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Beyond or Under Expectations? The Effect of CSR on Analyst Forecasts and Market Reactions to Earnings Announcements

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Abstract

This paper examines the relations among Corporate Social Responsibility, analyst earnings forecast optimism, forecast errors and market reactions to earnings news. We find that analyst optimism has negative effects on forecast accuracy. However, the higher CSR reduces the corresponding forecast errors when analysts are optimistic about a firm's prospects. Investors make a balance between CSR and financial performance. They value firms that engage in moderate CSR investments and exhibit good performance; but they react negatively to CSR-minded firms that release negative earnings news.

Keywords: Corporate social responsibility, Analyst earnings forecast, Optimism

I. Introduction

Research on the determinants and consequences of corporate social performance is extensive (Orlitzky et al., 2003), since corporate social responsibility (CSR) carries impacts on different dimensions of corporate operation. However, few studies have focused on the role of CSR in analyst earnings forecasts. To fill this gap, the objective of this study is to examine the relationship between CSR and analyst earnings forecasts, as well as the market reactions when earnings are announced.

This study is motivated by the following research. First, previous empirical studies have found inconclusive relations between corporate social performance (CSP) and corporate financial performance (CFP) (Margolis and Walsh, 2003). Furthermore, security analysts are known as certified industry experts. They are skilled to assess the information relevant to corporate financial performance (Ivkovic and Jegadeesh, 2004), and provide insight into the activities and beliefs of investors that cannot be observed directly (Schipper, 1991). Hence, these drive our interests to examine whether the analyst earnings forecasts related to CSR-minded firms will be more optimistic than for non-CSR-minded firms.

In addition, CSR-minded firms deliver more transparent and reliable financial information to investors as compared to non-CSR-minded firms (Kim et al., 2012). Lang and Lundholm (1996) provide evidence that firms with more informative disclosure policies have a larger analyst following and more accurate analyst earnings forecasts. Thus, analysts may use the information contained in CSR disclosures to reduce their forecast errors. Therefore, the analyst forecast accuracy would be greater for CSR-minded firms.

As the best we know, only few studies (Dhaliwal et al., 2011 & 2012) are regarding to examine whether analysts incorporate CSR information into their forecasts accuracy. Dhaliwal et al. (2011, 2012) examine whether firms initially issuing (Dhaliwal et al., 2011) or the issuance of the stand-alone CSR reports (Dhaliwal et al., 2012) have a higher analyst forecast accuracy. However, in order to include firms which both initially issue CSR reports and have engaged in CSR activities for years, we use and focus on the KLD CSR score data to measure whether analyst forecast accuracy improves with CSR performance. Thus, our study would make a contribution to the literature by complementing Dhaliwal et al. (2011, 2012).

We find that analysts are more optimistic about firms doing more good things. This effect is non-linear; the optimism is most sensitive to CSR strength among the lowest CSR-strength

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firms, and least sensitive to CSR strength among the highest CSR-strength groups. In addition, both CSR strength and concern are negatively associated with the accuracy of analyst earnings forecast. Taking strength and concern together, the effect of the CSR score on forecast accuracy is insignificant. This implies that the CSR decisions are often accompanied with delayed and noisy feedback, and confirms in spirit the prior mixed relation between CSR performance and financial performance (e.g., Roman, Hayibor and Agle, 1999; Margolis and Walsh, 2001, 2003; Post, Preston and Sachs, 2002). Although analyst optimism endogenously leads to forecasting errors, CSR reduces forecast errors associated with analysts' optimism. This collaborates the inverse relation between CSR engagement and information asymmetry according to Cui et al. (2012).

Moreover, the overall CSR performance is negatively correlated with three-day buy and hold abnormal returns (BHAR) around earnings announcement day, and this effect is mainly due to CSR strength, instead of to concern. This is consistent with the argument of agency-theory (Barnea and Rubin, 2010). Because over-investment in CSR wastes valuable resources and adversely affects firm value, the over-investment explanation predicts a negative relation between CSR engagement and market reaction. However, investors are not completely unconcerned about corporate social responsibility. They make a balance between CSR and financial performance, and value firms that engage in moderate CSR investments and exhibit good financial performance.

The remainder of this paper is organized as follows. Section 2 reviews prior literature regarding the relation between analyst earnings forecast and CSR, market reaction and CSR, and presents the hypotheses. Section 3 offers the sample, variable definitions and research design. Section 4 presents the research output, including test results and further analyses. Section 5 summarizes the results and includes a conclusion.

II. Literature Review and Hypothesis Development

II.1 CSR and Analyst Forecast Optimism

There are several explanations regarding that analysts' earnings forecasts are generally found to be optimistic (Espahbodi et al., 2001; Qian, 2009). First, according to incentive-bias explanation, analysts tend to issue more optimistic forecasts to obtain more firm-specific information by gaining asscess to firm insiders (Das et al., 1998; Lim, 2001), or to get more businesses or commissions (Lin and McNichols, 1998; Michaely and Womack, 1999; Dechow et al., 2000). Second, based on cognitive-bias expalnations, analysts overreact to positive news and underreact to negative news. Analysts often act irrationally and make systematic mistakes as they process the information (Easterwood and Nutt, 1999). Besides, earnings skewness (Gu and Wu, 2003), investor sentiments (Bergman and Roychowdhury, 2008; Qian, 2009; Walther and Willies, 2013), and macroeconomic factors (Chopra, 1998) also influence the optimism of analyst forecasts.

We posit that analyst forecasts' optimism could be influenced by firms' CSR performance, since CSR information will be a helpful input in analyst' forecast process to the extent that CSR activities influence firm value (Dhaliwal et al., 2012). Prior literature shows that CSR builds customer loyalty and reputation among key stakeholders and thereby increases firm value (Servaes and Tamayo, 2013; Elfenbein et al., 2012); attract more qualified employees and enhance productivity (Waddock and Graves, 1997); leads to higher merger announcement returns and better post-merger performance (Deng et al., 2013); facilitates more effective corporate governance and higher firm value (Waddock and Graves, 1997; Blazovich and Smith, 2011; Jo and Harjoto, 2011, 2012). These lead analysts to hold more positive beliefs toward

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CSR-minded firms, and thereby drive analysts to issue more optimistic earnings forecasts. Therefore, we offer the following hypothesis:

Hypothesis 1a: Ceteris paribus, analyst earnings forecasts for CSR-minded firms are more likely to be optimistic than for non-CSR-minded firms.

However, there are costs associated with CSR engagement. Sprinkle and Maines (2010) show that CSR activities result in immediate cash outflows. Aupperle et al. (1985) document that socially responsible firms incur a competitive disadvantage because they are incurring costs that might otherwise be avoided. Moreover, according to agency theory, CSR is a misuse of firm resources that would be better invested on valued-added projects or a way that managers use to advance their careers or other personal agendas, but which may hurt shareholders' benefits (Friedman, 1970; Barnea and Rubin, 2010). Therefore, we offer the following alternative hypothesis:

Hypothesis 1b: Ceteris paribus, analyst earnings forecasts for non-CSR-minded firms are more likely to be optimistic than those for CSR-minded firms.

II.2 CSR and Analyst Forecast Error

Theoretically CSR investments may lead to better financial performance through various channels (Baron, 2007; Bénabou and Tirole, 2010). For example, better CSR-performing firms experience reducing regulatory, supply chain, product and technology risks (Starks, 2009), lower bank loan cost (Goss and Roberts, 2009), lower cost of equity capital (Dhaliwal et al., 2011), and reducing earnings management (Chih et al,, 2008; Kim et al., 2012). In addition, the disclosure of CSR reduces the information asymmetry between insiders and outsiders (Cho et al., 2013), discourages managerial self-dealings, and delivers more transparent and reliable financial information to the market (Kim et al., 2012). These suggest that investors can infer information regarding CSR activities to evaluate a firm value (Deloitte, 2003). Hence, the information contained in CSR activities would be helpful for analysts to improve their forecast accuracy.

