

Impact of Controlling Shareholders on Corporate Social Responsibility under External Financial Constraints^{*}

HEE SUB BYUN^{}**

*Hallym University
Chuncheon, Korea*

JI HYE LEE^{*}**

*Korea University Business School
Seoul, Korea*

KYUNG SUH PARK^{**}**

*Korea University Business School
Seoul, Korea*

Abstract

This study examines the relationship between the ownership of controlling shareholders and corporate social responsibility in Korea under external financial constraints. Empirical results show that a negative relationship is observed only in firms with fewer external financial constraints, while it is weaker or disappears for firms with more financial constraints. We obtain similar results when we use the level of environmental management as a proxy for corporate social responsibility. These results confirm that external financial constraints act as a monitoring mechanism and mitigate the agency problem of controlling shareholders.

Keywords: controlling shareholders, conflict of interest, corporate social responsibility, external financial constraints, Korea

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** First author, Assistant Professor, Department of Finance, College of Business, Hallym University, E-mail: heesbyun@hallym.ac.kr, Tel: 82-33-248-1856.

*** Corresponding author, Ph.D. in finance, Korea University Business School, E-mail: jihye.lee.kr@gmail.com, Tel: 82-2-3290-1950.

**** Professor, Korea University Business School, E-mail: kspark@korea.ac.kr, Tel: 82-2-3290-1950.

INTRODUCTION

Within the context of firms' sustainability of organizations, corporate social responsibility (CSR) has been steadily attracting the attention of investors in global financial markets. In accordance with this trend, firms are undertaking considerable efforts to set up a CSR strategy that would contribute to their overall sustainability. Inevitably, academic researchers have expanded the debate regarding whether or how CSR influences firm value (Li and Zhang 2010; Jo and Harjoto 2011). The firm as a nexus of contracts faces conflicts of interest among various stakeholders (Williamson 1985), and the principal-agent model is one important theory that explains how such contracts are developed. This model focuses on the agency problem that may occur when corporate insiders or managers want to increase their private benefit of control within a context of information asymmetry. As the size of the firm increases, corporate insiders could increase their private benefit of control proportionally; therefore, they have an incentive to overinvest in negative net present value projects and exploit shareholders' wealth (Jensen and Meckling 1976). Similarly, in such a situation, managers would prefer to increase their expenditure on CSR (Beltratti 2005). Brown, Helland, and Smith (2006) argue that firms with high CSR have greater agency costs, thus concurring with findings that show that CSR costs outweigh its benefits (Friedman 1970), as well as with those that find no relationship between CSR and firm value (Ullmann 1985). Based on the principal-agent model, recent studies have analyzed the relationship between ownership structure and CSR. Barnea and Rubin (2010) find that as the level of insider ownership decreases, conflict of interests between managers and shareholders regarding investment in CSR increases.¹⁾ These results imply that corporate insiders can manipulate CSR to expand their private benefit of control. Harjoto and Jo (2011) also find a negative relationship between managers' ownership of a firm and CSR.

Meanwhile, this study extends the existing literature to Korea, an economy where most listed firms have a controlling shareholder,

1) On the other hand, stakeholder theory argues that enhancement of CSR can reduce conflict of interests, since it helps firms make more profit in the future, reduce legal restrictions, and comply with investor demand of moral acts (Carroll 1999).

who is also a manager. The traditional principal-agent system has focused on the agency problem between managers and shareholders under a dispersed ownership structure (Berle and Means 1932). However, contrary to the assumption of dispersed ownership, a large number of firms in the real world have concentrated ownership structures that provide substantial powers to controlling shareholders. Particularly in emerging markets with weak legal protection for shareholders, most firms have controlling shareholders whose influence in decision-making exceeds that of managers (Claessens, Djankov, and Lang 2000). As various studies have shifted their focus on the conflict of interest between corporate insiders and outsiders, there is also a need for a different perspective in investigating the relationship between ownership structure and CSR (Shleifer and Vishny 1997; La Porta, Lopez-de-Silanes, and Shleifer 1999). Consequently, we assume that in emerging markets, the ownership of controlling shareholders—rather than the ownership of managers—should be considered as an essential factor in determining the level of CSR. Acknowledging the limitations of previous studies that examine only developed countries, this study further extends the analysis to emerging market firms.

More importantly, this study shows that the relationship between ownership structure and CSR is moderated by external financial constraints, which are closely linked to the company's default risk. In perfect capital markets, since external funds entirely substitute internal cash flow (Modigliani and Miller 1958), corporate investment decisions are not affected by financial factors such as the availability of internal finance or access to new debt or equity financing. However, in the real world, it is appropriate to assume market imperfections and constraints with respect to access to capital markets. Thus, corporate investment decisions depend on the availability of internal cash flow or external financial constraints (Fazzari, Hubbard, and Petersen 1988). In this regard, greater external financial constraints are closely related to higher default risk, and previous literature shows that the level of such constraints significantly affects corporate value and managerial behavior (Lamont, Polk, and Saá-Requejo 2001; Almeida, Campello, and Weisbach 2004).

On the other hand, information asymmetry between corporate insiders and external investors causes external financial constraints and firms with more information asymmetry would be burdened

with a higher cost of capital (Myers and Majluf 1984). In this context, the effect of the ownership structure on CSR as observed in previous literature changes according to the level of external financial constraints.

To the best of our knowledge, this is the first study to examine whether and how the relationship between insider ownership, namely the ownership of controlling shareholders and CSR is affected by external financial constraints within an emerging market context. Existing literature investigates the direct effects of internal and external stakeholders on CSR. However, one single theory cannot easily explain CSR; rather, the broader and comprehensive relationship among firms and the capital markets should be considered. Thus, this study examines the reciprocal relationship between firm characteristics and the incentives of controlling shareholders, and seeks to understand how CSR decisions are made. The results show that the agency problem of controlling shareholders with respect to CSR can be mitigated by the discipline imposed by the capital markets.

We use Korean data, which we believe are well suited to the analysis for several reasons. First, many firms in Korea have concentrated ownership and the controlling shareholders have significant influence on managerial decision-making (Claessen, Djankov, and Lang 2000). They can play an active role in management, including weighing in on major investment decisions as well as the appointment of managers. Therefore, Korea provides a suitable environment for analyzing the relationship between the ownership of controlling shareholders and CSR. Second, the developing capital markets of Korea obstruct efficient external financing of local firms. Emerging markets have relatively less developed financial markets compared to developed countries; therefore, firms tend to rely more on internal systems rather than market mechanisms when they raise capital (Khanna and Palepu 2000; Khanna and Rivkin 2001). Under such an environment, the varied levels of external financial constraints among firms would lead to different behaviors among corporate decision-makers.

Moreover, to check the robustness of the results, this study considers environmental management (EM) in addition to CSR to test our hypothesis of the monitoring role of financial markets on managerial decision-making. Because of global resource depletion and environmental destruction, developed countries and the United

Nations (UN) have persistently raised the question of sustainability of the global economy. However, since both EM and CSR may not bring visible rewards in the short term, they can be used as a means of overinvestment by controlling shareholders. Thus, this study examines whether the relationship between the ownership of controlling shareholders and EM changes with the level of external financial constraints, thereby extending the scope of previous studies on the factors that affect EM.

This study employs panel data analysis using 724 Korean firms listed on the Korea Exchange (KRX) from 2010 to 2011. We use the CSR and EM indices provided by the Korea Corporate Governance Service (KCGS), which is a non-profit institution specializing in the assessment of both areas. While previous studies used indices that were selected and calculated by their authors, they are limited by the possibility that the authors could have chosen those specific items as a proxy for CSR in order to come up with empirical results they deemed appropriate. On the other hand, the KCGS indices are based on objective data, which enhances the academic integrity of the present study.

This study uses the summation of the ownership of controlling shareholders and their relatives as a proxy for the ownership of controlling shareholders. Such shareholders would increase their say on CSR to maximize their cash flow rights beyond managers. We first run regressions and investigate whether the relationship between insider ownership—that is, the ownership of controlling shareholders—and CSR suggested in Barnea and Rubin (2010) exists in Korea. As external financial constraints are due to information asymmetry, we incorporate this variable into the tests. We use the standard deviation in the residuals of stock returns of the previous year, credit rating, number of analyst reports, and the disclosure quality index from KCGS to measure the level of information asymmetry. Based on the median of these proxies, we create high external financial constraint dummy variables and examine whether the effect of interaction variables between these dummies and the ownership of controlling shareholders on CSR varies according to the level of such constraints. Considering the correlation between the ownership of controlling shareholders and the proxies for external financial constraints, we also divide the sample into two groups based on the median of each proxy and compare the relationship in each set.

The results of the study are as follows: as the ownership of controlling shareholders decreases, CSR increases. More importantly, the negative relationship between the ownership of controlling shareholders and CSR is influenced by external financial constraints after controlling for the level of internal cash flow. We find that the negative relationship is stronger for firms with fewer external financial constraints, while it is weaker or disappears for firms with greater constraints. This result means that the incentives of controlling shareholders to overinvest are mitigated by external market discipline, and the result is robust in various measures of such constraints. To alleviate the endogeneity issue between the ownership of controlling shareholders and CSR, we employ the 2SLS approach by using an instrument variable and confirm the same results. Lastly, the moderating effect of external financial constraints is consistently observed in analysis using EM as an alternative proxy for CSR.

