Working Papers 129

Corporate social responsibility and profit volatility: theory and empirical evidence

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Novembre 2013

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Abstract

Corporate social responsibility implies extra care for the wellbeing of stakeholders different from shareholders. In our theoretical model we show that, when this principle implies that more CSR oriented companies incorporate stakeholders' wellbeing constraints, it translates into higher sensitivity of profits to economic shocks. Our empirical analysis finds support for this hypothesis showing that CSR attributes which relate to positive contributions to stakeholders' wellbeing significantly and positively affects idiosyncratic profit volatility.

1.Introduction

Corporate social responsibility is becoming an increasingly important feature in globalized product and labour markets as documented by the constantly growing share of companies adopting CSR reporting[1] and the similarly growing role played by Socially Responsible Investment funds which create bottom-up pressure for CSR adoption.[2]

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[1] Recent KPMG surveys (2005 and 2011) document that 90 percent of Japanese companies, 71 percent of UK companies and 32 percent of US companies adopted CSR reporting in 2005. In just 6 years CSR reporting grew to involve 95 percent of the 250 world largest companies and led to the creation of separate CSR departments in 31 percent of the top

A main rationale for this phenomenon is that globalization has deeply changed the way companies, institutions and citizens interact with each other. Before it, in a non globalized economic framework, companies maximized profits and domestic institutions solved problems related to negative externalities, public goods and other market failures with taxes and regulations. After the global integration of financial, product and labour markets, corporations started to act on a global scale, while institutions and governance remained domestic and highly fragmented, thereby loosing large part of their enforcement and bargaining power. Stakeholders and the public opinion reacted to this imbalance by putting pressure on corporations and asking them to "internalize the externalities", even in absence of institutional pressure or regulatory constraints. As a consequence, the phenomenon of corporate social responsibility took place and progressively gained strength.

By definition we know that CSR implies a departure from standard profit maximization[3] 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).[4] With our paper we aim to document, both theoretically and empirically, that this specific CSR aspect (additional stakeholders' wellbeing constraint) has the consequence of increasing the volatility of earnings.[5] We analyse the impact of this characteristics in the framework of a profit maximizing firm which invests under uncertainty and we assume for simplicity that workers are the only corporate stakeholders, so that CSR employment contracts prevent the company from laying off workers also after a sequence of negative shocks affecting the capital accumulation. Based on this assumption our theoretical findings outline that, under reasonable parametric conditions (capital depreciation rate, intertemporal discount rate and price demand elasticity which are not too high), the additional

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500 Fortune companies (ICCA, 2010). According to EU Commission estimates companies addressing social goals beyond, or in addition to, profit maximization account for more than 10 percent of total EU economy (in terms of GDP), with more than 11 millions of workers (6 percent of total employment) (http://europa.eu/rapid/press-release_IP-11-1238_en.htm?locale=en).

[2] Socially responsible investment funds accounted for a share of around 11 percent of total assets under management in the US in 2010 (Social Investment Forum Foundation, 2010) corresponding to 2.71 trillion dollars. One year after the amount rose to 3.74 trillion dollars.

[3] A standard reference definition of CSR is that provided by the EU Commission (2001) where the latter is defined as "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis". The inspection of domains and criteria which are standard in the evaluation of CSR from SR rating agencies (ie. the KLD criteria provided in the Appendix) clearly document that CSR is a move from straight shareholder wealth maximization to the more complex goal of wellbeing satisfaction of a broader range of stakeholders.

[4] Benabou and Tirole (2010) argue that CSR companies internalize externalities and may reduce the distance between private and social optimum when regulation is imperfect or missing. For a recent survey on CSR see Kitzmueller and Shimshack (2012), Hoi, Wu, and Zhang, (2013) and Dhaliwal et al. (2012).

[5] From an anecdotal point of view a practice similar to (but not coincident with) our model assumption may be identified in the practices of "solidarity contracts" (widely adopted in Italy and other EU countries) by which, in presence of negative productivity shocks, companies reduce by a small number of hours the workload of all employees instead of firing part of them.

minimal wellbeing stakeholder constraint induces more CSR oriented firms to absorb shocks with relatively higher variation in profits.

In order to test empirically our theoretical proposition we select idiosyncratic volatility as the best measure to evaluate corporate earnings volatility affected by firm idiosyncratic shocks. We document that our dependent variable is significantly and positively affected by the specific CSR component represented by the positive contributions to the wellbeing of stakeholders different from shareholders (more specifically, KLD RiskMetrics items in the Employee, Human Right and Environment domains), net of the impact of other CSR factors (such as minimization of the risk of conflicts with stakeholders) which may work in the opposite direction.

The paper is divided into five sections (including introduction and conclusions). In the second section we provide a short survey of the literature in order to highlight the role and the originality of our specific contribution. In the third section we outline our theoretical model. In the fourth section we present our econometric model and findings. The fifth section concludes.

2.The state of art

A first main topic of interest in the CSR literature is whether companies adopting CSR may survive (or even do better in) the competitive challenge. This is why large part of the CSR theoretical and empirical contributions dedicated their effort to investigate the relationship between social and economic or financial performance. The results of this branch of the literature are not unambiguous. Some contributions find a positive relationship (Hart and Ahuja, 1996; Feldman et al., 1996; Russo and Fouts, 1997; Buts and Plattner, 1999; Dowell et al., 2000; Konar and Cohen, 2001; King and Lennox, 2001; Thomas, 2001; Hibiki, 2003; Becchetti et al., 2008; Margolis et al., 2007; Baron et al., 2009), some papers a negative relationship (see for instance Cordeiro and Sarkis, 1997; Ferris, 1997 and Wagner et al., 2002), while other papers document the absence of significant differences between SR firms and conventional firms (Welch and Wazzan, 1999 and McWilliams and Siegel, 2000).

