Corporate social responsibility and earnings response coefficients

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ABSTRACT

Market reactions to accounting information increase with the precision of accounting information and decrease with noise in accounting information (Holthausen and Verrecchia , 1988). Relying on this theoretical model, the current study examines the effect of corporate social responsibility (CSR) on earnings response coefficients (ERCs). This paper argues that less socially responsible firms have more noise in earnings, leading to lower ERCs, all else being equal. More socially responsible firms have more precision in earnings, leading to higher ERCs, all else being equal. CSR is measured using CSR strengths and CSR concerns from the KLD STATS database. Results are consistent with the argument that less socially responsible firms face greater uncertainty in future earnings and consequently current earnings innovations are appropriately discounted by capital markets.

Keywords: accounting, corporate social responsibility, earnings response coefficients, market reaction

INTRODUCTION

Demand for information about a firm's social and environmental performance has increased dramatically over the last two decades. One factor contributing to the demand has been growth in social responsible investing; it is estimated that 10% of the U.S. capital marketplace is invested in socially responsible funds (Social Investment Forum, 2010). In addition, more than 75 global financial institutions have adopted the Equator Principles, a code of conduct that incorporates social and environmental criteria into financing decisions for material projects (Equator Principles, 2012). Firms are meeting the demand for information about social and environmental performance. Approximately 80% of the world's largest companies and approximately 73% of the largest U.S. companies issue standalone corporate social responsibility (CSR) reports in addition to their annual financial reports (KPMG, 2008).

Increased accessibility to data about corporate social and environmental performance provides accounting and finance researchers opportunity to examine how market participants use CSR information in investment decisions. The purpose of this study is to examine the effect of corporate social responsibility on earnings response coefficients (ERCs). Relying on the Holthausen and Verrecchia (1988) theoretical model, along with an economic framework for understanding CSR (Heal, 2005), this paper argues that less (more) socially responsible firms have more noise (precision) in earnings, leading to lower (higher) ERCs, all else being equal. This study employs KLD STATs data, generating two measures of CSR (strengths and concerns).

Results show firms with more (less) CSR concerns have lower (higher) ERCs. Results are consistent with the argument that less socially responsible firms face greater uncertainty in future earnings and consequently current earnings innovations are appropriately discounted by capital markets. Results on the CSR strength measure yield no significant results over the sample period.

This study incrementally contributes to the current literature in three ways. First, it relies on economic theory to describe the interaction of CSR and accounting information on market participants. Second, it demonstrates that CSR is being impounded in market reactions to accounting earnings information. Finally, it provides an innovative method for measuring CSR using KLD Stats, overcoming obstacles that arise when using this data across multiple industries and years.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Holthausen and Verrecchia (1988) model price reactions to information releases regarding values of risky assets. The model provides a theoretical framework for understanding market reactions to accounting information. The Holthausen and Verrecchia model suggests market reactions to accounting information increases with the precision of accounting information and decreases with noise in accounting information.

Bae and Sami (2005) rely on this model when examining environmental performance and earnings response coefficients (ERCs). Bae and Sami theorize that poor environmental performers, proxied by potentially responsible parties for hazardous sites, have greater potential future environmental liabilities. This adds noise to current earnings signals, resulting in lower ERCs. Firms without such potential liabilities have more precise earnings signals, resulting in higher ERCs. Bae and Sami (2005) find higher (lower) ERCS for better (worse) environmental performing firms.

The current study relies on an analogous argument, but extends the context to include both social and environmental performance across multiple industries. Specifically this study examines whether CSR is associated with noise or precision in accounting information. Heal (2005) argues CSR plays a resource allocation role when there are private-social cost differences. He explains these differences arise when some costs of business activities are externalized and borne by society rather than by the corporation. This would include the context of environmental performance, but is much broader. Additionally, issues over fairness arise when competitive markets yield efficient outcomes regarding the distribution of welfare, but the outcomes are not considered socially optimal (Heal, 2005). For example, the supply and demand of labor in developing countries has led to fairness conflicts in the retail apparel industry.

Heal (2005) maintains CSR provides a Coasian[1] solution to conflicts between society and corporations by playing a resource allocation role. With CSR, resources are allocated to social/environmental initiatives to avoid or reduce the economic impact of negative events and/or negative externalities. There is empirical evidence to support this argument. Williams and Barrett (2000) find that while a firm's reputation is diminished by Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) violations, the extent of the decline is reduced by charitable giving. In studies involving the Bhopal disaster (Blacconiere and Patten, 1994) and the 3-Mile Island accident (Bowen et al., 1983), there is evidence consistent with a mitigated negative impact to financial performance for firms that would be considered more socially responsible, relative to industry peers that would be considered less socially responsible. Looking beyond environmental performance, there is consistent, though less persuasive evidence. An increase in shareholder activism (Waddock, 2003), the growing power of non-governmental entities, and ease with which negative information can be shared (blogs, emails) makes the threat of poor social performance a serious issue for corporations (O'Sullivan, 2006).

In sum, firms that are more socially responsible proactively deal with social and environmental issues, reducing the likelihood of negative earnings impacts in future earnings; hence, there is more precision in current earnings. Firms that are less socially responsible are more likely to incur future costs in response to social and environmental impacts of current operations; hence, there is more noise associated with current earnings. Consequently, one might expect a larger (smaller) response to earnings innovations for firms that are more (less) socially responsible. Assuming the market impounds CSR information, one would expect greater stock price movements with unexpected earnings for more socially responsible firms. This logic underlies the hypothesis:

H1: Corporate social responsibility is associated with ERCs.

