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The Effects of Cost Stickiness on Real Earnings Management: A Data Analysis of Export Marketers*

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Abstract

Purpose - Export marketers may have incentives to attempt real earnings management to avoid low reported earnings. Therefore, we attempted to verify the relationship between cost stickiness and real earnings management in the context of export marketing.
Design/methodology/approach - Data were collected from exporters that settle-accounts in December excluding financial businesses listed on the stock market from 2015 to 2019. Multiple regression analysis were employed to analyze the data.
Findings - The results showed that there is a negative relationship between cost stickiness and real earnings management. In addition, the results showed that export marketers little attempt to offset the cost inefficiency caused by the increase in expense because of cost stickiness with opportunistic management activities through real earnings management. Rather, as the level of real earnings management appears lower, exporters showing cost stickiness are expected to report management performance based on actual marketing. Furthermore, exporters with a high level of managerial centrality or high managerial overconfidence little attempt to offset cost inefficiency caused by cost stickiness with real earnings management activities.
Research implications or Originality - Our study is the first to investigate the quality of earnings information of exporters with cost stickiness. Based on the results, we suggested efficient marketing strategies for exporters.

Keywords: Cost Stickiness, Data Analysis, Efficiency, Export Marketing, Real Earnings Management
JEL Classifications: C53, M31, M42

Ⅰ. Introduction

Due to the global spread of COVID-19 in 2020, exporters are experiencing many difficulties in their business activities. Especially in a situation where it is impossible to predict when it will be possible to return to normal life and resume normal economic activities due to the outbreak of an epidemic that has never been experienced, the normal consumption activities of consumers are shrinking, and emergency management of exporters continues. In fact, in a situation where it is difficult to predict when the pandemic of COVID-19 will subside, exporters continue management in the fog, where the end of emergency management cannot

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be predicted. Thus, cost may also show discriminatory behavior depending on the marketers' judgment on their future management prospect. For example, a marketer who perceives the future prospects positively may choose to make a decision such as maintaining suspended facilities without reducing costs proportionally despite a short-term decrease in production (sales). In this case, the company's cost stickiness is strengthened, so it must bear more losses (costs) in the short term. However, if the future economy turns positive in a short period of time, the company will be able to fully enjoy the boom of a good economy because it has preemptively prepared for future demand growth. On the other hand, marketers who perceive the future prospects negatively will try to respond to the recession by reducing costs as proportionally as possible in response to short-term production (sales) declines. In this case, the company's cost stickiness may be alleviated and loss (cost) may be minimized even in the short term. However, if the future economy turns positive in a short period of time, the company did not prepare for future demand growth in advance, so it would be difficult to immediately connect it to sales in case of a rapid economic rise, and it may be eliminated from competition in the long term. Therefore, marketers have incentives to prepare for future demand growth while minimizing expenses (costs) as much as possible As can be seen in the previous case, however, there is no perfect management strategy in reality that responds to future demand growth while minimizing current expenses (costs). In most cases, if there is confidence in the positive outlook for the future, the marketer will try to maintain the current cost behavior and suspended facilities even with short-term losses (costs). In this case, the problem is the size of short-term losses (costs), and marketers have incentives to reduce these losses (costs) through various methods. In particular, there is a possibility to minimize these losses (costs) through management decision-making as cost stickiness is a product of managerial decision-making. In other words, there is an incentive to reduce the risk of one's own management decision-making through management decision-making such as real earnings management. Therefore, this study focused on the relationship between ccost stickiness and real-activity earnings management. exporters with high cost stickiness may experience large losses (costs) in the short term because they maintain their existing cost structure despite a drop in production (sales) quantity, so we are to empirically verify whether the marketer responds to this through real earnings management. To this end, the methodologies suggested by Homburg and Nasev (2008) and Weiss (2010) are used for cost stickiness, and the methodologies of Roychowdhury (2006) and Cohen and Zarowin (2010) are used for real activity earnings management.

II. Theoretical Lens and Hypothesis Development

1. Theoretical Lens

1.1. Sticky Cost Behavior

Founding that SG&A (Selling General & Administrative Expenses) decreases less relatively when sales decrease than when SG&A increases when corporate sales increase, Anderson et al. (2003) defined it as"sticky cost behavior". After they proposed the concept of sticky cost behavior, sticky cost behavior became the most notable research topic in the field of management and accounting at home and abroad. Thus, the research on sticky cost behavior reported

in Korea is divided into three flows as follows:[1)]

The first is a study to measure sticky cost behavior of domestic exporters. Ahn Tae-sik et al. (2004) analyzed the sticky cost behavior of domestic exporters using the methodology of Anderson et al. (2003) and suggested that manufacturing-related costs and SG&A show the sticky cost behavior. Baek Won-seon (2017) suggested that when sales decrease compared to when sales increase, sales factors that are simultaneously related to costs show downward elasticity, whereas sales factors that are in a non-simultaneous relationship with costs show downward rigidity.

The second is a study on factors affecting sticky cost behavior. Jang Seung-hyeon and Baek Tae-young (2009) suggested that various management conditions (cash flow, financial condition, growth potential, R&D investment, facility investment) of a company influence the decision-making of marketers, resulting in different SG&A cost behaviors. Ji Sung-kwon (2009) suggested that the downward rigidity of SG&A increase as the proportion of tangible assets increases, the company's free cash flow increases, and the set of investment opportunities increases. However, he suggested that the longer the inventory turnover period, the smaller the downward rigidity of SG&A expenses. Park Ae-Young (2014) found that KOSDAQ exporters in which embezzlement occurred by marketers exhibited greater sticky cost behavior in the year of occurrence compared to those that do not have such embezzlement. In particular, she suggested that, in the case of embezzlement by a marketer, the greater the amount of embezzlement, the more embezzlement by collusion, and the greater the time lag until the disclosure of the embezzlement, the greater the sticky cost behavior. Lim Sang-kyun et al. (2014) suggested that there is a positive correlation between sticky cost behavior and changes in internal reserve cash, indicating that exporters disposing of resources tend to reserve cashable assets for future investment. Park Ae-young and Kwak Ji-young (2014) suggested that sticky cost behavior is alleviated as the overall level of corporate governance is excellent, and the sticky cost behavior is further alleviated as the overall corporate governance is improved. Yang Dae-cheon (2015) suggested that marketers' optimistic expectations during economic growth can affect expansive resources and cost decision-making. Lee Sang-cheol and Kim Sook-yeon (2015) suggested that the higher the level of corporate social responsibility activities, the greater the sticky cost behavior, but the sustainability of performance for corporate social responsibility activities is not related to cost behavior. Son Jae-seong et al. (2019) suggested that sticky cost behavior at the corporate level appears even at the branch level of a bank, and in particular, branch groups that received relatively low ratings in the previous period showed low sticky cost behavior in response to a decrease in sales in the current period. Noh Gil-kwan (2019) suggested that there is a differential relationship between earnings management type and cost behavior, and this trend is different between Korean and Japanese exporters. Moon Hye-won et al. (2020) suggested that digital exporters, where R&D plays a very important role, reduce R&D expenses less than non-digital exporters even when sales are decreasing.

The third is a study to verify whether the sticky cost behavior affects the business activities of exporters. Park et al. (2012) suggested that sticky cost behavior indirectly provides marketers' intentional decision-making that future earnings will increase, and that it has an information effect in the market. Lee Mi-Young et al. (2015) reported that sticky cost behavior refers to

1) In the study of Kim Sae-rona and Yoo Hye-young (2014), the domestic studies on sticky cost behavior were classified into studies on factors affecting sticky cost behavior and studies on the effect of pursuit of private interest resulting from marketers'empire-building on cost behavior

the marketer's ability to maintain costs in order to respond to future increases in demand, and the market judges this as a rational decision-making, and this information effect is not mitigated by the labor union. Kim Tae-senog et al. (2015) suggested that credit rating agencies discriminately judge the quality of accounting earnings according to the degree of sticky cost behavior, and reflect it in the credit rating. Jeong Seong-hwan (2015) suggested that the cost ratio and discretionary sales accruals increased as the sticky cost behavior based on the agenct problem increased in a situation where current sales decreased compared to those in the previous term. Hong Young-eun et al. (2020) suggested that the higher the level of sticky cost behavior, the lower the risk of a stock price plunge.

1.2. Real Earnings Management

Export marketers' earnings management can be mainly divided into accruals-based earnings management and real earnings management based on real activities.[2] Specifically, accrual earnings management refers to managing earnings by managing the timing of attribution of profit and loss through change in estimates or accounting treatment for the same economic event and earnings management by real activities is defined as managing earnings by artificially managing actual business activities.