What is however also relevant and much less explored is whether CSR modifies some other important characteristics of corporate business. Becchetti and al. (2013) argue on this point that CSR could increase firm's value volatility, 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. This would occur because CSR companies have reduced flexibility in responding to negative shocks with a reduction of the wellbeing of stakeholders different from shareholders 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 those stock market dynamics which are common to the majority of non CSR oriented companies.

In our paper we aim to investigate this issue by providing an original contribution through a theoretical and empirical analysis.

Our theoretical framework is a model of optimal investment under uncertainty and dynamic contracting. The literature of continuous time dynamic contracting is broad and growing (see, among others, Duffie and Epstein, 1992; Sannikov, 2008; DeMarzo and Sannikov, 2006; DeMarzo et al., 2009; He, 2009 and 2011; Biais, Mariotti, and Villeneuve, 2010; Ai and Li, 2012)[6]. In particular the approach by Ai et al. (2012) presents a stochastic general equilibrium model with two-sided limited commitment accounting for the observed heterogeneity in firms' investments, payout and CEO-compensation policies. In the model, shareholders cannot commit to holding negative net present value projects, and managers cannot commit to compensation plans that yield life-time utility lower than their outside options. The authors show that both types of limited commitment, on the shareholder side and on the manager side, are important for understanding a wide range of empirical regularities in firms' investments, CEO compensation and dividend payout policies.

In our work we use, in a similar way to the above mentioned contributions, a model of investment choice under uncertainty to analyze firm' maximization behavior and compare findings under the two different scenarios of presence or absence of a CSR related commitment with stakeholders.

The effects of uncertainty on investment (another main feature of our model) have long been extensively explored in the investment theory literature (see, among others, Hartman, 1972; Abel, 1983 and 1985; Abel and Eberly, 1994; Caballero, 1991 and Pindyck, 1993). In the canonical models of investment with irreversibility based on the real options approach (see for instance Bernanke, 1983; McDonald and Siegel, 1986; Pindyck, 1988; Bertola and Caballero, 1994 and Dixit and Pindyck, 1994), uncertainty affects irreversible investment in two ways: first, through the effects of the risk premium component on the marginal profitability of capital, and second, through the effects on the trigger threshold of the value of waiting. The above mentioned models predict a positive or negative effect of uncertainty on investment depending on whether the marginal revenue product of capital is a convex or concave function of the exogenous shock.[7]

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[6] For a survey of this literature, see Biais, Mariotti, Plantin, and Rochet (2004).

[7] Among the most recent works on the topic of investments under uncertainty, Mashiyama (2009) explores the relationship between uncertainty and investment. The main conclusions of the author are that an increase in uncertainty depresses investment depending on the concavity of the operating profit function with respect to the demand shock. Fan and Firestone (2009) show that firm market

The simple theoretical model presented in the next section will borrow from both the above described branches of the literature (investment under uncertainty and firm maximization under commitment with stakeholders) in order to evaluate the consequences of CSR on the volatility of corporate profits.

3. The model: investment under uncertainty with the CSR constraint

The main assumptions of our model strictly follow canonical models of investment under uncertainty such as those of Abel (1983) and Mashiyama (2009), where the output is produced using capital and labor trough a Cobb-Douglas technology

$$y_{t=}K_t^{1-\alpha}L_t^{\alpha} \qquad 0 < \alpha < 1 \qquad (1)$$

where y denotes the output, K is the amount of capital, L is the amount of labor.

The demand curve faced by the firm is

$$P_{t=}Q_t^{\frac{1-\phi}{\phi}}X_t^{\varphi} \qquad \phi \geq 1, \qquad \varphi > 0 \qquad (2)$$

where P is the market price at time t, and X is an exogenous shock governed by the following stochastic differential equation

$$dX_t = \mu(X_t)dt + \sigma(X_t)d\varepsilon \qquad (3)$$

where ε is the standard Brownian motion. As a consequence the drift and variance coefficients are expressed, respectively, by $\mu(X) = \mu X$ and $\sigma(X) = \sigma X$. The aggregate quantity of product supplied in the market is $Q = Ny$. We assume $N = 1$, so that, denoting by w the real wage, the operating profit is

$$\pi_t(K, X, L) = P_t K_t^{1-\alpha}L_t^{\alpha} - wL_t - cL_t \qquad (4)$$

value can serve as a proxy for unobservable productivity shocks. They find out this result by estimating the production technology of the U.S. computer industry using firm market value to control for the correlation between inputs and unobservable productivity shocks.

where c measures the costs of controversies with workers, that is, costs that a company has paid in terms of substantial fines or civil penalties as a result of a normative action controversies. We assume that these conflicts may range from consumer class actions to litigation with workers and to conflicts with local communities.[8] Following what stated in the introduction, considering that, by definition, CSR implies extra care for stakeholders wellbeing (and assuming for simplicity that workers are the only stakeholders), companies which adopt CSR in our model have the following additional constraint (commitment or keeping promise)

$$wL_t = w\bar{L} \qquad \nabla t \geq 0 \qquad (5)$$

That is, the number of employees' must be kept constant in each t, despite the possible shocks.

