The right time for a big bath: asset impairment recognition in earnings management

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Abstract

Purpose – The article investigates the patterns of asset impairment recognition in search of signs of "big bath" earnings management practices across an internationally diversified sample of public companies. It also elucidates the incentives that may underlie such practices and explores possible safeguards embedded in the existing corporate governance mechanisms.

Design/methodology/approach – The article applied static panel and binary logit models to an international firm-level panel dataset of 1045 public companies observed between 2003 and 2018.

Findings – Our empirical results suggest that recognition of asset impairment has no determinate impact on earnings volatility. Investigating the possibility of "big bath" earnings management practices, the authors found no impact of asset impairment recognition on total senior executive compensation in firms, which pay performance-based remuneration. The quality of corporate governance has appeared to impact the firms' intertemporal proclivity to recognize asset impairment with those having the more entrenched and management-controlled boards being more likely to time impairment recognition by delaying it during exceptionally good and exceptionally bad years. While generally unlikely, recognition of asset impairment in a period with a recorded negative operating performance is found to be closely associated with key executive departures.

Originality/value – The article corroborates the salient role of corporate governance mechanisms in shaping the intertemporal patterns of asset impairment recognition. The possible remedies to the phenomenon should be derived therefrom.

Keywords Earnings management, Big bath, Asset impairment

Paper type Research paper

Introduction

While a growing effort is being invested internationally to increase the accuracy and transparency of corporate reporting, executives still wield a considerable discretionary decision-making arsenal capable of substantially skewing the quality of financial information. The internal operational and financial decisions may potentially influence the timeliness and quality of financial signals, thereby delaying market reactions, impacting important stakeholders or distorting corporate remuneration mechanisms. Therefore, the

study of the interrelations between managerial decision-making and the quality of financial information takes on an ever-increasing importance.

This study focuses on empirical analysis of asset impairment recognition, which is frequently mentioned as a tool of earnings management. Conventional wisdom and anecdotal evidence suggest that corporate managers may be prone to time asset impairment recognition by shifting write-offs to more opportune reporting periods in accordance with their subjective judgment or economic rationale advantageous to shareholders. Identification of determinants of the timing decisions affecting asset impairment recognition is one of the goals of this article.

We counterpose two hypotheses, which attempt to divulge the possibly existing patterns of intertemporal asset impairment recognition. On the one hand, the international regulatory framework mandates that asset impairment recognition be guided only by the relevant reporting standards with the managerial discretion being minimized in order to eliminate any possibilities of earnings manipulations. In the case of the perfect enforcement of the said regulatory framework, asset impairment recognition should be connected only to business fundamentals without any other discernable intertemporal patterns possibly attributable to managerial decision-making.

The opposing viewpoint tackled in the present article states that the timing of asset impairment recognition is subject to inherent managerial influence. It is especially asset impairment recognition that may be utilized as a tool for earnings management. The asset write-offs may either smooth or exacerbate earnings fluctuations depending on the chosen timing of recognition. Empirical literature describes the tactics of "big bath," whereby managers may withhold asset impairment recognition until a propitious moment when a large one-time write-off occurs (Nieken & Sliwka, 2015). The "big bath" causes contemporaneous earnings to plummet, while in the periods preceding and following the "big bath," earnings should supposedly be relatively higher and smoother ceteris paribus. If observed in empirical data, "big bath" should have its roots in managerial incentives: executives may be inclined to delay asset impairment recognition to reduce earnings volatility and, therefore, to increase the company's valuation. Empirical literature reveals that remuneration schemes tied to shareholder returns may increase the likelihood of the recurrence of earnings management practices (Nieken & Sliwka, 2015), while financial markets are found to favor earnings management tactics with higher valuation premia (Kirschenheiter & Melumad, 2002).

Contributing to the ongoing discussion on the role of asset impairment recognition in earnings management tactics, this article investigates the intertemporal patterns of write-offs with the goal of identifying the magnitude and direction of the possible distortionary impact of write-off timing on the accuracy of reported accounting earnings. For that purpose, we compiled an unbalanced international firm-level database covering the observation period between 2003 and 2018. The sample included only companies which implement a remuneration system tying executive compensation to total shareholder return – meaning option-based compensation or other schemes with a variable component tracking stock performance – because we expected the possible role of compensation mechanisms in managers' incentives standing behind earnings management practices. We considered in the empirical analysis only the impairment of assets held for operational use by the company. Using static panel regression models, we analyzed the contemporaneous relationships between earnings fluctuations and asset impairment recognition. Then, we tried to elucidate the transmission mechanisms between the two by introducing corporate governance quality proxies into the empirical analysis. Finally, we attempted to identify the factors that affect the firms' propensity to recognize asset impairment under different earnings shocks (both positive and negative) with the goal of establishing whether write-offs tend to smooth or accentuate earnings fluctuations.

