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Earnings Downside Risk and Earnings Management

기업의 이익하락위험이 이익조정에 미치는 영향

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ABSTRACT

Earnings Downside Risk and Earnings Management

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This study examines the association between earnings downside risk and earnings management. By capturing expectation for downward patterns in future operating performance, earnings downside risk (EDR) contains information about each firm's risk. Firms with high earnings downside risk are more likely to experience negative operating performance in the future and are more affected by downward macroeconomic states. Such characteristics provide link to earnings attributes and earnings management. As anticipated, firm's earnings downside risk is positively associated with accrual-based earnings management. However, the association between EDR and real earnings management is more complex. The findings show both consistent and inconsistent results with prior studies. This paper contributes to the usefulness of accounting-based information to reliably speculate firms' earnings management behaviors and exploration of disparate nature of different forms of earnings management.

Keywords: earnings downside risk, earnings management, discretionary accruals, real activities manipulation, accounting information

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I. INTRODUCTION

The focus of this study is to examine the association between earnings management and accounting-based downside risk, the earnings downside risk. According to Konchitchki et al. (2016), earnings downside risk (EDR) captures a firm's likelihood for future downward operating performance, containing distinctive information about firm's risk. Firms with high earnings downside risk are even more affected by downward macroeconomic states. Moreover, due to relation with earnings losses and higher sensitiveness to downward macroeconomic states, EDR shows positive relationships with earnings attributes such as lower accrual quality, earnings persistence and earnings smoothing. However, prior studies on EDR and earnings management haven't examined the association between them. Thus, my study extends research on EDR and earnings manipulation by showing the relationship between EDR and different types of earnings management; accrual-based (AEM) and real earnings management (REM).

The widely accepted motivation of earnings management is to reduce the variability in reported earnings (Kanagaretnam et al., 2004) or to "meet or beat" analysts' forecasts (Payne and Robb, 2000). Earnings variability is widely used as a proxy for firm's risk and earnings management is used to smooth or reduce such risk. In accounting studies, the risk contains potential of both upside and downside volatility. However, managers are usually loss averse and for a given increase in wealth, the losses outweigh gains (Kahneman and Tversky, 1979). The manager's

use of earnings management is even likely to be more sensitive to earnings' downside risk. Nevertheless, both the upside and downside potentials are equally weighted in measuring a firm's risk.

This paper adopts the measure of EDR to investigate firms' behaviors to practice earnings management, especially when they are expected to face losses in the future. Since earnings management is mainly composed of two parts, accrual-based earnings management and real activities manipulation, each type of earnings management is separately analyzed to explore the association with EDR. Consistent with Konchitchki et al. (2016) that EDR is positively associated with low quality of accruals, I provide evidence that firms with high EDR are more likely to engage in accrual-based earnings management. This sheds light on the implication that firms with high EDR are motivated to manage earnings to hide future poor operating performances.

The association between EDR and REM, however, is more complex. As accrual-based and real earnings management have shown substitutive relationship through prior findings (Cohen et al. 2008; Zang, 2012), the relationship between EDR and AEM can be different from the relationship of EDR and REM. Nonetheless, real activities manipulation is also held to achieve same goal as AEM does. Thus, firms with higher EDR also have incentives to engage in more real earnings management.

This paper provides empirical evidence for different association between EDR and different methods of real activities manipulation. Even though they are within

the same category of real activities management, overproduction of inventory and reduction of discretionary expenditures impose different costs on firms and lead to discrete outcomes. For example, firms might have to forsake valuable investment opportunities as a result of cutting discretionary investments. Vorst (2016) even presents how these reduced investment cuts reverse in subsequent period. Therefore, reducing the discretionary expenses can cause long-term consequences to the firms. However, whether the overproduction of inventory leads to the similar result hasn't been fully addressed.

The findings of this paper put more weight on the substitutive relation between AEM and REM by showing opposite results with EDR. Moreover, the potential factors and costs related to different types of REM, reduction of discretionary expenditures and overproduction of inventory, are further analyzed to examine their joint effect with EDR on firm's earnings management behaviors.

This paper contributes to the existing literature in several respects. First and foremost, by adopting the measure of earnings downside risk, managers' engagement in earnings management to hide their losses is examined. The accounting-based downside risk and its association with future earnings management add on to the literature on usefulness of accounting information in examining firm's behaviors. Considering the motivation of earnings management, EDR can be an effective measure of risk to show firm's myopic behaviors. Second, this research enriches the literature on real activities manipulation through meticulous analyses of subcategory of REM by finding the different associations

with EDR. Related costs and firm characteristics of different REM tools differ under earnings downside risk. As of my understanding, even though the overproduction of inventories and the cutting of discretionary expenditures have different attributes and consequences, not many papers have addressed them separately.

The remainder of the paper proceeds as follows. In section II and III, related prior research and my hypotheses development are presented. In Section IV, the research design and methodology of the research are explained. Section V shows the results of this paper and section VI concludes and discusses the implications of the findings.

II. PRIOR LITERATURE

2.1. Earnings Downside Risk

Extant studies focus on the volatility of firm's performance, such as earnings, as a measure of firm-specific risk (Abdel-Khalik, 2007). Such risk affects a firm's stock price to change. However, volatility consists of both upside and downside potential even though managers are more sensitive to losses than gains (Kahneman and Tversky, 1979). According to conservative accounting, managers choose accounting methods and estimates that lead to lower book values of net assets (Penman and Zhang, 2002). Such nature of accounting conservatism posits a similar question and yet, related issue hasn't been fully addressed.

In Konchitchki et al. (2016), a new metric based on the below-expectation variability in firm's earning, EDR, is presented. It is based on the notion that earnings are asymmetrically distributed and that risk is more evident in downside states (Kahneman and Tversky 1979; Gul 1991). By following the root lower partial moment framework from Stone (1973) and Fishburn (1977), EDR shows the expectation for firm's future downward operating performance. Moreover, firms with high EDR are more sensitive to downward macroeconomic states which are highly related to the profits of companies. EDR shares commonalities with contemporaneous earnings attributes such as accrual quality, earnings persistence, earnings predictability, value relevance, earnings smoothing, and timeliness[1]. For example, firms with high EDR have lower accrual quality and are related with more earnings smoothing. In addition, EDR contains more incremental information about a firm's fundamental states. Accounting-based EDR is distinctive from the stock-based measures of return downside risk of prior research (Chen et al. 2001; Kim et al. 2011) by capturing downside patterns of firms' fundamental operations when stock returns are usually affected by non-fundamental market disturbances (Hong and Stein 2003; Pastor and Stambaugh 2003).

The fact that EDR contains distinctive sensitivity to downward macroeconomic states and information related to earnings attributes leads to my analyses on the association between EDR and earnings management. Even though some studies

[1] The earnings attributes are based on prior studies (e.g., Minton and Schrand 1999; Aboody et al. 2005; Core et al. 2008; Kim and Qi 2010; Kim and Sohn 2011; Badertscher et al. 2012; Barth et al. 2013)

have used EDR measure, the topics were limited to the association between EDR and the macroeonomy, cost of capital and growth targets (Joslin and Konchitchki 2018; Lyu et al, 2018). Thus, this paper is to explore the link between firm's downside fundamental risk and firm's engagement in earnings management.

