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Abstract

Idiosyncratic volatility (*IV*) is regarded as a measure of firm specific information and has been shown to be correlated with ex post lower stock returns. We explore the nexus between *IV* and corporate social responsibility (CSR) and document that *IV* is positively correlated with net aggregate CSR and is negatively correlated with a CSR specific risk factor (namely stakeholder risk). Our findings show that: (i) less (more) reliance on market information (firm specific information) implies more difficulty in predictive accuracy; (ii) negative correlation between *IV* and exposure to the above mentioned CSR risk dimension contributes to explain the puzzle of the negative excess returns of high *IV* portfolios widely documented in the literature. Our findings are consistent with the hypothesis that CSR reduces flexibility in answering to productive shocks via reduction of stakeholders' well-being, thereby making earnings less predictable in conventional ways, even though they are less exposed to risk of conflicts with stakeholders.

JEL: D84; E44; F30; G17; C53.

Keywords: idiosyncratic volatility, corporate social responsibility, stakeholder risk.

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Idiosyncratic volatility (IV) is regarded as a measure of firm specific information and has been shown to be correlated with ex post lower stock returns. We explore the nexus between IV and corporate social responsibility (CSR) and document that IV is positively correlated with net aggregate CSR and is negatively correlated with a CSR specific risk factor (namely stakeholder risk). Our findings show that: (i) less (more) reliance on market information (firm specific information) implies more difficulty in predictive accuracy; (ii) negative correlation between IV and exposure to the above mentioned CSR risk dimension contributes to explain the puzzle of the negative excess returns of high IV portfolios widely documented in the literature. Our findings are consistent with the hypothesis that CSR reduces flexibility in answering to productive shocks via reduction of stakeholders' well-being, thereby making earnings less predictable in conventional ways, even though they are less exposed to risk of conflicts with stakeholders.

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1. Introduction

Recent literature has investigated the determinants of the stock return variability component not explained by market portfolio stock returns (or by exposition to systematic non-diversifiable risk) and industry returns. The variable is generally calculated with a measure inversely correlated to the *R-squared* of stock returns regressed on market and industry returns (or positively correlated with the residual of the same regression) and is called *Idiosyncratic Volatility* (henceforth noted as *IV*). *IV* definitely captures the lack of correlation between individual stock and market portfolio returns. The interpretation in the literature so far is that an increase in *IV* implies more dependence from (and superior collection of) firm private information and therefore higher quality of firm specific information (Gul et al., 2011; Roll, 1988; Morck et al., 2000; Durnev et al., 2003). Another important strand of this literature observes that ex ante exposure to *IV* is correlated with ex post lower stock returns (Campbell, Hilscher and Szilagyi, 2005). More specifically, Ang et al. (2006) find a -1.31% monthly difference across 23 developed markets on average returns between the extreme quintile portfolios sorted by *IV*. Their interpretation is that broad non-diversifiable risk factors lie behind this result. Peterson and Smedema (2011) find that the *IV* anomaly is not due to mispricing, while Chen et al. (2012) document that it is robust to the market microstructure effect.

Note that *IV* captures a risk of price change which is due to the specific characteristics of the stock as opposed to those of the overall market and, as such, this unsystematic risk should be eliminated by portfolio diversification. It is therefore puzzling that what is presumably a risk factor (which can be diversified) produces negative (and not positive or insignificant) portfolio returns.¹

¹ A notable exception is Bali and Cakici (2006). In an extensive empirical setting, these authors report that there is no robust, significant relation between idiosyncratic volatility and expected returns. Additionally, Bali, Cakici and Whitelaw (2011) also report an

In our paper we try to explain this puzzle by providing an original contribution to this literature through the analysis of the unexplored relationship among *IV*, earnings forecast error, and corporate social responsibility (CSR). Our results document that this nexus may contribute to explain the underpricing puzzle of the *IV* literature, while helping to better understand what *IV* actually measures.

Our main hypothesis is that CSR implies a departure from standard profit maximization toward a more complex strategy of stakeholder satisfaction (or, at least, toward a profit maximization strategy with additional constraints related to a minimal degree of satisfaction of the other stakeholders). This implies that CSR companies have reduced flexibility in responding to negative productivity shocks with a reduction of the well-being of the above mentioned other stakeholders in order to maintain their target earnings – i.e., firing workers, limiting their benefits, reducing the amount of donation to local communities, or the quality of environmental rules. The consequence is that their earnings are less predictable or less likely to follow stock market dynamics common to the majority of non CSR oriented companies. As a consequence, our prediction is that CSR should increase *IV*, even though this does not make CSR stocks riskier, given that CSR offers protection from a specific form of risk related to conflicts with stakeholders. Note that in this respect the specific CSR component of (reduced) stakeholder risk is exactly related to our main proposition. Higher stakeholder risk is in fact a proxy on how much companies deviate from CSR and how flexible they are in responding to shocks with reductions in stakeholders' well-being, which, in extreme cases, leads to open conflicts with stakeholders.

Our findings do not reject our main hypothesis, since we document that stakeholder risk is negatively and significantly correlated with *IV*. Results are robust to firm fixed effects, firm size, sample splits (before and

opposite result to the puzzling negative relation between returns and idiosyncratic volatility as described in Ang et al. (2006, 2009).

after the global financial crisis), and to sensitivity analysis on departures from the Conditional Independence Assumption (CIA). In this respect, our findings provide interesting insights on the puzzle of the correlation between higher ex ante *IV* and lower ex-post stock returns by identifying in stakeholder risk a risk factor which justifies the *IV* underpricing anomaly. In addition to this, we find that net aggregate CSR (total KLD strengths minus total KLD weaknesses) produces a strongly significant and positive effect on *IV*. The proposed rationale for this result traces back again to the main point that CSR reduces flexibility in responding to negative productivity shocks with a reduction of stakeholders' well-being, thereby making returns of CSR stocks less predictable and less likely to follow stock market dynamics of the majority of non CSR firms.

The paper is divided into five sections including the introduction and conclusion. The second section describes our datasets and illustrates our descriptive findings. The third section presents and comments on our econometric findings. The fourth section provides a sensitivity analysis to check whether our main results are robust to endogeneity and selection bias. The fifth section concludes.

2. Variables of Interest and Dataset

Our empirical analysis is based on U.S. listed firms from 1992 through 2010. Data on forecasted and actual earnings per share - EPS - are obtained from the Institutional Brokers Estimate System (I/B/E/S) database, while data for CSR scores are obtained from RiskMetrics-KLD. Data on corporate characteristics are obtained from COMPUSTAT.

As is well known, CSR involves a move from straightforward profit maximization to the satisfaction of the well-being of a wider range of stakeholders, which include workers, customers, suppliers, and local

communities.² RiskMetrics-KLD measures CSR quality in terms of the number of corporate strengths and corporate concerns according to seven domains: Community, Employees, Environment, Diversity, Human Rights, Corporate Governance, Product Quality, plus the Controversial Business domain. For each of the investigated domains firms may obtain positive or negative scores according to their behavior.³ After merging the above three datasets, the total number of observations is 25,033 with 4383 unique companies. The number of firms included in the analysis increases over time from 351 unique companies in 1992 (representing 6% of the total number of companies in COMPUSTAT with 28% of the total assets) to 2,553 unique companies in 2010 (representing 52% of the total number of companies in COMPUSTAT with 49% of the total assets).