Our econometric findings demonstrate that asset impairment recognition has no determinate impact on earnings dynamics. We have evidence that the timing of write-offs does not exacerbate earnings volatility. Moreover, our results show that asset impairment recognition has no statistically significant impact on the remuneration of senior executives in firms with performance-based compensation. The latter findings cast doubt on the role of executive compensation as a transmission mechanism incentivizing managers to engage in earnings management practices. In contrast, we demonstrate that the timing of asset impairment recognition is closely related to corporate governance variables, which approximate the degree of management entrenchment and executives' capture of the board. Firms with longer-tenured, management-dominated boards appear more likely to time asset impairment recognition and use the latter to smooth earnings fluctuations. Interestingly and in contrast to "big bath" assumptions, we find that firms may be generally reluctant to recognize asset impairment during periods of underperforming earnings. If the latter happens, it is statistically likely to be accompanied by a departure of an executive team member. This finding suggests that executive churn rate may serve as a factor softening the repercussions of poor operating performance. Asset impairment recognition following an executive departure may allow to clean the books and provides a fresh start for newcomers.

This article contributes to the empirical literature on earnings management practices in several respects. Below, we will expand the geographical coverage of econometric analysis and diversifies the research sample. Most studies in the extant literature cover only specific markets (e.g. Daniel, Denis, & Naveen, 2008; Choi, Kwak, & Choe, 2014), while our study relied on extensive data drawn from an international sample. Second, we will highlight the indeterminate relationship between earnings fluctuations and asset impairment recognition. While the literature (e.g. Nelson, Elliott, & Tarpley, 2002; Lhaopadchan, 2010) posits that managerial proclivity to recognize asset impairment is preconditioned by firms' contemporaneous operating performance, we argue that the relationship is more heterogenous with intertemporal patterns of asset impairment being preconditioned by corporate governance settings, deviations of operating performance from time-adjusted average, as well as shifts in managerial structures (managerial departures). Third, we will demonstrate that remuneration considerations are unlikely to play a decisive role in timing decisions regarding asset impairment recognition, because the latter appears to have no statistically significant impact on the former. Finally, we will show that corporate governance settings play a crucial role in shaping firm-level propensity to time asset impairment recognition. Entrenched boards appear to increase the managerial propensity to time asset impairment recognition. Thus, we measured the degree of board entrenchment with a number of proxies commonly applied in the extant literature such as board independence, CEOs' board participation and directors' external affiliations (Wells, 2002; Beatty & Weber, 2006; Zemánková, 2015).

The article is structured as follows. First, we will present the theoretical framework underlying the empirical analysis along with a review of relevant literature. Next, we introduce the methodology and summarize the data collection process. The subsequent section will include the discussion of principal empirical findings and conclusions.

Literature review

Earnings management practices have long been the focus of academic research. Scientific inquiries scrutinize the underlying economic causes, incentive factors and potential consequences of diverse accounting practices, which have the primary intention of serving the interests of managers and corporate shareholders (Zemánková, 2015).

Casual empiricism suggests that earnings management techniques are chiefly directed at keeping the reported information close to pre-announced earnings targets. Alternatively,

they may serve to meet analysts' forecasts or report earnings beating a psychologically important threshold (Degeorge, Patel, & Zeckhauser, 1999). Managers go to great lengths to smooth the possible adverse earnings fluctuations following a sudden shift in an operational environment. These tactics may produce desired results since capital markets may be inclined to reward firms, which achieve their targets thereby reducing the uncertainty faced by investors. The regulatory framework limits the scope of possible manipulations with accounting information. At the same time, the said standards provide a substantial leeway for management to exercise discretionary decision-making power over releases of sensitive private information. For example, nonpublic material information about the company's assets held for use may be released at the discretion of corporate executives, thereby potentially opening a possibility for managerial opportunism (Chen, Wang, & Zhao, 2007). In fact, the flexibility offered by the regulatory framework may incentivize managers to time asset impairment recognition with the goal of influencing the dynamics of stock prices. Empirical literature demonstrates that it is uncommon for managers to create reserves for asset write-offs and delay actual recognition to smooth earnings fluctuations to prompt a pre-specified market reaction (Strong & Meyer, 1987). The accumulated unrecognized asset impairment is eventually written off causing a one-off reduction in cotemporaneous earnings and constituting a phenomenon of "big bath."

Several empirical studies attempted to elucidate the determinants standing behind the "big bath." Some conclude that the "big bath" performs the role of a signaling mechanism, which conveys positive information about firms' expected future performance to the market (Francis, Hanna, & Vincent, 1996; Frantz, 1999; Chen et al., 2007). The episode of "big bath" is then regarded as a one-off event presaging a pivot in the company's performance record. Alternatively, the "big bath" could be prompted by other firm-specific or fundamental environmental factors. What may prompt a large one-off asset impairment recognition are changes in management, both voluntary and involuntary (Francis et al., 1996). Management churn may act as a cover for asset write-offs and an excuse for underperforming earnings. Moreover, unsatisfactory bottom line, low earnings response coefficients, one-off accruals and anticipated future write-offs can also potentially contribute to large one-off asset impairment recognitions (Gordon & Hsu, 2019). Due to a multitude of factors that may underlie corporate decisions to recognize asset impairment, financial markets are insensitive to the signals conveyed by write-offs: such events were found to produce no persistent return reaction and generally seem to produce noisy market signals (Chen et al., 2007).

