Article

The Influence of Corporate Environmental Responsibility on Overinvestment Behavior: Evidence from South Korea

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Abstract: The purpose of this paper is to examine the association between corporate environmental responsibility (CER) activities and investment efficiency as measured by overinvestment, and whether the industry-level competition affects this association. We investigate a sample of 2285 non-financial firms with fiscal year-end in December listed in the Korea Stock Exchange Market for the period of 2013–2018, measuring the investment efficiency by overinvestment model. Using environmental scores from the Korea Corporate Governance Service to measure CER activities, we show that, on average, firms can decrease overinvestment behavior through CER activities in South Korea. Moreover, in firms in a highly competitive market, the negative association between CER activities and overinvestment is pronounced, indicating that strong product market competition are effective in monitoring managerial opportunistic behavior. These results are robust, even after controlling for different setting and alternative CER. These findings also suggest that the relationship between CER and overinvestment appears to be benefit firms that are sound and sustainable and honestly present their financial information.

Keywords: corporate environmental responsibility (CER); product market competition; overinvestment behavior

1. Introduction

Corporate social responsibility (CSR) indicates the commitment by firms to behave responsibly [1] and is one of the most significant and common trends in recent years. In addition to annual reports, most large international companies now publish regular reports on the environmental and social impact of their practices. Recent studies have found a positive correlation between the social performance of a firm and its value, suggesting the shift to CSR is more strategic than altruistic.

Researchers have settled on two main theories regarding the relationship between CSR and firm value. Slack resources theory, as defined by Waddock and Graves [2], proposes that financial performance is positively correlated to the amount of available slack resources, which provide social investment opportunities for firms, such as community and employee relations and environmental sustainability. The other theory, known as good management or conflict theory, proposes a positive correlation between good management practices and social performance, since a focus on CSR theoretically strengthens relationships with important stakeholders, thereby improving overall performance.

In recent years, CSR activities in South Korean companies also has increased significantly. Specifically, firms' spending on CSR activities increased by four times in 2015 compared to 2000. In addition, the expenditure on CSR activities as a percentage of sales was 0.11% in the US, but Korea

showed 0.24%. Since 2011, the Korea Corporate Governance Service (KCGS, hereafter) offers insight into corporate governance and socially responsible management practices by providing environmental, social, and governance (ESG) scores. This ESG evaluation model was not only in accordance with the international standards such as the Organization for Economic Cooperation and Development (OECD) principles regarding corporate governance and ISO26000, but also truly reflective of legal and managerial settings in South Korea.

While these relatively new corporate activities have led academia into the study of social and environmental accounting to focus on environmental voluntary reporting behaviors, the underlying motivations for engagement in these CSR activities are questionable, and their effects on firm value are also vague. Among others, the use of the aggregate measures for CSR activities that are ambiguous, inconclusive, or overlapping can be one of the reasons for the mixed results of CSR. Indeed, CSR is a broad and abstract concept that comes from Bowen's seminal idea that companies should pursue those policies, to make those decisions, or to follow those lines of activity that are aligned with the objectives and values of our society [3]. To some degree, companies are likely to align their practices with society's demands by strengthening the green image of the firm at the same time. However, the demand for environmentally sustainable production can affect only minimum activity of environmental investments by showing the commitment with a green image. In line with, the literature reports that CSR may boost conventional innovation but not the overall level of environmental investments [4].

Thus, the specific focus of this study is corporate environmental responsibility (CER) distinguished from CSR activity, as proposed by World Business Council for Sustainable Development (WBCSD) [5,6]. Fortunately, KCGS publishes the ESG combined rating scores and individual E, S, and G rating scores to measure the level of sustainable management by the listed companies in Korea. Among them, CER activities refer to the score of environmental aspects, and specifically consists of performance management, performance reporting and stakeholder engagement. Prior studies report that CER activity is often considered to be part of, consequent to, or to spin off from a more comprehensive CSR activity [7]. Specifically, by considering the five dimensions of CSR—economic, environmental, social, stakeholder, and voluntariness—Dahlsrud [8] documented that the remaining dimensions account for more than 80% except the environmental dimension, but the environmental portion only accounts for 59%, indicating that CSR and CER overlap only some concepts. Moreover, Qui et al. [9] report that CSR disclosures are related to a company's market value, while there is no relation between CER disclosures and profitability. And, Cormier et al. [10] suggest that CSR disclosure and CER disclosure substitute each other in decreasing stock market asymmetry. In line with this, Michelin et al. [11] found that firm performance reacts to various social responsibility variables, while it is not related to environmental responsibility variables [12].

CER activities are believed to enhance overall firm performance by investing in environmental sustainability in order to mitigate negative impacts on the environment beyond what is legally required. Adequate investment in CER activities can affect investment decisions [13], lead to more efficient processes, and improve productivity [14]. In response to the growing focus on environmental sustainability, the International Finance Corporation (IFC) established its Sustainability Framework, setting standards for performance of environmental responsibilities (e.g., the Policy on Environmental and Social Sustainability, which defines IFC's commitments to environmental and social sustainability; the Performance Standards, which define clients' responsibilities for managing their environmental and social risks; and the Access to Information Policy, which articulates IFC's commitment to transparency). By fulfilling these standards, corporations can effectively enhance their competitive advantages and also develop new opportunities for growth and development [15]. A firm's optimal investment strategy is determined by its financing capabilities, available opportunities, and implied growth. Strategic investment can increase efficiency and reduce the likelihood of both underinvestment in projects with positive net present values and overinvestment in projects with negative net present values. By addressing the need of stakeholders while also signaling competitiveness, CER activities can be

an integral part of strategic investment [16,17]. By engaging in CER activities, firms signal their commitment to behaving responsibly while simultaneously advancing their economic development [1].

With this in mind, it is vital to understand the effect CER activities have on investment efficiency because investment efficiency directly impacts the operation of a firm. When a firm improves its CER activities, the subsequent improvement of accounting information can reduce information asymmetry between its management and shareholders [18]. An enhanced information environment and increased monitoring of management should result in better investment opportunities, enhanced innovation, and more efficient decision making. Furthermore, the relationship between CER activities and investment efficiency is influenced by the level of competition in product markets. According to economic theory, that competition disciplines managers who are averse to risk and effort [19,20]. A high level of competition has the effect of thinning profit margins, thus limiting the resources management can divert for their own interests. Therefore, a high level of competition in product markets can be considered an external control device. That competition also gives firms that engage in CER activities a competitive advantage and an opportunity to stand out [21].