2.2. Earnings Management

As of definition, earnings management is practiced to purposefully intervene in the financial reporting process, under the intent of obtaining certain private gain (Schipper, 1989). Practitioners and regulators pay considerable attention to earnings management from the belief that it is both pervasive and problematic (Dechow and Skinner, 2000). Many prior studies also have been conducted to show motivations and existence of earnings management. Firms manage reported earnings to avoid earnings decreases and losses (Burgstahler and Dichev, 1997) and manager's equity incentives lead to more earnings management (Cheng and Warfield, 2005).

Prior research (Carslaw, 1988; Thomas, 1989) shows that firms exercise discretions to increase earnings. Burgstahler and Dichev (1997) even find low frequencies of small decreases in earnings while high frequencies of small increases in earnings. When a firm is unable to meet an earnings benchmark, the company is conceived as willing to have poor future performances and end up having its stock price crashed in the market (Graham et al., 2005).

Since earnings management intervenes and manipulates the reporting of

firm's actual earnings, ways to detect earnings management haven been explored in prior literature (Dechow, Sloan and Sweeney, 1995). For instance, widely used types of earnings management, accrual-based earnings management (AEM) and real earnings management (REM), have been widely examined. The two different types of earnings management show distinctive features and even form substitutive relationship (Cohen et al. 2008; Cohen and Zarowin 2010; Badertscher 2011). The passage of Sarbanes-Oxley Act of 2002 or firm's seasoned equity offerings (SEO) affect firm's choice between AEM and REM (Cohen et al. 2008; Cohen and Zarowin, 2010). Zang (2012) even documents the trade-off between them due to the different costs that each type bears relatively. However, despite the extant studies on earnings management, the exact cause of firm's myopic behaviors wasn't fully addressed.

The research on accrual-based earnings management (AEM) and real activities manipulation (REM) has explored the distinctive features of each types of earnings management. Due to the proxy of AEM, research on firm's engagement in AEM and accruals quality has been examined through abundant studies. Firms practice manipulation of accruals since changing only the accruals has no direct cash flow consequences. However, auditors and regulators scrutinize accruals manipulations and thus, firms do not rely solely on AEM to manage their earnings (Roychowdhury, 2006). According to the survey of Graham et al. (2005), executives also manage real activities such as R&D, advertising and maintenance or even postpone a new project to avoid short term losses.

Roychowdhury (2006) introduces another type of real activities manipulation, the management of operational activities. Firms offer price discounts to temporarily increase sales and engage in overproduction of inventory to lower their costs of goods sold. Previously, studies on REM have focused mainly on investment activities, such as cutting discretionary expenditures; R&D, advertising and SG&A expenditures to improve margins. However, how firms increase their earnings both by reducing the cost of goods sold through overproduction of inventories and by reducing the discretionary expenditures hasn't been reviewed.

Even though they are held under similar motivation, accrual-based earnings management and real earnings management bear different costs and consequences. AEM is more likely to be detected by auditors and regulators when it is relatively hard for REM. Moreover, when accrual manipulations tend to reverse in the subsequent periods, REM imposes greater long-term costs on the firm. Especially, when firms sacrifice their projects to reduce discretionary expenses for short-term benefits, they might have to suffer even greater loss in the longer-term periods.

Consistent with opposing relationship between AEM and REM, Cohen et al. (2008) show that managers reduce AEM after the passage of the Sarbanes-Oxley Act of 2002 and rather, switch to REM. The tradeoff between AEM and REM depends on the relative costs of each action. Zang (2012) asserts that when AEM is affected by the scrutiny of auditors and regulators or the flexibility within firms' accounting systems, REM is affected by a firm's market-leader status, financial health and marginal tax rates.

Given the characteristics of EDR and different types of earnings management, research on the association between EDR, AEM and REM can contribute to important findings adding up to the literature on both EDR and earnings management. This paper confirms the substitutive nature of AEM and REM and shows different relationship between manipulation of inventory overproductions and discretionary expenditures with EDR. The relative costs of each manipulation and EDR show interaction effects on a firm's tendency to choose each earnings management.

III. HYPOTHESIS DEVELOPMENT

3.1. EDR and Accrual-based Earnings Management

As earnings attributes reveal information about the reported earnings, the measure of earnings downside risk is significantly and positively associated with earnings attributes such as accrual quality, earnings persistence, earnings predictability, and earnings smoothing. EDR even provides distinctive information not subsumed by other measures of earnings attributes (Konchitchki et al. 2016). Since the accrual quality is closely related to accrual-based earnings management, the link between EDR and earnings management seems logical. However, studies on neither EDR nor earnings management have examined the relationship between the two.

A finding that EDR captures the expectation for future downward operating performance aligns with a firm's incentive to manipulate earnings to avoid losses. If firms experience poor operating performance, they are more likely to report poor earnings, even lower than what analysts have forecasted and thus, more likely to manage their earnings. Several studies present systematic evidence of firm's motivation to report increases in earnings to meet its benchmark (e.g., DeAngelo et al. 1996; Hayn, 1995) and the firms that expect future downward operating performances are more likely to manage their earnings to avoid reporting potential losses. This leads to the following hypothesis:

H1: *Earnings downside risk (EDR) is positively associated with accrual-based earnings management.*

3.2. EDR and Real Earnings Management

Since the association between REM and EDR is more complex, my second hypothesis is presented in two sub-parts. Due to the tradeoff between accrual-based earnings management and real earnings management, the relationship between EDR and REM can be opposite to the relationship between EDR and AEM. There are several reasons to support this prediction. First, the practice of REM is more costly than that of AEM since reduction of discretionary expenditures can have a negative effect on cash flows in future longer-term periods and overproduction of inventory imposes high inventory holding costs on the company (Roychowdhury, 2006). Second, even despite such costs, survey by Graham et al. (2005) shows that

managers are more willing to practice REM than AEM because real activities manipulation is harder to be detected. Thus, the scrutiny of auditors and regulators is one of the factors that affect the decision to engage in REM. Third, Zang (2012) also points out that managers adjust the amount of AEM after REM is set, due to the timeline of two actions. This indicates that managers use the two different methods of earnings management as substitutes. Lastly, REM and AEM even have different effects on firms since REM, unlike AEM, can result in negative consequences on firms' future performances and decrease firm value (Graham et al., 2005; Gunny, 2005). Therefore, REM can be negatively related with EDR.

H2a: *Earnings downside risk (EDR) is negatively associated with real earnings management.*

On the contrary, EDR can be positively related with REM. Since real earnings management is practiced under same motivation of accrual-based earnings management, to avoid reporting potential losses, higher EDR can result in more real activities management. Because discretionary expenditures are expensed immediately, rather than being capitalized, managers can conveniently adjust their R&D, advertising and SG&A expenditures to achieve certain earnings management goals (Xu et al., 2007). According to Baber et al. (1991), the firms cut their R&D expenditures to maintain an increase in their earnings, regardless of firm's overall investment opportunities. Thus, a competing hypothesis can be presented as below.