Several accounting standards constitute the regulatory framework that may impact the process of asset impairment recognition. The standards include, but are not limited to, IAS 36 from IFRS issued by the IASB with asset-specific disclosure requirements in IAS 16 Property, Plant and Equipment, IAS 38 Intangible Assets, IFRS 3 Business Combinations; and ASC 360 Property, Plant and Equipment, SFAS 141 Business Combinations and SFAS 142 Goodwill and Other Intangible Asset from the U.S. GAAP issued by the FASB (Chen et al., 2007; Jerman & Manzin, 2008; Amiraslani, Iatridis, & Pope, 2013; Jordan & Clark, 2015; Gordon & Hsu, 2019). Researchers note that these standards provide executives with substantial discretionary power concerning the recognition of asset impairment (Bloom, 2009; Lhaopadchan, 2010; Jordan & Clark, 2015).

The empirical literature suggests that an insufficiently stringent regulatory framework underpinning the quality of financial information may be the core reason for the widespread recurrence of earnings management techniques (Nelson et al., 2002; Lhaopadchan, 2010). Some studies even suggest that the rules on asset impairment recognition embedded in IFRS and US GAAP may partially explain the occurrence of the "big bath" phenomenon (Jordan & Clark, 2015).

The discussion of reasons underpinning the recurrence of earnings management techniques in general and the timing of asset impairment recognition, in particular, revolves

around a few important strands. One posits that earnings management primarily caters to market expectations and the other one advances that earnings management is compatible with the incentives of managers (Bergstresser & Philippon, 2006; Demers & Wang, 2010). In fact, the two seem to be closely intertwined and run in conjunction as a transmission mechanism tying earnings dynamics and timing of asset impairment recognition.

Healy (1985) was the first to suggest that managers may be inclined to resort to earnings management to maximize their bonus payment in a performance-based remuneration package. The incentive to manipulate earnings with the goal of bonus maximization may be especially strong during the year of the probable manager's departure (Davidson, Xie, Xu, & Ning, 2007): empirically observable earnings management has been shown to be more pronounced during periods preceding and following management replacement. The newly appointed managers have been shown to be relatively less likely to engage in earnings management, while departing executives seem to have an incentive to maximize enterprise value before leaving either to maximize their exit bonus or to strengthen their reputation for consistently delivering shareholder value growth (Demers & Wang, 2010). To summarize, departing managers may be inclined to inflate the value of a firm's earnings before their departure, so they may be less likely to take appropriate action to prompt asset impairment recognition. On the contrary, the incoming managers tend to precipitate large asset write-offs, which are blamed on predecessors (Wells, 2002; Wilson, 2011). Since both departing and incoming managers have incentives to interfere with reported earnings, the frequency of asset impairment recognition was found to be higher in firms with a higher management churn rate (Francis *et al.*, 1996; Wells, 2002). Similar findings were reported by Strong and Meyer (1987) who found that asset impairment recognition was closely tied to management turnover. Executive departures were demonstrated to impact not only the timing of asset impairment recognition but also its magnitude in transition years (Beatty & Weber, 2006).

In some cases, managers may be prone to smooth earnings in quest of the reputation of being an executive capable of delivering predictable results in line with investors' expectations (Strong & Meyer, 1987; Francis *et al.*, 1996; Daniel *et al.*, 2008). Overall, executives' career concerns prominently feature among the most important factors influencing the prevalence of earnings management practices (Demers & Wang, 2010; Nieken & Sliwka, 2015).

Dataset and research design

The goal of this study was to inquire into the factors influencing the timing of asset impairment recognition. Relying on econometric analysis, we checked whether there are empirically observable patterns of intertemporal apportionment of asset write-offs, which could be attributable to discretionary managerial decision-making.

For the purposes of empirical analysis, we assembled an unbalanced panel dataset covering an internationally diversified (45 countries) sample of 1045 companies observed over the period between 2003 and 2018. The sample excluded utilities and financial companies. We incorporated only publicly listed companies, which implement performance-based remuneration systems with a variable component tracking the company's stock performance. The design of the sample allowed us to establish whether asset impairment recognition could be used as a tool of earnings management aimed at maximizing the managers' performance-based bonus payments. The sample size was limited because it remains relatively uncommon on an international scale for firms to release detailed reports on management compensation schemes. Furthermore, since the study verified the role of corporate governance settings in mediating the mechanisms underlying earnings management practices, we were forced to exclude all the firms that released no information on the characteristics of their boards, such as the number of board members'

external affiliations. Another variable that caused sample truncation was MGM.LEAVE, which is a binary variable indicating whether a firm saw one of its board members (executive or nonexecutive) depart during a given year. Even though severely truncated due to the lack of firm-specific or director-specific variables, the resulting research sample was well-balanced in terms of industry composition (139 unique subindustries represented) and geographical representation.