The dependent variable Idiosyncratic Volatility (IV) is defined as follows:

$$IV_{i,T} = \log \left(\frac{1 - R_{i,T}^2}{R_{i,T}^2} \right) \quad (1)$$

with $R_{i,T}^2$ capturing the percentage of the variation in the weekly (t) return of firm i explained by the variation in the market (m) and industry (s) returns from the following estimation model:^{4,5}

² Benabou and Tirole (2010) argue that with CSR companies internalize externalities and may reduce the distance between private and social optimum when regulation has limits or is missing. For a recent survey on CSR see Kitzmüller and Shimshack (2012), Hoi, Wu, and Zhang, (2013), and Dhaliwal, Radhakrishnan, Tsang, and Yong (2012).

³ The *Community* domain relates mainly to the amount of corporate profits invested in local philanthropic activities; the *Environmental* domain relates to pollution and waste management policies; the *Employee* domain relates to issues of safety in the working environment, wage and employment policies, flexibility of the work time, etc.; the *Human Right* domain concerns mainly how corporate policies with subsidiaries affect human rights of workers and local communities in other countries; the *Diversity* domain relates to corporate policies in terms of equal opportunities; the *Product Quality* domain reminds us that CSR also implies satisfaction of customers. The *Controversial Business* issue domain is related to how some ethical investors disregard companies that are investing in industries which are considered unethical from their point of view. For a detailed description on how RiskMetrics-KLD calculates strengths and concerns in each domain see Appendix A.

⁴ The definition of industry is based on Fama-French 49 industry code. We obtain daily returns for the 49 industry portfolios from their website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html), and then

$$r_{i,s,t} = \alpha_i + \beta_{i,m}r_{m,t} + \beta_{i,s}r_{s,t} + \varepsilon_{i,s,t}$$

where $r_{i,s,t}$ is the firm i in industry s week (t) return; $r_{m,t}$ is the market (m) weekly return; $r_{s,t}$ is the industry (s) weekly return; and $\varepsilon_{i,s,t}$ is the error term.

The median absolute forecast error - $MAFE_{i,T}$ - across firm i is defined as the median of the following equation:

$$AFE_{T,h}^{i,j} = \frac{|E[EPS]_{T,h}^{i,j} - EPS_T^i|}{P_{T-1}^i}$$

that is, of the absolute difference between the earnings per share for firm i forecasted by analyst j in the fiscal year T at h distance (in days) from the release date - $E[EPS]_{T,h}^{i,j}$ - and the released earnings per share - EPS_T^i - scaled by the share price at the end of the previous year - P_{T-1}^i .⁶

With regard to CSR, a fundamental component we are interested in for our particular analysis is related to the reduction of a specific risk factor identified in the potential conflicts that may arise between the firm and its stakeholders. Such conflicts may range from consumer class action lawsuits and litigation with workers to conflicts with local communities over problems related to pollution and production waste. Goss and Roberts (2011) discuss the point by arguing that companies produce negative externalities

transform daily returns into weekly returns. We use the CRSP US value-weighted index weekly returns as the proxy for the market returns. The reason why we use weekly returns is to avoid thin trading problems. To be specific, some small stocks may not be traded on a given day and CRSP data report a zero return when a stock is not traded on that day. Weekly returns are less likely to be affected by such thin trading problems.

⁵ In estimating residual stock returns we follow the approach suggested by Roll (1988), Morck et al. (2000), and Durnev et al. (2003). According to these authors the R-square measurement of stock price informativeness is based on the correlation between the stock's returns and the returns of the corresponding industry and of the market. If a firm's stock returns are strongly correlated with the market and industry returns, then the firm's stock price is less likely to convey firm specific information, which means that the stock price is less informative. On the other hand, if there is a larger fraction of firm-specific information capitalized into stock prices, then the stock is more informative, which is good for investors, as they can evaluate firms' growth opportunities more accurately and allocate capital more efficiently (Wurgler, 2000; Durnev et al., 2003).

⁶ For the related literature on the determinants of the earning forecast bias, see, among others, Keane and Runkle (1990, and 1998), Lim (2001).

for which stakeholders impose penalties. Freeman (1984) considers CSR as an optimal strategy to minimize transaction costs and conflicts with stakeholders. A specific dimension of stakeholder risk is related to reputational risk and to the effect of accidents which may undermine such reputation. An empirical work by Minor (2009) on a sample of 184 events of product recall documents that the negative abnormal returns that these events generate a net CSR gain of around 600 million dollars.

We therefore select as CSR measures the *StakeholderRisk* and the *NetCSR* variables.⁷ Overall, what must also be considered is that CSR implies that the firm has a more complex objective function than straight profit maximization. More specifically, greater weight given to the well-being of stakeholders different from shareholders (workers, local communities, customers) implies at least the presence of additional constraints to profit maximization. This means that CSR oriented firms have reduced flexibility in responding to productivity shocks with a reduction of the well-being of stakeholders different from shareholders in order to maintain their target earnings – i.e., with initiatives such as firing workers, limiting their benefits, or reducing the amount of donation to local communities, or the quality of environmental rules. The consequence is that their earnings are less predictable or less likely to follow stock market dynamics. Hence, our prediction is that good CSR should increase *IV*.

Based on the above considerations, the two hypotheses we are going to test in the empirical section of the paper are:

H_{01} : *StakeholderRisk* has a negative impact on *IV*.

H_{02} : *NetCSR* has a positive impact on *IV*.

⁷ *StakeholderRisk* is the sum of the following RiskMetrics-KLD items: COM-con-A, COM-con-B, COM-con-C, COM-con-D, COM-con-X, DIV-con-A, DIV-con-X, EMP-con-B, EMP-con-X, ENV-con-X, HUM-con-D, HUM-con-F, HUM-con-G, HUM-con-X, PRO-con-A, PRO-con-D, PRO-con-E, PRO-con-X. *NetCSR* is the difference between all strengths and concerns in RiskMetrics-KLD. See Appendix A for an extensive description of these criteria.

3. Estimation Model and Empirical Findings

In order to test our theoretical hypothesis we estimate the following panel fixed effect specification:

$$\begin{aligned}
 IV_{i,T} = & \alpha_0 + \alpha_1 StakeholderRisk_{i,T-1} + \alpha_2 Size_{i,T-1} \\
 & + \alpha_3 Leverage_{i,T-1} + \alpha_4 MAFE_{i,T-1} + \alpha_5 R\&DtoAsset_{i,T-1} \\
 & + \alpha_6 NetCSR_{i,T-1} + \sum_{l=19} \beta_l DYear_l + u_i + \varepsilon_{i,T}
 \end{aligned} \tag{2}$$

where $IV_{i,T}$ is *Idiosyncratic Volatility* of company i at time T calculated as in (1). *StakeholderRisk*, *MAFE*, and *NetCSR* variables have been described in detail in the previous Section. The inclusion of *Size* proxied by firm total assets in million dollars among controls may capture institutional trading effects which have been considered as potential determinants of the increase in *IV* over time. We further introduce *Leverage*, the ratio between firm debt and its equity book value, which is added among regressors since the variable amplifies effects of news on probability of default and therefore the idiosyncratic component of stock return volatility (Dennis and Stickland, 2004; Black, 1976; and Christie, 1982). *R\&DtoAsset*, the ratio between R\&D expenditures and total assets, is also included in the estimate in order to take into account the potential effect that intangibles have on the difficulty of predicting corporate returns, thereby affecting our dependent variable.

