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Corporate Social Responsibility and Information Asymmetry

Lu, Chia-Wu[1] and Chueh, Ting-Shu[2]

Abstract

This research investigates the connection between Corporate Social Responsibility (CSR) and the issue of information asymmetry. Our CSR sample comes from the DJSI (Dow Jones Sustainability North America Index), and the sample consists from 764 firm-year observations during 2002 to 2010. Our empirical work find there is a significantly negative relationship between CSR and information asymmetry proxy, which means that market responds CSR with smaller gap between bid-ask spreads. CSR also reduces the excess returns when higher degree of information asymmetry exists, which compensate less excess returns to investor than non-CSR firms. Furthermore, CSR firms have less degree of overreaction than matching firms when the book-to-market effect and intangible information are considered..

JEL classification numbers: M14, G30
Keywords: Corporate Social Responsibility; Information asymmetry; Dow Jones Sustainability Indices.

1 Introduction

Corporate social responsibility (hereafter abbreviated as CSR), an attractive topic worthy of attentions during decades, has being discussed within many financial, business and macroeconomic fields. There are several viewpoints to define CSR, although an exact definition is still yet to be obtained (Dahlsrud, 2008). A popular expression, stakeholder theory[3], suggests that firms with higher CSR characters will do more efforts for being

[1]Corresponding Author. Assistant Professor, Department of Finance & Cooperative Management, National Taipei University, New Taipei City, Taiwan.
[2]Assistant Manager, Taishin International Bank, Taipei, Taiwan.

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[3]The detail of stakeholder theory can be referred to Freeman (1984).

responsible not only to their shareholders, but also stakeholders. The stakeholder view takes a broader scope of corporate responsibilities; Stakeholder, including shareholders, employees, customers, suppliers, local communities, natural environment, government, and general society (Freeman, 1984; Freeman, Harrison, and Wicks, 2007), and each stakeholder group has expectations of the corporation. The firms' reactions to these expectations are critical to its current and future successful results. Those firms minded socially responsibilities are more likely to put their operating goal in the long run, focusing not only on increasing current profits but on nurturing future relationships with stakeholders, consider the effects of its actions on every entity that may be directly or indirectly affected by the companies.

One of the most concerned issues in microstructure studies among market participants and stakeholders is the problems of asymmetric information. A firm provides more informative disclosures should satisfy stakeholders need. It is obviously when some investors are better informed than others will influence on the efficiency of capital markets. Chemmanur and Fulghieri (1999) argue that firms with high information asymmetry are expected to be more likely to choose private placements than public offerings in order to reduce information production costs. Easley and O'Hara (2004) construct a rational expectations asset pricing model with asymmetric information and find that uninformed investors demand a premium to hold shares in firms with higher information asymmetry. Fu et al. (2012) empirical results show that higher reporting frequency reduces information asymmetry and the cost of equity. He et al. (2013) use the data of Australian listing companies and document a significant and positive relation between information asymmetry and ex ante investor's required rate of return. Thus, the above arguments suggest a close association between information asymmetry and firm value.

In this study, we examine the relationship between CSR and information asymmetry. To our best knowledge, there are rare extant literatures discuss the issue of CSR and information asymmetry. This paper would like to investigate whether those firms with higher CSR reputation will be accompanied with lower degree of information asymmetry, and, on the other hand, according to Kyle (1985), that information asymmetry may exist when superiorly informed traders are present, causes the bid–ask spread to be wider to compensate the liquidity provider for potential losses made when trading with better informed counterparties; this project also examines whether the different degree of information asymmetry between higher-CSR reputation firms and the match sample ones, will also make significant differences in explaining their stock returns. Furthermore, this study will also check the different impact of "book to market effect" and "overreaction", which Daniel & Titman (2006) mentioned, between the higher-CSR reputation firms and their matching sample counterparties.

Some extant literatures discussed the issue that how a firm's corporate financial performance (CFP) will be affected by its CSR's behavior (or corporate social performance (CSP)); the empirical results show different conclusions. For example, Bowman and Haire (1975) point out that some shareholders regard CSR as a symbolic management skill, namely, CSR is a symbol of reputation, and the company's reputation will be improved by actions to support the community, resulting in positive influence on sales. In other words, put more attention on CSR will lead to positive financial performance over the medium to long term due to the impact of corporate social performance on reputation and brand, and the attract high quality managers and employees (Derwall et al. 2005; Herremans, Akathaporn & McInnes 1993; Guerard 1997).

