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Incorporating Piecewise-linear Variables into an Empirical Model of Non-current Asset Impairment Timeliness

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Abstract: While prior research employs linear stock returns as a proxy for economic losses, this study uses piecewise-linear stock returns to separate positive and negative stock returns. It also examines the relationships of non-current asset impairments with changes in sales and cash flows from operations, which can be viewed as short-term indicators of economic impairments. I find a negative relationship between non-current asset impairments and negative stock returns in year t–5, consistent with prior research. I also find such a relationship in year t, contrary to prior research. The results indicate that the relationships are stronger in years t–1 and t–2 than in years t and t–3. These results suggest that non-current asset impairment losses reported by Japanese firms are consistent with the Japanese accounting standard, although such losses are not necessarily reported in a timely manner. In addition, I find evidence suggesting that changes in sales and cash flows from operations in year t are short-term indicators of non-current asset impairments. Overall, incorporating piecewise-linear variables improves the empirical model of non-current asset impairment timeliness.

1. Introduction

The purpose of this study is to investigate whether incorporating piecewise-linear stock returns and short-term indicators improves the empirical model of non-current asset impairment timeliness. Prior research suggests that a non-current asset impairment is subject to management discretion and reflects management incentives such as "big bath," income smoothing and management turnovers in Japan (e.g., Enomoto 2008; Obinata and Okada 2008; Hu and Kurumado 2012; Fujiyama 2014a, 2014c; Kimura 2015). Consistently, using data on Japanese firms, Fujiyama (2014b) finds that non-current asset impairments are not correlated with linear returns in the years of their recognition, but that such relationships exist in the period from one year to four (or five) years before their recognition; this suggests that Japanese firms can record non-current asset impairments in a less timely manner than expected by the accounting standards.[1] Moreover, the timeliness of non-current asset impairment is

[1] Prior research investigates the timeliness of asset impairments using other models and provides mixed evidence regarding the timeliness of the impairment losses of assets, such as non-current asset and goodwill (Chen et al. 2008; Choi 2008; Li and Sloan 2017). The timeliness of goodwill impairment losses is affected by narrative disclosure quality (Iatridis et al. 2021), CEO overconfidence (Chung and Hribar 2021), and audit quality (Albersmann and Quick 2020). André et al. (2016) show that goodwill impairment practices differ in the U.S. and European countries from the

particularly controversial in Japan. In general, the degree of loss recognition timeliness, or conditional conservatism, is lower in Japan than in common law countries such as the U.S. and the U.K. (Ball et al. 2000). Non-current asset impairment losses are one of the major components of accounting conservatism (Beaver and Ryan 2005). Therefore, non-current asset impairment timeliness is of great concern to practitioners and researchers and it is important to improve the empirical models used in prior research, such as that in Fujiyama (2014), and construct a better model.

While Fujiyama (2014b) employs linear stock returns as a proxy for economic losses to investigate non-current asset impairment timeliness in Japan, Banker et al. (2017) recommend piecewise-linear stock returns and short-term indicators.[2] Non-current asset impairment losses reflect only economic losses or bad news, as the accounting standards prohibit the recording of upward valuation profits. Thus, separating positive (good news) from negative stock returns (bad news) is expected to better reflect the asymmetric timeliness nature of profit and loss accounting. Accordingly, prior research on accounting conservatism captures the asymmetric timeliness of gains and losses by using piecewise-linear stock returns (e.g. Basu, 1997). However, studies on asset impairments employ linear stock returns to capture economic losses (e.g., Riedl 2004; Lapointe-Antunes et al. 2009; Fujiyama 2014b; Albersmann and Quick 2020), which may result in estimation bias. An exception is Iatridis et al. (2021), who employ piecewise-linear stock returns only for year t but not for the years before impairment recognition. Moreover, Banker et al. (2017) suggest that different indicators, such as stock returns and changes in sales and cash flows from operations, predict cash flows over varying time horizons and have different impacts among asset classes. Stock returns capture changes in cash flows over a long-term period; changes in sales and operating cash flows capture such changes over a short-term period. Thus, changes in sales and operating cash flows are expected to indicate non-current

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viewpoint of timeliness. Glaum et al. (2018) find that country-level enforcement determines goodwill impairment timeliness.

[2] Note that some argue that a piece-wise linear regression of earnings on stock returns provides an estimation bias in the presence of the skewness of stock returns (Jarva and Lof 2021; Obinata 2021)

asset impairments that are incremental to stock returns. As tangible assets have a finite useful life and goodwill has an indefinite future life, goodwill impairments are more strongly correlated to stock returns than tangible asset impairments. Note that stock returns are the more important impairment indicator even for tangible assets than operating cash flows and sales changes (Banker et al. 2017). Consistently, Banker et al. (2017) show that the results of Riedl (2004) change when the empirical model incorporates piecewise-linear stock returns and piecewise-linear short-term indicators of asset impairments. Therefore, it is important to investigate whether a new empirical model alters Fujiyama's (2014b) results.

In this study, I re-examine the timeliness of non-current asset impairments based on Fujiyama (2014b) and by using piecewise-linear stock returns, as suggested by Banker et al. (2017). In addition, I examine the relationships of non-current asset impairments with changes in sales and cash flows from operations (CFO), which are suggested by Banker et al. (2017) and can be viewed as the short-term indicators of economic loss. Using data on Japanese firms during the period 2007–2019, I find a negative relationship between non-current asset impairments (positive values) in year t and negative stock returns in year t–5, consistent with Fujiyama (2014b). Second, non-current asset impairments are negatively correlated with negative stock returns in year t, which is inconsistent with Fujiyama (2014b), who does not observe any correlation between impairments and linear stock returns in year t. Third, the relationships between non-current asset impairments and negative stock returns are the strongest in years t–1 and t–2. These results suggest that consistent with the "probability criterion" of the impairment recognition that the Japanese standard employs contrary to the "economic criterion" employed by International Financial Reporting Standards, the relationship between impairments and negative stock returns is stronger in years t–1 and t–2 than in year t.[3] Meanwhile,

[3] For the recognition of non-current asset impairments, the Japanese standard and the U.S. GAAP employ "probability criterion," which requires a firm to recognize an impairment loss "only if it is considered probable that the carrying amount of an asset cannot be fully recovered" (IAS 36, APPENDIX B, B81); IFRS employs "economic criterion," which requires a firm to recognize an impairment loss "whenever the recoverable amount of an asset is below its

the negative relationships from years t–5 to t–3 indicate that Japanese firms do not necessarily recognize non-current asset impairments in a timely manner. Fourth, I find statistically significant correlations of non-current asset impairments with negative changes in sales and CFO, suggesting that the changes in sales and CFO are short-term indicators of economic losses. Finally, additional analyses reveal that the use of non-zero thresholds for non-current asset impairment trigger provides a minor improvement in the explanatory power of the empirical model of non-current asset impairment timeliness.

This study contributes to the literature in two ways. First, it improves the findings of Fujiyama (2014b). While the finding of a negative relationship between non-current asset impairments and stock returns in year t–5 is consistent between Fujiyama (2014b) and this study, this study presents a statistically significant relationship between impairments and negative stock returns in year t. Moreover, adj-R^2 is higher for the models employed in this study. My findings suggest that piecewise-linear stock returns better reflect the asymmetric timeliness of non-current asset impairments and that piecewise-linear changes in sales and CFO capture the existence of non-current asset impairments. In addition, my findings suggest using statistical tests that the largest economic losses occur one or two years prior to their accounting recognition.

Second, this study contributes to research on the determinants of non-current asset impairments. Prior research on the determinants of non-current asset impairments often employs the model developed by Riedl (2004) (e.g., Enomoto 2008; Hu and Kurumado 2012; Fujiyama 2014c). Although this study does not replicate Riedl's (2004) model with piecewise-linear indicators such as

carrying amount" (IAS 36, APPENDIX, B88). Further, see Gordon and Hsu (2018) for the difference in the recognition criteria for asset impairments. The Japanese standard requires a firm to test an impairment of an asset when the signs of a non-current asset impairment, including operating losses or operating cash flows in two consecutive years or more, are observed and compare the undiscounted future cash flows with the carrying amount of an asset. IAS 36 provides several examples of asset impairment indications, including a significant decline in an asset's market value, the ratio of the carrying amount of a firm's net asset over its market capitalization, and unfavorable internal reporting. It requires a firm to compare value in use, such as discounted future cash flows, with the carrying amount of an asset when some indicators are observed.

stock returns, sales, and CFO, as implemented by Banker et al. (2017), my findings indicate that non-current asset impairments have non-linear relationships with those indicators, suggesting that piecewise-linear variables better control for the economic determinants of non-current asset impairments. Moreover, the findings suggest that research on accounting conservatism and timeliness of earnings can better reflect differences in the time horizons of cash flows among accounting items by incorporating piecewise changes in sales and cash flows from operations.