In this study, we examined the effects CER activities have on overinvestment using a sample of 2285 firm-year observations from South Korea firms between 2013 and 2018. Our findings indicate that CER activities are more likely to increase investment efficiency and therefore reduce overinvestment. These results suggest that CER activities can improve the information disclosure environment and the performance of managers. The relationship between CER activities and overinvestment is more pronounced in highly competitive markets, implying that CER activities may be a strategic way to obtain competitive advantage. Additional tests revealed the robustness of the relationship between CER activities and investment efficiency, using an alternative measure of CER activities and the sum of each CER activity score.

This study makes several important contributions. First, prior literature has primarily focused on the effects overall CSR has on the firm performance but paid less attention to specific CSR activities due to the lack of availability of specific data. However, this study extends the CSR literature by differentiating between overall CSR and CER activities. At the same time, this study adds to the current emerging literature on corporate environmental activities, competitive markets, and investment efficiency.

Second, managers are increasingly forced to effectively and strategically allocate the limited resources of a corporation to CSR in order to satisfy the expectations of its stakeholders, such as customers, employees, creditors, and suppliers [22]. Our findings have important implications for the resource allocation decisions of management. Managers must first have a thorough understanding of the ways in which focusing on a specific CSR can uniquely contribute to the financial performance of their company in order to maximize the impact of CSR investments. In other words, managers must understand the correlation between specific CSR activities and firm performance in their particular industries. When resources are limited, managers may choose to prioritize the CSR activities that are most beneficial to the firm rather than cutting back on all CSR equally.

Finally, this study adds to the current emerging literature on CSR, product competition, and investment efficiency. It differs from earlier studies in that it uses recent competition and focuses on a recent time period (2013–2018) that has the most comprehensive data provided by KCGS.

The rest of the paper is organized as follows: Section 2 reviews previous literature and builds upon hypotheses. Section 3 explains our data sample and research design. Section 4 displays the empirical results, and finally, Section 5 presents our conclusions.

2. Literature Review and Hypothesis Development

2.1. Prior Research on the Corporate Social Responsibility (CSR)

Waddock and Graves [2] introduce two distinct theories related to CSR: good management theory and slack resources theory. Good management theory is based on the belief that good management

practices and corporate social performance (CSP) are highly correlated, since focus on CSP, such as relationships with employees and the community, inevitably improves relationships with stakeholders, thus improving performance. Furthermore, if a firm has a positive impact on a community, the local government may be incentivized to enact tax breaks or ease regulations, which would have the effect of an improved bottom line for the firm.

On the other hand, according to slack resources theory, positive performance generates slack resources, including financing, which then present opportunities for firms to invest in CSP. Therefore, a firm's performance directly determines the degree to which it focuses on CSP.

In addition to the theories mentioned above, several prior studies have focused on CSR. According to Aguinis [23], CSR can be defined as the specific actions and policies that satisfy stakeholders' expectations with respect to the triple bottom line of economic, social, and environmental performance. Gibson [24] states that firms are moral agents and therefore engage in CSR to satisfy their moral obligations to society. However, Friedman [25] argues that firms are created to make profits, and managers are to use resources on CSR only if it leads to improved financial performance. While the motivations and definitions of CSR vary, the term itself generally refers to positive social actions that go beyond what is legally required.

The European Commission [26] defines corporate social responsibility as "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with stakeholders on a voluntary basis." As resources are depleted and environments are destroyed around the world, international bodies and developed nations are raising questions regarding corporate sustainability. In response to the growing global concern over environmental issues, the United Nations Framework Convention on Climate Change was enacted and adopted by the Kyoto Protocol in 1997 [27]. In accordance with this movement, financial institutions have also adopted green management investment strategies that emphasize corporate social responsibility and principle for responsible investment (PRI), which considers non-financial risks when investing, such as environmental impact. By doing so, firms have increased both the importance of environmental performance for corporate sustainability in the globalized capital market and its role as core growth strategy.

Following these global trends, efforts are being made to improve the environmental performance of companies in Korea. The Korea Exchange, for example, introduced its environmentally responsible investment index, called the Social Responsible Index-Eco (KRX SRI-ECO) on 1 October 2010. In order to both raise awareness of corporate social responsibilities and encourage sustainable management of Korean listed firms, the Korean Corporate Governance Service (KCGS) publishes codes of best practice for socially and environmentally responsible management. In 2011, the KCGS expanded its scope to the ESG rating, which stands for environment, social responsibility, and governance. As the sole publisher of the ESG codes in Korea, the KCGS presents desirable corporate governance and socially responsible management practices in order to assist Korean companies in earning trust both domestically and internationally, thus maximizing corporate value. The goals and definitions of each component part of ESG are as follows: environment aims for sustainable growth consisting of planning, execution, stakeholder engagement, and the management and reporting of performance; social responsibility aims for social responsibility and enhanced confidence consisting of employees, local communities, partners, competitors, and customers; and governance aims for transparency and efficiency improvement consisting of the market, stakeholders, auditing bodies, boards of directors, and shareholders.

In this study, we focus on the first part of ESG—corporate environmental responsibility score. This component presents future directions of environmental management as key factors to business sustainability. The purpose of this index is for investors to raise awareness of environmental management, thereby contributing to the corporate performance improvement and leading corporate value improvement and the establishment of sustainable management strategies. Environmentally responsible actions, also referred to as environmental-oriented CSR activities in this study, promote

the protection of the environment, sustainable development, the efficient use of natural resources, and waste and pollution management [28].

2.2. Corporate Environmental Responsibility

The ultimate goal of a firm is to maximize profits, and they can survive in the market only when benefits exceed costs. While firms engaged in more profit-oriented activities in the past, they have recently begun to engage in more environmentally friendly business practices [29]. CER activities refer to the efforts a company makes to mitigate negative impacts on the environment beyond what is legally required.

Studies reporting insignificant or no relation between CER activities and firm value are relatively rare. Feng et al. [28] report that in the industries, that are less environmentally sensitive, such as health care, IT, and telecommunication services, the correlation between CSR and firm value is weak. In other words, in the industries that consume small amounts energy and generate few pollutants, stakeholders tend to pay less attention to environmental impact. Therefore, CER activities do not benefit the firms in these industries. Also, due to expenses arising from the CER activities, the profitability of these firms will be negative eventually [30]. Margolis et al. [31] report a positive but small correlation between corporate social performance and corporate financial performance. Ullmann [32] states that the association between corporate social responsibility and corporate performance is hard to find. Furthermore, excessive attention paid to corporate social responsibility can limit firm value maximization due to financial constraint.