DESIGN

Data for hypotheses testing comes from four databases. Compustat, CRSP, and I/B/E/S databases are used for accounting measures, market measures, and analysts' forecast measures, respectively. KLD STATS database provides CSR information. The sample period extends from 1991-2006. This study uses multiple regression of abnormal stock returns on a measure of unexpected earnings, CSR measures, and other control variables, with ordinary least squares

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[1] This is a solution based on the work of Ronald Coase (*The Problem of Social Cost*, 1960).

estimation to test the hypothesis. The regression equation contains explanatory variables identified in previous studies to be determinants of ERCs, along with CSR measures. The model is shown below, followed by a description of variables.

$$CAR_{it} = \lambda_0 + \lambda_1 STR_{it} + \lambda_2 CON_{it} + \lambda_3 MB_{it} + \lambda_4 \beta eta_{it} + \lambda_5 LnMVE_{it} + \lambda_6 UE_{it} + \lambda_7 Numest_{it} + \lambda_8 StdROA5_{it} + \lambda_9 (UE_{it} * STR_{it}) + \lambda_{10}(UE_{it} * CON_{it}) + \lambda_{11}(UE_{it} * MB_{it}) + \lambda_{12}(UE_{it} * \beta eta_{it}) + \lambda_{13}(UE_{it} * LnMVE_{it}) + \lambda_{14}(UE_{it} * Numest_{it}) + \lambda_{15}(UE_{it} * StdROA5_{it}) + \epsilon_{it}$$

where:

CAR = cumulative abnormal return for firm (firm's actual return less CRSP value-weighted market return), continuously compounded between days -2 and +2 surrounding the date of a firm's annual earnings announcement (CRSP). The earnings announcement date is taken from Compustat (data item RDQ).

STR = CSR measure of strengths for a given firm-year, relative to industry, year, and size. Total number of strengths for a given firm-year are standardized by industry, year, and size (*MVE*), with mean = 10 and standard deviation = 1. Year, in this analysis, is the year in which the earnings announcement is made.

CON = CSR measure of concerns for a given firm-year, relative to industry, year, and size. Total number of concerns for a given firm-year are standardized by industry, year, and size (*MVE*), with mean = 10 and standard deviation = 1. Year, in this analysis, is the year in which the earnings announcement is made.

MB = market value of equity divided by book value of equity as of the last date of the fiscal year. Market value of equity = *MVE*, described below. Book value of equity = Total Assets – Total Liabilities at end of fiscal year (Compustat data items AT and LT).

Beta = market model slope coefficient as a proxy for firm risk (estimated by regressing 255 daily returns preceding the earnings announcement date, up to day -2, on the CRSP value-weighted indices of the corresponding dates).

LnMVE = Log of *MVE*, where *MVE*= Market Value of Equity at the end of fiscal year, in millions, calculated as price per share at fiscal yearend x number of outstanding shares at fiscal year-end (Compustat data items CSHO x PRCC_F).

UE = Unexpected Earnings for a given firm *i*, in a given fiscal year, *t*. It is calculated as: $UE_{it} = (AE_{it} - FE_{it})/P_{i,d-3}$ where, AE_{it} = Actual earnings per share excluding extraordinary items for firm *i*, for fiscal year *t*, from I/B/E/S Actuals file (data item FY-0Actual EPS); FE_{it}= the mean of analysts' forecasts of firm *i*'s EPS on I/B/E/S in the month; $P_{i,d-3}$= the price of firm *i*'s stock three days prior to the 4th quarter earnings announcement date (price comes from CRSP data item PRC) and earnings announcement date, *d*, determined from Compustat data item RDQ[2]);

Numest = # of analysts providing forecasts (for firm *i*, fiscal year *t*, annual eps) in month immediately prior to the earnings announcement (day *d*);

StdROA5 = variance of earnings, calculated as the standard deviation of *ROA* over preceding 5 years. *ROA* = Return on assets, measured as income before extraordinary items divided by

[2] For a very small number of firm-year observations, P_{id-3} was not available and the price per share on the date of analyst forecast was used (as provided by I/B/E/S Unadjusted Summary file).

average of beginning-of-year and ending-of-year total assets (Compustat data items IB, AT).

CSR Measures

KLD Research & Analytics, Inc. (now part of RiskMetrics Group), provides comprehensive data on the social and environmental performance of large US (and more recently, international) firms. KLD analysts compile CSR information from direct communication with company officers, news sources, public documents, governmental documents, and other sources to evaluate social and environmental performance. KLD data is the most often cited data used in CSR research (Deckop et al., 2006; Mattingly and Berman, 2006; Ruf et. al., 1998; Sharfman, 1996; Waddock, 2003). KLD STATS is one of several KLD research products. It is a set of 0/1 indicators for more than 50 social and environmental criteria for large US firms. The criteria are stated as outcomes rather than intentions or goals, a critical aspect of CSR measurement (Ruf, et al., 1998; Wartick and Cochran, 1985; Wood 1991). The 0/1 indicators are classified by dimension (environment, diversity, community, etc.), and further categorized as strengths or concerns. For example, if a company has a strong pollution prevention program in place, it is scored 1 for the Pollution Prevention Strength Indicator, 0 otherwise. If a company has material liabilities for hazardous waste sites, it is scored 1 for the Hazardous Waste Site Concern Indicator, 0 otherwise. In sum, KLD STATS provides objective, summary data indicating the presence or absence of distinct social and environmental criteria for a predefined population of firms on an annual basis.

Generally, in prior research with KLD data, CSR scores were created by netting the total strengths and total concerns for each firm-year. More recent literature argues against this practice (Mattingly and Berman, 2006). Netting strengths and concerns potentially obfuscates social or environmental performance. For example, Firm A may be socially responsible with regards to community and employee relations, scoring high on strengths, yet have a number of environmental concerns. If the CSR score is computed by subtracting total number of concerns from total number of strengths, Firm A may appear neutral. Analyses in the current study are performed using two CSR measures; each firm-year observation has a CSR Strength score and a CSR Concern score.