The definitions of variables used in the empirical analysis were summarized in Table 2. The nominal variables were normalized using scaling or logarithmization where appropriate. The collected dataset was subject to 1% winsorization to eliminate the outliers present in the raw data. The correlation matrix allowed us to control for possible multicollinearity issues in model specification. Descriptive statistics for the final research sample are presented in Table 1. Importantly, all nominal variables are reported in the same currency: US dollars. Moreover, the data are normalized, meaning properly adjusted for any differences in reporting standards across jurisdictions.

The first stage of the study evaluated the interrelation between the dynamics of earnings and recorded asset impairment recognition. Based on the existing empirical literature, we conjectured that the use of asset write-offs as a tool of earnings management should exacerbate the volatility of cash flows. The relatively higher write-offs should be observed in periods when actual earnings deviate from their mid-term trend. In order to test that, we took net income surprise (NI.SURPRISE) as the explained variable and the value of asset impairment recognition as the independent variable to test an empirical equation with the following specification:

$$NI.SURPRISE_{it} = \beta_0 + \beta_1 IMPAIRMENT_{it} + \beta_t CONTROL_{it} + \varepsilon_{it} \tag{1}$$

in which $NI.SURPRISE_{it}$ was net income surprise recorded by the ith company in year t defined as a difference between the current period's reported earnings and the last normalized annual net income; $IMPAIRMENT_{it}$ – the value of asset impairment recognition scaled by the contemporaneous value of total assets; $CONTROL_{it}$ – a vector of firm-specific control variables. The normalized net income was the company's after-tax profit after eliminating the impact of one-off nonrecurrent items, e.g. gains from the sale of assets, and one-off expenses.

The test results for Equation (1) should indicate whether impairment recognitions coincide with earnings surprises, which would suggest the possibility of write-off timing by the managers. We further subclassified earnings surprises into positive (POS.SURPRISE) and negative (NEG.SURPRISE), identified as firm-years, when firms record a positive or negative deviation from last year's mean net profit, respectively. The introduction of these variables should help to clarify whether asset impairment write-offs were more likely to be clustered in periods with significant upward or downward earnings fluctuations. If the results suggested

Variable	Mean	Std. dev.	Min	Max
Total assets	54,300,000,000	820,000,000,000	10,500,000	47,600,000,000,000
DEBT	0.2643	0.1757	0.0000	0.7957
LIQUIDITY.RES	0.1127	0.1186	0.0005	0.6379
ASSET.TANG	0.3240	0.2692	0.0007	0.9455
NI.SURPRISE	−0.0056	0.4418	−2.4647	1.8827
IMPAIRMENT	0.0012	0.0039	0.0000	0.0303
EX.COMP	39,587,269	697,858,509	0	40,095,000,000
OP.MARGIN	0.1224	0.2183	−0.7515	0.9542

Source(s): Own elaboration

Table 1.
Descriptive statistics

Variable	Definition
LN.TOTAL.ASSETS	Natural logarithm of firm's reported total assets
DEBT	The ratio of the firm's reported total debt to the reported total assets
LIQUIDITY.RESERVES	The ratio of reported cash and cash equivalents to total assets. The cash and cash equivalents comprise cash, short-term financial instruments and short-term derivatives
ASSET.TANG	The ratio of net property, plant and equipment to total assets
NI.SURPRISE	Net income surprise is defined as a percentage difference between the actual and the last normalized annual net income. Normalized net income is the company's after-tax profit after eliminating the impact of one-off nonrecurrent items (e.g. gains from the sale of assets, one-off write-offs)
IMPAIRMENT	Value of recognized impairment of assets held for use scaled by total assets. We sum up all recognized asset impairments regardless of the reason for write-offs (e.g. substantial changes in the market value of a tangible asset, changes in the company's environment or changes in the modes of the utilization of a company's tangible assets)
EX.COMP	Total compensation of the firm's senior executives in USD. The total compensation includes both base pay as well as compensation enhancements in the form of stocks and stock options
LN.EX.COMP	Natural logarithm of total compensation of firm's executives in USD
OP.MARGIN	The operating profit margin is calculated as a ratio of normalized EBIT to total sales. Normalized EBIT is calculated by cleaning the raw EBIT from one-off expenses and revenue items
IMPAIRMENT.BIN (aka IMP.BIN)	Binary variable encoded as 1 if during a given period the company disclosed an impairment of assets held for use and zero otherwise
NEG.SURPRISE	Binary variable encoded as 1 if during a given period the company recorded a negative net income surprise (NI.SURPRISE<0)
POS.SURPRISE	Binary variable encoded as 1 if during a given period the company recorded a positive net income surprise (NI.SURPRISE>0)
NEG.OP.MARG	Binary variable encoded as 1 if during a given period the company recorded a negative operating profit margin (OP.MARGIN<0)
AVG.TENURE	Average tenure of board members. Tenure is calculated as time (in years) from a board member's appointment to the moment of analysis
AFFILIATIONS	Average number of affiliations of board members. Affiliations are defined as executive or nonexecutive (e.g. supervisory) positions held by a given officer with companies other than the analyzed one. Only concomitant positions are taken into consideration
INDEPENDENT	Percentage of independent board members. A board member is classified as independent if they hold no executive position within the analyzed company and receive no other pecuniary benefits from the firm other than the board fees and any additional compensation paid to board members in relation to board functions (e.g. participation in committees)
UNITARY.BOARD	Binary variables encoded as 1 if the company has a unitary board structure. A unitary board comprises both executive and nonexecutive directors within the same decision-making and supervisory body
CEO.MEMBER	Binary variables encoded as 1 if the company's CEO is a member of the board
exCEO.CHAIR	Binary variables encoded as 1 if the company's ex-CEO is the chairman of the board
MGM.LEAVE	Binary variables encoded as 1 if during a given year, one of the company's senior executives left the company voluntarily (except for retirement) or was fired. For the purposes of this study, the group of senior executives comprises the entire C-suite, executive directors, division managers

