	.00	-1.25	.43	-1.59	-3.39	-1.18
CAR(-1;+1)	1.73	-.77	.43	-.21	1.97	-.87
CAR(-1;0)	2.31	-1.77	1.71	-.91	1.57	-1.80

\* Deletion events only

**Table VII (follows). Robustness check with sign an rank nonparametric tests on the effect of deletion from the Domini 400 Social Index (market model – 2 months estimation window)**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on the chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A.

We exclude from the sample deletion events caused by bankruptcy (5 cases) and lack of social and financial representation (12 cases) to eliminate negative abnormal returns which are likely to be generated by concurring financial distress.

**2 months estimation window – All deletions**

AR/Car	Overall sample period		1990 < t ≤ 1998		1998 < t ≤ 2004	
	J <sub>3</sub> *	J <sub>4</sub> *	J <sub>3</sub> *	J <sub>4</sub> *	J <sub>3</sub> *	J <sub>4</sub> *
AR(-1)	1.05	-.27	-.62	-1.64	1.86	.97
AR(0)	-.53	-1.72	.22	1.71	-.85	-3.33
CAR(-1;+3)	-.60	-.39	-.73	.54	-.16	-1.04
CAR(-1;+1)	-.77	.36	.00	1.59	-1.03	-1.07
CAR(-1;0)	-.25	-1.75	-1.46	.18	.80	-2.43

\* Deletion events only

**2 months estimation window – Bankruptcy and loss of financial and social representation deletion excluded**

AR/Car	Overall sample period		1990 < t ≤ 1998		1998 < t ≤ 2004	
	J <sub>3</sub> *	J <sub>4</sub> *	J <sub>3</sub> *	J <sub>4</sub> *	J <sub>3</sub> *	J <sub>4</sub> *
AR(-1)	1.04	-.21	-.63	-.64	2.13	1.32
AR(0)	-.46	-0.59	.22	1.71	-.85	-2.43
CAR(-1;+3)	.00	.16	-.73	.54	.82	-.36
CAR(-1;+1)	-.44	.83	.00	1.59	-.66	-.71
CAR(-1;0)	-.15	-.88	-1.46	.18	1.22	-1.50

\* Deletion events only

**Table VIII. Robustness check with sign and rank nonparametric tests on the effects of deletion from the Domini 400 Social Index (multi CAPM model – 8 months estimation window)** - The sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on the chronology and motivation of entries and exits see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A. From this sample we exclude from the sample deletion caused by bankruptcy (5 cases) and lack of social and financial representation (12 cases) to eliminate negative abnormal returns which are likely to be generated by concurring financial distress.

For details on the construction of the  $J_3$  and  $J_4$  tests see Table VII legend

**8 months estimation window – All deletions**

AR/Car	Overall sample period		1990 < t ≤ 1998		1998 < t ≤ 2004	
	$J_3^*$	$J_4^*$	$J_3^*$	$J_4^*$	$J_3^*$	$J_4^*$
AR(-1)	2.92	.52	.35	-1.45	3.59	1.78
AR(0)	1.52	-2.36	-.70	1.04	2.65	-3.74
CAR(-1;+3)	2.69	-.22	-.35	.06	3.90	-.32
CAR(-1;+1)	1.99	-.04	-.70	.07	3.28	-.58
CAR(-1;0)	3.16	-1.64	.70	-.27	3.59	-1.90

\* Deletion events only

**8 months estimation window – Bankruptcy and loss of financial and social representation deletion excluded**

AR/Car	Overall sample period		1990 < t ≤ 1998		1998 < t ≤ 2004	
	$J_3^*$	$J_4^*$	$J_3^*$	$J_4^*$	$J_3^*$	$J_4^*$
AR(-1)	2.10	.33	.35	-1.45	2.76	1.90
AR(0)	.78	-1.17	-.70	1.04	1.96	-2.64
CAR(-1;+3)	1.83	.33	-.35	.06	3.13	.42
CAR(-1;+1)	1.31	.39	-.70	.73	2.74	-.12
CAR(-1;0)	2.36	-1.87	.70	-.27	2.74	-2.43

\* Deletion events only



**Table IX. The effects of deletion from the Domini 400 Social Index – robustness check for stock market seasonality (market model)**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on the chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A.

We exclude from the sample deletions caused by bankruptcy (5 cases) and lack of social and financial representation (12 cases) to eliminate negative abnormal returns which are likely to be generated by concurring financial distress shocks.

The Table illustrates regression findings of the model when the abnormal return is calculated with the market model according to different windows (AR=abnormal return; CAR = cumulative abnormal return). T-stats on heteroskedasticity robust standard errors are reported in round brackets. Bull: dummy which takes the value of one when more than 65 percent of stocks in the S&P 500 Index trade above their respective 50-day moving average; Bear: dummy which takes the value of one when less than 40 percent of stocks in the S&P 500 Index trade above their respective 50-day moving average.