There are several obstacles to using KLD in a multi-industry, multi-year study. First, the number of firms evaluated by KLD changes over time, along with the number of social and environmental criteria being scored over time. Table 1, Panel A summarizes firm-year observations in KLD STATS population during the sample period, while Panel B summarizes indicator variables by year. Not only would one expect the raw scores to differ across time based on the number of possible indicators, the dispersion of raw scores will vary as well. An additional obstacle is that industries face different social and environmental challenges (Waddock and Graves, 1997). For example, in any given year, the mean number of environmental concerns in the Oil and Gas Extraction industry is likely to be higher than the mean number of environmental concerns in the Finance Industry. Consequently, a raw score of 3 concerns may be typical in one industry, but relatively high in another. In addition, the dispersion of raw scores may differ across industries. Finally, a number of indicators are more likely to apply to large firms. To deal with comparability issues from industry differences, and with consideration of the additional issues described above, an alternative method of calculating CSR scores is employed--standardizing raw scores by industry-year-size. The following steps describe how these CSR measures were calculated.

1. Concern indicators scoring one were aggregated for each firm-year. Strength indicators scoring one were aggregated for each firm-year. Therefore, for each firm-year observation, there were two raw scores—*Total Strengths* and *Total Concerns*.
2. Firms were then assigned to one of 12 industries based on SIC codes using Fama-French 12 industry portfolio assignment (French, 2010).
3. Market value of equity (*MVE)* data was collected when available. *MVE* is calculated as the price per share at the end of the fiscal year multiplied by number of outstanding shares (Compustat data items PRCC_F x CSHO).
4. For each industry, firms were sorted into quintiles by *MVE.* With 12 industries and 5 size levels, there were 60 groups. Industry averages for CSR *Total Strengths* and CSR *Total Concerns* were calculated for each year for each of the 60 groups. Similarly the standard deviation of CSR *Total Strengths* and CSR *Total Concerns* were calculated for each of the 60 groups.
5. The size-industry-year averages were subtracted from each firm's raw scores. Then raw scores were divided by the standard deviation of strength and concern scores for each size-industry-year. Consequently, the CSR measures for firm-year observations are relative to an industry with mean 10, and standard deviation of 1. The mean of 10 was used to avoid complication when CSR measures were interacted with unexpected earnings[3]. The final measures, *STR* and *CON,* provide CSR scores relative to a firm's size, industry, and year.

Table 2 provides an example of the conversion from raw scores to standardized scores for three firms in the Business Equipment industry in 2002. This paper assumes the manipulation of raw scores to standardized scores provides CSR measures that are comparable in this multi-year, multi-industry analysis. A more precise measure of CSR is expected when firms are compared to firms within the same industry-year. An even more precise measure of CSR is expected when firms are compared to firms in the same industry-year, with attention to firm size as well. The potential for information loss is acknowledged here as a limitation of this research.

Other Variables

Prior studies have shown that ERCs vary positively with earnings persistence (Kormendi and Lipe, 1987; Easton and Zmijewski, 1989; Lipe, 1990; and, Collins and Kothari, 1989). Explicitly, if the earnings innovation is likely to persist in future earnings, then the present value of revisions in future earnings is larger (Kormendi and Lipe, 1987). Assuming expected future earnings proxy for expected future dividends and assuming market value is the present value of expected future earnings, then it follows larger revisions lead to larger changes in current share price (Kormendi and Lipe, 1987; Easton and Zmijewski, 1989; Nichols and Waylen, 2004). Hence higher earnings persistence is expected to lead to higher abnormal returns around earnings

[3] Using a mean of 0, when standardizing CSR measures is more intuitive. The problem is that CSR measures would then take on both positive and negative values. Unexpected earnings may take on both positive and negative values as well. The interaction variable would be problematic.

announcement dates, assuming the earnings announcement conveys new information to the market, all else being equal.

In the primary analysis, persistence is proxied using the standard deviation of earnings in the five years prior to the current earnings performance being announced. A lower standard deviation indicates less variance in earnings over the five past fiscal periods, and hence, more persistent earnings. Larger standard deviations of earnings are indicative of lower persistence. Consequently a negative relationship is expected between abnormal returns and persistence, when persistence is interacted with unexpected earnings.

The short period used in this persistence proxy (five years of prior earnings) allows for a greater number of observations to be included in estimating the parameters in the model; however it may be a less precise proxy for the underlying construct, relative to variables with a longer history of earnings. Additional analyses were done using other proxies for persistence for robustness. Additional analyses were performed for this particular control variable because the economic argument associating CSR to accounting earnings (and future earnings) raises potential problems. It is important in to disentangle potential relationships between CSR, earnings persistence, and ERCs. Results would be more persuasive if the hypothesized effect was robust to alternative measures of persistence. The standard deviation of return on equity for current and prior 9 years of earnings was used. Similarly, the standard deviation of return on assets for the current and prior 9 years of earnings was used. Finally the slope coefficient generated by regressing current earnings on lagged earnings, for a given firm, using current and 9 prior periods of earnings, was used as a proxy for persistence. These variables are measured as follows and substitute for *StdROA5*, and its interaction term, in robustness testing.

StdROA10= variance of earnings, calculated as the standard deviation of *ROA* over current and preceding 9 years. *ROA* = Return on assets, measured as income before extraordinary items divided by average of beginning-of-year and ending-of-year total assets (Compustat data items IB, AT).

StdROE10= variance of earnings, calculated as the standard deviation of *ROE* over current and preceding 9 years. *ROE* = Return on common stockholder's equity, measured as income before extraordinary items divided by average of beginning-of-year and ending-of-year equity (Compustat data items IB, CEQ).

Pers = Firm-specific measure of persistence, constructed using rolling regressions of earnings on lagged earnings, AR1 model below. Rolling regressions were estimated with 10 periods of data (minimum 8 years) with Maximum Likelihood Estimation. Estimates of firm-specific persistence are equal to slope coefficient generated using the rolling regressions. Model:$E_t = \alpha_0 + \alpha_1 E_{t-1} + \epsilon_t$, where E_t = Earnings, measured as earnings before extraordinary items, in year *t*, deflated by average assets (average of beginning and end of the year total assets). The rolling regressions included current year earnings and the previous 9 periods of earnings (Compustat Data Items IB and AT).