The rest of this paper is organized as follows. The next section discusses related prior literature and develops our hypotheses. Then, we describe the data, variables, and methodologies. The next section reports the results, and the final section presents the conclusions.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Earlier studies on this subject have found that the corporate governance structure affects CSR. Barnea and Rubin (2010) examine the effect of insiders' ownership and capital structure on CSR ratings based on the agency theory proposed by Jensen and Meckling (1976). Corporate insiders are known to overinvest to enlarge the business and pursue their private benefit. Barnea and Rubin (2010) empirically find that when corporate insiders have low ownership CSR ratings improve. Assuming that higher CSR ratings are associated with higher CSR expenditure levels, they interpret this result as supporting the hypothesis that insiders induce firms to overinvest in CSR when they bear little of the cost of doing so. Meanwhile, they do not find a significant relationship between institutional ownership and CSR, but they show that firms with lower leverage invest more in CSR. Considering that firms with large amount of debt are less likely to overinvest because they

face a higher bankruptcy risk, the negative relationship between the leverage ratio and CSR ratings is interpreted as supporting the overinvestment theory. Harjoto and Jo (2011) hypothesize a negative relationship between managers' ownership and CSR expenditure, but their result is not statistically significant. However, they support the overinvestment theory finding that firms with weak corporate governance invest more in the CSR. Preston and O'Bannon (1997) find managers reducing expenses on CSR to increase short-term profits and private benefits. However, because these findings are based on the analysis of firms from developed countries, these cannot be generalized to emerging markets, in which the environment and the level of shareholder protection are very different. Analyzing an emerging market, Oh, Chang, and Martynov (2011) investigate the effect of the ownership of managers, institutional investors, and outside directors on CSR expenditure in Korea. They find a negative relationship between the managers' ownership and CSR. However, the ownership by institutions and foreign investors has a positive relationship with CSR, while outside directors' ownership has an insignificant effect. On the other hand, Johnson and Greening (1999) discover a positive relationship between the ownership of outside directors and executives and CSR. Bartkus, Morris, and Seifert (2002) find that firms with relatively less ownership by institutional investors donate larger amounts as a proxy for CSR. On analyzing stock ownership and company contributions to charity, Atkinson and Galaskiewicz (1988) find that companies gave less money to charity if the CEO or some other individual owned a significant percentage of stock in the company.

Meanwhile, this study examines the relationship between controlling shareholders' ownership structure and CSR in Korea. Most of the existing literature is based on the data of advanced countries. However, firms in Korea, an emerging market, have concentrated ownership, which could lead to different results. For instance, Oh, Chang, and Martynov (2011) use Korean data and find a negative relationship between top management ownership and CSR expenditure. However, in most Korean companies, controlling shareholders, and not professional managers, have the actual power to make managerial decisions—including the appointment of professional managers. In this sense, Oh, Chang, and Martynov (2011) acknowledge that the managers of companies with controlling families might adopt policies that benefit the families at the expense

of other stakeholders. Therefore, investigating the relationship between the incentive of controlling shareholders based on their ownership and CSR expenditure is more relevant in emerging market economies including Korea, and this is the major difference between this paper and Oh, Chang, and Martynov (2011). Moreover, we reinforce the academic contribution of this paper by showing that the relationship varies depending on the level of external financial constraints as a moderating variable, using a more comprehensive and objective CSR index.

As controlling shareholders have significant ownership, they would reduce CSR expenditure in order to keep more of their cash flow rights and would try to decrease the overinvestment problem. On the other hand, if they have only limited ownership, they would have an incentive to overinvest for strengthening their reputation in the capital markets and allocate more money for CSR. Therefore, we expect a negative relationship between the ownership of controlling shareholders and CSR.

H1: Ownership of controlling shareholders will have a negative (-) impact on CSR.

This study investigates whether the relationship between the ownership of controlling shareholders and CSR is affected by external financial constraints. Under information asymmetry, the stock price in imperfect capital markets may not reflect the real value of the firm. Firms with high intrinsic value could be inappropriately valued, and investors may make inadequate decisions (Jensen and Meckling 1976). The information asymmetry problem should be lessened to signal firms' correct value and performance to the market (Bhattacharya, Daouk, and Welker 2003). Firms in inefficient capital markets are burdened by external financial constraints, which depend on the level of information asymmetry (Fazzari, Hubbard, and Petersen 1988).

Existing studies assume that firms face no constraints in the financing of their CSR activities. However, CSR is a type of corporate investment and requires additional financing. Therefore, the implicit assumption of these studies that firms can choose any level of CSR expenditures regardless of their financing ability is impractical and inappropriate. We conjecture that the negative relationship between the ownership of controlling shareholders and their CSR activities,

as shown in existing studies, would change depending on the level of external financial constraints. The financing capability of external funds, which is affected by the issuing cost and overall cost of capital owing to the level of information asymmetry, would have a substantial influence on CSR as a corporate investment.

In this paper, we extend the literature on the relationship between the ownership of controlling shareholders and CSR activities. The reason for focusing on external financial constraints as a moderating variable is to examine the discipline effect of capital market participants on the agency problem of controlling shareholders. If we are able to show that external financial constraints moderate the overinvestment incentive of controlling shareholders with low ownership, it will be another piece of evidence on the disciplinary role of capital markets.

When controlling shareholders have more ownership, they desire to take greater care of their cash flow rights; therefore, the overinvestment problem decreases. By contrast, when they have less ownership, they will actively increase the expenditure on CSR. However, in firms with high financial constraints, controlling shareholders cannot easily change CSR expenditures depending on their ownership. In other words, the relationship between the ownership of controlling shareholders and CSR cannot apply to all firms. Therefore, the negative effect of the ownership of controlling shareholders on CSR should be partially revised in recognition of the existence of external financial constraints. The relationship between the ownership of controlling shareholders and CSR would be strong for firms with fewer external financial constraints and weak for firms with greater constraints.

H2: The negative (-) relationship between the ownership of controlling shareholders and CSR would be strong for firms with fewer external financial constraints and weak for firms with greater constraints.

There are competing arguments regarding CSR activities. First, the overinvestment hypothesis is the one that this paper focuses on. Previous studies supporting this hypothesis examine the relationship between CSR and the incentive of managers or corporate insiders based on their ownership structure. The negative relationship between those two variables supports the

hypothesis that CSR expenditure is overinvestment. Second, the strategic-choice hypothesis considers CSR activities as a mean that mediates the conflict of interests among stakeholders including managers and shareholders. This hypothesis argues that managers with bad performance would increase CSR expenditure to satisfy stakeholders, such as local society and environmental organizations, and so try to lower the possibility of turnover. Third, according to the product-signaling hypothesis, CSR activities signal firm value to the market. In this sense, CSR is expected to have a positive influence on firm value, especially in competitive industries. Lastly, the conflict resolution hypothesis competes with the overinvestment hypothesis and strategic-choice hypothesis. It assumes that firms with good corporate governance invest more in CSR activities. Among these hypotheses, this paper focuses on the overinvestment hypothesis and finds a negative relationship between the ownership of controlling shareholders and the CSR expenditure. The weakening or disappearance of this statistical relationship in firms with high external financial constraints is interpreted to imply that the agency problem can be mitigated by market discipline.

DATA AND METHODOLOGY

Data

To construct the sample, we use all firms listed on the Korean Stock Exchange (KSE), except those with impaired capital. The final sample consists of 724 firms. Financial and accounting data and ownership data of controlling shareholders and their relatives are obtained from internal database of the Korea Corporate Governance Service (KCGS). Data for stock returns, ownership data of financial and foreign investors, and the credit rating and the number of analyst reports are from Fn-Guide, a Korean financial data provider. Data regarding business groups, known as *chaebols*, are from the Korean Fair Trade Commission (KFTC), which selects and announces business groups to limit the concentration of economic power once a year. This study uses *CSRI* (Corporate Social Responsibility Index) and *EMI* (Environmental Management Index), prepared by the KCGS, as proxies for CSR and EM. KCGS is the first institution to evaluate and prepare the CSR and EM indices

of Korea. ISO, the International Organization for Standardization, has launched an international standard providing guidelines for CSR named ISO 26000 in 2010, on which the CSR and EM indices from KCGS are based. These indices also include information that is adequate for the Korean economy and aim to provide valuable information of CSR and EM.²⁾ KCGS also develops a corporate governance index; further details can be obtained from Byun, Lee, and Park (2012).

Variables

Ownership of controlling shareholders. Controlling shareholders have considerable influence on decision-making beyond the managers' scope (Johnson et al. 2000). This study focuses on the effect of the ownership of controlling shareholders in emerging markets with concentrated ownership structures. Therefore, we consider controlling shareholders and their relatives as insiders who can exert considerable influence on the determinants of CSR and EM. We use the summation of the ownership of controlling shareholders and their relatives as a proxy for control power and equity-based incentives (*Controlling*). In Korea, since controlling shareholders have substantial influence on management appointments, managers tend to act as a rubber stamp for their decisions. Thus, we exclude management ownership in our analysis, which is an approach commonly used in various academic studies regarding corporate governance in emerging markets.

The CSR and EM indices. This study uses *CSRI* and *EMI*, prepared by KCGS, as proxies for CSR and EM. *CSRI* has 66 assessment items in all with a total score of 300 points and is evaluated by publicly disclosed information. We standardize the full score of these indices into 1. *CSRI* consists of four sub-indices: those related to workers, vendors and competitors, consumers, and local communities. The scores of each sub-index are 140, 64, 66, and 30, respectively. Table 1 presents the details of the evaluation items and the *CSRI* score. Table 2 shows the sample distribution by *CSRI*. Although the

2) Most of the previous studies of Korean firms use the CSR index prepared by KEJI (Korea Citizens' Coalition for Economic Justice Institute) under the Citizens' Coalition for Economic Justice. However, this index includes only 200 firms with strong social performance, which may lead to a selection bias.