2. Timeliness Models for Non-current Asset Impairments in Prior Research

Prior research investigates the timeliness of non-current asset impairment losses, especially goodwill impairments, using several empirical models. In this section, I review the empirical models used in prior research. The most frequently used model employs the amount or recognition of impairment losses as the explained variable and stock returns as an explanatory variable (Lapointe-Antunes et al. 2009; Glaum et al. 2018; Albersmann and Quick 2020; Iatridis et al. 2021). Lapointe-Antunes et al. (2009) estimate the following OLS regression:

$$GoodwillImpairment_{i,t} = \alpha_0 + \alpha_1 Ret_{i,t} + \alpha_2 Ret_{i,t-1} + \alpha_3 Ret_{i,t-2} + \varepsilon_{i,t} \quad (1),$$

where $GoodwillImpairment_{i,t}$ is the reported goodwill and $Ret_{i,t}$ is firm *i*'s annual stock return.[4] Glaum et al. (2018) employ a recognition dummy as the explained variable, include only linear stock returns in years t and t–1, and compare the magnitude of these two coefficients; Albersmann and Quick (2020) also employ a recognition dummy as the explained variable and examine its relationships with linear stock returns in years t, t–1, and t–2; Iatridis et al. (2021) investigate only the relationship between the reported goodwill impairments and stock returns in year t but incorporate piecewise-linear stock returns. In line with this stream of research, Fujiyama (2014b) incorporates linear stock returns from year t to t–6. Similarly, Chen et al. (2008) use earnings before extraordinary items but after impairment

[4] As the purpose of this section is to explain the overview of the empirical models used in prior research, I do not discuss the details of the definitions of the variables employed by prior research.

charges as the explained variable and incorporate an interaction term between linear stock returns and impairment recognition as an explanatory variable. Another timeliness model employs stock returns as the explained variable and impairment losses as an explanatory variable, controlling for the reported earnings (Choi 2008; Chen et al. 2008).

The following two studies identify the signs of economic goodwill impairment. André et al. (2016) define impairment indicators as [market value of equity – book value of equity] < book goodwill, market-to-book ratio less than one, or EBITDA less than zero. Further, they compare the recognition of goodwill impairments by the E.U. and U.S. firms when observing each indicator. Li and Sloan (2017) consider the following two indicators. One is the book-to-market ratio of more than one in year t–1. The other takes the value of one if [book goodwill/total assets] is more than 10% and the return on assets (ROA) is less than zero, the negative value of one if [book goodwill/total assets] is less than 5% and ROA is more than 5%, and zero otherwise in year t–1. The negative value of one indicates that firms are unlikely to experience economic impairments in book goodwill. Then, they regress the goodwill impairment dummy in year t on these two indicators in year t–1. They interpret goodwill impairments as less timely if these indicators in year t–1 predict goodwill impairments in year t.

Chung and Hribar (2021) employ the Cox proportional hazards model and investigate the relationship between non-impairment duration and CEO overconfidence.

Overall, prior research investigates the timeliness of non-current asset impairments, especially goodwill impairments, by (1) using stock returns as an explanatory variable, (2) using stock returns as the explained variable, (3) identifying impairment indicators, and (4) employing a hazard model. As my focus is on non-current assets and not only on goodwill, the use of (3) impairment indicators and (4) a hazard model has some limitations. Specifically, a frequently used indicator of goodwill impairment, that is the book-to-market ratio, is not suitable for non-current assets such as fixed assets (e.g., property, plant, and equipment). For example, if a firm without book goodwill experiences a more than one BTM ratio, there lies a possibility that its inventories are economically impaired; they are not subject to accounting for non-current asset impairments in Japan. A hazard model may not be suitable for non-current asset impairments. As the U.S. Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards require a non-amortization method for goodwill, book goodwill is expensed only as goodwill impairment. This allows a study to identify the timing of expensing book goodwill. However, a proportion of non-current assets are subject to periodical depreciation and amortization, which complicates the identification of the duration between the economic existence and recognition timing of non-current asset impairments. Moreover, as observed in (2), the use of stock returns as the explained variable makes it difficult to control for the economic losses that occur in other fiscal years. Therefore, the use of stock returns as an explanatory variable constructs a better model for investigating the timeliness of non-current asset impairments. This study aims to improve the model that uses stock returns as an explanatory variable by introducing piecewise stock returns considering the years before impairment recognition in a setting of non-current asset impairments.

3. Empirical Model

Following Lapointe-Antunes et al. (2009), Fujiyama (2014b) estimates the following OLS regression:

$$Imp_{i,t} = \mathrm{a}_0 + \mathrm{a}_1 R_{i,t} + \mathrm{a}_2 R_{i,t-1} + \mathrm{a}_3 R_{i,t-2} + \mathrm{a}_4 R_{i,t-3} + \mathrm{a}_5 R_{i,t-4} + \mathrm{a}_6 R_{i,t-5} + \mathrm{a}_7 R_{i,t-6} + \Sigma \mathrm{Year} + \varepsilon_{i,t} \quad (2),$$

where $Imp_{i,t}$ is the positive value of the reported non-current asset impairment losses in year t, deflated by market capitalization at the end of year t–1, and $R_{i,k}$ is firm i's buy-and-hold annual stock return; k denotes the observed year (i.e., year t, year t–1…year t–6). Fujiyama (2014b) assumes a linear relationship between non-current asset impairments and stock returns.

However, Banker et al. (2017) point to differing relationships of non-current asset impairments with positive and negative stock returns. Thus, they propose incorporating a dummy variable, $Dec_{i,k}$, that takes the value of one if firm *i*'s stock return is negative and zero otherwise, and its interaction with $R_{i,k}$. Accordingly, I estimate the following OLS regression model incorporating those variables:

$$\begin{aligned} Imp_{i,t} = {} & b_0 + b_1 R_{i,t} + b_2 R_{i,t-1} + b_3 R_{i,t-2} + b_4 R_{i,t-3} + b_5 R_{i,t-4} + b_6 R_{i,t-5} + b_7 R_{i,t-6} \\ & + b_8 R_{i,t}{*}Dec_{i,t} + b_9 R_{i,t-1}{*}Dec_{i,t-1} + b_{10} R_{i,t-2}{*}Dec_{i,t-2} + b_{11} R_{i,t-3}{*}Dec_{i,t-3} \\ & + b_{12} R_{i,t-4}{*}Dec_{i,t-4} + b_{13} R_{i,t-5}{*}Dec_{i,t-5} + b_{14} R_{i,t-6}{*}Dec_{i,t-6} + b_{15} Dec_{i,t} \\ & + b_{16} Dec_{i,t-1} + b_{17} Dec_{i,t-2} + b_{18} Dec_{i,t-3} + b_{19} Dec_{i,t-4} + b_{20} Dec_{i,t-5} \\ & + b_{21} Dec_{i,t-6} + \Sigma\text{Year} + \Sigma\text{Industry} + \varepsilon_{i,t} \qquad (3). \end{aligned}$$

Note that in this study, I compute $R_{i,k}$ by adjusting dividends and stock splits and $Imp_{i,t}$ by adjusting stock splits.[5] Equation (3) also controls for industry fixed effects in addition to year fixed effects.

In addition, following Ball and Shivakumar (2006) and Banker et al. (2017), I estimate the following OLS regression model, incorporating short-term indicators:

$$\begin{aligned} Imp_{i,t} = {} & c_0 + c_1 R_{i,t} + c_2 R_{i,t-1} + c_3 R_{i,t-2} + c_4 R_{i,t-3} + c_5 R_{i,t-4} + c_6 R_{i,t-5} + c_7 R_{i,t-6} \\ & + c_8 R_{i,t}{*}Dec_{i,t} + c_9 R_{i,t-1}{*}Dec_{i,t-1} + c_{10} R_{i,t-2}{*}Dec_{i,t-2} + c_{11} R_{i,t-3}{*}Dec_{i,t-3} \\ & + c_{12} R_{i,t-4}{*}Dec_{i,t-4} + c_{13} R_{i,t-5}{*}Dec_{i,t-5} + c_{14} R_{i,t-6}{*}Dec_{i,t-6} + c_{15} \Delta Sales_{i,t} \\ & + c_{16} \Delta Sales_{i,t}{*}DecSales_{i,t} + c_{17} DecSales_{i,t} + c_{18} \Delta CFO_{i,t} \\ & + c_{19} \Delta CFO_{i,t}{*}DecCFO_{i,t} + c_{20} DecCFO_{i,t} + c_{21} Dec_{i,t} + c_{22} Dec_{i,t-1} \\ & + c_{23} Dec_{i,t-2} + c_{24} Dec_{i,t-3} + c_{25} Dec_{i,t-4} + c_{26} Dec_{i,t-5} + c_{27} Dec_{i,t-6} \\ & + \Sigma\text{Year} + \Sigma\text{Industry} + \varepsilon_{i,t} \qquad (4), \end{aligned}$$

where $\Delta Sales_{i,t}$ is the adjusted per-share change in sales in year t and $\Delta CFO_{i,t}$ is the adjusted per-share change in CFO in year t. Both $\Delta Sales_{i,t}$ and $\Delta CFO_{i,t}$ are deflated by a dividend and share-split adjusted

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[5] I use the cumulative adjustment coefficients B and A from NEED FinancialQuest 2.0 for $R_{i,k}$ and $Imp_{i,t}$, respectively. Cumulative adjustment coefficients A and B adjust share splits, share consolidation, and so on, excluding and including dividends, respectively.

stock price. $DecSales_{i,t}$ and $DecCFO_{i,t}$ take the value of one if $\Delta Sales_{i,t}$ and $\Delta CFO_{i,t}$ are negative, respectively. I also estimate models incorporating $\Delta Sales_{i,k}$ and $\Delta CFO_{i,k}$ from year t to t–6 to confirm that they are short-term indicators of economic impairment.