Until now, many previous studies on corporate earnings management (Kim Tae-wan, 2017; Lee Jong-rae · Seo Hee-yeol, 2017; Ryu Ye-rin · Ji Sang-hyeon, 2018; Lee Kyun-bong, 2018; Lee Seung-tae, 2018; Ji Sang-hyun, 2018; No Gil-kwan, 2019; Koh Yun-sung · Park Sun-young, 2020; Kim Myeong-jong, 2020; Park Soo-kyung, 2020; Baek Jeong-han and Kwak Young-min, 2020, etc.) have mainly focused on accounting earnings management through accruals. In particular, most studies on accruals-based earnings management (Tech et al 1998; Rangan 1998; Baek Won-seon and Choi Kwan 1999, etc.) reported that marketers conduct accounting earnings management through discretionary accruals under special circumstances such as IPO (initial public offering), valuation in case of capital increase, compensation for executives, and merger and acquisition (M&A). However, Graham et al (2005) suggested real earnings management as the means of earnings management preferred by marketers. They reported that real activity earnings management is as important as accounting earnings management because it may directly affect cash flows.[3]

In particular, as Roychowdhury (2006) presented an empirical model related to real-activity earnings management that can distinguish between normal and abnormal business activities of a company, follow-up studies on real-activity earnings management using it have been actively conducted. First, as an overseas study, Cohen et al (2008) suggested that the passage of the SOX Act was an opportunity to further utilize real-activity earnings management as a means of earnings management, and Cohen and Zarowin(2010) reported that in the case of paid-in capital increase, marketers use real-activity earnings management, which has relatively low legal costs and responsibilities. As a domestic research study, Kim Ji-hong et al. (2008) reported that as accrual earnings management and real-activity earnings management are different depending on the earnings-management incentive section, there may be differences in

2) Real-activity earnings management refers to performing abnormal business activities for the purpose of earnings management in corporate management.

3) Graham et al (2005) suggested that exporters prefer real-activity earnings management to accounting earnings management, which may be subject to sanctions from regulatory agencies such as external audits and the government (Jeon Hong-min and Cha Seung-min, 2012)

the means of marketer's earnings management depending on the characteristics and circumstances of the company. Kim Ji-hong et al. (2009) reported that real-activity earnings management exporters degraded sales performance not only in the next year but also after that, and the degree intensifies over time, and market participants recognize the negative impact of a company's real-activity earnings management on its operating performance. Park Jong-il et al. (2011) reported that exporters with a high level of accounting earnings using real-activity earnings management have worse business performance in the future than those with a low level of accounting earnings and that real-activity earnings management makes the company's future earnings worse than accounting earnings management. Bae Han-soo and Kim Kyung-wha (2012) reported that good corporate governance significantly reduces both accrual earnings management and actual earnings management, and especially reduces actual earnings management more than accrual earnings management. Park Ae-young (2013) reported that exporters with excellent corporate governance evaluation ratings had lower levels of real-activity earnings management compared to those that did not. Park Mi-hee and Jo Moon-ki (2013) reported that exporters that recognized impairment losses had higher levels of earnings management through real activities than those that did not recognize impairment losses. Park Mi-hee and Jeong Seol-hee (2015) (In relation to the extension of the deduction period for deficit carried forward in 2009 from 5 years to 10 years) reported that in the case of exporters with deficit carried forward for tax purposes, earnings management through real activities decreased compared to before the extension of the deduction period after the extension of the deduction period for deficit carried forward. Ji Sang-hyeon (2018) reported that the level of real-activity earnings management was lower in order not to lose market trust in exporters holding a business briefing session expecting market participants' investment, etc. compared to exporters not holding a business briefing session. Yoon Woo-young et al. (2019) verified the relationship between CEO pay slice (CPS) and earnings management, and reported that the higher the level of CEO pay slice (CPS), the higher the level of accounting earnings management and real-activity earnings management. Kim Yun-jin and Do Sang-ho (2020) reported that there is a difference in the levels of real-activity earnings management of exporters according to labor disputes.

2. Hypothesis Development

Cost is divided into variable cost and fixed cost according to the behavior. Due to the nature of cost behavior, variable costs fluctuate proportionally according to the increase or decrease in the production (sales) quantity, but the fixed cost is fixed without fluctuations, resulting in a leverage effect of the fixed cost in which the profit and loss fluctuate more than the increase or decrease in the production (sales) quantity. In other words, when the production (sales) quantity increases, the fixed cost does not fluctuate and only a certain amount is generated, so the cost per unit decreases, leading to increase in the earnings per unit. Even when the production (sales) quantity decreases, however, the fixed cost does not fluctuate and a certain amount is generated, so the cost per unit increases, resulting in earnings per unit. Therefore, the leverage effect of such fixed costs provides an incentive for marketers to use a management strategy of volume sales at a low unit margin of profit along with overproduction. On the other hand, variable costs also show a difference in cost behavior depending on the increase or decrease in production (sales) quantity. The level at which the cost decreases when the production (sales) quantity decreases is lower than the level at which

the cost increases when the production (sales) quantity increases. This phenomenon is called sticky cost behavior. Since the leverage effect of fixed costs creates greater earnings when the production (sales) quantity increases, but greater losses may occur when the production (sales) quantity decreases, so investment decisions on fixed costs should be sophisticated. Moreover, even if the production (sales) quantity decreases due to sticky cost behavior, the decrease in variable cost is small compared to that, so the decision-making related to scale expansion such as fixed cost investment should be designed very precisely.

On the other hand, such sticky cost behavior is fundamentally caused by cost behavior, but it is also differentiated by the decision-making of the management. Sticky cost behavior also occurs when a marketer retains facilities that are not in operation without reducing costs proportionally at the point in time when current production (sales) decreases. In other words, sticky cost behavior may be a product of decision-making to maintain current costs in order to respond to future demand growth due to the marketer's positive outlook for future sales trends, and also arise from opportunistic motives to increase the size of the company, thereby increasing the size of private utility that marketers enjoy (Jeong Seong-hwan, 2015).

In particular, sticky cost behavior entails an increase in production (sales) costs, irrespective of the motive. Therefore, whether it is sticky cost behavior due to cost behavior or sticky cost behavior generated as a product of managerial decision-making, the resulting increase in production (sales) costs may increase the incentives for marketers to attempt opportunistic earnings management activities. In other words, the higher sticky cost behavior appears, the more incentives to offset the increase in production (sales) costs through opportunistic earnings management activities. Therefore, this study focused on the relationship between sticky cost behavior and earnings management activities. In particular, when sticky cost behavior is the product of the marketer's decision-making, the marketer may have an incentive to offset the loss resulting from his/her decision-making that caused sticky cost behavior with another managerial decision-making. In other words, there is a possibility that the increase in losses (costs) caused by sticky cost behavior may be partially offset by real earnings management. In this case, sticky cost behavior and real earnings management are expected to show a positive (+) correlation. On the other hand, if the marketer has positive confidence in the future economic prospects, a tendency of sticky cost behavior may occur by holding facilities that are not in operation without reducing costs proportionally at the time when current production (sales) decreased relatively. In this case, since the marketer has a positive awareness of the sales trend (even if there is a temporary cost increase), there is a possibility that he/she will not attempt to manage profit and loss artificially through real earnings management from a long-term perspective. Therefore, considering all these contradictory predictions, we established the research hypothesis that there would be a significant relationship between sticky cost behavior and real earnings management.

Ⅲ. Research Design

1. Data

We established a sample for exporters that meet the following conditions among exporters listed on the stock market from 2015 to 2019.

(1) Non-financial exporters that settle accounts at the end of December
(2) exporters that are subject to capital erosion or did not designate items to be managed
(3) exporters that can collect financial information from Ts-2000 and FnGuide

First, as for data sources, corporate financial data were collected from Ts-2000 and FnGuide. Among the exporters listed on the stock market, study Sample 3,169 corporate years which meet each requirement of the above (1) non-financial exporters that settle accounts at the end of December (2) exporters that are subject to capital erosion or did not designate items to be managed and have financial data available as the basic study sample.