Moreover, firms engaging in CSR activities can establish ties with key stakeholders and decrease the likelihood of negative regulatory, legislative or fiscal action (Freeman, 1984; Hillman and Keim, 2001). It may lead to better performance by protecting and enhancing corporate reputation (Fombrun and Shanley, 1990; Freeman et al., 2007). As a result, CSR investment could minimize the transaction cost with stakeholders, and thereby reducing uncertainty and variability of earnings for analysts to improve their forecast accuracy (Becchetti et al., 2013). Therefore, we present the following hypothesis:

Hypothesis 2a: Ceteris paribus, earnings forecast error is smaller for CSR-minded firms than for non-CSR-minded firms.

However, Barnea and Rubin (2010) propose the over-investment hypothesis and view CSR as a waste of valuable resources. Because over-investment may increase firm risk, which may make information environment more opaque, there will be negative relation between CSR expenditure and the accuracy of analyst earnings forecasting. Therefore, we propose an alternative hypothesis as follows:

Hypothesis 2b: Ceteris paribus, earnings forecast error is larger for CSR-minded firms than for non-CSR-minded firms.

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II.3 CSR Performance and Market Reaction

Recent studies indicate that CSR-related information has been broadly utilized by investors through all kinds of information resources (Cohen et al., 2011; Cho et al., 2013). For example, with respect to voluntary CSR disclosure, Jo and Kim (2008) point out that voluntary CSR disclosure will improve firm transparency and thereby reduce the information asymmetry between insiders and outsiders. CSR-minded firms have a higher propensity to disclose more information and deliver their positive image to investors and other stakeholders (Kim et al., 2012). In addition, CSR disclosure reduces the information asymmetry between the firm and investors (e.g. Chen et al., 2011; El Ghoul et al., 2011, Cui et al., 2012). Similar in spirit, El Ghoul et al. (2011) claim that information asymmetry is likely to be more severe for non-CSR-minded firms.

If CSR activities reduce information asymmetry, corporate managers would take CSR activities as a positive signal to enhance communication with shareholders and resolve conflicts among stakeholders (Cui et al., 2012). Subsequently, CSR activities lead firms to be more salient; thereby they will achieve more analysts following (Hong & Kacperczyk, 2009) and receive more favorable recommendations (Ioannou & Serafeim, 2010). As a result, firms with higher CSR performance would be the targets which the media or investors tend to follow. Hence, investors would show a greater willingness to hold CSR-minded stocks, as investors respond more to good earning news of CSR-minded firms, and less to bad earnings news of CSR-minded firms. The hypothesis is as follows:

Hypothesis 3a: Ceteris paribus, CSR-minded firms are associated with larger (smaller) responses to positive (negative) earnings news than are non-CSR-minded firms.

However, Borghesi et al. (2014) find that firms with greater institutional ownership are less likely to invest in CSR. This casts doubt on the argument that CSR investments are useful in promoting shareholder value. Furthermore, Barnea and Rubin (2010) highlight the potential agency problem that arises when managers over-invest in CSR to enhance their own private reputations. They have a tendency to do so at the expense of shareholders when they gain private benefits from a high CSR rating. If shareholders agree with the agency view and think that CSR helps managers build personal reputation but do not necessarily enhance shareholders' wealth, they would respond less to good earning news of CSR-minded firms, and more to bad earnings news of CSR-minded firms. Therefore, we construct the alternative hypothesis as follows:

Hypothesis 3b: Ceteris paribus, CSR-minded firms are associated with smaller (larger) responses to positive (negative) earnings news than are non-CSR-minded firms.

III. Research Design

III.1 Sample

The sample is based on all NYSE/AMEX/ NASDAQ common stocks on the Center for Research in Security Prices (CRSP) monthly data files. To define our proxy for CSR, we obtain data from the KLD Stats database constructed by KLD Research and Analytics, Inc. Because KLD began in 1991 and KLD variables are lagged variables in the empirical estimation, we employ the KLD data from 1992-2013.

We retrieve financial data from Compustat and analysts' earnings forecasts data from I/B/E/S. Following Hong et al. (2000), we exclude firms with a price less than $5. We also require the sample firms to be covered by the I/B/E/S analyst forecast data set. Announcements on

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weekends, or without full firm-characteristic information are deleted. We exclude the financial industry because of its different industry characteristics. To reduce dependence among the sample (Cowen et al., 2006) and avoid stale data, we only keep the most recent earnings forecast of each analyst for each firm in the computation. All variables are winsorized at 1% and 99% level.

III.2 CSR Score

The KLD database is currently the largest multi-criteria CSR database available in the market (Ioannou & Serafeim, 2010). KLD rates companies on a number of positive indicators (strengths) and negative indicators (concerns) in each non-exclusionary dimension, but evaluates only negative indicators in each exclusionary dimension. KLD STAT database contains seven major issue areas: community, corporate governance, diversity, employee relations, environment, human rights and product. For each issue area, KLD assigns a binary (0/1) rating to a set of concerns and strengths.

Following the approach of Deng et al. (2013), we construct an adjusted strength (concern) by dividing the strength (concern) scores by the respective number of strength (concern) indicators. In addition, we exclude corporate governance in our calculation of CSR score, since corporate governance is perceived as a different issue from CSR (Kim et al., 2012; Servaes and Tamayo, 2013).

Further, we calculate the industry-adjusted CSR score, since the CSR activities are quite different across industries. The industry-adjusted CSR score is defined as the difference between the CSR score and its corresponding industry median in that year and firms in the same 2-digit SIC industry code are classified as the same industry. Consequently, we obtain the industry adjusted strength, adjusted concern, and adjusted scores, denoted by INDSTR_t, INDCON_t, and INDCSR_t, respectively.

III.3 Measure of Earnings Forecast Optimism and Forecast Error

We follow the approach of Cowen et al. (2006) to measure analyst optimism as follows:

$$\mathrm{RFOPT}_{i,j,t} = \frac{\mathrm{Forecast}_{i,j,t} - \mathrm{Mean}(\mathrm{Forecast}_{i,j,t})}{\mathrm{Std}(\mathrm{Forecast}_{i,j,t})} \quad (1)$$

where $\mathrm{Forecast}_{i,j,t}$ denotes the earnings forecast for firm j by analyst i during quarter t. $\mathrm{Mean}(\mathrm{Forecast}_{i,j,t})$ and $\mathrm{Std}(\mathrm{Forecast}_{i,j,t})$ are the average and standard deviation of the earnings forecast for firm j by analyst i during quarter t, respectively.

In order to measure how far a forecast is from actual realized earnings, we employ a measure of absolute forecast error used by many prior studies (e.g. Gu and Wu, 2003; Dhaliwal et al., 2011; Becchetti et al., 2013). The measure is defined as follows:

$$\mathrm{FE}_{i,j,t} = \left| \frac{\mathrm{Forecast}_{i,j,t} - \mathrm{Actual}_{j,t}}{\mathrm{Price}_{j,t-1}} \right| \quad (2)$$

where $\mathrm{Forecast}_{i,j,t}$ denotes the earnings forecast for firm j by analyst i during quarter t. $\mathrm{Actual}_{j,t}$ denotes the quarterly actual earnings released for firm j during quarter t. $\mathrm{Price}_{j,t-1}$ denotes the stock price for firm j at the end of quarter t-1.

III.4. Earnings Surprises

We use Standardized Unexpected Earnings (SUE) (Livnat & Mendenhall, 2006) to measure earnings surprises. Following Hirshleifer et al. (2011) and Huang et al. (2013), we measure

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unexpected earnings as follows:

$$SUE_{i,j,t} = \frac{Actual_{i,j,t} - Median(Forecast_{i,j,t})}{Price_{i,j,t-1}} \quad (3)$$

where $Forecast_{i,j,t}$ denotes the earnings forecast for firm j by analyst i during quarter t. $Actual_{j,t}$ denotes the actual earnings released for firm j during quarter t. $Price_{j,t-1}$ denotes the stock price for firm j at the end of quarter t-1.

III.5. Buy-and-Hold Abnormal Returns

We use buy and hold abnormal returns (BHAR) to measure performance. In order to measure the buy-and-hold abnormal returns, we employ the reference portfolio approach to generate benchmark portfolio returns. In particular, the event firm is matched according to its industry, size and market-to-book. There are 108 reference portfolios formed by industry, size and market-to-book groups, based on Fama and French classification process. Portfolios are formed in June for each year. The equally-weighted portfolio return is calculated for its benchmark portfolio. For each benchmark portfolio, size is computed as market capitalization at the end of June. The book-value used is from the financial statements for year *t*-1 to allow for delay in the publication of annual financial statement (Barber & Lyon, 1997).