Note however that, also by definition, the operating profit of a company adopting CSR, in absence of costs of controversies, is

$$\pi_t(K, L, X) = P_t K_t^{1-\alpha} \bar{L}^\alpha - w\bar{L} \qquad (6)$$

which may be rewritten as

$$\pi_t(K, X) = \bar{L}^{\alpha + \frac{1-\phi}{\phi}} X_t^\varphi K_t^{1-\alpha + \frac{1-\phi}{\phi}} - w\bar{L} \qquad (7)$$

or

$$\pi_t(K, X) = h X_t^v K_t^\beta - w\bar{L} \qquad (8)$$

where

$$h = \bar{L}^{\alpha + \frac{1-\phi}{\phi}} \qquad (9)$$

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[8] Goss and Roberts (2011) discuss the point by arguing that companies produce negative externalities for which stakeholders impose penalties on them. 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 recalls documents that the negative abnormal returns that these events generate on stock markets are significantly reduced when firms have good CSR reputation.

$$v = \varphi > 0 \qquad (10)$$

and

$$\beta = 1 - \alpha + \frac{1 - \phi}{\phi} \leq 1 \qquad (11)$$

The operating profit is a concave function of capital stock K, with $\pi_K > 0$, $\pi_{KK} \leq 0$, $\pi_X > 0$. The firm maximizes the intertemporal value of π_t (K, X), subject to the following law of motion of physical capital

$$dK_t = (I_t - \delta K_t) dt \qquad (12)$$

where $\delta > 0$ is the instantaneous depreciation rate of capital and I_t is the investment made at time t subject to the stochastic differential equation of X (3).

We denote by $g(I, K)$ the direct cost of investment, composed by the purchase/sale price of capital goods, the installing/detaching costs plus the costs of training workers and expanding the operating capacity. This function is assumed to be strictly convex for I and continuous, except for the origin $I = 0$.

We assume also that the firm is risk neutral and maximizes the following expected present value of profits

$$\Pi_t(I, X)$$

$$= E_s \int_0^\infty e^{-\rho t} \{\pi_{t+s}(K, X) - w\bar{L}$$

$$- g_{t+s}(K, I(t))\} \, dt \qquad (13)$$

where E_s is the conditional expectation operator at time s, and $\rho > 0$ is the discount rate that investors or stockholders require.

The Hamilton-Jacobi-Bellman differential equation characterizing the value function is

$$\rho V(K, X) = \max_I \left\{ \pi(K, X) - g(I, K) + V_K(I - \delta K) + \mu X + \frac{1}{2}\sigma^2 X^2 V_{XX} \right\} \qquad (14)$$

where V_K also corresponds to the marginal value q of the firm, that is, $q = V_K$ (see Mashiyama, 2009).

Solving this problem we find that the trigger threshold to invest, is equal to

$$X_1 = \left[\frac{b_1}{(1 - \frac{v}{\theta_1})} \frac{\rho + \beta\delta - v\mu - \frac{1}{2}v(v-1)\sigma^2}{\beta h} K_1^{1-\beta} \right]^{\frac{1}{v}} \qquad (15)$$

and the critical level of the operating profit corresponding to the trigger threshold to invest is given by

$$\pi(K, X_1) = \frac{b_1}{\beta'} \frac{\rho + \delta\beta - v\mu - v(v-1)\frac{\sigma^2}{2}}{1 - \frac{v}{\theta_1}} K - w\bar{L} \qquad (16)$$

According to (16), an increase in uncertainty depresses investment and so there exists a negative relationship between uncertainty and investment, i.e., the profit function decreases for high levels of σ.

In what follows we compare the above described results for a SR company with those from a conventional (NSR) firm, which faces the same problem of profit maximization without the commitment constraint.

This problem is just the same as in Abel (1983) and Mishiyama (2009) where the operating profit may be written as:

$$\tilde{\pi}_t(K, X) = \tilde{h} \, X_t^{\tilde{v}} \, K_t^{\tilde{\beta}} \qquad (17)$$

where

$$\tilde{h} = \left(1 - \frac{\alpha}{\phi}\right) \left(\frac{\alpha}{\phi} \frac{1}{w + c}\right)^{\frac{\frac{\alpha}{\phi}}{1 - \frac{\alpha}{\phi}}} \qquad (18)$$

$$\tilde{v} = \frac{\varphi\phi}{\phi - \alpha} > 0 \qquad (19)$$

$$\tilde{\beta} = \frac{1 - \alpha}{\phi - \alpha} \leq 1 \qquad (20)$$

and where the two main solutions for the trigger threshold of X and for the critical level of the operating profit corresponding to this threshold are respectively

$$\tilde{X}_1 = \left[\frac{b_1}{(1 - \frac{\tilde{v}}{\theta_1})} \frac{\rho + \tilde{\beta}\delta - \tilde{v}\mu - \frac{1}{2}\tilde{v}(\tilde{v}-1)\sigma^2}{\tilde{\beta}\tilde{h}} K_1^{1-\tilde{\beta}} \right]^{\frac{1}{\tilde{v}}} \quad (21)$$

and

$$\tilde{\pi}(K, X_1) = \frac{b_1}{\tilde{\beta}} \frac{\rho + \tilde{\beta}\delta - \tilde{v}\mu - \frac{1}{2}\tilde{v}(\tilde{v}-1)\sigma^2}{1 - \frac{\tilde{v}}{\theta_1}} K \quad (22)$$

Notice that the trigger threshold to invest is a decreasing function of $\tilde{h}$, therefore becoming higher for higher costs of commitments. By comparing these solutions for a non SR firm with the previous solutions for a SR firm having the additional worker constraint, we get the following main results:

i) due to the dependence on σ of the profit sensitivity to shocks , profits of SR companies are more sensitive to shocks if

$$\frac{\tilde{v}(\tilde{v}-1)\frac{\sigma^2}{2}}{\theta_1 - \tilde{v}} < \frac{v(v-1)\frac{\sigma^2}{2}}{\theta_1 - v} \quad (23)$$

This inequality implies that

ia) when $\varphi < \frac{1}{2}$ <u>non CSR companies have lower volatility</u> since the condition (23) is always satisfied given that, by assumption,

$$\phi < \frac{\alpha(1-\varphi)}{2\varphi - 1}$$

This implies that, when price demand elasticity is sufficiently low, shocks are mainly absorbed on the supply side. The rationale is that CSR companies have an additional workers' wellbeing constraint and, for this reason, they have to use profits more than on CSR companies to adjust shocks.

ib) If $\varphi > \frac{1}{2}$ non SR companies still have lower volatility except in the very special cases for a small interval $\varphi \in \left[\frac{1}{2}, \frac{1}{2} + \sqrt{2}\right]$ in which

$$\phi < \frac{\alpha(1 - \varphi)}{2\varphi - 1}$$

and/or for really high levels of the $\rho + \delta$ sum, that is, for implausibly high values of capital depreciation and intertemporal discount rates.