On the other hand, several studies report a positive association between CER activities and short-term management performance. As the expectation that firms engage in activities that minimize environmental damage spreads throughout the market, the disclosure of index encourages investors to recognize the importance of environmental management. CER activities are also expected to enhance firm performance in industries that are exposed to more environmental risks. Park et al. [33] examine the relationship between the environmental activities of firms and their performance. The results show a positive correlation between environmental grade and firm performance, measured by return on assets (ROA), indicating that companies are economically incentivized to make environmental investments.

Furthermore, Lee and Choi [34] studied firms with an environmental management system to determine its effect on financial performance. Using a sample of 8802 firms from 1993 to 2003, the author finds a positive impact that is correlated to firm size and export ratio and is more pronounced in clean industries. Kim [35] also examined the effects of environmental management on financial performance, finding that large, high-performance companies easily adopt environmental management. Jo et al. [13] showed that operating performances are enhanced by an appropriate level of corporate environmental responsibility. They found that effective investing in corporate environmental responsibility can decrease environmental costs of firms, thereby enhancing operating performance. In a study of manufacturing firms in the S&P 500, Konar and Chohan [36] examined the relationship between firm-level environmental performance and intangible assets and find a significant positive correlation between the value of intangible assets and the environmental performance of a firm. Finally, Nehrt [37] suggested that firms with pollution-reducing technologies may reduce unit production costs and enhance sales in the long term. In other words, if the industries often blamed for environmental pollution accept social responsibility by adopting green practices, such as reducing pollutant emissions or recycling industrial waste, the market is likely to respond positively.

2.3. Prior Research on Investment Efficiency

Economic theory suggests that the actions of a firm are based on strategic considerations [38]. The soundest investment strategy is to invest in that which has the greatest net realized value. However, sometimes firms misjudge the value of an investment and inevitably over- or under-invest. Firms often invest until the marginal benefit of that investment is equal to the marginal cost. Management obtains financing for projects with a positive net present value, and excess cash is returned to investors.

Using data from public companies between 2013 and 2015, Liu [39] examined the relationship between overconfidence of executives and overinvestment, as well as the ways in which the relationship changes depending on the financing ability of the company. The outcomes suggested that, when the financing ability of the company is low, overconfidence may limit overinvestment. On the other hand, when the financing ability of the company is high, overconfidence compounds overinvestment. Li et al. [40] analyzed the effects that investment spillover has on a company's investment level and selection of CEOs. The authors found a symmetric equilibrium for firms to appoint overconfident managers, which only benefits firms when the spillover effect is high. As the spillover parameters change, the equilibrium confidence level and investment decision decrease before increasing. Furthermore, as production costs increase, equilibrium performance becomes worse.

However, prior research has found two problems caused by information asymmetry between managers and investors, adverse selection and moral hazard, each of which can negatively impact the efficiency of capital investment.

Moral hazard refers to managers who prioritize their own self-interest often make investments that are not in the best interest of shareholders [41]. These managers will invest in a project with a negative net present value if there is a personal incentive attached. In some cases, this may lead to overinvestment. When managers are incentivized to increase the size of their firm, for example, they may do so beyond the ideal firm size [42,43]. In other cases, investors may anticipate this hazard and limit capital, thus leading to under-investment [44,45].

Adverse selection refers to the tendency by managers, if they are more informed than investors about the prospects of a firm, to strategically issue capital so they can sell securities that are overpriced. If successful, the managers may then over-invest the proceeds [46]. Investors, however, again may limit capital, leading to under-investment. In a situation in which a firm must fundraise in order to finance an ongoing positive net present value project, management acting in the best interest of existing shareholders may decide against raising fund at a discount, even if they are then forced to miss out on a positive investment opportunity [47].

Some previous research has also analyzed the correlation between the quality of financial reporting and investment efficiency. Biddle et al. [48] found that correlation to be dependent upon whether or not the firm was in an environment conducive to overinvestment or underinvestment. They also found the quality of reporting to be negatively correlated to investment efficiency when aggregate investment is high and vice versa. The implication here is that firms with high-quality financial reporting are less impacted by large-scale economic events than those with low-quality reporting.

In a similar study using a sample of firms that publicly disclosed internal control weaknesses, Chang et al. [49] more directly linked the quality of financial reporting to investment efficiency. They found that a lack of internal control over a firm's financial reporting significantly diminishes investment efficiency. Since this study is able to clearly connect the changes in investment efficiency to disclosed internal control weaknesses, the results are especially significant.

2.4. Hypothesis Development

As public interest in CSR has increased, investment in CSR has also become an important strategy for firms to consider. The KCGS presents ESG codes of practice in Korea, with the goal of maximizing corporate value. ESG codes offer targets of environmental management toward which Korean companies should aim amid environmental issues as key factors to business sustainability. Its purpose is to promote sustainable growth, and it is evaluated by planning, execution, performance management and reporting, and stakeholder engagement.

Involvement in CSR is explained by two theories—slack resources and good management theory [2]. Good management theory suggests that CSR improves relationships with key shareholder groups, resulting in better overall performance. CSR not only fosters corporate innovation and increases employee morale, but also ensures the efficient use of resources, which enhances corporate

reputation [2]. At the same time, it is reported that implementing CSR gives strength to sustainability in management and mitigates uncertainty in future cash flow [17].

Likewise, CER activities are associated with various aspects of firm performances. This is because Cormier et al. [10] documented that social disclosure and environmental disclosure substitute each other in reducing information asymmetry in the stock market. CER activities are expected to enhance firm performance in environmentally sensitive industries that are exposed to more environmental and social risks and greater public scrutiny, such as energy, materials, industrials, consumer discretionary, consumer staples, and utilities [50]. In other words, firms with pollution-reducing technologies may reduce unit production costs, therefore improving sales in the long run [37]. By adequately investing in CER activities, executives can decrease their firms' environmental costs, thereby affecting investment decisions [13]. Furthermore, Park et al. [33] suggest that there are economic incentives for companies to engage in environmental investment. Lopez-Gamero et al. [14] state that positive environmental performance could "lead to more efficient processes, improvements in productivity, lower compliance costs, and new market opportunities." The positive correlation between CER activities and financial performance may be due to the promotion of good environmental protection practices. For example, when the International Finance Corporation adopted its Sustainability Framework in 2006, firms that met its environmental performance standards increased their competitive advantage and discovered new opportunities for growth [15].