Thus, a company increases its costs by taking CSR activities can enhance company reputation, although sacrificing the short-term financial performance, it still can be improved by competitive advantages in the long run. Ghoul et al. (2011) investigate the effect of CSR on the cost of equity capital for a large sample of US firms. Using several approaches to estimate firms' ex ante cost of equity, they find that firms with better CSR scores exhibit cheaper equity financing. Their findings suggest that investment in improving responsible employee relations, environmental policies, and product strategies contributes substantially to reducing firms' cost of equity. Support arguments in the literature that firms with socially responsible practices have higher valuation and lower risk.

However, there are also negative conclusions of the relation between social performance and corporate financial performance. Aupperle et al., (1985) suggest that the fulfillment of CSR will bring competitive disadvantages because of bearing other costs; Bragdon and Marlin (1972), Vance (1975), Brammer, Brooks and Pavelin (2006), support this view. The major argument that a negative relationship between social performance and corporate financial performance dues to the additional costs, incurred to improve social or environmental performance does not contribute to enhancing shareholders' value. There are also some other studies suggested that CSR is not related to CFP at all; Ullmann (1985) argues that given such a large number of variables intervene between the social responsibility performance and the financial performance of companies, there is no reason to assume that a direct relation should exist. McWilliams and Siegel (2000) also prove that the relationship between corporate financial performance and corporate social performance would disappear with introducing more accurate variables, such as the R&D strength, into the economic models.

Gelb and Strawser (2001) examine the relationship between firms' disclosures and measures of social responsibility. They use ratings provided by the Council on Economic Priorities as proxies for the degree of social responsibility, and AIMR reports (disclosure rankings provided by the annual Association for Investment Management and Research Corporate Information Committee) are used to measure disclosure level. Their results indicate that there is a positive relation between firms' disclosures and measures of their corporate social responsibility (CSR). Firms with higher CSR ratings appear to provide more extensive disclosures than those provided by other firms. These findings suggest that some firms may provide more informative disclosures because of a sense of responsibility to their stakeholders. That is, firms that engage in socially responsible activities provide more informative and extensive disclosures than the companies that are less focused on advancing social goals.

Chih et al. (2008) test whether CSR mitigates or increases the extent of earnings management. They study three kinds of earnings management: earnings smoothing, earnings aggressiveness, and earnings losses and decreases avoidance. They find that with a greater commitment to CSR, the extent of earnings smoothing is mitigated, that of earnings losses and decreases avoidance is reduced, but the extent of earnings aggressiveness is increased. In sum, a firm with CSR in mind tends not to smooth earnings, and displays less interest in avoiding earnings losses and decreases. Besides, Yip, Staden, and Cahan (2011) examine whether CSR disclosure is related to earnings management and if the relationship is mitigated by political cost considerations or by the firm's ethical predisposition. They test their hypotheses by regressing earnings management on CSR disclosure while controlling for other factors that may affect the level of earnings management, then finding a negative significant relationship between

CSR reporting and earnings management especially in oil and gas industry, alternately positive relationship in the food industry.

Lopez et al. (2007) compared a sample of DJSI (Dow Jones Sustainability World Index) versus non-DJSI firms and found that the firms on the DJSI suffered from a temporary, negative dip in accounting-based performance indicators during the early years in which they joined the index. This may reflect the costs associated with being included in the index. Besides, Lee and Faff (2009) also employ the DJSI as corporate social performance proxy, and they find leading corporate social performance (CSP) firms exhibit significantly lower idiosyncratic risk.

Our empirical work would like to provide evidences about the following questions: First, firms which put more attentions on corporate social responsibility (abbreviated as CSR firms) would have less degree of information asymmetry contrast to those being considered making fewer efforts in CSR. Second, we will examine whether CSR may reduce the excess returns when higher degree of information asymmetry exist; and the last, this study explores that CSR character may reduce the overreaction results of book-to-market effect and intangible information, which are mentioned by Daniel and Titman(2006).

The remainders of this project are organized as follows. In the second section, we depict the hypotheses this study develops. Section III describes our data and the proxies which been employed in empirical analysis. Empirical results are presented in Section IV. The final section concludes this study.

2 Hypotheses

The primary goal of the analysis is to determine the effect of CSR on information asymmetry. By Gelb and Strawser (2001), firms with higher CSR ratings may provide more informative disclosures because of a sense of responsibility to their stakeholders. Therefore, we can infer when a firm contributes higher degree on CSR, its information released should be less distorted; and then hypothesize that:

H_1: The firms contribute higher degree on CSR would have less degree of information asymmetry contrast to those lower ones.

Easley, et al. (2002) investigate the role of information-based trading in affecting asset returns showing that while PIN (Private Information, a proxy of informed trading) does predict future returns in the sample they analyze. They suggest that a risk factor based on private information in a stock which is a determinant of stock returns. They found the magnitude of returns affected by PIN is pretty large. Stocks with higher PIN have higher rates of return. Their assertion comes from that uninformed traders require compensation to hold stocks with greater private information. By the explanation above, our hypothesis can be built as:

H_2: CSR may reduce the excess returns of a stock with higher degree of information asymmetry.