Source(s): Own elaboration

that larger write-offs tend to aggravate negative net income surprises, we would have found evidence of the "big bath" observable in empirical data. In contrast, if asset impairment recognition was used as a tool to smooth earnings fluctuations (Hazarika, Karpoff, & Nahata, 2012), we should have observed an oppositely directed statistically significant relationship between the magnitude of net income surprises and the value of asset write-offs.

Our choice of methodology to explore this relationship is in line with extant literature (e.g. Hazarika *et al.*, 2012) investigating the nexus between the scale of asset impairment and contemporaneous operating performance. Different proxies for operating performance are utilized in the extant literature, including operating margins and return on assets. We decided to use a novel proxy – net income surprise – which allowed us to eliminate any impact of one-off items from the gauge of performance. To our knowledge, no prior studies exploring the relationship between asset impairment recognition and firms' operating performance ever relied on a similar variable.

Stage two of the empirical study inquired into possible links between the magnitude of asset impairment recognition and senior executive compensation. The fact that the sample comprised only companies that pay performance-based stock-tracking compensation allowed us to verify the hypothesis by which earnings management practices are primarily directed at the maximization of management bonuses. Thus, we proposed the following specification of an econometric equation to test this conjecture:

$$LN.EX.COMP_{it} = \beta_0 + \beta_1 IMPAIRMENT_{it} + \beta_t CONTROL_{it} + \varepsilon_{it} \qquad (2)$$

in which $LN.EX.COMP_{it}$ was the natural logarithm of dollar-denominated total senior executive compensation (inclusive of variable equity component) in ith company in year t. The variables measuring asset impairment recognition were further multiplied by those measuring earnings volatility (NI.SURPRISE, POS.SURPRISE, NEG.SURPRISE) in order to create interaction terms and verify whether the timing of asset write-offs coinciding with earnings fluctuations may statistically significantly impact executive remuneration. If confirmed, the latter would suggest that picking the right time for recognizing asset impairment may bear important financing incentives for managers, thereby prompting them to recur to earnings management practices.

The next stage of analysis attempted to elucidate the factors possibly standing behind the timing of asset impairment recognition contingent upon earnings dynamics. To do so, we employed binary logit regression models to estimate the likelihood of asset impairment recognition (encoded as a dummy variable IMPAIRMENT.BIN) under positive/negative net income surprises. We interacted IMPAIRMENT.BIN with binary variables POS.SURPRISE and NEG.SURPRISE to model the dependent variable. The model specification was as follows:

$$logit(POS(NEG).SURPRISE_{it} * IMPAIRMENT.BIN) = \beta_0 + \beta_1 IMPAIRMENT_{it}$$
$$+ \beta_2 GOVERNANCE_{it} + \beta_3 MGM.LEAVE_{it} + \beta_t CONTROL_{it} + \varepsilon_{it} \qquad (3)$$

in which $GOVERNANCE_{it}$ was the vector of corporate governance proxies specified in Table 2 and $MGM.LEAVE_{it}$ – binary variable indicating whether a given company reported a departure of senior executives in a given year.

The goal of model (3) was to establish the factors underpinning decisions to recognize asset impairment during periods with either positive or negative net income surprises.

As a separate case, we analyzed the instances of asset impairment recognition under negative operating margins, which seemed to produce the most unfavorable outcomes for the company's bottom line. We conjectured that corporate governance mechanisms may play a crucial role in shaping the timing decisions regarding asset write-offs, so we tested a set of

corporate governance proxies, which were to approximate the degree of board entrenchment or management capture of the board. In conjunction, these variables could have pointed to an overall relationship between the quality of corporate governance and firms' proclivity to recur to earnings management through delays in asset impairment recognition.