H2b: *Earnings downside risk (EDR) is positively associated with real earnings management.*

IV. DATA AND RESEARCH DESIGN

4.1. Data and Sample Selection

The sample data starts from the CRSP/Compustat Merged Database from Wharton Research Data Services (WRDS). Since R&D expense is an important factor of discretionary expenditures, the sample consists of firm-year observations from 1976 to 2018. It starts from 1976 because the accounting treatment of R&D expense reporting was not standardized by FASB until 1975. Financial (SIC codes 6000-6999) and utilities firms (SIC codes 4900-4999) are excluded because they tend to have unique characteristics that aren't general to all firms in other industries. The observations with missing variables for computation of EDR, AEM and REM measures are excluded as well. The sample is restricted to only U.S. firms so that the difference in legal/judicial regime doesn't interfere with the results. All continuous variables are winsorized at the top and bottom 1% of each variable's distributions to minimize the effect of outliers. The final sample comprises of 46,863 firm-year observations.

4.2. Measurement

EDR

Following Konchitchki et al. (2016), the measure of earnings downside risk, EDR, focuses on the below-expectation volatility of earnings based on the assumption that earnings are asymmetrically distributed (Dechow, 1994; Dechow et al. 1998) and that risk demonstrates in downside states (Roy, 1952; Kahneman

and Tversky, 1979; Gul,1991). The theoretical risk framework of root lower partial moment is employed through the extension of the work of Stone (1973) and Fishburn (1977). EDR is defined relative to expected earnings as the reference level and given as follows:

$$EDR_{it} = \log\left[\frac{1+Lower_2(\tau_{it})}{1+Upper_2(\tau_{it})}\right] = \log\left\{\frac{1+\left[\left(\frac{1}{N}\right)\sum_{\gamma_{it}<\tau_{it}}(\tau_{it}-\gamma_{it})^2\right]^{1/2}}{1+\left[\left(\frac{1}{N}\right)\sum_{\gamma_{it}\geq\tau_{it}}(\tau_{it}-\gamma_{it})^2\right]^{1/2}}\right\} \quad (1)$$

EDR_{it} for firm *i* is estimated using observations conditioned in fiscal year-end *t*. The variable γ_{it} refers to realized earnings or firm *i* at fiscal year-end *t* and τ_{it} refers to the corresponding earning expectation using the earnings expectation model as follows:

$$ROA_{it} = \alpha_0 + \alpha_1 ROA_{it-1} + \alpha_2 SALE_{it-1} + \alpha_3 SIZE_{it-1} + \alpha_4 LEVERAGE_{it-1} + \alpha_5 STD\_ROA_{it-1} + \alpha_6 OC_{it-1} + \varepsilon_{it} \quad (2)$$

ROA is annual earnings scaled by total assets and *SALE* is the ratio of total revenues to total assets. *SIZE* is the firm size, measured as the natural logarithm of market value of equity, and *LEVERAGE* is the leverage ratio, calculated as long-plus short-term debts divided by total assets. *STD_ROA* is the standard deviation of *ROA* estimated over the prior 4 years, as available. *OC* is operating cycle, measured as the natural logarithm of 360 days multiplied by accounts receivable scaled by total revenues plus inventory scaled by cost of goods sold.

The fitted value from equation (2) indicates expected earnings, and the

estimated residual, ε_{it} , is the deviations below ($\hat{\varepsilon}_{it} < 0$) or above or equal to ($\hat{\varepsilon}_{it} \geq 0$) the expectation. Accordingly, the EDR construction in equation (1) is equivalently expressed as follows:

$$EDR_{it} = \log\left\{\frac{1 + \left[\left(\frac{1}{N}\right)\sum(\hat{\varepsilon}_{it} \times I\hat{\varepsilon}_{it<0})^2\right]^{1/2}}{1 + \left[\left(\frac{1}{N}\right)\sum(\hat{\varepsilon}_{it} \times I\hat{\varepsilon}_{it\geq 0})^2\right]^{1/2}}\right\}, \qquad (3)$$

where $I\hat{\varepsilon}_{it<0}$ is an indicator variable that equals one if $\hat{\varepsilon}_{it<0}$, which means that realized *ROA* is below its expected level and zero otherwise; $I\hat{\varepsilon}_{it\geq 0}$ is an indicator equal to one if $\hat{\varepsilon}_{it\geq 0}$ and zero otherwise; and *N* is the total number of residuals. The residuals of the earnings expectation model in equation (2) is estimated by employing ordinary least squares (OLS) regressions and four residuals are used to compute EDR according to equation (2).

To validate the link between EDR and firms' subsequent operating performance, various earnings-based variables are used. The following multivariate regression model is used to confirm the connection of EDR and firm's earnings-based variables.

$$Performance_{it+1} = \beta_0 + \beta_1 EDR_{it} + \sum \beta_k \, CONTROLS_{kit} + \varepsilon_{it}, \qquad (4)$$

where $Performance_{it+1}$ refers to the one-year-ahead earnings-based performance variable such as indicator for negative net income before extraordinary items, *DLOSS1*; an indicator for negative net income, *DLOSS2*; the

ratio of income before extraordinary items to total revenues, *NIM*; the ratio of operating income after depreciation to total revenues, *OPM*; and the gross profit margin, *GPM*, calculated as the difference between total revenues and cost of goods sold scaled by total revenues. When the subsequent loss indicator variable is the dependent variable, a probit estimation method is used and for margin measures of subsequent performance, OLS regression is used.

To ensure that estimated EDR-subsequent-performance links are not biased due to potential omission of firm fundamental characteristic or risk variables, control variables are included. The control variables include book-to-market ratio, *BM*; market value of equity, *MVE*; *ROA*; *LEVERAGE*; cash holdings, *CASH*; research and development investment intensity, *Invest_RD*; capital investment intensity, *Invest_CAPX*; operating options, *OO*; and year dummies. Appendix provides detailed variable definitions.

Accrual-Based Earnings Management

Following prior literature, discretionary accruals are used as proxy for accrual-based earnings management. Following modified Jones (1991) model:

$$Accruals_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(\Delta S_t/A_{t-1}) + \alpha_3(PPE_t/A_{t-1}) + \varepsilon_{t,} \quad (5)$$

$Accruals_t$ is the earnings before extraordinary items and discontinued operations minus the operating cash flows reported in the statement of cash flows in year *t* and PPE_t is the gross property, plant, and equipment. Since discretionary accruals are

the difference between firms' actual accruals and the normal level of accruals, the estimated residuals are the proxy for accrual-based earnings management (*AM*). The above regression is estimated cross-sectionally for industry-years with at least 15 observations.

Real Activities Manipulation

Following Roychowdhury (2006), manipulation of real activities is largely comprised of two parts: increasing earnings by reducing the cost of goods sold through overproducing inventory, and cutting discretionary expenditures, including R&D, advertising, and selling, general, and administrative (SG&A) expenditures. The former is measured by the abnormal level of production costs when the latter is measured by the abnormal level of discretionary expenditures.