The book-to-market effect, a famous issue that plenty of studies explore (e.g., Rosenberg et al., 1985; Fama and French, 1992; Lakonishok et al., 1994, Ali et al. 2003), indicates predictable returns over three to five years for portfolios long in high book-to-market (B/M) stocks and short in low B/M stocks. Fama and French (1992, 1993, and 1997)

suggest the return to B/M-based portfolio strategies represents compensation for risk. Another explanation, the return to B/M-based portfolio strategies results from systematic mispricing of extreme B/M securities. Studies supporting the mispricing explanation show that market participants underestimate future earnings for high B/M stocks and overestimate future earnings for low B/M stocks (La Porta et al.,1997; Skinner and Sloan, 2002). The DeBondt and Thaler (1985, 1987) and Lakonishok et al. (1994) figure that the stock price reversal and book-to-market effects are a result of investor's overreaction to past firm's financial performance. When the actual earnings are realized in future, prices recover to the level it should be, resulting in high returns for high BM firms (Barberis et al, 1998). Lakonishok et al. (1994) provide support for this hypothesis by showing that a firm's future returns are negatively related to its past 5-year financial performance (sales growth).

The third hypothesis we assume that CSR Group companies' future stock return has less book-to-market effects. The reason for the assumption is that the degree of information asymmetry may be less for CSR Group firms, and then it will reduce the degree of overreaction. Thus, we construct the hypothesis as follows:

H_{3A}: Stocks of CSR group have less book-to-market effects.

Furthermore, DeBondt and Thaler (1985, 1987) and Lakonishok, et al.(1994) assert investors overreact to the information contained in accounting growth rates, but Fama and French (1992,1993,1997) suggest the increased risk and return of high BM firms is a result of the distress brought by poor past performance. Daniel and Titman (2006) thought those above theories could not give a complete explanation. They decomposed the B/M effect into tangible and intangible information. The role of intangible information is orthogonal to accounting-based performance information. Daniel and Titman (2006) show that future returns are unrelated to the accounting measures of past performance (they denote as tangible information), but are strongly negatively related to the component of intangible information. In a seminal work, Liang (2012) decomposes B/M ratio into past tangible information and future intangible information and find that repurchase signals an undervaluation of the intangible return. Jiang (2010) finds that institutions react positively to intangible information, which contributes to stock price overreaction. Resutek (2010) documents that the accrual anomaly (i.e., stocks of firms with high accounting accruals underperform those of low accruals) can be subsumed by a negative relation between past intangible returns and future returns. The above literatures support the overconfidence hypothesis, which asserts intangible return comes from the investor overreaction. In this paper, we refer to Daniel and Titman (2006) and decompose into tangible and intangible information to examine whether the CSR Group firms have less degree of overreaction than matching firms when the intangible information is considered, as follows:

H_{3B}: CSR firms have less degree of overreaction than matching firms when the intangible information is considered.

3 Data and Methodology

3.1 Proxy of Corporate Social Responsibility

Refer to lots of recent literatures, this study employs the North American firms of being included in the Dow Jones Sustainability World Index (DJSI) as a proxy of Corporate

Social Responsibility (CSR) sample. The DJSI assesses three main areas of corporate sustainability. The Dow Jones Sustainability World Index (DJSI World) was launched in 1999 and includes the top 10% (in 59 industries) of the largest 2,500 companies in the Dow Jones Global Total Stock Market Index, based on an analysis of corporate economic, environmental and social performance. Indexes are updated yearly and companies are monitored throughout the year. The selection criteria evolve each year and companies must continue to make improvements to their long term sustainability plans in order to remain on the index.

According to DJSI official website, at present, DJSI select their including companies by following criteria:.