As stock returns capture long-term changes in cash flows, they can be assumed to overlap a short-term change in future cash flows, which is captured by changes in operating cash flows and sales. Nevertheless, the incorporation of these short-term indicators is important and interesting in two respects. First, short-term indicators are likely to capture the management and auditor decision processes. Operating cash flow forecasts are a major basis for the impairment tests for non-current assets, and sales forecasts are a major input in operating cash flow forecasts. Referring to Chase (2013), Banker et al. (2017) argue that since a sales forecast is based on the projection of a recent sales trend, a current sales change is an important determinant of a cash flow forecast by accountants. Thus, the incorporation of short-term indicators partly controls for the impairment testing processes of managers and auditors, which are expected to affect the timeliness of non-current asset impairments. Second, research on non-current asset impairment determinants generally does not control for lagged stock returns. The use of piecewise short-term indicators can improve the empirical models of non-current asset impairment determinants to the extent that lagged stock returns can capture a part of the economic losses captured by short-term indicators.

4. Data

Financial and price data are obtained from NEEDS-FinancialQUEST 2.0. I obtain the data on firms, whose fiscal year ends in March, for the period 2007–2019. I exclude the firms whose accounting period is not 12 months, whose accounting standards are not Japanese GAAP, which belong to financial industries, and whose necessary data are not available.[6] As a result of this sample selection,

[6] This study does not exclude observations with multiple impairment losses recorded in year t and other years (from year t–1 to year t–6), assuming that impairment losses in years t–1 to t–6 are not correlated to those in year t.

the final sample size is 25,860 firm-year observations. Each continuous variable is winsorized at the upper and bottom 1st percentile values by year. $Imp_{i,t}$ is winsorized at the upper 1st percentile value by year.

5. Empirical Results

5.1. Descriptive statistics and correlation matrix

Table 1 reports the descriptive statistics. The mean value of $Imp_{i,t}$ is 0.0068 and its median value is 0.0000, indicating that most firms do not record impairment losses. The second row of Table 1 presents the descriptive statistics of $Imp_{i,t}$ for only the impairment firms. The mean and median values are 0.0147 and 0.0037, respectively, while its 75th percentile value is 0.0121. Thus, a small portion of impairment firms record large impairment losses.

Table 2 reports the correlation matrix. Stock returns are not highly correlated each year. $\Delta Slaes_t$ is not highly correlated with ΔCFO_t. However, ΔCFO_t is relatively highly correlated with ΔCFO_{t-1}, (coefficient = –0.3627; untabulated). ΔCFO_t is not highly correlated with ΔCFO_{t-2} (coefficient = –0.0231; untabulated).

5.2. Timeliness of non-current asset impairment losses

Table 3 presents the results of the timeliness test of non-current asset impairments. Panel A of Table 3 reports the regression results. Column (1) reports the result of Fujiyama (2014b). Column (2) presents the result of the replication of Fujiyama (2014b). These results are similar, suggesting that the sample used in this study is similar to that of Fujiyama (2014b).

Columns (3) to (5) present the results obtained after using dividend- and share-split-adjusted returns but not employing the piecewise regression method. These results are similar to those of Fujiyama (2014), except for the result of $R_{i,t}$ in Columns (3) and (4). In Column (5), the coefficient of $R_{i,t}$ is negative but not statistically significant (coefficient = –0.0022; t = –1.29). The difference between Columns (4) and (5) is the standard error adjustment. As Fujiyama (2014c) shows that non-current asset impairment losses are correlated with the changes in gross domestic product in Japan, macroeconomic conditions, such as years, are factors affecting firms' non-current asset impairments. Moreover, stock returns are also affected by macroeconomic conditions. Thus, it may be better to adjust standard errors by clustering by year instead of using White's (1980) method in addition to year fixed effects.

The results in Columns (6) and (7) are my main interest and are obtained by estimating the piecewise-linear regression models. $R_{i,k}$ * $Dec_{i,k}$ is statistically significant from year t–4 to year t, indicating the asymmetric relationships of non-current asset impairments with positive and negative stock returns. In addition, the use of the piecewise-linear regression model improves the explanatory power of the estimation model; that is, the adjusted R^2 in Column (5) is 3.42% and that in Columns (6) and (7) is 7.23% and 8.52%, improving 3.81% and 5.1% of the explanatory power, respectively. The coefficients of $R_{i,k}$ are negative and statistically significant for years t to t–6, suggesting that impairment firms experience a smaller increase in their stock prices even when their stock prices increase before their impairment recognition.

Panel B of Table 3 presents the coefficients of stock returns for observations with negative stock returns (i.e., $R_{i,k}$ + $R_{i,k}$ * $Dec_{i,k}$) and comparisons of these coefficients. The coefficients for observations with negative stock returns are statistically significant at least at the 5% level from year t–5 to year t in Columns (6) and (7) and at the 10% level in year t–6 in Column (6). This suggests that non-current asset impairments gradually occur since approximately five years before their recognition. Contrary to Fujiyama (2014b), I find a statistically significant association between non-current asset impairments and stock returns for observations with negative stock returns in year t (coefficient = –0.0179 and –0.0186; t = –4.49 and –4.67 in Columns 6 and 7, respectively). These results suggest that economic impairments occur gradually for several years before their recognition.

For comparisons of the coefficients for observations with negative stock returns, the difference between those for years t and t–1 is 0.0116 and statistically significant at the 1% level (t = 3.13 and 3.26 in Columns 6 and 7, respectively), indicating that the coefficients for year t–1 are smaller than those for year t. While the difference between those for years t–1 and t–2 is insignificant, the differences between those for years t–2 and t–3 are –0.0091 and –0.0092 and statistically significant at the 10% level in Columns (6) and (7), respectively. In addition, the difference between years t–1 and t–3 is statistically significant at the 1% level (untabulated). These results suggest that the economic impairments of non-current assets occur to a greater extent in years t–1 and t–2, consistent with the accounting standard that employs the "probability criterion" instead of the "economic criterion." An example of the signs of non-current asset impairments under Japanese GAAP is to record negative CFO or operating losses for a cash-generating unit for two consecutive years.

Overall, the use of piecewise-linear regression is likely to improve the tests of non-current asset impairment timeliness. In addition, the results suggest that the reported impairment losses are timelier than Fujiyama (2014b) finds; however, such losses are not necessarily recorded in a timely manner as they gradually occurred since five years before their recognition.

5.3. Test of the short-term indicators of non-current asset impairments

Table 4 reports the results incorporating changes in sales and CFO as the short-term indicators of non-current asset impairments. In Panel A, only results for the observations with negative stock returns and/or changes in sales and/or CFO are presented. Only changes in sales and CFO in year t are incorporated in Column (1) while those for years t to t–6 are incorporated in Columns (2) to (6). In Column (1), the coefficients of $\Delta Sales_t$ * $Dec\Delta Sales_t$ and ΔCFO_t * $Dec\Delta CFO_t$ are negative and statistically significant at the 1% level (coefficient = –0.0081 and –0.0218; t = –4.28 and –5.74 for $\Delta Sales_t$ * $Dec\Delta Sales_t$ and ΔCFO_t * $Dec\Delta CFO_t$, respectively). The negative coefficients of $\Delta Sales_t$ * $Dec\Delta Sales_t$ and ΔCFO_t * $Dec\Delta CFO_t$ are consistently presented in Columns (2) to (6). These coefficients for year t–1 are negative but insignificant in Columns (2) to (6). The coefficients of $\Delta Sales_k$

* $Dec\Delta Sales_k$ and ΔCFO_k * $Dec\Delta CFO_k$ before year t–1 are insignificant, while the coefficient of ΔCFO_{t-6} * $Dec\Delta CFO_{t-6}$ is negative and statistically significant at the 10% level in Column (5) but not in Columns (4) and (6). Thus, positive and negative changes in sales and CFO, which are expected to be short-term indicators of non-current asset impairments, have asymmetry relationships with reported non-current asset impairment losses only in year t.

Panel B of Table 4 presents the coefficients of stock returns and changes in sales and cash flows from operations for observations with negative returns or changes in sales or CFO. In Columns (1), (2), (3), and (6), the combined coefficients of $\Delta Sales_t$ and $\Delta Sales_t$ * $Dec\Delta Sales_t$ are consistently negative and statistically significant at the 1% level. In Columns (1), (4), (5), and (6), the combined coefficients of ΔCFO_t and ΔCFO_t * $Dec\Delta CFO_t$ are consistently negative and statistically significant at the 1% level. The combined coefficients of both $\Delta Sales_k$ and $\Delta Sales_k$ * $Dec\Delta Sales_k$ and ΔCFO_k and ΔCFO_k * $Dec\Delta CFO_k$ are insignificant for years t–6 to t–1. The combined coefficients of ΔCFO_{t-4} and ΔCFO_{t-4} * $Dec\Delta CFO_{t-4}$ are positive and statistically significant. However, the sign is opposite to the prediction and is not interpretable.

The results for the negative stock returns are consistent with those in Table 3. The difference in the combined coefficients of R_k and R_k * Dec_k between years t and t–1 is consistently and statistically significant at the 5% level, even when controlling for changes in sales and CFO. The difference between years t–2 and t–3 is statistically significant at the 10% level in Column (1) but not in Columns (3), (5), and (6). Note that the difference between years t–1 and t–3 is consistently statistically significant at the 1% level in all columns (untabulated). Assuming that changes in operating cash flows and sales partly control for the non-current asset impairment testing processes of managers and auditors because they are major inputs of impairment tests, the effectiveness of the timeliness model holds even after undertaking such management and auditor decision processes.

