Pakistan Journal of Commerce and Social Sciences
2018, Vol. 12 (1), 01-28
Pak J Commer Soc Sci

Does the Participation in CSR Activities Enhance Information Diffusion? Evidence from US Firms

Muhammad Suhail Rizwan (Corresponding author)
NUST Business School, National University of Sciences and Technology, Islamabad, Pakistan
Email: suhail.rizwan@nbs.nust.edu.pk

Asfia Obaid
NUST Business School, National University of Sciences and Technology, Islamabad, Pakistan
Email: asfia.obaid@nbs.nust.edu.pk

Dawood Ashraf
Islamic Research & Training Institute, Islamic Development Bank Group Jeddah, Kingdom of Saudi Arabia
Email: dawood.ashraf@gmail.com

Abstract

The purpose of this paper is to investigate the impact of corporate social responsibility (CSR) on firm-specific information diffusion from 1,219 non-financial US firms between 2000 and 2012. By using Arellano-Bond dynamic panel-data estimation, we found evidence that suggests that stock prices of socially responsible firms have higher levels of firm-specific information diffusion. However, the size of firms plays a negative moderating role in this relationship. There is a positive and significant relationship between primary (technical) CSR activities and information diffusion among larger firms, while this relationship is reversed for secondary (institutional) CSR activities for similar firms. This study contributes to existing literature by providing empirical evidence on the CSR-Informativeness relationship, the moderating role of firm size and identifying the importance of primary stakeholders' CSR in US firms. This study has important policy implications for company management as it provides legitimacy to their CSR engagements, and to investors that CSR engagements should be considered as pricing factor.

Keywords: corporate social responsibility, stock price informativeness, principal component analysis, market efficiency, dynamic panel model.

1. Introduction

For an efficient capital market, it is important that stock prices reflect all available firm-specific information. Modigliani and Miller (1963) assumed that firm management and investors have the same level of information. However, in the presence of information asymmetry managers often have more information about a firm's affairs than other stakeholders. To facilitate the dissemination of information, firms provide disclosure through formal communications such as financial reporting or informal communications such as management forecasts, analyst presentations, and voluntary disclosures about

activities related to corporate social responsibility (CSR). By providing these disclosures, management attempts to reduce information asymmetry. In the presence of information asymmetry, stock price informativeness can be severely affected. Aside from regulated financial reporting, the voluntary disclosure of engagement in CSR activities may play a pivotal role in increasing firm-specific information diffusion. Fieseler (2011) argued that engagement in, and disclosure of, CSR activities can increase information flow from management to outside investors, and can improve stock price informativeness. Cho et al. (2013) found an inverse relationship between a firm's engagement in CSR and its level of information asymmetry. Furthermore, investors incorporate CSR-related disclosures in stock prices by penalizing socially irresponsible behavior and rewarding those firms that engaged in socially responsible behavior (Krüger, 2009).

CSR-related activities can be viewed by investors from a stakeholder theory perspective or from an agency theory perspective. Under stakeholder theory, CSR activities lead to a reduction in the cost of equity capital (Dhaliwal et al., 2011), more accurate forecasts by analysts (Dhaliwal et al., 2012), favorable recommendation by analysts (Ioannou and Serafeim, 2015), attract more analysts for following (Hong and Kacperczyk, 2009), and more information about stock risk (Spicer, 1978). On the other hand, agency theory perspective views CSR as an agency conflict between management and shareholders as management uses CSR for managerial benefit. Sprinkle and Maines (2010) argued that CSR may result in immediate cash outflows resulting in an opportunity cost. Barnea and Rubin (2010) argue that in circumstances under which socially responsible activities do not increase firm value then, potentially, valuable recourses are wasted. These findings concur with an earlier study by Mahapatra (1984) who found that the efficiency of CSR is questionable from an investor perspective.

The contradictory view about the impact of CSR-related activities raises the question of whether CSR contributes to price informativeness and, if it is the case, whether better informativeness is uniform regardless of the size of the firm. Although the relationship between CSR and information asymmetry has been studied extensively (Fieseler, 2011; and Cho et al., 2013). The linkage between CSR and informativeness has not yet been explored. This study addresses this question by empirically exploring the CSR-informativeness relationship. We used a sample consisting of 1,219 US listed companies which have data on the KLD CSR disclosure database from 2000 to 2012.

This study extends the existing literature on the CSR-Informativeness relationship by focusing on whether the size of a firm has any role in this relationship. We test the moderating effect of size on the CSR-informativeness relationship. Over or underestimation of the impact of CSR on informativeness of stock prices may occur due to the omission of this moderating effect. Second, we used principal component analysis (PCA) for the construction of CSR index for better estimation results as compared with the raw estimation technique for constructing a CSR index as used by Chen at al., (2014)

in which different aspects of CSR are added to form a composite index. Justification from this approach is that raw summation method suffers from several problems as discussed by Goss and Roberts (2011).

We extend the literature by focusing on activities affecting primary stakeholders (technical CSR) and secondary stakeholders (institutional CSR). Mattingly and Berman (2006) linked stakeholder classification provided by Freeman et al. (2008) with CSR activities and classified CSR into technical and institutional CSR. We used these two classifications separately in our investigation of the CSR-Informativeness relationship. To the best of the authors' knowledge this linkage has not been explored in the CSR-informativeness context. This study contributes to the literature by identifiying the presence of persistency and an adjustment mechanism in informativeness of stock returns. This suggests that using dynamic panel models is the most appropriate method when conducting empirical investigations on stock price informativeness.

Our empirical findings suggest that stock prices of socially responsible firms are more informative however, this informativeness is not uniform among all firms. The size of firms plays a negative moderating role in the CSR-informativeness relationship suggesting that the marginal impact of CSR on informativeness decreases with an increase in the size of firms. In terms of technical and institutional CSR activities, we found that technical CSR positively affects informativeness while institutional CSR is negative among large firms.

Our results indicate the importance of engagement in CSR activities and have important policy implications for management and investors alike. Management can use CSR-related activities to reduce information asymmetry. However, for shareholders, they need to be conscientious investors who value firms that are engaged in socially responsible behaviors.

The rest of the paper is organized as follows; Section two provides a literature review and hypothesis development; section three develops the empirical methodology adopted in this research; section four provides the data sources and a summary of descriptive statistics. Empirical estimations are reported in section five and section six concludes the paper.

2. Literature Review and Hypothesis Development

The efficient market hypothesis assumes information symmetry as advocated by Modigliani and Miller (1963). However, the symmetric information assumption is violated when management has more information about a firm affair than other stakeholders. Management use financial reporting and disclosure to communicate its performance and governance to outside parties including investors (Healy and Palepu,

2001). CSR can play its information asymmetry-reduction role and have a positive association with stock price informativeness through multiple ways.

First, the disclosure of engagement in CSR activities may improve the flow of firm-specific information to outsiders thus mitigating information asymmetry. In line with this argument, Cho et al. (2013), by using KLD stats data on CSR and annual averages of the ratio of daily closing bid-ask spreads to closing stock price as a measure of information asymmetry, found that the level of engagement in socially responsible activities helps reduce information asymmetry. Their findings suggest that socially responsible performance rewards investors in the form of a reduction in information asymmetry. Similarly, Cui et al. (2018) used analysts' forecast dispersion and transaction costs in the market as information asymmetry measures and found an inverse relationship between socially responsible engagement and information asymmetry. Lopatta et al. (2016) investigated if firms benefit from their commitment to CSR and found that CSR-oriented firms build investor confidence by providing benefits from lower information asymmetry. However, there is a need to further investigate whether this reduction in information asymmetry leads to higher stock price informativeness. Stock price informativness is the next step in informationally-efficient price discovery and is important because of its direct implications to efficient capital allocation (Wurgler, 2000; Durnev et al., 2003), comprehending managerial decisions (Durnev et al., 2004; Chen et al., 2007; Frésard, 2012) and information gathering about firms' future earnings (Durnev et al., 2003; Jiang et al., 2009).

Second, CSR disclosures may affect stock price movements which can lead to non-synchronicity of stock prices. This stock price movement can be upward or downward based upon investors' responses towards CSR engagement. From a stakeholder theory perspective investors perceive CSR as a value enhancing activity which can lead to an upward movement in stock prices. By using event study methodology with a sample of firms from CDP Korea in 2008-09, Lee et al. (2015) provided evidence that voluntary disclosure related to environmental CSR effects stock price movement and concluded that disclosures related to carbon emissions negatively affect stock prices. Jones and Murrel (2001) earlier illustrated these findings by using a framework of an informed investor, wherein investors in the presence of information asymmetry, invest in firms with better CSR scores assuming that only financially sound firms invest in CSR activities. Alniacik et al. (2011) used 'between-subject experimental design' methodology and concluded that keeping every other aspect of the firm constant, positive (negative) CSR enhances (diminishes) consumer intention to purchase products, employees' intention to seek employment with and investors intention to invest in the stocks of the focal company. From an agency theory perspective, Sprinkle and Maines (2010) argued that although stakeholder groups demand socially responsible firms, they are not in favor of firms abandoning their profit maximization aims. Cash outflow

requirements of CSR may result in opportunity costs adversely affecting profit maximization goals of organizations. Barnea and Rubin (2010) further suggest that CSR is a source of conflict among different shareholders and in most cases managers take additional benefits at the cost of other stakeholders. Combining both stakeholders and agency theory perspectives, the benefits/costs of engagement in CSR activities should be reflected in stock prices which can lead to non-synchronicity of stock prices as documented by Chen et al. (2014) who reported that engagement in CSR increases idiosyncratic volatility of stock returns.