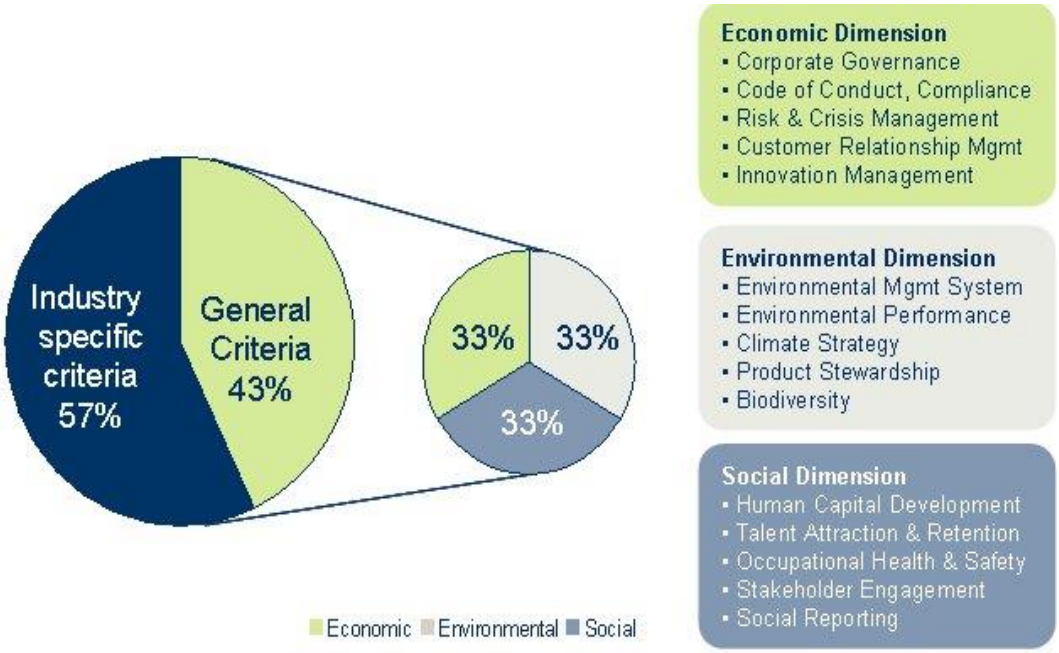

Figure 1: The criteria of selection of DJSI inclusion, 2012. Source: The official website of DJSI (http://www.sustainability-indices.com/)

The process is based on the annual in-depth analysis featuring approximately 80-120 questions on financially relevant economic, environmental and social factors with a focus on companies' long-term value creation.

The DJSI family contains one main global index, the DJSI World, and various indexes based on geographic regions. Among those, the Dow Jones Sustainability Index North America (DJSI, NA) was built in 2002. It contains the top 20% of the largest 600 Canadian and United States companies in the Dow Jones Global Total Stock Market Index.

Figure 2: The selection process of DJSI, North America, 2012. Source: The official website of DJSI (http://www.sustainability-indices.com/)

There are plenty of literatures employ DJSI as a proxy of CSR, such that, Robinson, et al. (2011); Detre, and Gunderson (2011); Artiach et al. (2010); Lee and Faff (2009); Lee et al (2009). Therefore, we also use the companies included in the Dow Jones Sustainability North America Index as higher level corporate sustainability performance ones during the sample period. Since the Dow Jones Sustainability Index North America data is available starting from 2002, our sample period is 2002 to 2010. We call this sample as "CSR-group".

On the other hand, this study choose the matching firms not be included in the DJSI North America during the entire sample period with respect to each "CSR-group" firm from the COMPUSTAT global database. A matching firm should have a same 4-bit SIC codes and the smallest absolute difference in size with respect to its counterparty CSR-group companies, thus, the matching process alleviates the influence of size, industry, and country effect. It is set a binary variable 1 if a sample firm belongs to the CSR-group, and 0 for matching ones (could be classified as "non CSR-group"). The final sample consists of 764 firm-year observations, which 461 firm-year observations of CSR-group and 303 firm-year observations of non CSR-group. All the sample firms are listed on the NYSE, AMEX or NASDAQ.

In addition, we collect some other information of sample firms, including daily stock prices, (dollar) trading volumes, yearly market returns from Center for Research in Security Prices (CRSP) database, and accounting-related information of firms' book value, net incomes and capital size from COMPUSTAT.

3.2 Construction of Variables

3.2.1 Degree of information asymmetry

There are two proxies to be employed in this paper:

3.2.1.1 Bid-Ask spread

Glosten and Harris (1988) using NYSE common stock transaction prices in the period 1981–1983 for the model estimated. They find the spread can be decomposed into two components, the first part dues to asymmetric information and the other can be resulted from inventory costs, specialist monopoly power, and clearing costs. Copeland and Galai (1983), and Glosten and Milgrom (1985) indicate that the higher the degree of information asymmetry, the wider the bid-ask spread should be. Based on above, we

employ the bid-ask spread as the proxy of information asymmetry.
According to the Jayaraman (2008) calculated method of daily spread, we take the bid-ask spread in the end of the day as the daily spread. To eliminate the different price level effect, as Harris (1994) method and matching the simulated spread of daily data, we take spread divided by the average price of the daily closing bid and ask price. In order to consider the yearly spread level, spread should be computed as yearly average,

$$RSPRD_i = \frac{\sum_{1}^{n} \frac{S_{i,t}}{\frac{BID_{i,t} + ASK_{i,t}}{2}}}{n} \tag{1}$$

$S_{i,t}$ is the last spread on day *t* of stock *i*, $BID_{i,t}$ is the last bid price on day *t* of stock *i*, $ASK_{i,t}$ is the last ask price on day *t* of stock *i* ; n represents the number of trading days during a year.