Interestingly, the combined coefficients of R_k and R_k * Dec_k in Column (1) in Panel B of

Table 4 are slightly different from those in Column (7) in Panel B of Table 3. Specifically, those in Tables 3 and 4 are –0.0186 and –0.0169 for year t, –0.0302 and –0.0241 for year t–1, –0.0219 and –0.0180 for year t–2, –0.0127 and –0.0100 for year t–3, –0.0077 and –0.0064 for year t–4, and –0.0054 and –0.0042 for year t–5, respectively. The difference is 0.0017 for year t, 0.0061 for year t–1, 0.0039 for year t–2, 0.0027 for year t–3, 0.0013 for year t–4, and 0.0012 for year t–5, respectively. The difference in the combined coefficients in Tables 3 and 4 is the largest in year t–1 and decreases afterwards. This result is consistent with the view that lagged stock returns capture long-term changes in cash flows, which are partly captured by short-term indicators. It is useful to recognize the trade-off between the control for impairment testing processes and overlap between short-term indicators and lagged stock returns when future research on non-current asset impairment timeliness employs the full model, that is, equation (3).

Overall, the results suggest that changes in sales and CFO the are short-term indicators of non-current asset impairments. To the extent that changes in sales and CFO are short-term indicators of non-current asset impairments, a model incorporating sales and CFO variables only for year t can better reflect short-term changes in firms' economic conditions.

6. Additional Analysis

As Banker et al. (2017) suggest that an impairment trigger is different from the value of zero for all the three indicators, that is stock return, sales change and operating cash flow change, I analyze the timeliness of non-current asset impairments by using different impairment trigger thresholds. Although Banker et al. (2017) employ a censored regression model, I employ an OLS regression model because the purpose of this study is to improve Fujiyama's (2014b) impairment timeliness model. Moreover, while they use grid search, I use certain thresholds of $Dec_{i,k}$, $DecSales_{i,t}$, and $DecCFO_{i,t}$: 0.1, 0.05, –0.05, –0.1, –0.15, –0.2, –0.25, and –0.3 because an optimal value will change as a sample changes.

Table 5 presents the results for the different thresholds for stock returns. R^2 is the highest for the threshold of –0.1, improving 0.12% of R^2 compared with the zero threshold (Panel A). Panel B reports the results of the coefficients of stock returns for observations with negative stock returns (i.e., $R_{i,k} + R_{i,k} * Dec_{i,k}$) and draws comparisons between the coefficients. For all the thresholds, the coefficients for observations below the thresholds are the largest in year t–1, which is consistent with the main result. Although there are some differences for Dec<–0.25 and Dec<–0.3, the results are qualitatively similar to those of Dec<0 in the case of other thresholds.

Panels A and B of Table 6 present the results of the different thresholds for changes in sales and CFO, respectively. In Panel A, the coefficients of sales changes for all the thresholds are similar to those of the main analysis except for those of $DecSales_{i,t}$ <–0.25 and –0.3. In Panel B, the coefficients of CFO changes for all the thresholds are similar to those of the main analysis. Moreover, R^2 for changes in sales and CFO are the highest for the thresholds of –0.1 and –0.05, respectively. However, minor improvements of the explanatory power are observed (0.05% and 0.01% for changes in sales and CFO, respectively).

Overall, although a non-zero threshold would improve the model of non-current asset impairment timeliness, the improvement appears to be minor for the both long- and short-term indicators. Therefore, if one sets a non-zero threshold, it is better for one to justify the threshold by comparing other thresholds.

7. Conclusions

This study re-examines the timeliness of non-current asset impairment losses, which Fujiyama (2014b) investigates using a piecewise-linear regression model proposed by Banker et al. (2017). Similar to Fujiyama (2014b), I find a negative relationship between non-current asset impairments (positive value) and negative stock returns in year t–5. However, contrary to Fujiyama (2014b), I find a negative relationship between non-current asset impairments and negative stock returns in year t. The negative relationship is stronger in years t–1 and t–2 than in years t and t–3. These results suggest that while the reported non-current asset impairments are not necessarily timely, the recognition of impairment losses is consistent with the "probability criterion" employed by the accounting standard for non-current asset impairment in Japan. In addition, I find a relationship between non-current asset impairments and changes in sales and cash flows from operations (CFO) in year t, suggesting that the changes in sales and CFO can be the short-term indicators of non-current asset impairments. Therefore, future research on non-current asset impairments and possibly accounting conservatism can better observe the timeliness of losses and control for the economic factors of losses by employing the piecewise-linear regression model recommended by Banker et al. (2017). Moreover, it can control for economic factors by piecewise-linear variables of changes in sales and CFO.

However, this study has at least two limitations. First, the model becomes complicated when a study focuses on two factors. As the model uses a piecewise interaction term, one needs to incorporate a four-variable interaction term when adding two factors. In this case, the model that uses stock returns as the explained variable may be the better one, introducing a three-variable interaction term, that is, an interaction term among an impairment variable, factor 1, and factor 2. Second, the piecewise interaction term may not be suitable for non-linear regression models, as questioned by Ai and Norton (2003) in the context of probit and logistic regression models. For example, Riedl (2004) and Glaum et al. (2018) employ the tobit and logistic regression models, respectively, while Ramanna and Watts (2012) employ the OLS regression model. Thus, one needs to pay attention to model specification when using a piecewise-linear stock return.

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Table 1: Descriptive statistics (n =25,860)

	Mean	SD	25P	Median	75P
Imp_t	0.0068	0.0228	0.0000	0.0000	0.0030
Imp_t (only $Imp_t > 0$)	0.0147	0.0319	0.0010	0.0037	0.0121
R_t	0.0679	0.3857	-0.1663	0.0218	0.2252
R_{t-1}	0.1076	0.4096	-0.1398	0.0533	0.2715
R_{t-2}	0.1093	0.4164	-0.1406	0.0524	0.2733
R_{t-3}	0.1491	0.4843	-0.1373	0.0640	0.3197
R_{t-4}	0.1455	0.4939	-0.1450	0.0614	0.3181
R_{t-5}	0.1197	0.5103	-0.1719	0.0338	0.2843
R_{t-6}	0.0974	0.5180	-0.1917	0.0112	0.2599
$\Delta Sales_t$	-0.0231	0.6088	-0.0762	0.0233	0.1230
$\Delta Sales_{t-1}$	-0.0285	1.0326	-0.0793	0.0251	0.1301
$\Delta Sales_{t-2}$	-0.0164	1.9183	-0.0837	0.0260	0.1357
$\Delta Sales_{t-3}$	-0.0067	2.1041	-0.0857	0.0296	0.1471
$\Delta Sales_{t-4}$	-0.0197	2.2240	-0.0941	0.0295	0.1521
$\Delta Sales_{t-5}$	0.0117	3.4337	-0.1153	0.0236	0.1476
$\Delta Sales_{t-6}$	0.0603	3.0436	-0.1187	0.0216	0.1444
ΔCFO_t	0.0068	0.1863	-0.0460	0.0022	0.0546
ΔCFO_{t-1}	0.0065	0.2118	-0.0485	0.0028	0.0575
ΔCFO_{t-2}	0.0058	0.2236	-0.0508	0.0029	0.0593
ΔCFO_{t-3}	0.0080	0.2453	-0.0541	0.0027	0.0625
ΔCFO_{t-4}	0.0098	0.2645	-0.0565	0.0035	0.0672
ΔCFO_{t-5}	0.0103	0.2747	-0.0593	0.0030	0.0689
ΔCFO_{t-6}	0.0119	0.2628	-0.0609	0.0020	0.0685

Note: Imp_t is non-current asset impairment losses per share in year t, deflated by the adjusted stock price at the end of fiscal year t–1. R_k is the adjusted stock return in year k. $\Delta Sales_k$ is a change in sales in year k, deflated by the adjusted stock price at the end of fiscal year k–1. ΔCFO_k is a change in cash flows from operations in year k, deflated by the adjusted stock price at the end of fiscal year k–1. The number of firm-year observations with impairment losses is 11,868 (Row 2).

Table 2: Pearson correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)Imp_t	1.0000								
(2)R_t	-0.0111	1.0000							
(3)R_{t-1}	**-0.1225**	**-0.0381**	1.0000						
(4)R_{t-2}	**-0.1011**	**-0.1182**	0.0022	1.0000					
(5)R_{t-3}	**-0.0500**	**-0.1120**	-0.0008	**0.0199**	1.0000				
(6)R_{t-4}	**-0.0236**	**-0.0757**	**-0.1540**	0.0011	**-0.0255**	1.0000			
(7)R_{t-5}	**0.0143**	**-0.0884**	**-0.0922**	**-0.1749**	**-0.0502**	-0.0029	1.0000		
(8)R_{t-6}	**0.0247**	**0.0675**	**-0.0993**	**-0.1100**	**-0.1945**	**-0.0269**	-0.0026	1.0000	
(9)$\Delta Sales_t$	**-0.1206**	**0.0581**	**0.1658**	**0.0963**	**0.0384**	**-0.0421**	**-0.0711**	**-0.1285**	1.0000
(10)ΔCFO_t	0.0019	**0.0976**	**-0.0564**	**-0.0196**	**0.0122**	**0.0124**	-0.0053	**0.0191**	**0.0527**

Note: Imp_t is non-current asset impairment losses per share in year t, deflated by the adjusted stock price at the end of fiscal year t–1. R_k is the adjusted stock return in year k. $\Delta Sales_k$ is a change in sales in year k, deflated by the adjusted stock price at the end of fiscal year k–1. ΔCFO_k is a change in cash flows from operations in year k, deflated by the adjusted stock price at the end of fiscal year k–1. Bold letters indicate statistical significance at the 5% level.

