The Effect of Corporate Sustainable Management on the Relationship between Cost Stickiness and Earnings Transparency

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Abstract: This study empirically analyzes the relationship between cost stickiness and earnings transparency. Additionally, this study examines the effect of corporate sustainable management (CSM) on the relationship between cost stickiness and earnings transparency. The evaluation scores of Korea Corporate Governance Service (KCGS) are employed to measure CSM activities. The empirical results show that the relationship between cost stickiness and earnings transparency is significant in the negative direction. This means that the more sticky the costs of a firm, the lower the earnings transparency of the firm. In addition, the relationship between the interaction variables of CSM and cost stickiness and earnings transparency is significant in the positive direction. This indicates that CSM activities act as a mechanism to mitigate the negative relationship between cost stickiness and earnings transparency. The findings of this study, which presented the effects of cost stickiness on earnings transparency and the fact that CSM activities act as a device to suppress the opportunistic cost behavior of managers, are expected to provide important implications to investors, external auditors, and supervisors.

Keywords: corporate sustainable management (CSM); asymmetric cost behavior; cost stickiness; earnings transparency

1. Introduction

This study investigates the impact of cost stickiness on earnings transparency. Additionally, this study examines the effect of corporate sustainable management (CSM) on the relationship between cost stickiness and earnings transparency. In traditional cost models, it was assumed that volume and costs show symmetrical behaviors [1]. However, studies related to asymmetric cost behavior presented various logics for the cause of cost asymmetry, and one of them is managers’ strategic decision making with regard to the uncertainty of future demand. That is, the logic is that asymmetric cost behavior is the outcome of decision making that reflects the firm’s business environment and the structural characteristics of the industry to which the firm belongs. A logic additionally applied is that asymmetric cost behavior is the result of decision making that appears in the process through which managers pursue their own private interests and utility [2].

Kim and Yoo [3] stated that cost asymmetry is the result of a manager’s decision making, and that the manager’s judgment on and propensity for future earnings are reflected in the decision-making process. Park and Sonu [4] examined how cost behavior differs according to managers’ sales forecasts and predictive information, and according to the results, the more optimistic managers’ visions of the future were, the more the cost stickiness increased. Since some of the corporate performance is determined by managers’ discretion, managers’ discretion is an important factor in making decisions related to costs [5].
Meanwhile, the accounting information that is the most easily accessed by information users and that is used for various kinds of decision making is financial statements. The reason is that the accounting information provided through financial statements is considered to be useful information indicating the firm's management performance and financial position. However, if accounting information is not transparent but is distorted, the information will make users unable to make rational decisions. The more transparent and accurate the accounting information is, the more rational the decisions that the information users can make [6]. Accounting transparency is the timely disclosure of information on a firm's performance and the financial position of the firm presented to an information user in an understandable way, at a relevant and reliable level. However, accounting transparency is unobservable and difficult to measure. In contrast, if the efficient market hypothesis is satisfied, earnings transparency can be measured objectively because earnings information is reflected in stock price [7,8].

This study employs a measure of earnings transparency to improve the limitations of selecting measurements due to an abstract concept.

Although agency problems have been pointed out as the main cause of asymmetric cost behavior in previous studies since the study conducted by Anderson et al. [9] was published, due to the limitations in the measurement of agency problems, there is a scarcity of studies that directly investigated the relationship between agency problems and asymmetric cost behavior [2]. Therefore, this study expanded on previous studies and took note of asymmetric cost behavior as a factor that affects earnings transparency. Previous studies reported that asymmetric cost behavior reflects the structural characteristics of the industry to which the firm belongs while being the outcome of decision making appearing in the process of pursuing managers' private interests and utility. This study predicted that asymmetric cost behavior would lower the level of earnings transparency and empirically analyzed the foregoing information. In addition, since the relationship between asymmetric cost behavior and earnings transparency may appear differentially according to CSM activities, the relevant relationship was additionally analyzed. The ESG ratings of Korea Corporate Governance Service (KCGS) were used as a proxy for CSM, and the methodology of Cheng and Subramanyam [10] and Barth et al. [8] was applied to the measurement of earnings transparency. This study is considered to have broadened the understanding of managers' asymmetric cost behavior and agency problems because it examined asymmetric cost behavior as a determinant of earnings transparency.

The results of this study are as follows: First, the relationship between cost stickiness and earnings transparency was significant in the negative direction. This means that the more sticky the costs of the firm, the lower the earnings transparency of the firm. That is, the results of the empirical analysis show that cost stickiness is a product of managers' opportunistic decision making and can be used as a proxy for the measurement of agency problems. Second, the relationship between the interaction variables of CSM and cost stickiness and earnings transparency was significant in the positive direction. This indicates that CSM activities act as a mechanism to mitigate the negative relationship between cost stickiness and earnings transparency. That is, this means that CSM activities play a role in controlling the manager’s opportunistic, private utility-seeking behavior.

Although research on cost asymmetry has been actively conducted in several previous studies, there are a limited number of studies on the relationship between cost behavior and earnings transparency. Since earnings reporting can be discriminatory depending on cost behavior, it is expected that the efficient use of resources is more directly related to the survival of a firm. Therefore, the purpose of this study is to present the rationale for effective monitoring of management’s cost decision making and policy establishment for regulatory direction by examining the relationship between cost stickiness, earnings transparency, and sustainability.

This study is meaningful in that, first, it directly verified the relationship between a manager’s discretionary judgment and cost behavior by examining the relationship between earnings transparency and asymmetric cost behavior as a determinant of earnings
transparency. Second, whereas most of the previous studies focused on the accounting transparency measured using only financial statement information, such as discretionary accruals and the quality of accounting profit, this study measured earnings transparency from the perspective of the capital market and examined the relationship between earnings transparency and asymmetric cost behavior. Third, this study revealed the fact that the relationship between a manager’s discretionary judgment and cost behavior may be differential according to CSM activities by analyzing the relationship between asymmetric cost behavior and earnings transparency according to CSM activities.

The remainder of this study is as follows: Section 2 reviews the theoretical background and develops hypotheses, and Section 3 presents the data and the research design. In addition, Section 4 discusses the empirical results, and Section 5 concludes the study.

2. Literature Review and Hypotheses Development

2.1. Asymmetric Cost Behavior and Earnings Transparency

The study of Anderson et al. [9] is the first study to investigate asymmetric cost behavior using actual financial statement data. Thereafter, various studies were conducted with whether asymmetric cost behavior exists or not, determinants of asymmetric cost behavior, and the effects of asymmetric cost behavior as the main study subjects. Studies related to asymmetric cost behavior presented various logics regarding the cause of cost asymmetry, and one of them is that cost asymmetry is the product of a manager’s strategic decision making as a means by which to be prepared for the uncertainty of future demand. That is, the logic is that cost asymmetry is the result of a manager’s decision making reflecting the business environment of the firm or the structural characteristics of the industry to which the firm belongs [2]. Another logic, which is more widely applied, is that cost asymmetry is the result of the decision of a manager to pursue their own personal interest and utility, rather than choosing to pursue corporate profits. After Anderson et al. [9] argued that since reducing the organization or dismissing intimate employees greatly reduces a manager’s own utility, managers may not actively reduce surplus resources intentionally when sales decrease, leading to the occurrence of asymmetric cost behavior; many follow-up studies have adopted the foregoing logic [2].

Factors that affect managers’ decision making to adjust resources include current sales, future sales forecast, the level of resources in the previous term, agency problems, and behavioral factors. If sales are on an upward trend, in cases where sales temporarily decrease, the reduction in controllable resources is irrational when considering adjustment costs. From the viewpoint of the rational expectation theory, managers will expect that the sales reduction will be temporary and that future sales will rise, and they will try to maintain the asymmetric cost behavior [4].