4. Empirical Analysis

We test our theoretical proposition using financial data and, more specifically, looking at stock returns. As is well known the standard approach in finance is to conceive stock prices as the sum of the future expected discounted cash flows arising to stockholders or

$$P_t = \sum_{t=0}^{\infty} \frac{CF(1 + E[g_t])^t}{(1 + r_{CAPM})^t} \qquad (24)$$

with CF being firm current cash flow, $E[g_t]$ the yearly expected rate of growth of earnings, $r_{CAPM} = R_f + \beta E[R_m]$ the CAPM discount rate, that is, the return that equity investors expect from an investment of comparable risk. Its components are the risk free rate R_f, the expected stock market premium $E[R_m]$ and the exposition to systematic nondiversifiable risk β. As is clear from this formula any news affecting factors at the nominator or denominator lead to a price change, thereby generating an impact on stock returns.

Our theoretical model assumes that the CSR option implies more attention to the wellbeing of stakeholders under the form of an additional constraint on the number of workers. If this is the case, and given the specificity of the constrained maximization of CSR firms following this strategy, the impact of economic shocks is absorbed by relatively more profit variation than what is the case for non CSR firms.

The stock price volatility measure chosen to test this hypothesis is idiosyncratic volatility, that is, the stock return variability component which is not accounted for by market portfolio stock returns (or by exposition to systematic non-diversifiable risk) and industry returns (for references to idiosyncratic volatility in the empirical literature see Gul et al., 2011; Roll, 1988; Morck et al., 2000; Durnev et al., 2003). We prefer a financial measure of volatility to earning volatility since we need a volatility measure calculated at yearly intervals in order to match the time frequency of our CSR data. Stock price variability allows us to do so and is a measure which is highly sensitive to profits variability given the standard stock price formula in (24). Second, we prefer idiosyncratic volatility to a simple measure of stock return volatility since we want to isolate the idiosyncratic volatility component determined by the variability of firm specific earnings, with respect to a volatility component which is determined by nondiversifiable factors.

Our empirical analysis is based on two main sources: RiskMetrics-KLD for CSR scores, and COMPUSTAT for stock market prices and corporate characteristics. We use data on U.S. listed firms from 1992 through 2010. The total number of observations is 25,033 with 4383 unique companies.

The number of firms included in the analysis moves from 351 unique companies in 1992 to 2,553 unique companies in 2010 (representing 6% of the total number of companies in COMPUSTAT with 28% of the total assets in 1992 and 52% of the total number of companies in COMPUSTAT with 49% of the total assets in 2010).

RiskMetrics-KLD assigns positive or negative scores to companies according to their behavior in terms of the number of corporate strengths and corporate concerns in seven specific domains: Community, Employees, Environment, Human Rights, Diversity, Corporate Governance, Product Quality and presence in Controversial Business areas. These domains relate respectively mainly to the amount of corporate profits invested in local philanthropic activities (Community); pollution and waste management policies (Environment); issues of safety in the working environment, wage and employment policies, flexibility of the work time, etc. (Employees); how corporate policies with subsidiaries affect human rights of workers and local communities in other countries (Human Rights); corporate policies in terms of equal opportunities (Diversity); satisfaction of customers (Product Quality); presence in industries which may be considered unethical according to values of some groups of investors (Controversial Business). [9]

Our dependent variable is a measure of the Idiosyncratic Volatility (*IV*) defined, following Becchetti, Ciciretti and Hasan (2013), as follows

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[9] For a detailed description on how RiskMetrics-KLD calculates strengths and concerns in each domain see Appendix A.

$$IV_{it} = \log\left(\frac{R_{it}^2}{1 - R_{it}^2}\right) \qquad (25)$$

where $R_{i,T}^2$ captures 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[10]

$$r_{ijt} = \alpha_i + \beta_{im} r_{mt} + \beta_{ij} r_{jt} + \varepsilon_{ijt}$$

where r_{ijt} is the weekly (t) return of firm i in industry s; r_{mt} is the market (m) weekly return; r_{jt} is the industry (s) weekly return; and ε_{ijt} is the error term.

Based on what considered above we are going to test in this empirical section of the paper the hypothesis that *CSR* has a positive impact on *IV*.

To this purpose we estimate the following panel fixed effect specification

$$IV_{i,t} = \alpha_0 + \alpha_1 CSR_{i,t-1} + \alpha_2 Size_{i,t-1} + \alpha_3 Leverage_{i,t-1} + \alpha_4 R\&DtoAsset_{i,t-1} +$$
$$\sum_l^{19} \beta_l DYear_l + u_i + \varepsilon_{i,t} \ (2)$$

where $IV_{i,t}$ is *Idiosyncratic Volatility* of company i at time t calculated as in (1) and CSR is the selected CSR variable (which varies according to the specification as described in the following section). The inclusion of *Size* proxied by firm total assets in million dollars among controls captures institutional trading effects which have been considered as potential determinants of the increase in *IV* over time. *Leverage*, the ratio between firm debt and its equity book value, is added among regressors since similar news are expected to have much larger impact on more indebted companies due to their amplified effects on the probability of default (Dennis and Stickland, 2004; Black, 1976 and Christie, 1982). Among other controls we introduce the ratio between R&D expenditures and total assets (*R&DtoAsset*) under the assumption that high-tech corporate profits are less easily predictable due to the characteristics of this specific industry and to the difficulty of predicting in them the value of intangibles. We finally introduce firm fixed effects to capture time