To estimate the normal level of production costs,

$$PROD_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_t/A_{t-1}) + \alpha_3\,(\Delta S_t/A_{t-1}) + \alpha_4\,(\Delta S_{t-1}/A_{t-1}) + \varepsilon_{t,} \quad (6)$$

where $PROD_t$ is the sum of the cost of goods sold in year *t* and the change in inventory from *t-1* to *t*; A_{t-1} is the total assets in year *t-1*; S_t is the net sales in year t; and ΔS_t is the change in net sales from year *t-1* to *t*. Equation (6) is estimated cross-sectionally for each industry-year with at least 15 observations, where industry is defined by two-digit SIC industry[2] such that the estimated

[2] The results based on industry grouping defined by Fama and French (1997) are similar for all the estimation regressions.

coefficients vary over time and reflect the impact on production costs from industry-wide economic conditions during the year. The estimated residual from the equation indicates the abnormal level of production costs (RM_{PROD}). The higher residual signifies the larger amount of inventory overproduction, which results in the increase of reported earnings through reducing the cost of goods sold.

The normal level of discretionary expenditures is estimated using the following equation:

$$DISX_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_{t-1}/A_{t-1}) + \varepsilon_t, \qquad (7)$$

where $DISX_t$ is the discretionary expenditures, which is the sum of R&D, advertising, and SG&A expenditures in the year *t*. The above regression is also estimated cross-sectionally for industry-years with at least 15 observations. The estimated residual from the regression is the abnormal level of discretionary expenditures (RM_{DISX}). The residuals are multiplied by -1 so that the higher values indicate greater amounts of discretionary expenditures cut by firms to increase reported earnings. Higher levels of both proxies of real activities manipulations signify more earnings management. The two real activities manipulations are aggregated into one proxy, *RM*, by taking their sum.

4.3. Empirical Models

To examine whether firms with high EDR are associated with more accrual-based earnings management, I test the following regression:

$$Y_t = \beta_0 + \beta_1 EDR_{t-1} + \beta_2 AM_t (or\ RM_t) + \beta_3 SIZE_{t-1} + \beta_4 MB_{t-1} + \beta_5 ROA_t + \beta_6 ADJ\_ROA_{t-1} + \beta_7 LEV_{t-1} + \beta_8 RD\_INT_t + \beta_9 AD\_IND\_INT_t + \beta_{10} CASH_t + \beta_{11} INVEST\_CAPX_t + \beta_{12} OO_t + \beta_{13} EO_t + \beta_{14} FIRM\_AGE_t + \varepsilon_{it}, \quad (8)$$

where the dependent variables are measures of accrual-based (*AM*) and real earnings management (RM_{DISX} and RM_{PROD}) for Model 1, 2 and 3, respectively. Since the two mechanisms (AEM and REM) are substitutive to each other, firms can choose the less costly one between the two techniques. To control for such tradeoff effect, *AM*, the proxy for accrual-based earnings management, is included as a control variable in the real activities manipulation regressions (Model 2 and 3) and the proxy for real activities manipulation, *RM*, included as a control variable in the accrual-based earnings management regressions (Model 1). Following Zang (2012) and Kim et al. (2012), the firm size (*SIZE*), market-to-book-ratio (*MB*) and the return on assets (*ROA*) are included to control for systematic variation in abnormal production costs, discretionary expenditures, and accruals related to firm size, growth opportunities and current-period firm performance. Roychowdhury (2006) suggests that firm-specific growth opportunities and firm's size can explain significant variation in earnings management.

To isolate the effect of EDR on earnings management, industry-adjusted ROA (*ADJ_ROA*) is included in the regressions. Since R&D intensity and advertising intensity in the industry can positively affect earnings, *RD_INT* and *AD_IND_INT* are included to control for a firm's R&D expenditure and the advertising intensity

of its industry, respectively. To further address the problem of correlated omitted variables, leverage (*LEV*) and an indicator variable for the incidence of an equity offering during the following fiscal year (*EO*) are included to control for the leverage- and equity-offering-related incentives for earnings management (e.g., Teoh et al. 1998; Kim and Park 2005).

To ensure that the estimated EDR-earnings management links are not biased or inconsistent due to the potential omission of firm fundamental characteristic or risk variables, cash holdings, *CASH*; capital investment intensity, *INVEST_CAPX*; operating options, *OO* are included in the regressions. *FIRM_AGE* is also included as financial reporting behavior could change as firm matures, and different developmental stages of the business could affect accordingly. Appendix provides detailed information about control variables.

One thing to note is that the measure of EDR is from year *t-1* when earnings management proxies, the dependent variables, are from year *t*. Since EDR contains information about the expectation for future downward operating performance, the realized downward operating performance of the future from prediction at year *t-1* will be associated with the future's earnings management at year *t*.

V. EMPIRICAL RESULTS

5.1. Descriptive Statistics and Univariate Analyses

In Table 1, the sample distribution by the two-digit SIC code industry is presented. The most heavily represented industry is Business Services (12.64

percent, two-digit SIC code 73), followed by Electronic and Other Electric Equipment (12.51 percent, two-digit SIC code 36), and Industry Machinery and Computer Equipment (9.49 percent, two-digit SIC code 35).

[Insert Table 1 about here]

Table 2 shows the descriptive statistics for the measures of EDR, AEM(*AM*), REM (RM_{PROD} and RM_{DISX}) and control variables. All continuous variables are winsorized at the top and bottom 1 percent of their distributions. The measure of EDR shows comparable values to the values reported by Konchitchki et al. (2016).[3] The mean values of *AM*, RM_{PROD} and RM_{DISX} are -0.0004, 0.003 and -0.001, respectively. Higher values indicate more manipulation of earnings by the firm.

[Insert Table 2 about here]

Table 3 reports Pearson correlation coefficients for selected variables. EDR is significantly related to all the dependent variables of my main regressions. Especially, firms with high earnings downside risk are likely to engage in real earnings management through overproduction of inventory but not through reduction of discretionary expenditures. All types of discretionary expenditures are significantly and negatively correlated with EDR.

[Insert Table 3 about here]

[3] The values are even more similar when the sample period of the observations coincide with Konchitchki et al. (2016)'s, 1968 to 2014. (untabulated)

5.2. Validity Analyses

Even though the reported levels of EDR from Table 2 is quite similar with the level presented by Konchitchki et al. (2016), the validity of EDR is tested using Equation (4). The link between EDR and a firm's subsequent performance should be examined to ensure that firms with high EDR are expected to experience negative future operating performance so that they have incentives to engage in earnings management in subsequent periods.

Thus, table 4 shows the results from the regressions of EDR with the subsequent year's loss indicators (*DLOSS1* and *DLOSS2*) and the earnings-based margin variables (*IBM, NIM, OPM,* and *GPM*).

[Insert Table 4 about here]

The results show that EDR is significantly and positively related with the loss indicators; *DLOSS1* and *DLOSS2*, (β_1=0.231, t-value =5.27, and β_1=0.244, t-value =6.03), respectively, indicating high EDR firms are more likely to face losses in the subsequent year. Moreover, EDR is significantly and negatively related with the earnings-based margin variables; *IBM, NIM, OPM,* and *GPM* (β_1= -0.145, t-value = -7.42; β_1= -0.146, t-value = -7.14; β_1= -0.209, t-value = -12.72; β_1= -0.246, t-value = -13.84; respectively). The result confirms that the association between EDR and subsequent underperformance is unaffected by various control variables. Therefore, the validity of the EDR measure in incorporating downside risk in firms' fundamentals is verified.