Since *StdROA10* and *StdROE10* are the standards deviations of ten years of ROA and ROE, respectively, a lower standard deviation is indicative of more persistent earnings. Like *StdROA5*, the direction of coefficients for these persistence measures, when interacted with unexpected earnings is expected to be negative. Since the variable in *Pers* measure is higher for more firms with more persistent earnings and lower for firms with less persistent earnings, the expected direction of *Pers*, when interacted with unexpected earnings is expected to be positive.

Collins and Kothari (1989) show persistence estimates, particularly over longer time series are deficient in reflecting current growth opportunities. Current growth opportunities being realized in earnings innovations have greater implications on shareholder value when compared to a weighted average of changing growth opportunities captured in persistence proxies. To control for current growth opportunity, the proxy of market to book value is used. It is expected to have a positive association with *CAR*, when interacted with unexpected earnings (Collins and Kothari, 1989).

ERCs are correlated with systematic risk (Easton and Zmijewski, 1989) which may change over time (Collins and Kothari, 1989). The reasoning is that greater risk leads to higher discount factors when valuing the present value of revisions to expected future earnings. To control for potential changes in systematic risk over time, *Beta* is estimated from a market model over the prior 255 trading days (excluding the return window). The relationship between *CAR* and *Beta*, when *Beta* is interacted with unexpected earnings is expected to be negative.

There have been mixed results concerning the effect of size on ERCs (Easton and Zmijewski, 1989; Lipe, 1990). Shevlin and Shores (1990) find the mixed results can be explained given the correlation between firm size and other control variables typically included in empirical studies of ERCs. Size is included in the model, measured as the natural log of market value of equity. No expectation is made on the direction of relationship between *CAR* and size, when size is interacted with unexpected earnings.

The predisclosure environment plays an important role in the magnitude of ERCs. Reliable information available about a firm's future earnings from other sources will reduce the relevance of the reported earnings number. In order to effectively control for predisclosure environment, the number of analysts included in the consensus forecast is included in the model. It is expected that larger analyst following indicates more information is available to market participants prior to earnings announcement, all else being equal (Lang and Lundholm, 1996). Note size may similarly be capturing the predisclosure environment (Atiase, 1985). The direction of relationship between *CAR* and number of analysts, when the number of analysts is interacted with unexpected earnings, is expected to be negative.

Biddle and Seow (1991) and Teets (1992) show ERCs vary across industries as industries face similar supply and demand uncertainties. Firms within the same industry cope with similar accounting measurement issues, which may affect noise in accounting earnings. Consequently, it is important to control for industry membership when investigating the earnings-returns relationship. Some researchers have used a balanced sample or matched pair design to account for industry differences (Teoh and Wong, 1993; Bae and Sami, 2005). In this study, CSR measures are standardized by industry/year. Incremental information provided in a *UE* x CSR interaction is less likely to be driven by industry differences.

The empirical test for the hypothesis is a test on the coefficients yielded from the regression for interaction between the CSR measures and unexpected earnings. A statistically significant coefficient suggests the CSR measure is capturing some incremental information investors impound in market prices when evaluating earnings information.

RESULTS

The derivation of the sample and descriptive statistics are shown in Table 3. The overall sample contains 9,282 firm-year observations, between the years 1991-2006. Firm size ranges from approximately $5 million to $508 billion in market capitalization (*MVE*), with median and mean *MVE* of $1,906 million and $7,654 million, respectively. As is typical in large sample studies, distribution of firm size is heavily right-skewed. The primary analysis has the proxy for persistence measured as the standard deviation of return on assets for the five year period prior to the current year's earnings announcement. The use of this proxy limits the sample to 8,148 observations. Alternative analyses are performed for robustness with various measures of persistence along with analysis omitting a persistence proxy.

The number of observations by industry and year is shown Table 4. The number of observations increases over time given the availability of KLD data. I/B/E/S data availability drops off significantly in 2006[4]. All industries are represented in the final sample, with the largest number of observations coming from Manufacturing, Business Equipment, Retail, and Finance industries. Telecommunications and Utilities industries are the most poorly represented, with a combined number of firm-year observations making up less than 4% of the final sample. Table 5 shows the Pearson correlation coefficients. As one would expect the level of unexpected earnings is positively correlated with cumulative abnormal return (*CAR*) during the earnings announcement window. The four proxies for persistence are all significantly correlated with one another in the direction expected. No significant correlation exists between CSR strength measures and historical *ROA* and *ROE* measures. The CSR measure of concerns is positively and significantly associated with the variance of *ROA* (both 5 and 10 year period) and the variance of *ROE*. A higher number of CSR concerns in the current year, relative to a firm's peers, is linearly associated with greater variability in earnings over previous periods. On a practical level, however, the correlations are very small in magnitude. Finally the proxy for current growth opportunities, market to book ratio (*MB*), is positively correlated with *Beta*, *LnMVE*, the number of analysts following a firm (*Numest*), and the historical variability of earnings (*StdROA5*, *StdROA10*, and *StdROE10*). While *MB* has no significant linear association with the CSR strength measure, it is negatively associated with CSR concerns, with a correlation coefficient of -.0928 (p-value of <.0001). It appears that less socially responsible firms, with respect to concerns, are linearly associated with lower current growth opportunities.

Regression results are reported in Table 6. Panel A shows the regression results of from the full sample and Panel B shows the results repeated on a smaller sample, excluding observations that were associated with studentized residuals with an absolute value greater than 2.5 (Freund and Wilson, 1998). Adjusted R-squared measures varied between .0224 and .0317 across all variations of the model (varying persistence proxies), similar to other empirical studies of ERCs.