Table 3: Test of timeliness of non-current asset impairment losses

Panel A: OLS regression results

	(1) Fujiyama (2014b)		(2) Sample period and research design of Fujiyama (2014b)		(3) Sample period same as Fujiyama (2014b)		(4) Full sample period		(5) Full sample period		(6) Full sample period		(7) Full sample period	
Dep = Imp_t	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
Constant	0.0134***	12.74	0.0127***	13.76	0.0115***	16.56	0.0098***	19.66	0.0098 ***	6.07	0.0042***	5.28	0.0051***	3.95
R_t	0.0008	0.44	-0.0012	-0.89	-0.0033***	-2.93	-0.0022***	-3.52	-0.0022	-1.29	0.0006	1.29	0.0006	1.30
R_{t-1}	-0.0098***	-8.47	-0.0094***	-9.74	-0.0097***	-12.46	-0.0067***	-16.35	-0.0067 ***	-3.93	-0.0042***	-4.88	-0.0042***	-4.73
R_{t-2}	-0.0075***	-7.56	-0.0076***	-9.26	-0.0075***	-11.23	-0.0054***	-13.86	-0.0054 ***	-3.69	-0.0044***	-9.19	-0.0045***	-8.81
R_{t-3}	-0.0003***	-4.28	-0.0026***	-4.01	-0.0036***	-7.33	-0.0033***	-9.73	-0.0033 ***	-3.12	-0.0038***	-3.36	-0.0038***	-3.31
R_{t-4}	-0.0025***	-3.12	-0.0023***	-2.99	-0.0036***	-6.10	-0.0024***	-6.31	-0.0024 ***	-3.13	-0.0032***	-4.29	-0.0032***	-4.27
R_{t-5}	-0.0019**	-2.10	-0.0014*	-1.71	-0.0023*	-3.54	-0.0018***	-4.44	-0.0018 ***	-3.43	-0.0030***	-4.31	-0.0031***	-4.58
R_{t-6}	0.0005	0.52	0.0005	0.60	-0.0003	-0.51	-0.0005	-0.99	-0.0005	-0.98	-0.0013*	-1.87	-0.0014*	-1.97
R_t * Dec_t											-0.0185***	-4.87	-0.0191***	-5.07
R_{t-1} * Dec_{t-1}											-0.0253***	-6.78	-0.0260***	-6.66
R_{t-2} * Dec_{t-2}											-0.0168***	-3.51	-0.0174***	-3.80
R_{t-3} * Dec_{t-3}											-0.0084**	-3.00	-0.0089***	-3.61
R_{t-4} * Dec_{t-4}											-0.0044*	-1.90	-0.0045*	-1.92
R_{t-5} * Dec_{t-5}											-0.0024	-1.48	-0.0023	-1.37
R_{t-6} * Dec_{t-6}											-0.0016	-1.03	-0.0010	-0.56
Dec_t											-0.0002	-0.25	-0.0002	-0.30
Dec_{t-1}											-0.0011*	-1.79	-0.0012	-1.78
Dec_{t-2}											-0.0007	-1.64	-0.0008	-1.58
Dec_{t-3}											0.0001	0.24	0.0000	0.11
Dec_{t-4}											0.0002	0.59	0.0002	0.50
Dec_{t-5}											-0.0002	-0.42	-0.0002	-0.39
Dec_{t-6}											-0.0001	-0.24	-0.0001	-0.18
Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry	No		No		No		No		No		No		Yes	
SE adjustment	Robust		Robust		Robust		Robust		year-clustered		year-clustered		year-clustered	
# of observations	14,094		13,998		13,998		25,860		25,860		25,860		25,860	
R2	0.0195		0.0242		0.0365		0.0342		0.0342		0.0723		0.0852	

Panel B: Coefficients for observations with negative stock returns and their comparisons

	(6) Full sample period		(7) Full sample period	
	Coef./Diff.	t-value	Coef./Diff.	t-value
[1] $R_t + R_t * Dec_t$	-0.0179***	-4.49	-0.0186***	-4.67
[2] $R_{t-1} + R_{t-1} * Dec_{t-1}$	-0.0295***	-7.69	-0.0302***	-7.53
[3] $R_{t-2} + R_{t-2} * Dec_{t-2}$	-0.0213***	-4.36	-0.0219***	-4.64
[4] $R_{t-3} + R_{t-3} * Dec_{t-3}$	-0.0122***	-4.74	-0.0127***	-5.58
[5] $R_{t-4} + R_{t-4} * Dec_{t-4}$	-0.0076***	-3.49	-0.0077***	-3.47
[6] $R_{t-5} + R_{t-5} * Dec_{t-5}$	-0.0054**	-3.13	-0.0054**	-2.97
[7] $R_{t-6} + R_{t-6} * Dec_{t-6}$	-0.0028*	-2.16	-0.0024	-1.58
[1] - [2]	0.0116***	3.13	0.0116***	3.26
[2] - [3]	-0.0082	-1.66	-0.0083	-1.76
[3] - [4]	-0.0091*	-1.90	-0.0092*	-2.05
[4] - [5]	-0.0046	-1.16	-0.0050	-1.30
[5] - [6]	-0.0022	-0.87	-0.0023	-0.88
[6] - [7]	-0.0026	-1.13	-0.0030	-1.20

Note: Panel A presents the OLS regression results of the test of the timeliness of non-current asset impairments. Panel B reports the coefficients of stock returns for observations with negative stock returns and their comparisons between years k and k–1. Imp_t is non-current asset impairment losses per share in year t, deflated by the adjusted stock price at the end of fiscal year t–1. R_k is the adjusted stock return in year k. Dec_k takes the value of one if R_k is negative. Column (1) is the result of Fujiyama (2014b) using market capitalization to compute stock returns. Column (2) employs the same regression model as Fujiyama (2014b) and estimates it with my sample. Columns (3) to (6) use dividend- and share-split-adjusted stock prices to compute stock returns. In Columns (1) to (4), standard errors are adjusted based on White (1980) as in Fujiyama (2014b). In Columns (5) and (6), standard errors are clustered by year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Short-term indicators of non-current asset impairment losses

Panel A: OLS regression results

	(1) Changes in sales and CFO in year t		(2) Only changes in sales		(3) Stock returns and changes in sales		(4) Only changes in CFO		(5) Stock returns and changes in CFO		(6) Stock returns and changes in sales and CFO	
Dep = Imp_t	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
R_t * Dec_t	-0.0162***	-5.02			-0.0162***	-4.83			-0.0179***	-4.99	-0.0159***	-4.75
R_{t-1} * Dec_{t-1}	-0.0203***	-7.31			-0.0208***	-7.25			-0.0230***	-6.61	-0.0196***	-7.19
R_{t-2} * Dec_{t-2}	-0.0141***	-3.33			-0.0139***	-3.19			-0.0150***	-3.16	-0.0133**	-2.88
R_{t-3} * Dec_{t-3}	-0.0067***	-3.01			-0.0069***	-3.14			-0.0073***	-3.04	-0.0064**	-2.85
R_{t-4} * Dec_{t-4}	-0.0036*	-1.84			-0.0040*	-2.06			-0.0036	-1.66	-0.0037*	-1.84
R_{t-5} * Dec_{t-5}	-0.0014	-1.00			-0.0015	-1.03			-0.0017	-1.09	-0.0015	-0.99
R_{t-6} * Dec_{t-6}	-0.0001	-0.03			0.0006	0.34			-0.0007	-0.45	0.0003	0.17
$\Delta sales_t$ * $Dec\Delta Sales_t$	-0.0081***	-4.28	-0.0153***	-8.02	-0.0116***	-8.57					-0.0094***	-7.28
$\Delta sales_{t-1}$ * $Dec\Delta Sales_{t-1}$			0.0019	1.21	0.0016	1.29					0.0016	1.15
$\Delta sales_{t-2}$ * $Dec\Delta Sales_{t-2}$			0.0007	0.68	0.0004	0.44					0.0004	0.35
$\Delta sales_{t-3}$ * $Dec\Delta Sales_{t-3}$			0.0004	0.62	0.0002	0.30					0.0003	0.37
$\Delta sales_{t-4}$ * $Dec\Delta Sales_{t-4}$			0.0002	0.41	-0.0002	-0.47					-0.0003	-0.77
$\Delta sales_{t-5}$ * $Dec\Delta Sales_{t-5}$			-0.0004	-0.98	-0.0005	-1.18					-0.0003	-0.79
$\Delta sales_{t-6}$ * $Dec\Delta Sales_{t-6}$			0.0004	0.79	0.0003	0.49					0.0006	0.92
ΔCFO_t * $Dec\Delta CFO_t$	-0.0218***	-5.74					-0.0447***	-9.04	-0.0274***	-7.37	-0.0202***	-5.56
ΔCFO_{t-1} * $Dec\Delta CFO_{t-1}$							-0.0070	-1.80	-0.0030	-0.82	0.0001	0.02
ΔCFO_{t-2} * $Dec\Delta CFO_{t-2}$							-0.0006	-0.24	-0.0005	-0.23	-0.0007	-0.24
ΔCFO_{t-3} * $Dec\Delta CFO_{t-3}$							0.0003	0.20	-0.0006	-0.33	-0.0002	-0.11
ΔCFO_{t-4} * $Dec\Delta CFO_{t-4}$							0.0032**	2.79	0.0022*	2.11	0.0035***	3.09
ΔCFO_{t-5} * $Dec\Delta CFO_{t-5}$							0.0000	0.02	-0.0020	-1.27	-0.0018	-1.00
ΔCFO_{t-6} * $Dec\Delta CFO_{t-6}$							-0.0013	-0.70	-0.0039*	-2.01	-0.0027	-0.90
Year	Yes		Yes		Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes		Yes		Yes	
Other variables	Yes		Yes		Yes		Yes		Yes		Yes	
SE adjustment	year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered	
# of observations	25,860		25,860		25,860		25,860		25,860		25,860	
$adjR^2$	0.0997		0.0674		0.0979		0.0538		0.0947		0.1020	