The rationale for the inclusion of corporate governance variables into the analysis resided in the viewpoint rooted in the empirical literature, which posits that stringent corporate oversight may enhance the transparency of corporate reporting, reduce the risk of managerial opportunism and preclude practices of earnings management as such, which may thus hinder efficient market communication and complicate the processing of market signals by investors (Florou & Conyon, 2004). We expected more stringent and management-independent corporate oversight mechanisms to be associated with a lower firm propensity to time asset impairment recognition for the purposes of earnings manipulations. Board independence (INDEPENDENT defined as a percentage of independent board members) is commonly postulated to reduce the managerial impact on the board's decisions (Klein, 2002; Liu & Lu, 2007). Following Liu and Lu (2007), we assumed that the presence of a CEO on the board of directors (encoded as a binary variable CEO.MEMBER) would reduce the board's capacity for independent oversight, thereby undermining the board's supervisory function. Similarly, the transition of a former CEO to the position of supervisory board chair (encoded as a binary variable exCEO.CHAIR) would infringe on the board's ability to independently exercise corporate supervision and introduce an insider element into the decision-making process. As opposed to two-tier and mixed board structures, the unitary board structure (UNITARY.BOARD) was generally proven to weaken the board's ability to exercise independent supervisory functions (Bezemer, Peij, de Kruijs, & Maassen, 2014), so we might expect firms with unitary boards to be relatively more likely to engage in earnings management ceteris paribus. Thus, we introduced the average number of board members' external affiliations (AFFILIATIONS) to control for directors' business, which could affect the quality of corporate oversight and contribute to a higher level of managerial opportunism. The modeling choices in our study for both experimental and control variables agree with prior studies referenced above. The novelty we introduced was the interaction term calculated as a product of a binary variable that encoded the occurrence of asset impairment recognition during a given year with a binary variable encoding positive and negative net income surprises. By introducing this variable absent from prior studies, we attempted to establish the intertemporal patterns of asset impairment recognition, namely measuring the relative likelihood of asset write-offs under exceptionally good and exceptionally bad performance as measured by net income surprises.

Finally, we analyzed how management departures (encoded with a binary variable MGM.LEAVE) could contribute to decisions on the timing of asset impairment recognition. Existing empirical studies hint at the relationship between write-off decisions, corporate financial performance and management departures (Choi et al., 2014). On the one hand, poor operational performance may be alleviated by delaying impairment recognition. On the other hand, poor performance is likely to trigger involuntary management departure, which may prompt the remaining incumbents to clean the books through a "big bath" and use management churn as an excuse for a dip in performance caused by asset write-offs. While some studies suggest that the frequency of management replacements does not correlate with the occurrence of asset impairment recognition (Agrawal, Jaffe, & Karpoff, 1999), the more recent empirical evidence (Hazarika et al., 2012) points that recurrence to earnings management may be associated with a higher likelihood of involuntary management churn. At the same time, asset impairment recognition in the year following changes in the executive team may be used to artificially reduce the contemporaneous earnings to secure a lower base for next year's performance record. Our study aimed at establishing whether there

is a relationship between the occurrence of asset impairment recognition and management departures so as to confirm or disprove the conjectures posited in the existing literature.

Control variables used in the analysis included a set of firm-specific fundamentals, which controlled for a firm's life cycle stage, financial health and opacity. The choice of control variables was shaped following extant literature (e.g. Klein, 2002; Bloom, 2009; Wilson, 2011). In the mentioned articles, authors utilize different proxies for the enumerated explanatory variables, but they all control for the same set of factors, commonly regarded as determinants of managerial proclivity to time asset impairment recognition. In particular, we measure firms' liquidity reserves to approximate their resourcefulness, include a proxy for opacity to control for the firms' asset structure, consider the margin to control for contemporaneous operating performance, and check a set of exogenous variables measuring the quality of corporate governance, e.g. board independence and directors' affiliations and CEOs' board participation.

Empirical findings

The empirical results were obtained using random-effect static panel regression analysis and binary logit modeling. The models featured heteroscedasticity-robust standard errors and industry dummies.

Table 3 summarizes the empirical results of model specification testing (1). The goal of these estimations was to check for the possible impact of asset impairment recognition on intertemporal earnings fluctuations. In particular, model (1) in Table 3 suggests that there is a statistically significant (at 5% significance level) negative relationship between asset impairment recognition and earnings surprises, which may at first glance suggest that asset write-offs were used to alleviate net income variation in the preceding period's trend. However, further subclassification of net income surprises into positive and negative (based on earnings variation) in models (3) and (5) demonstrated that the negative associative link between asset impairment recognition and earnings surprises was clustered in the subsample of firm-years recording negative net income surprises. Hence, the impairment of assets held for use was evidenced to aggravate the downward earnings fluctuations while having no significant impact on positive net income surprises. The latter finding could speak in favor of the "big bath" hypothesis pointing to the firms' proclivity to recognize asset impairment in the event of earnings underperformance. While the amount of asset write-offs clearly plays a role in the discovered relationship with larger write-offs dragging down the reported earnings, the very fact of the occurrence of an asset write-off seemed to have no statistically significant impact on the reported net income surprise. Models (2), (4) and (6) in Table 3 demonstrated that variable IMPAIRMENT.BIN (defined as a dummy variable encoding firm-years, when a given company reports a nonzero asset impairment recognition) was consistently statistically insignificant. Therefore, we concluded that while large asset write-offs could be responsible for important negative net income surprises, the event of asset impairment recognition did not seem to substantially skew reported earnings in the analyzed research sample. However, the question remained regarding the underlying factors, which may possibly prompt firms to time asset impairment recognition.