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[10] Industries are defined on the basis of the 49 industry codes. Daily returns for the 49 industry portfolios are obtained from Fama-French website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html), with daily returns being transformed into weekly returns. CRSP US value-weighted index weekly returns are used as proxy for market returns. Weekly return are preferred to higher frequency returns in order to avoid bias due to thin trading.

invariant firm idiosyncratic components and year dummies ($DYear$) to capture business cycle effects and potential trends on the dependent variable. Fixed effects also allow us to overcome some important limits in the construction of KLD indicators. As emphasized by Nicolosi et al. (2011) minimum-maximum ranges in each KLD domain vary over time and across industries (ie. some items in specific domains may not apply to a given industry). With fixed effects and time dummies we partially overcome these problems under the assumption that industry affiliation is time invariant (an assumption which will be removed in the robustness check which follows in section 4.2). All non dummy variables are lagged one period in order to avoid that an event affecting KLD score may happen after and not before the variation of the dependent variable. Descriptive statistics of all the variables of interest are shown in Table 1. The debt is on average 88 percent of the equity in our sample, while R&D expenditure accounts on average for around 3.5 percent of total assets. The average number of KLD strengths is slightly higher than 1, while the average number of KLD concerns is close to 2, thereby determining a negative average for the difference between strengths and concerns at firm level.

4.1 Empirical findings

In our first specification (Table 2, column 1) we use an aggregate CSR indicator calculated as the algebraic sum of all Risk-Metrics KLD strengths minus all Risk-Metrics KLD weaknesses (see Appendix A for an extensive description of these criteria). The coefficient has the expected sign but its significance is very weak. Our interpretation is that this aggregate measure includes several heterogeneous components some of which have nothing to do with what we outline in our theoretical model. In addition to it, consider that, when jointly considering strengths and concerns, we implicitly assume that absence of a concern (a passive action) has the same weight than presence of a strength (an active action). The creation of indicators which separately consider strengths and weaknesses is therefore advised not just for consistency with our theoretical framework but also for methodological reasons. When we decompose the *NetKLDCSR* variable into two variables measuring respectively total KLD strengths and total KLD concerns we find that the first contribute significantly to idiosyncratic volatility as expected (Table 2, column 2).

It is however possible to work to a finer decomposition which isolates spurious components from a KLD strength factor which is closer to what we model in our theoretical framework. Following Becchetti, Ciciretti and Giovannelli (2012) we decompose aggregate CSR into four components

(stakeholder risk, accounting opacity, overinvestment and corporate governance) and use them as regressors in our third specification. The first component (stakeholder risk) is actually a volatility decreasing CSR component if we follow the standard Freeman (1984) argument CSR may help in reducing transaction costs with stakeholders. The *StakeholderRisk* variable is calculated by Becchetti et al. (2012) summing all KLD items related to such conflicts.[11] The *CorporateGovernance* variable is also computed as a separate CSR variable since it captures items which essentially look at shareholders' wellbeing.[12] *AccountingOpacity* is as well potentially a volatility reducing CSR component and as such must be separated by the factor we are looking at.[13] What remains (the *TotalKLDStrenghts-noCGov* variable) is the affirmative action that companies do for creating benefits for stakeholders different from shareholders (positive actions in the employees, human rights, environment, product quality and diversity domains).[14] Our estimates document that this factor has positive and significant effects on idiosyncratic volatility (Table 2, column 3). The magnitude of the effect is such that a unit change of this variable produces a variation corresponding to 10 percent of the dependent variable standard deviation. Since our specification is estimated with fixed effects what we are capturing is a within effect by which, given the impact of idiosyncratic time invariant company characteristics (including industry effects), an increase in attention to the wellbeing of stakeholders produces a positive change in idiosyncratic volatility.

Note that, in order to be even more faithful to our theoretical model, we can limit the relevant CSR measure to positive contributions to wellbeing of employees and subcontractor workers (Employee and Human Right domain) When we do so our variable remains positive and significant with a magnitude similar to that discussed above (Table 2, columns 4 and 5).

With regard to our controls we observe that, in all considered specifications, leverage is positive and significant documenting, as expected, that idiosyncratic shocks have stronger impact on IV if the

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[11] Following Becchetti et al. (2013) *StakeholderRisk* is the sum of the following RiskMetrics-KLD items related to corporate controversies with stakeholders: 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 (for a detailed item description see Appendix A).

[12] Following Becchetti et al. (2013) the corporate governance factor is calculated as the sum of all pros minus all cons in the KLD corporate governance domain. For details on KLD corporate governance items see Appendix A.

[13] Following Becchetti et al. (2013) accounting accuracy is measured with the criteria used by the CSR rating company RiskMetrics-KLD to assess corporate CSR weaknesses. More specifically, one of these criteria assigns negative points if "*The company restated its earnings over an accounting controversy, has other accounting problems, or is involved with some other controversy not covered by other RiskMetrics-KLD ratings*" while another is if "*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*"

[14] Following Becchetti et al. (2013) *TotalKLDStrenghts-noCGov* is the sum of all the KLD strengths COM-str-A, COM-str-B, COM-str-C, COM-str-D, COM-str-F, COM-str-G, COM-str-H, COM-str-X, DIV-str-A, DIV-str-B, DIV-str-C, DIV-str-D, DIV-str-E, DIV-str-F, DIV-str-G, DIV-str-H, DIV-str-X, EMP-str-A, EMP-str-B, EMP-str-C, EMP-str-D, EMP-str-F, EMP-str-G, EMP-str-H, EMP-str-X, ENV-str-A, ENV-str-B, ENV-str-C, ENV-str-D, ENV-str-F, ENV-str-G, ENV-str-X,HUM-str-A, HUM-str-D, HUM-str-G, HUM-str-X, PRO-str-A, PRO-str-B, PRO-str-C, PRO-str-D, PRO-str-X.

company has a higher debt to equity ratio. Another risk component which is positive and significant is the R&D to asset ratio documenting that companies operating in more innovative sectors have higher idiosyncratic risk.