Investment efficiency is directly related to a firm's value. Efficient investment increases firm value by promoting investment with positive net present value. Prior studies report that there is positive association between financial reporting quality and investment efficiency [48,51]. From an accounting perspective, previous studies have found that the quality of accounting profit affects investment efficiency. Meanwhile, by improving the quality of financial reporting, firms gain the ability to monitor managers by reducing information asymmetry between investors and managers. Biddle and Hilary [51] found that the higher the quality of earnings, the more sensitive the investment-cash flow, and the effect is greater in countries where capital markets are well developed. Furthermore, Biddle et al. [48] report that the high-quality financial reporting decreases both over- and under-investment. Chang et al. [49] found a positive relationship between internal control weaknesses and investment efficiency, which means improvements in financial reporting condition effectively impacts investment efficiency.

Investment efficiency and CER overlap on certain topics, such as corporate governance, such as audit committee, foreign investors, institutional investor, performance, accounting transparency, and disclosure. Firms that practice CER are reported to have a higher quality of corporate governance and financial reporting than those that do not, and it is highly likely that CER affects investment efficiency. In other words, CER decreases information asymmetry, which may also increase investment efficiency by reducing overinvestment behavior. Therefore, in this study, we attempt to examine the relationship between CER, focusing on environmental issues and overinvestment behavior, which is directly related to firm value. Our first hypothesis is as follows:

Hypothesis 1. *CER activities are positively related to investment efficiency.*

Economic theory assumes that product market competition disciplines managers who are averse to risk and effort [19,20]. Competition also thins profit margins, thus limiting the amount of resources management can divert for their own interests, which means competition can be considered an external control device. Competition also gives firms that engage in CER activities a competitive advantage [52].

Increased market competition has two conflicting effects on the incentives of management [53]. First, as competition increases, job security becomes increasingly tied to performance, which incentivizes managers to perform at a high level. At the same time, an increase in competition lowers profits, which saps the value of cost reduction. This lowers managements incentive to over-perform, thus rendering the overall effect of competition ambiguous.

Product market competition affects the relationship between CSR and firm value in a number of ways. First of all, CSR allows firms to differentiate themselves from the competition, giving them higher market shares. According to Fisman et al. [54], firms in competitive markets are more likely to invest in CSR, because the benefits are more pronounced. Declerck and M'Zali [55] and Siegel and Vitaliano [56] came to similar conclusions. Sheikh [57] also found that CEOs who control investments choose to invest more in innovation when their firms are in highly competitive markets.

Another effect of competition is the thinning of profit margins, which leaves management with fewer cash flows to use for personal gain. When competition is high, managers must invest in CSR to increase firm value and retain their position. Based on the findings of Jia and Shi [58], this is a sound strategy, as social performance is correlated to firm value within competitive industries.

Finally, a high level of competition forces management to focus on short-term projects with positive net present values, which more immediately increase shareholder wealth, rather than long-term projects, such as CSR. Ryu et al. [59] showed that CSR only significantly increases the wealth of shareholders in low-competition markets.

However, Siegel and Vitaliano [56] make the point that in a theoretical market in which all firms are equally competitive, each would invest equally in CSR, thus rendering the overall effect of CSR unclear. Regardless, it is clear that markets significantly influence the relationship between CSR and investment efficiency, which brings us to the following hypothesis:

Hypothesis 2. *Product market competition influences the relationship between CER activities and investment efficiency.*

3. Methodology

3.1. CER Activities

Corporate sustainability management is increasingly viewed as a key aspect of management that every corporation must pursue, and investors pay close attention to the sustainability performance of companies. The KCGS solely publishes ESG codes of practice in Korea and presents desirable corporate governance and socially responsible practices. In the acronym “ESG,” E stands for “environmental responsibility,” which is a driver of sustainable growth.

The Environmental Index evaluates whether firms are environmentally engaged for sustainable development and the maximization of corporate value. As the sole publisher of the ESG codes in South Korea, the KCGS presents desirable corporate governance and socially responsible management practices. CER activities consist of performance management, performance reporting and stakeholder engagement. Together, they promote sustainable growth and indicate that firms have systems in place that align with KCGS recommendations, decreasing the likelihood of reduced shareholders' value.

First of all, the performance management aspect of CER activities have the goal of establishing an environmental-friendly production system, such as a greenhouse gas management system, while also strengthening the environmental capabilities of the supply chain. The performance management aspect of CER activities measures eco-friendly supply chain management, clean production system, environmental risk management, environmental accounting, and environmental auditing. Its major indicators are (1) environmental performance management (e.g., the establishment of an environmental performance evaluation system), (2) greenhouse gas emission management, (3) chemical management (e.g., storage and transportation), (4) supplier management (e.g. environmental management review, providing training and support), (5) green purchasing policy and system, and (6) facility investment in last five years (e.g., greenhouse gas, energy, water, and waste).

The second indicator is the performance reporting aspect of CER activities. Environmental performance is a by-product of corporate activities, and by voluntarily reducing environmental risks, firms can respond to those risks. Firms have established systematic management through the environmental performance evaluation system, and the environmental impact of business activities can

be moderated by conducting environmental audits. The major indicators of the performance reporting aspect of CER activities are as follows: (1) climate change (e.g., GHG emission reduction, reduction of energy consumption), (2) resources (e.g., water consumption reduction, waste reduction), and (3) chemical management (e.g., reduction of hazardous chemical emission).

The third indicator is the stakeholder engagement aspect of CER activities. The environmental information provided by a firm should ensure clarity, comparability, timeliness, and verifiability. At the same time, firms are required to disclose environmental information as a means of communication and to reflect the opinion of shareholders. It measures reporting on the environment and the responses of stakeholders. The major indicators of stakeholder engagement are (1) communication programs with stakeholders, (2) environmental information (e.g. disclosure channels, external verification), (3) the support of and cooperation with local environmental conservation activities, and (4) the membership of an international initiative.

This study considers each indicator of CER activities based on the detailed and precise information provided by the KCGS.

3.2. The Overinvestment Estimation Model

In this study, we consider overinvestment to be any investment beyond what is optimal based on the firm's investment opportunities. In order to estimate overinvestment, we employ two models. First, we use the traditional Tobin's q model, as follows:

$$INV_t = \alpha_0 + \beta_1 Q_{t-1} + \beta_2 CFO_t + \varepsilon_t \quad (1)$$

where INV = capital expenditures, or cash outflow from investing activities divided net property, plant, and equipment; Q = Tobin's q, or the market value of equity plus total liabilities, divided by the book value of total assets; and CFO = cash flow from operations divided by net property, plant, and equipment.