Third, CSR-oriented firms can attract more analysts and improve analysts' information environment resulting in highly informational stock prices. Support for this argument can be found by the studies of Ioannou and Serafeim (2015) who found that socially responsible firms attract more coverage from analysts and Cormier and Magnan (2014) who studied the relationship between CSR disclosures, corporate governance and financial analysts' information environement and found that there exists a direct relationship between both CSR and corporate governance and financial analysts' information environment. They suggest that CSR influences the forecast precision of analysts.

Based on these arguments, we propose our first hypothesis as:

- **H_1:** All else being the same, disclosure of CSR activities increase stock price informativeness.

Stakeholder theory posits that disclosure of engagement in CSR activities helps in the reduction of information asymmetry and thus increases price informativeness. However, according to legitimacy theory, there exists a social contract between an organization and the society in which it operates (Deegan and Unerman, 2000). Corporations try to legitimize their corporate actions by engaging in CSR activities and disclosure thereto. Because large firms are followed and scrutinized more due to their scope and scale of operations, as compared to small size firms, it can lead to higher societal demands of legitimizing activities. Under such circumstances, small size firms can have higher marginal benefits of CSR engagement and disclosures in comparison to large size firms. Therefore, the size of the firm can have a moderating role in CSR-informativeness relationship. Moreover, theoretical work by Udayasankar (2008) suggests that firm size and motivations for CSR participation has a U-shaped relationship due to perceived expected benefits from such participation. Different sized firms may have different benefit expectations from engagement in CSR. We test this notion through our analysis to find out if information diffusion benefits of CSR differ according to firm size? Based upon these arguments, we expect a moderating role of firm size in the CSR-informativeness relationship. We hypothesize:

- **H_2:** All else being the same, the magnitude of the effect of CSR disclosures on stock price informativeness is more for small firms than large firms.

Freeman et al. (2008) categorised corporate stakeholders into two groups: primary stakeholders – those who are necessary for the organization and secondary stakeholders – those who can influence primary stakeholders. Mattingly and Berman (2006) provided empirical evidence to support such a classification for CSR-related stakeholders using the KLD database. Technical CSR (TCSR) is linked with primary stakeholders and include employee relations, product quality, diversity, and governance. Institutional CSR (ICSR) is related to secondary stakeholders and includes environmental and community-related information disclosures. Both TSCR and ICSR potentially reduce information asymmetry and may have a positive impact on price informativeness. However, TCSR-related disclosures seem more relevant in CSR-informativeness relationships and may act like insurance during times of adverse events (Godfrey et al., 2009). A similar study conducted by Marhfor et al. (2017) on the relationship between CSR and stock price informativeness in Canadian firms found that CSR has a positive association with stock price informativeness but that this relationship differs among different dimensions of CSR. Based on this argument, we hypothesize both TCSR and ICSR are positively related to stock price informativeness.

- **H_3:** All else being same, Technical CSR significantly increases stock price informativeness.
- **H_4:** All else being same, Institutional CSR significantly increases stock price informativeness.

We provide a visual presentation of the above developed hypotheses in figure 1 showing direction of relationship between dependent and independent variables.

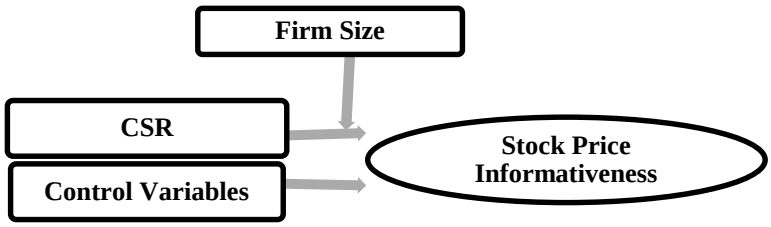

Figure 1: Research Model

3. Empirical Methodology

The relationship between CSR activities and stock price informativeness persists over time and is contemporously correlated. This means that the level of informativeness of a stock is inversely related to the stock price momentum. The persistence or momentum in stock prices is reported on extensively in finance literature (Fama and French, 1988; Lo and MacKinlay 1988; Poterba and Summers, 1988; and Jegadeesh, 1990). Unobservable heterogeneity problems may arise due to the unobservable differences among firms that do not vary over time and which directly affect the levels of informativeness of each firm. The panel data model offers useful opportunities for taking these latent characteristics of firms into account by modeling them as individual effects which can then be eliminated. To test the proposed hypotheses we used the Generalized Method of Moments (GMM) estimator developed by Arellano and Bond (1991). GMM allows for the control of unobservable heterogeneity problems as well as possible endogeneity between dependent and independent variables. The GMM model can be specified as:

$$INFO_{it} = \alpha + \partial INFO_{it-1} + \beta_1 CSR_{it} + \beta_2 SIZE_{it} + \beta_3 CSR \times SIZE_{it} + \sum_{i=1}^{n} \gamma_i X_{it} + \varepsilon_{it} \quad (1)$$

Where $\varepsilon_{it} = \varepsilon_i + v_{it}$

The dependent variable $INFO_{it}$ measures price informativeness, estimated non-sychronicity of stock returns, for firm i at time t, with $i = 1, \dots, N$ and $t = 1, \dots, T$. N denotes the number of cross-sectional observations and T the length of the sample period. The model further consists of a constant term, measured by the scalar α, and of a vector of $k \times 1$ slope parameters (β) that estimates the size of the explanatory variables. The explanatory variables are divided into $1 \times k$ vectors of firm-specific, market-specific, and expert opinion-specific variables, where k refers to the number of slope parameters for the different variable classes. The coefficient (β_0) of the 'one-period lagged dependent variable' measures the adjustment speed of stock price informativeness to equilibrium. A value of ∂ between 0 and 1 implies that informativeness will eventually return to their equilibrium but some degree of informativeness persistence exists. Finally, the model includes a one-way error disturbance term ε_{it} capturing a firm-specific or fixed effect (ε_i) and a remainder or idiosyncratic effect that varies over time and between firms (v_{it}).

For testing the above hypotheses, we develop the following covariates.

3.1 Stock Price Informativeness Measure

In an efficient market informed investors adjust stock prices when new information is released to the market. However, individual stocks do reflect more information than the market predicts (Roll, 1988; Durnev et al., 2003; Morck et al., 2000). Roll (1988), while using the coefficient of determination (R^2) as a proxy for market synchronicity, found that the explanatory power of widely used market models (capital asset pricing and

arbitrage pricing) is limited when explaining individual stock returns. In an ideal situation when market returns can explain stock returns, R^2 of the model should be equal to one. However, when R^2 is less than one, it implies that firms' diffuse specific information in the market and is not sensitive to market returns (Roll, 1988). Veldkamp (2006) suggests that information production (collection and processing) for individual stocks is expensive therefore; investors use a common subset of information for price adjustments to all assets. This may result in prices varying more than stock-fundamentals would predict. Morck et al. (2000) suggest that the level of firm-specific information diffusion increases as its synchronicity with market return (R^2) decreases. There is a plethora of empirical literature explaining the reasons for non-synchronicity including contagion (Kodres and Pritsker, 2002; Kyle and Xiong, 2001), lack of transparency (Jin and Myers, 2006), style investing (Barberis and Shleifer, 2003), sentiments of investors (Barberis et al., 2005) and corporate social responsibility (Chen et al., 2014). In our study we use the inverse of the standard measure of price synchronicity as introduced by Roll (1988) and later used by Morck et al. (2000) and Chen et al. (2014). The firm specific information diffusion ($info_i$) is a function of a logistically transformed ratio of non-synchronicity of stock returns with that of synchronicity market returns:

$$INFO_i = \log\left(\frac{1-R_i^2}{R_i^2}\right) \qquad (2)$$

Where $INFO_i$ measures the level of informativeness for stock *i*, R^2 is the coeffecient of determination and explains the variation in return of stock *i* by the overall stock market movement. While (1- R^2) is the level of variation in stock *i*'s return unexplained by market return. We hypothesize that firm-specific information diffusion increases as its non-synchronicity (1- R^2) increases with market returns. R^2 is obtained from a two factor capital asset pricing model:

$$R_{it} = \alpha_0 + \beta R_{mt} + \varepsilon_{it} \quad (3)$$

Where R_{it} is the return of company *i* at time *t*, and R_{mt} is a value-weighted local market return in time *t*.