All the above mentioned regressors are lagged one period in order to avoid the possibility that covariates may lead and not lag the dependent variable.⁸ We also control our findings for firm fixed effects which capture all firm specific time invariant components and year effects (*DYear*) to control for time increasing trend.⁹ The latter are important since it has been

⁸ If we do not lag CSR scores it may well be that an event determining such scores occurs around the end of the year and therefore after and not before the occurrence of most of the financial events determining *IV*.

⁹ *DYear* are year dummies variables to capture year effects from 1992 to 2010.

observed that *IV* has increased over time (Dennis and Stickland, 2004). Descriptive statistics of all the variables of interest are shown in Table 1.

We estimate our model starting from a simpler specification which includes only *StakeholderRisk*, *Size*, and *DYear*. We progressively add *Leverage*, *R&DtoAsset*, and the median absolute earning forecast error (*MAFE*). Results provided in Table 2 document that our main variable of interest, *StakeholderRisk*, is negative and significant, its impact remaining remarkably stable across the different specifications (Table 2, columns 1-3).

The effect of *StakeholderRisk* is strong also in terms of economic significance. If we take as a reference the coefficient of the fully augmented estimate (Table 2, column 3), one standard deviation change of such variable produces a 33.2 percent change of the dependent variable with respect to its sample mean. The impact is almost the same if we consider the previous two specifications in columns (1) and (2). The effect of *Leverage* on *IV* is positive as expected and strongly significant as well, even though the magnitude of one standard deviation change is much smaller if compared with that of the stakeholder risk variable (around 2 percent in the fully augmented estimate of column 3). *Size* is also highly significant, establishing that larger firms have lower *IV* and more synchronicity with market returns. The effect on the dependent variable is around 8.2 percent in the case of a one standard deviation change in the fully augmented estimate. This finding may be explained by the fact that large caps are among the main constituents of stock market indexes and their moves may affect in relevant way the index itself. This is why it is important to introduce *Size* among controls in our estimates. When we add the median absolute earning forecast error (*MAFE*) as an additional control we find that the effect of the variable is positive and significant in all specifications, and the impact of one standard deviation change is around 7 percent on the dependent variable in the fully augmented estimate in column 3. This implies that earnings predictive accuracy is negatively correlated with *IV*. This result may seem at odd with the idea that *IV* measures quality of firm specific information. However, if

we stick on how IV is measured we observe that the variable captures the proportion of firm return variability not explained by stock market returns. This implies by definition that, if market returns help less in predicting corporate returns, it is more difficult to predict the behavior of the latter.

Since our main hypothesis (CSR introduces additional constraints and reduces capacity to smooth earnings in the presence of productivity shocks) is also related to aggregate CSR as such, we aggregate all RiskMetrics-KLD criteria. We repeat our final specification by replacing the *StakeholderRisk* variable with the *NetCSR*. We find that the variable is positive and significant, net of the impact of the additional controls (Table 2, column 4). In terms of magnitude, one standard deviation change of *NetCSR* produces now a 16.7 percent variation of the dependent variable IV with respect to its sample mean.

The aggregate CSR (*NetCSR*) effect is consistent with our main theoretical hypothesis that CSR reduces flexibility in responding to negative productivity shocks with a reduction of stakeholders' well-being, thereby making returns of CSR stocks less predictable and less likely to follow stock market dynamics of the majority of non CSR firms. Note as well that also the *StakeholderRisk* result may be seen as consistent with our main theoretical hypothesis, since this variable may well be considered a proxy of how the company deviates from CSR by being flexible in reacting to productivity shocks via reduction of well-being of stakeholders different from shareholders.

From Table 3 to Table 6, we check whether our findings are robust to subsample splits based on sample period (1992-2005 and 2006-2010) and *Size* (using the overall sample median as threshold). The time split allows us to test whether our model is robust also for a pre-crisis period and the last global financial crisis (2006-2010). This split is important because the global financial crisis may have involved a shift of paradigm.

StakeholderRisk proves to be quite robust across different subsamples and always remains significant with small variations in coefficient

magnitude. The exception is for the small size group but only for the estimate with less controls, and not in the fully augmented estimate. The effects of *Size* and *Leverage* also remain strongly significant with a relatively stable coefficient.

On the contrary, the magnitude of the *MAFE* coefficient is far larger in the second (more recent) time subsample where one standard deviation change of the median absolute earning forecast error accounts for a 40 percent change (Table 4, column 3). The same happens for this variable in the small *Size* sample estimate where one standard deviation change accounts for a 21 percent change in the dependent variable (Table 6, column 3). The different impact of the earning forecast bias in the two size subsamples is reasonable since the nexus between *IV* and prediction difficulties must be higher for smaller companies for which information is presumably lower. The different impact of the same variable in the more recent time subsample can be explained by the fact that the second period (2006-2010) includes the turmoil of the global financial crisis where earning predictions become much more difficult and the correlation between the bias and idiosyncratic volatility higher.

4. Sensitivity Analysis

Endogeneity and selection might bias our results if an unobservable covariate affects both *CSR* and *IV*, producing a spurious relationship between them. In order to control for departures from the exogeneity assumption we implement the Imbens (2003) sensitivity analysis. The approach is based on the relaxation of the unconfoundedness hypothesis and on the evaluation of the conditions under which such relaxation produces relevant impact on the estimation of our treatment effect.

Based on the two hypotheses H_{01} and H_{02} as previously formulated, we are mainly interested in the impact of *StakeholderRisk* and *NetCSR* on *IV*. If conditions under which the relaxation of the CIA makes our treatment insignificant are shown to be unrealistic, the effect of the treatment

(*NetCSR* or *StakeholderRisk*) on the dependent variable (*IV*) may be considered robust. The advantage of this approach is that it must not rely on validity and relevance assumptions of instrumental variables, which are usually difficult to support and not robust to critiques.

More specifically, following Imbens (2003), we assume that an unobserved covariate U may produce a bias if correlated with both the treatment assignment T and the outcome Y . In order to model the impact of U , it is common under this approach to use the observed controls of our empirical estimates as plausible benchmarks.¹⁰ The reference equation we consider is the fully augmented estimate in (2). Note that the Imbens (2003) approach requires the transformation of the treatment into a (0/1) dummy variable. We therefore transform our variable of interest (*StakeholderRisk*) into a dummy which takes a value of one if the company has a *StakeholderRisk* value above the median and zero otherwise. The baseline estimate (Table 2, column 3) with the modified variable of interest yields a significant coefficient for the transformed *StakeholderRisk* dummy variable (-.224, and t-stat -21.39). We perform the sensitivity analysis by using the Harada (2012) algorithm.

The results of our sensitivity analysis are shown in Figure 1 (*Panels A* and *B*), which draws the impact of each of the observed controls in terms of variation of the treatment T (*StakeholderRisk*) and the dependent variable Y (*IV*). More specifically, on the vertical axis we measure the marginal increase in R^2 from adding a given observed covariate and on the horizontal axis the marginal effect of the covariate on the treatment. The solid curve must be interpreted as the threshold above which the modeled unobserved confounder U is so influential as to reduce the baseline treatment effect to zero (*Panels B* and *D*) or to make it statistically insignificant or, more specifically, below the 1.96 t-stat level (*Panels A* and *C*).

¹⁰ For further details on this approach see Rosenbaum and Rubin (1983). For its application to an empirical problem see Blattman and Annan (2010).