In a perfect capital market, according to Modigliani and Miller [60], actual investments depend only on opportunity, and those opportunities are reflected by marginal q [61]. The conditions in which marginal q equals average Q, as presented by Hayashi [62], form the basis of the above formula. The internal financing ability of firms is controlled for by the inclusion of CFO.

The second model that we use to estimate overinvestment is the McNichols and Stubben [63] model. McNichols and Stubben [63] adjusted the Tobin's q model by controlling for past investment levels, asset growth, and variation in the relationship between Tobin's q and investment. This model includes past investment levels in order to establish a firm-specific standard, since overinvestment estimates are based on residual investments, which are based on investments from the previous year. Asset growth from the beginning of the fiscal year is also included in order to control for the possibility that growth firms are more likely to make investments. Finally, the model includes a control for variation in the relationship between Tobin's q and investment by including incremental coefficients for the quartiles of Tobin's q.

$$\begin{aligned} rINV_t = & \alpha_0 + \beta_1 Q_{t-1} + \beta_2 Q_{QRT2,t-1} + \beta_3 Q_{QRT3,t-1} + \beta_4 Q_{QRT4,t-1} \\ & + \beta_5 CFO_t + \beta_6 GROWTH_t + \beta_7 INV_{t-1} + \varepsilon_t \end{aligned} \quad (2)$$

where INV = capital expenditures; Q_QRT2 (Q_QRT3 , Q_QRT4) = Q times an indicator variable to partition Tobin's q into quartiles (equal to 1 if Q belongs to the second [third, fourth] quartile of its industry-year distribution, and 0 otherwise); CFO = cash flow from operations divided by net property, plant, and equipment; and $GROWTH$ = $\ln$ times the difference between total assets and total assets at the beginning of the year.

3.3. Industry-Level Competition

The Hefindahl-Hirschman Index (HHI) is used to measure competitiveness in a market. The HHI was originally intended to explain market concentration and is commonly used in research, because it explains the competitive structure and market concentration between entities belonging to a specific group. Sutton [64] explains it as an appropriate measure of the degree of competition, and it is widely used in financial studies [65].

The primary measure of market competition used in this study is the HHI, which is equal to the sum of squared market shares:

$$HHI = \sum_{i=1}^I s_{ijt}^2 \quad (3)$$

where s_{ijt} equals the market share of firm i in industry j in year t .

We calculate the market share for each firm based on its net sales, relative to the total net sales of firms across its industry. The squares of those markets shares are then added together for each industry. These calculations are made for each year and each industry, according to their SIC classification code. HHI values are negatively correlated to market competition, meaning low HHI values suggest a relatively equal market share among competitive firms and vice versa. For the convenience of interpretation, we multiply a negative one with HHI and set a dummy variable that takes a value of one for the case where the value of HHI is greater than the median, and 0 otherwise.

3.4. Empirical Models

To test hypothesis 1, we analyze the correlation between CER activities and overinvestment behavior while employing firm-level controls in the following model. We attempt to cluster analyses by incorporating year and firm, which serves as a control for the potential that either residuals are not identically distributed or there is a correlation within the group of residuals [66]. This kind of clustering, which is achieved by calculating standard deviations that reflect the time series and cross-sectional correlations of samples, results in more conservative t-statistics [66].

$$XINV_t = \beta_0 + \beta_1 E1 + \beta_2 FCF_t + \beta_3 SIZE_t + \beta_4 LEV_t + \beta_5 ROA_t + \beta_6 MTB_t + \beta_7 AQ_t + \varepsilon \quad (4)$$

where $XINV$ = overinvestment behavior; $E1$ = environmental performance management score; $E2$ = Environmental performance reporting score; $E3$ = environmental stakeholder engagement score; $SIZE$ = $\ln$ (total assets); LEV = total liability / total assets; ROA = net income / total assets; MTB = market value or book value of equity; AQ = financial reporting quality measure developed by Kothari et al. (2005).

FCF is included, which is calculated as free cash flow divided by total assets. $SIZE$ is the mean firm size, calculated as the natural log of total assets. We also include the additional control variables MTB , which stands for market-to-book ratio, or the market value of equity, and LEV , representing financial leverage, which is calculated as total liability divided by total assets. Borrowing from Hutton et al. [67], we introduce ROA , calculated as net income divided by total assets. Finally, we include the accounting reporting quality variable (AQ). Using low quality earnings may lead to an incorrect assessment of the fundamental value of the firm. Discretionary accruals are therefore used as a proxy for accounting earnings quality in this study. The remodified Jones model [68] is used to distinguish between normal and discretionary accruals. Because discretionary accruals are affected by firm performance, return on assets (ROA) is included as a variable in the modified Jones model [69]. The estimation model is shown below in Equation (5).

$$\frac{TA_t}{A_{t-1}} = \alpha_0 + \beta_1 \frac{1}{A_{t-1}} + \beta_2 \frac{\Delta S_t - \Delta AR_t}{A_{t-1}} + \beta_3 \frac{PPE_t}{A_{t-1}} + \beta_4 ROA_t + \varepsilon_t \quad (5)$$

where TA_t = net income – cash flow from operations; S_t = sales revenue; AR_t = accounts receivables; PPE_t = plant, property, and equipment; ROA_t = net income/total assets; A_t = total assets.

We use a cross-sectional model of discretionary accruals and estimate the model for every industry classified by its two-digit industry code. The sample includes only firms with 20 or more firm-year observations to ensure sufficient data for parameter estimation. The residuals from the estimation model of Equation (5) are used to estimate the discretionary accruals. For the convenience of interpretation, we multiply a negative one that indicates a higher value for high level of accounting earnings quality.

To test hypothesis 2, we examine the effect of product market competition on the relation between CER activities and overinvestment behavior by using interaction variable in Equation (6). We also attempt to cluster analyses by incorporating year and firm, which serves as a control for the potential that either residuals are not identically distributed or there is a correlation within the group of residuals [66].

$$XINV_t = \beta_0 + \beta_1 E1 + \beta_2 HHI_t + \beta_3 E * HHI_t + \beta_4 FCF_t + \beta_5 SIZE_t + \beta_6 LEV_t + \beta_7 ROA_t + \beta_8 MTB_t + \beta_9 AQ_t + \varepsilon \quad (6)$$

where $XINV$ = overinvestment behavior; $E1$ = environmental performance management score; $E2$ = environmental performance reporting score; $E3$ = environmental stakeholder engagement score; HHI = a dummy variable that takes a value of one for the case where the value of [(Herfindahl–Hirshman index) $\times (-1)$] is greater than the median, and 0 otherwise; $SIZE$ = $\ln$ (total assets); LEV = total liability / total assets; ROA = net income / total assets; MTB = market value or book value of equity; AQ = Financial reporting quality measure developed by Kothari et al. [68].