3.2.1.2 Amihud illiquidity measure
The illiquidity index developed by Amihud (2002) being:

$$ILLIQ_i = \frac{\sum_{1}^{n} \frac{|R_{i,t}|}{DVol_{i,t}}}{n} \tag{2}$$

$R_{i,t}$ is the return on day *t* of stock *i*, $DVol_{i,t}$ is the (dollar) trading volume on day *t* of stock *i* ; n represents the number of trading days during a year.

3.2.2 Intangible return

Follow the Daniel and Titman (2006), the stock return consists of two components; one part reflects relatively concrete information, measured in accounting-based performance (tangible return), and the other belongs to relative vague information (intangible return) which is orthogonal to accounting-based information.

3.2.2.1 Book return

$$r_i^B(t-\tau, t) = log\left({B_t}/{B_{t-\tau}}\right) + n(\tau - t, \tau) \tag{3}$$

Where $r_i^B(t-\tau, t)$ is τ-year book return; B_t is firms' equity book value in time t; $n(\tau\text{-}t, \tau)$ could be established as follow equation:

$$n(t-\tau, t) = \sum_{s=t-\tau}^{t} [\log(f_s) + \log\left(1 + \frac{D_s}{P_s \cdot f_s}\right)] \tag{4}$$

Where f_s is a price adjustment factor.

3.2.2.2 Intangible return

Return decomposition can be done, for each year, by running two cross-sectional regressions of each group firm's past τ-year log stock return of CSR group and non-CSR group, $r_i \ (t-\tau, t)$, on the firms' *t*-year lagged log book-to-market ratio, $bm_{i,t-\tau}$, and their τ-year book return, $r_i^B(t\text{-}\tau, t)$:

$$r_i(t-\tau,t) = \gamma_0 + \gamma_{BM}.bm_{i,t-\tau} + \gamma_B.r_i^B(t-\tau,t) + u_{i,t} \quad (5)$$

The firms' t-year lagged log book-to-market ratio should capture tangible information at time τ-t, and the τ-year book return serves as a proxy for tangible information that arrives between τ-t and *t*. The tangible return during this period is defined as the fitted component of the regression.

$$r^T{}_i(t-\tau,t) = \hat{\gamma}_0 + \hat{\gamma}_{BM}.bm_{i,t-\tau} + \hat{\gamma}_B.r_i^B(t-\tau,t) \quad (6)$$

Thus, the intangible return is defined as the regression residual

$$r_i^I(t-\tau,t) = u_i \quad (7)$$

3.2.3 Other variables

The variables used in the following regression can be expressed as follows:
Info_asym: A proxy of firm's information asymmetry. It can be represented as *RSPRD* or *ILLIQ*.
RSPRD: Yearly average of the daily closing spreads divided by the average price of the daily closing bid and ask price.
ILLIQ: Amihud (2002) illiquidity measure.
ER: A firm's excess return, which is the yearly return of the firm minus the CRSP value-weighted return.
ITR: Variation for the intangible return of each firm-year.
R_{EQUITY}: Cost of equity, calculated by CAPM.
R_{DEBT}: Cost of debt. The ratio of interest expense divided by interest-bearing debt on annual balance sheet.
R_{WACC}: Cost of total capital.
SIZE: Natural logarithm of firm's total asset.
ROA: Return on total assets.
BM: The ratio of book equity divided by market equity at the end of year.
BR: Book return of each firm-year.
CSR: Dummy, 1 for firms in DJSI sample (North America) and 0 for the matching firms.

4 Empirical Results

4.1 Descriptive Statistics

Table 1 presents the summary statistics. The mean of yearly relative spreads (*RSPRD*) of all sample stocks' is 0.0015, which is smaller than Harris (1994) result 0.0176. Harris (1994) found that higher stock price is accompanied by smaller *RSPRD*, their sample stocks' mean price is \$22.2, much lower than our sample stocks' mean price \$42.3.
Panel B and C of table 1 demonstrates CSR group (those companies being included in DJSI) and non-CSR group (the matching firms sample). The mean (median) RSPRD of non-CSR firms is 0.00183 (0.00109), which is higher than the mean (median) RSPRD of CSR firms 0.00129 (0.00080). Hypothesis 1 is preliminarily supported.
Table 2 shows the correlation coefficients for the control variables. There are not highly correlated between the explanatory variables, which suggest that multicollinearity is not a serious concern in our regressions.