The main result of the sensitivity analysis is that all the observed covariates lie well below the solid curve and therefore any reasonable confounder having marginal impact similar to the observed covariates may produce little variation in Y or T . In other terms, the unobserved confounder should have far higher correlations with T and Y to significantly affect the treatment effect. Such correlations are therefore highly implausible and this provides support to the hypothesis that our main finding is robust to departures from the exogeneity assumption. The only exception to this is size, which is close to the boundary due to its high correlation with the treatment.

We run the same sensitivity analysis for the estimate in Table 2 (column 4) in which we use the aggregate CSR variable (*NetCSR*). Again, we transform the variable into a (0/1) dummy taking a value of one if aggregate CSR is above the median and zero otherwise. The variable is strongly significant in the modified baseline estimate (coefficient .063, t-stat 12.19). Figure 1 (*Panels C and D*) shows that, also in this case, the impact of the observed controls fall well inside the solid curve which delimits the border of confounder impacts on T and Y , which significantly weaken the treatment effect. Note that in this case also the *Size* variable lies far below the boundary. This supports the hypothesis that the nexus between CSR and IV is robust when we relax the unconfoundedness assumption.

5. Conclusions

The interest on the determinants of *Idiosyncratic Volatility* - so far generally regarded as a measure of quality of firm specific information and measured as the component of stock return variability not explained by market portfolio stock returns - has recently grown in parallel with the discovery that ex ante exposure to IV is correlated with ex post lower stock returns. A likely rationale is that the variable is correlated to some unobserved risk factors.

Our empirical findings on the nexus between *IV* and Corporate Social Responsibility shed light on these issues. We document that *IV* is significantly and negatively correlated with a main CSR risk factor (*StakeholderRisk*) after controlling for the average earning forecast error which is, in turn, negatively correlated with the dependent variable. Our first important conclusion is that this CSR dimension may account for part of the unobservable risk factor which is behind the underperformance of high *IV* portfolios.

Our final and more general result is that CSR, when considered in aggregate (*NetCSR*), is significantly related to *IV*. This finding and the previous two are consistent with our theoretical hypothesis that CSR implies lower flexibility in responding to negative productivity shocks with a reduction of stakeholders' well-being, thereby making returns of CSR stocks less predictable and less likely to follow stock market dynamics of the majority of non CSR firms. In this respect stakeholder risk may be considered a proxy on how companies counteract productivity shocks with such flexibility, thereby reducing the well-being of stakeholders who are not shareholders.

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Table 1. Descriptive statistics

	Obs	Mean	St. Dev.	Min	Max
<i>IV</i>	25,033	.7843	1.1914	-6.4230	14.4598
<i>StakeholderRisk</i>	21,052	.5826	1.1116	0	11
<i>MAFE</i>	9,349	.0271	.1772	0	9.2648
<i>Size</i>	23,069	10847.4	64,317.33	.9790	2,187,631
<i>Leverage</i>	22,998	.8830	15.4564	0	1,784.172
<i>R&DtoAsset</i>	23,069	.0353	.1084	0	7.7912
<i>NetCSR</i>	25,033	-.5112	2.0887	-14	13

IV is the Idiosyncratic Volatility of the company (calculated as explained in section 2). *StakeholderRisk* is the sum of the following RiskMetrics-KLD items: COM-con-A, COM-con-B, COM-con-C, COM-con-D, COM-con-X, DIV-con-A, DIV-con-X, EMP-con-B, EMP-con-X, ENV-con-X, HUM-con-D, HUM-con-F, HUM-con-G, HUM-con-X, PRO-con-A, PRO-con-D, PRO-con-E, PRO-con-X. *NetCSR* is the difference between all strengths and concerns in RiskMetrics-KLD (see Appendix 1). *MAFE* is the median absolute forecast error across firm *i*. *Leverage* the ratio between firm debt and its equity book value *R&DtoAsset* is the ratio between R&D expenditures and total assets, *Size* is proxied by firm total assets (divided by 1,000,000).

Table 2. The impact of CSR on idiosyncratic volatility (Panel Fixed Effects Estimates - overall sample)

	(1)	(2)	(3)	(4)
<i>StakeholderRisk</i>	-0.223*** (.0071)	-0.238*** (.0105)	-0.224*** (.0104)	
<i>Size</i>	-0.001*** (.0001)	-0.001*** (.0002)	-0.001*** (.0002)	-0.003*** (.0002)
<i>Leverage</i>	0.002*** (.0004)	0.001** (.0004)	0.001** (.0004)	0.002*** (.0005)
<i>MAFE</i>		0.293*** (.0789)	0.307*** (.0778)	0.360*** (.0806)
<i>R&DtoAsset</i>			1.959*** (.1343)	2.007*** (.1279)
<i>NetCSR</i>				0.063*** (.0051)
<i>Year Dummies</i>	YES	YES	YES	YES
<i>Constant</i>	-2.359*** (.4694)	0.693*** (.1014)	0.617*** (.1002)	0.917*** (.1501)
<i>Obs</i>	19,435	7,825	7,825	8,908
<i>F-test Fixed eff.</i> (p-value)	21.54 (0.00)	48.71 (0.00)	52.11 (0.00)	525.6 (0.00)
<i>F-test Good fit</i> (p-value)	71.86 (0.00)	138.38 (0.00)	153.91 (0.00)	90.60 (0.00)

For Variables details see Table 1. (robust standard error) ***p<0.01 **p<0.05 *p<0.10

Table 3. The impact of CSR on idiosyncratic volatility (Panel Fixed Effects Estimates - subsample split 1992-2005)

	(1)	(2)	(3)	(4)
<i>StakeholderRisk</i>	-0.220*** (.0084)	-0.251*** (.0129)	-0.227*** (.0127)	
<i>Size</i>	-0.001*** (.0001)	-0.001*** (.0003)	-0.001*** (.0003)	-0.004*** (.0003)
<i>Leverage</i>	0.002*** (.0004)	0.001** (.0004)	0.001** (.0004)	0.003*** (.0005)
<i>MAFE</i>		0.256*** (.0750)	0.275*** (.0729)	0.352*** (.0767)
<i>R&DtoAsset</i>			2.168*** (.1416)	2.312*** (.1390)
<i>NetCSR</i>				0.055*** (.0067)
<i>Year Dummies</i>	YES	YES	YES	YES
<i>Constant</i>	0.354*** (.0795)	0.671*** (.0169)	0.562*** (.0179)	1.186*** (.2021)
<i>Obs</i>	10,484	4,129	4,129	4,397
<i>F-test Fixed eff.</i>	70.66	186.18	206.97	196.30
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)
<i>F-test Good fit</i>	125.91	128.94	155.87	86.53
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)

For Variables details see Table 1. (robust standard error) ***p<0.01 **p<0.05 *p<0.10

Table 4. The impact of CSR on idiosyncratic volatility (Panel Fixed Effects Estimates - subsample split 2006-2010)

	(1)	(2)	(3)	(4)
<i>StakeholderRisk</i>	-0.229*** (.0125)	-0.221*** (.0177)	-0.217*** (.0176)	
<i>Size</i>	-0.002*** (.0002)	-0.001*** (.0003)	-0.001*** (.0003)	-0.004*** (.0003)
<i>Leverage</i>	0.014 (.0113)	0.003 (.0184)	0.014 (.0186)	0.048** (.01849)
<i>MAFE</i>		1.054** (.4234)	1.052** (.4223)	0.465 (.2878)
<i>R&DtoAsset</i>			1.317*** (.2998)	1.399*** (.2542)
<i>NetCSR</i>				0.069*** (.0077)
<i>Year Dummies</i>	YES	YES	YES	YES
<i>Constant</i>	-1.483*** (.4385)	0.403*** (.2297)	0.668** (.2292)	0.897*** (.2267)
<i>Obs</i>	8,951	3,696	3,696	4,511
<i>F-test Fixed eff.</i>	9.42	15.32	15.67	23.55
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)
<i>F-test Good fit</i>	36.65	43.83	39.92	33.10
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)