In this regard, Kim and Yoo [3] analyzed the relationship between a manager’s tendencies toward overconfidence in future earnings and cost behavior. In the results of the analysis, the higher the firm manager’s tendency toward overconfidence was, the stronger the cost stickiness that the firm showed. That is, it was interpreted that managers who are overconfident about future earnings do not immediately reduce surplus resources even when current sales decrease but instead endure related costs. Anderson et al. [9] verified the fact that cost variations are different between when the firm’s activity level increases and when the firm’s activity level decreases and pointed out agency problems, such as the manager’s pursuit of personal interests and utility, as the cause of the occurrence of asymmetric cost behavior. Chen et al. [11] also presented a view that a manager’s tendency toward empire building and privileged consumption induces asymmetric cost behavior.

Regarding the determinants of cost stickiness, Lee and Nam [12] examined the effect of the relationship between accounting earnings and compensation on cost stickiness. He reported that based on the results of the analysis, firms where the relationship between accounting earnings and compensation existed showed more asymmetric cost behavior compared to firms where the relationship between accounting earnings and compensation did not exist. He interpreted the foregoing finding as indicating that asymmetry cost
behavior was related to managers’ acts to pursue private interests, such as performance evaluation and compensation based on current profits. Koo [13] analyzed the effect of earnings management incentives on cost stickiness. In the results of the analysis, firms with larger incentives to raise earnings showed more asymmetric cost behavior. This was interpreted as indicating that a manager’s opportunistic earnings management incentives affect the firm’s asymmetric cost behavior.

In addition, Cheong et al. [2] directly verified whether agency problems induce cost stickiness by examining whether there are differences in cost behavior between firms subject to tax investigation and firms reported on violation of supervision, as well as other firms. The results of the analysis indicated that in the case of firms subject to tax investigation, cost reduction was relatively small when sales decreased before undergoing tax investigation compared to other firms. Jung [14] found that in a situation where sales decreased, discretionary sales accruals increased as cost stickiness increased, and they interpreted the foregoing results as indicating that managers use discretionary sales accruals to hide increases in the ratio of costs to sales.

Meanwhile, accounting transparency cannot be objectively observed, and quantifying accounting transparency at the level of individual firms has limitations. Since there are differences in perspectives in evaluating accounting transparency according to the positions of information users and information providers, it is not easy to establish clear evaluation standards for accounting transparency. In previous studies, the accruals, discretionary accruals, and disclosure qualities were used as proxies for accounting transparency [15,16], and, recently, a method of estimating transparency based on a firm’s earnings and stock price information was presented. Cheng and Subramanyam [10] proposed the transparency of financial information using the residual, which is “the value obtained by subtracting the estimated market-adjusted excess earning rate from the actual market-adjusted excess earning rate of the individual firm”. The purpose of the financial statements is to provide information users with useful accounting information on a firm’s financial position and management performance, thereby helping information users to properly evaluate the firm’s value. Therefore, the higher the reliability of the financial statements, the more appropriately information users will be able to evaluate the firm’s value using accounting information. That is, a lot of accounting information will be reflected in the evaluation of the value of the firm. An element of the accounting information, profit information, known as information useful for the evaluation of the firm’s future management performance and corporate value, is believed to be utilized the most frequently, and the result of the evaluation of the corporate value will appear in stock prices. Barth et al. [8] defines earnings transparency as the degree to which earnings information explains a firm’s economic value. That is, Barth et al. [8] measure the degree to which earnings information is reflected in stock prices as earnings transparency. From this viewpoint, the higher the reliability of the financial statements, the more the earnings transparency is expected to be enhanced.

2.2. Corporate Sustainable Management, Cost Stickiness, and Earnings Transparency

As firms’ economic environments are globalized and firms’ influence expands, interest in firms’ social responsibility activities increases. The firms’ social responsibility activities as such expand as stakeholders, such as investors and consumers, demand transparency in all aspects of firms, and the attitudes of firms show many changes, as stakeholders increasingly emphasize the importance of firms’ social responsibility activities. Firms’ social responsibility activities mean that firms carry out decision making and activities by simultaneously considering production and the interests of the entire society, including local communities. Firms should not simply settle for activities aimed at pursuing the profits of shareholders but should create strategies for their competitive advantages, create positive outcomes while regarding stakeholder management as important for corporate sustainable management, and strive to increase corporate value by meeting the expectations of various stakeholders.
CSM is the introduction of “sustainable development”, declared as a new growth paradigm at the human level at the 1992 United Nations Earth Summit, into corporate management. CSM emerged as a concept encompassing firms’ environmental management and social contribution activities in the process of reviewing the overall existing management methods again as environmental and social issues were magnified in firms’ management activities. Concretely, CSM refers to the type of management that pursues sustainable development based on economic reliability, social responsibility, and environmental soundness.

From the beginning of the 2000s, as the global economy grew to some extent, interest in environmental and social issues spread throughout society, and the demand for firms to be socially responsible rapidly increased; the CSM paradigm came to the fore in earnest. In addition to the traditional management value termed profit creation through product quality, pricing policies, and marketing strategies, CSM emphasizes management transparency and ethical management, and regards the contribution to social development and environmental protection for public interests as important. This stems from the critical mind believing that firms can survive and grow by surpassing the level of simply sharing social responsibilities and seeking ways to cooperate, agree, and coexist with various stakeholders through economic, social, and environmental responsibilities [17].

As CSM activities are viewed as voluntary actions for stakeholders, recently, CSM activities have been expected to curb managers’ opportunistic behaviors and provide accounting information helpful to various stakeholders’ decision making. In this regard, many studies have been conducted on the relationship between CSM activities and earnings management. Hong and Anderson [18] argued that firms that conduct many CSM activities have higher quality accruals and less frequently carry out earnings management and that the foregoing finding affects the quality of financial reporting. In a finding that estimated that CSM activities and earnings management (earnings smoothing and earnings aggressiveness) would have an inverse relationship, Scholtens and Kang [19] argued that Asian firms’ CSM activities in good faith alleviate earnings management and positively interact with investor protection.

In addition, Kim et al. [20] divided the KEJI index into social, environmental, and economic indices and verified their relationships with earnings management. Based on the results, they reported that only the social index has a significant negative (-) relationship with earnings management and argued that the higher the social index, which represents ethical actions, the less frequently the earnings management occurs, which is an unethical behavior inside a firm. Choi and Moon [21] reported that firms that carry out CSM activities conduct earnings management less frequently than other firms and that firms that carry out CSM activities continuously less frequently conduct earnings management and show higher levels of earnings persistence than firms that carry out CSM activities discontinuously. Therefore, they reported that firms that carry out CSM activities have higher accounting transparency than firms that do not carry out CSM activities and argued that accounting transparency is higher when CSM activities are carried out continuously and that non-financial information is related to accounting transparency.

2.3. Hypothesis Development

Summarizing the results of the previous studies, the view that asymmetric cost behavior is decision making based on a manager’s rational expectations [4] and the view that asymmetric cost behavior appears due to a manager’s decision to pursue his private interests and utility, such as earnings management and agency problems [2,5], are mixed. Previous studies that examined cost stickiness from the viewpoint of agency theory mainly stated that a manager’s act of pursuing private interests in situations where the interests of the manager and those of the shareholders are in conflict with each other causes cost stickiness [22]. Managers’ discretion can be regarded as involving irrational decision making to pursue private interests while not actively reducing costs when sales decrease [5]. In this study, hypotheses were established from the viewpoint of agency theory, which is the
more widely used of the two views regarding asymmetric cost behavior. The asymmetric cost behavior as a proxy for agency costs, which represents manager’s discretion and uncertainty, is expected to have a negative correlation with earnings transparency. Since it is believed that the more asymmetric the cost behavior of a firm, the higher the information uncertainty of the firm and the wider the breadth of the manager’s discretionary choices, the following hypothesis was developed:

**Hypothesis 1 (H1).** Cost stickiness will be negatively related to earnings transparency.

According to agency theory, since it is practically difficult for shareholders to monitor managers’ behavior, managers can manage earnings for personal gains, such as personal compensation. Since earnings management can occur due to information asymmetry, information asymmetry and earnings management can affect cost behavior. If managers conduct earnings management through the adjustment of decision making related to costs, the cost behavior may appear differently due to earnings management. Therefore, the ultimate reason for managers to make a decision or carry out an action that causes cost asymmetry is related to the managers’ pursuit of private interests, and such a behavior may appear due to agency costs.