On the other hand, in this study, the independent variable, sticky cost behavior, is measured using the methodologies of Homburg and Nasev (2008) and Weiss (2010), respectively, and there is a possibility of sample bias according to the missing values of the study sample because there is a large number of missing values in the measurement of sticky cost behavior using the methodology of Weiss (2010). Therefore, in this study, based on the basic study sample, the study samples were selected differently according to the measurement of sticky cost behavior, and each secondary study sample was selected as follows:

First, the Sample 1, which was established based on the measurement of sticky cost behavior measured by the methodology of Homburg and Nasev (2008), is as follows: First, a total of 231 corporate years of missing values of the real earnings management measure and sticky cost behavior measure (Homburg and Nasev, 2008) were excluded from 3,169 basic study samples. Next, a total of 2,591 corporate years calculated excluding 341 samples of outliers for each variable (mean ± 3 × sample over standard deviation) is the final sample of Sample 1.

Next, Sample 2, which was established based on the measurement of sticky cost behavior measured by Weiss (2010)'s methodology, is as follows: First, missing 1,919 corporate years of real earnings management measures and sticky cost behavior measures (Weiss, 2010) were excluded from 3,169 basic study samples. Next, a total of 1,076 corporate years, excluding 174 samples of outliers (mean ±3 × sample over standard deviation) of each variable are the final sample of Sample_2

The following 〈Table 1〉 is a table that presents the final selection results of Sample 1 and Sample 2.

Table 1. Research Sample

Sample 1	
Non-financial business that is listed on the Korea Exchange from 2015 to 2019 and settles accounts in December	3,169
exporters from which real earnings management measures and sticky cost behavior measures cannot be calculated (Homburg and Nasev; 2008)	(231)
exporters belonging to outliers [mean ±3 (standard deviation)]	(347)
Final sample	2,591

Sample 2	
Non-financial business that is listed on the Korea Exchange from 2015 to 2019 and settles accounts in December	3,169
exporters from which real earnings management measures and sticky cost behavior measures cannot be calculated (Weiss, 2010)	(1,919)
exporters belonging to outliers [mean ±3 (standard deviation)]	(174)
Final sample	1,076

2. Research model

The purpose of this study is to verify the relationship between sticky cost behavior and real earnings management. To this end, the research model is constructed as shown in Equation (1) below: First, the independent variables include two measures of sticky cost behavior indicating cost behavior (Homburg and Nasev, 2008; Weiss, 2010), and the dependent variables include the real earnings management measures based on the methodology of Roychowdhury (2006) and Cohen and Zarowin (2010) and others such as: the company size (SIZE), debt ratio (LEV), total return on assets (ROA), total asset growth (GRW), R&D expenses (R&D), auditor size (BIG4), loss in prior period (Loss), major shareholder's share (OWN), audit time (AT), and listing period (FirmAge).

$$REM\_[1],[2],[3]_{i,t} = \alpha_0 + \beta_1 Sticky\_[1],[2]_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 GRW_{i,t} + \beta_6 R\&D_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 Loss_{i,t} + \beta_9 OWN_{i,t} + \beta_{10} AT_{i,t} + \beta_{11} FirmAge_{i,t} + \sum IND + \sum YEAR + \varepsilon_{i,t}, \quad (1)$$

where $REM\_[1],[2],[3]_{i,t}$: Integrated real earnings management measures measured using the methodology of Roychowdhury (2006) and Cohen & Zarrowin (2010)

Stick_[1], $[2]_{i,t}$: Two measures of sticky cost behavior

$Stick\_[1]_{i,t}$ = A measure of sticky cost behavior measured according to the methodology of Homburg and Nasev (2008)

$Stick\_[2]_{i,t}$ = A measure of sticky cost behavior measured according to the methodology of Weiss (2010).

$SIZE_{i,t}$: Natural logarithm value of total assets at the beginning of period

$LEV_{i,t}$: Value obtained by dividing total debt by equity capital

$ROA_{i,t}$: Value obtained by dividing net income by total assets

$GRW_{i,t}$: Total asset growth rate compared to the previous year.

$R\&D_{i,t}$: Value obtained by dividing R&D expenses by sales

BIG4i,t : Dummy Variables with a value of 1 if the audit firm is one of the BIG4 (Samil, Samjeong, Anjin, Hanyeong) and 0 otherwise.

$Loss_{i,t}$: Dummy Variables with a value of 1 if the company suffered loss at the beginning of period and 0 otherwise.

$OWN_{i,t}$: Major shareholder's share ratio at the end of the period.

$AT_{i,t}$: Natural logarithm value of the audit time

$FirmAge_{i,t}$: Natural logarithm value of the number of listing days

$\sum IND$: Industrial dummy

$\sum YEAR$: Year dummy

Here, if β_1' of the sticky cost behavior (Sticky_[1],[2]) variable, which is an independent variable, has a statistically significant value, the research hypothesis that sticky cost behavior and real earnings management will have a significant relationship is supported. On the other hand, if β_1 of the sticky cost behavior (Sticky_[1],[2]) variable has a statistically significant positive value, a company with a high level of sticky cost behavior indicates a relatively high level of real earnings management, and if β_1 has a statistically significant negative value, a company with a high level of sticky cost behavior indicates a relatively low level of real earnings management.

3. Operational definition of variables

3.1. Independent Variable: Sticky Cost Behavior

In the prior research on cost behavior, the methodology of Anderson et al. (2003) was mainly used to measure cost behavior. However, their methodology, which defined the percentage of increase in cost when sales increase cross-sectionally is greater than the percentage of decrease in cost when sales decrease as sticky cost behavior, has a limitation in that it cannot directly measure cost changes in response to changes in sales at the individual company level. In this study, therefore, sticky cost behavior was measured with a methodology that modified and supplemented Weiss (2010)'s methodology along with Homburg and Nasev (2008)'s methodology that can measure sticky cost behavior at the individual company level.

3.1.1. Homburg and Nasev (2008)'s Methodology for Measuring Sticky Cost Behavior

First, it is Homburg and Nasev (2008)'s methodology for measuring sticky cost behavior.[4] As shown in Equation (2), they measured the increase in the ratio of SG&A to sales when sales decreased compared to the previous period as sticky cost behavior. In Equation (2), if cost is not actively reduced when sales decrease, the ratio of cost to sales in the current period has a larger value than that in the previous year, so exporters experiencing sticky cost behavior will show a positive (+) value (Park Yeon-hee et al., 2012). Therefore, in this study, a value of 1 is assigned when sticky cost behavior [Sticky_[1]] measured by the methodology of Homburg and Nasev (2008) is positive (+), and a value of 0 is assigned when it is negative (-).

$$\text{Sticky\_[1]}_{i,t} = \text{Cost Signal}_{i,t} \times \text{DSale}_{i,t} \times \text{DCost}_{i,t} \quad (2)$$

where,

$\text{Sticky\_[1]}_{i,t}$: Homburg and Nasev(2008) stickiness of firm i, year t

$$\text{Cost\_Signal}_{i,t} = \left[\frac{Cost_{i,t}}{Sales_{i,t}}\right] - \left[\frac{Cost_{i,t-1}}{Sales_{i,t-1}}\right]$$

$\text{Dsales}_{i,t}$: 1 if sales of firm i, year t are smaller than those of previous year, 0 otherwise; and

$\text{DCost}_{i,t}$: 1 if Cost_Signal of firm i, year t are smaller than zero, 0 otherwise.

3.1.2. Weiss(2010)'s Methodology for Measuring Sticky Cost Behavior

Next is Weiss (2010)'s methodology for measuring sticky cost behavior. In the methodology of Weiss (2010) in the following Equation (3), sticky cost behavior is defined as the difference between the cost increase rate in the most recent quarter when sales increased and the cost decrease rate in the most recent quarter when sales decreased. That is, in Equation (3), sticky cost behavior is the difference between the rate of cost increase (slope of the cost function)

4) In order to measure sticky cost behavior, it is first necessary for investors to know how the market evaluates the signal for cost, which represents the ratio of cost to sales.

when sales increased in the most recent quarter and the rate of cost decrease (slope of the cost function) when sales decreased in the most recent quarter during the 16 quarters (t-3 year to t year).[5] Thus, if sticky cost behavior appears, the measured value shows a negative (-) value because the rate of increase in cost when sales increases is greater than the rate of decrease in cost when sales decrease. Therefore, in this study, in order to increase the visibility of the research results and to match the direction with the measured values of the Homburg and Nasev (2008) methodology, we multiply the measured value by a negative (-) value and adjust so that if the measured value has a positive (+) value, sticky cost behavior is high, and if the measured value has a negative (-) value, sticky cost behavior is low.

$$W\_STICKY_{i,t} = \log\left(\frac{\triangle \cos t}{\triangle sales}\right)_{i,\gamma} - \log\left(\frac{\triangle \cos t}{\triangle sales}\right)_{i,\mu} \gamma,\mu \in [t,\cdots t-3] \quad (3)$$