When testing the managerial hypothesis of earnings management, which posits that executives use earnings management in general and asset impairment recognition in particular to boost their individual bonuses, we ran several random-effect static panel regression models to check for the existence of any associative links between the value and occurrence of asset impairment recognition and the value of compensation received by senior executives. Table 4 summarized the results of tests of model specification (2), whereby total executive compensation (USD-denominated and logarithmized for the purposes of normalization of the variable's distribution) was selected as a dependent variable. Model

Regressand Model No	NI.SURPRISE 1		NI.SURPRISE 2		NEG.SURPRISE*NI.SURPRISE 3		NEG.SURPRISE*NI.SURPRISE 4		POS.SURPRISE*NI.SURPRISE 5		POS.SURPRISE*NI.SURPRISE 6	
Wald (joint)	13.23	**	9.357	*	38.21	***	32.25	***	10.52	*	10.73	*
R^2	0.03821767		0.03688736		0.0759459		0.07384653		0.06256214		0.06260094	
AR(1) test	−4.709	***	−4.786	***	−3.474	***	−3.521	***	−5.06	***	−5.078	***
AR(2) test	−2.571	***	−2.588	***	−3.458	***	−3.5	***	−2.463	**	−2.449	**
Constant	−0.126984		−0.175716		−0.631633	***	−0.674822	***	0.496546	***	0.49452	***
	(0.223)		(0.222)		(0.167)		(0.166)		(0.132)		(0.132)	
IMPAIRMENT	−4.29405	**			−3.6177	**			−0.303385			
	(2.068)				(1.477)				(1.210)			
IMPAIRMENT.BIN			−0.0117185				−0.00608708				−0.00509817	
			(0.017)				(0.012)				(0.010)	

Note(s): All models include control variables, time and industry dummies (not reported). This table presents the random-effect static panel model estimates. The heteroscedasticity-robust standard errors are provided in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively

Source(s): Own elaboration

Table 3.
The association
between asset
impairment and
net income
surprise ($N = 3473$)

Regressand Model No	LN.EX.COMP 1		LN.EX.COMP 2		LN.EX.COMP 3		LN.EX.COMP 4		LN.EX.COMP 5	
Wald (joint)	744.6	***	742.8	***	747.2	***	744.9	***	745.9	***
R^2	0.8711909		0.870051		0.8717554		0.8712827		0.8711325	
AR(1) test	1.593		1.388		1.63		1.592		1.582	
AR(2) test	-3.425	***	-3.513	***	-3.378	***	-3.414	***	-3.435	***
Constant	4.84498	***	4.85027	***	4.81237	***	4.84081	***	4.76426	***
	(0.581)		(0.578)		(0.579)		(0.581)		(0.580)	
OP.MARGIN	-0.0620072				-0.0546651		-0.0610839		-0.0384915	
	(0.091)				(0.090)		(0.091)		(0.091)	
NI.SURPRISE			0.0738143	**						
			(0.032)							
IMPAIRMENT	-0.249									
	(0.250)									
IMPAIRMENT.BIN					-0.0221239					
					(0.031)					
NEG.SURPRISE*IMPAIRMENT							-4.30753			
							(4.710)			
POS.SURPRISE*IMPAIRMENT									8.11097	
									(5.005)	

Note(s): All models include control variables, time and industry dummies (not reported). This table presents the random-effect static panel model estimates. The heteroscedasticity-robust standard errors are provided in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively
Source(s): Own elaboration

Table 4.
The impact of asset impairment on senior management compensation (N = 3252)

(2) in Table 4 suggested that net income surprises were generally positively and significantly associated with the value of executive compensation, which agreed with our expectations as the variable component of performance-based equity-tracking executive compensation was supposed to respond positively to upward variations in reported earnings. In turn, models (1) and (3) demonstrated that neither the value nor the occurrence of the asset impairment recognition exercised any statistically significant impact on total executive remuneration. Both IMPAIRMENT and IMPAIRMENT.BIN variables were statistically insignificant pointing to the lack of sensitivity of the variable component of executive remuneration to asset write-offs. The latter finding could suggest that the performance-based compensation mechanism discounts and disregards any information pertaining to asset write-offs even if those write-offs constituted a substantial burden on contemporaneously reported earnings.

Models (4) and (5) reported in Table 4 checked whether the timing of asset impairment recognition may impact executive compensation. By subdividing net income surprises into positive and negative, we checked whether a write-off under an event of earnings growth (POS.SURPRISE interacted with IMPAIRMENT) or earnings slump (NEG.SURPRISE interacted with IMPAIRMENT) could affect the variable component of remuneration, thereby potentially incentivizing managers to recur to the timing of asset impairment recognition. We evidenced that be it under positive or negative net income surprise, the asset write-offs had no statistically significant effect on executive compensation. Our results cast doubt on the role of management compensation mechanisms in promoting the practices of earnings management, prompting a further search for factors underlying the firms' proclivity to make asset impairment recognition contingent on anticipated earnings dynamics. As such, they stand in contrast with prior studies (e.g. Bergstresser & Philippon, 2006; Demers & Wang, 2010), which argue that the existing asset impairment recognition mechanisms allowing for a substantial degree of managerial decision-making with regard to the timing may be compatible with a sound system of managerial incentives and preclude abuses.