Table 1. The corporate social responsibility index from KCGS

This table shows the evaluation criteria of corporate social responsibility index from KCGS. Evaluation contents are rearranged from <http://www.cgs.or.kr/> (homepage of KCGS)

Category	# evaluation question (score)	%	Detail contents
Related to workers	27 (140)	40.9	<ul style="list-style-type: none"> - Establishment of policy for employment stability - Level of benefits package - Operation of a joint labor-management conference - Establishment of policy for safety and health of employee - Average of employee turnover rate - Scheme for education of training of employee and support of retiree - Training expense - Policy of prohibition of forced labor, child labor, and discrimination in hiring - Percentage of employment for female and disabled person, etc.
Related to vendors and competi- tors	17 (64)	25.8	<ul style="list-style-type: none"> - Establishment of scheme for fair trade with subcontractors - Establishment of activation guideline for fair trade with rival corporation - Education related to fair trade - Organization to prevent corruption - Implementation of ethical education and training - Regular monitoring for ethical management of subcontractors - Program for supporting technology and fund to subcontractor, etc.
Related to con- sumers	14 (66)	21.2	<ul style="list-style-type: none"> - Establishment of scheme for fair trade with consumer - Sanction against fair trade contract - International or domestic certification for stability of product and service - Establishment of policy for managing private information of consumer - Establishment of policy for improving consumer satisfaction - performance of settlement over consumer's complaints, etc.

Table 1. (continued)

Category	# evaluation question (score)	%	Detail contents
Related to local com- munities	8 (30)	12.1	- Establishment of scheme for development of community - Program (health and education) to support community - Establishment of scheme for indigenization - Adopt of communication channel with local resident, etc.
Total	66 (300)	100.0	

development of CSR in Korean firms is still lacking, investment in this regard has gradually increased. In this context, CSR is utilized as firms' strategic paradigm to be carefully considered in corporate decision-making. *EMI* has 91 assessment items with a total score of 300 points, and is evaluated as per information provided publicly by firms. We also standardize the full score of those indices into 1 for a robustness check.

External financial constraints. External financial constraints are closely related with information asymmetry (Myers and Majluf 1984; Leary and Robert 2010). Such asymmetry raises the problems of inverse selection and moral hazard, so investors face significant investment risks. As risk-averse investors are reluctant to invest in firms with high information asymmetry, those firms have trouble raising funds and are caught in a vicious circle of rising cost of capital and declining profits. This study uses four measures of information asymmetry that have been used in previous studies. The first is standard deviation in the residuals of stock returns of the previous year (*Volatility*), which is the standard deviation of the difference between daily stock returns and daily market returns. Under the efficient market hypothesis, the stock price should reflect all the information related to the firm. Thus, if investors do not have enough information, the standard deviation in stock returns' residuals would be high, which means that investors lack firm-specific information, which results in high information asymmetry (Krishnaswami and Subramaniam 1999). The second measure is a

Table 2. Sample distribution by corporate social responsibility index

The table reports year-by-year distribution of our sample based on the level of CSRI (corporate social responsibility index). The sample includes 1,375 firms from 2010 and 2011.

Range	CSRI		CSRI1		CSRI2		CSRI3		CSRI4	
	2010 (N=670)	2011 (N=705)	2010 (N=670)	2011 (N=705)	2010 (N=670)	2011 (N=705)	2010 (N=670)	2011 (N=705)	2010 (N=670)	2011 (N=705)
0.0-0.1	127	0	0	0	422	327	461	1	393	239
0.1-0.2	310	161	164	36	39	72	43	112	55	168
0.2-0.3	115	296	320	283	71	95	40	308	104	142
0.3-0.4	50	122	110	230	32	61	77	146	72	87
0.4-0.5	19	47	16	65	38	39	25	76	17	29
0.5-0.6	23	23	20	31	19	33	11	28	12	19
0.6-0.7	15	31	23	31	12	22	6	11	8	11
0.7-0.8	9	17	14	17	28	29	4	12	5	4
0.8-0.9	2	8	3	12	5	14	2	9	1	5
0.9-1.0	0	0	0	0	4	13	1	2	3	1

credit rating. Firms with low credit ratings have a high bankruptcy risk, and thus have to bear a high cost of capital. Existing studies use credit ratings as a proxy for financial distress and external financial constraints (Aivazian, Booth, and Cleary, 2006). We use the annual credit ratings of corporate bonds from FN-Guide. Among the credit ratings provided by Nice Investors Service, Korea Investors Service, and Korea Ratings for each firm, the lowest rating of the firm is used. In case of unavailability of a credit rating for a certain year, we use the information from the year of last credit rating instead. CR-indices based on the credit ratings are as follows.

Credit rating		CR-index	Credit rating		CR-index
AAA+	=	0	BBB-	=	11
AAA	=	1	BB+	=	12
AAA-	=	2	BB	=	13
AA+	=	3	BB-	=	14
AA	=	4	B+	=	15
AA-	=	5	B	=	16
A+	=	6	B-	=	17
A	=	7	CCC	=	18
A-	=	8	CC	=	19
BBB+	=	9	C	=	20
BBB	=	10	D	=	21

The third measure is the number of research analyst reports (*Analyst*). Research analysts produce analyses of firms' intrinsic value and disseminate such reports to investors. Professional information in analyst reports decreases the information asymmetry between firms and investors. Thus, a large number of analyst reports indicates lower information asymmetry. Lastly, the level of information asymmetry in firms is closed linked with disclosure quality such as the number of voluntary disclosures and the provision of annual reports, semi-annual reports, and other items on the company website, etc. Therefore, we use the corporate disclosure quality index prepared by KCGS, which reports the internal corporate governance information for all Korean companies listed on the KSE (Korea Stock Exchange) and KOSDAQ (Korea Securities Dealers Automated Quotation) on an annual basis. They measure the CGI (Corporate Governance Index), including the protection level of shareholder rights, board structure, corporate disclosure quality,

auditing quality, and corporate dividend policy [for further details, see table 1 in Byun, Lee, and Park (2012)]. This index is commonly used in previous literature analyzing the effect of corporate governance (Black, Jang, and Kim 2006; Byun, Lee, and Park 2012). We employ the corporate disclosure quality index (*Disclosure*)³⁾ from CGI as the fourth proxy for the level of information asymmetry. This index included 27 assessment items in 2010 with a total score of 60 points. We standardize this index into 1 and posit that a high score for the index indicates lower information asymmetry.

Control variables. Before investigating our hypotheses, we should consider the level of internal cash flow closely related to external financing activities. If firms have sufficient internal cash flow, they do not need to be dependent on external financing. Thus, the relationship between the ownership of controlling shareholders and CSR, as seen in previous literature is less affected by external financial constraints. In order to control for the effect of internal cash flow, we include the average of ROA during the past three fiscal years (*Profit*) and the level of free cash flow. ROA is net income over book value of total assets. Free cash flow is operating income minus the sum of income taxes, gross interest expense on debt, and dividend payment scaled by the book value of total assets (*FCF*).

To control for the effect of firm size on CSR, we include market capitalization, which is the number of common shares outstanding multiplied by the stock price at fiscal year-end (*M-cap*). As firm size increases, firms could pay more toward CSR. We include the leverage ratio, that is, total leverage divided by total assets (*Leverage*), in order to control for the leverage effect. The growth of firms can also have a positive effect on CSR; thus, we include the *M/B ratio*, which is measured by the market value of common equity over its book value. We also include the past five years' standard deviations in return on assets (ROA) as a proxy for a firm's risk (*Risk*).

Firms with good corporate governance have a higher stock price and stronger managerial performance (Gompers, Ishii, and Metrick

3) The corporate disclosure quality index evaluates items such as the number of voluntary disclosures, the number of confirmatory disclosures, the number of disclosures that correct for previous disclosures, disclosure of the attendance rate of individual board members, provision of independent auditors' audit opinion and other material information in English, disclosure of annual reports, semi-annual reports, and other items on the firm's website.

2003). In this context, firms need good corporate governance to make investors support managers' decisions and trust them (Jo and Harjoto 2011). Thus, as proxies for corporate governance, we control for institutional investors (*Institutional*) and foreign investors (*Foreign*), because they monitor firms with professional knowledge and are expected to have a positive impact on CSR. We include the proportion of their ownerships when it exceeds 5%. By way of background, since 2004, a public announcement of ownership has not been mandatory for firms in Korea. However, if the ownership of institutional or foreign investors exceeds 5%, then companies must disclose it because it can significantly influence managerial decisions (Klein and Zur 2009; Byun, Lee, and Park 2012). As proxy for a weak corporate governance structure (Beak, Kang, and Park 2004), we include a dummy variable for firms belonging to business groups. Controlling shareholders for companies in a *chaebol* have a strong incentive to maximize their private benefits of control and exploit shareholders' rights. To control for this effect, we include a dummy variable (*Chaebol*) that adopts a value of 1 if a firm belongs to a *chaebol* and 0 if it does not.

Descriptive statistics

Table 1 provides the detailed statistics of the variables in our analysis. The mean of standardized CSRI is 0.2595 out of 1. The maximum standardized value of CSRI is 0.8867, which shows that there are firms that spend a lot of money on CSR. We also standardize *EMI* into 1, and this index has a mean of 0.2391. This number is similar to CSRI; a maximum score of 0.8933 shows that some firms spend a lot on CSR. The ownership of controlling shareholders (*Controlling*), 0.2212, shows that most firms in Korea have a concentrated ownership structure and controlling shareholders could have considerable influence on management. As proxy for external financial constraints, the mean of standard deviation in the residuals of stock returns for the past year (*Volatility*), CR-index, the number of analyst reports (*Analyst*), and the corporate disclosure quality index (*Disclosure*) is 0.0267, 10.2313, 100, and 0.2949, respectively. Market capitalization (*M-cap*) of the entire sample of firms has a mean value of 1,511 billion won, with 0.4581 of leverage ratio (*Leverage*). The mean of the average ROA during the past three years (*Profit*) and free cash flow (*FCF*) is 0.0249 and

Table 3. Summary statistics

This table shows the summary statistics of variables. *CSRI* is the corporate social responsibility index provided by the Korean Corporate Governance Service (KCGS). *EMI* is the environmental management index provided by KCGS. *Controlling* is the summation of direct ownership of controlling shareholders and their relatives. *Volatility* is the standard deviation in the residuals of daily stock returns in the past year. *CR-index* measures the credit rating of a firm, and has higher value as the credit rating is lower. *Analyst* is the number of analyst reports. *Disclosure* is the corporate disclosure quality index provide by KCGS. *Profit* is the average of ROA (net income over total assets) during the past three fiscal years. *FCF* is the value of operating income minus the sum of total income taxes, gross interest expense on debt, and dividend payments over the book value of total assets. *M-cap* is the market capitalization (common share outstanding*stock price at fiscal year-end). *Leverage* is computed by total leverage divided by total assets. The *M/B ratio* is computed by the market value of common equity divided by its book value. *Risk* is the past five years' standard deviation in ROA. *Institutional* is the proportion of institutional investors when it exceeds 5%. *Foreign* is the proportion of foreign investors when it exceeds 5%. *Chaebol* is the dummy variable that takes the value of 1 if the firm belongs to a *chaebol* conglomerate. *Age* is calculated by current year – (foundation year + 1).