The interaction term between CSR measures and unexpected earnings yielded significant results for the CSR Concern measure, but not the CSR Strength measure. In Table 6, the *UE*CON* coefficient is significantly negative in both panels with t-statistics of -2.75 and -2.1 in Panel A and Panel B, respectively. So, after controlling for historical persistence of earnings, and for a given level of unexpected earnings, higher levels of CSR concerns are negatively associated with abnormal returns. In other words, firms with more CSR concerns—less socially responsible firms--have smaller movements in share price for the same level of unexpected earnings, all else being equal. Alternatively, firms with less CSR concerns—more socially responsible firms--have larger market reactions for a given level of unexpected earnings, all else being equal. Robustness tests using various proxies for persistence yields similar results. The coefficient on the variable of interest (*UE x CON*) is statistically significant, or at least marginally so, for four of the six additional analyses .

[4] Access to I/B/E/S ended in the latter half of 2006 at author's university, so only firms with early fiscal year ends are presented in the observations in 2006.

In sum, results support the argument that firms considered more (less) socially responsible have less (more) noise in accounting earnings, leading to higher (lower) market reactions for unexpected earnings. Empirical results in Table 6 suggest there is incremental information captured in CSR; however, the results suggest it is only captured by CSR concerns. Results are also consistent with the argument that the market is discounting accounting earnings information when firms have more social/environmental concerns.

CONCLUSIONS

The empirical analysis provided evidence that CSR, at least some aspect of CSR, is associated with market responses to unexpected earnings. Theory advocated in this research is that more (less) socially responsible firms have less (more) noise in accounting information. More socially responsible firms proactively deal with private-social conflicts and issues of fairness, mitigating negative impacts on future earnings (future cash flows). Market responses to unexpected earnings provide perspective about information uncertainty from investors. The results raise interesting questions, given that increased uncertainty in future earnings (future cash flows) makes estimates of firm value less reliable. As described in Jiang et al. (2005), high information-uncertainty firms may have expected cash flows that are less "knowable" (p. 185), due to the nature of their operations and/or business environment. In the CSR setting, one could argue there is higher information uncertainty for less socially responsible firms due to difficulties estimating how private-social conflicts will manifest in future earnings. If this is the case, questions arise over information asymmetry. Assuming managers have information that could assist external decision-makers in assessing this kind of uncertainty, there are implications to standard setters and regulators regarding social and environmental disclosures.

This area of research is particularly important now as CSR has become an integral part of corporate strategies. The data has become more readily available, but understanding how market participants use CSR data is an area of great interest today. The growing extent to which CSR affects resource allocation in today's business environment, makes academic research in this area particularly critical. The current study provides a new approach to using one of the most popular CSR databases that overcomes obstacles faced when conducting a multi-industry, multi-year study. The difficulties measuring CSR will continue to challenge accounting and finance researchers; however, there are both interesting and important research questions that remain to be addressed, making this a very rich area of future research.

Table 1
Number of Firms Evaluated, Number of Strength Indicators, and
Number of Concern Indicators in KLD STATS Database, by Year

Panel A: Number of firm-year observations in KLD STATS, by year

Year	Number of firms evaluated	Year	Number of firms evaluated
1991	647	1999	662
1992	652	2000	660
1993	651	2001	1,107
1994	643	2002	1,108
1995	647	2003	2,963
1996	652	2004	3,034
1997	653	2005	3,015
1998	658	2006	2962

Panel B: Number of Strength and Concern Indicators, by year

Year	Number of Strength Indicators	Number of Concern Indicators
1991	30	24
1992	30	26
1993	30	26
1994	34	30
1995	34	28
1996	33	27
1997	33	28
1998	33	29
1999	33	30
2000	34	31
2001	34	31
2002	35	30
2003	36	30
2004	36	30
2005	38	33
2006	38	34

Panel A indicates the number of firms evaluated, by year in KLD STATS database. Panel B indicates the number of strength indicators and number of concern indicators for each year.

Table 2

Example of Conversion of Raw Score to Standardized Score
Industry = Business Equipment, Year = 2002

	IBM	Autodesk	Gateway
Strengths			
Raw Score	12	6	0
Industry Average	3.53	1.38	1.34
Standard Deviation	3.31	1.60	1.36
Standardized Score	12.56	12.89	9.01
Concerns			
Raw Score	6	1	4
Industry Average	2.13	1.50	1.25
(Standard Deviation)	1.21	1.32	1.11
Standardized Score	13.20	9.62	12.48
MVE	133,483.44	2,281.40	1,017.59
Size Quintile	5	3	1

Table 2 shows the conversion of raw scores to standardized scores for 3 firms in the Business Equipment industry in 2002. The raw scores represent the aggregate number of Strengths (Concerns) by combining all Strength (Concern) indicators = 1 for each firm, in 2002. Firms were assigned to quintiles based on market value of equity (MVE) with quintile 5 being largest firms and quintile 1 being smallest firms. Industry averages and standard deviations were computed for each of the five size groups in the Business Equipment industry in 2002 for Total Strengths and Total Concerns, respectively. Standardized scores = [(Firm score – Industry Mean) / Standard Deviation] + 10.

Market value of equity (*MVE*) is calculated as the price per share at the end of the fiscal year multiplied by number of outstanding shares (Compustat data items PRCC_F x CSHO), in millions.

Table 3
Derivation of Sample and Descriptive Statistics for Sample

Panel A: Derivation of Sample

Firm-year observations in KLD STATS, 1991-2008	20,716
Firm-year observations not included because:	
No match in Compustat	(1,742)
Missing *MVE* data to calculate *STR, CON,* and *LnMVE*	(140)
Missing CRSP data to calculate CAR and/or Beta	(3,405)
Missing I/B/E/S data to calculate *UE*	(4, 090)
Missing I/B/E/S data to calculate *Numest*	(262)
Deleted top, bottom 1% values of:	
CAR, Beta, MB, UE, STR, and *CON*	(1,788)
Firm Year observations remaining before persistence proxies	9,289
Firm-years remaining for various persistence proxies after truncating top, bottom 1% values	
StdROA5	8,148
StdROA10	6,667
StdROE10	6,659
Pers	7,645