3.2. Dependent Variable: Real Earnings Management

In this study, the methodology of Roychowdhury (2006) and Cohen and Zarowin (2010) is borrowed to measure the level of real earnings management. Also in this study, based on these methodologies, sales activity management, production activity management, and sales management activity management are divided into normal/abnormal activities, and the abnormal components of each variable are estimated as the value obtained by subtracting the normal activity estimate from the actual value of business activity.[6] Therefore, the real earnings management measures in this study are three integrated real earnings management measures composed of a combination of the three individual real earnings management measures calculated as follows:

First, the level of real earnings management calculated from abnormal operating cash flows was measured as in Equation (4) below.

$$\left(\frac{CFO_{i,t}}{Asset_{i,t-1}}\right) = \beta_1\left(\frac{1}{Asset_{i,t-1}}\right) + \beta_2\left(\frac{Sales_{i,t}}{Asset_{i,t-1}}\right) + \beta_3\left(\frac{\triangle Sales_{i,t}}{Asset_{i,t-1}}\right) + \varepsilon_{i,t} \quad (4)$$

$$abCFO_{i,t} = \left(\frac{CFO_{i,t}}{Asset_{i,t-1}}\right) - \left[\widehat{\beta}_1\left(\frac{1}{Asset_{i,t-1}}\right) + \widehat{\beta}_2\left(\frac{Sales_{i,t}}{Asset_{i,t-1}}\right) + \widehat{\beta}_3\left(\frac{\triangle Sales_{i,t}}{Asset_{i,t-1}}\right)\right]$$

Second, the level of real earnings management calculated by the abnormal production cost was measured as in Equation (5) below.

$$\left(\frac{\mathrm{Prod}_{i,t}}{Asset_{i,t-1}}\right) = \beta_1\left(\frac{1}{Asset_{i,t-1}}\right) + \beta_2\left(\frac{Sales_{i,t}}{Asset_{i,t-1}}\right) + \beta_3\left(\frac{\triangle Sales_{i,t}}{Asset_{i,t-1}}\right) + \beta_4\left(\frac{\triangle Sales_{i,t-1}}{Asset_{i,t-1}}\right) + \varepsilon_{i,t} \quad (5)$$

5) In order to measure the skewness of the earnings distribution of individual exporters, Gu and Wu (2003) suggested that it is desirable to measure observations of at least 16 quarters. On the other hand, as suggested by Anderson and Lanen (2007), when measuring sticky cost behavior with Equation (5), it was assumed that the direction of cost increase and decrease in relation to sales increase and decrease was the same, so observations in which the direction of change in cost and that of change in sales were opposite were excluded (Park Yeon-hee et al., 2012).

6) The regression coefficients of each model were estimated by industry-year only for industries with more than 10 observations for each industry.

$$abProd_{i,t} = (\frac{\mathrm{Prod}_{i,t}}{Asset_{i,t-1}}) - \left[\widehat{\beta_1}(\frac{1}{Asset_{i,t-1}}) + \widehat{\beta_2}(\frac{Sales_{i,t}}{Asset_{i,t-1}}) + \widehat{\beta_3}(\frac{\triangle Sales_{i,t}}{Asset_{i,t-1}}) + \widehat{\beta_4}(\frac{\triangle Sales_{i,t-1}}{Asset_{i,t-1}})\right]$$

Third, the level of real earnings management calculated by abnormal SG&A was measured as in Equation (6) below.

$$(\frac{SG\&A_{i,t}}{Asset_{i,t-1}}) = \beta_1(\frac{1}{Asset_{i,t-1}}) + \beta_2(\frac{Sales_{i,t-1}}{Asset_{i,t-1}}) + \varepsilon_{i,t} \quad (6)$$

$$abSG\&A_{i,t} = (\frac{SG\&A_{i,t}}{Asset_{i,t-1}}) - \left[\widehat{\beta_1}(\frac{1}{Asset_{i,t-1}}) + \widehat{\beta_2}(\frac{Sales_{i,t-1}}{Asset_{i,t-1}})\right]$$

In this study, for the readability of the analysis results, the direction of real earnings management and that of real earnings management measures were matched by multiplying abnormal operating cash flow (abCFO) and abnormal SG&A (abSG&A) by negative values. In addition, in order to reflect the comprehensive effect of the real earnings management level in the analysis, this study additionally uses three integrated real earnings management measures, which are partially combined with the three individual real earnings management measures calculated above as follows.

REM1 = abProd + (-)abSG&A,
REM2 = (-)abCFO + (-)abSG&A,
REM3 = (-)abCFO + abProd + (-)abSG&A

3.3. Control variable

In this study, the following variables that may affect a company's real earnings management level were included in the control variables of the research model. First, the company size (SIZE) was measured by the natural logarithm of total assets at the beginning of period. Second, the debt-to-equity ratio (LEV) was measured by the value obtained by dividing total liabilities by equity capital. Third, the return on assets (ROA) was measured by the value obtained by dividing current operating cash by total assets at the beginning of period. Fourth, the total asset growth rate (GRW) was measured by the total asset growth rate compared to the previous period. Fifth, R&D expenses were measured by the value obtained by dividing total R&D expenses by sales. Sixth, the auditor scale (BIG4) is a dummy variable that has a value of 1 if audited by one of Samil Accounting Firm, Samjong Accounting Firm, Anjin Accounting Firm, and Hanyoung Accounting Firm, and 0 otherwise. Seventh, loss/ no loss in prior period is a dummy variable that has a value of 1 if it is a company with loss in prior period, and 0 otherwise. Eighth, the major shareholder's share (OWN) was measured as the sum of the shareholding ratio of the largest shareholder at the end of the term. Ninth, audit time (AT) was measured as the natural logarithm value of the total audit time. Tenth, the listing period (FirmAge) was measured as the natural logarithm value of the total number of listing days. In addition, Industry dummy (∑IND) and year dummy (∑YEAR) were added to control year-to-year differences by industry.

Ⅳ. Analysis and Results

1. Descriptive Statistics

The following 〈Table 2〉 shows the results of descriptive statistics of the main variables of this research model.[7] First, the means of the integrated measures of real earnings control, the dependent variable of this study, were found to be -0.036 (REM_[1]), -0.044 (REM_[2]), and -0.068 (REM_[3]), respectively. In addition, the mean of the measured value of sticky cost behavior, the independent variable, was found to be about 0.007(Sticky_(1)) and 0.202(Sticky_(2)), respectively.

The descriptive statistics of the control variables are as follows: The mean of the debt-to-equity ratio (LEV) was about 47.4%, and that of the return on assets (ROA) was about 0.042. The mean of the total asset growth rate (GRW) is about 0.030, and the mean of R&D is about 0.006, indicating that about 0.6% of sales are spent on R&D. In addition, about 65.9% of the total sample exporters were found to be audited by the 4 major accounting firms (BIG4), and the majority shareholding ratio (OWN) was found to be about 45.5%. On the other hand, since most variables do not have a big difference between the mean and median values when the standard deviation is considered, we believe that it is not unreasonable to assume the normal distribution of the sample of this study

Table 2. Descriptive statistics

	Mean	Median	Std. Deviation	25%	75%
REM_[1]	-0.036	-0.039	0.252	-0.142	0.065
REM_[2]	-0.044	-0.047	0.149	-0.119	0.033
REM_[3]	-0.068	-0.076	0.283	-0.201	0.057
Sticky_[1]	0.007	0.000	0.022	0.000	0.005
Sticky_[2]	0.202	0.145	2.036	-0.942	1.260
SIZE	27.101	26.921	1.508	26.033	27.952
LEV	0.474	0.485	0.202	0.315	0.620
ROA	0.042	0.039	0.052	0.013	0.068
GRW	0.030	0.028	0.121	-0.021	0.080
R&D	0.006	0.001	0.011	0.000	0.007
BIG4	0.659	1.000	0.474	0.000	1.000
Loss	0.227	0.000	0.419	0.000	0.000
OWN	0.455	0.456	0.164	0.334	0.569
AT	3.183	3.129	0.332	2.944	3.380
FirmAge	3.829	3.947	0.372	3.646	4.123

2. Correlation Analysis

The following 〈Table 3〉 shows the results of Pearson's correlation analysis between the research model variables prior to testing the research hypothesis. It is a bivariate correlation

7) As mentioned in the study sample above, it is subdivided into 〈study sample_1〉 and 〈study sample_2〉 according to the measured values, but it is difficult to present all the descriptive statistics of these samples due to paper space limitations. However, 〈Study Sample_1〉 is a research sample that includes all major variables, so descriptive statistics are presented using this sample as a representative sample. This also applies to the correlation analysis in 〈Table 3〉.

coefficient that does not control the influence of control variables.