3.2 Corporate Social Responsibility

In recent literature, an additive index of strengths and weaknesses is used as a proxy to determine the level of CSR activities among non-financial firms (Oikonomou et al., 2012; Godfrey, 2009; Bae et al., 2011; Verwijmeren and Derwall, 2010; and El Ghoul et al., 2011). Under this method, a CSR score is obtained by subtracting the cumulative concerns score from cumulative strengths score of each company. Mathematically this is portrayed as:

$$CSR_{i,t} = \sum_{f=1}^{n} comp\_str_{f,c,t} - \sum_{f=1}^{n} comp\_con_{f,c,t} \qquad (4)$$

Where f indicates the number of indicators used for the construction of the index, $comp\_str_{fct}$, and $comp\_con_{fct}$ are cumulative strengths and weaknesses of indicator f

respectively. Deng et al. (2013) argued that this methodology is biased in terms of the number of indicators in every aspect. Aspects having more indicators will get more weight in the net score using the additive rule. For example, if environmental CSR is having more indicators as compared to community CSR then adding both aspects with equal weights will result in a higher score for environmental CSR as compared to community CSR. To remove this bias, Deng et al. (2013), proposed dividing the cumulative raw score by the number of aspects in each indicator.

$$CSR_{i,t} = \sum_{f=1}^{n} \frac{\sum indi_{comp\_str_{i,c,t}}}{\#\ of\ aspect_{comp\_str_{i,c,t}}} - \sum_{f=1}^{n} \frac{\sum indi_{comp\_con_{i,c,t}}}{\#\ of\ indi_{comp\_con_{i,c,t}}} \quad (5)$$

Although this methodology helped to alleviate the aforementioned problem, this methodology still treats every indicator equally. To address this problem we used a principal component analysis (PCA) approach for the construction of a CSR index. Under additive approaches, CSR scores are ordinal and provide only the relative performance score of every firm but not the variation. While with the PCA approach, by assigning weights to each component based on the relative correlation, it not only provides the relative performance matrix but also explains the maximum variation (Goss and Roberts, 2011).

For principal component analysis, we used the algorithmic approach of Cutter et al. (2003). We did PCA on standardized data as proposed by Schmidtlein et al. (2008). After standardization of data, we applied PCA that provided the orthogonal components. These orthogonal components are linear combinations of all input standardized variables. The first component is a linear combination of all variables which explain maximum variation. The second component contains second maximum variation and so on. For selection criteria, we used Kaiser Criterion to select a parsimonious subset of components. There are three methods available to construct a single index from selected components. The first component can be used as the final index as it explains maximum variation in the input variables (Goss and Roberts, 2011). Second, an index can be constructed by using equal weights to selected components. Third, an index from PCA is constructed by giving weights to each of the selected components according to the proportion of their explanatory power. The next subsection explains the control variables used in our empirical analysis.

3.3 Other Control Variables

The literature on the impact of CSR activities on stock price informativeness identifies several control variables. We divided these variables into three groups: market value based control variables, expert opinion based control variables and firm-specific control variables. These are discussed next.

Among market value based control variables we used the systematic risk ($BETA_{it}$) of a stock. Investors with fully diversified portfolios assume only systematic risk. A drift from market risk is not compensated by investors. This may result in a decrease of firm-specific information diffusion. We control for investor diversification through the use of a $BETA_{it}$ estimated by using the market model as developed in Equation (3). A negative relationship of $BETA_{it}$ with informativenss suggests that capital market compensates only for the systematic risk assumed. The Market-to-book ratio (MB_{it}) shows the optimism investors have towards the future growth potential of a particular stock. A firm with a high market-to-book ratio shows that investors are more optimistic about the future growth potential of the firm hence it increases the investor base and more information diffusion. We expect a positive relationship of MB_{it} with informativeness. Dividend payment can also affect the informativeness of a stock. Companies paying consistent dividends are considered to be stable companies. On the other hand, investors looking for growth may avoid dividend-paying companies assuming that firms that pay dividends do not have future potential growth. To proxy for dividend payments, DD_{it} is a dummy variable equal to unity if firm *i* paid dividend in year *t*, zero otherwise.

For expert opinion-based variables, we used industry analysts and auditors as experts to control for CSR-informativeness relationship. The level of firm-specific informativeness can increase as the number of analysts covering an individual firm increases. Also, positively recommended firms by analysts may catch the attention of investors and hence stock price informativeness increase. We control analyst coverage ($ANCOV_{it}$) by taking a log of one plus the number of analysts' covering a firm in a particular year. We measure analyst recommendations ($ANREC_{it}$) by taking the average of inverted analysts' recommendation scores. Analyst recommendation score take 1 for "strong buy", 2 for "buy", 3 for "hold", 4 for "underperform", and 5 for "sell". We inverted this score by subtracting it from 6 which resulted in a series showing a large number for good performance indicators and vice versa so that the result can be viewed and interpreted with ease.

Auditors' trust in the financial reporting process can affect the informativeness of stock price. Informativeness increases as investors' trust on financial reporting increases while collecting, processing and incorporating firm-specific information into the stock price. We control for the auditor's opinion on financial reporting and the auditor's opinion on the robustness of the internal controls. Auditor opinion ($ADOP_{it}$) is coded 0 for "unaudited", 1 for "unqualified opinion", 2 for "qualified opinion", 3 for "Disclaimer or No opinion", 4 for "Unqualified opinion" with explanatory language. We restructured this coding by giving a minimum number to "No opinion or Disclaimer" and maximum number to an "unqualified opinion" and then took log of 1+number. We restructured this coding so that a larger score shows more auditor trust and vice versa and results can be presented and interpreted with clarity. We used two variables related to the auditors'

opinion: auditor trust on financial reporting ($ADTR_{it}$) and auditor opinion on internal control ($ADOP_{it}$).

As profitable firms are more attractive to investors profitability can increase the amount of firm-specific information diffusion. We measure profitability using a ratio of net income to book value of equity (ROE_{it}). We expect a positive relationship of ROE_{it} with informativeness. Leverage increases the overall riskiness of firms. Investors may have negative sentiments about highly leveraged firms and may refrain or forego a particular investment due to the level leverage. The ratio long-term debt to total assets (LEV_{it}) is used to proxy for leverage. A negative association is expected between the leverage and informativeness.

Merton (1987) suggests that in the presence of information asymmetry investors' focus on a subset of securities available in the market. The selection of this subset of securities may depend on the ease of information availability and the size of the firm. Similarly, investors' response to firm-specific information may differ based on the size of firms. Several studies have identified the size of a company as being a key determinant of the informativeness level in stock prices (Morck et al., 2000; Cho et al., 2013; Ioannou and Serafeim, 2015). We use a log of market capitalization as a proxy for the size of a firm ($SIZE_{it}$). For formally examining the moderating effect of the size of the CSR-informativeness relationship we used an interactive term of size and CSR. We expect a negative moderating effect of size on the CSR-informativeness relationship implying that price informativeness increases with a decrease in firm size.

To control for the impact of the financial crisis on informativeness, a dummy variable FC is used, which takes the value of one for the time period of the financial crisis, otherwise zero. As the impact of the financial crisis was not resolved fully till the end of our study period, FC took a value of 1 for year 2008 to 2012 and zero otherwise.

4. Data Sources and Descriptive Statistics

This section describes the sources of data used in the empirical analysis and presents summary descriptive statistics. The sample comprises of annual data for all non-financial firms reporting on KLD Research and Analytics (KLD) database from 2000 to 2012. We used data till 2012 due to the fact that KLD stats database has been acquired by RiskMetrics which restructured the contents of the database after 2012 and, therefore, pose serious consistency issues. Waddock and Graves (1997) considered KLD data as a standard database of corporate social responsibility and has been used in a number of studies including, but not limited to, Oikonomou et al. (2012), Godfrey et al. (2009), Bae et al., (2011), Verwijmeren and Derwall (2010) and El Ghoul et al. (2011).

KLD rank companies in thirteen dimensions of CSR: community, diversity, governance, employee relations, human rights, environment, product, alcohol, gambling, firearms,

military, tobacco, and nuclear power. From these dimensions, the first seven dimensions have data in the form of strengths and concerns while the later six dimensions are dichotomous variables having score 1 if the company is involved in any of the above industries and 0 otherwise. Under the first seven dimensions, companies can receive strength for better performance in a particular aspect of social responsibility while it can have weakness/concern for socially irresponsible behavior in a particular aspect. We developed a socially responsible index by using these seven aspects after excluding firms from banking and insurance industries due to their regulated nature. Annual financial statement data and daily stock price data is obtained from DataStream. Auditor-related data is obtained from Audit Analytics Dataset from Compustat. Data on variables related to analysts is obtained from IBES (Institutional Brokers Estimate System) provided by Thomson Financial.