Variable	N	MEAN	MEDIAN	STD.DEV	MAX	MIN
<i>CSRI</i>	1,375	0.2595	0.2200	0.1561	0.8867	0.0667
<i>EMI</i>	1,375	0.2391	0.1600	0.2217	0.8933	0.0000
<i>Controlling</i>	1,375	0.2212	0.1813	0.2089	0.8485	0.0000
<i>Volatility</i>	1,375	0.0267	0.0245	0.0098	0.0781	0.0099
<i>CR-index</i>	1,375	10.2313	12.0000	3.4142	21.0000	1.0000
<i>Analyst</i>	1,375	100	1	212	1,746	0
<i>Disclosure</i>	1,375	0.2949	0.2500	0.1540	0.9000	0.0667
<i>Profit</i>	1,375	0.0249	0.0313	0.0994	0.3436	-0.8336
<i>FCF</i>	1,375	0.0124	0.0130	0.0575	0.3974	-0.4418
<i>M-cap (billion won)</i>	1,375	1,511	138	6,793	155,843	4
<i>Leverage</i>	1,375	0.4581	0.4511	0.2174	0.9701	0.0006
<i>M/B ratio</i>	1,375	1.1489	0.8060	1.2910	20.9168	0.1029
<i>Risk</i>	1,375	0.0547	0.0333	0.1105	1.5861	0.0012
<i>Institutional</i>	1,375	0.0482	0.0000	0.0931	0.8797	0.0000
<i>Foreign</i>	1,375	0.0334	0.0000	0.0965	0.7894	0.0000
<i>Chaebol</i>	1,375	0.2567	0.0000	0.4370	1.0000	0.0000
<i>Age</i>	1,375	38	39	18	115	1

0.0124, respectively. The mean values of the *M/B ratio* and the past five years' standard deviations in return on assets (*Risk*) are 1.1489 and 0.0547, respectively. The ownership of institutional (*Institutional*) and foreign investors (*Foreign*) has a mean of 0.0482 and 0.0344, respectively, but these numbers may be underestimated because ownership less than 5% is reported as zero. About 26% of sample firms belong to *chaebol* conglomerates (*Chaebol*).

Table 3 presents the correlation among variables. Positively significant correlation between *CSRI* and *EMI* implies that firms who take care of CSR also care about their EM. The ownership of controlling shareholders (*Controlling*) is negatively and significantly correlated with *CSRI* and *EMI*. This shows that as insiders, namely, controlling shareholders have greater ownership, the overinvestment problem diminishes and expenditure on CSR and EM decreases. The results seen in existing literature are also supported in Korea. *CSRI* and *EMI* have significantly negative correlation with standard deviation in the residuals of stock returns for the past year (*Volatility*) and credit rating (*CR-index*), while they are positively correlated with number of analyst reports (*Analyst*), and the corporate disclosure quality index (*Disclosure*). This shows that firms with lower information asymmetry spend more on CSR and EM. The level of internal cash flow as proxy for average ROA during the past three fiscal years (*Profit*) and free cash flow (*FCF*) is positively correlated with *CSRI*. This means that for CSR expenditure as a corporate investment, internal cash flow over a certain level is required. The ownership of controlling shareholders is not correlated with standard deviation in the residuals of stock returns for the past year. As there can be bias in estimation when we use interaction variables between two with high correlation, we divide the sample.

EMPIRICAL RESULTS

Univariate test

Panel A of table 4 shows the different levels of firm characteristics depending on the level of CSR. We divide the whole sample into two based on the median of *CSRI*. Firms with high *CSRI* have lower ownership of controlling shareholders (*Controlling*), and the mean of ownership of controlling shareholders differs significantly. This

Table 4. Correlation

This table shows the summary statistics of variables. *CSRI* is the corporate social responsibility index provided by the Korean Corporate Governance Service (KCGS). *EMI* is the environmental management index provided by KCGS. *Control* (*Controlling*) is the summation of ownership of controlling shareholders and their relatives. *Vol* (*Volatility*) is the standard deviation in the residuals of daily stock returns in past year. *CR* (*CR-index*) measures the credit rating of a firm, and has higher value as the credit rating is lower. *Analyst* is the number of analyst reports. *Disclo* (*Disclosure*) is corporate disclosure quality index provide by KCGS, we standardize the full score of *Disclosure* into 1. *Profit* is the average of ROA (net income over total assets) during the past three fiscal years. *FCF* is the value of operating income minus the sum of total income taxes, gross interest expense on debt, and dividend payments over the book value of total assets. *M-cap* is the natural log of market capitalization (common share outstanding*stock price at fiscal year-end). *Leve* (*Leverage*) is computed by total leverage divided by total assets. The *M/B* (*M/B ratio*) is computed by market value of common equity divided by its book value. *Risk* is the past five years' standard deviations in ROA. *Insti* (*Institutional*) is the proportion of institutional investors when it exceeds 5%. *Fore* (*Foreign*) is the proportion of foreign investors when it exceeds 5%. *Chae* (*Chaebol*) is a dummy variable that takes the value of 1 if the firm belongs to a *chaebol* conglomerate. *Age* is the natural log of current year - (foundation year + 1). The highlighted coefficients are significant at least at the 5% level.

	CSRI	EMI	Control	Vol	CR	Analyst	Disclo	Profit	FCF	M-cap	Leve	M/B	Risk	Insti	Fore	Chae
<i>EMI</i>	0.7148															
<i>Control</i>	-0.2837	-0.2269														
<i>Vol</i>	-0.1957	-0.0344	-0.0146													
<i>CR</i>	-0.5473	-0.3560	0.2108	0.3794												
<i>Analyst</i>	0.6347	0.4674	-0.2682	-0.2064	-0.5680											
<i>Disclo</i>	0.6476	0.4339	-0.2515	-0.2766	-0.5248	0.6384										
<i>Profit</i>	0.1304	0.0558	0.1167	-0.4335	-0.1930	0.1594	0.1475									
<i>FCF</i>	0.1284	0.0384	0.0292	-0.3313	-0.1884	0.2125	0.1563	0.4253								
<i>M-cap</i>	0.4309	0.3252	-0.1415	-0.1460	-0.3779	0.5542	0.4041	0.0977	0.1231							
<i>Leve</i>	0.1176	0.1091	-0.3307	0.1238	-0.0769	0.0262	0.1226	-0.2415	-0.2726	-0.0396						
<i>M/B</i>	0.1902	0.1138	-0.1743	0.1926	-0.0850	0.2570	0.1955	-0.0931	0.0193	0.1237	0.1122					
<i>Risk</i>	-0.0806	-0.0316	-0.0767	0.3103	0.1290	-0.0678	-0.0957	-0.7250	-0.1628	-0.0376	-0.0117	0.2241				
<i>Insti</i>	0.0923	0.0745	-0.1572	-0.2429	-0.1675	0.1338	0.1184	0.0587	0.0665	0.0300	0.1342	0.0240	-0.0728			
<i>Fore</i>	0.0644	0.0727	-0.1443	-0.1086	-0.0820	0.0653	0.1013	0.0418	0.0487	0.0100	-0.1206	0.0250	0.0134	-0.0260		
<i>Chae</i>	0.0453	0.3583	-0.2941	-0.1963	-0.4823	0.4489	0.4201	0.0588	0.0875	0.2649	0.1599	0.1538	-0.0307	0.1248	-0.0087	
<i>Age</i>	-0.0379	-0.0064	0.1184	-0.0891	0.0403	-0.0789	-0.0627	-0.0561	-0.0996	-0.0158	0.0278	-0.1363	-0.0301	0.0330	-0.0308	-0.0110

result is consistent with the findings of previous studies, which show that firms with large ownership of controlling shareholders experience a decline in the agency problem and have lower expenditure on CSR. Firms with high CSRI have lower external financial constraints as proxy for *Volatility*, *CR-index*, *Analyst*, and *Disclosure*, and the difference test is significant at the 1% level.

This study examines whether the relationship between the ownership of controlling shareholders and CSR is affected by external financial constraints. In Panel B, we divide the whole sample into two based on the median of standard deviation in the residuals of stock returns (*Volatility*), then separate each sample into two groups based on the median of level of ownership of controlling shareholders, and compare the CSRI. The difference of CSRI between firms with large ownership of controlling shareholders and those with limited ownership is significant at the 1% level in the sample of firms with low external financial constraints. In the group of firms with significant external financial constraints, the difference of CSRI between firms with large ownership of controlling shareholders and those with limited ownership is also significant at the 1% level. To investigate in more detail whether the effect of ownership of controlling shareholders on CSRI changes according to the level of external financial constraints, we use the difference-in-differences approach. The last column shows that the difference of the marginal effect of ownership of controlling shareholders on CSRI between firms with low external financial constraints and those with high external financial constraints is statistically significant at the 1% level. This result suggests that the marginal effect of the ownership of controlling shareholders on CSR is stronger in firms with low external financial constraints. Since firms with significant external financial constraints face greater default risk and higher cost of capital, they rarely increase their spending CSR depending on their ownership. On the other hand, firms with low external financial constraints experience relatively low cost of capital, so they increase investment in CSR. Therefore, the relationship between the ownership of controlling shareholders and CSR is observed strongly in firms with low external financial constraints.