For each event firm *j,* we measure the buy-and-hold abnormal return ($BHAR_{j,T}$) as the buy-and-hold return difference between the firm and the corresponding reference portfolio p. The method is as follows:

$$BHAR_{j,T} = \prod_{t=1}^{T}(1 + R_{j,t}) - \prod_{t=1}^{T}(1 + R_{p,t}) \quad (4)$$

where *T* is the holding period in days. $R_{j,t}$ is stock return for firm j at time t, and $R_{p,t}$ is the stock return for the corresponding reference portfolio p at time t. We use BHAR(-1,+1) to measure the market immediate response, which is three days around the earnings announcement.

III.6 Method

3.6.1 Analyst Forecast Optimism

To test how CSR affects analysts' forecast optimism, we run the following regression model.

$$RFOPT_{i,j,t} = \alpha_0 + \alpha_1 INDCSR_{j,t-1} + \alpha_2 HORIZON_{i,j,t} + \alpha_3 GEXP_{i,j,t-1} + \alpha_4 FEXP_{i,j,t-1} + \alpha_5 SIZE_{j,t-1} + \alpha_6 VAREARN_{j,t-1} + YearFixedEffects_t \quad (5)$$

In this equation, RFOPT and INDCSR are the main variables. We also include several factors which were identified related to analyst forecast optimism in the prior research as control variables: forecast horizon (HORIZON) (Cowen et al., 2006), firm size (SIZE) (Lim, 2001; Gu and Wu, 2003), variance of earnings (VAREARN) (Lim, 2001), analysts' general experience (GEXP)(Lim, 2001; Cowen et al., 2006), and analysts' firm-specific experience (FEXP)(Mikhail et al., 2003). Horizon is measured as the number of days between the issue of forecast and the earnings announcement. GEXP is the analyst's general experience, calculated as the number of quarters to date since the analyst has issued an earnings forecast in I/B/E/S. FEXP is defined as the number of quarters that an analyst has followed a firm. SIZE is measured in terms of the number of shares outstanding multiplied by the closing stock price at the end of prior quarter (in billions of dollars). VAREARN is the standard deviation of earnings per share. We use the year fixed effect to control for the macro-economic factors which carry similar impacts across all industries. Since we have used the 2-digit SIC code to derive the adjusted CSR score, the industry fixed effect is not presented as a control variable in the

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equations (5) to (11). Following Petersen (2009), we cluster by firms when calculating the robust standard errors for equations (5) to (11).

III.6.2 Analyst Forecast Errors

We use the following regression to examine how CSR affects analysts' forecast accuracy.

$$\begin{aligned} FE_{i,j,t} = {} & \alpha_0 + \alpha_1 INDCSR_{j,t-1} + \alpha_2 HORIZON_{i,j,t} + \alpha_3 GEXP_{i,j,t-1} + \alpha_4 FEXP_{i,j,t-1} \\ & + \alpha_5 FE_{j,t-1} + \alpha_6 VAREARN_{j,t-1} + \alpha_7 LOSS_{j,t-1} + \alpha_8 SIZE_{j,t-1} \\ & + \alpha_9 FFIN_{j,t-1} + \alpha_{10} STDROE_{j,t-1} + \alpha_{11} ROA_{j,t-1} + \alpha_{12} INST_{j,t-1} \\ & + \alpha_{13} MB_{i,j,t-1} + \alpha_{14} FOLL_{j,t-1} \\ & + YearFixedEffects_t \end{aligned} \quad (6)$$

The control variables in Equation (6) include analyst, earnings, and firm characteristics. The variables of analyst characteristics on forecast bias include: Forecast horizon (HORIZON) (Clement, 1999; Dhaliwal et al., 2012), analyst general experience (GEXP) (Clement, 1999), analysts' firm-specific forecasting experience (FEXP) (Mikhail et al. ,1997; Clement, 1999), and analysts' prior forecast error (FE) (Abarbanell and Bernard 1992; ; Mikhail et al. 2003). The variables of earnings characteristics on forecast errors include: the volatility of earnings (VAREARN) (Dichev and Tang, 2009; Dhaliwal et al., 2012) and firm earnings losses (LOSS) (Brown, 2001; Dhaliwal et al., 2012). The variables of firm characteristics on forecasting bias include: firm size (SIZE) (Atiase, 1985), analyst following (FOLL) (Lys and Soo, 1995; Dhaliwal et al., 2012), financial opaqueness (FFIN) (Bhttacharya et al., 2003; Defond and Hung, 2003; Dhaliwal et al., 2012), ROA (Dhaliwal et al., 2011) and STDROE (Bhushan, 1989), M/B(Frankel and Lee, 1998), and institutional ownership (INST) (Ljungqvist et al., 2007). LOSS is an indicator variable that equals 1, if the firm reports negative earnings in the previous quarter. FFIN is the scaled accruals calculated as the absolute value of a firm's scaled accruals averaged over the past three years of each firm. STDROE is the standard deviation of ROE. ROA is total return on assets at the beginning of each year. INST is the total percentage of institutional ownership of the company at the end of the quarter immediately preceding the forecast. MB is the ratio of market value to book value at the end of prior year. FOLL is the number of analyst following. Other variables are defined in equation (5).

III.6.3 Market Reaction

To test how CSR affects the market as the earnings news is released, we run the following regression model.

$$\begin{aligned} BHAR(-1,+1)_{i,j,t} = {} & \alpha_0 + \alpha_1 INDCSR_{j,t-1} + \alpha_2 SUE_{i,j,t} + \alpha_3 SUE_{i,j,t} \times INDCSR_{j,t-1} \\ & + \alpha_4 SIZE_{j,t-1} + \alpha_5 INST_{j,t-1} + \alpha_6 MB_{j,t-1} + \alpha_7 IVOL_{j,t-1} \\ & + \alpha_8 FOLL_{j,t-1} + YearFixedEffects_t \end{aligned} \quad (7)$$

Since there are several variables known to influence investors' response to earnings surprise (SUE), we include the following control variables: log of market capitalization of equity (SIZE) (Hong et al., 2000; Qin et al., 2014), market to book ratio (MB) (Hirshleifer, Lim and Teoh, 2009), shares of institutional ownership (INST) (Campbell et al., 2009; Bartov et al., 2000), idiosyncratic return volatility (IVOL) (Mendenhall, 2004; Demers & Vega, 2010) and analyst following (FOLL) (Bhushan, 1989; Hong et al., 2000). IVOL is the residual variance measured from a market model of the daily stock returns on the market return for the 250 days ending 21 days before the earnings release. Furthermore, we separate earnings surprises into positive and negative to examine if there is an asymmetric effect. Hence, we run the following regression

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model.

$$BHAR(-1,+1)_{i,j,t} = \alpha_0 + \alpha_1 INDCSR_{j,t-1} + \alpha_2 PSUE_{i,j,t} + \alpha_3 PSUE_{i,j,t} \times INDCSR_{j,t-1} + \alpha_4 NSUE_{i,j,t} + \alpha_5 NSUE_{i,j,t} \times INDCSR_{j,t-1} + \alpha_6 Size_{j,t-1} + \alpha_7 INST_{j,t-1} + \alpha_8 MB_{i,j,t-1} + \alpha_9 IVOL_{j,t-1} + \alpha_{10} FOLL_{j,t-1} + YearFixedEffects_t \quad (8)$$

PSUE is defined as positive earnings news. NSUE is defined as the negative earnings news. Other variables are as defined in Equations (5) and (6).

III.6.4 Piece-wise Regression

In light that a firm's CSR measurement is multi-dimensional and complex, and the effects of CSR on firm financial performance are also inclusive. The earnings forecast optimism, accuracy and buy-and-hold abnormal returns may be non-monotonic with the CSR evolvement. To investigate this issue, we first use equation (5) and then we run a nonlinear regression according to the framework proposed by Sirri and Tufano (1998) for further tests. Each year, we measure each firm's industry-adjusted CSR ranking relative to other firms, and assign each firm a rank ranging from 0 (poorest CSR performance) to 1 (best CSR performance). We structure the analysis using piecewise linear regression, which allows us to examine whether the sensitivity of earnings forecast optimism, accuracy, and market reaction vary with CSR performance quintiles, respectively.