4.2 Multivariate Regression Analysis

To test hypothesis 1, by running the following regression:

$$info_asym_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta CV_{i,t} + u_{i,t} \tag{8}$$

Where *Info_asym* is the proxy of firm's information asymmetry, which can be represented as *RSPRD* or *ILLIQ*. Referring to Easley, et al. (2002), CV (control variables) includes *SIZE*, *ROA* and *BM*. Table 3 reports the results. Panel A of table 3 indicates CSR negatively and significantly (most at the 1% level) relate to *RSPRD* even controlling *SIZE*, *ROA* and *BM*. The other proxy for information asymmetry *ILLIQ*, Panel B also indicates CSR negatively and significantly (at the 5% or 10% level) relate to *ILLIQ* even controlling *SIZE*, *ROA* and *BM*. It means that firms with higher CSR will have low degree of information asymmetry on both proxies, therefore, Hypothesis 1 is supported. It also shows that *ILLIQ* being a proxy of information asymmetry is less significant than employing *RSPRD*.
The table shows the summary statistics for the variables: *P* is average stock price of the sample (in dollar). *RET* is a natural logarithm of the stock price divided by the price of previous year. *ER* is yearly stock return in excess of the CRSP value-weighted return. *RSPRD* is a yearly average of the daily closing spreads divided by the average price of the daily closing bid and ask price. R_{EQUITY} is a firm's cost of equity. R_{DEBT} is a firm's cost of debt. R_{WACC} is the cost of total capital. *BM* is a book value of equity divided by market value of equity at the end of the year. *BR* and *ITR* are book return and intangible return, respectively, which are measured by the estimation in Daniel and Titman (2006). The sample period is 2002-2010. N represents the number of firm-year observations.

Table 1: Descriptive Statistics

Panel A: Full samples							
Variable	Mean	Min	Q1	Median	Q3	Max	N
P	42.3	3.94	23.0	37.6	57.0	168	764
RET	0.175	-0.646	-0.091	0.126	0.354	2.36	752
ER	0.097	-0.526	-0.113	0.026	0.224	2.14	748
RSPRD	0.00150	0.00017	0.00056	0.00088	0.00151	0.0128	749
R_{EQUITY}	0.175	0.004	0.072	0.120	0.229	1.068	574
R_{DEBT}	0.021	0.000	0.010	0.019	0.030	0.092	725
R_{WACC}	0.108	0.003	0.048	0.075	0.138	0.671	550
BM	0.504	0.054	0.263	0.423	0.675	1.781	764
BR	-0.021	-2.158	-0.195	-0.002	0.170	1.645	558
ITR	-0.006	-1.531	-0.252	-0.040	0.173	4.827	558
Panel B: Non-CSR sample (matching firms)							
Variable	Mean	Min	Q1	Median	Q3	Max	N
P	38.7	4.06	20.5	35.0	49.9	168	303
RET	0.213	-0.646	-0.082	0.142	0.409	2.36	296
ER	0.125	-0.522	-0.099	0.039	0.269	1.88	293
RSPRD	0.00183	0.00017	0.00068	0.00109	0.00204	0.0115	295
R_{EQUITY}	0.198	0.005	0.083	0.141	0.257	1.016	223
R_{DEBT}	0.020	0.000	0.005	0.017	0.031	0.073	286
R_{WACC}	0.118	0.003	0.050	0.082	0.145	0.671	214
BM	0.575	0.063	0.308	0.514	0.778	1.781	303
BR	-0.043	-1.646	-0.244	-0.045	0.146	1.337	218
ITR	-0.008	-1.321	-0.301	-0.047	0.156	4.827	218
Panel C: CSR sample							
Variable	Mean	Min	Q1	Median	Q3	Max	N
P	44.7	3.94	25.3	40.7	59.2	146	461
RET	0.150	-0.644	-0.095	0.118	0.322	2.13	456
ER	0.079	-0.526	-0.126	0.020	0.195	2.14	455
RSPRD	0.00129	0.00017	0.00051	0.00080	0.00128	0.0128	454
R_{EQUITY}	0.161	0.004	0.066	0.107	0.213	1.068	351
R_{DEBT}	0.021	0.000	0.012	0.020	0.029	0.092	439
R_{WACC}	0.102	0.004	0.048	0.072	0.132	0.530	336
BM	0.457	0.054	0.242	0.362	0.627	1.677	461
BR	-0.008	-2.158	-0.159	0.017	0.182	1.645	340
ITR	-0.005	-1.531	-0.223	-0.034	0.195	1.962	340

This table demonstrates correlation coefficients of the control variables in our regression. *SIZE* is a natural logarithm of firm's total asset. *ROA* is the return on assets. *BM* is a book value of equity divided by market value of equity. *BR* and *ITR* are book return and intangible return respectively, which are measured by the estimation in Daniel and Titman (2006). .