4.2 Robustness check

In this section we provide a robustness check of our main results by removing the assumption that industry affiliation is time invariant and by taking into account the problem of KLD variation across time and industry in minimum-maximum numerical ranges in each KLD domain.

By addressing this point Nicolosi et al. (2013) observe that, if a given concern is not applicable in an industry, scores of that industry will be upward biased when compared with those of other industries. The same authors also point out that the maximum for KLD scores varied from 30 strengths and 24 concerns in 1991 to 40 strengths and 34 concerns in 2007. The introduction of year and fixed effects may only partially solve these problems provided that the industry mix of the company does not change over time. This is because, if we reasonably conceive an interaction effect between the above mentioned biases and the impact of CSR on IV, we cannot capture it with year and fixed effects.
A good way to deal with this issue is therefore to repeat all the specifications above with all CSR variables normalized by using industry and time specific means and standard deviations. That is, for each year $t = 1, \dots T$ (industry $s = 1, \dots, M$ and company i = 1,…,N), we calculate average values for the generic CSR variable $\overline{CSR}_{jt} = \sum_{i=1}^{n} \frac{CSR_{ijt}}{N}$ and their year and industry specific standard deviations σ_{jt}^{CSR}, so that we get the following standardized value:

$$StandardizedCSR_{ist} = \frac{CSR_{ijt} - \overline{CSR}_{jt}}{\sigma_{jt}^{CSR}}$$

When we apply the above mentioned standardization to the different measures used in Table 2 the significance of CSR variables becomes stronger. Even in the first specification where we use the most aggregate proxy of the net KLD score we find that the variable is positive and becomes now strongly significant (Table 3, column 1). Following the same approach we calculate standardized values for all other CSR factors used in the other four specifications. By doing so we find that the magnitude of the coefficient of the (year and industry) standardized *TotalKLDStrenghts-noCGov* variable is much larger as well (Table 3, column 3). A similar rise in magnitude occurs for the standardised *StakeholderWellbeing* variable (Table 3, columns 4 and 5).

5.Concluding Remarks

Corporate social responsibility implies additional care for the wellbeing of stakeholders different from shareholders. We analyze its impact in a theoretical model where profit maximizing firms invest under uncertainty and adopt CSR under the form of a constraint on shareholders' wellbeing. We document that under reasonable parametric conditions (capital depreciation rate, intertemporal discount rate and price demand elasticity which are not too high) this implies that CSR adoption enhances profit volatility.

We test our theoretical proposition and document that idiosyincratic volatility (IV) measured by stock market returns not explained by exposition to systematic nondiversifiable risk is significantly and positively affected by CSR. More specifically, the CSR items represented by extra care for employees have a positive and significant impact on IV net of the effect of other CSR components.

Note as well that the original volatility enhancing component we identify with our theoretical and empirical work does not imply per se that the overall CSR effect on corporate profit volatility is positive since our estimates clearly show that the volatility enhancing effect is counterbalanced by a volatility reducing effect produced by reduction of stakeholder risk.

References

Abel, A.B. (1983), Optimal Investment under Uncertainty, *American Economic Review*, 73(1), 228-233.

Abel, A.B.(1985), A Stochastic Model of Investment, Marginal q and the Market Value of the Firm, *International Economic Review*, 26(2), 305-322.

Abel, A.B., Eberly, J.C. (1994), A Unified Model of Investment Under Uncertainty, *American Economic Review*, 84(1).

Baron, D. P. (2009), A positive theory of moral management, social pressure, and corporate social performance, *Journal of Economics and Management Strategy*, 18(1), 7-43

Becchetti, L., Giacomo, S. D., Pinnacchio, D. (2008), Corporate social responsibility and corporate performance: evidence from a panel of us listed companies, *Applied Economics*, 40(5), 541-567.

Becchetti L.,Ciciretti R., Giovannelli A., 2012, Corporate Social Responsibility and Stock Market Efficiency, CEIS working papers n.233 (forth on Journal of Banking and Finance)
Becchetti, L., Ciciretti, R., Hasan, I. (2013), Corporate Social Responsibility, Stakeholder Risk, and Idiosyncratic Volatility, *CEIS Research Paper*, 285, July.

Benabou R., Tirole, J. (2010), Individual and Corporate Social Responsibility," *Economica*, 77, 1-19.

Bernanke, B.S. (1983), Irreversibility, Uncertainty, and Cyclical Investment, *Quarterly Journal of Economics*, 98(1), 85-106.

Bertola, G, Caballero, R.J.(1994), Irreversibility and Aggregate Investment, *Review of Economic Studies*, 61, 223-246.

Biais, B., Mariotti,T., Rochet, S., Villeneuve,J-C. (2010), LargeRisks, Limited Liability, and Dynamic Moral Hazard, *Econometrica*, 78, 73–118.

Black, F. (1976), Studies of stock price volatility changes, *Proceedings of the 1976 Meeting of the Business and Economic Statistic Section*, American Statistical Association, 79-121.

Caballero, R.J. (1991), On the Sign of the Investment-Uncertainty Relationship, *American Economic Review*, 81(1), 279-288.

Christie, A. A. (1982), The stochastic behavior of common stock variances - value, leverage and interest rate effects, *Journal of Financial Economics*, 3, 145-166.

Dhaliwal, D.S., Radhakrishnan,S., Tsang, A., Yang, G.Y. (2012), Nonfinancial Disclosure and Analyst Forecast Accuracy: International Evidence on Corporate Social Responsibility Disclosure, *The Accounting Review*, 87, 3, 723-759.