Panel B: Descriptive Statistics

Variable	N	Median	Mean	Std Dev	Minimum	Maximum
CAR	9,289	0.0021	0.0025	0.0624	-0.2014	0.2096
STR	9,289	9.7907	10.0016	0.8943	8.6073	13.0531
CON	9,289	9.7730	9.9368	0.8650	8.4746	12.7657
MB	9,289	2.4188	3.2021	2.4900	0.6451	19.3212
Beta	9,289	1.0200	1.0931	0.5023	0.1100	2.8300
MVE	9,289	1,906	7,564	23,524	5	508,330
LnMVE	9,289	7.5530	7.6652	1.4679	1.6660	13.1389
UE	9,289	0.00031	0.00001	0.00498	-0.04362	0.02144
Numest	9,289	10	12	9	1	50
StdROA5	8,148	0.0218	0.0385	0.0502	0.0006	0.3771
StdROA10	6,667	0.0270	0.0382	0.0377	0.0010	0.2703
StdROE10	6,659	0.0605	0.1035	0.1725	0.0083	2.3283
Pers	7,645	0.3905	0.3826	0.3492	-0.5598	1.3291

Panel A shows the derivation of the final sample used in analysis. Panel B shows descriptive statistics for all variables. N is equal to the number of observations. Other summary statistics shown are median, mean, standard deviation, minimum value, and maximum value for each variable.

Table 4
Number of Observations By Industry and Year

Year	Consumer Non-Durables	Consumer Durables	Manu-facturing	EnergyOilGas Extraction Products	Chemicals	Business Equipment	Telephone Television Transmission	Utilities	Wholesale Retail	Healthcare MedEquip Drugs	Finance	Other	**Total by year**
1991	41	16	75	23	22	38	4	17	49	22	50	23	380
1992	40	17	74	18	22	41	4	19	50	21	43	21	370
1993	41	15	72	22	22	40	4	22	48	18	45	25	374
1994	37	20	73	21	21	35	3	20	48	23	40	23	364
1995	39	18	70	13	19	33	2	15	40	23	49	23	344
1996	42	20	74	16	17	38	1	10	45	18	52	23	356
1997	38	17	81	15	16	41	2	9	40	22	47	27	355
1998	36	14	73	12	14	37	1	11	43	18	43	25	327
1999	38	14	70	12	18	38	2	11	44	17	49	23	336
2000	33	14	54	6	18	57	4	6	37	16	44	18	307
2001	45	18	72	17	23	85	11	9	53	38	88	44	503
2002	48	17	82	18	24	106	12	13	68	47	114	45	594
2003	78	36	164	47	32	294	28	21	153	133	272	167	1,425
2004	77	38	172	48	35	284	29	22	161	148	306	159	1,479
2005	78	34	150	55	32	291	21	24	160	139	318	177	1,479
2006	24	13	18	2	6	82	2	0	85	22	14	28	296
Total by industry	735	321	1,374	345	341	1,540	130	229	1,124	725	1,574	851	9,289

Table 5
Pearson Correlation Coefficients
(Two-tailed p-values)

	STR	*CON*	*MB*	*Beta*	*LnMVE*	*UE*	*Numest*	*StdROA5* [a]	*StdROA10* [b]	*StdROE10* [c]	*Pers* [d]
CAR	0.0002	0.0034	-0.0481	-0.0063	-0.0091	0.1394	0.0009	-0.0296	-0.0327	-0.0356	0.0121
STR		0.0224	0.0142	-0.01	0.0494	0.0075	0.076	0.0134	0.0127	-0.0176	0.0115
CON			-0.0928	0.0198	0.059	-0.0029	0.0491	0.0539	0.036	0.0802	-0.013
MB				0.107	0.3099	0.0187	0.1696	0.1373	0.1486	0.1874	0.0169
Beta					-0.0695	0.0221	0.0012	0.3632	0.3602	0.1731	-0.0359
LnMVE						0.0579	0.7123	-0.1875	-0.1624	-0.0986	0.0162
UE							0.0245	0.0156	-0.0251	-0.0062	-0.0225
Numest								-0.0795	-0.0585	-0.069	0.0042
StdROA5									0.8735	0.4594	-0.1112
StdROA10										0.5031	-0.0524
StdROE10											-0.0805

Pearson correlation coefficients shown are shown above. All correlations greater than .022 in absolute value are significant at less than the .05 level.
The number of observations for first seven columns is equal to 9,289. The number of observations in remaining columns is indicated below.
[a]The number of observations for *StdROA5* column is equal to 8,148.
[b]The number of observations for *StdROA10* column is equal to 6,667.
[c]The number of observations for *StdROE10* column is equal to 6,659
[d]The number of observations for *Pers* column is equal to 7,645.

Table 6
Regression Results

Panel A: OLS Regression Results, proxy for persistence is StdROA5

Number of observations =	8,148
F-Statistic =	13.4677
Prob > F =	<.0001
Adjusted R^2	0.0224

Variable	Expected Direction	Parameter Estimate	Std. Error	t-statistic	Prob>|t|
Intercept	?	0.01432	0.0114	1.2500	0.2099
STR	?	0.00021	0.0007	0.2800	0.7758
CON	?	-0.00037	0.0008	-0.4700	0.6398
MB	?	-0.00079	0.0003	-2.5500	0.0109
Beta	?	0.00085	0.0015	0.5800	0.5601
LnMVE	?	-0.00108	0.0007	-1.5200	0.1279
UE	+	4.36246	2.2900	1.9100	0.0568
Numest	?	0.00013	0.0001	1.1700	0.2415
StdROA5	?	-0.04036	0.0150	-2.6900	0.0072
*UE*STR*	+	0.03217	0.1477	0.2200	0.8276
*UE*CON*	-	-0.40761	0.1482	-2.7500	0.0060
*UE*MB*	+	0.02308	0.0741	0.3100	0.7555
*UE*Beta*	-	0.46594	0.2659	1.7500	0.0798
*UE*LnMVE*	?	0.21860	0.1374	1.5900	0.1117
*UE*Numest*	-	-0.09264	0.0212	-4.3700	<.0001
*UE*StdROA5*	-	-0.94207	2.9776	-0.3200	0.7517