3.5. Sample Selection

The sample includes companies listed on the Korea Stock Exchange (KSE) market from 2013 to 2018 that satisfy the following criteria: (1) companies with CER scores data, which can be bought from the Korea Corporate Governance Service (KCGS), (2) companies (except financial companies) listed on the KSE market with accounts closing in December, (3) companies with equity greater than zero, and (4) companies with financial statements in the FnGuide database. The top and bottom 1% of dependent and independent variable outcomes are Winsorized in an attempt to minimize the effect of outliers. Complete firm-year observation values are described in Table 1. In this process, only companies whose values have increased through the revaluation model remain in the final sample.

Table 1. The sample.

Panel A. Sample Selection Procedure				
Initial observations from 2012 to 2018	10,902			
Less:				
Firms without Environmental Index	6192			
Closing fiscal year in months other than December/ Financial companies	80			
Firms with Equity is less than zero	14			
Companies with no financial statements and missing information	2331			
Final observation	2285			
Panel B. Industry Distribution of Sample with Mean Value of Corporate Environmental Responsibility (CER) Scores				
Types of Industries	N	E1	E2	E3
Manufacture of food products, beverage, tobacco products	123	0.404	0.103	0.426
Manufacture of textiles, sewn wearing apparel, luggage and footwear	75	0.208	0.042	0.263
Manufacture of wood, pulp, paper, printing	83	0.484	0.111	0.560
Manufacture of refined petroleum products, chemical products, rubber, plastics	502	0.412	0.084	0.382
Manufacture of non-metallic products	62	0.456	0.105	0.470
Manufacture of basic metals, fabricated metal products	197	0.475	0.080	0.405
Manufacture of machinery, equipment, computer, electronic components, medicinal chemical, motor vehicles, transportation	559	0.489	0.089	0.373
Construction	97	0.454	0.084	0.408
Retail, wholesale	150	0.279	0.091	0.300
Services	437	0.283	0.068	0.293
Total	2285	0.401	0.083	0.368

4. EMPIRICAL RESULTS

4.1. Descriptive Statistics

Table 2 presents the summary statistics for the variables used in this paper. The average value of overinvestment, *XINV*, was 0.049, the median was -0.012 , and the mean was greater than the median. *E1* has a mean (median) of 0.428 (0.433), with a standard deviation of 0.744. *E2* has a mean (median) of 0.055 (0.025), with a standard deviation of 0.025. *E3* has a mean (median) of 0.125 (0.090), with a standard deviation of 0.182. The average of *HHI* is 0.507. The firms in our sample have an average *FCF* of 0.013 with a standard deviation of 0.267.

Table 2. Descriptive statistics.

Variables	Mean	STD	Q1	Median	Q3
<i>XINV</i>	0.049	0.744	-0.040	-0.012	0.016
<i>E1</i>	0.428	0.197	0.393	0.433	0.472
<i>E2</i>	0.055	0.077	0.000	0.025	0.090
<i>E3</i>	0.125	0.182	0.000	0.090	0.144
<i>HHI</i>	0.507	0.500	0.000	1.000	1.000
<i>FCF</i>	0.013	0.267	-0.010	0.033	0.075
<i>SIZE</i>	26.538	1.654	25.525	26.382	27.522
<i>LEV</i>	0.974	1.172	0.291	0.649	1.195
<i>ROA</i>	0.023	0.072	0.003	0.026	0.054
<i>MTB</i>	1.588	1.699	0.663	1.040	1.781
<i>AQ</i>	0.001	0.105	-0.037	-0.002	0.027

Notes: Variable definition: *XINV* = overinvestment estimated from McNichols and Stubben (2008) model = residual from Equation (2); *E1* = environmental Performance Management Score; *E2* = Environmental Performance Reporting Score; *E3* = Environmental Stakeholder Engagement Score; *HHI* = A dummy variable that takes a value of one for the case where the value of [(Herfindahl-Hirshman index) $\times (-1)$] is greater than the median, and 0 otherwise; *FCF* = free cash flow / total assets = (net profit + depreciation – change in PPE – change in net working capital) / total asset; *SIZE* = $\ln(\text{total assets})$; *LEV* = total liability / total assets; *ROA* = net income / total assets; *MTB* = Market value of equity/book value of equity; *AQ* = Financial reporting quality measure developed by Kothari et al. [68].

Table 3 displays the Pearson correlation matrix for the main variables used in this research. The investment decision, *XINV*, is negatively correlated with *E1* and significant at the 1% level. The correlation coefficient of both *E2* and *E3*, two other measures CER, is -0.024 and -0.014 , respectively. Overall, our univariate results support the notion that CER activities score is associated with investment efficiency by reducing overinvestment behavior.

Table 3. A correlation matrix.

	(1)	(2)	(3)	(4)	(5)
<i>XINV</i> (1)	1.000	-0.100 ($<.0001$)	-0.024 (0.247)	-0.014 (0.496)	0.090 ($<.0001$)
<i>E1</i> (2)		1.000	-0.057 (0.006)	-0.402 ($<.0001$)	-0.042 (0.042)
<i>E2</i> (3)			1.000	-0.001 (0.942)	0.028 (0.169)
<i>E3</i> (4)				1.000	0.103 ($<.0001$)
<i>HHI</i> (5)					1.000

1) See Table 2 for definitions of other variables.

4.2. Main Results

Table 4 presents the results of the multivariate test of hypothesis 1 based on the estimation in Equation (4). Hypothesis 1 explores whether CER affects overinvestment by reducing information asymmetry. Table 4 presents the coefficient estimates for testing hypothesis 1 resulting from the regressions, with the firms' overinvestment (XINV) as the dependent variable. As predicted in hypothesis 1, the results show that the coefficients on E1 is negative (−0.213) and statistically significant at the 0.01 level ($t = -2.75$), after controlling for the effect of firm-specific size, leverage, market-to-book, free cash flow. E1, stands for environmental performance management score, which assesses environmentally preventive action of a firm. Firms with high environmental performance management scores have a well-established environmentally friendly production system. Thus, the result indicates that environmental performance management positively affects investment efficiency.