A firm's fractional rank (Rank) ranges from 0 to 1, defined as a firm's percentile CSR performance relative to other firms in the same period. The bottom CSR performance quintile ($LOWCSR_{t-1}$) is classified as $Min(Rank_{t-1}, 0.2)$, the 4th CSR performance quintile is classified as $Min(0.2, Rank_{t-1}-LOWCSR_{t-1})$, and so on, continuing to the highest CSR performance quintile (HIGHCSR). The middle three performance quintiles are bound together as one group, which is labeled as the 2nd-4th CSR performance quintile (MIDCSR), classified as Min (0.6, Rank – LOWCSR). Therefore, we use LOWCSR, MIDCSR, and HIGHCSR to substitute CSR to measure the nonlinear effect in equations (5), (6), and (7).

$$RFOPT_{i,j,t} = \alpha_0 + \alpha_1 LOWCSR_{j,t-1} + \alpha_2 MIDPCSR_{j,t-1} + \alpha_3 HIGHCSR_{j,t-1} + \alpha_4 HORIZON_{i,j,t} + \alpha_5 GEXP_{i,j,t-1} + \alpha_6 FEXP_{i,j,t-1} + \alpha_7 SIZE_{j,t-1} + \alpha_8 VAREARN_{j,t-1} + YearFixedEffects_t \quad (9)$$

$$FE_{i,j,t} = \alpha_0 + \alpha_1 LOWCSR_{j,t-1} + \alpha_2 MIDCSR_{j,t-1} + \alpha_3 HIGHCSR_{j,t-1} + \alpha_4 HORIZON_{i,j,t} + \alpha_5 GEXP_{i,j,t} + \alpha_6 FEXP_{i,j,t} + \alpha_7 FE_{j,t-1} + \alpha_8 VAREARN_{j,t-1} + \alpha_9 LOSS_{j,t-1} + \alpha_{10} SIZE_{j,t-1} + \alpha_{11} FFIN_{j,t-1} + \alpha_{12} STDROE_{j,t-1} + \alpha_{13} ROA_{j,t-1} + \alpha_{14} INST_{j,t-1} + \alpha_{15} MB_{j,t-1} + \alpha_{16} FOLL_{j,t-1} + YearFixedEffects_t \quad (10)$$

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$$\begin{aligned}&\mathrm{BHAR}(-1,+1)_{i,j,t}\\&=\ \alpha_0+\alpha_1\mathrm{LOWCSR}_{j,t-1}+\alpha_2\mathrm{MIDCSR}_{j,t-1}+\alpha_3\mathrm{HIGHCSR}_{j,t-1}+\alpha_4\mathrm{SUE}_{i,j,t}\\&+\alpha_5\mathrm{SUE}_{i,j,t}\times\mathrm{LOWCSR}_{j,t-1}+\alpha_6\mathrm{SUE}_{i,j,t}\times\mathrm{MIDCSR}_{j,t-1}+\alpha_7\mathrm{SUE}_{i,j,t}\times\mathrm{HIGHCSR}_{j,t-1}\\&+\alpha_8\mathrm{Size}_{j,t-1}+\alpha_9\mathrm{INST}_{j,t-1}+\alpha_{10}\,\mathrm{MB}_{j,t-1}+\alpha_{11}\,\mathrm{IVOL}_{j,t-1}+\alpha_{12}\,\mathrm{FOLL}_{j,t-1}\\&+\mathrm{YearFixedEffects}_t\end{aligned}\qquad(11)$$

IV. Empirical Results

IV.1 Basic statistics summary and correlation

Table 1 shows summary statistics for all variables. We find that the mean relative forecast optimism is 0.004, and the standard deviation is 0.904. This indicates that, on average, analyst earnings forecast is neutral, but that individual forecasts are quite different. Also, it indicates that analysts usually issue optimistic earnings forecasts rather than pessimistic ones. The mean forecast error is 0.003, which is larger than zero. The mean forecast horizon is about 68 days and the median forecast horizon is 83 days.

Refer Table 1

The coefficients between each two of the variables in Table 2 are almost smaller than 0.5. Specially, the coefficient of firm size (SIZE) and analyst following (FOLL) is 0.657, leading to a collinear problem. In addition, prior research presents that analyst following is very strongly correlated to firm size (Bhushan, 1989; Hong et al., 2000). Hence, we control the influence of size on analyst following by regressing $\log(1+\mathrm{FOLL})$ on the log of firm size every year to obtain the residual analyst following (RES_CNT). We then run Equations (5) to (11) with the variable analyst following (FOLL) replaced by the residual analyst following (RES_CNT).

Refer Table 2

IV.2 CSR Performance and Analyst Forecast Optimism

Table 3 reports the estimates of CSR on analyst earnings forecast optimism. The CSR score in the first column is not significant. Given this finding, we wonder if this result stems from the offsetting of CSR strength and CSR concern. To answer this question, we separately report the coefficient of CSR strength and concern. As shown, the coefficient of the CSR strength is significant, while the coefficient of the CSR concern is insignificantly negative. This reveals that analyst earnings forecast optimism mainly attributes to the CSR strength, rather than the CSR concern. It indicates that analysts value CSR activities, and pay more attention to how many good things they have done when issuing earnings forecasts.

To the extent that relation between earnings forecast optimism and CSR performance might be nonlinear, we conduct a piece-wise regression proposed by Sirri and Tufano (1998) to make a robust test. The result in the third column of Table 3 indicates that the coefficients insignificantly differ from zero for all CSR score groups. It suggests that analysts can't assess the firms only by their CSR performance. Therefore, to get further insight, we decompose the effects of CSR strengths and concerns into three groups. The result in the fourth column of Table 3 presents that the coefficients of CSR strength are all significantly positive at the 5% confidence level. This confirms that analysts are more optimistic for firms that do more good things. This reveals that, although there is a tradeoff between private profits and public

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interests, analysts think the benefits of CSR would dominate its associated costs.

However, a close look reveals that when CSR strength is relatively moderate, it has a greater and positive effect on firm value by engaging in more CSR activities, but the marginal effect of an additional dollar of CSR expenditure increases shareholders wealth with a decreasing rate for firms with a higher level of strength performance (0.6188>0.1480>0.1166). To the extent that a lower CSR firm would have more marginal benefits over marginal costs from the adoption of CSR, such as increasing productivity of employees (Barnea and Rubin, 2005), the above results seem to be reasonable.

The high CSR concern of a firm might indicate its exposure to non-sustainability risk, like environmental risk, product and commercial-practices risks, or risk associated with workplace quality of life (Boutin-Dufresne and Savaria, 2004). A high-concern firm could also relate to litigation risk, investor distrust and other intangible disadvantages (Becchetti and Ciciretti, 2007; Derwall and Verwijmeren, 2007). These might influence firms' financial performance, and analysts are thus less prone to issue optimistic earnings forecasts for firms in the top CSR-concern quintile (HIGHCSR_C). However, the coefficients of the three CSR-concern groups are all insignificant. This suggests that the CSR is not relevant to analyst forecast optimism. In sum, strength, instead of concern, is the key factor that drives analysts to have optimistic earnings forecasts for CSR-minded firms. Moreover, although the coefficient of CSR is not significant, that of CSR strength is significant. The regression analyses support the notion that analyst are more likely to issue optimistic earnings forecasts for firms doing more good things, partially supporting Hypothesis 1a.

Refer Table 3

IV.3 CSR Performance and Analyst Earnings Forecast Accuracy

Table 4 reports the regression result for the effects of CSR on the forecasting error (FE). The coefficient of CSR score is insignificant, presenting that the overall CSR performance has no impact on the forecasting error. When decomposing the CSR scores into strength and concern, only the coefficient of the CSR strength is significantly positive. It reveals that CSR strength, instead of CSR concern, influences the accuracy of the analyst earnings forecast. Consistent with the linear results in Column 1, the result from the piece-wise regression reveals that the coefficients of three different CSR levels are all insignificant. That is, the overall CSR performance does not influence the analyst forecast accuracy, irrespective of the level at which a firm engages in CSR investments.