Table 2: Correlation coefficients of the control variables

	SIZE	*ROA*	*BM*	*BR*	*ITR*
SIZE	1				
ROA	0.0573	1			
BM	0.1309	-0.3609	1		
BR	0.1743	0.1101	0.3079	1	
ITR	-0.1646	0.1535	-0.2924	-0.0168	1

The table shows the results of equation (8). Dependent variables: *RSPRD* is a yearly average of the daily closing spreads divided by the average price of the daily closing bid and ask price. *ILLIQ* is Amihud (2002) illiquidity measure. Independent variables: *CSR* is a dummy, 1 for firms in DJSI sample (North America) and 0 for the matching firms. *SIZE* is a natural logarithm of firm's total asset. *ROA* is the return on assets. *BM* is a book value of equity divided by market value of equity. *BR* and *ITR* are book return and intangible return respectively, which are measured by the estimation in Daniel and Titman (2006). The symbol ***, ** and * represent 99%, 95% and 90% significant level respectively. Numbers in parentheses are t-values.

Table 3: Regression results of the proxy of information asymmetry on CSR

Panel A: Dependent variable: *RSPRD*					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Intercept	0.00183 (17.35)***	0.0037 (8.85)***	0.00212 (18.95)***	0.00153 (9.46)***	0.00413 (9.84)***
CSR	-0.000538 (-3.97)***	-0.000378 (-2.74)***	-0.000479 (-3.62)***	-0.000477 (-3.47)***	-0.000282 (-2.05)**
SIZE		-0.000463 (-4.62)***			-0.000520 (-5.24)***
ROA			-0.00596 (-6.51)***		-0.00599 (-6.02)***
BM				0.000527 (2.47)**	0.0001536 (0.67)
R^2	0.0193	0.0453	0.0708	0.0260	0.1016
Panel B: Dependent variable: *ILLIQ*					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Intercept	0.00000144 (2.74)***	0.00000387 (1.85)*	0.00000153 (2.75)***	0.00000109 (1.34)	0.00000371 (1.75)*
CSR	-0.00000144 (-2.12)**	-0.00000122 (-1.74)*	-0.00000141 (-2.07)**	-0.00000136 (-1.98)**	-0.00000109 (-1.65)*
SIZE		-0.00000060 (-1.20)			-0.00000067 (-1.30)
ROA			-0.0000020 (-0.49)		-0.0000007 (-0.16)
BM				0.00000062 (0.57)	0.00000082 (0.70)
R^2	0.0046	0.0051	0.0036	0.0037	0.0034

To test hypothesis 2, by running the following regression:

$$ER_{i,t} = \beta_0 + \beta_1 RSPRD_{i,t-1} + \beta_2 CSR_{i,t} + \beta_3 RSPRD_{i,t-1} \times CSR_{i,t} + \beta CV_{i,t-1} + u_{i,t} \quad (9)$$

Where $ER_{i,t}$ is the excess return of stock *i* of year *t*. CV (control variables) includes *SIZE, ROA* and *BM* .Table 4 reports the results. The coefficient β_3 (of CSR*RSPRD), which measures the CSR could mitigate the influence of information asymmetry on excess return. By table 4, the significant negative coefficient represents that under higher information asymmetry (broader RSPRD), the investor ask only less excess returns on CSR firms than non-CSR firms. These evidences support hypothesis 2. By the way, the positive sign of β_1 is consistent with Easley et al. (2002).

The table demonstrates the results of equation (9), which tests of hypothesis 2. The dependent variable ER is a firm's excess return, which is the yearly return of the firm minus the CRSP value-weighted return. Independent variables: RSPRD is a yearly average of the daily closing spreads divided by the average price of the daily closing bid and ask price. CSR is a dummy, 1 for firms in DJSI sample (North America) and 0 for the matching firms. SIZE is a natural logarithm of firm's total asset. ROA is the return on assets. BM is a book value of equity divided by market value of equity. BR and ITR are book return and intangible return respectively, which are measured by the estimation in Daniel and Titman (2006). The symbol ***, ** and * represent 99%, 95% and 90% significant level respectively. Numbers in parentheses are t-values.