Combining the above studies, it can be seen that CSM activities can suppress managers’ opportunistic acts to conduct earnings management and improve the quality of financial reporting. This relationship means that CSM activities can also affect asymmetric cost behavior. Accordingly, firms with excellent CSM activities are expected to conduct asymmetric cost behavior less frequently compared to other firms. Therefore, the following hypothesis was developed in relation to the effect of CSM activities on the negative relationship between cost stickiness and earnings transparency:

**Hypothesis 2 (H2).** The better the CSM activities of a firm are, the weaker the negative relationship between cost stickiness and earnings transparency will be.

3. Research Design and Data

3.1. Empirical Models

In this study, the regression model to verify the effect of asymmetric cost behavior on earnings transparency is as shown in Equation (1). The models of Homburg and Nasev [23] and Park et al. [24] were applied to asymmetric cost behavior, and the proxy for earnings transparency was measured with the methods of Cheng and Subramanyam [10] and Barth et al. [8]. The evaluation scores of KCGS were used for CSM activities.

\[
\text{TRANS}_{i,t} = \beta_0 + \beta_1 \text{STICKY}_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{ROA}_{i,t} + \beta_4 \text{LEV}_{i,t} + \beta_5 \text{INTAN}_{i,t} + \beta_6 \text{GRW}_{i,t} + \beta_7 \text{AGE}_{i,t} + \beta_8 \text{MTB}_{i,t} + \beta_9 \text{FOR}_{i,t} + \beta_{10} \text{OWN}_{i,t} + \sum \text{YD} + \sum \text{ID} + \epsilon_{i,t}
\]  

(1)

where TRANS is the earnings transparency, which is measured using the methods of Cheng and Subramanyam [10] and Barth et al. [8], for firm i in year t; STICKY represents asymmetric cost behavior, which is defined as 1 in the case of firms that show asymmetric cost behavior and 0 otherwise. STICKY is the variable of interest in H1, and the prediction code is in the negative direction. Firms that show asymmetric cost behavior are predicted to have low earnings transparency. As control variables, the SIZE, ROA, LEV, INTAN, GRW, AGE, MTB, FOR, and OWN variables, which affected earnings transparency in previous studies, were selected. SIZE is the natural logarithm of total assets, which controls the size effect. ROA is the return on assets, which is measured as the net income of t divided by the lagged total assets. LEV is the debt ratio of a firm, representing the leverage or capital structure. INTAN is intangible assets divided by total assets; GRW is the growth rate, which is measured as (total assets for firm i in year t—lagged total assets)/lagged total assets, and AGE is the natural logarithm of firm age. MTB is the market value of equity divided by the book value of equity, which controls growth opportunities. The foreign ownership ratio (FOR) and ownership ratio (OWN) are included to control corporate governance. Finally,
year dummies (YD) and industry dummies (ID) are included to control the effects of year and industry on earnings transparency.

In this study, the regression model to verify the effect of CSM on the relationship between asymmetric cost behavior and earnings transparency is as shown in Equation (2).

\[
\text{TRANS}_{i,t} = \beta_0 + \beta_1 \text{STICKY}_{i,t} + \beta_2 \text{CSM}_{i,t} + \beta_3 \text{STICKY}_{i,t} \times \text{CSM}_{i,t} + \beta_4 \text{SIZE}_{i,t} + \beta_5 \text{ROA}_{i,t} \\
+ \beta_6 \text{LEV}_{i,t} + \beta_7 \text{INTAN}_{i,t} + \beta_8 \text{GRW}_{i,t} + \beta_9 \text{AGE}_{i,t} + \beta_{10} \text{MTB}_{i,t} \\
+ \beta_{11} \text{FOR}_{i,t} + \beta_{12} \text{OWN}_{i,t} + \sum \text{YD} + \sum \text{ID} + \epsilon_{i,t}
\]  

(2)

where TRANS is the earnings transparency, which is measured using the methods of Cheng and Subramanyam [10] and Barth et al. [8], for firm i in year t; STICKY represents asymmetric cost behavior, which is defined as 1 in the case of firms that show asymmetric cost behavior and 0 otherwise; CSM indicates the level of sustainability management, which is the ESG ratings (ESG integration sector, governance sector, social sector, and environment sector) of KCGS. In Equation (2), STICKY × CSM is an interacting variable between asymmetric cost behavior and CSM. STICKY × CSM is the variable of interest in H2, and the prediction code is in the positive direction. Firms with more active CSM activities are predicted to have a weaker negative relationship between asymmetric cost behavior and earnings transparency. The control variables employ the same variables as in Equation (1).

3.2. Measurement of Variables

3.2.1. Earnings Transparency

In this study, earnings transparency is measured using the method of Cheng and Subramanyam [10].

\[
\text{ARET}_{i,t} = \beta_0 + \beta_1 \text{NI}_{i,t} + \beta_2 \text{LOSS}_{i,t} + \beta_3 \text{NI}_{i,t} \times \text{LOSS}_{i,t} + \beta_4 \Delta \text{NI}_{i,t} + \epsilon_{i,t}
\]  

(3)

\[
\text{TRANS}_{i,t} = \left[\text{ARET}_{i,t} - \left(\beta_0 + \beta_1 \text{NI}_{i,t} + \beta_2 \text{LOSS}_{i,t} + \beta_3 \text{NI}_{i,t} \times \text{LOSS}_{i,t} + \beta_4 \Delta \text{NI}_{i,t}\right)\right]^2 \times (-1)
\]  

(4)

where ARET is the market adjusted returns for 12 months from April of the current fiscal year to March of the next fiscal year; NI is net income divided by a beginning market value of equity; LOSS is a dummy variable that if a firm reports negative income, it takes the value of 1 and 0 otherwise; ∆NI is the change in net income divided by the beginning market value of equity [25]. Coefficients estimated in Equation (3) and the earnings information are substituted in Equation (4).

3.2.2. Earnings Transparency

Barth et al. [8] define earnings transparency as the extent of the explanatory power of earnings and changes in earnings for price/earnings ratios. Since it is assumed that the disclosed information is immediately reflected in stock prices in an efficient market [26], earnings transparency is measured with the extent to which profit information for economic value is reflected in price/earnings ratios. To reflect changes between firms and time series changes, earnings transparency is measured at the level of individual firms by summing the components of R²’s at individual stages estimated by a two-stage procedure. This can be expressed as Equation (5), where i, j, and p denote the firm, industry, and portfolio, respectively.

\[
\text{TRANS}_{i,t} = \text{TRANS}_{i,t}^{\text{I}} + \text{TRANS}_{i,t}^{\text{IN}}
\]  

(5)

where TRANS is the first element of earnings transparency, which is the R² of the estimated earnings price/earnings ratio regression model of firms belonging to industry j in every year t. The R²’s, measured with the earnings price/earnings ratio regression models by industry represent the relationship between earnings information and stock prices of firms belonging to the same industry and means the average earnings transparency of firms of
the same type with similar accounting methods. Concretely, in order to measure TRANSI, \( R^2 \)s are measured by industry–year using the regression equation of Equation (6).

\[
RET_{i,j,t} = \alpha_0 + \alpha_1 E_{i,j,t} / P_{i,j,t} + \alpha_2 \Delta E_{i,j,t} / P_{i,j,t-1} + \epsilon_{i,j,t}
\] (6)

where RET is measured with the price/earnings ratios for 12 months from 3 months after the end of the fiscal year. \( E_t / P_{t-1} \) is the operating profit divided by the underlying stock price, and \( \Delta E \) is the change in operating profits between years \( t-1 \) and \( t \). The coefficients and those estimated with Equation (6) above have the same values for all firms included in the same industry-year.