The analysis results are as follows: First, sticky cost behavior showed a negative (-) correlation with real earnings management (REM_[1].[2].[3]) at the 10% significance level only for the measurements of Homburg and Nasev (2008) (Sticky_[1]). Therefore, only in the methodology of Homburg and Nasev (2008), it can be expected that the higher the level of sticky cost behavior, the lower real earnings management. Second, the measure of sticky cost behavior (Sticky_[2]) measured by the methodology of Weiss (2010) showed a negative correlation with real earnings management (REM_[1].[2].[3]), but it was found not to be statistically significant. Therefore, it can be expected that the higher the level of sticky cost behavior, the lower the level of real earnings management. On the other hand, the above results are limited in their interpretation as they do not take into account the effects of control variables that are expected to affect the level of real earnings management.

The results of the control variable analysis are as follows: First, the debt ratio (LEV) showed a positive correlation with some real earnings management measures (REM_[2].[3]) at a significance level within 5%. Second, the return on assets (ROA) showed a negative (-) correlation with the real earnings management measure (REM_[1].[2].[3]) at the 1% significance level. Third, R&D showed a negative (-) correlation with the real earnings management measure (REM_[1].[2].[3]) at a significance level within 5%. Fourth, the loss/ no loss in prior period (Loss) showed a positive (+) correlation with some real earnings management measures (REM_[2].[3]) at a significance level within 5%. In addition, company size (SIZE), total asset growth rate (GRW), auditor size (BIG4), major shareholder's share (OWN), audit time (AT), and listing period (FirmAge) did not show a statistically significant correlation with real earnings management measures.

Table 3. Correlations

	REM_(1)	REM_(2)	REM_(3)	Sticky_(1)	Sticky_(2)	SIZE	LEV	ROA	GRW	R&D	BIG4	Loss	OWN	AT
Sticky_(1)	-0.037	-0.027	-0.029											
	0.033	0.073	0.097											
Sticky_(2)	-0.002	-0.003	-0.001	0.019										
	0.537	0.523	0.565	0.530										
SIZE	0.006	0.038	0.010	-0.009	-0.014									
	0.754	0.052	0.609	0.646	0.631									
LEV	-0.001	.056**	.041*	-0.007	0.008	.273**								
	0.979	0.004	0.038	0.717	0.782	0.000								
ROA	-.093**	-.139**	-.148**	-.188**	-0.051	.097**	-.258**							
	0.000	0.000	0.000	0.000	0.092	0.000	0.000							
GRW	-0.031	-0.030	-0.033	-.116**	-0.025	0.035	-.111**	.371**						
	0.114	0.121	0.098	0.000	0.397	0.076	0.000	0.000						
R&D	-.055**	-.045*	-.041*	.042*	0.009	-0.036	-.100**	0.031	0.027					
	0.005	0.021	0.036	0.032	0.775	0.064	0.000	0.110	0.171					
BIG4	0.011	0.036	0.020	-0.020	-0.044	.457**	.084**	.082**	-0.012	0.010				
	0.559	0.069	0.300	0.303	0.140	0.000	0.000	0.000	0.539	0.600				
Loss	0.003	.049*	.040*	.068**	0.004	-.100**	.342**	-.432**	-.236**	-0.028	-.082**			
	0.892	0.013	0.041	0.001	0.891	0.000	0.000	0.000	0.000	0.158	0.000			
OWN	0.017	-0.009	0.005	0.014	0.011	0.014	-.135**	.131**	.058**	-.059**	.066**	-.163**		
	0.374	0.665	0.792	0.476	0.715	0.487	0.000	0.000	0.003	0.003	0.001	0.000		
AT	-0.030	0.000	-0.022	-0.024	-0.012	.839**	.316**	0.037	-.050*	-0.006	.508**	0.004	-.079**	
	0.130	0.998	0.258	0.217	0.681	0.000	0.000	0.059	0.011	0.756	0.000	0.828	0.000	
FirmAge	-0.024	-0.008	-0.014	0.006	-0.014	0.030	.056**	-.151**	-.053**	0.001	-.055**	.083**	-.125**	-0.007
	0.233	0.700	0.480	0.769	0.649	0.126	0.005	0.000	0.008	0.979	0.006	0.000	0.000	0.744

Note) *, ** : Significant at 5% and 1% significance levels, respectively.

3. Test Results

3.1. Verification of the Hypothesis of Sticky Cost Behavior

The following 〈Table 4〉 is the result of verifying the correlation between sticky cost behavior (Sticky_[1]) and real earnings management measured by the methodology of Homburg and Nasev (2008), and the results are as follows: First, sticky cost behavior (Stick_[1]) showed a negative (-) correlation with real earnings management (REM_[1]) at the 10% significance level. Second, sticky cost behavior (Stick_[1]) showed a negative (-) correlation with real earnings management (REM_[2]) at the 1% significance level. Third, sticky cost behavior (Stick_[1]) showed a negative (-) correlation with real earnings management (REM_[3]) at the 5% significance level. Therefore, exporters with greater sticky cost behavior were found to have a relatively low level of real earnings management, indicating that exporters do not attempt artificial real earnings management to offset the increase in losses (costs) for the term due to sticky cost behavior. Therefore, according to the results in 〈Table 4〉 above, the research hypothesis that verified the correlation between sticky cost behavior and real earnings management was supported.

The following is the result of the control variable analysis: First, company size (SIZE) showed a positive (+) correlation with real earnings management (REM_[1],[2],[3]) at the 1% significance level, indicating that the larger the company, the higher the level of real earnings management. Second, the return on assets (ROA) showed a negative (-) correlation with real earnings management (REM_[1],[2],[3]) at the 1% significance level, indicating that a company with a higher net profit ratio to total assets has a relatively low level of real earnings management. Third, total asset growth (GRW) showed a positive (+) correlation with some real earnings management (REM_[2]) at the 10% significance level. Fourth, R&D expenses have a negative (-) correlation with real earnings management (REM_[1],[2],[3]) at the 1% significance level, indicating that the higher the R&D investment, the lower the level of real earnings management. Fifth, auditor size (BIG4) showed a positive (+) correlation with real earnings management (REM_[1],[2],[3]) at the 5% significance level, indicating that the level of real earnings management of exporters audited by large accounting firms is relatively higher. Sixth, audit time (AT) showed a negative (-) correlation with real earnings management (REM_[1],[2],[3]) at the 1% significance level, indicating that the higher the audit level, the lower the level of real earnings management. Seventh, the listing period (FirmAge) showed a negative (-) correlation with real earnings management (REM_[1],[2],[3]) at the 1% significance level, indicating that the longer the listing period, the lower the level of real earnings management. On the other hand, debt ratio (LEV), loss/ no loss in prior period (Loss), and major shareholder's share (OWN) did not show a statistically significant correlation with real earnings management.

Table 4. Results of hypothesis testing on sticky cost behavior and real earnings management (1) -Homburg and Nasev(2008)'s methodology-

$$REM\_[1],[2],[3]_{i,t} = \alpha + \beta Sticky\_[1]_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 GRW_{i,t} + \beta_6 R\&D_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 Loss_{i,t} + \beta_9 OWN_{i,t} + \beta_{10} AT_{i,t} + \beta_{11} FirmAge_{i,t} + \Sigma IND + \Sigma YEAR + \varepsilon_{i,t}$$

	REM_[1]		REM_[2]		REM_[3]	
	Coef.	t	Coef.	t	Coef.	t
Intercept	-0.236*	-1.937	-0.201***	-2.842	-0.278**	-2.051
Sticky_[1]	-0.345*	-1.732	-0.284***	-2.845	-0.451**	-2.085
SIZE	0.033***	4.988	0.018***	4.751	0.035***	4.802
LEV	-0.043	-1.510	0.010	0.577	-0.011	-0.357
ROA	-0.728***	-6.411	-0.529***	-8.015	-1.109***	-8.799
GRW	0.015	0.350	0.044*	1.732	0.074	1.519
R&D	-1.443***	-3.129	-0.745***	-2.778	-1.243**	-2.428
BIG4	0.025**	2.021	0.014**	1.962	0.033**	2.434
Loss	-0.017	-1.243	0.000	-0.055	-0.013	-0.847
OWN	0.010	0.307	-0.004	-0.234	0.007	0.200
AT	-0.150***	-4.820	-0.072***	-3.988	-0.162***	-4.692
FirmAge	-0.039***	-2.873	-0.022***	-2.845	-0.046***	-3.092
IND/YEAR	Included		Included		Included	
Adj-R2	.058		.073		.074	
F-value	8.065***		10.054***		10.163***	
Sample			Sample 1			