Panel B: Coefficients for observations with negative stock returns and their comparisons

	(1) Changes in sales and CFO in year t		(2) Only changes in sales		(3) Stock returns and changes in sales		(4) Only changes in CFO		(5) Stock returns and changes in CFO		(6) Stock returns and changes in sales and CFO	
	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
$\Delta sales_t + \Delta sales_t * Dec\Delta Sales_t$	-0.0033**	-2.44	-0.0072***	-4.87	-0.0049***	-4.72					-0.0042***	-4.30
$\Delta sales_{t-1} + \Delta sales_{t-1} * Dec\Delta Sales_{t-1}$			-0.0015	-1.50	-0.0005	-0.54					-0.0002	-0.23
$\Delta sales_{t-2} + \Delta sales_{t-2} * Dec\Delta Sales_{t-2}$			-0.0004	-0.63	0.0001	0.21					0.0002	0.25
$\Delta sales_{t-3} + \Delta sales_{t-3} * Dec\Delta Sales_{t-3}$			0.0000	-0.08	0.0004	0.98					0.0004	1.05
$\Delta sales_{t-4} + \Delta sales_{t-4} * Dec\Delta Sales_{t-4}$			0.0001	0.31	0.0002	0.89					0.0001	0.62
$\Delta sales_{t-5} + \Delta sales_{t-5} * Dec\Delta Sales_{t-5}$			-0.0004	-1.11	-0.0004	-1.05					-0.0003	-0.68
$\Delta sales_{t-6} + \Delta sales_{t-6} * Dec\Delta Sales_{t-6}$			0.0001	0.37	0.0001	0.18					0.0004	0.85
$\Delta CFO_t + \Delta CFO_t * Dec\Delta CFO_t$	-0.0121***	-5.31					-0.0246***	-7.23	-0.0163***	-5.63	-0.0121***	-4.54
$\Delta CFO_{t-1} + \Delta CFO_{t-1} * Dec\Delta CFO_{t-1}$							-0.0048*	-1.93	-0.0027	-1.27	-0.0014	-0.97
$\Delta CFO_{t-2} + \Delta CFO_{t-2} * Dec\Delta CFO_{t-2}$							-0.0014	-0.73	-0.0007	-0.37	-0.0009	-0.38
$\Delta CFO_{t-3} + \Delta CFO_{t-3} * Dec\Delta CFO_{t-3}$							-0.0009	-0.72	-0.0006	-0.50	-0.0005	-0.35
$\Delta CFO_{t-4} + \Delta CFO_{t-4} * Dec\Delta CFO_{t-4}$							0.0012*	2.03	0.0016**	2.27	0.0022**	2.56
$\Delta CFO_{t-5} + \Delta CFO_{t-5} * Dec\Delta CFO_{t-5}$							-0.0001	-0.09	-0.0002	-0.16	-0.0002	-0.14
$\Delta CFO_{t-6} + \Delta CFO_{t-6} * Dec\Delta CFO_{t-6}$							-0.0016	-1.23	-0.0024*	-1.79	-0.0017	-0.87
[1] $R_t + R_t * Dec_t$	-0.0169***	-4.91			-0.0165***	-4.65			-0.0180***	-4.71	-0.0164***	-4.60
[2] $R_{t-1} + R_{t-1} * Dec_{t-1}$	-0.0241***	-8.58			-0.0244***	-8.19			-0.0268***	-7.62	-0.0228***	-8.18
[3] $R_{t-2} + R_{t-2} * Dec_{t-2}$	-0.0180***	-4.18			-0.0177***	-3.98			-0.0191***	-3.91	-0.0169***	-3.56
[4] $R_{t-3} + R_{t-3} * Dec_{t-3}$	-0.0100***	-4.95			-0.0102***	-4.93			-0.0108***	-4.83	-0.0096***	-4.50
[5] $R_{t-4} + R_{t-4} * Dec_{t-4}$	-0.0064***	-3.37			-0.0068***	-3.66			-0.0066***	-3.16	-0.0064***	-3.26
[6] $R_{t-5} + R_{t-5} * Dec_{t-5}$	-0.0042**	-2.88			-0.0042**	-2.73			-0.0048**	-2.78	-0.0043**	-2.58
[7] $R_{t-6} + R_{t-6} * Dec_{t-6}$	-0.0016	-1.15			-0.0008	-0.60			-0.0022	-1.62	-0.0012	-0.87
[1] - [2]	0.0072**	2.84			0.0079***	3.09			0.0088**	2.82	0.0064**	2.57
[2] - [3]	-0.0061	-1.42			-0.0067	-1.57			-0.0077	-1.51	-0.0059	-1.25
[3] - [4]	-0.0080*	-1.86			-0.0075	-1.69			-0.0083	-1.75	-0.0073	-1.54
[4] - [5]	-0.0036	-1.10			-0.0034	-1.02			-0.0042	-1.12	-0.0032	-0.91
[5] - [6]	-0.0023	-0.98			-0.0026	-1.14			-0.0019	-0.75	-0.0021	-0.89
[6] - [7]	-0.0026	-1.21			-0.0034	-1.61			-0.0025	-1.13	-0.0031	-1.45

Note: Panel A presents the OLS regression results of the test of the timeliness of non-current asset impairments incorporating changes in sales and cash flows from operations. Panel B reports the coefficients of stock returns and changes in sales and CFO for observations with negative stock returns or changes in sales or CFO and their comparisons between years k and k–1. Imp_t is non-current asset impairment losses per share in year t, deflated by the adjusted stock price at the end of fiscal year t–1. R_k is the adjusted stock return in year k. Dec_k takes the value of one if R_k is negative. $\Delta Sales_k$ is a change in sales in year k, deflated by the adjusted stock price at the end of fiscal year k–1. $Dec\Delta Sales_k$ takes the value of one if $\Delta Sales_k$ is negative. ΔCFO_k is a change in cash flows from operations in year k, deflated by the adjusted stock price at the end of fiscal year k–1. $Dec\Delta CFO_k$ takes the value of one if ΔCFO_k is negative. Standard errors are clustered by year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Impairment trigger thresholds for stock returns