TRANSIN, which is the second element of earnings transparency, considers industry-neutral elements. To obtain TRANSIN, the residuals are estimated by industry–year with the regression model between earnings and stock prices in Equation (6), and the residuals are quartered according to size in order to organize portfolios. Regression models between earnings and stock prices are again estimated with the portfolios by quintile, and the \( R^2 \)s are measured. The \( R^2 \)s measured as such become an element that captures additional explanatory power for the relationship between earnings and stock prices that was not reflected in the regression models by industry so that the cross-sectional volatility of earnings transparency can be considered. Equation (7) shows the regression model used to obtain TRANSIN.

\[
RET_{i,p,t} = \alpha_0^{IN} + \alpha_1^{IN} E_{i,p,t} / P_{i,p,t} + \alpha_2^{IN} \Delta E_{i,p,t} / P_{i,p,t-1} + \epsilon_{i,p,t}
\] (7)

### 3.2.3. Cost Stickiness

Previous studies have confirmed that asymmetric cost behavior appears in sales, general, and administrative (SG&A) costs, and since investors and analysts are interested in SG&A costs and monitor it, SG&A costs are used as a signal for cost. In the model of Anderson et al. [27], changes in the SG&A costs ratio (SG&A\(_{\text{Ratio}}\)) were defined as the difference between the ratio of SG&A in the current period to the sales in the current period and the ratio of the SG&A costs in the previous period to the sales in the previous period as follows:

\[
SG&A\_{\text{Ratio}}_{i,t} = \frac{\text{SG&A} \_t}{\text{SALES} \_t} - \frac{\text{SG&A} \_{t-1}}{\text{SALES} \_{t-1}}
\] (8)

where SG&A and SALES denote sales, general, and administrative costs and sales revenue. Using the above equation, firms where asymmetric cost behavior occurred are identified using two methods. First, as with the study conducted by Homburg and Nasev [23], firms where asymmetric cost behavior occurred (cost stickiness firms) are identified with changes in the ratio of SG&A costs to sales in situations where SG&A costs were not reduced while sales decreased. Since asymmetric cost behavior means cases where the amount of costs reduced when sales decreased is smaller than the amount of costs increased when sales increased, the ratios of SG&A costs of firms where SG&A costs are not reduced when sales decrease are measured as follows and used in studies.

\[
\text{CSfirm}_{i,t} = SG&A\_{\text{Ratio}}_{i,t} \times D\text{sales}_{i,t} \times D\text{SG&A}_{i,t} = \left( \frac{\text{SG&A} \_t}{\text{SALES} \_t} - \frac{\text{SG&A} \_{t-1}}{\text{SALES} \_{t-1}} \right) \times D\text{sales}_{i,t} \times D\text{SG&A}_{i,t}
\] (9)

where if \( D\text{sales} (=\text{SALES} \_t / \text{SALES} \_{t-1}) < 1 \), it is 1, otherwise 0; if \( D\text{SG&A} (=\text{SG&A} \_t / \text{SALES} \_t - \text{SG&A} \_{t-1} / \text{SALES} \_{t-1}) > 1 \), it is 1, otherwise 0; \( \text{CSfirm} \) is the cost stickiness for firm \( i \) in year \( t \). Next, in a study conducted by Park et al. [24], cost stickiness was measured by expanding the method of Homburg and Nasev [23], considering the number of employees and tangible assets. Cost stickiness is formed when resources held are intentionally not disposed of because adjustment costs, etc., are incurred in relation to the manager’s sales forecast, and the adjustment costs as such are also incurred in relation to assets owned by the company or employees [9]. In cases where sales decrease, there is an incentive to fire employees, but this causes great burdens on the firm. When employees...
are dismissed, large amounts of restructuring costs, such as severance pays, are incurred, and a vicious cycle in which loyalty to the firm decreases due to the demoralization of employees and the intensification of the turnover problem. In addition, in cases where sales increase again, recruitment-related expenses, such as education and training expenses for employee recruitment, act as a burden on the firm. With regard to tangible assets, when decreases in demand are expected, selling such assets is more difficult for firms compared to reducing resources, such as material costs, because selling assets involves selling costs and additionally incurs costs related to the installation or customization of certain investment assets. Using the method of Homburg and Nasev [23] discussed earlier and additionally considering situations where the number of employees and tangible assets did not decrease, firms where cost stickiness occurred are identified as follows:

$$\text{CSfirm}_{i,t} = \text{SG&A Ratio}_{i,t} \times D_{\text{sales}}_{i,t} \times D_{\text{SG&A}}_{i,t} \times D_{\text{Emp}}_{i,t} \times D_{\text{asset}}_{i,t} \quad (10)$$

where \( \text{SG&A Ratio} = \frac{\text{SG&A}_{i,t}}{\text{SALES}_{i,t}} - \frac{\text{SG&A}_{i,t-1}}{\text{SALES}_{i,t-1}} \); if \( D_{\text{sales}} (=\frac{\text{SALES}_{i,t}}{\text{SALES}_{i,t-1}} - 1) < 1 \), it is 1, otherwise 0; if \( D_{\text{SG&A}} (\text{SG&A}_{i,t}/\text{SALES}_{i,t} - \text{SG&A}_{i,t-1}/\text{SALES}_{i,t-1}) > 1 \), it is 1, otherwise 0; if \( D_{\text{Emp}} \) (number of employees in year \( t/\text{SALES}_{i,t} \)—number of employees in year \( t-1/\text{SALES}_{i,t-1} \) > 1, it is 1, otherwise 0; if \( D_{\text{asset}} \) (tangible assets in year \( t/\text{SALES}_{i,t} \)—tangible assets in year \( t-1/\text{SALES}_{i,t-1} \) > 1, it is 1, otherwise 0; \( \text{CSfirm} \) is the cost stickiness for firm \( i \) in year \( t \). According to the above equation, firms where cost stickiness occurred report a positive \( \text{CSfirm} \) value. Therefore, in this paper, firms with a positive \( \text{CSfirm} \) value were given a value of 1, and other firms were given a value of 0 for use in empirical analysis.

3.2.4. Corporate Sustainable Management

The ESG grades of KCGS are divided into four categories (ESG integration, governance, social responsibility, and environment management), ranging from A+ grade to C grade. In this study, the ESG ratings of KCGS are scored by assigning A+: 10, A: 9, B+: 8, B: 7, C+: 6, and C: 5 [18,25]. The governance sector has a distribution of 10 to 5 points, while the rest of the sectors have a distribution ranging from 10 to 7.

3.3. Samples and Data

Our sample consists of listed firms on the Korea Exchange (KRX) from 2011 to 2017. Financial data and stock price were collected from the FN DataGuide. To ensure homogeneity, the financial industry is excluded from the samples. For comparability, we included firms that settle accounts at the end of December and excluded firms without the financial data needed for analysis. We analyzed firms that are able to obtain data on the evaluation grade of sustainable management in the KCGS. In addition, outliers of all variables except dummy variables were observed and adjusted to observations, with outliers less than 1% at the bottom and less than 99% at the top [25]. The final sample used in our study was 4383 firm years. The sample selection process is summarized in Table 1.

Table 1. Sample selection.

| Criteria                                                                 | Firm Year Observations |
|--------------------------------------------------------------------------|------------------------|
| Quoted firms for fiscal years 2011–2017                                  | 4897                   |
| (less) Non-December 31 firms for fiscal years and financial firms        | (306)                  |
| (less) Firms for which financial, stock data, and corporate sustainable management grade could not be obtained from FN Guide, KCGS | (208)                  |
| Final sample                                                             | 4383                   |

Table 2 shows the distributions of the samples by industry and year. The proportions of the samples by year were similar. The numbers of samples of coke, chemicals, and metallic
were shown to be the largest, and those of publishing/broadcasting, rubber/plastic, and non-metallic industries were shown to be the smallest.