Notes: 1. *, **, *** correlation coefficients are significant at 0.10, 0.05, and 0.01 levels (both sides).
2. VIF Max : 4.528

3.2 Verification of the Hypothesis of Sticky Cost Behavior

The following 〈Table 5〉 is the result of verifying the correlation between sticky cost behavior (Sticky_[2]) and real earnings management measured by the methodology of Weiss(2010), and the results are as follows: First, sticky cost behavior (Stick_[2]) showed a negative (-) correlation with real earnings management (REM_[1]) at the 5% significance level. Second, sticky cost behavior (Stick_[2]) showed a negative (-) correlation with real earnings management (REM_[2]), but it was found not to be statistically significant. Third, sticky cost behavior (Stick_[2]) showed a negative (-) correlation with real earnings management (REM_[3]) at the 5% significance level. Therefore, exporters with greater sticky cost behavior were found to have a generally low level of real earnings management, indicating that exporters do not attempt artificial real earnings management to offset the increase in losses (costs) for the term due to sticky cost behavior. Therefore, according to the results in 〈Table 5〉 above, the research hypothesis that verified the correlation between sticky cost behavior and real earnings management was partially supported.

The following is the result of the control variable analysis: First, company size (SIZE) showed

a positive (+) correlation with real earnings management (REM_[1],[2],[3]) at the significance level within 5%, indicating that the larger the company, the higher the level of real earnings management. Second, the return on assets (ROA) showed a negative (-) correlation with real earnings management (REM_[1],[2],[3]) at the significance level within 5%, indicating that a company with a higher net profit ratio to total assets has a relatively low level of real earnings management. Third, total asset growth (GRW) showed a positive (+) correlation with real earnings management (REM_[2]) at the 10% significance level, indicating that a company with a growth cycle in which total assets increase has a relatively high level of real earnings management. Fourth, R&D expenses have a negative (-) correlation with real earnings management (REM_[1],[2],[3]) at the significance level within 10%, indicating that the higher the R&D investment, the lower the level of real earnings management. Fifth, audit time (AT) showed a negative (-) correlation with real earnings management (REM_[1],[2],[3]) at the 5% significance level, indicating that the higher the audit level, the lower the level of real earnings management. Seventh, the listing period (FirmAge) showed a negative (-) correlation with real earnings management (REM_[1],[2],[3]) at the 10% significance level, indicating that the longer the listing period, the lower the level of real earnings management. On the other hand, debt ratio (LEV), auditor size (BIG4), loss/ no loss in prior period (Loss), and major shareholder's share (OWN) did not show a statistically significant correlation with real earnings management.

Table 5. Results of hypothesis testing on sticky cost behavior and real earnings management (2) -Weiss(2010)'s methodology-

$$REM\_[1],[2],[3]_{i,t} = \alpha + \beta Sticky\_[2]_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 GRW_{i,t} + \beta_6 R\&D_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 Loss_{i,t} + \beta_9 OWN_{i,t} + \beta_{10} AT_{i,t} + \beta_{11} FirmAge_{i,t} + \Sigma IND + \Sigma YEAR + \varepsilon_{i,t}$$

	REM_[1]		REM_[2]		REM_[3]	
	Coef.	t	Coef.	t	Coef.	t
Intercept	-0.098	-0.499	-0.156	-1.327	-0.191	-0.884
Sticky_[2]	-0.005*	-1.821	-0.003	-1.445	-0.006**	-1.999
SIZE	0.023**	2.088	0.016***	2.498	0.030**	2.505
LEV	-0.020	-0.448	0.002	0.072	-0.004	-0.087
ROA	-0.490**	-2.418	-0.444***	-3.660	-0.933***	-4.178
GRW	0.129*	1.644	0.109**	2.329	0.212**	2.447
R&D	-1.898**	-2.429	-0.850*	-1.820	-1.721**	-2.001
BIG4	0.013	0.659	0.018	1.480	0.030	1.364
Loss	-0.019	-0.871	-0.010	-0.777	-0.021	-0.854
OWN	-0.022	-0.432	-0.033	-1.086	-0.030	-0.535
AT	-0.116**	-2.251	-0.066**	-2.147	-0.144**	-2.531
FirmAge	-0.039*	-1.821	-0.027**	-2.119	-0.053**	-2.255
IND/YEAR	Included		Included		Included	
Adj-R2	.031		.042		0.044	
F-value	2.520***		3.078***		3.199***	
Sample			Sample2			

Notes: 1. *, **, *** correlation coefficients are significant at 0.10, 0.05, and 0.01 levels (both sides).
2. VIF Max : 4.812

According to the results of the hypothesis testing above, exporters with a high level of sticky cost behavior were found to have a relatively low level of real earnings management. exporters with a high tendency for sticky cost behavior, which may appear by maintaining suspended facilities based on a positive awareness of future sales trends, can be expected to provide more reliable earnings information according to actual business activities by not attempting artificial real earnings management.

4. Additional analysis: Moderating effect of CEO characteristics

The result of testing the research hypothesis showed that there is a negative (-) correlation between sticky cost behavior and real earnings management. Here, both sticky cost behavior and real earnings management activities can be said to be products of the CEO's management decision-making, so it can be expected that the correlation between them will show differential behavior depending on the CEO's characteristics. Thus, the additional analysis classified management characteristics into the CPS and the marketer overconfidence tendency, and verified that their moderating effects. The results are as follows:

4.1. Additional Analysis of the Moderating Effect of Managerial Centrality

After Bebchuk et al. (2011) presented the 'CEO Pay Slice (CPS)', measured by the proportion of CEO wages out of the total salary of top 5 executives in the salary ranking, as the CPS, there have been many studies that applied this to Korea. As a representative study, Kwak Young-min and Kim Hyun-jin (2017) verified the effect of CEO Pay Slice (CPS) on corporate value and overinvestment, reporting that the higher CEO Pay Slice (CPS), the worse the corporate value and the higher the level of inefficient decision-making such as overinvestment. After these studies, a number of related previous studies (Moon Bo-young · Jeon Hong-min, 2018; Kim Ji-young · Ji Sang-hyeon; 2018; Kim Yong-sik, 2018; Kim Yu-jin · An Jeong-in, 2018; An Jeong-in · Kim Yu-jin, 2018; Kwak Young-min · Park Jin-mo, 2019; Woon Woo-young et al., 2019; Ji Sang-hyeon · Kim Jin-tae, 2019, et al.) have been presented, and the results of most studies reported that the high CPS has a negative effect on overall corporate management.[8] As mentioned above, sticky cost behavior can be said to be a product of the marketer's decision-making, and real earnings management can also be said to be a part of the marketer's management activities. Therefore, the CPS can be an important influencing factor in these management activities. If a marketer secures strong management rights within the company, it is easy to reflect his/her belief in a positive outlook for the future in management decision-making, and it will be also easy to put into practice the opportunistic motivation to increase the size of the private utility that he/she enjoys by increasing the size of the company. In addition, if the marketer secures strong management rights within the company, it will be easier to carry out real earnings management. In addition, as domestic studies related to the level of managerial centrality have reported the negative impact of the level of marketerial centrality, when the level of managerial centrality is high, marketers are likely to attempt real earnings

8) On the other hand, Kim Jin-seop and Kim Young-rak (2020) reported that the higher the CPS, the higher the level of sustainable management activity was because the CEO was relatively free from the constraints of governance and control devices inside and outside the company. In addition, Ahn Sang-bong et al. (2021) reported that at least artificial earnings smoothing using earnings management was not attempted when management rights were concentrated on the CEO.

management through business activities to offset the negative effects of decision-making that caused sticky cost behavior. Therefore, if the CPS is high, the negative (-) correlation between sticky cost behavior and real earnings management may weaken or there may be a different correlation. On the other hand, the higher the CPS, the freer the marketer is from the monitoring of stakeholders and control bodies inside and outside the company, so he/she is likely not to respond to the increase in losses (costs) due to sticky cost behavior with opportunistic management activities. Recently, some studies on the level of managerial centrality (Kim Jin-seop and Kim Young-rak, 2020; Ahn Sang-bong, et al., 2021, etc.) have reported that the level of managerial centrality may have a positive effect on business activities of a company. In particular, Ahn Sang-bong et al. (2021) reported that exporters with a higher level of managerial centrality do not attempt earnings management for earnings smoothing relatively, and the level of real earnings management is especially lower. According to this, exporters with a high level of managerial centrality are likely not to show opportunistic behavior trying to offset the increase in costs (expenses) due to sticky cost behavior that may occur as a product of management decision-making with real earnings management. Therefore, if the CPS is high, there is a possibility that the negative (-) correlation between sticky cost behavior and real earnings management will be maintained. Thus, in the additional analysis, considering all these conflicting predictions, we verified whether the correlation between sticky cost behavior and real earnings management shows discriminatory behavior depending on the CPS in terms of the moderating effect of the level of managerial centrality. The results are as follows:

The following 〈Table 6〉 is the result of examining the moderating effect of the CPS in the correlation between sticky cost behavior and real earnings management, and the results are as follows:[9] First, in the correlation between sticky cost behavior and real earnings management measured by the methodology of Homburg and Nasev (2008), the moderating effect of the level of managerial centrality (Sticky_[1]×CPS_H) showed a negative (-) correlation at the significance level within 10%. Second, in the correlation between sticky cost behavior and real earnings management measured by the methodology of Weiss (2010), the moderating effect of the level of managerial centrality(Sticky_[1]×CPS_H) showed a negative (-) correlation at a level that is not statistically significant. Therefore, according to the above results, the moderating effect of the CPS was partially proven in the negative (-) correlation between sticky cost behavior and real earnings management.

Table 6. Additional Analysis: Moderating Effect of the CPS

-Homburg and Nasev(2008)'s Methodology-

$$REM\_[1],[2],[3]_{i,t} = \alpha + \beta Sticky\_[1]_{i,t} + \beta Sticky\_[1]\times CPS\_H_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROA_{i,t} + \beta_6 GRW_{i,t} + \beta_7 R\&D_{i,t} + \beta_8 BIG4_{i,t} + \beta_9 Loss_{i,t} + \beta_{10} OWN_{i,t} + \beta_{11} AT_{i,t} + \beta_{12} FirmAge_{i,t} + \Sigma IND + \Sigma YEAR + \varepsilon_{i,t}$$

9) With the methodology of Kwak Young-min and Kim Hyun-jin (2017), which modified the methodology of Bebchuk et al. for the domestic situation, the CPS (Ceo Pay Slice) was measured as follows. First, the CEO was defined as the person with the highest position among full-time executives with the title of 'CEO' in the current status of executives and employees in the business report. And, based on the compensation data of individual executives disclosed in the business report, the CPS (Ceo Pay Slice) was measured as the ratio of the total compensation of one CEO to the total compensation of all full-time registered executives.

	REM_[1]		REM_[2]		REM_[3]	
	Coef.	t	Coef.	t	Coef.	t
Intercept	-0.616***	-3.517	-0.340***	-3.183	-0.540***	-2.828
Sticky_[1]	-0.513	-1.148	-0.094	-0.122	-0.453	-0.438
Sticky_[1] ×CPS_H	-0.548*	-1.810	-0.549*	-1.754	-0.769**	-1.973
Control Variables	Included		Included		Included	
Adj-R2	.111		.109		.127	
F-value	5.513***		5.408***		6.254***	
Sample	Sample 3[10]					

-Weiss(2010)'s methodology-

$$REM\_[1],[2],[3]_{i,t} = a + \beta Sticky\_[2]_{i,t} + \beta Sticky\_[2]\times CPS\_H_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROA_{i,t} + \beta_6 GRW_{i,t} + \beta_7 R\&D_{i,t} + \beta_8 BIG4_{i,t} + \beta_9 Loss_{i,t} + \beta_{10} OWN_{i,t} + \beta_{11} AT_{i,t} + \beta_{12} FirmAge_{i,t} + \Sigma IND + \Sigma YEAR + \varepsilon_{i,t}$$

	REM_[1]		REM_[2]		REM_[3]	
	Coef.	t	Coef.	t	Coef.	t
Intercept	-0.861***	-3.280	-0.604***	-3.582	-0.892***	-3.044
Sticky_[2]	-0.013	-1.446	-0.004	-0.730	-0.011	-1.108
Sticky_[2] ×CPS_H	-0.011	-1.011	-0.004	-0.556	-0.008	-0.644
Control Variables	Included		Included		Included	
Adj-R2	.089		.080		.102	
F-value	2.528***		2.351***		2.766***	
Sample	Sample 4[11]					

Notes 1. *, **, *** correlation coefficients are significant at 0.10, 0.05, and 0.01 levels (both sides).
2. VIF Max:

10) In measuring the Ceo Pay Slice (CPS) according to the methodology of Bebchuk et al. (2011), the missing value was found to be very large due to the large omission of disclosure data, so we newly constructed additional 〈Sample_3〉 as follows for the moderating effect of the level of managerial centrality in the correlation between sticky cost behavior and real earnings management measured by the methodology of Homburg and Nasev (2008) in 〈Table 6〉 and conducted the analysis of the samples of final 1,039 corporate years.

〈Sample_3〉

Non-financial business that is listed on the Korea Exchange from 2015 to 2019 and settles accounts in December	3,169
exporters from which real earnings management measures and sticky cost behavior measures cannot be calculated (Homburg and Nasev; 2008)	(231)
exporters from which Ceo Pay Slice (CPS) cannot be extracted	(1,628)
exporters belonging to outliers [mean ±3 (standard deviation)]	(271)
Final sample	1,039

11) In measuring the Ceo Pay Slice (CPS) according to the methodology of Bebchuk et al. (2011), the missing value was found to be very large due to the large omission of disclosure data, so we newly constructed additional 〈Sample_4〉 as follows for the moderating effect of the level of managerial centrality in the correlation between sticky cost behavior and real earnings management measured by the methodology of Weiss (2010) in 〈Table 6〉 and conducted the analysis of the samples of final 452 corporate years.

4.2. Additional analysis of the Moderating Effect of Managerial Overconfidence

As we have seen so far, managerial overconfidence, which is one of the key marketer characteristics, marketer's self-confidence, may have a differential effect on the correlation between sticky cost behavior and real earnings management, which can be said to be products of management decision-making. Domestic and foreign research flows regarding managerial overconfidence can be divided into four major research flows as follows: First, prior studies on the correlation between managerial overconfidence and investment (Hambrick, 1997; Malmendier and Tate, 2005; Ben David et al., 2012, etc.) reported that high managerial overconfidence has a negative impact on investment in general.[12] Second, as studies on the correlation between managerial overconfidence and dividend policy, some previous studies (Dschmukh et al., 2013; Hwang Gyu-young and Kim Eung-gil, 2018, etc.) reported that managerial overconfidence had a negative effect on dividends, whereas some studies (Choi Hye-rin et al., 2020) reported that the higher the managerial overconfidence, the higher the dividend level. Third, previous studies on the correlation between managerial overconfidence and accounting information (Schrand and Zechman, 2011; Schrand and Zechman, 2012; Ahmed and Duelman, 2013; Hribar and Yang, 2013; Bouwman, 2014; Ryu and Kim, 2015; Kang, 2019; Kim Na-yeon and Hwang Kuk-jae, 2020; Ji Sang-hyun, 2020, etc.) reported that the higher the managerial overconfidence, the more likely accounting information will be accounted for in a direction with low reliability, in general.[13] Finally, previous studies on the correlation between managerial overconfidence and tax information (Jang Sung-ju et al., 2017; Kim Sang-myung et al., 2019; Nam Hye-jeong, 2019; Park Jong-il · Kim Su-in, 2020, etc.) reported that the higher the managerial overconfidence, the lower the reliability of tax information, in general. The preceding studies on managerial overconfidence have generally reported that the higher the managerial overconfidence, the more negative the impact on overall corporate management. In the event of the tendency of sticky cost behavior appears by maintaining suspended facilities, etc. due to the positive outlook of the actual management for the future forecast, if a manager has confidence in his/her own judgment, there is a possibility that he/she can bear losses (costs) in the current period without attempting opportunistic actions with confidence in future performance. In this case, it can be expected that the negative correlation between sticky cost behavior and real earnings management will be strengthened in exporters

〈Sample_4〉

Non-financial business that is listed on the Korea Exchange from 2015 to 2019 and settles accounts in December	3,169
exporters from which real earnings management measures and sticky cost behavior measures cannot be calculated (Weiss, 2010)	(1,819)
exporters from which Ceo Pay Slice (CPS) cannot be extracted	(627)
exporters belonging to outliers [mean ±3 (standard deviation)]	(271)
Final sample	452

12) However, Kim Hee-jung and Park Won (2019) suggested that the CEO's overconfidence and overinvestment activities had a positive (+) effect on the corporate value.