Initially, there were a total of 660 firms available in the KLD database in year 2000 but had increased to 3034 firms in 2012. Matching these firms with financial and stock price data, we got a final sample of 300 firms (minimum) in 2000 and 1,219 (maximum) in 2012 with a total number of firm-year observations at 12,630. To avoid survivorship bias entry into, and exit from, the sample was not restricted. In addition, as CSR have large positive or negative outliers therefore we winsorize CSR variable at the 1^{st} and 95^{th} percentile of their respective distributions.

For empirical analysis, the sample is divided into three subsamples (small, medium and large) based on company size (market capitalization). Table 1 reports the differences in means analysis of three subsamples for the level of informativeness and raw CSR scores. It is clearly evident that that mean CSR is significantly higher for large firms as compared to medium and small firms. However, there is no signficant difference between medium and small firms in terms of their CSR scores. On the other hand, stocks of small firms reflected higher levels of informativeness as compared with medium and large firms. These significant differences highlight the fact that the CSR-informativeness behavior of smaller firms is different from that of larger firms.

Table 1: Differences in Means of Three Subsamples

Informativeness			**CSR**		
A. Small and Medium size firms			D. Small and Medium size firms		
Group	N	Mean	Group	N	Mean
Small	3940	1.108054	Small	3940	-0.735787
Medium	4204	0.869169	Medium	4204	-0.701713
Combined	8144	0.98474	Combined	8144	-0.718197
Diff	0.238886***	0.023094	Diff	-0.034074	0.0421984
		t = 10.3439			t = -0.8075
B. Medium and Large size firms			E. Medium and Large size firms		
Group	N	Mean	Group	N	Mean
Medium	4204	0.869169	Medium	4204	-0.701713
Large	4486	1.062425	Large	4486	0.1484619
Combined	8690	0.968933	Combined	8690	-0.262831
Diff	-0.19326***	0.024146	Diff	-0.850175***	0.0652669
		t = -8.0038	t = -13.0261		
C. Small and Large size firms			F. Small and Large size firms		
Group	N	Mean	Group	N	Mean
small	3940	1.108054	Small	3940	-0.735787
Large	4486	1.062425	Large	4486	0.1484619
Combined	8426	1.083761	Combined	8426	-0.265013
Diff	0.04563**	0.025632	Diff	-0.884249***	0.0644169
		t = 1.7802			t = -13.7270

Differences in means analysis of three subsamples for the level of informativeness (A to C) and raw CSR scores (D to F). Sample time period is 2000-2012. CSR data is from KLD stats database.

Table 2 reports the summary of descriptive statistics from Panel A to D for small firms, medium firms, large firms, and overall sample respectively. Aside from the raw CSR score, all three subsamples report different behavior in terms of TCSR and ICSR. Larger firms report a higher score in both aspects while medium and small firms lag behind each other. In terms of control variables, future growth potential is measured by market-to-book ratio and is highest among large firms. Small firms reported a negative return on equity during the sample period. Large firms were more profitable as compared to medium sized firms during the same time period. Large size firms are highly leveraged as compared with medium and small sized firms.

Systematic risk of small firms is considerably higher than average benchmark risk while medium and large sized firms show lower systematic risk as compared with the benchmark. In terms of analyst coverage, large firms enjoy more coverage as compared

with medium and small firms while analyst recommendation scores shows an almost similar pattern across subsamples. Audit opinion scores show that small firms are having a higher level of auditors' trust as compared with medium and large sized firms.

Table 2: Summary of Descriptive Statistics

	A. Small size firms			B. Medium size firms			C. Large size firms			D. Overall sample firms		
Variable	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**
INFO	3940	1.1081	1.0952	4204	0.8692	0.9886	4486	1.0624	1.239	12630	1.0123	1.1203
ADJ_CSR	3940	-0.234	0.447	4204	-0.202	0.519	4486	-0.088	0.866	12630	-0.172	0.650
RAW_CSR	3940	-0.738	1.675	4204	-0.702	2.062	4486	0.106	3.476	12630	-0.426	2.596
FIRSTPC_CSR	3940	-0.065	0.502	4204	-0.087	0.701	4486	0.133	1.335	12630	-0.002	0.941
EQ_PC_CSR	3940	0.352	0.743	4204	0.098	0.984	4486	-0.393	1.828	12630	0.003	1.333
WGT_PC_CSR	3940	0.165	0.371	4204	0.043	0.495	4486	-0.182	0.916	12630	0.001	0.666
INST_CSR	3940	-0.040	0.550	4204	-0.078	0.905	4486	0.113	1.812	12630	0.002	1.241
TEC_CSR	3940	-0.696	1.492	4204	-0.622	1.648	4486	0.028	2.433	12630	-0.414	1.952
INST_ADJCSR	3940	-0.003	0.127	4204	-0.004	0.209	4486	0.030	0.438	12630	0.008	0.297
TEC_ADJCSR	3940	-0.230	0.405	4204	-0.198	0.422	4486	-0.116	0.587	12630	-0.179	0.485
INST_FIRSTPC	3940	-0.040	0.625	4204	-0.108	1.045	4486	0.001	1.883	12630	-0.048	1.322
TEC_FIRSTPC	3940	-0.031	0.952	4204	-0.104	1.177	4486	0.032	1.820	12630	-0.033	1.387
BETA	3940	1.0733	0.3928	4204	0.9543	0.3919	4486	0.7401	0.3919	12630	0.9154	0.4159
MB	3758	0.5815	0.7454	4101	0.8547	0.6693	4418	1.0803	0.7044	12277	0.8523	0.7344
ANCOV	2316	1.7055	0.6317	2511	2.0887	0.6647	3140	2.6293	0.5968	7967	2.1904	0.7369
ANREC	2316	1.2721	0.1868	2511	1.2639	0.1632	3140	1.264	0.1184	7967	1.2663	0.1551
ADOP	3940	1.4087	0.1112	4204	1.4283	0.1096	4486	1.4351	0.1067	12630	1.4246	0.1096
ADTR	3940	1.223	0.4526	4204	1.1781	0.4577	4486	1.1358	0.4579	12630	1.1771	0.4576
ROE	3926	-0.3675	16.269	4192	0.0838	2.488	4477	0.2418	7.882	12595	-0.0007	10.329
LEV	3923	0.1849	0.2468	4191	0.2125	0.192	4477	0.2141	0.1528	12591	0.2045	0.1993
SIZE	3940	5.8778	0.6251	4195	7.3027	0.3726	4486	9.2367	1.0315	12621	7.5453	1.5656

Descriptive statistics shows subsamples of small, medium, large size firms and overall sample firms containing data from 2000 to 2012. INFO is informativeness constructed using equation (3). Raw_CSR is CSR index constructed adding Raw scores, ADJ_CSR is adjusted CSR, FIRST_PC_CSR is CSR using first component of PCA, EQ_PC_CSR is CSR using equally weighted selected components of PCA, WGT_PC_CSR is CSR using weighted scores of selected components of PCA. BETA is systemic risk, MB is Market to Book ratio, DD is dividend payout ratio, ANCOV is analyst coverage, ANREC is analyst recommendations, ADOP is auditor opinion on internal controls, ADTR is auditor opinion on reporting, ROE is return on equity, LEV is leverage, SIZE is size , FC is dummy for financial crisis.

These descriptive statistics support our argument regarding the moderating effect of size and difference of technical and institutional CSRs and requires further investigation. The

next section provides a discussion on empirical results obtained from the empirical model developed in Section three.

5. Empirical Estimation and Results

This section reports the estimation results for the empirical model as developed in Equation (1) on the impact of engagement in CSR activities on stock-price informativeness.

Table 3 reports the estimation results based on five alternative CSR measures: unadjusted (Raw) CSR, adjusted CSR, first component PCA CSR, equally weighted PCA CSR and weighted average PCA CSR in Panels A to E respectively. The coefficient of $INFO_{it-1}$ is positive and significant with values between the range of 0 and 1 suggesting the presence of persistency in the level of informativeness. This further confirms the appropriateness of using estimation methodology for empirical analysis.