Table 2. Industry distribution of the sample.

| Industry                      | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Observations |
|-------------------------------|------|------|------|------|------|------|------|--------------|
| Food, beverage                | 33   | 34   | 34   | 34   | 34   | 36   | 36   | 237          |
| Fiber, clothes, and leathers  | 24   | 24   | 24   | 23   | 24   | 26   | 27   | 189          |
| Timber, pulp, and furniture   | 23   | 23   | 24   | 24   | 24   | 24   | 24   | 187          |
| Cokes and chemical            | 62   | 64   | 66   | 67   | 67   | 67   | 67   | 507          |
| Medical manufacturing         | 30   | 30   | 32   | 32   | 34   | 36   | 37   | 265          |
| Rubber and plastic            | 17   | 19   | 19   | 19   | 19   | 19   | 19   | 151          |
| Non-metallic                  | 18   | 18   | 19   | 19   | 20   | 21   | 21   | 136          |
| Metallic                      | 46   | 46   | 48   | 51   | 51   | 50   | 50   | 406          |
| PC and medical                | 40   | 40   | 40   | 40   | 41   | 41   | 41   | 311          |
| Machine and electronic        | 39   | 39   | 39   | 40   | 42   | 42   | 41   | 320          |
| Other transportation          | 42   | 43   | 44   | 46   | 47   | 49   | 49   | 375          |
| Construction                  | 30   | 30   | 30   | 30   | 31   | 30   | 31   | 185          |
| Retail and whole sales        | 46   | 47   | 47   | 50   | 53   | 55   | 54   | 400          |
| Transportation services       | 20   | 20   | 20   | 20   | 21   | 21   | 21   | 154          |
| Publishing and broadcasting   | 11   | 13   | 14   | 14   | 14   | 14   | 14   | 122          |
| Professional services         | 63   | 63   | 66   | 66   | 65   | 70   | 70   | 404          |
| Other                         | 49   | 50   | 50   | 50   | 53   | 54   | 54   | 369          |
| Total                         | 593  | 603  | 614  | 622  | 639  | 656  | 656  | 4383         |

4. Empirical Results

4.1. Descriptive Statistics

Table 3 shows the descriptive statistics of major variables. The means of TRANS1 and TRANS2, which indicate earnings transparency, are −0.120 and −0.312, respectively. The averages of STICKY1 and STICKY2, which indicate cost stickiness, are 0.279 and 0.199, showing that the ratio of firms with cost stickiness is about 28% and 20%, respectively. The mean of the total evaluation grades (TOTAL_SCORE) is 7.235, and the mean of the corporate governance evaluation grades (GOV_SCORE) is 6.618. The average of the social responsibility activity evaluation grade (SOC_SCORE) is 7.309, and the average of the environmental management evaluation grade (ENV_SCORE) is 7.356. The mean firm size is 27.089 and the median is 26.884. The mean debt-to-equity ratio (LEV) is 0.472 and the median is 0.479. The average return on asset (ROA) is 1.9%, and the intangible assets ratio (INTAN) has a mean of 0.036, with 3.6% of total assets comprising intangible assets. Growth rate (GRW) has a mean of 0.117, and firm age (AGE) has a mean of 2.870. The mean of book value-to-market value ratio (MTB) is 1.221, which is 1.22 times the market value compared to the book value. The foreign ownership ratio (FOR) has an average of about 10%, and the ownership ratio (OWN) is 45% on average.

4.2. Pearson Correlations

Table 4 shows the results of the Pearson correlation analysis of the major variables. Earnings transparency (TRANS1 and TRANS2) has a significant negative relationship with cost stickiness (STICKY1 and STICKY2). This means that the more asymmetric the cost, the lower the earnings transparency. This is consistent with our hypothesis that asymmetric cost behavior has a negative effect on earnings transparency, although other factors affecting earnings transparency are not controlled for. Firm size (SIZE), intangible assets ratio (INTAN), foreign ownership ratio (FOR), and majority shareholders ratio (OWN) show a significant negative relationship with earnings transparency (TRANS1 and TRANS2). This means that the larger the firm size, the higher the intangible assets ratio, the higher foreign ownership ratio, and the higher majority shareholders ratio, the lower the earnings transparency. Since the above results do not control for other variables affecting earnings transparency, we performed a multiple regression analysis.
Table 3. Descriptive statistics (N = 4383).

| Variable  | Mean  | Std.  | Min   | 25%   | Median | 75%   | Max   |
|-----------|-------|-------|-------|-------|--------|-------|-------|
| TRANS1    | -0.120 | 0.325 | -3.899 | -0.103 | -0.032 | -0.006 | 0.000 |
| TRANS2    | -0.312 | 0.207 | -1.040 | -0.442 | -0.288 | -0.158 | 0.102 |
| STICKY1   | 0.279  | 0.448 | 0.000  | 0.000  | 0.000  | 1.000  | 1.000 |
| STICKY2   | 0.199  | 0.399 | 0.000  | 0.000  | 0.000  | 0.000  | 1.000 |
| TOTAL_SCORE | 7.235 | 0.563 | 7.000  | 7.000  | 7.000  | 7.000  | 10.000 |
| GOV_SCORE | 6.618  | 1.202 | 5.000  | 7.000  | 7.000  | 7.000  | 10.000 |
| SOC_SCORE | 7.309  | 0.682 | 7.000  | 7.000  | 7.000  | 7.000  | 10.000 |
| ENV_SCORE | 7.356  | 0.650 | 7.000  | 7.000  | 7.000  | 7.000  | 10.000 |
| SIZE      | 27.089 | 1.576 | 24.000 | 25.995 | 26.884 | 27.951 | 31.478 |
| ROA       | 0.019  | 0.077 | -0.364 | 0.002  | 0.027  | 0.056  | 0.203 |
| LEV       | 0.472  | 0.200 | 0.000  | 0.000  | 0.000  | 0.001  | 0.771 |
| INTAN     | 0.036  | 0.067 | 0.000  | 0.000  | 0.006  | 0.014  | 0.038 |
| GRW       | 0.117  | 0.971 | -0.969 | -0.022 | 0.035  | 0.105  | 19.861 |
| AGE       | 2.870  | 0.851 | 0.000  | 2.485  | 3.135  | 3.526  | 4.127 |
| MTB       | 1.221  | 1.159 | 0.168  | 0.546  | 0.854  | 1.396  | 6.852 |
| FOR       | 9.951  | 13.006 | 0.000 | 1.156  | 4.306  | 14.182 | 60.579 |
| OWN       | 44.547 | 16.747 | 8.930 | 32.360 | 55.970 | 83.360 | 55.970 |

Note: Please see Appendix A for variable definitions.

Table 4. Pearson correlations (N = 4383).

| (2) TRANS1 | -0.094 | -0.036 | -0.044 | -0.077 | 0.020 | 0.002 | 0.012 | 0.003 | -0.005 | 0.209 | -0.033 | -0.031 |
| (2) TRANS2 | -0.010 | -0.007 | -0.004 | -0.020 | 0.032 | -0.078 | 0.013 | 0.029 | -0.055 | -0.007 | -0.010 |
| (3) STICKY1 | 0.809 | -0.039 | -0.114 | -0.012 | -0.020 | -0.039 | 0.044 | -0.042 | -0.048 | -0.015 |
| (4) STICKY2 | -0.074 | 0.120 | 0.258 | 0.125 | 0.146 | 0.028 | -0.065 | 0.475 | -0.018 |
| (5) SIZE   | 0.120 | 0.258 | 0.125 | 0.146 | 0.028 | -0.065 | 0.475 | -0.018 |
| (6) ROA    | -0.263 | -0.046 | 0.016 | -0.063 | -0.022 | 0.162 | 0.114 |
| (7) LEV    | -0.074 | 0.012 | -0.071 | 0.094 | 0.073 | -0.039 |
| (8) INTAN  | 0.011 | 0.031 | 0.056 | 0.036 | 0.004 | -0.126 | -0.123 |
| (9) GRW    | -0.006 | 0.005 | 0.082 | -0.031 |
| (10) AGE   | -0.088 | 0.009 | -0.165 |
| (11) MTB   | 0.105 | -0.097 |
| (12) FOR   | -0.138 |
| (13) OWN   | 1.000 |

Notes: This table presents Pearson correlations. Coefficients shown in bold are significant at p < 0.05 (two-tailed test). Please see Appendix A for variable definitions.