5.3. EDR and Earnings Management (AEM and REM)

Table 5 reports the results of multivariate regression analyses of accrual-based and real earnings management. All test statistics and significance levels are based on the standard errors adjusted by a two-dimensional cluster at the firm and year levels because the residuals can be correlated across firms and/or over time (Pertersen 2009; Gow et al. 2010; Kim et al. 2012).

[Insert Table 5 about here]

The estimated coefficients of Model 1 show result for accrual-based earnings management regression, where dependent variable is *AM* in Equation (8). Consistent with Konchitchki et al. (2016), the estimated coefficient on EDR is positive and significant (β_1=0.085, t-value =9.27). The firms in this sample with high EDR are more likely to engage in accrual-based earnings management. The result also indicates that smaller and older firms are more likely to practice accrual-based earnings management. R&D intensity is significantly and positively correlated with AEM (β_8=0.119, t-value =8.26). Overall, the result from Model 1 is consistent with H1.

The estimated coefficients of Model 2 and 3 in Table 5 present interesting results for real earnings management regression, where dependent variable is RM_{DISX} and RM_{PROD} in Equation (8), respectively. According to the result of Model 2, firms with high EDR is less likely to engage in real activities manipulation through cutting discretionary expenses ((β_1= -0.305, t-value = -9.00).

Even though managing discretionary expenditures is conducted under the similar incentive for accrual-based earnings management, to avoid losses, firms in this sample with high EDR are less likely to choose earnings management through reducing discretionary expenditures. This indication puts more weight on the trade-off relationship between AEM and REM. Moreover, R&D intensity and advertising intensity of firm's industry are significantly and negatively correlated with reduction of discretionary expenditures (β_8= -1.204, t-value = -17.32; β_9= -0.809, t-value = -2.10; respectively). The result of Model 2 supports H2a by showing the negative association between EDR and RM_{DISX}.

On the contrary, the estimated coefficient on EDR is significant and positive (β_1=0.058, t-value =2.35) in Model 3. This adds on to the second perspective that EDR and REM are positively related, as EDR and AEM do, since engagement in AEM and REM share same motivation. Yet, different from the result of AEM regression, firms with high R&D intensity are less likely to engage in overproduction of inventory when older firms are more likely to do so. Overall, the results from Model 3 is consistent with H2b.

In summary, EDR is significantly associated with real earnings management and the results of Table 5 provide evidence consistent with all three hypotheses. Consistent with the positive relation between inverse accrual quality and EDR, the results show positive correlation between AEM and EDR, but the result is different for real earnings management. An interesting finding shows that relationship between EDR and REM is dependent on which technique is used to manipulate

real activities.

5.4. Further Analyses

The Model 2 and 3 indicate that different manners of real earnings management have contrasting association with EDR. Firms who are expected to experience more negative operating performance in future are not likely to reduce their discretionary expenditures such as R&D, advertising and SG&A expenses but are more likely to manage their earnings through overproducing inventory. Thus, further tests are held to analyze the potential factors that explain the opposite relationship within real earnings management.

Reduction of Discretionary expenditures

The topic of R&D expenditures has been examined in many of accounting studies. According to Lev and Sougiannis (1996), R&D investment and advertising expenditures are correlated with firm's growth factors such as market minus book values and Tobin's Q values (the ratio of market value to replacement cost of assets). The effect of a firm's Tobin's Q values might explain the negative relationship between EDR and RM_{DISX}.

To further examine the distinctive feature of RM_{DISX}, I test whether firm's Tobin's Q values, the firm's future performance potential, affect the relation with EDR following the model below.

$$Y_t = \beta_0 + \beta_1 EDR_{t-1} + \beta_2 EDR_{t-1} * Tobin'sQ_{t-1} + \beta_3 Tobin'sQ_{t-1} + \sum \beta_k \, CONTROLS_{kt} + \varepsilon_t \,, \quad (9)$$

where the dependent variables is each discretionary expenditures of R&D, advertising and SG&A; $RM_{DISX\_R\&D}$, RM_{DISX_ADV} and $RM_{DISX\_SG\&A}$, respectively. The model of Equation (9) is similar with Equation (8), which is the main model. The control variables remain the same but an interaction term of EDR_{t-1} with $Tobin'sQ_{t-1}$, and each separate term are added to test whether firm's choice to reduce discretionary expenses under its Tobin's Q values is affected by firm's earnings downside risk. Since Tobin's Q values are highly related to firm's investment opportunities, my conjecture is that a firm with high Tobin's Q values will be less likely to engage in reducing discretionary expenditures and that firm's such decision will be more pronounced when faced with high EDR. Again, all test statistics and significance levels are based on the standard errors adjusted by a two-dimensional cluster at the firm and year levels. Appendix provides more detailed information on the variables.

[Insert Table 6 about here]

Table 6 reports the results of Equation (9), regression for each discretionary expenditure. The estimated coefficient on the interaction term, $EDR_{t-1} * Tobin'sQ_{t-1}$, is significant and negative in both models of discretionary R&D and SG&A expenditures, (β_2= -0.006, t-value = -1.74; β_2= -0.074, t-value = -4.96; respectively). It indicates that firms with high EDR and Tobin's Q values are even less likely to engage in manipulation of discretionary R&D and SG&A expenditures. The untabulated result of F-test on the sum of coefficients of

EDR_{t-1} alone and the interaction term, $EDR_{t-1} * Tobin'sQ_{t-1}$, shows significance at 10 percent level, with F-value of 2.88. Coefficients on other control variables are similar with prior results from Model 2.

Overproduction of Inventory

The positive relationship between EDR and RM_{PROD} indicates that firms with high earnings downside risk are motivated to engage in overproduction of inventory to manage their reported earnings. According to Zang (2012), one of the factors that abstain the firms from engaging in accrual-based earnings management is the flexibility within firms' accounting systems. Under limited flexibility within GAAP and reversal of accruals, managers' choice to manipulate accruals is restricted by the accrual management activities in previous periods. Based on the trade-off relationship between AEM and REM, I hypothesize that firms with high EDR will engage in overproduction of inventory when accrual-based earnings management is harder to practice.

To test further analysis of H2b, the cost associated with accrual-based earnings management is added. Employing Barton and Simko's (2002) balance sheet measure of previous accounting choices as a proxy for the accrual management activities in previous periods, net operating assets at the beginning of the year, NOA_{t-1}, and its interaction term with EDR are added to main model (Eq. (8)) as below:

$$RM_{PROD_t} = \beta_0 + \beta_1 EDR_{t-1} + \beta_2 EDR_{t-1} * NOA_{t-1} + \beta_3 NOA_{t-1}$$

$$+\sum \beta_k \, CONTROLS_{kt} + \varepsilon_t \,, \qquad (10)$$

Since abnormal accruals in past earnings are also reflected in net assets, net operating assets in previous periods are overstated according to the firm's engagement in accrual-based earnings management. When NOA_{t-1} is overstated, conducting accrual management activities is more costly for the company. In other words, the relative cost associated real earnings management is low. Therefore, the predicted sign of the interaction term, $EDR_{t-1} * NOA_{t-1}$, is positive since firms with high EDR and limited flexibility within their accounting system are inclined to choose real earnings management. The control variables of Eq. (10) are equal to those of Equation (8) and all test statistics and significance levels are based on the standard errors adjusted by a two-dimensional cluster at the firm and year levels. Appendix provides more detailed variable information.