Among the most notable results, the coefficient of CSR is positive and significant irrespective of the CSR measure used. This suggests that a higher level of involvement in positive CSR activities mitigates information asymmetry between shareholders and management. These findings are in line with stakeholder theory suggesting that engagement and disclosure of CSR activities has value generation ability. Specifically, our findings are in line with literature showing that CSR helps reduce information asymmetry (Cho et al., 2013; Cui et al., 2018; Lopatta et al., 2016), results in idiosyncratic stock price movement (Lee et al, 2015; Jones and Murrel, 2001; Alniacik et al., 2011; Sprinkle and Maines 2010; Chen et al., 2014), and more analysts' coverage and information environment (Ioannou and Serafeim , 2015; Cormier and Magnan, 2014). The coefficient of SIZE×CSR interaction is negative and significant irrespective of what CSR measure is used for estimations. This suggests that the size of firm impacts price informativeness; price informativeness declined as firms increase in their size during the sample period. This finding is in line with legitimacy theory under which the marginal contribution of CSR diminishes with the size of the firm. This can be attributed to the fact that firms larger in size are usually followed by more analysts and also disseminate more information as compared with small and medium sized firms. Therefore, the stock price of larger firms is more aligned with that of the market. Financial crisis dummy is negative and significant which supports the argument that during the financial crisis overall stock price informativeness declined.

Among market-based control variables, MB_{it} is positive and significant in small firms irrespective of the CSR measure used, validating the argument that growth stocks grab more investor attention and thus spreads more firm-specific information. The coefficient of $BETA_{it}$ is negative and significant showing that as systematic risk increases, firm-level information diffusion decreases. The coefficient of DD_{it} is positive and slightly

significant suggesting that dividend-paying firms exhibit higher levels of price informativeness.

The direction and significance of covariates on 'expert opinion' control variables are generally consistent with expectations. The coefficient of 'analyst coverage' ($ANCOV_{it}$) is positive and significant suggesting that high analyst coverage results in better information dissemination. This can be attributed to the fact that information collection and processing increases as the number of analysts covering a firm increase. Similarly, auditor assurance on financial reporting and auditor trust on internal controls are positive and significant with the level of information diffusion. This suggests that investor's confidence in the auditors' opinion enhances stock price informativeness. Also, it suggests that investors' access to reliable public information improves price efficiency. Surprisingly, the coefficient of $ANROC_{it}$ is negative and significant irrespective of what CSR measures are used implying that investors do not see strong recommendations by analysts as a mitigating factor. A plausible explanation for the negative coefficient may be the diversity of recommendations by analysts.

Among financial statement-based control variables, the coefficient ROE_{it} is positive and significant suggesting that stock prices of profitable firms contain higher firm-specific information. The coefficient on LEV_{it} is insignificant among all models. This suggests that stock informativeness is not highly sensitive to the 'financial statement-based risk' variable. This can be attributed to the historic nature of this information. The most notable of the financial statement-based control variables is the size of the firm. The coefficient on $SIZE_{it}$ is negative and significant irrespective of the CSR measure used, suggesting that stock price informativeness decreases with an increase in the size of firms. This also suggests that smaller firms can send positive signals to the market by their involvement in CSR activities. Moreover, the coefficient of $SIZE_{it}$-CSR_{it} interaction is also negative confirming that information diffusion is inversely related with the size of firms. Financial crisis dummy is negative and significant thus supporting the argument that during the financial crisis overall stock price informativeness declined.

In summary the empirical results suggest that a higher level of CSR engagement (disclosure) significantly increases firm-specific price informativeness. However, it is unclear whether such a relationship is uniform among all firms irrespective of size especially in the presence of a negative significant relationship of informativeness with size and interactive term (CSR×Size). These findings warrant further investigation as to how the level of CSR activities affects the price informativeness based on the size of firms.

Table 3: Regression Results

	(A)	(B)	(C)	(D)	(E)
Variables	$info_{it}$	$Info_{it}$	$info_{it}$	$Info_{it}$	$info_{it}$
$INFO_{it-1}$	0.0561***	0.0617***	0.0566***	0.0561***	0.0562***
	(0.0148)	(0.0146)	(0.0148)	(0.0147)	(0.0147)
CSR_{it}	0.329***	1.179***	0.739***	0.448***	0.912***
	(0.0339)	(0.108)	(0.113)	(0.0702)	(0.140)
$CSR \times SIZE$	-0.0325***	-0.107***	-0.0742***	-0.0432***	-0.0882***
	(0.00369)	(0.0118)	(0.0119)	(0.00760)	(0.0152)
$BETA_{it}$	-1.664***	-1.684***	-1.661***	-1.661***	-1.661***
	(0.0733)	(0.0726)	(0.0738)	(0.0739)	(0.0739)
MB_{it}	0.0703*	0.0875**	0.0757*	0.0851**	0.0846**
	(0.0414)	(0.0412)	(0.0417)	(0.0415)	(0.0416)
DD_{it}	0.115**	0.0952*	0.126**	0.132**	0.132**
	(0.0578)	(0.0574)	(0.0598)	(0.0611)	(0.0610)
$ANCOV_{it}$	0.118***	0.117***	0.122***	0.127***	0.127***
	(0.0226)	(0.0224)	(0.0229)	(0.0230)	(0.0229)
$ANREC_{it}$	-0.157***	-0.149**	-0.171***	-0.177***	-0.177***
	(0.0597)	(0.0596)	(0.0596)	(0.0591)	(0.0591)
$ADOP_{it}$	0.491***	0.509***	0.505***	0.485***	0.485***
	(0.118)	(0.117)	(0.117)	(0.117)	(0.117)
$ADTR_{it}$	0.203***	0.179***	0.202***	0.186***	0.186***
	(0.0208)	(0.0204)	(0.0209)	(0.0211)	(0.0211)
ROE_{it}	0.00517***	0.00566***	0.00560***	0.00590***	0.00589***
	(0.00186)	(0.00179)	(0.00181)	(0.00177)	(0.00177)
LEV_{it}	0.0669	-0.0461	0.0843	0.0689	0.0694
	(0.213)	(0.211)	(0.215)	(0.213)	(0.213)
$SIZE_{it}$	-0.167***	-0.201***	-0.158***	-0.171***	-0.171***
	(0.0385)	(0.0381)	(0.0387)	(0.0386)	(0.0386)
FC_{it}	-0.824***	-0.833***	-0.828***	-0.836***	-0.836***
	(0.0301)	(0.0297)	(0.0303)	(0.0297)	(0.0298)
Constant	2.940***	3.246***	2.805***	2.909***	2.907***
	(0.375)	(0.371)	(0.376)	(0.375)	(0.376)
Firm Clustering	YES	YES	YES	YES	YES
Observations	5,933	5,933	5,933	5,933	5,933
Chi2 Probability	0.00	0.00	0.00	0.00	0.00

Regression results of equation (1) with interactive term of CSR and Size under Arellano-Bond dynamic panel-data estimation and without interactive term. Standard errors are robust and clustered on firm level. The independent variable CSR in Panel A to E is an index of CSR disclosures of KLD stat constructed based on raw CSR scores, adjusted CSR, first component of PCA, equally weighted selected components of PCA, and weighted average of PCA respectively. BETA is systemic risk, MB is Market to Book ratio, DD is dividend payout ratio, ANCOV is analyst coverage, ANREC is analyst recommendations, ADOP is auditor opinion on internal control, ADTR is auditor opinion on reporting, ROE is return on equity, LEV is leverage, SIZE is size , FC is dummy for financial crisis.

To test our third hypothesis, we repeat our estimations by dividing the sample into three subsamples: large, medium and small firms and results are reported in Table 4. Similar to our results for overall firms, we used five different measures to construct CSR index.