4.3. Multivariate Results

4.3.1. Cost Stickiness and Earnings Transparency (H1)

Table 5 shows the results of the regression analyses of Equation (1) for the effects of cost stickiness on earnings transparency. Table 5 presents the results of regression analyses using models 1–4. In the case of model 1, the variable of interest is STICKY1, and the dependent variable is TRANS1; in the case of model 2, the variable of interest is STICKY1, and the dependent variable is TRANS2; in the case of model 3, the variable of interest is STICKY2, and the dependent variable is TRANS1; and in the case of model 4, the variable of interest is STICKY2, and the dependent variable is TRANS2. The F value of the analysis results appears to be statistically significant, indicating that the study models are appropriate. The regression coefficient (β1), which indicates the effect of cost stickiness on earnings transparency, was shown to have significant negative values according to the model. This means that firms with cost stickiness have lower earnings transparency than that of other firms. That is, this shows that asymmetric cost behavior is a product of a manager’s opportunistic decision making, indicating that asymmetric cost behavior acts as a factor that hinders earnings transparency. This suggests that asymmetric cost behavior affects earnings transparency and shows the perspective of agency costs, which is an empirical result supporting H1 [2,14,28].
Table 5. The relevance of cost stickiness and earnings transparency (N = 4383).

\[
\text{TRANS}_{i,t} = \beta_0 + \beta_1 \text{STICKY}_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{ROA}_{i,t} + \beta_4 \text{LEV}_{i,t} + \beta_5 \text{INTAN}_{i,t} + \beta_6 \text{GRW}_{i,t} + \beta_7 \text{AGE}_{i,t} + \beta_8 \text{MTB}_{i,t} + \beta_9 \text{FOR}_{i,t} + \beta_{10} \text{OWN}_{i,t} + \sum YD + \sum ID + \varepsilon_{i,t}
\]

| Variables | Model 1 = TRANS1 | Coefficient | t-Value | Model 2 = TRANS2 | Coefficient | t-Value |
|-----------|-----------------|-------------|---------|-----------------|-------------|---------|
| Intercept |                 | 0.320       | 3.340 ***|                 | 0.275       | 4.090 ***|
| STICKY1   |                 | -0.022      | -2.060 **|                 | -0.017      | -2.180 **|
| SIZE      |                 | -0.012      | -3.240 ***|                | 0.001       | 0.220    |
| ROA       |                 | 0.101       | 2.840    |                 | -0.017      | -0.610    |
| LEV       |                 | 0.029       | 1.110    |                 | -0.006      | -0.300    |
| INTAN     |                 | 0.029       | 0.390    |                 | -0.027      | -0.500    |
| GRW       |                 | 0.001       | 0.900    |                 | 0.001       | 0.670    |
| AGE       |                 | 0.006       | 1.120    |                 | 0.002       | -0.550    |
| MTB       |                 | 0.044       | 14.800   |                 | -0.005      | -2.400    |
| FOR       |                 | -0.001      | -2.450 **|                | -0.001      | -0.200    |
| OWN       |                 | -0.001      | -0.800   |                 | -0.001      | -0.780    |
| YD        |                 |             |         | Included        |             |         |
| ID        |                 |             |         | Included        |             |         |
| F-value   | Model 3 = TRANS1 | 12.55 ***   |         | Model 4 = TRANS2 | 15.22 ***   |         |
| Adj. R²   | Model 3 = TRANS1 | 15.83%      |         | Model 4 = TRANS2 | 19.51%      |         |

Note: This table reports the relevance of asymmetric cost behavior and earnings transparency. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 levels, respectively. Please see Appendix A for variable definitions.

4.3.2. CSM, Cost Stickiness, and Earnings Transparency (H2)

Table 6 shows the results of the regression analysis of Equation (2) for the effects of CSM activities on the relationship between cost stickiness and earnings transparency. The total score of ESG was used for CSM activities, and it is a dummy variable that is 1 if the total score is greater than the average, or 0 otherwise. The regression coefficient (\( \beta_3 \)), which represents the effects of CSM activities on the relationship between cost stickiness and earnings transparency, was found to have significant positive values according to the model. This indicates that CSM activities act as a moderating variable to alleviate the negative relationship between cost stickiness and earnings transparency. This means that the reduction in earnings transparency due to a manager’s opportunistic cost decision making can be enhanced by actively conducting CSM activities.
Table 6. The effect of CSM (=TOTAL_SCORE) on the relationship between cost stickiness and earnings transparency (N = 4383).

\[
\text{TRANS}_{it} = \beta_0 + \beta_1 \text{STICKY}_{it} + \beta_2 \text{CSM}_{it} + \beta_3 \text{STICKY} \times \text{CSM}_{it} + \beta_4 \text{SIZE}_{it} + \beta_5 \text{ROA}_{it} \\
+ \beta_6 \text{LEV}_{it} + \beta_7 \text{INTAN}_{it} + \beta_8 \text{AGE}_{it} + \beta_9 \text{MTB}_{it} \\
+ \beta_{10} \text{FOR}_{it} + \beta_{11} \text{OWN}_{it} + \sum \text{YD} + \sum \text{ID} + \epsilon_{it}
\]

| Variables                | Model 1 = TRANS1 | Model 2 = TRANS2 |
|--------------------------|------------------|------------------|
| Intercept                | 0.161            | 0.462            |
| \(\text{STICKY1}\)       | -0.028           | -0.019           |
| \(\text{TOTAL}_{\text{DUM}}\) | -0.067         | 0.020            |
| \(\text{STICKY1} \times \text{TOTAL}_{\text{DUM}}\) | 0.050          | 0.058            |
| \(\text{SIZE}\)          | -0.005           | -0.006           |
| \(\text{ROA}\)           | 0.096            | -0.006           |
| \(\text{LEV}\)           | 0.023            | 0.033            |
| \(\text{INTAN}\)         | 0.045            | -0.005           |
| \(\text{GRW}\)           | 0.001            | 0.001            |
| \(\text{AGE}\)           | 0.007            | 0.006            |
| \(\text{MTB}\)           | 0.044            | -0.005           |
| \(\text{FOR}\)           | -0.001           | 0.001            |
| \(\text{OWN}\)           | -0.001           | 0.001            |
| \(\text{YD}\)            | Included         | Included         |
| \(\text{ID}\)            | Included         | Included         |
| \text{F-value}           | 12.16 ***        | 4.18 ***         |
| \text{Adj. } R^2         | 16.05%           | 11.06%           |

| Variables                | Model 3 = TRANS1 | Model 4 = TRANS2 |
|--------------------------|------------------|------------------|
| Intercept                | 0.187            | 0.461            |
| \(\text{STICKY2}\)       | -0.034           | -0.022           |
| \(\text{TOTAL}_{\text{DUM}}\) | -0.067         | 0.020            |
| \(\text{STICKY2} \times \text{TOTAL}_{\text{DUM}}\) | 0.054          | 0.076            |
| \(\text{SIZE}\)          | -0.004           | -0.006           |
| \(\text{ROA}\)           | 0.099            | -0.004           |
| \(\text{LEV}\)           | 0.015            | 0.033            |
| \(\text{INTAN}\)         | 0.024            | -0.005           |
| \(\text{GRW}\)           | 0.001            | 0.001            |
| \(\text{AGE}\)           | 0.009            | 0.006            |
| \(\text{MTB}\)           | 0.043            | -0.005           |
| \(\text{FOR}\)           | -0.001           | 0.001            |
| \(\text{OWN}\)           | -0.001           | 0.001            |
| \(\text{YD}\)            | Included         | Included         |
| \(\text{ID}\)            | Included         | Included         |
| \text{F-value}           | 23.84 ***        | 4.38 ***         |
| \text{Adj. } R^2         | 15.35%           | 11.13%           |

Note: This table reports the effect of CSM (=TOTAL_SCORE) on the relationship cost stickiness and earnings transparency. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 levels, respectively. Please see Appendix A for variable definitions.