For details on the construction of the  $J_1$  and  $J_2$  tests see Table II legend

	1990 – 2004				1990 – 2004			
	Market model				Market model*			
	AR(-1)	CAR(-1,0)	AR(0)	CAR(-1,1)	AR(-1)	CAR(-1,0)	AR(0)	CAR(-1,1)
Del	-0.019 (-2.70)	-0.102 (-2.72)	-0.083 (-2.66)	-0.050 (-2.67)	-0.018 (-2.45)	-0.086 (-2.30)	-0.067 (-2.22)	-0.039 (-2.14)
Bull	0.022 (-1)	-0.044 (-0.38)	-0.061 (-0.68)	-0.017 (-0.31)	0.022 (-1.03)	-0.043 (-0.42)	-0.061 (-0.78)	-0.018 (-0.38)
Bear	-0.002 (-0.11)	-0.023 (-0.29)	-0.021 (-0.34)	-0.006 (-0.17)	-0.002 (-0.11)	-0.026 (-0.38)	-0.025 (-0.45)	-0.012 (-0.38)
Constant	-0.001 (-0,34)	-0.005 (-0.25)	-0.003 (-0.22)	-0.003 (-0.35)	-0.001 (-0.36)	-0.005 (-0.30)	-0.004 (-0.26)	-0.003 (-0.39)
<i>R-sq:</i>	0.033	0.030	0.028	0.027	0.030	0.022	0.022	0.020
<i>R-Adjusted:</i>	0.022	0.017	0.017	0.016	0.018	0.010	0.010	0.007
<i>Obs</i>	263	263	263	263	247	247	247	247
<i>F-test</i>	2.920	2.510	2.460	2.400	2.500	1.850	1.850	1.610
<i>(Prob&gt;F)</i>	0.034	0.060	0.063	0.068	0.060	0.138	0.140	0.187
$J_1$		-4.836		-2.032		-4.843		-1.848
$J_2$		-29.091		-11.917		-21.884		-8.154

\*Bankruptcy and loss of financial and social representation deletion excluded

**Table X. The effects of deletion from the Domini 400 Social Index – robustness check for stock market seasonality (CAPM model)**

Our sample is represented by 263 events of addition and deletion from the Domini 400 Social Index occurred between January 1990 and December 2004 (for details on chronology and motivation of entries and exists see Appendix B). Social responsibility criteria considered for inclusion in the Domini index are illustrated in the Appendix A.

We exclude from the sample deletions caused by bankruptcy (5 cases) and lack of social and financial representation (12 cases) to eliminate negative abnormal returns which are likely to be generated by concurring financial distress shocks.

The Table illustrates regression findings of the model when the abnormal return is calculated with the market model according to different windows (AR=abnormal return; CAR = cumulative abnormal return). T-stats on heteroskedasticity robust standard errors are reported in round brackets. Bull: dummy which takes the value of one when more than 65 percent of stocks in the S&P 500 Index trade above their respective 50-day moving averages; Bear: dummy which takes the value of one when less than 40 percent of stocks in the S&P 500 Index trade above their respective 50-day moving averages (Commodity Research Bureau Stock Market Momentum Indicator).

For details on the construction of the  $J_1$  and  $J_2$  tests see Table II legend

	1990 – 2004				1990 – 2004			
	Multi CAPM model				Multi CAPM model*			
	AR(-1)	CAR(-1,0)	AR(0)	CAR(-1,1)	AR(-1)	CAR(-1,0)	AR(0)	CAR(-1,1)
Del	-0.012 (-3.03)	-0.024 (-4.10)	-0.014 (-3.94)	-0.025 (-3.99)	-0.012 (-2.79)	-0.021 (-3.35)	-0.010 (-2.99)	-0.021 (-3.20)
Bull	0.010 (0.09)	-0.013 (-0.66)	-0.004 (-0.40)	-0.010 (-0.51)	0.001 (0.09)	-0.013 (-0.70)	-0.004 (-0.48)	-0.011 (-0.56)
Bear	0.004 -0.48	-0.002 (-0.15)	-0.003 (-0.40)	-0.004 (-0.32)	0.004 (-0.49)	-0.003 (-0.27)	-0.004 (-0.68)	-0.007 (-0.55)
Constant	-0.002 (-0.30)	0.002 (0.56)	0.003 (1.65)	0.000 (0.08)	-0.001 (-0.30)	0.002 -0.61	0.003 -1.97	0.000 -0.13
<i>R-sq:</i>	0.032	0.056	0.053	0.054	0.029	0.041	0.035	0.039
<i>R-Adjusted:</i>	0.022	0.046	0.043	0.044	0.018	0.031	0.024	0.028
<i>Obs</i>	289	289	289	289	274	274	274	274
<i>F-test</i>	3.140	5.650	5.260	5.370	2.660	3.880	3.220	3.610
<i>(Prob&gt;F)</i>	0.026	0.001	0.002	0.001	0.049	0.010	0.023	0.014
$J_1$		-1.811		-0.984		-2.185		-0.927
$J_2$		-14.784		-10.088		-14.887		-10.057

\*Bankruptcy and loss of financial and social representation deletion excluded