Table 4: Regression Results

	(1)			(2)			(3)			(4)			(5)		
VARIABLES	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
$INFO_{it-1}$	-0.0323	-0.0684**	0.127***	-0.0306	-0.0535*	0.130***	-0.0277	-0.0753**	0.127***	-0.0262	-0.0763**	0.127***	-0.0261	-0.0762**	0.127***
	(0.0297)	(0.0306)	(0.0182)	(0.0297)	(0.0300)	(0.0181)	(0.0300)	(0.0310)	(0.0183)	(0.0297)	(0.0309)	(0.0183)	(0.0297)	(0.0309)	(0.0183)
CSR	0.164***	0.102***	0.0129	0.550***	0.432***	0.157***	0.502***	0.217***	0.00374	0.251***	0.146***	0.0167	0.519***	0.295***	0.0323
	(0.0174)	(0.0139)	(0.00825)	(0.0533)	(0.0473)	(0.0278)	(0.0666)	(0.0473)	(0.0198)	(0.0387)	(0.0255)	(0.0131)	(0.0770)	(0.0512)	(0.0262)
BETA	-1.344***	-1.341***	-2.305***	-1.368***	-1.370***	-2.307***	-1.339***	-1.339***	-2.308***	-1.335***	-1.356***	-2.304***	-1.335***	-1.355***	-2.304***
	(0.108)	(0.0998)	(0.143)	(0.107)	(0.0980)	(0.143)	(0.110)	(0.100)	(0.143)	(0.112)	(0.100)	(0.142)	(0.112)	(0.100)	(0.142)
MB	0.308***	0.0859	0.0298	0.305***	0.106	0.0484	0.311***	0.0824	0.0273	0.303***	0.0894	0.0299	0.303***	0.0893	0.0298
	(0.0818)	(0.0738)	(0.0664)	(0.0830)	(0.0719)	(0.0668)	(0.0825)	(0.0742)	(0.0663)	(0.0836)	(0.0745)	(0.0663)	(0.0835)	(0.0745)	(0.0663)
DD	0.00919	0.143*	0.155	0.00187	0.118	0.128	0.0254	0.155*	0.155	0.0526	0.158*	0.149	0.0516	0.157*	0.149
	(0.0841)	(0.0848)	(0.0967)	(0.0834)	(0.0809)	(0.0945)	(0.0868)	(0.0870)	(0.0966)	(0.0930)	(0.0909)	(0.0964)	(0.0925)	(0.0905)	(0.0964)
ANCOV	0.128***	0.119***	0.113***	0.130***	0.119***	0.111***	0.137***	0.116***	0.115***	0.150***	0.123***	0.113***	0.150***	0.123***	0.113***
	(0.0384)	(0.0317)	(0.0390)	(0.0384)	(0.0315)	(0.0390)	(0.0391)	(0.0322)	(0.0391)	(0.0403)	(0.0323)	(0.0390)	(0.0402)	(0.0323)	(0.0391)
ANREC	-0.0719	-0.117	-0.342***	-0.0907	-0.110	-0.314**	-0.0913	-0.114	-0.345***	-0.141	-0.102	-0.347***	-0.138	-0.102	-0.347***
	(0.0971)	(0.0771)	(0.122)	(0.0954)	(0.0780)	(0.123)	(0.0966)	(0.0791)	(0.122)	(0.0954)	(0.0784)	(0.123)	(0.0954)	(0.0784)	(0.122)
ADOP	-0.123	-0.0622	0.892***	-0.0885	-0.0528	0.858***	-0.107	-0.0181	0.893***	-0.0987	-0.0366	0.876***	-0.0990	-0.0378	0.877***
	(0.210)	(0.159)	(0.173)	(0.204)	(0.156)	(0.174)	(0.210)	(0.157)	(0.173)	(0.217)	(0.155)	(0.174)	(0.217)	(0.155)	(0.174)
ADTR	0.206***	0.0677**	0.186***	0.199***	0.0589*	0.143***	0.195***	0.0651**	0.196***	0.182***	0.0493	0.187***	0.182***	0.0495	0.187***
	(0.0433)	(0.0312)	(0.0319)	(0.0415)	(0.0310)	(0.0321)	(0.0438)	(0.0314)	(0.0318)	(0.0449)	(0.0313)	(0.0324)	(0.0448)	(0.0313)	(0.0323)
ROE	0.0853***	0.00650	0.00440*	0.0885***	0.00832	0.00455*	0.0837***	0.00669	0.00447*	0.0784**	0.00781	0.00450*	0.0785**	0.00784	0.00450*
	(0.0310)	(0.0115)	(0.00259)	(0.0308)	(0.0106)	(0.00254)	(0.0312)	(0.0117)	(0.00261)	(0.0309)	(0.0115)	(0.00259)	(0.0309)	(0.0115)	(0.00259)
LEV	-0.191	-0.150	0.0576	-0.279	-0.221	-0.0385	-0.145	-0.145	0.0784	-0.134	-0.124	0.0643	-0.133	-0.125	0.0645
	(0.272)	(0.436)	(0.261)	(0.274)	(0.435)	(0.260)	(0.273)	(0.439)	(0.260)	(0.279)	(0.439)	(0.260)	(0.278)	(0.439)	(0.260)
SIZE	-0.488***	-0.181***	-0.00514	-0.484***	-0.202***	-0.0527	-0.492***	-0.188***	0.00626	-0.497***	-0.196***	-0.00235	-0.497***	-0.196***	-0.00213
	(0.0883)	(0.0647)	(0.0535)	(0.0890)	(0.0637)	(0.0540)	(0.0888)	(0.0650)	(0.0539)	(0.0894)	(0.0650)	(0.0537)	(0.0894)	(0.0650)	(0.0537)
FC	-0.886***	-0.890***	-0.756***	-0.877***	-0.874***	-0.801***	-0.895***	-0.901***	-0.740***	-0.909***	-0.900***	-0.751***	-0.908***	-0.900***	-0.751***
	(0.0535)	(0.0446)	(0.0442)	(0.0534)	(0.0440)	(0.0437)	(0.0544)	(0.0440)	(0.0446)	(0.0545)	(0.0434)	(0.0438)	(0.0545)	(0.0434)	(0.0439)
Constant	5.607***	3.682***	1.364**	5.609***	3.862***	1.917***	5.522***	3.625***	1.241**	5.470***	3.679***	1.376**	5.467***	3.682***	1.371**
	(0.620)	(0.593)	(0.614)	(0.625)	(0.588)	(0.618)	(0.621)	(0.595)	(0.621)	(0.633)	(0.592)	(0.625)	(0.632)	(0.592)	(0.625)
Observations	1,470	1,823	2,640	1,470	1,823	2,640	1,470	1,823	2,640	1,470	1,823	2,640	1882	2168	2878
chi2 probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Regression results of equation (1) under Arellano-Bond dynamic panel-data estimation and without interactive term. Standard errors are robust and clustered on firm level. (1) Raw, (2) adjusted, (3) first PC, (4) equally weighted PC and (5) weighted PC measures of CSR are given in Panels 1 to 5 respectively. INFOit-1 is lag of dependent variable under dynamic settings. BETA is systemic risk, MB is Market to Book ratio, DD is dividend payout ratio, ANCOV is analyst coverage, ANREC is analyst recommendations, ADOP is auditor opinion on internal control, ADTR is auditor opinion on reporting, ROE is return on equity, LEV is leverage, SIZE is size , FC is dummy for financial crisis. Sample period is 2000-2012.

One of the major differences in estimation results of the subsample from that of the overall sample is the change in sign and level of significance for coefficients of CSR_{it} with informativeness of large firms. For large firms, this shift in significance level highlights the role of CSR in reducing information asymmetry based on the size of firms. This synchronization of large companies with the market can be attributed to the coverage that large companies usually receive from media and analysts. This is further confirmed by the insignificance of analyst recommendation variables ($ANROC_{it}$) for small and medium firms irrespective of the CSR measure used. This suggests that small and medium firms, by engaging in CSR activities, send positive signals to investors and thus reduce information asymmetry. These highly significant results validate our argument that the size of firms plays a moderating role in CSR-informativeness relationship. A positive effect of CSR on informativeness is high for smaller firms in comparison to larger firms indicating that with an increase in firm size, the positive effect of CSR on informativeness diminishes.

Among other notable differences is the positive and highly significant coefficient of $ROE_{it.}$ For small firms it is significant, for large firms it is insignificant, and for medium firms it is slightly significant. This suggests that higher returns-on-equity for smaller firms sends positive signals to the market. However, dividend payment (DD_{it}) is insignificant irrespective of the size of firms suggesting that dividend payment does not contribute to information diffusion.

Overall, empirical estimation found in Table 4 highlights important differences on the level of informativeness based on the size of firms. The impact of engagement in CSR is more pronounced for smaller firms as compared with larger firms. The level of informativeness is positively correlated with the return-on-equity for smaller firms while analyst recommendations are significant for larger firms only.

For testing our third and fourth hypothesis, we regress technical and institutional CSR on informativeness along with all control variables. Our equation is as follows:

$$Info_{it} = \alpha + \beta_0 Info_{it-1} + \beta_1 TCSR_{it} + \beta_2 ICSR_{it} + \sum_{i=1}^{n} \gamma_i X_{it} + \varepsilon_{it} \quad (6)$$

Where $TCSR_{it}$ is technical CSR while $ICSR_{it}$ is institutional CSR while X_{it} is vector of control variables. Table 5 presents the estimation results based on Equation 6. With additive CSR measures, $TCSR_{it}$ is positively increasing firm-specific information diffusion while $ICSR_{it}$ is insignificant for small firms. On the other hand, it is significantly decreasing for medium and large firms. Adjusted CSR index $TCSR_{it}$ remaining positive and significant while $ICSR_{it}$ is insignificant for all subsamples.