13) On the other hand, Hirschleifer et al. (2012) suggested that the higher the CEO's overconfidence, the higher the possibility of an increase in R&D expenditure and an increase in patent acquisition attempts and enjoyment of innovative success.

with high managerial overconfidence. On the other hand, as previous studies related to managerial overconfidence and real earnings management (Koh Woo and Han Gil-seok, 2018, etc.) reported that the higher the managerial overconfidence, the higher the level of real earnings management as well as accrual earnings management, high managerial overconfidence is likely to weaken the negative relationship between sticky cost behavior and real earnings management or show a different correlation. Therefore, in the additional analysis, considering all these conflicting predictions, we verified whether the correlation between sticky cost behavior and real earnings management shows a differential behavior according to managerial overconfidence in terms of the moderating effect of overconfidence. The results are as follows:

The following 〈Table 7〉 is the result of examining the moderating effect of managerial overconfidence in the correlation between sticky cost behavior and real earnings management. The results are as follows: First, the moderating effect (Sticky_[1]×CPS_H) of managerial overconfidence in the correlation between sticky cost behavior and real earnings management measured by the methodology of Homburg and Nasev (2008) showed a negative (-) correlation at the significance level within 10%. Second, the moderating effect (Sticky_[1]×CPS_H) of managerial overconfidence in the correlation between sticky cost behavior and real earnings management measured by the methodology of Weiss(2010) also showed a negative relationsihp at the significance level within 10%. Therefore, according to the above results, the moderating effect of managerial overconfidence was proven in the negative relationship between sticky cost behavior and real earnings management.

Table 7. Additional Analysis: Moderating Effect of Managerial Overconfidence

-Homburg and Nasev(2008)'s methodology-

$$REM\_[1],[2],[3]_{i,t} = a + \beta Sticky\_[1]_{i,t} + \beta Sticky\_[1]\times OverConf_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROA_{i,t} + \beta_6 GRW_{i,t} + \beta_7 R\&D_{i,t} + \beta_8 BIG4_{i,t} + \beta_9 Loss_{i,t} + \beta_{10} OWN_{i,t} + \beta_{11} AT_{i,t} + \beta_{12} FirmAge_{i,t} + \Sigma IND + \Sigma YEAR + \varepsilon_{i,t}$$

	REM_[1]		REM_[2]		REM_[3]	
	Coef.	t	Coef.	t	Coef.	t
Intercept	-0.204	-1.677	-0.191***	-2.704	-0.249	-1.844
Sticky_[1]	-0.232	-0.951	-0.232	-1.640	-0.311	-1.148
Sticky_[1] ×OverConf	-1.317*	-1.724	-0.807*	-1.820	-1.869**	-2.206
Control Variables	Included		Included		Included	
Adj-R2	.060		.076		.077	
F-value	7.933***		10.013***		10.124***	
Sample	Sample 1					

-Weiss(2010)'s methodology-

$$REM\_[1],[2],[3]_{i,t} = a + \beta Sticky\_[2]_{i,t} + \beta Sticky\_[2]\times CPS\_H_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROA_{i,t} + \beta_6 GRW_{i,t} + \beta_7 R\&D_{i,t} + \beta_8 BIG4_{i,t} + \beta_9 Loss_{i,t} + \beta_{10} OWN_{i,t} + \beta_{11} AT_{i,t} + \beta_{12} FirmAge_{i,t} + \Sigma IND + \Sigma YEAR + \varepsilon_{i,t}$$

	REM_[1]		REM_[2]		REM_[3]	
	Coef.	t	Coef.	t	Coef.	t
Intercept	-0.092	-0.466	-0.154	-1.310	-0.186	-0.860
Sticky_[2]	-0.015	-1.121	-0.005	-1.340	-0.009*	-1.676
Sticky_[2] ×CPS_H	-0.009*	-1.802	-0.004*	-1.825	-0.012**	-2.249
Control Variables	Included		Included		Included	
Adj-R2	.032		.041		.044	
F-value	2.530***		2.974***		3.124***	
Sample	Sample 2[14]					

Notes 1. *, **, *** correlation coefficients are significant at 0.10, 0.05, and 0.01 levels (both sides).
2. VIF Max : 4.528

V. Discussion

In our study, the reliability of earnings information of exporters showing a tendency of sticky cost behavior was verified in terms of real earnings management. To this end, research samples were established for corporations that settle accounts in December from 2015 to 2019, excluding financial businesses listed on the stock market. For the empirical analysis, sticky cost behavior was measured using multiple methodologies (Homburg and Nasev, 2008; Weiss2010), and real earnings management was measured using the methodologies of Roychowdhury (2006) and Cohen and Zarowin (2010). The result of the empirical analysis showed that exporters with a high level of sticky cost behavior had a lower level of real earnings management compared to those without a high level of sticky cost behavior. This means that a company exhibiting a tendency of sticky cost behavior, which is likely to record relatively low reported earnings, does not perform artificial real activity earnings management to offset this increase in losses (costs) because the corresponding cost does not decrease proportionally at the point of decrease in sales according to the business strategy of the company. Therefore, according to

14) Since managerial overconfidence is a human characteristic and is related to an individual's way of thinking, it is not easy to measure and quantify it objectively. In overseas studies, studies have been reported that measure managerial overconfidence as follows: First, Hribar and Yang (2013) measured overconfidence by the degree of media exposure of CEOs. However, the degree of media exposure of marketers is very subjective because it can be influenced by external factors as well as their own will. Second, the studies of Malmendier and Tate (2005), Malmendier and Tate (2008), and Chen et al. (2013) measured the CEO's overconfidence by the marketer's stock option exercise behavior. In Korea, however, the stock option of the CEO is provided only to some industries and exporters, so it is somewhat inappropriate as data for empirical analysis (Kim Saerona and Yoo Hye-young, 2014). Third, based on a study by Malmendier and Tate (2005) suggesting that marketers who are overconfident in the return on investment proposals have more excessive capital expenditure, Ahmed and Duellman (2013) measured managerial overconfidence by the size of capital expenditure compared to the industrial average. Fourth, Schrand and Zechman (2012) extracted the residual after regression analysis of sales growth rate (independent variable) and asset growth rate (dependent variable) by industry-year and considered a company with a positive (+) residual value as a company with high managerial overconfidence because the investment in asset expansion is higher than that of the same type of company. In the additional analysis, Ahmed and Duellman (2013) and Schrand and Zechman (2012)'s methodologies applicable to domestic situations were used to measure managerial overconfidence, respectively. Measured values based on the two methodologies are dummy variables that have a value of 1 if CEO overconfidence is high, and 0 otherwise. Especially in this study, in both the methodologies of Ahmed and Duellman (2013) and Schrand and Zechman (2012), measured values that have a value of 1 if the managerial overconfidence is high and 0 otherwise are used in the analysis to increase the reliability of marketer overconfidence as much as possible.

the results of this study, a company with a high level of sticky cost behavior can be expected to provide reliable earnings information without artificial management despite cost inefficiency. On the other hand, the additional analysis additionally verified the moderating effect of managerial characteristics in the negative (-) correlation between sticky cost behavior and real earnings management. The results of the verification are as follows:

First, the higher the level of the CPS, the stronger the negative (-) correlation between sticky cost behavior and real earnings management. It can be expected to provide reliable earnings information without artificial real earnings management to hide cost inefficiency due to sticky cost behavior even if the management rights are concentrated on the CEO.

Second, the negative (-) correlation between sticky cost behavior and real earnings management was found to be strengthened in exporters with high managerial overconfidence, indicating that marketers with a high tendency to overconfidence in their own decision-making provide more reliable earnings information without artificial real earnings management to hide cost inefficiency due to sticky cost behavior. This study is expected to provide an opinion on the question whether marketers actually try to manage earnings through opportunistic management activities in response to the increase in losses (costs) due to sticky cost behavior, which can be said to be the product of managerial decision-making. In addition, by suggesting the moderating effect of managerial characteristics (the level of managerial centrality and managerial overconfidence) in the negative relationship between such sticky cost behavior and real earnings management, it is expected to be a stepping stone for the development of related research in the future.

On the other hand, the limitation of this study is that there may be some differences in the research results depending on the research sample as it failed to analyze with a single study sample due to the increase in the number of samples removed in the process of calculating not only multiple measures of sticky cost behavior but also managerial characteristic variables.

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