For Variables details see Table 1. (robust standard error) ***p<0.01 **p<0.05 *p<0.10

Table 5. The impact of CSR on idiosyncratic volatility (Panel Fixed Effects Estimates – large company subsample)

	(1)	(2)	(3)	(4)
<i>StakeholderRisk</i>	-0.130*** (.0074)	-0.147*** (.0109)	-0.147*** (.0109)	
<i>Size</i>	-0.001*** (.0001)	-0.001*** (.0002)	-0.001*** (.0002)	-0.002*** (.0002)
<i>Leverage</i>	0.002*** (.0004)	0.001*** (.0004)	0.001*** (.0004)	0.002*** (.0004)
<i>MAFE</i>		0.267*** (.0799)	0.268*** (.0799)	0.307*** (.0817)
<i>R&DtoAsset</i>			0.269 (.4140)	-1.110** (.4165)
<i>NetCSR</i>				0.058*** (.0053)
<i>Year Dummies</i>	YES	YES	YES	YES
<i>Constant</i>	-1.451** (.5682)	0.377*** (.0795)	0.374*** (.0797)	0.403*** (.0822)
<i>Obs</i>	10,586	4,641	4,641	4,919
<i>F-test Fixed eff.</i> (p-value)	10.06 (0.00)	33.84 (0.00)	33.80 (0.00)	35.66 (0.00)
<i>F-test Good fit</i> (p-value)	28.27 (0.00)	52.73 (0.00)	44.01 (0.00)	35.78 (0.00)

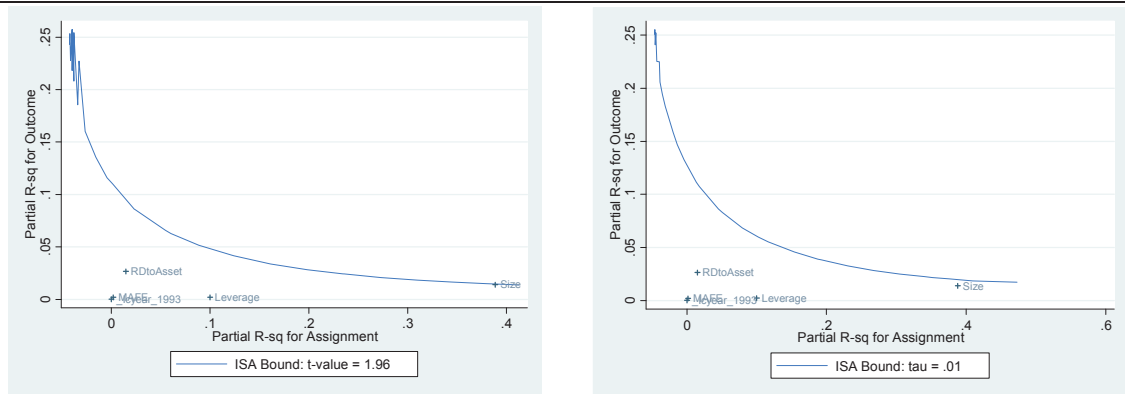
For Variables details see Table 1. (robust standard error) ***p<0.01 **p<0.05 *p<0.10

Table 6. The impact of CSR on idiosyncratic volatility (Panel Fixed Effects Estimates – small company subsample)

	(1)	(2)	(3)	(4)
<i>StakeholderRisk</i>	-0.023 (.0234)	-0.111** (.4048)	-0.095** (-.0404)	
<i>Size</i>	-0.679*** (.0255)	-0.665*** (.431)	-0.602*** (.0451)	-0.598*** (.0436)
<i>Leverage</i>	0.057*** (.0080)	0.016 (.0120)	0.019 (.0120)	0.035** (.0126)
<i>MAFE</i>		0.577** (.2223)	0.556** (.2216)	0.309 (.1918)
<i>R&DtoAsset</i>			0.675*** (.1461)	0.535*** (.1411)
<i>NetCSR</i>				0.022** (.0113)
<i>Year Dummies</i>	YES	YES	YES	YES
<i>Constant</i>	1.062 (.7180)	1.439*** (.0307)	1.353*** (.0358)	1.425*** (.0338)
<i>Obs</i>	8,849	3,184	3,184	3,989
<i>F-test Fixed eff.</i> (p-value)	15.32 (0.00)	46.71 (0.00)	47.77 (0.00)	43.03 (0.00)
<i>F-test good fit</i> (p-value)	34.47 (0.00)	68.49 (0.00)	59.41 (0.00)	47.41 (0.00)

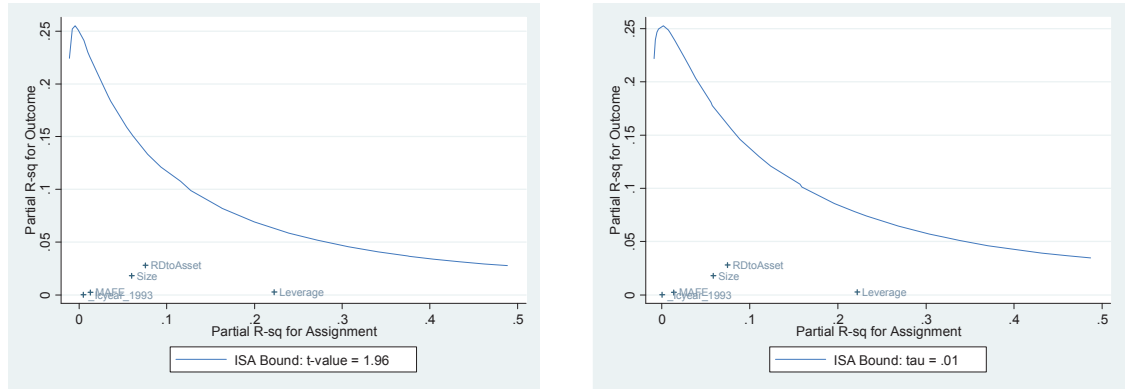
For Variables details see Table 1. (robust standard error) ***p<0.01 **p<0.05 *p<0.10

Figure 1. Sensitivity analysis on the relaxation of the Conditional Independence Assumption



Panel A. Stakeholder risk t-stat

Panel B. Stakeholder risk coefficient



Panel C. NetCSR t-stat

Panel D. NetCSR coefficient

Panels in the figure display results obtained with the ISA program for the general sensitivity analysis (GSA) developed by Hamada (2012) built upon Imbens (2003) approach. The “+” signs are the partial R^2 values for the X covariates of the baseline model, plotted according to the additional explanatory power of the covariate for T (*StakeholderRisk* in *Panel A* and *B*, and *NetCSR* in *Panel C* and *D* horizontal axis) and for Y (idiosyncratic risk, vertical axis); the axis measures variations in the R^2 from adding that X-regressor to the baseline model. The solid curve is the set of partial R^2 for U and represents where the unobserved covariate would have enough correlation with both treatment and educational outcomes to modify magnitude and/or significance of the baseline ATE.