Table 7 shows the results of the regression analysis of Equation (2) for the effects of CSM activities on the relationship between cost stickiness and earnings transparency. The corporate governance score of ESG was used for CSM activities, and it is a dummy variable that is 1 if the corporate governance score is greater than the average, or 0 otherwise. The regression coefficient (\(\beta_3\)), which represents the effects of CSM activities on the relationship between cost stickiness and earnings transparency, was found to have significant positive values according to the model. This indicates that corporate governance acts as a moderating variable to alleviate the negative relationship between cost asymmetry and earnings transparency. This means that the reduction in earnings transparency due to a manager’s opportunistic cost decision making can be enhanced by actively conducting CSM activities.
Table 7. The effect of CSM (=GOV_SCORE) on the relationship between cost stickiness and earnings transparency (N = 4383).

\[
\text{TRANS}_{it} = \beta_0 + \beta_1 \text{STICKY}_{it} + \beta_2 \text{GOV}_{DUM} + \beta_3 \text{STICKY} \times \text{CSM}_{it} + \beta_4 \text{SIZE}_{it} + \beta_5 \text{ROA}_{it} \\
+ \beta_6 \text{LEV}_{it} + \beta_7 \text{INTAN}_{it} + \beta_8 \text{GRW}_{it} + \beta_9 \text{AGE}_{it} + \beta_{10} \text{MTB}_{it} \\
+ \beta_{11} \text{FOR}_{it} + \beta_{12} \text{OWN}_{it} + \sum YD + \sum ID + \epsilon_{it}
\]

| Variables          | Model 1 = TRANS1 | Model 2 = TRANS2 |
|--------------------|------------------|------------------|
| Intercept          | 0.317            | 0.267            |
| STICKY1            | -0.037           | -0.045           |
| GOV_DUM            | -0.033           | -0.029           |
| STICKY1 x GOV_DUM  | 0.024            | 0.051            |
| SIZE               | -0.009           | 0.001            |
| ROA                | 0.106            | -0.012           |
| LEV                | 0.015            | 0.034            |
| INTAN              | 0.019            | -0.148           |
| GRW                | 0.001            | 0.001            |
| AGE                | 0.010            | 0.004            |
| MTB                | 0.041            | -0.007           |
| FOR                | -0.001           | 0.001            |
| OWN                | 0.001            | -0.001           |
| YD                 | Included         | Included         |
| ID                 | Included         | Included         |
| F-value            | 18.20 ***        | 12.33 ***        |
| Adj. R^2           | 16.00%           | 16.61%           |

| Variables          | Model 3 = TRANS1 | Model 4 = TRANS2 |
|--------------------|------------------|------------------|
| Intercept          | 0.315            | 0.334            |
| STICKY2            | -0.049           | -0.039           |
| GOV_DUM            | -0.032           | -0.028           |
| STICKY2 x GOV_DUM  | 0.037            | 0.054            |
| SIZE               | -0.009           | -0.001           |
| ROA                | 0.107            | -0.005           |
| LEV                | 0.014            | 0.027            |
| INTAN              | 0.016            | -0.209           |
| GRW                | 0.001            | 0.001            |
| AGE                | 0.011            | 0.007            |
| MTB                | 0.042            | -0.004           |
| FOR                | -0.001           | 0.001            |
| OWN                | 0.001            | -0.001           |
| YD                 | Included         | Included         |
| ID                 | Included         | Included         |
| F-value            | 23.84 ***        | 4.07 ***         |
| Adj. R^2           | 15.35%           | 11.03%           |

Note: This table reports the effect of CSM (=GOV_SCORE) on the relationship asymmetric cost behavior and earnings transparency. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 levels, respectively. Please see Appendix A for variable definitions.

Table 8 shows the results of the regression analysis of Equation (2) for the effects of CSM activities on the relationship between cost stickiness and earnings transparency. The social responsibility score of ESG was used for CSM activities, and it is a dummy variable that is 1 if the social responsibility score is greater than the average, or 0 otherwise. The regression coefficient ($\beta_3$), which represents the effects of CSM activities on the relationship between cost stickiness and earnings transparency, was found to have significant positive values according to the model. This indicates that social responsibility activities act as a moderating variable to alleviate the negative relationship between cost asymmetry and earnings transparency. This means that the reduction in earnings transparency due to a...
manager’s opportunistic cost decision making can be enhanced by actively conducting CSM activities.

Table 8. The effect of CSM (=SOC_SCORE) on the relationship between cost stickiness and earnings transparency (N = 4383).

\[
\text{TRANS}_{it} = \beta_0 + \beta_1 \text{STICKY}_{it} + \beta_2 \text{CSM}_{it} + \beta_3 \text{STICKY} \times \text{CSM}_{it} + \beta_4 \text{SIZE}_{it} + \beta_5 \text{ROA}_{it} \\
+ \beta_6 \text{LEV}_{it} + \beta_7 \text{INTAN}_{it} + \beta_8 \text{GRW}_{it} + \beta_9 \text{AGE}_{it} + \beta_{10} \text{MTB}_{it} \\
+ \beta_{11} \text{FOR}_{it} + \beta_{12} \text{OWN}_{it} + \sum \text{YD} + \sum \text{ID} + \epsilon_{it}
\]

| Variables               | Model 1 = TRANS1 | Model 2 = TRANS2 | Coefficient | t-Value | Coefficient | t-Value |
|-------------------------|------------------|------------------|-------------|---------|-------------|---------|
| Intercept               | 0.216            | 2.110            | **          |         | 0.421       | 5.740   | ***     |
| STICKY1                 | -0.025           | -2.090           | **          | -0.019  | -2.170      | **      |
| SOC_DUM                 | -0.057           | -3.470           | ***         | 0.006   | -0.440      |         |
| STICKY1 xSOC_DUM        | 0.043            | 2.050            | **          | 0.056   | 2.680       | ***     |
| SIZE                    | -0.006           | -1.410           | -0.004      | -1.480  |
| ROA                     | 0.103            | 2.900            | ***         | -0.007  | -0.230      |         |
| LEV                     | 0.017            | 0.650            |            | 0.031   | 1.660       | *       |
| INTAN                   | 0.031            | 0.440            |            | -0.217  | -3.960      | ***     |
| GRW                     | 0.001            | 0.380            |            | 0.001   | 1.050       |         |
| AGE                     | 0.010            | 1.800            | *           | 0.006   | 1.460       |         |
| MFB                     | 0.043            | 14.840           | ***         | -0.005  | -2.700      | ***     |
| FOR                     | -0.001           | -2.250           | **          | 0.001   | 0.250       |         |
| OWN                     | -0.001           | -0.930           |            | 0.001   | 0.040       |         |
| YD                      | Included          |                  |            |         | Included     |         |
| ID                      | Included          |                  |            |         | Included     |         |
| F-value                 | 23.43 ***        |                  |            |         | 3.68 ***    |         |
| Adj. R²                 | 15.26%           |                  |            |         | 11.01%      |         |

Table 9 shows the results of the regression analysis of Equation (2) for the effects of CSM activities on the relationship between cost stickiness and earnings transparency. The environmental management score of ESG was used for CSM activities, and it is a dummy variable that is 1 if the environmental management score is greater than the average, or 0 otherwise. The regression coefficient (β3), which represents the effects of CSM activities on the relationship between cost stickiness and earnings transparency, was found to have significant positive values according to the model. This indicates that environmental
management activities act as a moderating variable to alleviate the negative relationship between cost asymmetry and earnings transparency. This means that the reduction in earnings transparency due to a manager’s opportunistic cost decision making can be enhanced by actively conducting CSM activities.