Table 4. The impact of environmental index on overinvestment.

Variable	E1		E2		E3	
	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.
Intercept	0.500	1.97 **	0.115	0.30	0.403	0.76
E	−0.213	−2.75 ***	−0.619	−2.20 **	−0.404	−2.37 **
FCF	0.024	0.46	−0.003	−0.04	−0.149	−1.34
SIZE	−0.007	−0.77	0.014	0.98	0.017	0.90
LEV	−0.002	−0.18	0.078	3.70 ***	0.107	3.61 ***
ROA	0.177	0.66	0.571	1.45	0.757	1.36
MTB	−0.014	−1.63	−0.025	−1.95 *	−0.044	−2.46 **
AQ	−0.275	−1.64	−0.163	−0.66	−0.252	−0.72
Industry Dummy	Included		Included		Included	
Year Dummy	Included		Included		Included	
F-value	8.86 ***		14.93 ***		19.76 ***	
Adj. R ²	0.063		0.107		0.139	
Observations	2285		2285		2285	

1) See Table 2 for definitions of the variables. 2) *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 4 also presents the coefficients of E2 and E3 as −0.619 and −0.404, respectively, and they are statistically significant, respectively ($t = -2.20$, $t = -2.37$, respectively). E2 stands for environmental performance reporting score, which encourages a firm to respond to environmental risks voluntarily. The result indicates that when a firm takes action to mitigate possible environmental risk, it reduces the risk of information asymmetry that can cause managerial overinvestment. E3 stands for environmental stakeholder engagement score and assesses whether or not a firm discloses environmental information with shareholders, and the degree to which it does so with verifiability, comparability, timeliness, and understandability. Firms with higher scores are less likely to engage in overinvestment behavior.

Among the control variables, the coefficient of leverage (LEV) has a significantly positive effect on overinvestment. The coefficient of ROA is significantly negative, meaning that low-performance firms may be more interested in investing more than required.

Each score evaluates CER activities in various aspects, and the aforementioned results support hypothesis 1. Overall, this indicates that disclosing information of a firm making an effort to improve environmental management positively affects firm value in terms of investment efficiency by reducing overinvestment behavior.

Hypothesis 2 tests the effect of product market competition on the relationship between CER activities and investment efficiency. Table 5 presents the results of testing hypothesis 2. The coefficients of interaction variable in E1 (−8.643), E2 (−16.659), and E3 (−11.317) are significant at 10%, 10%, and 5% level, respectively. This suggests that when the level of competition is high, performance

management, performance reporting, and stakeholder engagement of CER activities are more likely to reduce managerial overinvestment behavior, supporting hypothesis 2.

Table 5. The impact of environmental index on overinvestment firms with high competition.

Variable	E1		E2		E3	
	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.
Intercept	2.014	2.87 ***	1.066	1.53	−0.428	−0.56
<i>E</i>	−1.387	−2.97 ***	−2.149	−2.36 **	−1.200	−2.51 **
<i>HHI</i>	−13.156	−3.07 ***	0.230	0.62	−25.028	−3.98 ***
<i>EXHHI</i>	−8.643	−1.67 *	−16.659	−1.72 *	−11.317	−2.08 **
<i>FCF</i>	−0.080	−0.57	−0.095	−0.82	−0.072	−0.52
<i>SIZE</i>	−0.012	−0.49	−0.016	−0.73	0.001	0.07
<i>LEV</i>	0.002	0.07	0.026	0.83	−0.009	−0.25
<i>ROA</i>	0.010	0.02	1.300	2.42 **	−0.182	−0.31
<i>MTB</i>	−0.079	−3.46 ***	−0.039	−2.06 **	−0.085	−3.76 ***
<i>AQ</i>	−0.290	−0.64	−1.266	−3.88 ***	−0.452	−1.01
Industry Dummy	Included		Included		Included	
Year Dummy	Included		Included		Included	
F-value	8.49***		15.03***		10.75***	
Adj. R ²	0.063		0.118		0.085	
Observations	2285		2285		2285	

1) See Table 2 for definitions of the variables. 2) *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Overall, the level of competition can increase investment efficiency. Product market competition plays an external governance mechanism which enforces managers to exercise their best efforts not to fall behind in the competition. These good governance mechanisms result in better monitoring by outside stakeholders, which also discipline managers to work harder to satisfy the interest of outside shareholders. Thus, when managers face discipline from high competition markets, CER activities are more likely to increase investment efficiency.

When the competitive threat is strong, managers are less likely to use CER activities as a method of overinvestment [57]. This result can be explained by stakeholder theory that CER in fact is a value increasing investment as it balances the interests of both financing and non-financing stakeholders who have influence over firm resources. It also considers CER as a strategic investment that increases firm value where market is highly competitive, as economic theory postulates that competition in product markets plays an important role in disciplining the risk and effort averse managers [19,20]. Also, CER activities foster information disclosure, thereby affects business sustainability.

4.3. Alternative Proxies for CER

The first alternative measure we use is *E_total*, the sum of each CER activities score, provided by KCGS. And the second alternative measure in the study is *E_average*. In Table 6, all of the main analyses for Hypothesis 1 and Hypothesis 2 that investigate the relationship between CER activities and investment efficiency is examined as measured by total CER measure and average CER measure.

Specifically, for the calculation of first measure, we add each score of performance management, performance reporting, and stakeholder engagement and make total score of CER activities and for second measure, we calculate the average value of aforementioned three CER variable.

Table 6. Alternative proxies of corporate environmental responsibility (CER).

Panel A. H1				
Variables	E_total		E_average	
	Coeff.	t-stat.	Coeff.	t-stat.
Intercept	0.498	1.20	0.210	0.56
<i>E</i>	−0.041	−2.01 **	−0.977	−3.13 ***
Controls	Included		Included	
IND Dummy	Included		Included	
YR Dummy	Included		Included	
Adj. R ²	0.120		0.109	
F-stat.	21.85 ***		15.14 ***	
N	2285		2285	
Panel B. H2				
Variables	E_total		E_average	
	Coeff.	t-stat.	Coeff.	t-stat.
Intercept	1.548	2.74 ***	1.594	3.04 ***
<i>E</i>	−0.112	−1.68 *	−2.693	−3.40 ***
<i>HHI</i>	−7.602	−3.03 ***	−5.760	−3.15 ***
<i>EXHHI</i>	−1.402	−1.99 **	−15.855	−1.80 *
Controls	Included		Included	
IND Dummy	Included		Included	
YR Dummy	Included		Included	
Adj. R ²	0.183		0.065	
F-stat.	14.13 ***		13.81 ***	
N	2285		2285	

1) *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. 2) See Table 2 for definitions of other variables.