[Insert Table 7 about here]

Table 7 shows the estimated coefficients of Eq. (10). The interaction term, $EDR_{t-1} * NOA_{t-1}$, is both significantly and positively associated with RM_{PROD} (β_2= 0.205, t-value = 6.39). The untabulated result of F-test on the sum of coefficients of EDR_{t-1} alone and the interaction term, $EDR_{t-1} * NOA_{t-1}$, even shows significance at 1 percent level, with F-value of 49.10. It implies that firms with high EDR and lower flexibility within accounting systems are more likely to manipulate their earnings through overproduction of inventory, conforming with my prediction.

VI. CONCLUSION

This study examines the association between firm's earnings downside risk and both accrual-based and real earnings management. The measure of EDR shows significant and positive correlation with accrual-based earnings management and real activities manipulation through overproduction of inventory. The interesting result reports the opposite (negative) and significant relationship with real earnings management through reduction of discretionary expenditures. The further analyses indicate that firms with high EDR and Tobin's Q values are less likely to engage in manipulation of discretionary expenditures when firms with high EDR and inflexibility within their accounting system tend to manipulate real activities through overproducing inventory.

This study contributes to accounting research, especially the earnings management literature, by showing the usefulness of accounting information to examine the firm's myopic behaviors. The findings provide evidence that the accounting-based risk, EDR, in previous periods can be used to explore the firm's engagement in earnings management in subsequent periods. By containing the distinct information about a firm's risk, earnings downside risk even captures a firm's tendency to manipulate its reported earnings in the future.

Overall, the findings are consistent with prior studies and yet, introduce more to be explored. For instance, the results indicate that different types of real earnings management are oppositely related with EDR due to the disparate nature of each

REM practice. My findings have implications for both researchers and regulators. For researchers, the conflicting association between EDR and two different real earnings management suggests that the two manipulations should be treated separately to fully understand real activities management. For regulators, firm's past earnings downside risk can be helpful in examining firm's earnings management behaviors.

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APPENDIX

Variable Definitions

Variable	Definition
Dependent Variables	
EDR	Proxy for earnings downside risk calculated following Konchitchki et al. (2016), for firm *i* at the fiscal year-end *t* as the natural logarithm of the ratio of one plus the root lower partial moment of earnings (Compustat: IB) over total assets Ccompustat: AT), which is denoted as Lower, to one plue the root upper partial moment of earnings over total assets, denoted as Upper, according to Eqs. (2) and (3) in the text
$DLOSS1$	An indicator variable equal to one if annual income before extraordinary items (Compustat: IB) is negative for firm *i* in the fiscal year t and zero otherwise
$DLOSS2$	An indicator variable equal to one if annual net income (Compustat: NI) is negative for firm *i* in the fiscal year t and zero otherwise
IBM	The ratio of annual income before extraordinary items (Compustat: IB) to total revenues (Compustat: SALE) for firm *i* in fiscal year *t*
NIM	The ratio of annual net income (Compustat: NI) to total revenues (Compustat: SALE) for firm *i* in fiscal year *t*
OPM	The ratio of annual operating income after depreciation (Compustat: OIADP) to total revenues (Compustat: SALE) for firm *i* in fiscal year *t*
GPM	Annual gross profit margin ratio, calculated as the difference between total revenues and cost of goods sold divided by total revenues for firm *i* in fiscal year *t*
AM_t	The estimated residuals from Equation (5)
RM_{PROD}	The estimated residuals from Equation (6)
RM_{DISX}	The estimated residuals from Equation (7) multiplied by -1
Control Variables	
BM	Book-to-market ratio for stock i measured at fiscal year-end t.
MVE	Market value of equity for stock i at fiscal year-end t
$CASH$	The ratio of cash holdings and cash equivalents to total assets
ROA	The ratio of income before extraordinary items to total assets
$LEVERAGE$	The ratio of the sum of interest-bearing long-term and short-term debts to total assets
$Invest\_RD$	The ratio of R&D expenditures to total assets

$Invest\_CAPX$	The ratio of capital expenditures to total assets
RM	Sum of RM_{PROD} and RM_{DISX}
$SIZE$	Natural logarithm of the market value of equity
ADJ_ROA	Industry mean-adjusted ROA in the previous year
RD_INT	R&D intensity (R&D expense/net sales) for the year
AD_IND_INT	Advertising intensity for the two-digit SIC code industry for the year
OO	The ratio of property, plant, and equipment to total assets
EO	An indicator variable that takes on a value of 1 if the firm has equity offerings (if a firm's equity issuance is greater than 10% of its total assets in the next year) in the following year, and 0 otherwise, following Ghosh and Lee (2013)
FIRM_AGE	Natural logarithm of (1+ the number of years since the firm first appears in the CRSP database)
$Tobin'sQ$	The ratio of market value to replacement cost of assets
NOA	An indicator variable that equals 1 if the net operating assets at the beginning of the year divided by lagged sales are above the median of the corresponding industry-year, and 0 otherwise

Table 1.

Sample Description: Distribution of Firm-Year Observations by Industry

Industry	Two-Digit SIC	# of Obs.	% of Sample	Cumulative Percent (%)
Metal Mining, Ores	10	59	0.13	0.13
Oil and Gas	13	1776	3.79	3.92
General Building Contractors	15	27	0.06	3.97
Heavy Construction, Except Building	16	100	0.21	4.19
Food, Beverage	20	1676	3.58	7.76
Textile Mill Products	22	305	0.65	8.41
Apparel and Other Textile Products	23	771	1.65	10.06
Lumber and Wood Products	24	333	0.71	10.77
Furniture and Fixtures	25	567	1.21	11.98
Paper and Allied Products	26	762	1.63	13.61
Printing and Publishing	27	638	1.36	14.97
Chemicals and Allied Products	28	4061	8.67	23.63
Petroleum	29	423	0.90	24.54
Rubber	30	767	1.64	26.17
Leather & Leather Products	31	32	0.07	26.24
Stone, Clay, & Glass Products	32	364	0.78	27.02
Primary Metal Industries	33	1035	2.21	29.23
Fabricated Metal Products	34	1153	2.46	31.69
Industrial Machinery and Computer Equipment	35	4447	9.49	41.18
Electronic and Other Electric Equipment	36	5863	12.51	53.69
Transportation Equipment	37	1608	3.43	57.12
Instruments and Related Products	38	4091	8.73	65.85
Miscellaneous Manufacturing	39	727	1.55	67.40
Wholesale-Durable Goods	50	1749	3.73	71.13
Wholesale-Non-Durable Goods	51	855	1.82	72.96
General Merchandise Store	53	489	1.04	74.00
Food Stores	54	412	0.88	74.88
Auto Dealers, Gas Stations	55	129	0.28	75.15
Apparel and Accessory Stores	56	802	1.71	76.86
Furniture & Home furnishing Stores	57	30	0.06	76.93
Eating and Drinking	58	910	1.94	78.87
Miscellaneous Retail	59	1263	2.70	81.57
Business Services	73	5925	12.64	94.21
Motion Pictures	78	47	0.10	94.31
Amusement and Recreation Services	79	382	0.82	95.12
Health Services	80	804	1.72	96.84
Educational Services	82	84	0.18	97.02
Engineering and Management Services	87	956	2.04	99.06
Non-Classifiable Establishments	99	441	0.94	100.00
Total		46,863	100.00	

Table 2.