Appendix A. Criteria of RiskMetrics-KLD social ratings

COMMUNITY STRENGTHS:

Charitable Giving (COM-str-A). The company has consistently given over 1.5% of trailing three-year net earnings before taxes (NEBT) to charity, or has otherwise been notably generous in its giving [In 2002, KLD renamed the Generous Giving Strength as Charitable Giving]. Innovative Giving (COM-str-B). The company has a notably innovative giving program that supports nonprofit organizations, particularly those promoting self sufficiency among the economically disadvantaged. Companies that permit nontraditional federated charitable giving drives in the workplace are often noted in this section as well. Support for Housing (COM-str-C). The company is a prominent participant in public/private partnerships that support housing initiatives for the economically disadvantaged, e.g., the National Equity Fund or the Enterprise Foundation. Support for Education (COM-str-D). The company has either been notably innovative in its support for primary or secondary school education, particularly for those programs that benefit the economically disadvantaged, or the company has prominently supported job-training programs for youth. Indigenous People Relations (COM-str-E). The company has established relations with indigenous people in the areas of its proposed or current operations that respect the sovereignty, land, culture, human rights, and intellectual property of the indigenous people [added in 2000; in 2002 moved into the Human Rights area]. Non-US Charitable Giving (COM-str-F). The company has made a substantial effort to make charitable contributions abroad, as well as in the U.S. To qualify, a company must make at least 20% of its giving, or have taken notably innovative initiatives in its giving program, outside the U.S. Volunteer Programs (COM-str-G). The company has an exceptionally strong volunteer program [added in 2005]. Other Strength (COM-str-X). The company has either an exceptionally strong in-kind giving program, or engages in other notably positive community activities.

COMMUNITY CONCERNS:

Investment Controversies (COM-con-A). The company is a financial institution whose lending or investment practices have led to controversies, particularly ones related to the Community Reinvestment Act. Negative Economic Impact (COM-con-B). The company's actions have resulted in major controversies concerning its economic impact on the community. These controversies can include issues related to environmental contamination, water rights disputes, plant closings, "put-or-pay" contracts with trash incinerators, or other company actions that adversely affect the quality of life, tax base, or property values in the community. Indigenous People Relations (COM-con-C). The company has been involved in serious controversies with indigenous people that indicate the company has not respected the sovereignty, land, culture, human rights, and intellectual property of the indigenous people [added in 2000; in 2002 moved into the Human Rights area]. Disputes (COM-con-D). The company has recently been involved in major tax disputes involving Federal, state, local or non-U.S. government authorities, or is involved in controversies over its tax obligations to the community [entered in 1991; in 2005 moved into the Community area]. Other Concern (COM-con-X). The company is involved with a controversy that has mobilized community opposition, or is engaged in other noteworthy community controversies.

CORPORATE GOVERNANCE STRENGTHS:

Limited Compensation (CGOV-str-A). The company has recently awarded notably low levels of compensation to its top management or its board members. The limit for a rating is total compensation of less than \$500,000 per year for a CEO or \$30,000 per year for outside directors. Ownership Strength (CGOV-str-C). The company owns between 20% and 50% of another company KLD has cited as having an area of social strength, or is more than 20% owned by a firm that KLD has rated as having social strengths. When a company owns more than 50% of another firm, it has a controlling interest, and KLD treats the second firm as if it is a division of the first. Transparency Strength (CGOV-str-D). The company is particularly effective in reporting on a wide range of social and environmental performance measures, or is exceptional in reporting on one particular measure [added in 2006; this strength incorporates information from the former Environment: Communications Strength (ENV-str-E) as part of its content]. Accountability Strength (CGOV-str-E). The company has shown markedly responsible leadership on public policy issues and/or has an exceptional record of transparency and accountability concerning its political involvement in state or federal-level U.S. politics, or in non-U.S. politics [added in 2006]. Other Strength (CGOV-str-X). The company has an innovative compensation plan for its board or executives, a unique and positive corporate culture, or some other initiative not covered by other KLD ratings.

CORPORATE GOVERNANCE CONCERNS:

High Compensation (CGOV-con-B). The company has recently awarded notably high levels of compensation to its top management or its board members. The limit for a rating is total compensation of more than \$10 million per year for a CEO or \$100,000 per year for outside directors. Ownership Concern (CGOV-con-F). The company owns between 20% and 50% of a company KLD has cited as having an area of social concern, or is more than 20% owned by a firm KLD has rated as having areas of concern. When a company owns more than 50% of another firm, it has a controlling interest, and KLD treats the second firm as if it is a division of the first. Accounting Concern (CGOV-con-G). The company is involved in significant accounting related controversies [added in 2006]. Transparency Concern (CGOV-con-H). The company is distinctly weak in reporting on a wide range of social and environmental performance measures [added in 2006]. Political Accountability Concern (CGOV-con-I). The company has been involved in noteworthy controversies on public policy issues and/or has a very poor record of transparency and accountability concerning its political involvement in state or federal level U.S. politics, or in non-U.S. politics [added in 2006]. Other Concern (CGOV-con-X). The company restated its earnings over an accounting controversy, has other accounting problems, or is involved with some other controversy not covered by other KLD ratings.

DIVERSITY STRENGTHS:

CEO (DIV-str-A). The company's chief executive officer is a woman or a member of a minority group. Promotion (DIV-str-B). The company has made notable progress in the promotion of women and minorities, particularly to line positions with profit-and-loss responsibilities in the corporation. Board of Directors (DIV-str-C). Women, minorities, and/or the disabled hold four seats or more (with no double counting) on the board of directors, or one-third or more of the board seats if the board numbers less than 12. Work/Life Benefits (DIV-str-D). The company has outstanding employee benefits or other programs addressing work/life concerns, e.g., child care, elder care, or flextime [entered in 1991 with the name Family Benefits Strength, it was renamed in 2005]. Women & Minority Contracting (DIV-str-E). The company does at least 5% of its subcontracting, or otherwise has a demonstrably strong record on purchasing or contracting, with women- and/or minority-owned businesses. Employment of the Disabled (DIV-str-F). The company has implemented innovative hiring programs, other innovative human resource programs for the disabled, or otherwise has a superior reputation as an employer of the disabled. Gay & Lesbian Policies (DIV-str-G). The company has implemented notably progressive policies toward its gay and lesbian employees. In particular, it provides benefits to the domestic partners of its employees [entered in 1991 with the name Progressive Gay/Lesbian Policies strength, it was renamed in 1995]. Other Strength (DIV-str-X). The company has made a notable commitment to diversity that is not covered by other KLD ratings.

DIVERSITY CONCERNS:

Controversies (DIV-con-A). The company has either paid substantial fines or civil penalties as a result of a remedial action controversies, or has otherwise been involved in major controversies related to a remedial action issues. Non-Representation (DIV-con-B). The company has no women on its board of directors or among its senior line managers. Other Concern (DIV-con-X). The company is involved in diversity controversies not covered by other KLD ratings.

EMPLOYEE RELATIONS STRENGTHS:

Union Relations (EMP-str-A). The company has taken exceptional steps to treat its unionized workforce fairly [entered in 1991 it was renamed from Strong Union Relations]. No-Layoff Policy (EMP-str-B). The company has maintained a consistent no-layoff policy [added in 1994]. Cash Profit Sharing (EMP-str-C). The company has a cash profit-sharing program through which it has recently made distributions to a majority of its workforce. Employee Involvement (EMP-str-D). The company strongly encourages worker involvement and/or ownership through stock options available to a majority of its employees, gain sharing, stock ownership, sharing of financial information, or participation in management decision-making. Retirement Benefits Strength (EMP-str-F). The company has a notably strong retirement benefits program. KLD renamed this strength from Strong Retirement Benefits. Health and Safety Strength (EMP-str-G). The company is noted by the US Occupational Health and Safety Administration for its safety programs. Other Strength (EMP-str-X). The company has strong employee relations initiatives not covered by other KLD ratings.