DeMarzo, P., Sannikov, Y. (2006), Optimal Security Design and Dynamic Capital Structure in a Continuous-Time Agency Model, *Journal of Finance*, 61, 2681–2724.

DeMarzo, P., Fishman, M., He, Z., Wang, N. (2009), Dynamic Agency and Theory of Investment, Journal of Finance, Forthcoming.

Dennis, P. J., Strickland, D. (2004), The determinants of idiosyncratic volatility, *Working paper Terry College of Business.*

Dixit, A.K., Pindyck, R.S. (1994), Investment Under Uncertainty, Princeton University Press.

Duffie, D., Epstein, L. (1992), Stochastic Differential Utility, *Econometrica*, 60, 353–394.

Durnev, A., Morck, R., Yeung, B., Zarowin,P. (2003), Does greater firm-specific return variation mean more or less informed stock pricing?, *Journal of Accounting Research*, 41(5), 797– 836.

Freeman, R. E. (1984). Strategic Management: A stakeholder approach. Boston: Pitman.

Goss, A., Roberts, G. S. (2011), The impact of corporate social responsibility on the cost of bank loans, *Journal of Banking and Finance*, 35(7), 1794-1810.

Gul, F. A., Srinidhi, B., Ng, A. C. (2011), Does board gender diversity improve the informativeness of stockprices?, *Journal of Accounting and Economics*, 51(3), 314-338.

Hartman, R. (1972), The Effects of Price and Cost Uncertainty on Investment, *Journal of Economic Theory*, 5, 258-266.

He, Z. (2009), Optimal Executive Compensation when Firm Size Follows Geometric Brownian Motion, *Review of Financial Studies*, 22, 859–892.

He, Z. (2011), A Model of Dynamic Compensation and Capital Structure*, Journal of Financial Economics*, 100, 351–366.

Hoi, C.K., Wu, Q., Zhang,H. (2013), Is Corporate Social Responsibility (CSR) Associated with Tax Avoidance? Evidence from Irresponsible CSR Activities, *The Accounting Review* , in Press, doi: http://dx.doi.org/10.2308/accr-50544

Kitzmueller, M., Shimshack, J. (2012), Economic Perspectives on Corporate Social Responsibility, *Journal of Economic Literature*, 50(1), 51-84.

Margolis, J., Elfenbein, H., Walsh, J. (2007), Does it pay to be good? A meta-analysis and redirection of research on the relationship between corporate social and financial performance, *Working paper*, Available at:http://stakeholder.bu.edu/2007/Docs/Walsh,%20Jim%20Does%20It%20Pay%20to%20Be%20Good.pdf [Accessed 10.09.2010].

Mashiyama, K.(2009), The Effects of Uncertainty and Irreversibility on Investment, *Discussion paper N.09-01*, Meiji Gakuin University.

McDonald, R., Siegel, D. (1986), The Value of Waiting to Investment, *Quarterly Journal of Economics*, 101(4), 707-728.

McWilliams, A., Siegel, D. (2000), Corporate social responsibility and financial performance: Correlation or misspecification?, *Strategic Management Journal*, 21 (5), 603-609.

Minor, D. (2009), CSR as Reputation Insurance: Adding Endogenous Enforcement, *Working Paper*, UC Berkeley.

Morck, R., Yeung, B., Yu, W. (2000), The information content of stock markets: Why do developing markets have synchronous stock price movements?, *Journal of Financial Economics,* 58, 215-260.

Nicolosi, Marco, Grassi, Stefano and Stanghellini, Elena, (2011), How to measure Corporate Social Responsibility, No 96/2011, Quaderni del Dipartimento di Economia, Finanza e Statistica, Università di Perugia, Dipartimento Economia, Finanza e Statistica, http://EconPapers.repec.org/RePEc:pia:wpaper:96/2011.

Pindyck, R.S. (1988), Irreversible Investment, Capacity Choice, and the Value of the Firm, American Economic Review, 78(5), 969-985.

Pindyck, R.S. (1993), A Note on Competitive Investment under Uncertainty, *American Economic Review*, 83(1), 273-277.

Roll, R. (1988), R2, *Journal of Finance*, 43(2), 541-566.

Sannikov, Y.(2008), A Continuous-Time Version of the Principal-Agent Problem, *Review of Economic Studies*, 75, 957–984.

Teoh, S., Welch, I., Wazzan, C. (1999), The effect of socially activist investment policies on the financial markets: Evidence from the South African boycott, *Journal of Business*, 72, 35-89.

Wagner, M., Azomahou, T.T., Nguyen Van, P , Wehrmeyer, W. (2002), The relationship between the environmental and economic performance of firms: An empirical analysis of the European paper industry, *Corporate Social Responsibility and Environmental Management,* 9, 133-146.

Wright, P., Ferris, S. (1997), Agency conflict and corporate strategy: the effect of divestment on corporate value, *Strategic Management Journal*, 18, 77-83.

Wurgler, J. A. (2000), Financial Markets and the Allocation of Capital, *Journal of Financial Economics*, 58(1-2), 187-214.