Table 5: Regression Results

	(1)			(2)			(3)		
	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$	$Info_{it}$
VARIABLES	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
INFOit-1	-0.0390	-0.0567*	0.123***	-0.0331	-0.0495*	0.127***	-0.0202	-0.0685**	0.123***
	(0.0294)	(0.0301)	(0.0183)	(0.0294)	(0.0300)	(0.0181)	(0.0290)	(0.0301)	(0.0186)
$TCSR_{it}$	0.188***	0.154***	0.0749***	0.632***	0.558***	0.265***	0.289***	0.197***	0.0902***
	(0.0180)	(0.0144)	(0.0116)	(0.0560)	(0.0504)	(0.0441)	(0.0273)	(0.0199)	(0.0139)
$ICSR_{it}$	-0.0971**	-0.113***	-0.0854***	-0.176	-0.150	-0.0127	-0.0444	-0.105***	-0.105***
	(0.0495)	(0.0277)	(0.0128)	(0.167)	(0.137)	(0.0631)	(0.0565)	(0.0251)	(0.0125)
$BETA_{it}$	-1.348***	-1.367***	-2.337***	-1.366***	-1.378***	-2.322***	-1.351***	-1.377***	-2.327***
	(0.105)	(0.0979)	(0.142)	(0.105)	(0.0973)	(0.143)	(0.107)	(0.0990)	(0.141)
MB_{it}	0.301***	0.0888	0.0320	0.298***	0.109	0.0477	0.294***	0.101	0.0373
	(0.0811)	(0.0720)	(0.0655)	(0.0828)	(0.0713)	(0.0654)	(0.0838)	(0.0718)	(0.0647)
DD_{it}	0.000257	0.131	0.138	-0.00536	0.131	0.121	0.0248	0.117	0.110
	(0.0828)	(0.0901)	(0.0998)	(0.0826)	(0.0850)	(0.0945)	(0.0868)	(0.0936)	(0.101)
$ANCOV_{it}$	0.121***	0.126***	0.127***	0.124***	0.129***	0.121***	0.146***	0.134***	0.116***
	(0.0382)	(0.0307)	(0.0381)	(0.0382)	(0.0307)	(0.0388)	(0.0385)	(0.0315)	(0.0380)
$ANREC_{it}$	-0.0844	-0.113	-0.294**	-0.0986	-0.110	-0.315**	-0.126	-0.110	-0.275**
	(0.0952)	(0.0719)	(0.121)	(0.0942)	(0.0745)	(0.123)	(0.0903)	(0.0733)	(0.122)
$ADOP_{it}$	-0.148	-0.103	0.897***	-0.112	-0.0698	0.875***	-0.157	-0.126	0.755***
	(0.211)	(0.161)	(0.177)	(0.204)	(0.154)	(0.174)	(0.226)	(0.167)	(0.176)
$ADTR_{it}$	0.212***	0.0774**	0.214***	0.203***	0.0673**	0.150***	0.173***	0.0597**	0.197***
	(0.0428)	(0.0306)	(0.0320)	(0.0409)	(0.0308)	(0.0324)	(0.0432)	(0.0303)	(0.0318)
ROE_{it}	0.0877***	0.00439	0.00388	0.0879***	0.00703	0.00428*	0.0806**	0.00748	0.00397
	(0.0307)	(0.0111)	(0.00260)	(0.0308)	(0.0108)	(0.00250)	(0.0314)	(0.0107)	(0.00253)
LEV_{it}	-0.215	-0.156	0.0590	-0.298	-0.229	-0.0368	-0.210	-0.149	-0.0182
	(0.269)	(0.432)	(0.260)	(0.272)	(0.434)	(0.259)	(0.272)	(0.426)	(0.259)
$SIZE_{it}$	-0.483***	-0.164**	0.0102	-0.477***	-0.196***	-0.0512	-0.498***	-0.194***	0.00809
	(0.0875)	(0.0640)	(0.0534)	(0.0889)	(0.0635)	(0.0538)	(0.0910)	(0.0637)	(0.0525)
FC_{it}	-0.882***	-0.864***	-0.703***	-0.870***	-0.859***	-0.794***	-0.900***	-0.881***	-0.663***
	(0.0523)	(0.0455)	(0.0442)	(0.0527)	(0.0449)	(0.0427)	(0.0535)	(0.0447)	(0.0463)
Constant	5.663***	3.615***	1.105*	5.646***	3.830***	1.881***	5.683***	3.815***	1.353**
	(0.623)	(0.586)	(0.609)	(0.627)	(0.583)	(0.616)	(0.651)	(0.588)	(0.598)
firm clustering	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,470	1,823	2,640	1,470	1,823	2,640	1,470	1,823	2,640
chi2 probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Regression results of equation (7) under Arellano-Bond dynamic panel-data estimation. Standard errors are robust and clustered on firm level. TCSR is technical CSR, ICSR is Institutional CSR, (1) shows Raw CSR score, (2) adjusted CSR and (3) CSR through PCA BETA is systemic risk, MB is Market to Book ratio, DD is dividend payout ratio, ANCOV is analyst coverage, ANREC is analyst recommendations, ADOP is auditor opinion on internal controls, ADTR is auditor opinion on reporting, ROE is return on equity, LEV is leverage, SIZE is size of firm in logarithmic term, FC is dummy for financial crisis. Sample period is 2000-2012.

With CSR measures developed using PCA, $TCSR_{it}$ is positive and signigicant for all subsamples. On the other hand $ICSR_{it}$ is negative and significant for large firms but insignificant for small and medium firms. By reading these two findings together it suggests that $TCSR_{it}$ is more relevant in CSR-informativeness relationships while $ICSR_{it}$ is assumed by investors as an inefficient use of resources by large firms as indicated by the agency theory perspective of CSR.

6. Conclusion

The economic consequence of corporate social responsibility on firm valuation is quite a contentious. For some, voluntary participation in CSR-related activities may be considered as philanthropic activities to enhance management influence (agency-problem view). For others, by engaging in CSR activities, management is sending a signal to the market and is seeking to reduce information asymmetry. This paper contributes in this debate and sheds light on the informativeness function of CSR. We argue that by engagement and disclosure of socially responsible activities, firms attempt to increase the stock price informativeness and thus mitigate information asymmetry.

This study contributes to existing literature on CSR and stock price informativeness in three ways. First, our findings suggest that stock prices of socially responsible firms are more informative. Considering benefits of informativeness include efficient capital allocation (Wurgler, 2000; Durnev et al., 2003), comprehending managerial decisions (Durnev et al., 2004; Chen et al., 2007; Frésard, 2012) and information gathering about firms' future earnings (Durnev et al., 2003; Jiang et al., 2009) management should engage in and provide voluntary disclosures about their CSR activities. Second, we contribute to the CSR-informativeness literature by providing evidence that informativeness contribution of CSR is not uniform among all firms. In line with legitimacy theory, our analysis provides empirical evidence that the size of firms plays a negative moderating role in CSR-informativeness relationships. This finding has important policy implication especially for large firms suggesting that they should perform in a highly responsible way legitimize activities. Third, after splitting CSR into primary (technical) and secondary (institutional) stakeholders, we found that technical CSR positively affects informativeness while institutional CSR is negative among large

firms. Based upon these findings we suggest that managers should consider different dimensions of CSR under budgetary constraints and chose those dimensions for voluntary actions which have maximum benefits for their firm.

6.1 Limitations and Future Research

This study opens up multiple avenues for future research despite some data-related limitations. The data set used in this study to construct CSR measures has been collected from the KLD STATS database. Although this is one of the most comprehensive databases on CSR and is used in large number of studies, there are a few shortcomings to this database.

Chatterji et al. (2009) analyzed the KLD database and found that although the CSR ratings are capturing CSR issues reasonably well, it does not optimize public information. Furthermore, the KLD database gives ordinal numbers which gives the relative performance of firms but not the variations. In this study, principal component analysis (PCA) approach is used to circumvent this problem. The CSR index based on a PCA approach not only provides a relative performance matrix but also explains the maximum variation by assigning weights to each component based on relative correlation (Goss and Roberts, 2011).

Another limitation of this study is related to the generalization of the results. This study uses data from US non-financial firms. Maignan and Ralston (2002) suggest that what is deemed to be socially responsible differs considerably between countries. The researcher's choice of which CSR issues to emphasize may lead to a problem in generalization of results. A comparative study from different countries/regions can provide a better understanding of CSR perspectives and may be a good avenue for future research. Furthermore, it will be fruitful to conduct a study on developing versus developed countries' perspectives of corporate social responsibility subject to the data availability.

6.2 Acknowledgments

We would like to thank Dr. Barbara Marie L'Huillier, and participants of NBS PhD seminar for their valuable feedback on an earlier draft. We would also like to thank the anonymous referees for their helpful comments and suggestions that enabled us to improve the quality of this paper considerably. The views expressed in this paper are those of the author(s) and do not necessarily reflect the views of the Islamic Research and Training Institute or the Islamic Development Bank Group. All the remaining errors are the responsibility of the authors

REFERENCES

Alniacik, U., Cigerim, E., Akcin, K., & Bayram, O. (2011). Independent and joint effects of perceived corporate reputation, affective commitment and job satisfaction on turnover intentions. *Procedia-Social and Behavioral Sciences*, *24*, 1177-1189.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277-297.