Table 4: Regression results of excess return on RSPRD and CSR

Dependent variable: ER				
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	0.09151 (3.14)***	0.15952 (3.77)***	0.16826 (3.47)***	0.931 (5.92)***
RSPRD	30.4 (2.47)**	26.5 (2.14)**	21.70 (1.81)*	8.06 (0.45)
CSR		-0.10 (-2.21)**	-0.117 (-1.93)**	-0.094 (-1.54)
*CSR*RSPRD*			-9.25 (-2.37)**	-9.96 (-2.40)**
SIZE				-0.139 (-3.97)***
ROA				-0.93 (-2.63)***
BM				-0.23 (-2.83)***
R^2	0.0068	0.0119	0.0108	0.0453

To test hypothesis 3, by running the following regressions:
According to the hypothesis 3A, the regression is constructed as follows:

$$ER_{i,t} = \beta_0 + \beta_1 BM_{i,t-1} + \beta_2 CSR_{i,t} + \beta_3 BM_{i,t-1} \cdot CSR_{i,t} + u_{i,t} \quad (10)$$

$BM_{i,t-1}$ is the BM ratio in year *t-1* for the sample firm *i*; refer to Daniel and Titman (2006), the lag BM ratio is employed.
For testing hypothesis 3B, the regression is:

$$ER_{i,t} = \beta_0 + \beta_1 ITR_{i,t-1} + \beta_2 CSR_{i,t} + \beta_3 CSR_{i,t} \cdot ITR_{i,t-1} + \beta_4 BM_{i,t-1} + \beta_5 BR_{i,t-1} + u_{i,t} \quad (11)$$

Where $ITR_{i,t-1}$ is the intangible return in year *t-1* for the stock *i*; $BM_{i,t-1}$ is the BM ratio in year *t-1* for the sample firm *i*; $BR_{i,t-1}$ is the book return in year *t-1* for the stock *i*. Refer to Daniel and Titman (2006), the lag BM ratio, ITR and BR are employed.
The results of Table 5 show the supporting evidence of hypothesis 3a because the coefficient of $BM_{i,t-1}$ being positive significant at 1% level, which is consistent with prior studies (DeBondt & Thaler 1985, 1987; Lakonishok, Shleifer & Vishny 1994; Daniel & Titman 2006). Furthermore, the signal of the cross term $CSR_{i,t}*BM_{i,t-1}$ is negative significant at 1% level, which represents the stocks of CSR sample have less book-to-market effects. The results of Table 5 support the hypothesis 3A. Besides, the signal of the cross term $CSR_{i,t}*ITR_{i,t-1}$ are significant and negative at 1% level, that mean stocks of CSR group have less degree of overreaction when the intangible information is considered. It can be concluded that hypothesis 3B is also supported.
The table demonstrates the results of equation (10) and (11), which tests of hypothesis 3A and 3B. The dependent variable ER is a firm's excess return, which is the yearly return of the firm minus the CRSP value-weighted return. Independent variables: CSR is a dummy, 1 for firms in DJSI sample (North America) and 0 for the matching firms. BM is a book value of equity divided by market value of equity. BR and ITR are book return and intangible return respectively, which are measured by the estimation in Daniel and Titman (2006). The symbol ***, ** and * represent 99%, 95% and 90% significant level respectively. Numbers in parentheses are t-values.

Table 5: Regression results of excess return on BM, ITR, BR and CSR

Dependent variable: ER				
	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	-0.243 (-7.97)***	-0.240 (-5.75)***	-0.334 (-7.40)***	-0.020 (-10.4)***
BM	0.766 (16.09)***	0.765 (15.81)***	0.925 (16.00)***	0.656 (29.00)***
CSR		-0.003 (-0.09)	0.247 (3.89)***	-0.0039 (-0.21)
*CSR*BM*			-0.520 (-5.03)***	
ITR				0.948 (41.2)***
*CSR*ITR*				-0.208 (-5.48)***
BR				-0.470 (-21.3)***
R^2	0.2539	0.2529	0.2762	0.8912

5 Conclusion

This paper investigates the connection between CSR and the issue of information asymmetry. Our empirical work would like to provide evidences about the following questions: First, firms which put more attentions on corporate social responsibility (abbreviated as CSR firms) would have less degree of information asymmetry contrast to those being considered making fewer efforts in CSR. Second, we examine whether CSR may reduce the excess returns when higher degree of information asymmetry exist; furthermore, this study explores that CSR character may reduce the overreaction results of book-to-market effect and intangible information, which are mentioned by Daniel and Titman(2006).

Our CSR sample comes from the DJSI (Dow Jones Sustainability North America Index), and the sample consists from 764 firm-year observations during 2002 to 2010. We also collect the counterparty matching firms by selecting with same SIC code and similar size in the sample. Refer to Jayaraman (2008), the information asymmetry is proxied by daily closing bid-ask spread divided by the mid-point of bid and ask quotation. Control variables, such as size, ROA, and BM ratio are also considered in the regressions. Our major findings can be depicted as follows:

1. There is a significantly negative relationship between CSR and information asymmetry proxy, which means that market responds CSR with smaller gap between bid-ask spreads.
2. CSR also reduces the excess returns when higher degree of information asymmetry exists, which compensates less excess returns to investor than non-CSR firms.
3. CSR firms have less degree of overreaction than matching firms when the book-to-market effect and intangible information are considered.

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