Table 1. Descriptive statistics

	Obs	Mean	St. Dev.	Min	Max
IV	25033	0.784	1.191	-6.423	14.460
CorporateGovernance	21053	-0.511	2.089	-14	3
StakeholderRisk	21052	0.583	1.112	0	11
StakeholderWellbeing	21052	1.334	1.981	0	21
AccountingOpacity	21052	0.038	0.193	0	2
TotalAssets	23069	10847.4	64317.33	0.979	21876.00
Leverage	22998	0.883	15.456	0	1784.172
R&Dtoasset	23069	0.035	0.108	0	7.791
TotalKLDStrenghts	25033	1.196	1.873	0	20
TotalKLDconcerns	25033	1.707	2.114	0	20
TotalKLDStrenghts-noCGov	25033	1.052	1.779	0	19
TotalKLDStrenghts-CGov	25033	0.143	0.363	0	3
NetKLDCSR	25033	-0.511	2.089	-14	13

IV: Idiosyncratic Volatility of the company (calculated as shown in section 4). **CorporateGovernance**: sum of all pros minus all cons in the KLD corporate governance domain. ***StakeholderRisk***: 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. **AccountingOpacity**: sum of CGOV-con-I and CGOV-con-X. ***TotalKLDStrenghts-noCGov***: sum of all the KLD strengs COM-str-A, COM-str-B, COM-str-C, COM-str-D, COM-str-F, COM-str-G, COM-str-H, COM-str-X, DIV-str-A, DIV-str-B, DIV-str-C, DIV-str-D, DIV-str-E, DIV-str-F, DIV-str-G, DIV-str-H, DIV-str-X, EMP-str-A, EMP-str-B, EMP-str-C, EMP-str-D, EMP-str-F, EMP-str-G, EMP-str-H, EMP-str-X, ENV-str-A, ENV-str-B, ENV-str-C, ENV-str-D, ENV-str-F, ENV-str-G, ENV-str-X,HUM-str-A, HUM-str-D, HUM-str-G, HUM-str-X, PRO-str-A, PRO-str-B, PRO-str-C, PRO-str-D, PRO-str-X. *TotalKLDStrenghts-CGov*: sum of total strengths in the Corporate Governance domain; *TotalKLDStrenghts*: sum of all KLD strengths *TotalKLDConcerns*: sum of all KLD concerns; **StakeholderWellbeing**; sum of all KLD strengths in the Employee, Human Rigths and Environment domains. ***NetKLDCSR*** is the difference between all strengths and concerns in RiskMetrics-KLD. ***Leverage*** the ratio between firm debt and its equity book value; ***R&DtoAsset*** is the ratio between R&D expenditures and total assets, ***TotalAssets*** firm total assets (divided by 1,000,000).
For details on KLD strengths and concerns in the different domains see Appendix A.

Table 2. CRS and idiosyncratic volatility: econometric findings

	(a)	(b)	(c)	(f)	(g)
$NetKLDCSR_{t-1}$	0.007* (0.004)				
$R\&DtoAsset_{t-1}$	0.259** (0.132)	0.262** (0.132)	0.349** (0.171)	0.263** (0.132)	0.259** (0.132)
$TotalAssets_{t-1}$	0.001 (0.001)	0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
$Leverage_{t-1}$	0.002*** (0.001)		0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)
$TotalKLDStrengths_{t-1}$		0.017*** (0.006)			
$TotalKLDStrCGov_{t-1}$					-0.054** (0.022)
$CorporateGovernance_{t-1}$			0.007 (0.014)		
$StakeholderWellbeing_{t-1}$				0.025*** (0.007)	0.027*** (0.007)
$StakeholderRisk_{t-1}$			0.045*** (0.010)		
$TotalKLDConcerns$		-0.001 (0.005)		-0.001 (0.005)	-0.001 (0.005)
$TotalKLDStrenghts\text{-}noCGov_{t-1}$		0.017*** (0.006)			
$AccountingOpacity_{t-1}$			0.040 (0.043)		
Years Dummies	Yes	Yes	Yes	Yes	Yes
Constant	1.436*** (0.055)	1.447*** (0.055)	1.373*** (0.054)	1.453*** (0.055)	1.454*** (0.055)
Observations	22998	19435	22998	22998	22998
F-test	218.99	210.10	181.97	210.39	202.29
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
F-test (joint significance of fixed effects)	5.33 (0.000)	4.67 (0.000)	4.86 (0.000)	4.66 (0.000)	4.65) (0.000)
(p-value)					

Standard errors in round brackets ***p>0.01 **p>0.05 *p>0.10. Variable legend: see Table 1.

Table 3. CRS and idiosyncratic volatility: econometric findings – normalized CSR variables

	(a)	(b)	(c)	(f)	(g)
NetKLDCSR	0.028***				
	(0.009)				
R&DtoAsset	0.259	0.254*		0.255*	0.267**
	(0.132)	(0.132)		(0.132)	(0.131)
TotalAssets	0.001	0.001	0.001	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	0.002***	0.002***	0.002***	0.002***	0.002***
Leverage	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TotalKLDStrenghts		0.024**			
		(0.011)			
TotalKLDStrCGov $_{t-1}$					-0.017**
					(0.008)
CorporateGovernance $_{t-1}$			-0.001		
			(0.012)		
StakeholderWellbeing $_{t-1}$				0.033**	0.036***
				(0.012)	(0.013)
StakeholderRisk			0.008		
			(0.014)		
TotalKLDConcerns		-0.022**		-0.024**	-0.023**
		(0.010)		(0.010)	(0.011)
TotalKLDStrenghts-noCGov			0.073***		
			(0.018)		
AccountingOpacity			-0.002		
			(0.011)		
Years Dummies	Yes	Yes	Yes	Yes	Yes
Constant	1.446***	1.455***	1.843***	1.464***	1.327***
	(0.056)	(0.059)	(0.080)	(0.059)	(0.115)
Observations	22813	22582	13271	22520	20302
F-test	218.74	207.86	114.00	208.16	185.40
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
F-test				4.78	4.42
(joint significance of	5.43	4.81	3.69	(0.000)	(0.000)
fixed effects)	(0.000)	(0.000)	(0.000)		
(p-value)					

Standard errors in round brackets ***p>0.01 **p>0.05 *p>0.10. Variable legend: see Table 1.

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 $10million 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 _nes or civil penalties as a result of a_rmative action controversies, or has otherwise been involved in major controversies related to a_rmative 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 that 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].