Table 9. The effect of CSM (=ENV_SCORE) on the relationship between cost stickiness and earnings transparency (N = 4383).

\[
\text{T\text{RAN}_{it}} = \beta_0 + \beta_1\text{STICKY}_{it} + \beta_2\text{CSM}_{it} + \beta_3\text{STICKY} \times \text{CSM}_{it} + \beta_4\text{SIZE}_{it} + \beta_5\text{ROA}_{it} \\
\quad + \beta_6\text{LEV}_{it} + \beta_7\text{INTAN}_{it} + \beta_8\text{GRW}_{it} + \beta_9\text{AGE}_{it} + \beta_{10}\text{MTB}_{it} \\
\quad + \beta_{11}\text{FOR}_{it} + \beta_{12}\text{OWN}_{it} + \sum \text{YD} + \sum \text{ID} + \epsilon_{it}
\]

| Variables       | Model 1 = TRANS1 | Model 2 = TRANS2 |
|-----------------|------------------|------------------|
| Intercept       | 0.205            | 0.202            |
| \text{STICKY1}  | -0.027           | -0.037           |
| ENV_DUM         | -0.045           | -0.045           |
| \text{STICKY1} \times \text{ENV_DUM} | 0.032          | 0.044           |
| \text{SIZE}     | -0.007           | -0.007           |
| \text{ROA}      | 0.095            | 0.096            |
| \text{LEV}      | 0.028            | 0.044            |
| \text{INTAN}    | 0.029            | 0.028            |
| \text{GRW}      | 0.001            | 0.001            |
| \text{AGE}      | 0.007            | 0.007            |
| \text{MTB}      | 0.044            | 0.044            |
| \text{FOR}      | -0.001           | -0.001           |
| \text{OWN}      | -0.001           | -0.001           |
| \text{YD}       | Included          | Included          |
| \text{ID}       | Included          | Included          |
| \text{F-value}  | 11.97***         | 5.40***          |
| \text{Adj. R}^2 | 15.69%           | 11.47%           |

| Variables       | Model 3 = TRANS1 | Model 4 = TRANS2 |
|-----------------|------------------|------------------|
| Intercept       | 0.202            | 0.202            |
| \text{STICKY2}  | -0.037           | -0.037           |
| ENV_DUM         | -0.045           | -0.045           |
| \text{STICKY2} \times \text{ENV_DUM} | 0.044          | 0.044           |
| \text{SIZE}     | -0.007           | -0.007           |
| \text{ROA}      | 0.096            | 0.096            |
| \text{LEV}      | 0.027            | 0.027            |
| \text{INTAN}    | 0.028            | 0.028            |
| \text{GRW}      | 0.001            | 0.001            |
| \text{AGE}      | 0.007            | 0.007            |
| \text{MTB}      | 0.044            | 0.044            |
| \text{FOR}      | -0.001           | -0.001           |
| \text{OWN}      | -0.001           | -0.001           |
| \text{YD}       | Included          | Included          |
| \text{ID}       | Included          | Included          |
| \text{F-value}  | 12.05***         | 5.78***          |
| \text{Adj. R}^2 | 15.59%           | 11.59%           |

Note: This table reports the effect of CSM (=ENV_SCORE) on the relationship asymmetric cost behavior and earnings transparency. ***, **, and * represent significance at the 0.01, 0.05, and 0.1 levels, respectively. Please see Appendix A for variable definitions.

5. Discussion and Conclusions

This study analyzed the effect of cost stickiness on earnings transparency. Additionally, this study examined the effect of CSM activities on the relationship between cost stickiness and earnings transparency. The ESG ratings of KCGS were used as a proxy for corporate sustainable management, and the methodology of Homburg and Nasev [23] and
Park et al. [24] was applied for cost stickiness. For earnings transparency, the proxies of Cheng and Subramanyam [10] and Barth et al. [8] were employed.

Traditionally, the level of firm activities and the rate of changes in costs were assumed to be symmetrical, but the empirical study conducted by Anderson et al. [9] stated that the level of firm activities and the rate of changes in costs might be different. As the cause of this asymmetric cost behavior, Anderson et al. [9] pointed toward agency problems, such as managers’ pursuit of private interests and utility. After the study conducted by Anderson et al. [9] was published, various studies have been conducted centering on whether asymmetric cost behavior exists or not, the cause of asymmetric cost behavior, and the effect of asymmetric cost behavior. In previous studies that directly examined agency problems and asymmetric cost behavior, the findings are insufficient due to the difficulties in the direct measurement of agency problems. Therefore, in this study, asymmetric cost behavior was used as a proxy for agency costs to verify the relationship with earnings transparency.

In the empirical results of this study, firms with cost asymmetry show low earnings transparency, indicating that asymmetric cost behavior may be used as a proxy for agency problems. In addition, it was found that CSM activities play the role of a moderating variable to alleviate the negative relationship between cost stickiness and earnings transparency. This means that earnings transparency, which was lowered due to managers’ opportunistic cost decision making, can be enhanced by suppressing decisions made for managers’ private interests through CSM activities.

This study has a contribution in that it identified the fact that asymmetric cost behavior is an element that affects earnings transparency by analyzing the relationship between asymmetric cost behavior and earnings transparency. In addition, this study suggested that the relationship between asymmetric cost behavior and earnings transparency may be differential according to CSM activities. The findings of this study, which presented the effects of asymmetric cost behavior on earnings transparency and the fact that CSM activities act as a device to suppress the opportunistic cost behavior of managers, are expected to provide important implications to investors, external auditors, and supervisors.

The limitations of this study include the problem of omitted variables that affect earnings transparency and the necessity of additional consideration about various motivations related to asymmetric cost behavior. In addition, studies on the implications of asymmetric cost behavior and how earnings transparency affects the capital market and firms among accounting-related studies are expected in the future.

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Appendix A. Variable Definitions

| Dependent Variables | |
|---------------------|------------------|
| TRANS               | earnings transparency, which is measured using the method of Cheng and Subramayam [10]; |
| TRANS1              | earnings transparency, which is measured using the method of Barth et al. [8]. |

| Explanatory Variables | |
|-----------------------|------------------|
| STICKY                | asymmetric cost behavior, which is measured using the method of Homburg and Nasev [23]; |
| STICKY1               | asymmetric cost behavior, which is measured using the method of Park et al. [24]; |
| STICKY2               | corporate sustainable management, ESG ratings (ESG integration sector, governance sector, social sector, and environmental sector) of the KCGS (Korean Corporate Governance Service). |
| CSM                   | |

| Control Variables | |
|-------------------|------------------|
| SIZE               | the natural log of total assets; |
| ROA                | the return on assets, pretax income/lagged total assets; |
| LEV                | leverage, total debts/total assets; |
| INTAN              | the intangible assets/total assets; |
| GRW                | the growth rate, which is measured as (total assets for firm i in year t—lagged total assets)/lagged total assets; |
| AGE                | the natural log of the number of years between t – 1 year and initial listing year; |
| MTB                | the market value of equity/the book value of equity; |
| FOR                | the foreign ownership ratio; |
| OWN                | the ownership ratio; |
| YD                 | year dummy; |
| ID                 | industry dummy. |

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