Descriptive Statistics

Variables	N	Mean	Std. Dev.	Median	Q1	Q3
AM	46863	0.000	0.092	0.006	-0.037	0.046
RM_{PROD}	46863	0.003	0.190	0.012	-0.097	0.111
RM_{DISX}	46863	-0.001	0.248	0.034	-0.101	0.149
RM	46863	0.001	0.421	0.052	-0.179	0.247
EDR	46863	0.001	0.073	-0.009	-0.036	0.023
DLOSS1	46863	0.280	0.449	0.000	0.000	1.000
DLOSS2	46863	0.287	0.452	0.000	0.000	1.000
IBM	46863	-0.001	0.179	0.030	-0.010	0.070
NIM	46863	-0.002	0.185	0.030	-0.012	0.071
OPM	46863	0.046	0.158	0.061	0.014	0.115
GPM	46863	0.388	0.196	0.355	0.243	0.509
SIZE	46863	5.640	2.267	5.534	3.914	7.243
MB	46862	2.561	2.853	1.820	1.099	3.073
ROA	46863	0.008	0.138	0.038	-0.011	0.077
ADJ_ROA	46863	0.000	0.004	0.000	0.000	0.000
LEV	46863	0.213	0.193	0.186	0.036	0.331
RD_INT	46863	0.049	0.083	0.008	0.000	0.064
AD_IND_INT	46863	0.014	0.013	0.010	0.005	0.019
CASH	46863	0.157	0.170	0.093	0.027	0.233
Invest_CAPX	46863	0.052	0.051	0.036	0.019	0.066
OO	46863	0.526	0.374	0.439	0.240	0.721
EO	46863	0.100	0.301	0.000	0.000	0.000
Firm_AGE	46863	2.893	0.613	2.890	2.398	3.296

Note. This table presents descriptive statistics for variables used in the analyses. Appendix provides detailed variable definitions. The sample includes 46,863 firm-year observations for fiscal year-ends from 1976 to 2018.

Table 3.

Pearson Correlation Matrix

Correlations among EDR, Earnings Management Proxies and Other Selected Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) EDR_{t-1}	1.00											
(2) AM_t	**-0.102**	1.00										
(3) RM_{PROD_t}	**0.085**	**-0.053**	1.00									
(4) RM_{DISX_t}	**-0.111**	**0.139**	**0.637**	1.00								
(5) RM_t	**-0.028**	**0.064**	**0.868**	**0.921**	1.00							
(6) $SIZE_{t-1}$	**-0.092**	**0.023**	**-0.106**	-0.005	**-0.051**	1.00						
(7) ADJ_ROA_{t-1}	**-0.510**	**0.104**	**-0.064**	**0.092**	**0.024**	**0.174**	1.00					
(8) LEV_{t-1}	**0.118**	**-0.027**	**0.136**	**0.160**	**0.160**	**-0.022**	**-0.081**	1.00				
(9) EO_t	**0.018**	**-0.014**	**-0.098**	**-0.105**	**-0.113**	**0.078**	**-0.062**	**-0.063**	1.00			
(10) RD_INT_t	**0.167**	**-0.11**	**-0.193**	**-0.303**	**-0.275**	**0.061**	**-0.141**	**-0.224**	**0.146**	1.00		
(11) $AD\_IND\_INT_t$	**-0.041**	**-0.004**	0.006	**0.012**	0.009	**-0.022**	-0.004	**0.041**	-0.001	**-0.047**	1.00	
(12) $Firm\_AGE_t$	**-0.077**	**0.066**	**0.045**	**0.061**	**0.060**	**0.303**	**0.076**	**0.026**	**-0.068**	**-0.141**	0.007	1.00

Note. This table reports Pearson correlations of EDR, earnings management proxies and other selected variables from the main models. Bold coefficients indicate statistical significance at 1 percent level. Variable definitions are in Appendix.

Table 4.

Validity Analyses of EDR measure

	$DLOSS1_t$	$DLOSS2_t$	IBM_t	NIM_t	OPM_t	GPM_t
EDR_{t-1}	**0.231*****	**0.244*****	**-0.145*****	**-0.146*****	**-0.209*****	**-0.246*****
	(5.74)	**(6.03)**	**(-7.42)**	**(-7.14)**	**(-12.72)**	**(-13.84)**
BM_{t-1}	0.075***	0.083***	-0.020***	-0.023***	-0.014***	-0.045***
	(17.66)	(19.37)	(-10.39)	(-11.58)	(-9.56)	(-27.28)
MVE_{t-1}	-0.021***	-0.020***	0.005***	0.004***	0.011***	0.010***
	(-22.06)	(-20.89)	(12.51)	(11.31)	(34.89)	22.76
ROA_{t-1}	-1.180***	-1.157***	0.560***	0.570***	0.491***	-0.095***
	(-47.46)	(-46.23)	(38.45)	(37.58)	(40.73)	(-8.67)
LEV_{t-1}	0.085***	0.081***	-0.019***	-0.016***	0.060***	-0.009*
	(7.08)	(6.65)	(-3.43)	(-2.7)	(12.93)	(-1.74)
$CASH_{t-1}$	0.199***	0.166***	-0.090***	-0.078***	-0.086***	0.398***
	(15.2)	(12.6)	(-11.85)	(-10.01)	(-13.29)	(65.23)
$Invest\_CAPX_{t-1}$	-0.278***	-0.282***	-0.116***	-0.125***	-0.023	0.451***
	(-5.9)	(-5.94)	(-4.49)	(-4.66)	(-0.99)	(18.71)
OO_{t-1}	0.046***	0.043***	-0.003	-0.001	-0.012***	-0.070***
	(6.69)	(6.23)	(-0.94)	(0.24)	(-5.04)	(-24.01)
Intercept	0.303***	0.306***	0.005	0.004	-0.003	*0.317****
	(32.95)	(33.13)	(1.16)	(0.15)	(-0.84)	*(81.04)*
Observations	46863	46863	46863	46863	46863	46863
R^2	0.210	0.203	0.241	0.231	0.311	0.217

Note. This table reports the results of Probit or OLS regressions of subsequent loss indicators or profit margin variables on EDR and controls.
***, **, * statistical significance at 1, 5, 10 % levels, respectively, and t statistics are in parentheses.

Table 5.