Table 6 (continued)
Regression Results

Panel B: OLS Regression Results, proxy for persistence is StdROA5, excluding outliers

Number of observations =	7,916
F-Statistic =	16.7723
Prob > F =	<.0001
Adjusted R_2	0.0290

Variable	Expected Direction	Parameter Estimate	Std. Error	t-statistic	Prob>|t|
Intercept	?	0.01444	0.0103	1.4000	0.1615
STR	?	0.00032	0.0007	0.4800	0.6323
CON	?	-0.00043	0.0007	-0.6000	0.5510
MB	?	-0.00058	0.0003	-2.0300	0.0422
Beta	?	0.00036	0.0013	0.2700	0.7860
LnMVE	?	-0.00106	0.0006	-1.6600	0.0977
UE	+	2.56491	2.1235	1.2100	0.2271
Numest	?	0.00006	0.0001	0.6100	0.5404
StdROA5	?	-0.05168	0.0138	-3.7500	0.0002
*UE*STR*	+	0.05621	0.1380	0.4100	0.6838
*UE*CON*	-	-0.28529	0.1355	-2.1000	0.0353
*UE*MB*	+	0.15109	0.0788	1.9200	0.0553
*UE*Beta*	-	0.71851	0.2481	2.9000	0.0038
*UE*LnMVE*	?	0.17872	0.1254	1.4200	0.1543
*UE*Numest*	-	-0.09407	0.0192	-4.9100	<.0001
*UE*StdROA5*	-	-0.21463	2.7964	-0.0800	0.9388

Panel A and Panel B show regression results, using OLS estimation, on the model. The difference between the two panels is the sample of observations used. Panel A uses the all observations with required data. Panel B excludes observations that had studentized residuals exceeding 2.5 in magnitude, after running regression yielding Panel A results (Freund and Wilson, 1998). All p-values are shown for two-tailed testing.

Table 7
Regression Results, Other Proxies for Persistence

Panel A: OLS Regression results using various proxies for persistence

Proxy for persistence		*StdROA10*				*StdROE10*				*Pers*			
Number of observations =		6,667				6,659				7,645			
F-Statistic =		12.78				12.55				12.90			
Prob > F =		<.0001				<.0001				<.0001			
Adjusted R^2		0.0258				0.0254				0.0228			
Variable	Exp. Dir.	Coef	Std.Err.	t-stat.	Prob>|t|	Coef	Std.Err.	t-stat.	Prob>|t|	Coef	Std.Err.	t-stat.	Prob>|t|
Intercept	?	0.0048	0.0120	0.4000	0.6856	0.0051	0.0120	0.4300	0.6706	0.0087	0.0116	0.7500	0.4534
saSTRerc	?	0.0005	0.0008	0.6500	0.5180	0.0004	0.0008	0.5500	0.5826	0.0001	0.0008	0.0900	0.9315
saCONerc	?	0.0004	0.0008	0.4200	0.6749	0.0000	0.0008	0.0000	0.9979	0.0000	0.0008	0.0600	0.9520
MB	?	-0.0006	0.0003	-1.6600	0.0975	-0.0007	0.0003	-2.1300	0.0328	-0.0009	0.0003	-3.1000	0.0020
Beta	?	0.0033	0.0016	2.0400	0.0417	0.0021	0.0015	1.4000	0.1605	0.0006	0.0014	0.4000	0.6884
lnMVE	?	-0.0015	0.0008	-1.9300	0.0541	-0.0009	0.0008	-1.2200	0.2215	-0.0008	0.0007	-1.1900	0.2330
UE	+	3.3516	2.3857	1.4000	0.1601	3.4185	2.4190	1.4100	0.1576	1.0125	2.3739	0.4300	0.6697
Numest	?	0.0001	0.0001	1.1300	0.2579	0.0001	0.0001	0.9300	0.3525	0.0001	0.0001	0.6400	0.5190
*UE*saSTRerc*	+	0.0800	0.1563	0.5100	0.6088	0.0942	0.1566	0.6000	0.5474	0.1784	0.1565	1.1400	0.2543
*UE*saCONerc*	-	-0.4326	0.1563	-2.7700	0.0057	-0.4197	0.1639	-2.5600	0.0105	-0.2309	0.1519	-1.5200	0.1285
*UE*MB*	+	0.1761	0.1044	1.6900	0.0918	0.1404	0.1069	1.3100	0.1889	0.0230	0.0716	0.3200	0.7485
*UE*Beta*	-	0.2928	0.2862	1.0200	0.3063	0.3795	0.2685	1.4100	0.1577	0.3880	0.2583	1.5000	0.1332
*UE*LnMVE*	?	0.3029	0.1501	2.0200	0.0436	0.2746	0.1438	1.9100	0.0562	0.2692	0.1349	2.0000	0.0460
*UE*Numest*	-	-0.1029	0.0221	-4.6500	<.0001	-0.1036	0.0221	-4.6900	<.0001	-0.0973	0.0214	-4.5500	<.0001
StdROA10	?	-0.0656	0.0212	-3.1000	0.0020								
*UE*StdROA10*	-	4.1758	4.0894	1.0200	0.3072								
StdROE10	?					-0.0112	0.0044	-2.5300	0.0114				
*UE*StdROE10*	-					0.3060	0.9301	0.3300	0.7422				
Pers	?									0.0029	0.0020	1.4700	0.1409
*UE*Pers*	+									-0.2999	0.3894	-0.7700	0.4412

Table 7 (continued)
Regression Results, Other Proxies for Persistence

Panel B: OLS Regression results using various proxies for persistence, no outliers