Multivariate test

This study investigates the impact of the ownership of controlling

Table 5. Univariate test

This table shows the results of univariate test. Panel A presents the differences in variables between firms with high corporate social responsibility index (*CSRI*) and those with low *CSRI*. We separate the sample into two based on the median of *CSRI*. Panel B shows the differences in *CSRI* between firms with high *CSRI* and those with low *CSRI* in each separated sample based on the level of external financial constraints. We divide the sample into two sub-samples based on the median of the standard deviation in the residuals of the daily stock returns for the past year and compare the effect of the ownership of controlling shareholders (*Controlling*) on *CSRI* in each separated sample. The definitions of the variables are same as those in Table 4. The numbers in the parenthesis are t-statistics. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Univariate test				
	Low <i>CSRI</i> [N=683]	High <i>CSRI</i> [N=692]	Difference (p-value)	
			t-test	Wilcoxon test
<i>EMI</i>	0.1676	0.3096	0.0000***	0.0000***
<i>Controlling</i>	0.2666	0.1764	0.0000***	0.0000***
<i>Volatility</i>	0.0296	0.0239	0.0000***	0.0000***
<i>CR-index</i>	11.6310	8.8497	0.0000***	0.0000***
<i>Analyst</i>	19.7980	179.1000	0.0000***	0.0000***
<i>Disclosure</i>	0.2304	0.3586	0.0000***	0.0000***
<i>Profit</i>	0.0113	0.0384	0.0000***	0.0000***
<i>FCF</i>	0.0056	0.0192	0.0000***	0.0006***
<i>M-cap</i>	25.1368	26.9120	0.0000***	0.0000***
<i>Leverage</i>	0.4263	0.4895	0.0000***	0.0000***
<i>M/B ratio</i>	1.0144	1.2817	0.0000***	0.0000***
<i>Risk</i>	0.0673	0.0423	0.0000***	0.0000***
<i>Institutional</i>	0.0373	0.0589	0.0000***	0.0000***
<i>Foreign</i>	0.0282	0.0386	0.0465**	0.0000***
<i>Chaebol</i>	0.0952	0.4162	0.0000***	0.0000***
<i>Age</i>	37.8814	37.8497	0.9737	0.8146

Panel B: The Difference-in-differences approach

External financial constraint	Low [N=690]		Difference (A)	High [N=685]		Difference (B)	(A)-(B)
	Small [N=345]	Large [N=345]		Small [N=341]	Large [N=344]		
<i>Controlling</i>							
<i>CSRI</i>	0.3566	0.2315	0.1250*** (10.11)	0.2462	0.2035	0.0427*** (4.48)	0.0823*** (5.26)

shareholders on CSR using regression analysis. To gauge whether this relationship is changed depending on external financial constraints, we use a dummy variable (*Constraint dummy*) that takes the value of 1 if the standard deviation in the residuals of stock return for the past year (*Volatility*) is greater than the median in the sample. We include a one-digit level KSIC industry dummy to control for the industry effect. We also include a year dummy to control for the year effect. In order to avoid heteroskedasticity of the sample data, we use robust standard errors in testing for the significance of coefficients. Section 3.2 contains a list of the definitions of the variables.

$$\begin{aligned} \text{CSR}_{it} = & \beta_0 + \beta_1 \text{Controlling}_{it} + \beta_2 \text{Controlling}_{it} * \text{Constraint dummy}_{it} + \\ & \beta_3 \text{Constraint dummy}_{it} + \beta_4 \text{Profit}_{it} + \beta_5 \text{FCF}_{it} + \beta_6 \text{M-cap}_{it} + \\ & \beta_7 \text{Leverage}_{it} + \beta_8 \text{M/Bratio}_{it} + \beta_9 \text{Risk}_{it} + \beta_{10} \text{Institutional}_{it} + \\ & \beta_{11} \text{Foreign}_{it} + \beta_{12} \text{Chaebol}_{it} + \varepsilon_{it} \end{aligned}$$

Impact of the ownership of controlling shareholders on corporate social responsibility under external financial constraints. Table 6 shows the impact of the ownership of controlling shareholders on CSR under external financial constraints, including control variables. In Model (1), the ownership of controlling shareholders (*Controlling*) has a significant and negative effect on CSRI. This shows that as insiders, namely controlling shareholders have more ownership, the conflicts of interest with minority shareholders decrease and expenditure on CSR declines (Jensen and Meckling 1976; Barnea and Rubin 2010). This is consistent with the Hypothesis 1. This result is identically observed when we add other firm characteristics in Model (2). In Model (3), we include the *Constraint dummy* variable and the interaction variable between *Controlling* and *Constraint dummy*. The coefficient of *Controlling* has significant and negative value as seen in Model (1), while the interaction variable between *Controlling* and *Constraint dummy* has a significantly positive coefficient. The sum of the coefficients of *Controlling* and the interaction variable between *Controlling* and *Constraint dummy* represents the effect of the ownership of controlling shareholders on CSRI for firms with high external financial constraints. Therefore, the results show that the effect of the ownership of controlling shareholders on CSRI decreases for firms with high external financial constraints. On the other hand,

the coefficient of *Controlling* in Model (3) has a more significant value than that of Model (1), showing that the negative relationship between the ownership of controlling shareholders and *CSRI* is stronger in firms with fewer external financial constraints. This result supports hypothesis 2. The *Constraint dummy* has a significant and negative coefficient at the 1% level, which means that firms with high external financial constraints do not have sufficient capacity to invest in CSR. Since financial and insurance firms have different characteristics and are affected by different regulations in comparison to other types of firms, in Model (5), we estimate the same empirical model by excluding them from the sample. The result is same as in Model (4). Model (6) reports the result using the continuous measure of external financial constraints (*Volatility*) instead of a dummy variable (*Constraint dummy*). We still obtain the same results, supporting our hypothesis.⁴⁾ To control for the issue of an appropriate level of CSR expenditure, we additionally use an industry-adjusted CSR index based on the 1-digit KSIC as a dependent variable, assuming that CSR expenditure exceeding industry average is more likely to be overinvestment. The result remains consistent with the previous ones, supporting our hypothesis.

In summary, under the agency theory, an increase in the ownership of controlling shareholders alleviates the overinvestment problem and leads to a reduction in expenditure on CSR. Empirical results show that such a relationship is strong for firms with fewer external financial constraints because they have sufficient financing capability for CSR. On the other hand, since firms with significant external financial constraints are burdened with a high cost of capital, they do not increase expenditure on CSR depending on the ownership of controlling shareholders. This result implies that the relationship between the ownership of controlling shareholders and CSR is not valid for all types of firms. Thus, firm characteristics such as the level of external financial constraints should be considered before generalizing the agency theory. In addition, the overinvestment problem of controlling shareholders based on CSR can be somewhat mitigated by the discipline imposed by the capital markets.

Among control variables, firm size (*M-cap*) has a significantly

4) We thank the referee for a good suggestion on this matter.

positive coefficient, because firms with large market capitalization are able to afford the expense of CSR. The ownership of institutional investors (*Institutional*) has a significantly negative impact on CSRI, meaning that institutional investors with large ownership monitor managers and prevent them from overinvesting. An important point we need to consider when we interpret such a result is that institutional investors are different from controlling shareholders in their investment horizon. In general, institutional investors have shorter investment horizon than controlling shareholders, and even if CSR investment is value increasing in the long run, institutional investors may oppose it if stock market negatively reacts to CSR activities in the short run provided that the reaction of stock market to CSR expenditure is not clearly determined and that we do not have detailed information on the characteristics of institutional investors. Accordingly, we discreetly assume the negative relationship between the ownership of institutional investors and CSR expenditure to be a result of monitoring on the part of institutional investors who regard the latter as a value-decreasing activity in Korea.⁵⁾ *Chaebol* has a significantly positive effect on CSRI.⁶⁾

Separated sample approach. In order to circumvent any problems that may arise from the correlation between two variables of the interaction variable, we separate the whole sample into two based on the level of financial constraints and rerun the regression. The

5) The case for foreign investors would be more complicated since they would have different experiences in their own countries regarding the value of CSR activities. Some foreign investors may accept the positive role of CSR, which would be affected by their investment horizon in the Korean stock market. We are obliged to interpret the insignificant coefficients as a result of mixed attitudes of foreign investors toward CSR activities. As the main focus of this paper is not the incentive of foreign investors, we propose to examine this topic in future research.

6) As a referee suggests, we examine the effect of disparity between the cash flow rights and control rights of controlling shareholders on the CSR in the sample of *Chaebol* firms. The disparity is measured by the ownership of affiliated firms, so it represents the indirect control rights that controlling shareholders have through the affiliates. The result shows a positive relationship between the disparity and CSR expenditure, while the interaction variable between disparity and constraints dummy has a negative coefficient. Yet, the coefficients are statistically insignificant, partly because of limited number of samples. The result implies that controlling shareholders invest more in CSR when they have higher incentive to pursue the private benefit of control, but not under a high level of external financial constraint. It is consistent with the results of this paper.