Multiple Regression of Earnings Management on EDR

	Model 1	**Model 2**	**Model 3**
	AM_t	RM_{DISX}	RM_{PROD}
$\boldsymbol{EDR_{t-1}}$	**0.085*** **	**-0.305*** **	**0.058** **
	(9.27)	**(-9.0)**	**(2.35)**
$AM_t (or\ RM_t)$	0.230***	0.406***	0.072***
	(14.09)	(19.66)	(3.16)
$SIZE_{t-1}$	-0.004***	0.010***	0.001
	(-14.05)	(7.55)	(1.58)
MB_{t-1}	-0.000*	-0.014***	-0.010***
	(-1.92)	(-14.58)	(-12.56)
ROA_t	0.381***	-0.256***	-0.382***
	(56.69)	(-10.73)	(-24.2)
ADJ_ROA_{t-1}	-0.679***	1.240	-0.218
	(-2.87)	(1.60)	(-0.49)
LEV_{t-1}	0.004	0.123***	0.056***
	(0.272)	(7.16)	(4.22)
RD_INT_t	0.119***	-1.204***	-0.716***
	(8.26)	(-17.32)	(-14.68)
$AD\_IND\_INT_t$	-0.231***	-0.809**	-0.643**
	(-3.10)	(-2.10)	(-2.3)
$CASH_t$	-0.040***	0.109***	-0.018
	(-6.06)	(4.59)	(-1.4)
$INVEST\_CAPX_t$	-0.119***	-0.249***	-0.246***
	(-9.17)	(-5.69)	(-6.61)
OO_t	0.004**	0.053***	0.006
	(1.98)	(4.56)	(0.77)
EO_t	0.003	-0.037***	-0.025***
	(1.57)	(-5.89)	(-5.2)
$FIRM\_AGE_t$	0.003***	-0.006	0.009***
	(4.77)	(-1.42)	(2.87)
Industry dummies	included	included	included
R^2	0.250	0.184	0.163
n	46863	46863	46863

Note. ***, **, * statistical significance at 1, 5, 10 % levels, respectively, and t statistics are in parentheses. All test statistics and significance levels are calculated based on the standard errors adjusted by a two-dimensional cluster at the firm and year levels.

Table 6.

Multiple Regression of Reduction of Discretionary Expenditure on EDR

	$RM_{DISX\_R\&D}$	RM_{DISX_ADV}	$RM_{DISX\_SG\&A}$
EDR_{t-1}	-0.005	-0.017***	-0.150***
	(-0.60)	(-3.22)	(-3.77)
$\boldsymbol{EDR_{t-1} * Tobin'sQ_{t-1}}$	**-0.006***	**0.002**	**-0.074*****
	(-1.74)	**(1.07)**	**(-4.96)**
$Tobin'sQ_{t-1}$	-0.006***	-0.001***	-0.041***
	(-11.95)	(-3.16)	(-13.51)
AM_t	0.068***	0.009***	0.299***
	(15.85)	(3.08)	(17.79)
$SIZE_{t-1}$	0.002***	-0.000	0.011***
	(11.39)	(-0.88)	(9.43)
MB_{t-1}	-0.000*	-0.000*	-0.001
	(-1.88)	(-1.82)	(-1.29)
ROA_t	-0.076***	0.002	-0.153***
	(-18.27)	(0.88)	(-7.83)
ADJ_ROA_{t-1}	0.489***	0.012	-0.115
	(5.49)	(0.17)	(-0.19)
LEV_{t-1}	0.008***	0.005**	0.095***
	(4.46)	(2.27)	(6.99)
RD_INT_t	-0.637***	0.031***	-0.511***
	(-36.04)	(5.08)	(-10.51)
$AD\_IND\_INT_t$	-0.441***	-0.047	-0.405
	(-5.44)	(-0.76)	(-1.33)
$CASH_t$	0.030***	-0.002	0.118***
	(8.79)	(-1.10)	(6.48)
$INVEST\_CAPX_t$	-0.018**	-0.009*	-0.090**
	(-2.51)	(-1.68)	(-2.41)
OO_t	-0.002**	0.005***	0.042***
	(-2.05)	(3.21)	(4.33)
EO_t	0.000	-0.001*	-0.020***
	(0.14)	(-1.82)	(-4.39)
$FIRM\_AGE_t$	-0.000	-0.000	-0.010***
	(-1.02)	(-1.00)	(-2.89)
Industry dummies	included	included	included
R^2	0.633	0.015	0.184
n	46863	46863	46863

Note. ***, **, * statistical significance at 1, 5, 10 % levels, respectively, and t statistics are in parentheses. All test statistics and significance levels are calculated based on the standard errors adjusted by a two-dimensional cluster at the firm and year levels.

Table 7.
Multiple Regression of Overproduction of Inventory on EDR

	RM_{PROD}
EDR_{t-1}	-0.271
	(-0.87)
$\boldsymbol{EDR_{t-1} * NOA_{t-1}}$	**0.205*****
	(6.39)
NOA_{t-1}	0.008**
	(2.36)
AM_t	0.073***
	(3.18)
$SIZE_{t-1}$	0.001
	(1.31)
MB_{t-1}	-0.009***
	(-12.41)
ROA_t	-0.388***
	(-24.50)
ADJ_ROA_{t-1}	-0.436
	(-0.99)
LEV_{t-1}	0.051***
	(3.92)
RD_INT_t	-0.726***
	(-15.06)
$AD\_IND\_INT_t$	-0.631**
	(-2.26)
$CASH_t$	-0.010
	(-0.80)
$INVEST\_CAPX_t$	-0.248***
	(-6.61)
OO_t	0.007
	(0.92)
EO_t	-0.025***
	(-5.20)
$FIRM\_AGE_t$	0.010***
	(3.12)
Industry dummies	included
R^2	0.165
n	46863

Note. ***, **, * statistical significance at 1, 5, 10 % levels, respectively, and t statistics are in parentheses.

국 문 초 록

기업의 이익하락위험이 이익조정에 미치는 영향

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본 연구에서는 이익하락위험에 처한 기업들의 이익조정 양상에 대해 살펴보며 회계정보의 유용성에 대한 이해를 높이는 것을 목적으로 한다. 기존의 이익 변동성과는 달리 기업의 미래 이익하락위험을 보여주는 Konchitchki et al.(2016)의 이익하락위험과 기업의 이익조정 활동의 관계를 살펴본다. 연구 결과에 따르면, 기존 연구에서 이익하락위험과 발생액의 질의 연관성을 보였듯이 이익하락위험이 높은 기업일수록 발생액 이익조정 활동을 더 많이 하는 것으로 보여졌다. 하지만 실제이익조정에 대해서는 다소 상반되는 관계가 보여졌다. 이익하락위험과 거시경제 또는 자본비용과의 관계에 대한 연구는 있었지만 기업의 이익조정 양상 예측과 연결시킨 연구는 아직 이루어지지 않았다. 따라서 본 논문은 이익하락위험과 이익조정 관련 연구에 추가적인 공헌점을 제공해 줄 것으로 기대된다.

주요어: 이익하락위험, 이익조정, 발생액이익조정, 실제이익조정활동, 회계정보 유용성
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