Proxy for persistence		*StdROA10*				*StdROE10*				*Pers*			
Number of observations =		6,475				6,373				7,426			
F-Statistic =		15.14				14.58				14.99			
Prob > F =		<.0001				<.0001				<.0001			
Adjusted R^2		0.0317				0.0310				0.0275			
Variable	Exp. Dir.	Coef	Std.Err.	t-stat.	Prob>|t|	Coef	Std.Err.	t-stat.	Prob>|t|	Coef	Std.Err.	t-stat.	Prob>|t|
Intercept	?	0.01119	0.0108	1.0400	0.2999	0.01065	0.0109	0.9800	0.3282	0.00962	0.0105	0.9200	0.3575
saSTRerc	?	0.00021	0.0007	0.2900	0.7717	0.00017	0.0007	0.2400	0.8107	0.00026	0.0007	0.3700	0.7102
saCONerc	?	-0.00011	0.0008	-0.1500	0.8825	-0.00045	0.0008	-0.5900	0.5553	-0.00030	0.0007	-0.4200	0.6764
MB	?	-0.00028	0.0003	-0.9100	0.3645	-0.00045	0.0003	-1.4300	0.1517	-0.00084	0.0003	-3.0100	0.0026
Beta	?	0.00322	0.0015	2.2200	0.0268	0.00198	0.0014	1.4200	0.1556	0.00096	0.0013	0.7400	0.4579
lnMVE	?	-0.00127	0.0007	-1.8500	0.0645	-0.00071	0.0007	-1.0500	0.2957	-0.00068	0.0006	-1.0700	0.2856
UE	+	0.60531	2.2157	0.2700	0.7847	0.30710	2.2603	0.1400	0.8919	-0.09305	2.1552	-0.0400	0.9656
Numest	?	0.00004	0.0001	0.3600	0.7186	0.00001	0.0001	0.0600	0.9499	-0.00002	0.0001	-0.1600	0.8730
*UE*saSTRerc*	+	0.21891	0.1464	1.4900	0.1350	0.23350	0.1472	1.5900	0.1127	0.16228	0.1444	1.1200	0.2611
*UE*saCONerc*	-	-0.29578	0.1431	-2.0700	0.0387	-0.26653	0.1518	-1.7600	0.0791	-0.09737	0.1377	-0.7100	0.4795
*UE*MB*	+	0.29066	0.0959	3.0300	0.0024	0.33564	0.1000	3.3600	0.0008	0.12884	0.0757	1.7000	0.0889
*UE*Beta*	-	0.71781	0.2693	2.6700	0.0077	0.73914	0.2525	2.9300	0.0034	0.42212	0.2378	1.7700	0.0760
*UE*LnMVE*	?	0.21595	0.1355	1.5900	0.1110	0.20122	0.1294	1.5600	0.1199	0.22309	0.1226	1.8200	0.0689
*UE*Numest*	-	-0.10111	0.0199	-5.0800	<.0001	-0.10175	0.0199	-5.1100	<.0001	-0.09645	0.0192	-5.0200	<.0001
StdROA10	?	-0.06517	0.0194	-3.3700	0.0008								
*UE*StdROA10*	-	0.56459	3.8193	0.1500	0.8825								
StdROE10	?					-0.00591	0.0044	-1.3500	0.1782				
*UE*StdROE10*	-					-0.69692	0.9067	-0.7700	0.4421				
Pers	?									0.00206	0.0018	1.1700	0.2416
*UE*Pers*	+									-0.55015	0.3499	-1.5700	0.1159

Table 7 (continued)
Regression Results, Other Proxies for Persistence

Panel A and Panel B show regression results, using OLS estimation, on the model that follows. The difference between the three columns in each panel is the proxy used for persistence. The difference between Panels A and B is the sample of observations used. Panel A uses the all observations with required data. Panel B excludes observations with studentized residuals exceeding 2.5 in magnitude, after running regression yielding Panel A results (Freund and Wilson, 1998). All p-values are shown for two-tailed testing.

Model (adjusted for persistence proxy):

$$CAR_{it} = \lambda_0 + \lambda_1 saSTRerc_{it} + \lambda_2 saCONerc_{it} + \lambda_3 MB_{it} + \lambda_4 \beta eta_{it} + \lambda_5 LnMVE_{it} + \lambda_6 UE_{it} + \lambda_7 Numest_{it} + \lambda_8 PersistenceProxy_{it} + \lambda_9 (UE_{it} * saSTRerc_{it}) + \lambda_{10} (UE_{it} * saCONerc_{it}) + \lambda_{11} (UE_{it} * MB_{it}) + \lambda_{12} (UE_{it} * \beta eta_{it}) + \lambda_{13} (UE_{it} * LnMVE_{it}) + \lambda_{14} (UE_{it} * Numest_{it}) + \lambda_{15} (UE_{it} * PersistenceProxy_{it}) + \epsilon_{it}$$

Variable definitions in persistence proxies:

StdROA10= variance of earnings, calculated as the standard deviation of *ROA* over current and preceding 9 years. *ROA* = Return on assets, measured as income before extraordinary items divided by average of beginning-of-year and ending-of-year total assets (Compustat data items IB, AT).

StdROE10= variance of earnings, calculated as the standard deviation of *ROE* over current and preceding 9 years. *ROE* = Return on common stockholder's equity, measured as income before extraordinary items divided by average of beginning-of-year and ending-of-year equity (Compustat data items IB, CEQ).

Pers = Firm-specific measure of persistence, constructed using rolling regressions of earnings on lagged earnings, AR1 model below. Rolling regressions were estimated with 10 periods of data (minimum 8 years) with Maximum Likelihood Estimation. Estimates of firm-specific persistence are equal to slope coefficient generated using the rolling regressions. Model: $E_t = \alpha_0 + \alpha_1 E_{t-1} + \epsilon_t$, where E_t = Earnings, measured as earnings in before extraordinary items, in year *t*, deflated by average assets (average of beginning and end of the year total assets). The rolling regressions included current year earnings and the previous 9 periods of earnings (Compustat Data Items IB and AT).

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