Table 6. Impact of the ownership of controlling shareholders on corporate social responsibility index under the external financial constraint

This table reports results from regressing corporate social responsibility index on the ownership of controlling shareholders and the interaction between the ownership of controlling shareholders and external financial constraint. *Constraint dummy* is a dummy variable that takes a value of one if a firm's standard deviation in the residuals of daily stock returns in the past year (*Volatility*) is above the median. The definitions of variables are the same as those in Table 4. Year effect is the year dummy variable. Industry effect is industry dummy variables based on 1-digit of Korea Standard Industry Classification (KSIC). The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Total sample								Continuous measure of constraint	Industry adjusted CSRI	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)			
Intercept	0.3064*** [43.83]	-1.2694*** [16.42]	0.3622*** [34.30]	-1.2203*** [-15.61]	-1.1357*** [-14.04]	-1.1712*** [-14.80]	-1.3881*** [-17.98]	-1.3883*** [-17.16]			
Controlling	-0.2120*** [-11.20]	-0.0458*** [-3.24]	-0.3109*** [-10.82]	-0.0831*** [-3.76]	-0.0892*** [-3.96]	-0.1305*** [-3.60]	-0.0463*** [-3.28]	-0.0840*** [-3.80]			
Controlling * Constraint dummy			0.2012*** [5.49]	0.0632** [2.34]	0.0717*** [2.60]	2.9444*** [2.69]		0.0639** [2.37]			
Constraint dummy			-0.1130*** [-8.49]	-0.0344*** [-3.41]	-0.0402*** [-3.89]	-2.1313*** [-4.60]		-0.0348*** [-3.44]			
Profit		-0.0425 [-0.99]		-0.0497 [-1.16]	-0.0336 [-0.79]	-0.0965** [-2.11]	-0.0423 [-0.99]	-0.0495 [-1.17]			
FCF		-0.0627 [-1.22]		-0.0617 [-1.22]	-0.0360 [-0.72]	-0.0858 [-1.63]	-0.0623 [-1.22]	-0.0613 [-1.21]			

Table 6. (continued)

	Total sample						Continuous measure of constraint	Industry adjusted CSRI	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)		Model (7)	Model (8)
<i>M-cap</i>		0.0549*** [18.11]		0.0535*** [17.72]	0.0503*** [15.93]	0.0533*** [17.76]	0.0548*** [18.12]	0.0534*** [17.72]	
<i>Leverage</i>		0.0228 [1.17]		0.0315 [1.59]	0.0380** [2.01]	0.0271 [1.38]	0.0235 [1.21]	0.0323 [1.63]	
<i>M/B ratio</i>		-0.0050 [-1.58]		-0.0040 [-1.28]	-0.0042 [-1.35]	-0.0023 [-0.70]	-0.0051 [-1.60]	-0.0041 [-1.30]	
<i>Risk</i>		-0.0273 [-0.84]		-0.0204 [-0.66]	-0.0063 [-0.21]	-0.0311 [-1.01]	-0.0274 [-0.85]	-0.0203 [-0.66]	
<i>Institutional</i>		-0.1211*** [-4.27]		-0.1379*** [-4.77]	-0.1978*** [-5.15]	-0.1462*** [-5.11]	-0.1208*** [-4.24]	-0.1378*** [-4.75]	
<i>Foreign</i>		-0.0094 [-0.30]		-0.0165 [-0.53]	-0.0105 [-0.34]	-0.0236 [-0.75]	-0.0096 [-0.30]	-0.0168 [-0.54]	
<i>Chaebol</i>		0.0393*** [3.95]		0.0365*** [3.66]	0.0518*** [5.11]	0.0348*** [3.50]	0.0391*** [3.93]	0.0362*** [3.64]	
Year effect	No	Yes	No	Yes	Yes	Yes	Yes	Yes	
Industry effect	No	Yes	No	Yes	Yes	Yes	Yes	Yes	
N	1,375	1,375	1,375	1,375	1,273	1,375	1,375	1,375	
Adj-R ²	0.080	0.578	0.145	0.582	0.593	0.583	0.503	0.507	

results are reported in the Table 7. Model (1) and (2) shows the results of two sub-samples divided based on the median of *Volatility*. Using firms with fewer external financial constraints, the coefficient of *Controlling* in Model (1) has a significant and negative value at the 5% level, consistent with the results of the whole sample. However, for firms with significant external financial constraints, Model (2) shows an insignificant relationship between the ownership of controlling shareholders and *CSRI*, which is consistent with our expectation. Additionally, when we divide the sample into the sub-samples of firms with high or low external financial constraints based on the tertile and quartile of *Volatility*, the coefficient of the ownership of controlling shareholders remains significantly negative only in the group of firms with low volatility. Models (3) to (6) contain the results. The significance of coefficient is stronger when we separate the sample based on the quartile of the volatility than we use the tertile, and when we use the tertile than the median, supporting the hypothesis of this paper.⁷⁾

Alternative measures of external financial constraints. In order to check the robustness of empirical results, we also use credit rating (*CR-index*), the number of analyst reports (*Analyst*), and the corporate disclosure quality index (*Disclosure*) as proxies for external financial constraints. In this analysis, we also use a dummy variable (*Constraint dummy*) that takes the value of 1 if alternative proxies are less than the median in the sample. In Table 7, Models (1) to (3) show the results using credit rating as a proxy for external financial constraints. In Model (1), while the ownership of controlling shareholders (*Controlling*) has a significant and negative effect on *CSRI*, the interaction variable between *Controlling* and *Constraint dummy* has a significantly positive coefficient, which is consistent with the results in Table 6. It means that the negative relationship between the ownership of controlling shareholders and *CSR* is mitigated when there is high external financial constraint. We separate the whole sample into two groups based on the level of external financial constraints to eliminate any problem that might occur from the correlation between the two variables of the interaction variable; Models (2) and (3) show the results. In Model (2), using firms with low external financial constraints, *Controlling*

7) We thank the referee for the useful suggestion.

Table 7. Impact of the ownership of controlling shareholders on corporate social responsibility index under the external financial constraint: separated sample approach

This table reports results from regressing corporate social responsibility index on the ownership of controlling shareholders. High and low constraints samples are separated based on the firm's standard deviation in the residuals of daily stock returns in the past year (*Volatility*). The definitions of variables are same as those in Table 4. Year effect is the year dummy variable. Industry effect is industry dummy variables based on 1-digit of Korea Standard Industry Classification (KSIC). The numbers in square brackets are t-statistic computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Low constraints (50%)	High constraints (50%)	Low constraints (66%)	High constraints (34%)	Low constraints (75%)	High constraints (25%)
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Intercept	-1.4300*** [-12.69]	-0.8803*** [-8.76]	-1.3637*** [-13.99]	-0.7712*** [-6.89]	-1.3058*** [-14.37]	-0.6848*** [-5.30]
<i>Controlling</i>	-0.0605** [-2.52]	-0.0220 [-1.29]	-0.0537*** [-2.77]	-0.0213 [-1.06]	-0.0544*** [-3.00]	-0.0214 [-0.98]
<i>Profit</i>	-0.1988 [-1.64]	-0.0140 [-0.33]	-0.2275** [-2.36]	0.0308 [0.72]	-0.2510*** [-3.00]	0.0637 [1.40]
<i>FCF</i>	-0.1494 [-1.21]	0.0264 [0.51]	-0.1472 [-1.50]	0.0327 [0.62]	-0.0883 [-0.97]	0.0101 [0.20]
<i>M-cap</i>	0.0608*** [14.17]	0.0395*** [9.70]	0.0588*** [15.66]	0.0356*** [7.65]	0.0571*** [16.24]	0.0317*** [6.10]
<i>Leverage</i>	-0.0031 [-0.09]	0.0570*** [2.87]	0.0003 [0.01]	0.0404* [1.80]	-0.0007 [-0.03]	0.0433* [1.94]
<i>M/B ratio</i>	0.0042 [0.51]	-0.0029 [-0.99]	0.0020 [0.28]	-0.0015 [-0.52]	0.0009 [0.14]	-0.0007 [-0.23]
<i>Risk</i>	-0.0760 [-1.04]	-0.0034 [-0.12]	-0.0932* [-1.68]	0.0066 [0.20]	-0.1178** [-2.38]	0.0236 [0.67]
<i>Institutional</i>	-0.1376*** [-3.80]	-0.0742 [-1.56]	-0.1351*** [-4.23]	-0.0858 [-1.35]	-0.1427*** [-4.70]	-0.0541 [-0.62]
<i>Foreign</i>	-0.0216 [-0.44]	-0.0167 [-0.40]	-0.0352 [-0.96]	0.1072 [1.20]	-0.0351 [-1.01]	0.1388 [1.15]
<i>Chaebol</i>	0.0157 [1.12]	0.0716*** [4.83]	0.0223* [1.84]	0.0848*** [4.64]	0.0282** [2.49]	0.0900*** [4.14]
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
N	690	685	917	458	1,032	343
Adj-R ²	0.587	0.545	0.572	0.577	0.568	0.590

has a significant and negative coefficient at the 1% level, yet the significance level decreases to 10% in Model (3) when we use data on firms with high external financial constraints.⁸⁾ This result shows that the negative impact of the ownership of controlling shareholders on CSR is significant for firms with fewer external financial constraints. This result is consistent with hypothesis 2. Models (4), (5), and (6) show the results using the number of analyst reports to measure external financial constraints. In Model (4), the ownership of controlling shareholders has a negative impact on CSRI. The interaction variable between *Controlling* and *Constraint dummy* is significantly positive. When we divide the whole sample into two based on the level of external financial constraints, the ownership of controlling shareholders has a negative effect on CSRI for firms with low external financial constraints, and it disappears for firms with high external financial constraints. Using different proxies for external financial constraints, these results are robust. In Models (7), (8), and (9), we use the corporate disclosure quality index as a proxy for external financial constraints. The results are the same as table 6 and reconfirm the robustness of our hypotheses. The coefficients of control variables are similar to those in table 6.