EMPLOYEE RELATIONS CONCERNS:

Union Relations (EMP-con-A). The company has a history of notably Poor Union Relations. Health and Safety Concern (EMP-con-B). The company recently has either paid substantial fines or civil penalties for willful violations of employee health and safety standards, or has been otherwise involved in major health and safety controversies. Workforce Reductions (EMP-con-C). The company has reduced its workforce by 15% in the most recent year or by 25% during the past two years, or it has announced plans for such reductions. Retirement Benefits Concern (EMP-con-D). The company has either a substantially underfunded defined benefit pension plan, or an inadequate retirement benefits program [entered in 1991 with the name Pension/Benefits Concern, it was renamed in 2004]. Other Concern. The company is involved in an employee relations controversy that is not covered by other KLD ratings.

ENVIRONMENTAL STRENGTHS:

Beneficial Products and Services (ENV-str-A). The company derives substantial revenues from innovative remediation products, environmental services, or products that promote the efficient use of energy, or it has developed innovative products with environmental benefits. (The term "environmental service" does not include services with questionable environmental effects, such as landfills, incinerators, waste-to-energy plants, and deep injection wells). Pollution Prevention (ENV-str-B). The company has notably strong pollution prevention programs including both emissions reductions and toxic-use reduction programs. Recycling (ENV-str-C). The company either is a substantial user of recycled materials as raw materials in its manufacturing processes, or a major factor in the recycling industry. Clean Energy (ENV-str-D). The company has taken significant measures to reduce its impact on climate change and air pollution through use of renewable energy and clean fuels or through energy efficiency. The company has demonstrated a commitment to promoting climate-friendly policies and practices outside its own operations [entered in 1991 it was renamed from Alternative Fuel Strength]. Communications (ENV-str-E). The company is a signatory to the CERES Principles, publishes a notably substantive environmental report, or has notably effective internal communications systems in place for environmental best practices. [added in 1996; it was incorporated with the Corporate Governance: Transparency rating (CGOV-str-D), which was added in 2005]. Property, Plant, and Equipment (ENV-str-F). The company maintains its property, plant, and equipment with above average environmental performance for its industry. [added in 1995]. Management Systems (ENV-str-G). The company has demonstrated a superior commitment to management systems through ISO 14001 certification and other voluntary programs [added in 2006]. Other Strength (ENV-str-X). The company has demonstrated a superior commitment to management systems, voluntary programs, or other environmentally proactive activities.

ENVIRONMENTAL CONCERNS:

Hazardous Waste (ENV-con-A). The company's liabilities for hazardous waste sites exceed \$50million, or the company has recently paid substantial fines or civil penalties for waste management violations. Regulatory Problems. (ENV-con-B) The company has recently paid substantial fines or civil penalties for violations of air, water, or other environmental regulations, or it has a pattern of regulatory controversies under the Clean Air Act, Clean Water Act or other major environmental regulations. Ozone Depleting Chemicals. (ENV-con-C). The company is among the top manufacturers of ozone depleting chemicals such as HCFCs, methyl chloroform, methylene chloride, or bromines. Substantial Emissions. (ENV-con-D). The company's legal emissions of toxic chemicals (as defined by and reported to the EPA) from individual plants into the air and water are among the highest of the companies followed by KLD. Agricultural Chemicals. (ENV-con-E). The company is a substantial producer of agricultural chemicals, i.e., pesticides or chemical fertilizers. Climate Change. (ENV-con-F). The company derives substantial revenues from the sale of coal or oil and its derivative fuel products, or the company derives substantial revenues indirectly from the combustion of coal or oil and its derivative fuel products. Such companies include electric utilities, transportation companies with fleets of vehicles, auto and truck manufacturers, and other transportation equipment companies. Other Concern. (ENV-con-X). The company has been involved in an environmental controversy that is not covered by other KLD ratings.

HUMAN RIGHTS STRENGTHS:

Positive Record in South Africa (HUM-str-A). The company's social record in South Africa is noteworthy [existed only in 1994 and 1995]. Indigenous Peoples Relations Strength. (HUM-str-D). See Community Indigenous Peoples Relations (COM-str-E) [added in 2000 under Community, from 2004 moved in Human Rights]. Labor Rights Strength (HUM-str-G). The company has outstanding transparency on overseas sourcing disclosure and monitoring, or has particularly good union relations outside the U.S., or has undertaken labor rights-related initiatives that KLD considers outstanding or innovative [added in 2002]. Other Strength.(HUM-str-X) The company has undertaken exceptional human rights initiatives, including outstanding transparency or disclosure on human rights issues, or has otherwise shown industry leadership on human rights issues not covered by other KLD human rights ratings [entered in 1994].

HUMAN RIGHTS CONCERNS:

South Africa (HUM-con-A). The company faced controversies over its operations in South Africa [existed from 1991 to 1994]. Northern Ireland (HUM-con-B). The company has operations in Northern Ireland [existed from 1991 to 1994]. Burma Concern(HUM-con-C). The company has operations or direct investment in, or sourcing from, Burma. [added in 1995]. Mexico (HUM-con-D). The company's operations in Mexico have had major recent controversies, especially those related to the treatment of employees or degradation of the environment [existed from 1995 to 2002]. Labor Rights Concern (HUM-con-F). The company's operations have had major recent controversies primarily related to labor standards in its supply chain [added in 1998; it was lately renamed from the International Labor Concern]. Indigenous Peoples Relations Concern (HUM-con-G). The company has been involved in serious controversies with indigenous peoples (either in or outside the U.S.) that indicate the company has not respected the sovereignty, land, culture, human rights, and intellectual property of indigenous peoples [added in 2000]. Other Concern (HUM-con-X). The company's operations have been the subject of major recent human rights controversies not covered by other KLD ratings.

PRODUCT STRENGTHS:

Quality (PRO-str-A). The company has a long-term, well-developed, company-wide quality program, or it has a quality program recognized as exceptional in U.S. industry. R&D/Innovation (PRO-str-B). The company is a leader in its industry for research and development (R&D), particularly by bringing notably innovative products to market. Benefits to Economically Disadvantaged (PRO-str-C). The company has as part of its basic mission the provision of products or services for the economically disadvantaged. Other Strength (PRO-str-X). The company's products have notable social benefits that are highly unusual or unique for its industry.

PRODUCT CONCERNS:

Product Safety (PRO-con-A). The company has recently paid substantial fines or civil penalties, or is involved in major recent controversies or regulatory actions, relating to the safety of its products and services. Marketing/Contracting Concern (PRO-con-D). The company has recently been involved in major marketing or contracting controversies, or has paid substantial fines or civil penalties relating to advertising practices, consumer fraud, or government contracting. (Formerly: Marketing/Contracting Controversy). Antitrust (PRO-con-E). The company has recently paid substantial fines or civil penalties for antitrust violations such as price fixing, collusion, or predatory pricing, or is involved in recent major controversies or regulatory actions relating to antitrust allegations. Other Concern (PRO-con-X). The company has major controversies with its franchises, is an electric utility with nuclear safety problems, defective product issues, or is involved in other product related controversies not covered by other KLD ratings.