In light that a firm might do good and bad things at the same time, thereby cancelling each other out, we decompose the CSR strengths and concerns individually into three groups. From the fourth column of Table 4, only the coefficient of the CSR concerns is negative and marginally significant in the bottom quintile group; the coefficients of the CSR strength are significantly positive at the 5% and 1% confidence level for the middle and top quintile groups, respectively. This implies that analyst forecast errors will be higher for firms doing more good things, which partially supports hypothesis 2b. Consistent spiritually with prior conclusions regarding the effects of CSR on financial performance (i.e. Margolis and Walsh, 2003; Schuler and Cording, 2006), this implies that performance associated with CSR investment is difficult to measure and it will be more difficult for analysts for make accurate forecasts.

Refer Table 4

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IV.4 The Endogeneity Issue

To the extent that CSR-minded firms are associated with both greater optimism and forecast errors, our interest is to examine whether the higher earnings forecast error of CSR-minded firms is due to the greater optimism of analyst earnings forecast with respect to the CSR-minded firms. Note that forecast optimism and forecast accuracy usually accompany each other. Therefore, there is a potential endogeneity problem regarding analyst forecast optimism on analyst forecast accuracy. In order to avoid the endogenous problem, we estimate the models of analyst forecast errors using the two stage least squares (2SLS).

In the first stage of the two stage least squares (2SLS), we use two variables (Horizon and FEXP) which are significant in explaining forecasting optimism in Table 3 as the instrument variables to derive the estimated optimism ($\widehat{RFOPT}$). In the second stage, we replace the optimism with the estimated optimism to run the regression.

Column 1 of Table 5 reveals that these two instrument variables (Horizon and FEXP) are positively correlated to analysts' forecasting optimism. Columns 2 and 3 of Table 5 report the results of the second stage regression. As shown in column 2, the coefficient of the overall CSR score is insignificant, indicating that CSR does not influence analyst forecast error. However, the coefficients of $\widehat{RFOPT}$ are significant at the 1% confidence level. This reveals that, on average, the earnings forecast error is positively correlated to the optimism of analyst earnings forecast. This is consistent with the results of Cowen et al. (2006) and Hong and Kubik (2003). The significant coefficient of $INDCSR * \widehat{RFOPT}$ reveals that a higher CSR score firm would reduce the forecast error associated with the optimism of analyst earnings forecast.

In column 3, we further report whether the influence is from CSR strength or CSR concern. We find that both CSR strength and concern are positively correlated to analyst forecast errors. These, to some degree, imply that both socially responsible and irresponsible activities bring ambiguity to firms' profitability and lead to greater analysts' forecasting errors. The result supports Hypothesis 2b. Moreover, the coefficient of the interaction of CSR strength and optimism ($INDSTR * \widehat{RFOPT}$) is negatively significant at the 5% confidence level, while the interaction of CSR concern and optimism($INDCON * \widehat{RFOPT}$) is positively significant at the 1% confidence level. The result suggests that" doing good things" reduce the forecasting errors associated with analyst optimism, but "doing bad things" deteriorates the forecasting accuracy when analysts are optimistic about these firms.

Refer Table 5

IV.5 CSR Performance and Market Reaction

Table 6 presents the relation between CSR and the market immediate response (BHAR(-1,+1)). In the first column, we find that the coefficient of CSR is significantly negative, indicating that firms which engage in CSR activities are negatively associated with subsequent BHAR(-1,+1). However, the positive and significant coefficient of earnings surprises reveals that investors exhibit positive immediate reactions to positive earnings news. The interaction of CSR and earnings surprises is marginally significant at the 10% confidence level. It suggests that the market takes CSR as a positive image only when the firms release positive earnings news.

We take a further step and decompose the CSR score into strength and concern. The results in the second column present that, although investors respond negatively to high CSR strength, investors would value a firm that has done many good things if this firm is accompanied with good earnings news. In the third column, we add the piece-wise analysis for CSR. The result

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shows that only the coefficient of the top CSR performance is negative and significant at the 5% confidence level. It implies that investors regard CSR as costly if the firms engaged too much in CSR activities; this is consistent with the implication of the agency theory. However, the interaction of CSR and earnings surprises is positive and significant at the middle group. In other words, a moderate level of CSR engagement of firms with positive earnings would lead to positive reactions. This suggests that investors balance between the potential benefits and costs associated with CSR investments.

We make a further analysis by separating CSR score into CSR strength (LOWCSR_S, MIDCSR_S, HIGHCSR_S) and CSR concern (LOWCSR_C, MIDCRS_C, HIGHCSR_C). The result in column 4 shows that the coefficients are negatively significant at the high CSR strength performance group. It indicates that firms doing too many good things have negative influences on the buy-and-hold abnormal returns upon earnings announcements. The result is consistent with that in column 3, and confirms prior finding that the CSR effects mainly come from CSR strength, instead of CSR concern.

Refer Table 6

With respect to stock return and earnings surprises, prior studies address that there is a larger stock price reaction in absolute value to bad news earnings surprises compared to good news earnings surprises of a comparable magnitude (Skinner and Sloan, 2002; Bartov et al., 2002). Skinner and Sloan (2002) offer evidence to support that there is an asymmetric price reaction to positive and negative earnings news. In particular, larger price changes result from negative unexpected earnings than those induced by positive ones, given the same level of unexpected earnings. This asymmetry can be explained by the negativity effect in psychology. Because negative phenomena tend to attract more attention (Fiske, 1980), the negativity effect predicts that bad news (NSUE) has a greater impact on prices than any positive effect induced by a similar volume of good news (PSUE).

In order to examine whether there are different impacts from positive earnings surprises (PSUE) and negative earnings surprises (NSUE), we further divide earnings surprises into these two items and run a regression. If SUE $\geq$ 0, PSUE=SUE, otherwise, PSUE=0. On the contrary, if SUE < 0, NSUE=SUE; otherwise, NSUE=0.

From the first column of Table 7, the positive and significant coefficient of PSUE indicates that a better earnings surprise is associated with higher buy-and-hold returns. Likewise, the positive coefficient of NSUE implies a lower buy-and-hold return for worse earnings news. Interestingly, the coefficients of CSR and the interaction of CSR and PSUE are not significant, but the interaction of CSR and NSUE is significant at the 5% confidence level. This indicates that market reaction is negative for CSR-minded firms to release negative earnings. It suggests that the firm with negative earnings surprises represents a lower ability to engage in CSR activities therefore the market reaction is negative. Moreover, negative earnings surprises are more salient to the market investors. Therefore, investors will engage in greater scrutiny to CSR investment as firms release negative earnings surprises. This is consistent with the prior research (Skinner & Sloan, 2002; Bartov et al., 2002). From the result in column 2, the interaction coefficient of INDSTR $*$ NSUE are significantly positive, which indicates that investors are more concerned about how many investments firms make in doing good things when they do not perform well. In particular, the market does not value these worse-performing, but CSR-involved firms.

The results from piece-wise regression in columns 3 and 4 further confirm our prior results.

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Specifically, only the coefficients of MIDCSR*NSUE and HIGHPERF*NSUE are significant and positive. In other words, only worse-performing firms that make too much CSR investments receives negative reactions from the investors. Moreover, the coefficient of HIGHCSR_S*NSUE is marginally positive. Since there are costs associated with CSR activities, too much spending in doing good things for worse-performing firms might largely hurt the shareholders; this could induce investors to react negatively to bad-performing firms with high CSR strength.

Refer Table 7

In sum, both CSR score and CSR strength are negatively associated with BHAR. Moreover, there is a negative influence on the market when firms do more good things but release negative earnings. These results partially support Hypothesis 3b.

V. Conclusion

In this paper, we examine the relations among CSR, analyst earnings forecast optimism, forecast error and market reactions to earnings news. We find that analysts are more optimistic about firms doing more good things. Furthermore, this effect is non-linear. The low CSR-performing firms have the strongest sensitivity of analyst optimism, the middle CSR-performing group ranks second, and the high CSR-performing firms are least sensitive. Regarding the CSR influence on the analyst earnings forecast error, the CSR strength, instead of the CSR concern, is negatively associated with the accuracy of the analyst earnings forecast. Furthermore, socially responsible firms incur a competitive disadvantage (Aupperle et al., 1985) because they incur costs that might otherwise be avoided. According to this line of reasoning, the costs to socially responsible behavior might dominate the corresponding economic benefits. The mixed relationship between social and financial performance confirms unclear results from CSR investments. Therefore, greater CSR investment might be associated with more complexity in predicting their financial performance. Thus, the forecasting errors are pronounced for firms with the middle and top CSR strength performance.