Considering the endogeneity issue. In corporate governance literature, researchers commonly face the endogeneity problem. Our variable of interest, namely the ownership of controlling shareholders, can be endogenously determined by other factors. Existing literature shows that the ownership structure of a firm is considered an endogenous variable, because corporate insiders or managers can change their own stock holdings in reaction to market performance and firm characteristics (Demsetz and Lehn 1985; Durnev and Kim 2005). In addition, the ownership of controlling shareholders could affect CSR activity, but it is also possible that controlling shareholders change their ownership depending on the level of CSR expenditure. To solve the endogeneity problem, we employ a simultaneous equation by using the instrument variable that correlates with the endogenous variable, but not with the dependent variable. We estimate a simultaneous equation framework by using the firms' age (*Age*) as the instrument variable

8) We obtain the consistent results using KZ-index (Kaplan and Zingales 1997) as a proxy for external financial constraint.

Table 8. Alternative measures of external financial constraints

This table reports results from regressing the corporate social responsibility index on the ownership of controlling shareholders and the interaction between the ownership of controlling shareholders and external financial constraints. The *Constraint dummy* is a dummy variable that (i) takes a value of 1 if a firm's credit rating (*CR-index*) is below the median (ii) takes a value of 1 if a firm's number of analyst reports (*Analyst*) is below the median (iii) takes a value of 1 if a firm's corporate disclosure index (*Disclosure*) is below the median. The definitions of variables are same as those in Table 4. *Year effect* is the year dummy variable. *Industry effect* is industry dummy variables based on 1-digit of Korea Standard Industry Classification (KSIC). The numbers in square brackets are t-statistic computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

	Constraints=CR-index			Constraints=Analyst			Constraints=Disclosure		
	Total sample	Low constraints	High constraints	Total sample	Low constraints	High constraints	Total sample	Low constraints	High constraints
Intercept	-1.1604*** [-12.96]	-1.3787*** [-10.28]	-0.7643*** [-7.53]	-1.2947*** [-14.05]	-1.5591*** [-12.46]	-0.5001*** [-5.41]	-1.1583*** [-14.07]	-1.5299*** [-13.41]	-0.4885*** [-5.20]
Controlling	-0.1001*** [-3.39]	-0.0857*** [-2.63]	-0.0229* [-1.80]	-0.0933*** [-3.83]	-0.0714*** [-2.68]	-0.0076 [-0.63]	-0.0802*** [-3.38]	-0.0547** [-2.15]	-0.0184 [-1.37]
Controlling * Constraint dummy	0.0815*** [2.61]			0.0850*** [3.04]			0.0619** [2.40]		
Constraint dummy	-0.0344*** [-3.13]			-0.0075 [-0.76]			-0.0391*** [-4.56]		
Profit	-0.0454 [-1.07]	-0.7613*** [-4.93]	0.0805** [2.28]	-0.0320 [-0.74]	-0.1359 [-1.39]	0.0745** [2.05]	-0.0530 [-1.23]	-0.1227 [-1.32]	-0.0186 [-0.56]
FCF	-0.0507 [-0.99]	-0.0248 [-0.17]	-0.0649 [-1.60]	-0.0505 [-0.99]	0.0420 [0.35]	-0.0335 [-0.85]	-0.0597 [-1.20]	0.0022 [0.02]	-0.0670* [-1.80]

Table 8. (continued)

	Constraints=CR-index			Constraints=Analyst			Constraints=Disclosure		
	Total sample	Low constraints	High constraints	Total sample	Low constraints	High constraints	Total sample	Low constraints	High constraints
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
<i>M-cap</i>	0.0516*** [15.50]	0.0624*** [12.86]	0.0354*** [8.53]	0.0559*** [16.05]	0.0664*** [14.45]	0.0232*** [6.29]	0.0516*** [16.50]	0.0639*** [15.40]	0.0238*** [6.49]
<i>Leverage</i>	0.0183 [0.94]	-0.0887* [-1.95]	0.0137 [0.89]	0.0244 [1.26]	-0.0068 [-0.19]	0.0608*** [3.51]	0.0179 [0.93]	0.0134 [0.40]	0.0335** [1.98]
<i>M/B ratio</i>	-0.0038 [-1.21]	0.0148** [2.16]	-0.0043* [-1.94]	-0.0047 [-1.52]	-0.0018 [-0.32]	-0.0069*** [-3.38]	-0.0051 [-1.62]	-0.0050 [-0.87]	-0.0050** [-2.48]
<i>Risk</i>	-0.0291 [-0.94]	-0.3890*** [-4.25]	0.0265 [0.88]	-0.0133 [-0.41]	-0.1128** [-2.04]	0.0476 [1.37]	-0.0308 [-0.95]	-0.0592 [-1.24]	-0.0517* [-1.67]
<i>Institution</i>	-0.1302*** [-4.56]	-0.1169** [-2.50]	-0.1068*** [-2.86]	-0.1178*** [-4.12]	-0.1634*** [-3.32]	-0.0348 [-1.01]	-0.1201*** [-4.13]	-0.1645*** [-3.67]	-0.0032 [-0.10]
<i>Foreign</i>	-0.0070 [-0.22]	-0.0102 [-0.15]	0.0019 [0.06]	-0.0064 [-0.20]	-0.0482 [-0.94]	0.0739** [1.98]	-0.0176 [-0.57]	0.0106 [0.25]	-0.0093 [-0.34]
<i>Chaebol</i>	0.0369*** [3.75]	0.0161 [1.07]	0.0480*** [3.65]	0.0386*** [3.88]	0.0371*** [2.61]	0.0407*** [3.32]	0.0362*** [3.64]	0.0191 [1.41]	0.0547*** [4.07]
Year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,375	538	837	1,375	684	691	1,375	711	664
Adj-R ²	0.581	0.534	0.495	0.581	0.540	0.452	0.583	0.540	0.505

for the ownership of controlling shareholders. As reported in Table 4, the instrument variable (*Age*) has no correlation with the dependent variable, CSRI, but has statistically significant correlation with the ownership of controlling shareholders. To evaluate the suitability of the instrument variable statistically, we perform Durbin test and Wu-Hausman test, and find their statistics insignificant at the 5% significance level. Such a result implies that the error term of first stage regression is not correlated with the CSRI, and that the instrument variable is appropriately selected. In Models (2), (4), and (6) of Table 8, which shows the results of the first stage analyses, firms' age (*Age*) has a significantly positive effect on the ownership of controlling shareholders, as predicted. F-statistics in the first stage model is greater than 10, showing that the instrument variable is proper by rule of thumb. In Model (1), the ownership of controlling shareholders (*Controlling*) has a negative effect on CSRI, but it is not statistically significant. In Model (3) using a sample of firms with low external financial constraints measured by the standard deviation in the residuals of stock returns for the past year (*Volatility*), the ownership of controlling shareholders has a significantly negative effect on CSRI. However, in Model (5) using the sample of firms with high external financial constraints, the ownership of controlling shareholders does not have a significant effect on CSRI, similar to table 6, which shows the robustness of our results.

Impact of the ownership of controlling shareholders on environmental management under external financial constraints. Table 10 includes the impact of the ownership of controlling shareholders on EM as an alternative proxy for CSR under external financial constraints. We use the standard deviation in stock returns of the past year (*Volatility*) as a proxy for external financial constraints. In Model (1), the ownership of controlling shareholders (*Controlling*) has a negative impact on *EMI*. Consistent with hypothesis 1, controlling shareholders with large ownership reduce expenditure on EM. Including the *Constraint dummy* in Model (2), the ownership of controlling shareholders has a still-significant and negative coefficient, but the interaction variable between *Controlling* and *Constraint dummy* has a significantly positive coefficient, at both confidence levels. The ownership of controlling shareholders has a more significant negative effect on EM in Model (2) than in Model (1), meaning that the impact of the ownership of controlling

Table 9. Considering the endogeneity issue

This table reports results from regressing corporate social responsibility index on the ownership of controlling shareholders and the interaction between the ownership of controlling shareholders and external financial constraints. The *Constraint dummy* is a dummy variable that takes a value of one if a firm's standard deviation in residuals of daily stock returns in the past year (*Volatility*) is above the median. The definitions of variables are same as those in Table 4. The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Total sample		Low constraints		High constraints	
	2 stage	1 stage	2 stage	1 stage	2 stage	1 stage
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Intercept	-1.0634*** [-8.91]	0.7153*** [7.04]	-0.7964*** [-2.98]	0.9737*** [7.57]	-0.9182*** [-8.71]	0.2542 [1.41]
<i>Controlling</i>	-0.1533 [-1.27]		-0.4330* [-1.93]		0.0431 [0.30]	
<i>Profit</i>	0.0230 [0.41]	0.1727** [2.03]	0.0977 [0.58]	0.4293** [2.46]	0.0047 [0.09]	0.0564 [0.55]
<i>FCF</i>	-0.1438** [-2.26]	-0.0338 [-0.33]	-0.3532** [-2.11]	-0.1533 [-0.77]	-0.0501 [-0.78]	-0.0847 [-0.68]
<i>M-cap</i>	0.0522*** [16.22]	-0.0167*** [-4.26]	0.0467*** [6.30]	-0.0276*** [-5.70]	0.0422*** [11.81]	0.0020 [0.28]
<i>Leverage</i>	0.0142 [0.38]	-0.2840*** [-11.14]	-0.0755 [-1.25]	-0.2418*** [-6.78]	0.0997** [2.14]	-0.2928*** [-7.52]
<i>M/B ratio</i>	-0.0074*** [-2.61]	-0.0050 [-1.17]	-0.0021 [-0.28]	-0.0082 [-0.95]	-0.0054* [-1.82]	-0.0055 [-0.99]
<i>Risk</i>	-0.0060 [-0.13]	-0.0710 [-1.01]	0.0373 [0.32]	0.1899 [1.41]	0.0279 [0.56]	-0.1536* [-1.80]
<i>Institutional</i>	-0.1348*** [-3.36]	-0.1804*** [-3.31]	-0.2142*** [-3.44]	-0.1706*** [-2.77]	-0.0063 [-0.08]	-0.3245*** [-2.82]
<i>Foreign</i>	-0.0377 [-0.69]	-0.3622*** [-7.03]	-0.1457 [-1.40]	-0.4047*** [-6.18]	0.0011 [0.02]	-0.3119*** [-3.81]
<i>Chaebol</i>	0.0367*** [2.95]	-0.0731*** [-5.15]	0.0068 [0.35]	-0.0627*** [-3.62]	0.0761*** [4.16]	-0.0979*** [-4.10]
<i>Age</i>		0.0341*** [5.21]		0.0336*** [3.61]		0.0331*** [3.57]
N	1,375	1,375	690	690	685	685
Adj-R ²	0.463	0.247	0.356	0.327	0.418	0.181

Table 9. (continued)

	Total sample		Low constraints		High constraints	
	2 stage	1 stage	2 stage	1 stage	2 stage	1 stage
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Durbin (p-value)	0.6240 (0.43)		2.8717 (0.09)		0.2287 (0.63)	
Wu- Hausman (p-value)	0.6188 (0.43)		2.8336 (0.09)		0.2248 (0.64)	
F-statistics (p-value)	27.1707 (0.00)		13.0277 (0.00)		12.7680 (0.00)	

shareholders on CSR increases for firms with low external financial constraints. However, such a relationship weakens when firms have high external financial constraints. This result supports hypothesis 2.