Panel A: Regression results

	Dec < 0.1		Dec < 0.05		Dec < 0		Dec < -0.05		Dec < -0.1		Dec < -0.15		Dec < -0.2		Dec < -0.25		Dec < -0.3	
Dep = Imp_t	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
Constant	0.0034**	2.74	0.0041***	3.06	0.0051***	3.95	0.0057***	4.88	0.0061***	5.29	0.0068***	5.80	0.0071***	5.97	0.0073***	6.19	0.0076***	6.09
R_t	0.0014**	2.90	0.0010*	2.06	0.0006	1.30	0.0001	0.30	-0.0003	-0.69	-0.0005	-1.16	-0.0008*	-1.87	-0.0012**	-2.53	-0.0014**	-2.93
R_{t-1}	-0.0036***	-4.01	-0.0039***	-4.30	-0.0042***	-4.73	-0.0045***	-5.03	-0.0046***	-5.46	-0.0049***	-5.79	-0.0049***	-6.11	-0.0053***	-6.21	-0.0053***	-6.83
R_{t-2}	-0.0041***	-6.89	-0.0044***	-7.64	-0.0045***	-8.81	-0.0045***	-9.13	-0.0045***	-8.92	-0.0047***	-8.18	-0.0047***	-8.47	-0.0046***	-8.34	-0.0050***	-7.37
R_{t-3}	-0.0038***	-3.35	-0.0039***	-3.34	-0.0038***	-3.31	-0.0038***	-3.35	-0.0038***	-3.52	-0.0040***	-3.48	-0.0040***	-3.51	-0.0040***	-3.53	-0.0039***	-3.6
R_{t-4}	-0.0030***	-4.06	-0.0032***	-4.09	-0.0032***	-4.27	-0.0033***	-4.37	-0.0034***	-4.70	-0.0034***	-4.75	-0.0034***	-4.68	-0.0034***	-4.78	-0.0033***	-4.74
R_{t-5}	-0.0029***	-5.27	-0.0028***	-4.48	-0.0031***	-4.58	-0.0032***	-4.87	-0.0031***	-4.33	-0.0032***	-4.67	-0.0032***	-4.49	-0.0032***	-4.2	-0.0031***	-4.42
R_{t-6}	-0.0013*	-1.85	-0.0013	-1.71	-0.0014*	-1.97	-0.0014*	-1.97	-0.0014*	-1.79	-0.0014*	-1.81	-0.0014	-1.77	-0.0014*	-1.8	-0.0015**	-2.21
R_t * Dec_t	-0.0175***	-5.47	-0.0182***	-5.28	-0.0191***	-5.07	-0.0202***	-4.84	-0.0218***	-4.82	-0.0226***	-4.58	-0.0236***	-4.44	-0.0236***	-4.29	-0.0228***	-4.37
R_{t-1} * Dec_{t-1}	-0.0219***	-5.79	-0.0236***	-6.01	-0.0260***	-6.66	-0.0289***	-7.38	-0.0320***	-7.79	-0.0358***	-8.68	-0.0382***	-7.39	-0.0472***	-9.5	-0.0503***	-12.87
R_{t-2} * Dec_{t-2}	-0.0146***	-3.98	-0.0160***	-3.90	-0.0174***	-3.80	-0.0184***	-3.61	-0.0191***	-3.36	-0.0209***	-3.06	-0.0196**	-2.82	-0.0161**	-2.3	-0.0174**	-2.36
R_{t-3} * Dec_{t-3}	-0.0084***	-3.42	-0.0089***	-3.58	-0.0089***	-3.61	-0.0092***	-3.73	-0.0089***	-3.19	-0.0102***	-3.43	-0.0098***	-5.09	-0.0083***	-5.01	-0.0058	-1.59
R_{t-4} * Dec_{t-4}	-0.0041*	-1.85	-0.0048**	-2.21	-0.0045*	-1.92	-0.0045	-1.78	-0.0046	-1.69	-0.0054*	-1.85	-0.0031	-0.89	-0.0030	-0.81	-0.0009	-0.18
R_{t-5} * Dec_{t-5}	-0.0023*	-1.86	-0.0016	-1.04	-0.0023	-1.37	-0.0029	-1.51	-0.0025	-1.06	-0.0041*	-1.80	-0.0049	-1.64	-0.0043	-1.07	-0.0035	-0.75
R_{t-6} * Dec_{t-6}	-0.0011	-0.68	-0.0007	-0.40	-0.0010	-0.56	-0.0010	-0.51	-0.0003	-0.11	-0.0006	-0.24	0.0005	0.17	0.0010	0.28	-0.0027	-0.80
Dec_t	0.0012**	2.81	0.0006	1.16	-0.0002	-0.30	-0.0011	-1.12	-0.0022*	-2.07	-0.0027*	-1.92	-0.0036**	-2.30	-0.0041**	-2.45	-0.0041**	-2.42
Dec_{t-1}	0.0008**	2.28	0.0000	0.06	-0.0012	-1.78	-0.0027**	-2.88	-0.0042***	-3.36	-0.0061***	-4.30	-0.0073***	-3.28	-0.0124***	-6.49	-0.0141***	-8.45
Dec_{t-2}	0.0006	1.61	-0.0002	-0.52	-0.0008	-1.58	-0.0012	-1.68	-0.0016	-1.53	-0.0028	-1.49	-0.0023	-1	-0.0006	-0.21	-0.0020	-0.7
Dec_{t-3}	0.0001	0.30	-0.0001	-0.20	0.0000	0.11	-0.0001	-0.23	-0.0001	-0.10	-0.0009	-1.31	-0.0008	-0.9	-0.0001	-0.1	0.0011	0.48
Dec_{t-4}	0.0005*	2.05	0.0000	0.01	0.0002	0.50	0.0002	0.37	0.0001	0.12	-0.0004	-0.47	0.0008	0.81	0.0010	0.76	0.0021	0.95
Dec_{t-5}	0.0000	0.01	0.0005	1.07	-0.0002	-0.39	-0.0005	-0.98	-0.0001	-0.11	-0.0009	-1.41	-0.0013	-1.11	-0.0008	-0.49	-0.0001	-0.07
Dec_{t-6}	0.0000	-0.12	0.0003	0.94	-0.0001	-0.18	-0.0001	-0.15	0.0004	0.74	0.0003	0.37	0.0009	0.82	0.0012	0.89	-0.0010	-0.8
Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
SE adjustment	year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered	
# of observations	25,860		25,860		25,860		25,860		25,860		25,860		25,860		25,860		25,860	
R2	0.0834		0.0845		0.0852		0.0860		0.0865		0.0863		0.0864		0.086		0.0844	

Panel B: Coefficients for bad news observations

	Dec < 0.1		Dec < 0.05		Dec < 0		Dec < -0.05		Dec < -0.10		Dec < -0.15		Dec < -0.2		Dec < -0.25		Dec < -0.3	
	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
[1] $R_t + R_t * Dec_t$	-0.016082***	-4.85	-0.01717***	-4.71	-0.0186***	-4.67	-0.0201***	-4.56	-0.0221***	-4.65	-0.0231***	-4.51	-0.0244***	-4.45	-0.0247***	-4.38	-0.0242***	-4.52
[2] $R_{t-1} + R_{t-1} * Dec_{t-1}$	-0.025421***	-6.58	-0.027415***	-6.81	-0.0302***	-7.53	-0.0334***	-8.17	-0.0367***	-8.47	-0.0407***	-9.31	-0.0431***	-8.03	-0.0525***	-10.04	-0.0556***	-13.62
[3] $R_{t-2} + R_{t-2} * Dec_{t-2}$	-0.018717***	-4.72	-0.020406***	-4.71	-0.0219***	-4.64	-0.0229***	-4.44	-0.0237***	-4.14	-0.0256***	-3.71	-0.0243***	-3.5	-0.0207**	-2.99	-0.0223***	-3.07
[4] $R_{t-3} + R_{t-3} * Dec_{t-3}$	-0.012218***	-5.48	-0.012761***	-5.70	-0.0127***	-5.58	-0.0130***	-5.62	-0.0127***	-4.97	-0.0141***	-5.05	-0.0138***	-7.89	-0.0123***	-7.39	-0.0097**	-2.75
[5] $R_{t-4} + R_{t-4} * Dec_{t-4}$	-0.00715***	-3.35	-0.008024***	-3.88	-0.0077***	-3.47	-0.0078***	-3.16	-0.0080**	-3.03	-0.0088**	-3.09	-0.0065*	-1.89	-0.0063	-1.76	-0.0043	-0.83
[6] $R_{t-5} + R_{t-5} * Dec_{t-5}$	-0.005252***	-4.04	-0.004466**	-2.83	-0.0054**	-2.97	-0.0061**	-2.98	-0.0056**	-2.29	-0.0073**	-3.14	-0.0081**	-2.75	-0.0074*	-1.86	-0.0066	-1.39
[7] $R_{t-6} + R_{t-6} * Dec_{t-6}$	-0.002396	-1.74	-0.001968	-1.29	-0.0024	-1.58	-0.0024	-1.30	-0.0016	-0.71	-0.0020	-0.81	-0.0008	-0.26	-0.0004	-0.10	-0.0043	-1.23
[1] - [2]	0.009339**	2.97	0.010245**	2.91	0.0116***	3.26	0.0134***	3.52	0.0145***	3.88	0.0175***	4.50	0.0187***	4.85	0.0278***	6.70	0.0314***	5.97
[2] - [3]	-0.006703*	-1.99	-0.007009	-1.73	-0.0083	-1.76	-0.0105*	-2.07	-0.0130*	-2.34	-0.0151*	-2.16	-0.0188**	-2.37	-0.0318***	-3.97	-0.0333***	-4.77
[3] - [4]	-0.006499	-1.64	-0.007645*	-1.83	-0.0092*	-2.05	-0.0099*	-2.13	-0.0109*	-2.00	-0.0115	-1.77	-0.0106	-1.47	-0.0084	-1.04	-0.0126	-1.36
[4] - [5]	-0.005069	-1.38	-0.004737	-1.31	-0.005	-1.30	-0.0052	-1.30	-0.0047	-1.13	-0.0053	-1.29	-0.0073*	-1.94	-0.0060*	-1.80	-0.0055	-1.28
[5] - [6]	-0.001898	-0.92	-0.003558	-1.53	-0.0023	-0.88	-0.0017	-0.52	-0.0024	-0.62	-0.0015	-0.36	0.0016	0.32	0.0011	0.17	0.0024	0.27
[6] - [7]	-0.002856	-1.49	-0.002498	-1.09	-0.003	-1.20	-0.0037	-1.29	-0.0040	-1.08	-0.0053	-1.45	-0.0073	-1.49	-0.0071	-1.29	-0.0024	-0.45

Note: Imp_t is non-current asset impairment losses per share in year t, deflated by the adjusted stock price at the end of fiscal year t–1. R_k is the adjusted stock return in year k. Dec_k takes the value of one if R_k is below a threshold. $\Delta Sales_k$ is a change in sales in year k, deflated by the adjusted stock price at the end of fiscal year k–1. $Dec\Delta Sales_k$ takes the value of one if $\Delta Sales_k$ is negative. ΔCFO_k is a change in cash flows from operations in year k, deflated by the adjusted stock price at the end of fiscal year k–1. $Dec\Delta CFO_k$ takes the value of one if ΔCFO_k is negative. Standard errors are clustered by year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6: Impairment trigger thresholds for changes in sales and operating cash flows
Panel A: Results for sales changes