ALCOHOL (ALC-con-A) : Licensing. The company licenses its company or brand name to alcohol products. Manufacturers. Companies that are involved in the manufacture alcoholic beverages including beer, distilled spirits, or wine. Manufacturers of Products Necessary for Production of Alcoholic Beverages. Companies that derive 15% or more of total revenues from the supply of raw materials and other products necessary for the production of alcoholic beverages. Retailers. Companies that derive 15% or more of total revenues from the distribution (wholesale or retail) of alcoholic beverages. Ownership by an Alcohol Company. The company is more than 50% owned by a company with alcohol involvement. Ownership of an Alcohol Company. The company owns more than 20% of another company with alcohol involvement. (When a company owns more than 50% of company

with alcohol involvement, KLD treats the alcohol company as a consolidated subsidiary.) (ALC-con-X): Alcohol Other Concern. The company derives substantial revenues from the activities closely associated with the production of alcoholic beverages [KLD assigned concerns in this category through 2002].

GAMBLING (GAM-con-A): Licensing. The company licenses its company or brand name to gambling products. Manufacturers. Companies that produce goods used exclusively for gambling, such as slot machines, roulette wheels, or lottery terminals. Owners and Operators. Companies that own and/or operate casinos, racetracks, bingo parlors, or other betting establishments, including casinos; horse, dog, or other race tracks that permit wagering; lottery operations; on-line gambling; pari-mutuel wagering facilities; bingo; Jai-alai; and other sporting events that permit wagering. Supporting Products or Services. Companies that provide services in casinos that are fundamental to gambling operations, such as credit lines, consulting services, or gambling technology and technology support. Ownership by a Gambling Company. The company is more than 50% owned by a company with gambling involvement. Ownership of a Gambling Company. The company owns more than 20% of another company with gambling involvement. (When a company owns more than 50% of company with gambling involvement, KLD treats the gambling company as a consolidated subsidiary.) (GAM-con-X): Gambling Other Concern The company derives substantial revenues from the activities closely associated with the production of goods and services closely related to the gambling industry or lottery industries [KLD assigned concerns in this category through 2002].

TOBACCO (TOB-con-A): Licensing The company licenses its company name or brand name to tobacco products. Manufacturers. The company produces tobacco products, including cigarettes, cigars, pipe tobacco, and smokeless tobacco products. Manufacturers of Products Necessary for Production of Tobacco Products. The company derives 15% or more of total revenues from the production and supply of raw materials and other products necessary for the production of tobacco products. Retailers. The company derives 15% or more of total revenues from the distribution (wholesale or retail) of tobacco products. Ownership by a Tobacco Company. The company is more than 50% owned by a company with tobacco involvement. Ownership of a Tobacco Company. The company owns more than 20% of another company with tobacco involvement. (When a company owns more than 50% of company with tobacco involvement, KLD treats the tobacco company as a consolidated subsidiary). (TOB-con-X): Tobacco Other Concern The company derives substantial revenues from the production of tobacco products [added in 2002].

FIREARMS (FIR-con-A): Manufacturers. The company is engaged in the production of small arms ammunition or firearms, including, pistols, revolvers, rifles, shotguns, or sub-machine guns. Retailers. The company derives 15% or more of total revenues from the distribution (wholesale or retail) of firearms and small arms ammunition. Ownership by a Firearms Company. The company is more than 50% owned by a company with firearms involvement. Ownership of a Firearms Company. The company owns more than 20% of another company with firearms involvement. (When a company owns more than 50% of company with firearms involvement, KLD treats the firearms company as a consolidated subsidiary) [added in 1999].

MILITARY (MIL-con-A): Manufacturers of Weapons or Weapons Systems. Companies that derive more than 2% of revenues from the sale of conventional weapons or weapons systems, or earned 50 million or more from the sale of conventional weapons or weapons systems, or earned 10 million or more from the sale of nuclear weapons or weapons systems. Manufacturers of Components for Weapons or Weapons Systems. Companies that derive more than 2% of revenues from the sale of customized components for conventional weapons or weapons systems, or earned 50 million or more from the sale of customized components for conventional weapons or weapons systems, or earned 10 million or more from the sale of customized components for nuclear weapons or weapons systems. Ownership by a Military Company. The company is more than 50% owned by a company with military involvement. Ownership of a Military Company. The company owns more than 20% of another company with military involvement. (When a company owns more than 50% of company with military involvement, KLD treats the military company as a consolidated subsidiary) [entered since 1991]. (MIL-con-B): Minor Weapons Contracting Involvement. The company has minor involvement in weapons-related contracting. In the most recent fiscal year for which information is available, it derived 10 to 50 million in conventional weapons-related prime contracts (when that figure is less than 2% of revenue), or 1 to 10 million from nuclear weapons-related prime contracts [existed just from 1991 to 2002]. (MIL-con-C): Major Weapons-related Supplier. During the last fiscal year, the company received from the Department of Defense more than 50 million for fuel or other supplies related to weapons [existed just from 1991 to 2002]. (MIL-con-X): Military Other Concern. The company has substantial involvement in weapons-related contracting. In the most recent fiscal year for which information is available, it derived more than 2% of sales or 50 million from weapons-related contracting, or it received more than 10 million in nuclear weapons-related prime contracts [existed just through 2002].

NUCLEAR POWER (NUC-con-A): Construction & Design of Nuclear Power Plants. The company designs, engineers, and constructs nuclear power plants and nuclear reactors for use in nuclear power plants; including companies that design nuclear reactors and engineer and/or construct nuclear power plants. Nuclear Power Fuel and Key Parts. The company supplies nuclear fuel material and key parts used in nuclear plants and reactors. Fuel includes mining of uranium and conversion, enrichment, and fabrication of uranium. Key parts include manufacture or sale of specialized parts for use in nuclear power plants including but not exclusive to steam generators, control rod drive mechanisms, reactor vessels, cooling systems, containment structures, fuel assemblies, and digital instrumentation & controls. Nuclear Power Service Provider. The company is involved in the transport of nuclear power materials and nuclear plant maintenance. Ownership of Nuclear Power Plants. The company has an ownership interest or operates nuclear power plant(s). Does not include publicly traded companies that are an owner or operator of a nuclear plant that has shut down and is being decommissioned. Ownership by a

Nuclear Power Company. The company is more than 50% owned by a company with nuclear power involvement. Ownership of a Nuclear Power Company. The company owns more than 20% of another company with nuclear power involvement. If company ownership of company with nuclear power involvement is greater than 50%, KLD treats subsidiary as a consolidated subsidiary. (NUC-con-C):Design. The company derives identifiable revenues from the design of nuclear power plants. This category does not include companies providing construction or maintenance services for nuclear power plants [existed just through 2002; it was re-instated as Construction &Design of Nuclear Power Plants under the code NUC-con-A in 2005]. (NUC-con-D): Fuel Cycle/Key Parts. The company mines, processes, or enriches uranium, or is otherwise involved in the nuclear fuel cycle. Or, the company derives substantial revenues from the sale of key parts or equipment for generating power through using nuclear fuels. [existed just through 2002; it was re-instated as Nuclear Power Fuel and Key Parts under the code NUCcon-A]. (NUC-con-X): Nuclear Power Other Concern. The company is involved in the production of Nuclear Power[existed just through 2002].

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