To check for robustness, we use the credit rating (*CR-index*), number of analyst reports (*Analyst*), and the corporate disclosure quality index (*Disclosure*) as proxies for external financial constraints. Models (3), (4), and (5) show these results. In Model (3), the ownership of controlling shareholders has a significantly negative coefficient, while the interaction variable between *Controlling* and *Constraint dummy* has a significantly positive coefficient. This result is consistent with that in Models (2) and (3). In Model (4), we use the number of analyst reports and the corporate disclosure quality index as proxies for external financial constraints, and obtain results similar to those in Models (2) and (3). These findings are consistent with hypothesis 2, and show the robustness of the results. To sum up, a negative relationship between the ownership of controlling shareholders and EM as well as CSR is observed. We can infer that both CSR and EM might be used as means of overinvestment by controlling shareholders. The attraction of overinvestment could be a determinant of expenditure on CSR and EM. However, these effects are mitigated by the market discipline imposed by the firm's financing conditions, which depends on the level of information asymmetry.

Among control variables, firm size (*M-cap*) has a significantly positive coefficient, since firms with large market capitalization are able to afford the expense of EM. *Leverage* also has a positive

Table 10. Impact of ownership of controlling shareholders on the environmental management index under external financial constraints

This table reports the results from regressing the environmental management index on the ownership of controlling shareholders and the interaction between the ownership of controlling shareholders and external financial constraints. The *Constraint dummy* is a dummy variable that takes a value of one (i) if a firm's standard deviation in residuals of daily stock returns in the past year (*Volatility*) is above the median. (ii) if a firm's credit rating (*CR-index*) is below the median (iii) if a firm's number of analyst reports (*Analyst*) is below the median (iv) if a firm's corporate disclosure index (*Disclosure*) is below the median. The definitions of variables are same as those in Table 4. The definitions of the variables are the same as those in Table 4. Year effect is the year dummy variable. Industry effect is an industry dummy variable based on the 1-digit code of Korea Standard Industry Classification (KSIC). The numbers in square brackets are t-statistics computed by robust standard error. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

		Constraints =Volatility	Constraints =CR-index	Constraints =Analyst	Constraints =Disclosure
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Intercept	-1.7725*** [-18.40]	-1.7373*** [-17.58]	-1.6520*** [-15.15]	-1.8017*** [-15.98]	-1.6405*** [-15.88]
Controlling	-0.0519*** [-2.75]	-0.0979*** [-3.50]	-0.1230*** [-3.55]	-0.1275*** [-4.18]	-0.1036*** [-3.54]
Controlling * Constraint dummy		0.0826** [2.33]	0.1069*** [2.75]	0.1354*** [3.70]	0.0937*** [2.74]
Constraint dummy		-0.0256* [-1.90]	-0.0398*** [-2.82]	-0.0141 [-1.07]	-0.0493*** [-4.14]
Profit	-0.0986 [-1.45]	-0.0956 [-1.40]	-0.1023 [-1.52]	-0.0836 [-1.22]	-0.1109 [-1.62]
FCF	-0.1823** [-2.39]	-0.1815** [-2.39]	-0.1683** [-2.22]	-0.1639** [-2.14]	-0.1796** [-2.37]
M-cap	0.0677*** [17.82]	0.0668*** [17.33]	0.0642*** [15.71]	0.0691*** [16.09]	0.0639*** [16.23]
Leverage	0.0979*** [3.78]	0.1011*** [3.84]	0.0934*** [3.59]	0.1001*** [3.89]	0.0929*** [3.61]
M/B ratio	-0.0141*** [-3.58]	-0.0138*** [-3.51]	-0.0128*** [-3.30]	-0.0136*** [-3.56]	-0.0141*** [-3.57]
Risk	0.0373 [0.67]	0.0470 [0.84]	0.0356 [0.65]	0.0583 [1.03]	0.0339 [0.60]

Table 10. (continued)

		Constraints =Volatility	Constraints =CR-index	Constraints =Analyst	Constraints =Disclosure
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
<i>Institutional</i>	-0.0213 [-0.57]	-0.0277 [-0.74]	-0.0316 [-0.85]	-0.0166 [-0.45]	-0.0203 [-0.54]
<i>Foreign</i>	0.0299 [0.64]	0.0248 [0.53]	0.0336 [0.73]	0.0348 [0.77]	0.0201 [0.43]
<i>Chaebol</i>	0.0347*** [2.78]	0.0329*** [2.62]	0.0321** [2.57]	0.0337*** [2.70]	0.0307** [2.45]
Year effect	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes
N	1,375	1,375	1,375	1,375	1,375
Adj-R ²	0.616	0.617	0.618	0.621	0.620

effect on EM. The *M/B* ratio has a significantly negative coefficient, showing that less valuable firms pay more on EM. The *Chaebol* dummy has a significantly positive coefficient.

CONCLUSION

To the best of our knowledge, this is the first study that examines the relationship between insider ownership, namely controlling shareholders, and CSR and EM in Korea, an emerging market where controlling shareholders with concentrated ownership have significant influence on corporate decisions beyond the managers. This study investigated the negative effect of the ownership of controlling shareholders on CSR and EM (seen in existing literature) and finds that it can be changed by the level of external financial constraints.

We confirmed that the negative relationship between the ownership of controlling shareholders and CSR that previous studies have discovered also exists in emerging markets. However, such a relationship is strong in firms with fewer external financial constraints, while it disappears in firms with greater external financial constraints. For firms with low constraints, we attribute

these results to the stronger incentive of controlling shareholders to decrease overinvestment and increase the value of their cash flow. On the other hand, for firms with high constraints, controlling shareholders do not increase their expenditure on CSR as their ownership declines because CSR needs to be supported by a significant amount of funds. To check for robustness, we use alternative measures of external financial constraints and employ the 2SLS approach using an instrument variable, and obtain consistent results. When we use EM as a dependent variable, we obtain the same results as those obtained using CSR.

Under agency theory, reduction in overinvestment is presented as a reason for decreasing CSR when controlling shareholders' ownership increases. However, we find that this does not hold for firms with high external financial constraints. Thus, these results imply that the agency problem of controlling shareholders being proportional to their ownership is mitigated by the market discipline imposed by the varied financing conditions based on the level of information asymmetry in firms.

<Appendix> Definition of variables

Variable	Definition
<i>CSRI</i>	Corporate social responsibility index provided by Korean Corporate Governance Service (KCGS) standardized the full score into 1
<i>Industry-adjusted CSRI</i>	CSRI of firms minus the industry average CSRI based on 1-digit KSIC
<i>CSRI1</i>	Sub-indices of corporate social responsibility related to workers
<i>CSRI2</i>	Sub-indices of corporate social responsibility related to vendors and competitors
<i>CSRI3</i>	Sub-indices of corporate social responsibility related to consumers
<i>CSRI4</i>	Sub-indices of corporate social responsibility related to local communities
<i>EMI</i>	Environmental management index provided by KCGS standardized the full score into 1
<i>Controlling</i>	Summation of ownership of controlling shareholder and their relatives
<i>Volatility</i>	Standard deviation in residual of daily stock returns in past year
<i>CR-index</i>	Higher CR-index indicates lower credit rating of the firm
<i>Analyst</i>	Number of analyst report
<i>Disclosure</i>	Corporate disclosure quality index provided by KCGS standardized the full score into 1
<i>Constraint dummy</i>	(i) dummy variable that takes a value of one if a firm's standard deviation in residual of daily stock returns in past year (<i>Volatility</i>) is above the median (ii) dummy variable that takes a value of one if a firm's credit rating (<i>CR-index</i>) is below the median (iii) dummy variable that takes a value of one if a firm's number of analyst report (<i>Analyst</i>) is below the median (iv) dummy variable that takes a value of one if a firm's corporate disclosure index (<i>Disclosure</i>) is below the median
<i>FCF</i>	$[\text{operating income} - \{\text{total income taxes} + \text{gross interest expense on debt} + \text{dividend payment}\}] / \text{total asset}$
<i>Profit</i>	Average of ROA (net income over total asset) during past 3 fiscal years

Variable	Definition
<i>M-cap</i>	Log(common share outstanding*stock price in fiscal year end)
<i>Leverage</i>	Total leverage / total asset
<i>M/B ratio</i>	Market value of common equity / book value of common equity
<i>Risk</i>	Past five years' standard deviations in ROA
<i>Institutional</i>	Proportion of foreign investors when it exceeds 5%
<i>Foreign</i>	Proportion of institutional investors when it exceeds 5%.
<i>Chaebol</i>	Dummy variable that takes value of one if the firm belongs to Chaebol conglomerate
<i>Age</i>	Log (current year – foundation year +1)

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