Bae, K. H., Kang, J. K., & Wang, J. (2011). Employee treatment and firm leverage: A test of the stakeholder theory of capital structure. *Journal of Financial Economics*, *100*(1), 130-153.

Barberis, N., & Shleifer, A. (2003). Style investing. *Journal of financial Economics*, *68*(2), 161-199.

Barberis, N., Shleifer, A., & Wurgler, J. (2005). Comovement. *Journal of Financial Economics*, *75*(2), 283-317.

Barnea, A., & Rubin, A. (2010). Corporate social responsibility as a conflict between shareholders. *Journal of Business Ethics*, *97*(1), 71-86.

Chatterji, A. K., Levine, D. I., and Toffel, M. W. (2009). How well do social ratings actually measure corporate social responsibility? *Journal of Economics and Management Strategy*, *18*(1), 125-169.

Chen, Q., Goldstein, I. & Jiang, W. (2007). Price informativeness and investment sensitivity to stock price. *The Review of Financial Studies*, *20*(3), 619-650.

Chen. G., Wang. B., & Wang. X. (2014). Corporate Social Responsibility and the Informativeness of Stock Prices, working paper, [online] Available at: www.fma.org/Nashville/Papers/CSR_INFO_20140115.pdf (July 11th, 2017).

Cho, S. Y., Lee, C., & Pfeiffer, R. J. (2013). Corporate social responsibility performance and information asymmetry. *Journal of Accounting and Public Policy*, *32*(1), 71-83.

Cormier, D., & Magnan, M. (2014). The impact of social responsibility disclosure and governance on financial analysts' information environment. *Corporate Governance*, *14*(4), 467-484.

Cui, J., Jo, H., & Na, H. (2018). Does corporate social responsibility affect information asymmetry? *Journal of Business Ethics*, 148(3), 549-572.

Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003). Social vulnerability to environmental hazards. *Social Science Quarterly*, *84*(2), 242-261.

Deegan, C., Rankin, M., and Voght, P. (2000). Firms disclosure reactions to major social incidents: Australian evidence. *Accounting Forum*, *24*(1), 101-130.

Deng, X., Kang, J. K., & Low, B. S. (2013). Corporate social responsibility and stakeholder value maximization: Evidence from mergers. *Journal of Financial Economics*, *110*(1), 87-109.

Dhaliwal, D. S., Li, O. Z., Tsang, A., & Yang, Y. G. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *The Accounting Review*, *86*(1), 59-100.

Dhaliwal, D. S., Radhakrishnan, S., Tsang, A., & Yang, Y. G. (2012). Nonfinancial disclosure and analyst forecast accuracy: International evidence on corporate social responsibility disclosure. *The Accounting Review*, *87*(3), 723-759.

Durnev, A., Morck, R. & Yeung, B. (2004). Value-enhancing capital budgeting and firm-specific stock return variation. *The Journal of Finance, 59*(1), 65-105.

Durnev, A., Morck, R., Yeung, B., and Zarowin, P. (2003). Does Greater Firm-Specific Return Variation Mean More or Less Informed Stock Pricing. *Journal of Accounting Research*, *41*(5), 797–836.

El Ghoul, S., Guedhami, O., Kwok, C. C., & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking & Finance*, *35*(9), 2388-2406.

Fama, E. F., & French, K. R. (1988). Permanent and temporary components of stock prices. *Journal of Political Economy*, *96*(2), 246-273.

Fieseler, C. (2011). On the corporate social responsibility perceptions of equity analysts. *Business Ethics: A European Review*, *20*(2), 131-147.

Freeman R. E., Harrison J. S., and Wicks A. C. (2008). Managing for Stakeholders: Survival, Reputation, and Success, Yale University Press: New Haven, CT.

Frésard, L. (2012). Cash savings and stock price informativeness. *Review of Finance, 16*(4), 985-1012.

Godfrey, P. C., Merrill, C. B., & Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: An empirical test of the risk management hypothesis. *Strategic Management Journal*, *30*(4), 425-445.

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

Healy, P. M., and Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, *31*(1), 405-440.

Hong, H., & Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics*, *93*(1), 15-36.

Ioannou, I., & Serafeim, G. (2015). The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strategic Management Journal*, *36*(7), 1053-1081.

Jegadeesh, N. (1990). Evidence of predictable behavior of security returns. *The Journal of Finance*, *45*(3), 881-898.

Jiang, G. J., Xu, D. and Tong, Y. (2009). The information content of idiosyncratic volatility. *Journal of Financial & Quantitative Analysis*, *44*(1), 1-28.

Jin, L., & Myers, S. C. (2006). R 2 around the world: New theory and new tests. *Journal of financial Economics*, *79*(2), 257-292.

Jones, R., & Murrell, A. J. (2001). Signaling positive corporate social performance: An event study of family-friendly firms. *Business & Society*, *40*(1), 59-78.

Kodres, L. E., and Pritsker, M. (2002). A rational expectations model of financial contagion. *The Journal of Finance*, *57*(2), 769-799.

Krüger, P. (2009) 'Corporate Social Responsibility and the Board of Directors', Toulouse School of Economics working paper, [online] Available at: https://www.ebs.edu/fileadmin/redakteur/funkt.dept.economics/Colloquium/jmp_krueger.pdf (August 21st, 2017).

Kyle, A. S. and Xiong, W. (2001). Contagion as a wealth effect. *The Journal of Finance*, *56*(4), 1401-1440.

Lee, S. Y., Park, Y. S., & Klassen, R. D. (2015). Market responses to firms' voluntary climate change information disclosure and carbon communication. *Corporate Social Responsibility and Environmental Management*, *22*(1), 1-12.

Lo, A. W., & MacKinlay, A. C. (1988). Stock market prices do not follow random walks: Evidence from a simple specification test. *The Review of Financial Studies*, *1*(1), 41-66.

Lopatta, K., Buchholz, F., & Kaspereit, T. (2016). Asymmetric information and corporate social responsibility. *Business & Society*, *55*(3), 458-488.

Mahapatra, S. (1984). Investor reaction to a corporate social accounting. *Journal of Business Finance & Accounting*, *11*(1), 29-40.

Maignan, I., and Ralston, D. A. (2002). Corporate social responsibility in Europe and the US: Insights from businesses' self-presentations. *Journal of International Business Studies*, *33*(3), 497-514.

Marhfor, A., & Bouslah, K & M'Zali B., (2017). Corporate Social Responsibility and Stock Price Informativeness: Evidence from the Canadian Market. RBF working paper. [Online] Available at: https://www.st-andrews.ac.uk/business/rbf/workingpapers/RBF17_011.pdf

Mattingly, J. E., & Berman, S. L. (2006). Measurement of corporate social action: Discovering taxonomy in the Kinder Lydenburg Domini ratings data. *Business & Society*, *45*(1), 20-46.

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *The Journal of Finance*, *42*(3), 483-510.

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: a correction. *The American Economic Review*, *53*(3), 433-443.

Morck, R., Yeung, B., & Yu, W. (2000). The information content of stock markets: why do emerging markets have synchronous stock price movements? *Journal of Financial Economics*, *58*(1), 215-260.

Oikonomou, I., Brooks, C., and Pavelin, S. (2012). The impact of corporate social performance on financial risk and utility: A longitudinal analysis. *Financial Management*, *41*(2), 483-515.

Poterba, J. M., and Summers, L. H. (1988). Mean reversion in stock prices: Evidence and implications. *Journal of Financial Economics*, *22*(1), 27-59.

Roll R. (1988). R^2. *Journal of Finance, 43*(3), 541-566.

Schmidtlein, M. C., Deutsch, R. C., Piegorsch, W. W., & Cutter, S. L. (2008). A sensitivity analysis of the social vulnerability index. *Risk Analysis*, *28*(4), 1099-1114.

Spicer, B. H. (1978). Market risk, accounting data and companies' pollution control records. *Journal of Business Finance and Accounting, 5*(1), 67–83.

Sprinkle, G. B., & Maines, L. A. (2010). The benefits and costs of corporate social responsibility. *Business Horizons*, *53*(5), 445-453.

Udayasankar, K. (2008). Corporate social responsibility and firm size. *Journal of Business Ethics*, *83*(2), 167-175.

Veldkamp, L. L. (2006). Information markets and the comovement of asset prices. *The Review of Economic Studies*, *73*(3), 823-845.

Verwijmeren, P., and Derwall, J. (2010). Employee well-being, firm leverage, and bankruptcy risk. *Journal of Banking and Finance*, *34*(5), 956-964

Waddock, S., and Graves, S. (1997). The corporate social performance-financial performance link. *Strategic Management Journal, 18*, 303–319.

Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics, 58*(1-2), 187-214.