We considered an endogeneity problem between optimism and forecast error, and ran two-stage least squares to get further insights. The result indicates that not only CSR itself, but also analysts with more optimistic prospects, have more negative effects on forecast accuracy. On average, both CSR strength and concern positively influence analyst forecast errors. This implies that both socially responsible and irresponsible activities add ambiguity to firms' profitability and thereby lead to greater analysts' forecasting errors. Analysts' forecast errors would be smaller if analysts were more optimistic about firms which do good things. On the other hand, their forecasting errors would be larger if analysts are more optimistic about firms which do bad things.

The overall CSR performance influences market immediate reaction earnings surprises. Both CSR score and CSR strength are negatively associated with BHAR, which is consistent with the prediction of the agency theory, namely that investors view CSR as a waste of corporate resources. However, investors are not completely unconcerned about corporate social responsibility. They make a balance between CSR and financial performance, and value firms that engage in moderate CSR investments and exhibit good financial performance. In contrast, the market reacts negatively to CSR-minded firms that release negative earnings news. This result is specifically prevalent for top and mid CSR-minded firms. This implies that the firms with negative earnings surprises have low ability to engage in CSR activities. Moreover, because the marginal effect of an additional dollar of CSR expenditure decreases shareholders'

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wealth at some relatively higher CSR levels (Barnea and Rubin, 2010), investors might not prefer a firm which is overly devoted to CSR activities. In other words, while other stakeholders may benefit from higher CSR performance, shareholders may disagree with a higher CSR expenditure if the firm cannot offer good earnings news.

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Table 1 Summary Statistics

This table provides descriptive statistics for the all sample. BHAR (-1,+1) is the buy-and–hold abnormal returns over the window period between one day before and one day after the earnings announcement. RFOPT is the relative earnings forecast optimism. FE is the analyst forecast error. The industry-adjusted CSR score, industry-adjusted CSR strength, and industry-adjusted CSR concern are denoted by INDCSR, INDSTR, and INDCON, respectively. SUE is the standardized unexpected earnings. HORIZON is the number of days between the issue of forecast and the earnings announcement. GEXP is the analyst's general experience (in quarters), calculated as the number of quarters to date since the analyst has issued an earnings forecast in I/B/E/S.. FEXP is the analyst's experience for a specific firm (in quarters). SIZE is measured in terms of the number of shares outstanding multiplied by the closing stock price (in billions of dollars).VAREARN is the standard deviation of earnings per share. LOSS is an indicator variable that equals 1 if the firm reports negative earnings in the previous quarter, and 0 otherwise. FFIN is the scaled accruals, calculated as the absolute value of a firm's scaled accruals averaged over the past three years of each firm. $FFIN_{j,t} = \frac{(\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta CASH_{j,t} + \Delta STD_{j,t} - DEP_{j,t} + \Delta TP_{j,t})}{TA_{j,t-1}}$,where CA is current assets, CL is current liabilities, CASH is cash, STD is current portion of long-term debt, DEP is depreciation and amortization expense, TP is income taxes payable, and TA is total assets. STDROE is the standard deviation of ROE. ROA is total return on assets. MB is the ratio of market value to book value. INST is the total percentage of institutional ownership of the company. IVOL is the residual variance from a market model regression of the stock's daily returns on those of the market return for the 250 days ending 20 days prior to the earnings announcement. FOLL is the number of analyst following. N is the number of observations. Stdev is the standard deviation.

Variable	N	Mean	Stdev	Q1	Median	Q3	Min	Max
BHAR(-1,+1)	15562	0.005	0.066	-0.033	0.003	0.042	-0.208	0.260
RFOPT	15562	0.004	0.904	-0.664	0.000	0.674	-2.121	2.417
FE	15562	0.003	0.007	0.000	0.001	0.003	0.000	0.190
INDCSR	15562	0.134	0.566	-0.149	0.013	0.333	-2.348	3.917
INDSTR	15562	0.260	0.535	0.000	0.018	0.375	-0.500	4.300
INDCON	15562	0.065	0.404	-0.200	0.000	0.200	-1.083	3.583
SUE	15562	0.001	0.006	0.000	0.000	0.002	-0.160	0.053
HORIZON	15562	67.637	32.043	41.000	83.000	90.000	0.000	278.000
GEXP	15562	58.652	24.396	41.000	57.000	75.000	0.000	115.000
FEXP	15562	24.619	19.043	9.000	20.000	37.000	0.000	69.000
SIZE	15562	14.765	1.560	13.549	14.699	15.929	10.552	18.017
VAREARN	15562	0.150	0.228	0.051	0.092	0.172	0.003	6.309
LOSS	15562	0.080	0.272	0.000	0.000	0.000	0.000	1.000
FFIN	15562	-0.028	0.133	-0.064	-0.036	-0.003	-3.873	2.882
STDROE	15562	0.348	1.953	0.043	0.078	0.144	0.003	40.202
ROA	15562	0.106	0.096	0.061	0.107	0.157	-1.062	0.394
MB	15562	3.748	3.819	1.812	2.756	4.138	0.142	57.216
INST	15562	0.733	0.165	0.635	0.760	0.859	0.060	1.000
IVOL	15562	0.131	0.145	0.048	0.090	0.164	0.006	7.799
FOLL	15562	42.131	27.884	21.000	35.000	58.000	2.000	152.000

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Table 2 Correlations (Pearson\Spearman)

The Pearson (Spearman) correlations are below the diagonal. All variables are defined in Table 1. Correlation coefficients in bold indicate that the correlation is statistically significant at least 10 percent level, respectively.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	**BHIR(-1,+1)**	1																			
2	**RFOPT**	-0.008	1																		
3	**FE**	**0.030**	**-0.041**	1																	
4	**INDCSR**	**-0.018**	0.012	**-0.041**	1																
5	**INDSTR**	**-0.024**	**0.019**	**-0.053**	**0.727**	1															
6	**INDCON**	-0.008	0.009	**-0.015**	**-0.435**	**0.276**	1														
7	**SUE**	**0.205**	-0.005	**-0.316**	0.000	**0.014**	**0.016**	1													
8	**HORIZON**	0.003	**0.017**	**0.033**	0.006	**-0.045**	**-0.087**	**0.014**	1												
9	**GEXP**	0.003	0.008	0.011	**0.113**	**0.242**	**0.121**	**0.016**	**0.023**	1											
10	**EXP**	-0.001	**0.022**	**-0.034**	**0.127**	**0.298**	**0.210**	**0.015**	**-0.085**	**0.375**	1										
11	**SIZE**	-0.011	**0.016**	**-0.236**	**0.260**	**0.517**	**0.341**	0.009	**-0.113**	**0.222**	**0.370**	1									
12	**VAREARN**	-0.010	**-0.019**	**0.196**	**-0.025**	**0.044**	**0.086**	0.008	**-0.033**	**0.113**	**0.061**	**-0.017**	1								
13	**LOSS**	0.000	0.001	**0.280**	**-0.050**	**-0.087**	**-0.044**	**-0.048**	0.011	**-0.035**	**-0.069**	**-0.249**	**0.184**	1							
14	**FFIN**	-0.005	-0.004	**0.014**	-0.004	**-0.029**	**-0.029**	-0.005	**0.020**	**-0.033**	**-0.045**	**-0.020**	**-0.018**	**0.017**	1						
15	**STDROE**	0.002	0.004	**0.082**	-0.011	0.009	**0.026**	**0.053**	**0.025**	0.003	-0.002	**-0.029**	**0.039**	**0.050**	**0.045**	1					
16	**ROA**	0.011	-0.012	**-0.249**	**0.109**	**0.101**	-0.011	**-0.020**	**-0.044**	**0.065**	**0.103**	**0.322**	**-0.097**	**-0.432**	**0.058**	**-0.046**	1				
17	**MB**	0.006	0.007	**-0.104**	**0.082**	**0.091**	**0.016**	-0.001	0.011	0.008	**0.045**	**0.272**	**-0.064**	**-0.075**	**0.021**	**0.099**	**0.285**	1			
18	**INST**	**0.019**	0.007	0.002	0.009	**-0.083**	**-0.157**	**0.029**	**0.085**	**0.184**	**-0.024**	**-0.084**	**0.067**	**-0.013**	0.006	0.002	**-0.061**	**-0.093**	1		
19	**IVOL**	-0.006	0.003	**0.266**	**-0.114**	**-0.209**	**-0.100**	**-0.017**	**0.029**	**-0.113**	**-0.189**	**-0.363**	**0.101**	**0.294**	**0.056**	**0.081**	**-0.258**	**-0.027**	**-0.072**	1	
20	**FOLL**	-0.002	-0.004	**-0.085**	**0.287**	**0.419**	**0.154**	**0.019**	**-0.069**	**0.252**	**0.232**	**0.657**	-0.001	**-0.080**	**0.015**	0.004	**0.172**	**0.153**	0.000	**-0.107**	1