	DecΔSalest < 0.1		DecΔSalest < 0.05		DecΔSalest < 0		DecΔSalest < -0.05		DecΔSalest < -0.1		DecΔSalest < -0.15		DecΔSalest < -0.2		DecΔSalest < -0.25		DecΔSalest < -0.3	
Dep = Imp_t	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
R_t	-0.0007	-1.17	-0.0006	-1.44	-0.0006	-1.50	-0.0007	-1.53	-0.0007	-1.58	-0.0007	-1.58	-0.0007	-1.57	-0.0007	-1.56	-0.0006	-1.54
R_t * Dec_t	-0.0167	-10.96	-0.0166^{***}	-5.14	-0.0162^{***}	-5.02	-0.0161^{***}	-5.14	-0.0161^{***}	-5.35	-0.0162^{***}	-5.39	-0.0163^{***}	-5.50	-0.0166^{***}	-5.43	-0.0166	-5.44
Dec_t	-0.0003	-0.69	-0.0003	-0.52	-0.0003	-0.52	-0.0003	-0.49	-0.0003	-0.47	-0.0003	-0.44	-0.0002	-0.42	-0.0002	-0.41	-0.0002	-0.39
$\Delta Sales_t$	0.0049^{**}	7.42	0.0049^{***}	3.94	0.0048^{***}	4.18	0.0048^{***}	4.54	0.0046^{***}	4.36	0.0042^{***}	4.05	0.0039^{***}	4.16	0.0033^{***}	4.12	0.0031^{***}	3.64
$\Delta Sales_t$ * $Dec\Delta Sales_t$	-0.0084^{**}	-11.14	-0.0084^{***}	-4.40	-0.0081^{***}	-4.28	-0.0078^{***}	-4.18	-0.0073^{***}	-3.95	-0.0068^{***}	-3.74	-0.0063^{***}	-3.59	-0.0057^{***}	-3.54	-0.0054^{**}	-3.31
$Dec\Delta Sales_t$	0.0011^{***}	2.8	0.0013^{**}	2.98	0.0016^{***}	3.96	0.0023^{***}	4.21	0.0027^{***}	4.40	0.0028^{***}	4.26	0.0031^{***}	3.81	0.0026^{*}	2.07	0.0029^{***}	2.17
ΔCFO_t	0.0098^{***}	7.37	0.0098^{***}	5.18	0.0097^{***}	5.24	0.0095^{***}	5.39	0.0095^{***}	5.44	0.0096^{***}	5.57	0.0097^{***}	5.63	0.0101^{***}	5.86	0.0101^{***}	5.97
ΔCFO_t * $Dec\Delta CFO_t$	-0.0221^{***}	-10.4	-0.0221^{***}	-5.63	-0.0218^{***}	-5.74	-0.0213^{***}	-5.92	-0.0213^{***}	-6.05	-0.0215^{***}	-6.19	-0.0216^{***}	-6.34	-0.0225^{***}	-6.63	-0.0226^{***}	-6.82
$Dec\Delta CFO_t$	0.0001	0.44	0.0001^{***}	0.54	0.0001	0.44	0.0001	0.56	0.0001	0.63	0.0002	0.77	0.0002	0.85	0.0002	0.85	0.0002^{**}	0.81
Other variables	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
SE adjustment	year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered	
# of observations	25,860		25,860		25,860		25,860		25,860		25,860		25,860		25,860		25,860	
R2	0.0993		0.0994		0.0997		0.1002		0.1003		0.1000		0.0999		0.0989		0.0989	
$R_t + R_t$ * Dec_t	-0.0173^{***}	-5.10	-0.0172^{***}	-5.03	-0.0169^{***}	-4.91	-0.0167^{***}	-5.02	-0.0168^{***}	-5.22	-0.0169^{***}	-5.28	-0.0170^{***}	-5.37	-0.0172^{***}	-5.30	-0.0173^{***}	-5.32
$\Delta Sales_t + \Delta Sales_t$ * $Dec\Delta Sales_t$	-0.0035^{**}	-2.66	-0.0034^{**}	-2.57	-0.0033^{**}	-2.44	-0.0030^{**}	-2.24	-0.0028^{*}	-2.09	-0.0027^{*}	-2.00	-0.0024^{*}	-1.85	-0.0024	-1.76	-0.0023	-1.63
$\Delta CFO_t + \Delta CFO_t$ * $Dec\Delta CFO_t$	-0.0123^{***}	-5.23	-0.0123^{***}	-5.23	-0.0121^{***}	-5.31	-0.0118^{***}	-5.38	-0.0117^{***}	-5.49	-0.0118^{***}	-5.58	-0.0119^{***}	-5.75	-0.0124^{***}	-6.02	-0.0125^{***}	-6.20

Panel B: Results for CFO changes

	DecΔCFOt < 0.1		DecΔCFOt < 0.05		DecΔCFOt < 0		DecΔCFOt < -0.05		DecΔCFOt < -0.1		DecΔCFOt < -0.15		DecΔCFOt < -0.2		DecΔCFOt < -0.25		DecΔCFOt < -0.3	
Dep = Imp_t	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	t-value
R_t	-0.0006	-1.33	-0.0006	-1.47	-0.0006	-1.50	-0.0006	-1.49	-0.0006	-1.45	-0.0006	-1.42	-0.0006	-1.38	-0.0005	-0.97	-0.0005	-1.20
R_t * Dec_t	-0.0163	-5	-0.0162	-5.01	-0.0162***	-5.02	-0.0162***	-5.08	-0.0164***	-5.02	-0.0165***	-5.01	-0.0165***	-5.01	-0.0166***	-10.86	-0.0166	-5.01
Dec_t	-0.0003	-0.53	-0.0003	-0.55	-0.0003	-0.52	-0.0003	-0.50	-0.0003	-0.45	-0.0003	-0.45	-0.0003	-0.45	-0.0003	-0.60	-0.0002	-0.41
$\Delta Sales_t$	0.0050***	4.44	0.0049***	4.19	0.0048***	4.18	0.0048***	4.17	0.0050***	4.38	0.0052***	4.59	0.0053***	4.73	0.0055***	9.49	0.0056***	5.00
$\Delta Sales_t$ * $Dec\Delta Sales_t$	-0.0084***	-4.47	-0.0082***	-4.31	-0.0081***	-4.28	-0.0082***	-4.31	-0.0084***	-4.45	-0.0086***	-4.56	-0.0088***	-4.64	-0.0090***	-13.10	-0.0091***	-4.76
$Dec\Delta Sales_t$	0.0016***	3.99	0.0016***	3.98	0.0016***	3.96	0.0016***	3.90	0.0017***	4.04	0.0018***	4.17	0.0018***	4.22	0.0019***	5.53	0.0019***	4.23
ΔCFO_t	0.0099 ***	4.92	0.0091***	5.08	0.0097***	5.24	0.0093***	5.39	0.0075***	6.70	0.0061***	6.54	0.0054***	6.19	0.0043***	4.30	0.0040***	3.98
ΔCFO_t * $Dec\Delta CFO_t$	-0.0199***	-5.38	-0.0208***	-5.50	-0.0218***	-5.74	-0.0202***	-6.17	-0.0190***	-5.58	-0.0182***	-5.09	-0.0168***	-4.48	-0.0171***	-5.58	-0.0152***	-3.16
$Dec\Delta CFO_t$	0.0008	1.34	0.0000	0.07	0.0001	0.44	0.0005	1.02	-0.0003	-0.51	-0.0010	-1.12	-0.0007	-0.56	-0.0020	-1.43	-0.0010	-0.38
Other variables	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
SE adjustment	year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered		year-clustered	
# of observations	25,860		25,860		25,860		25,860		25,860		25,860		25,860		25,860		25,860	
R2	0.0993		0.0996		0.0997		0.0998		0.0992		0.0988		0.0986		0.0981		0.0981	
R_t + R_t * Dec_t	-0.0168***	-4.87	-0.0169***	-4.89	-0.0169***	-4.91	-0.0169***	-4.98	-0.0170***	-4.91	-0.0171***	-4.90	-0.0171***	-4.89	-0.0171***	-4.87	-0.0171***	-4.86
$\Delta Sales_t$ + $\Delta Sales_t$ * $Dec\Delta Sales_t$	-0.0034**	-2.47	-0.0033**	-2.46	-0.0033**	-2.44	-0.0033**	-2.45	-0.0034**	-2.45	-0.0034**	-2.46	-0.0034**	-2.47	-0.0035**	-2.48	-0.0035**	-2.48
ΔCFO_t + ΔCFO_t * $Dec\Delta CFO_t$	-0.0100***	-5.06	-0.0116***	-5.33	-0.0121***	-5.31	-0.0109***	-4.74	-0.0116***	-4.20	-0.0121***	-4.18	-0.0114***	-3.70	-0.0128***	-3.15	-0.0112***	-2.48

Note: Imp_t is non-current asset impairment losses per share in year t, deflated by the adjusted stock price at the end of fiscal year t–1. R_k is the adjusted stock return in year k. Dec_k takes the value of one if R_k is negative. $\Delta Sales_k$ is a change in sales in year k, deflated by the adjusted stock price at the end of fiscal year k–1. $Dec\Delta Sales_k$ takes the value of one if $\Delta Sales_k$ is below a threshold for Panel A and negative for Panel B. ΔCFO_k is a change in cash flows from operations in year k, deflated by the adjusted stock price at the end of fiscal year k–1. $Dec\Delta CFO_k$ takes the value of one if ΔCFO_k is negative for Panel A and below a threshold for Panel B. Standard errors are clustered by year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.