Panel A shows the result of H1 that investigates the relation between CER activities and investment efficiency as measured by total CER scores and average CER scores. The coefficient of *E*, total (average) score of CER activities is −0.041 (−0.977) and negatively correlated with overinvestment. This suggests that successful CER activities reduce information asymmetry between management and outside stakeholders by improving information environments and enhancing the quality of accounting information [70–72]. Moreover, high-level monitoring on managerial action coupled with a clearer information environment should result in value creation by improving the efficiency of decision-making and increasing the number of optimal investment opportunities [73]. Furthermore, the result implies that firms which actively participated in CER activities can cut resource costs, leading to financial benefits [74].

Panel B shows the results of H2 that examines the effect of product market competition on the relation between CER activities and investment efficiency by using an alternative measurement of total and average value of CER activities. The coefficient of interaction variable in total CER activities shows −1.402 and is significant, while the coefficient of interaction variable in average CER activities is significantly negative at 10% level. The result is consistent with the main results, suggesting that managers who wish to improve efficiency perform best in highly competitive industries [20]. That means that firms in highly competitive industries are expected to make sound decisions regarding management. At the same time, highly competitive industries generally have low information asymmetry and good monitoring mechanism, because it is easy to compare the performance of one firm to others in the same industry. This makes firms less likely to have the agency problem of information asymmetry, which often causes overinvestment [75].

4.4. Firm-Fixed Regression

Some situations can make CER endogenous [76]. This is that causality either runs from overinvestment to the CER or causality runs both ways. A random shock that enters the regression model through the error term can affect our dependent variable. Since overinvestment affects the CER and CER activity will be correlated with the error term, generating a biased coefficient on the CER activities. To solve this problem, we include firm-fixed effects in our regression model. This serves as a control for the possibility that either residuals are not equally shared or a correlation between the groups of residuals exists. Through this, more-accurate predictions of individual outcomes and sound results can be empirically produced from this study.

Table 7 documents the results of the fixed effects. Generally, the findings seem to be parallel with the main results. This suggests a relation between each CER activities index and investment, and this relationship is significant in highly competitive markets, even when robustness is controlled.

Table 7. Firm-fixed regression.

Panel A. H1						
Variables	E1		E2		E3	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Intercept	0.500	1.97 **	0.115	0.30	0.403	0.76
<i>E</i>	−0.213	−2.75 ***	−0.619	−2.20 **	−0.404	−2.37 **
Controls	Included		Included		Included	
IND Dummy	Included		Included		Included	
YR Dummy	Included		Included		Included	
Adj. R ²	0.071		0.115		0.147	
F-stat.	8.86 ***		14.93 ***		19.76 ***	
N	2285		2285		2285	
Panel B. H2						
Variables	E1		E2		E3	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Intercept	1.979	2.82 ***	1.066	1.53	−0.428	−0.56
<i>E</i>	−1.395	−2.99 ***	−2.149	−2.36 **	−1.200	−2.51 **
<i>HHI</i>	−13.160	−3.07 ***	0.230	0.62	−25.028	−3.98 ***
<i>EXHHI</i>	−8.678	−1.68 *	−16.659	−1.72 *	−11.317	−2.08 **
Controls	Included		Included		Included	
IND Dummy	Included		Included		Included	
YR Dummy	Included		Included		Included	
Adj. R ²	0.072		0.126		0.094	
F-stat.	8.47 ***		15.03 ***		10.75 ***	
N	2285		2285		2285	

1) *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. 2) See Table 2 for definitions of other variables.

5. Conclusions

In this study, we examine the relationship between CER activities and investment efficiency by reducing overinvestment between the years 2013 and 2018. CER activities refer to the efforts a company invests in activities that mitigate a negative impact on the environment. Using overinvestment as a proxy for investment efficiency in terms of sustainability and clarity of an information disclosure environment, we find that CER activities generally decrease the degree of overinvestment. At the same time, the evidence of additional analysis shows that the impact of CER activities are more pronounced among firms in highly competitive market. Specifically, the high level of competition can play an external mechanism which enforces managers to exercise their best efforts not to fall behind in the competition. The good governance mechanism results in better monitoring by outside stakeholders, which also discipline managers to work harder to please the interest of outside investors. As a result,

the investment efficiency by reducing overinvestment under the highly competitive market. These findings have important implications for regulators, standard-setters and capital market investors, as CER activities appear to benefit firms that are sound and sustainable and present financial information honestly. The results are robust, even after controlling for different settings and alternative CER activities practices. Overall, these findings indicate that CER activities in South Korea has the potential to be an effective policy tool for increasing financial disclosure environments in a sustainable way.

This study makes several important contributions to the preexisting literature. First extant literature has primarily focused on the effect overall CSR has on the firm performance but has paid less attention to specific types of CSR, i.e., CER. This study extends the CSR literature by differentiating between overall CSR and CER activities in detail. At the same time, this study adds to the emerging literature on CER activities, competitive markets, and investment efficiency, and it differs from earlier studies in that it uses recent time competition and examines a recent time period (2013–2018), using the most comprehensive and privileged data provided by KCGS.

Furthermore, since all parts of the society members such as employees, customers, suppliers, creditors, and community increasingly demand CSR activities, managers must allocate limited corporate resources effectively and strategically in order to satisfy these stakeholders. Likewise, this study has important implications for the performance of managers when allocating resources. Investment in CSR is most beneficial when management has a firm understanding of the ways in which a specific type of CSR activities can assist the value creation of a company in a specific industry. This is especially necessary when resources are limited, as it may be most beneficial for management to cut spending on certain type of CSR practices while spending the limited resources on those which will provide the greatest corporate value.

Our findings are subject to several limitations, including measurement errors for the level of competition and investment efficiency. Moreover, unknown omitted variables can mislead our results. Since control variables are estimated coefficients that are homogenously sized, oriented, and significant across model specifications, there is a possibility that control variables are correlated to the three main explanatory variables. We hope future research papers solve these possible problems. Nevertheless, the empirical findings suggest that CER activities are distinguished from CSR activities in reducing overinvestment and product market competition, which acts as an external governance mechanism, may generate positive consequences for managers' investment efficiency. We believe that the results in this study are important and provide several valuable insights into the positive effect of product market competition on the investment efficiency, especially for regulatory bodies, management bodies, and other various outside investors.

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