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Table 3 Relation between Relative Earnings Forecast Optimism and CSR Performance

INDCSR, INDSTR, and INDCON represent the industry-adjusted CSR score, industry-adjusted CSR strength, and industry-adjusted CSR concern, respectively. A firm's fractional rank (Rank) represents its percentile CSR performance relative to other firms in the same period, and ranges from 0 to 1. LOWCSR, MIDCSR, and HIGHCSR indicate the bottom, the middle quintiles, and the top overall CSR performance quintile, respectively. LOWCSR_S (LOWCSR_C), MIDCSR_S (MIDCSR_C), and HIGHCSR_S (HIGHCSR_C) indicate the bottom, the middle quintiles, and the top CSR strength (concern) performance quintile, respectively. Other variables are defined in Table1. t-statistics are shown in parentheses. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Independent Variables	1	2	3	4
INTERCEPT	-0.0326	0.0395	-0.0423	0.0310
	(-0.30)	0.3300	(-0.38)	(0.26)
INDCSR	0.0248			
	(1.43)			
INDSTR		0.0450**		
		(2.03)		
INDCON		-0.0014		
		(-0.06)		
LOWCSR			0.0418	
			(0.1600)	
MIDCSR			0.0178	
			(0.3000)	
HIGHCSR			0.0380	
			(0.9400)	
LOWCSR_S				0.6188**
				(2.07)
MIDCSR_S				0.1480**
				(2.43)
HIGHCSR_S				0.1166**
				(2.56)
LOWCSR_C				-0.2388
				(-0.92)
MIDPERF_C				-0.0537
				(-0.87)
HIGHCSR_C				-0.0197
				(-0.48)
HORIZON	0.0006**	0.0006***	0.0006**	0.0006**
	(2.52)	(2.58)	(2.51)	(2.53)
GEXP	0.0004	0.0004	0.0004	0.0004
	(0.85)	0.8500	(0.82)	(0.79)
FEXP	0.0011*	0.0010*	0.0011*	0.0010*
	(1.88)	(1.69)	(1.87)	(1.73)
SIZE	-0.0027	-0.0084	-0.0024	-0.0092
	(-0.36)	(-1.00)	(-0.32)	(-1.11)
VAREARN	-0.0621	-0.0658	-0.0627	-0.0680*
	(-1.58)	(-1.64)	(-1.60)	(-1.67)
Year fixed effects	Yes	Yes	Yes	Yes
N	15562	15562	15562	15562
R^2	0.0039	0.0042	0.0039	0.0045

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Table 4 Relation between Forecast Error and Adjusted CSR Score
Variables are defined in Table 1. t-statistics are shown in parentheses.***,**,*indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Independent variables	1	2	3	4
INTERCEPT	0.0117***	0.0128***	0.0119***	0.0129***
	(11.17)	(11.56)	(11.47)	(11.68)
INDCSR	0.0002			
	(1.53)			
INDSTR		0.0005***		
		(4.04)		
INDCON		0.0003		
		(1.52)		
LOWCSR			-0.0014	
			(-0.77)	
MIDCSR			-0.0003	
			(-0.62)	
HIGHCSR			0.0002	
			(0.66)	
LOWCSR_S				0.0022
				(0.92)
MIDCSR_S				0.0009**
				(2.24)
HIGHCSR_S				0.0010***
				(3.64)
LOWCSR_C				-0.0027*
				(-1.76)
MIDCSR_C				-0.0006
				(-1.37)
HIGHCSR_C				0.0000
				(0.14)

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Table 4-*Continued*

Independent variables	1	2	3	4
HORIZON	0.0000	0.0000	0.0000	0.0000
	(1.46)	(1.63)	(1.46)	(1.53)
GEXP	0.0000	0.0000	0.0000	0.0000
	(0.87)	(0.77)	(0.83)	(0.79)
FEXP	0.0000**	0.0000*	0.0000**	0.0000**
	(2.17)	(1.85)	(2.12)	(1.88)
FE	0.1975***	0.1965***	-0.0071***	-0.0069***
	(6.94)	(6.91)	(-6.75)	(-6.51)
VAREARN	0.0031***	0.0030***	0.0031***	0.0030***
	(2.84)	(2.76)	(2.81)	(2.78)
LOSS	0.0029***	0.0029***	0.0029***	0.0029***
	(5.42)	(5.46)	(5.42)	(5.43)
SIZE	-0.0006***	-0.0007***	-0.0006***	-0.0007***
	(-9.21)	(-9.3)	(-9.25)	(-9.49)
FFIN	0.0009*	0.0009*	0.0009*	0.0009*
	(1.66)	(1.69)	(1.68)	(1.73)
STDROE	0.0002*	0.0002**	0.0002**	0.0002*
	(1.9)	(1.98)	(1.91)	(1.96)
ROA	-0.0072***	-0.0069***	0.1972***	0.1961***
	(-6.76)	(-6.54)	(6.91)	(6.93)
INST	-0.0022***	-0.0019***	-0.0022***	-0.0020***
	(-4.74)	(-3.86)	(-4.62)	(-4.08)
MB	0.0000	0.0000	0.0000	0.0000
	(-1.62)	(-0.41)	(-0.72)	(-0.51)
RES_CNT	0.0003**	0.0003**	0.0003**	0.0003**
	(2.06)	(2.36)	(2.11)	(2.71)
Year fixed effects	Yes	Yes	Yes	Yes
N	15562	15565	15562	15562
R^2	0.1988	0.1998	0.1989	0.2000

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Table 5 Two-stage least squares

$\widehat{RFOPT}$ represents estimated optimism. Other variables are defined in Table 1. t-statistics are shown in parentheses. ***, **,* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	First stage	2nd Stage	2nd Stage
Independent Variables	$\widehat{RFOPT}$	FE	FE
INTERCEPT	-0.1322	0.0124	0.0136***
	(-1.10)	(11.37)	(11.89)
INDCSR	0.0292*	0.0001	
	(1.69)	(0.49)	
$\widehat{RFOPT}$		0.0069***	0.0065**
		(2.73)	(2.54)
INDCSR*$\widehat{RFOPT}$		-0.0044**	
		(-2.05)	
INDSTR			0.0004**
			(2.47)
INDCON			0.0005**
			(2.47)
INDSTR*$\widehat{RFOPT}$			-0.0041**
			(-2.13)
INDCON*$\widehat{RFOPT}$			0.0111***
			(2.61)
HORIZON	0.0006**		
	(2.44)		
FEXP	0.0010*		
	(1.79)		
GEXP	0.0005	0.0000	0.0000
	(1.12)	(0.13)	(0.01)
SIZE	-0.0011	0.0035***	0.0034***
	(-0.14)	(3.33)	(3.48)
VAREARN	-0.0588	-0.0006***	-0.0007***
	(-1.51)	(-9.45)	(-9.57)
FFIN	-0.0142	0.0009*	0.0010*
	(-0.24)	(1.81)	(1.86)
STDROE	0.0041	0.0001	0.0001*
	(1.16)	(1.63)	(1.82)
LOSS	0.0207	0.0027***	0.0027***
	(0.58)	(5.13)	(5.19)
FE	-2.6083**	0.2152***	0.2122***
	(-2.20)	(7.53)	(7.51)

(Continued on next page)

Table 5- ***Continued***

	First stage	2nd Stage	2nd Stage
Independent Variables	$\widehat{RFOPT}$	FE	FE
ROA	-0.2309**	-0.0057***	-0.0054***
	(-2.15)	(-5.00)	(-4.86)
INST	0.1134**	-0.0031***	-0.0026***
	(2.05)	(-5.32)	(-4.52)
MB	0.0002	0.0000	0.0000
	(0.07)	(-0.71)	(-0.36)
RES_CNT	-0.0336*	0.0005***	0.0005***
	(-1.71)	(3.09)	(3.38)
Year fixed effects	Yes	Yes	Yes
N	15562	15562	15562
R^2	0.0053	0.1993	0.2015

Table 6 The relationship between BHAR(-1,+1) and CSR performance around earnings announcements

BHAR (-1,+1) is the buy-and–hold abnormal returns over the window period between one day before and one days after the earnings announcement. INDCSR, INDLSTR, and INDCON represent the industry-adjusted CSR score, industry-adjusted CSR strength, and industry-adjusted CSR concern, respectively. A firm's fractional rank (Rank) represents its percentile CSR performance relative to other firms in the same period, and ranges from 0 to 1. LOWCSR, MIDCSR, and HIGHCSR indicate the bottom, the middle quintiles, and the top overall CSR performance quintile, respectively. LOWCSR_S (LOWCSR_C), MIDCSR_S (MIDCSR_C), and HIGHCSR_S (HIGHCSR_C) indicate the bottom, the middle quintiles, and the top CSR strength(concern) performance quintile, respectively. Other variables are defined in Table 1. t-statistics are shown in parentheses.***,**,*indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Independent Variables	1	2	3	4
INTERCEPT	0.0066	0.0030	0.0085	0.0011
	(0.87)	(0.37)	(1.10)	(0.13)
INDCSR	-0.0022**			
	(-2.06)			
INDSTR		-0.0037***		
		(-2.88)		
INDCON		-0.0005		
		(-0.34)		
LOWCSR			-0.0168	
			(-0.92)	
MIDCSR			-0.0049	
			(-1.24)	
HIGHCSR			-0.0055**	
			(-2.21)	
LOWCSR_S				-0.0446*

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				(-1.95)
MIDCSR_S				-0.0037
				(-0.85)
HIGHCSR_S				-0.0072**
				(-2.45)
LOWCSR_C				0.0167
				(0.93)
MIDCSR_C				0.0058
				(1.42)
HIGHCSR_C				0.0012
				(0.62)
SUE	2.1614***	2.0202***	1.0955*	2.0720
	(8.14)	(7.53)	(1.71)	(1.62)
INDCSR*SUE	0.9551*			
	(1.88)			

Table 6 - *Continued*

Independent Variables	1	2	3	4
INDSTR*SUE		1.9206***		
		(3.29)		
INDCON*SUE		-0.3883		
		(-0.68)		
LOWCSR*SUE			7.4017	
			(1.12)	
MIDCSR*SUE			2.5548*	
			(1.69)	
HIGHCSR*SUE			1.7353	
			(1.63)	
LOWCSR_S*SUE				-4.1578
				(-0.42)
MIDCSR_S*SUE				0.4662
				(0.25)
HIGHCSR_S*SUE				1.8341
				(1.50)
LOWCSR_C*SUE				0.8470
				(0.10)
MIDCSR_C*SUE				-0.3156
				(-0.17)
HIGHCSR_C*SUE				0.1702
				(0.14)
SIZE	-0.0007*	-0.0003	-0.0007*	-0.0003

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	(-1.71)	(-0.68)	(-1.65)	(-0.58)
INST	0.0070*	0.0056	0.0069*	0.0057
	(1.81)	(1.38)	(1.79)	(1.43)
MB	0.0002*	0.0002*	0.0003*	0.0002
	(1.79)	(1.68)	(1.89)	(1.58)
RES_CNT	0.0010	0.0009	0.0011	0.0010
	(0.92)	(0.78)	(0.95)	(0.85)
IVOL	-0.0064	-0.0060	-0.0067	-0.0062
	(-1.02)	(-0.96)	(-1.07)	(-1.00)
Year fixed effects	Yes	Yes	Yes	Yes
N	15562	15562	15562	15562
R^2	0.0462	0.0478	0.0464	0.0480

Table 7 The relation between BHAR (-1,+1) and CSR performance around positive and negative earnings announcements

Variables are defined in Table 1. t-statistics are shown in parentheses.***,**,*indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Independent Variables	1	2	3	4
INTERCEPT	-0.0140	-0.0217**	-0.0150	-0.0260
	(-1.51)	(-2.25)	(-1.60)	(-2.63)
INDCSR	-0.0014			
	(-1.22)			
INDSTR		-0.0032**		
		(-2.33)		
INDCON		-0.0021		
		(-1.32)		
LOWCSR			-0.0036	
			(-0.16)	
MIDCSR			0.0018	
			(0.42)	
HIGHCSR			-0.0037	
			(-1.38)	
LOWCSR_S				-0.0430*
				(-1.68)
MIDCSR_S				-0.0041
				(-0.86)
HIGHCSR_S				-0.0075**
				(-2.41)
LOWCSR_C				0.0263
				(1.38)
MIDCSR_C				0.0069
				(1.43)

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HIGHCSR_C				0.0003
				(0.09)
PSUE	4.7632***	4.7445***	4.6717***	5.7641***
	(14.3)	(13.01)	(7.19)	(5.42)
NSUE	0.9920***	0.8899***	-0.1563	1.0318
	(4.72)	(4.42)	(-0.33)	(1.04)
INDCSR*PSUE	0.4309			
	(0.99)			
INDCSR*NSUE	0.9062**			
	(2.25)			
INDSTR*PSUE		0.5421		
		(0.98)		
INDCON*PSUE		-0.3050		
		(-0.55)		
INDSTR*NSUE		1.7267***		
		(3.18)		
INDCON*NSUE		-0.3919		
		(-0.79)		

Table 7-*Continued*

Independent Variables	1	2	3	4
LOWCSR*PSUE			2.9286	
			(0.37)	
MIDCSR*PSUE			-0.2848	
			(-0.19)	
HIGHCSR*PSUE			1.2103	
			(1.16)	
LOWCSR*NSUE			8.3398	
			(1.42)	
MIDCSR*NSUE			2.7223**	
			(2.22)	
HIGHCSR*NSUE			1.8370**	
			(2.43)	
LOWCSR_S*PSUE				-11.5913
				(-1.13)
MIDCSR_S*PSUE				-1.5632
				(-0.85)
HIGHCSR_S*PSUE				-0.3185
				(-0.27)
LOWCSR_S*NSUE				-1.7292

				(-0.23)
MIDCSR_S*NSUE				0.0172
				(0.01)
HIGHCSR_S*NSUE				1.8477*
				(1.75)
LOWCSR_C*PSUE				-1.2583
				(-0.17)
MIDCSR_C*PSUE				-0.5829
				(-0.30)
HIGHCSR_C*PSUE				-0.1364
				(-0.13)
LOWCSR_C*NSUE				1.3648
				(0.20)
MIDCSR_C*NSUE				-0.4848
				(-0.35)
HIGHCSR_C*NSUE				-0.0514
				(-0.05)
SIZE	0.0002	0.0010	0.0003	0.0011*
	(0.45)	(1.68)	(0.61)	(0.96)
INST	0.0101**	0.0077*	0.0097**	0.0082*
	(2.47)	(1.81)	(2.36)	(1.96)
MB	0.0004**	0.0003**	0.0004***	0.0003**
	(2.54)	(2.29)	(2.70)	(2.22)
RES_CNT	0.0009	0.0007	0.0009	0.0008
	(0.73)	(0.56)	(0.73)	(0.63)
IVOL	-0.0197**	-0.0193**	-0.0196**	-0.0199**
	(-2.18)	(-2.15)	(-2.18)	(-2.21)
Year fixed effects	Yes	Yes	Yes	Yes
N	15562	15562	15562	15562
R^2	0.0660	0.0670	0.0668	0.0680