Table 5 presents the results of econometric tests of model specification (3), in which we tried to identify the factors impacting firms' likelihood of recognizing asset impairment under positive net income surprises, as opposed to recognition under negative net income surprises. In particular, we introduce a set of corporate governance proxies, which could give a general indication of the impact of corporate supervision on the likelihood of earnings management.

Model (1) demonstrates that higher average board tenure increased the likelihood of asset impairment recognition under negative net income surprises. In contrast, what appeared to play no role in decisions on asset write-off timing was board independence defined by relying on formally imposed regulatory criteria, which is the requirement of not having any pecuniary relationships with the company other than board sitting fees. While independence was utilized as a standard proxy for the board's ability to effectively perform supervisory functions, empirical literature demonstrates that board tenure could be a far more accurate measure of board independence from executives (Nili, 2016). Director business measured by the average number of directors outside affiliations also showed to have no impact on the likelihood of timing of asset impairment recognition. In contrast, unitary board structure and the presence of a CEO on the board proved to increase the likelihood of asset impairment recognition under negative net income surprises. Overall, the discovered relationships could suggest that firms with more management-controlled or management-associated boards (due to longer board tenures) may be more likely to engage in the timing of asset impairment recognition, thus pointing to the important role the corporate governance settings play in shaping the prevalence of earnings management practices. Our findings generally agree with prior empirical studies (e.g. Demers & Wang, 2010; Nieken & Sliwka, 2015), which suggests that managerial and board entrenchment may increase managerial discretionary power with the latter being used primarily to cater to executives' and directors' career considerations rather than shareholders' interests.

Regressand Model No	IMP.BIN*POS.SURPRISE 1		IMP.BIN*POS.SURPRISE 2		IMP.BIN*POS.SURPRISE 3		IMP.BIN*POS.SURPRISE 4		IMP.BIN*POS.SURPRISE 5		IMP.BIN*POS.SURPRISE 6		IMP.BIN*POS.SURPRISE 7	
Constant	-2.59521	***	-2.70700	***	-2.47790	***	-1.76752	***	-2.31083	***	-2.75286	***	-2.73499	***
	(0.4970)		(0.4957)		(0.5193)		(0.5276)		(0.5057)		(0.4942)		(0.4949)	
IMPAIRMENT	95.3033	***	96.5032	***	95.9393	***	94.5899	***	95.5640	***	96.3588	***	96.4181	***
	(9.677)		(9.713)		(9.707)		(9.675)		(9.708)		(9.710)		(9.716)	
AVG.TENURE	-0.0217709	**												
	(0.009396)													
AFFILIATIONS			0.0313385											
			(0.03804)											
INDEPENDENT					-0.00216678									
					(0.001396)									
UNITARY.BOARD							-0.489954	***						
							(0.09320)							
CEO.MEMBER									-0.427517	***				
									(0.09476)					
exCEO.CHAIR											-0.0567637			
											(0.07757)			
MGM.LEAVE													0.00874171	
													(0.1591)	
Log-likelihood	-2361.83308		-2364.20904		-2363.34717		-2351.13971		-2354.69422		-2364.27634		-2364.54352	
Chi^2	156.99	***	152.23	***	153.96	***	178.37	***	171.26	***	152.1	***	151.56	***

Note(s): The table presents the maximum likelihood estimates of a binary logit model. All models include firm-level control variables, which are not reported. Asymptotic standard errors are reported in parentheses under the coefficients. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively
Source(s): Own elaboration

Table 5.
The likelihood of impairment recognition under positive net income surprise ($N = 4291$)

Finally, Table 6 tackles a very specific subsample of firms, which reported asset impairment recognition in periods when the firms simultaneously recorded negative operating performance, namely negative operating profit margin. In such cases, substantial write-offs aggravated the mounting operational troubles, which possibly cause the owners to ponder the decisions regarding possible management replacement. Our empirical findings support this conjecture. The event of asset impairment recognition under negative operating profit margins was modeled as a function of a set of independent corporate governance proxies relying on binary logit models: IMPAIRMENT.BIN interacted with the dummy variable NEG.OP.MARG encoding firm-years reporting negative operating profit margins. In line with previous results, we established that the less independent board with a unitary structure, longer director tenures and CEO being either a member or a chair of the supervisory board made asset impairment recognition less likely in the event of contemporaneous negative operating performance. Therefore, we concluded that the boards' ability to exercise independent supervisory functions in the study played an important role in preventing firms from recurring to earnings management through delaying asset impairment recognition. At the same time, we identified an important and statistically significant associative link between the likelihood of asset impairment recognition under unsatisfactory operating performance and the likelihood of management departure, which could suggest that management churn was utilized as a trigger for cleaning the books and securing a fresh start for the company in the subsequent reporting periods.

Concluding remarks

The present study sought to identify the firm-level factors that influence the timing of asset impairment recognition, which may be used as a tool of earnings management.

We demonstrated that despite being frequently alluded to as an instrument of earnings management, asset impairment recognition has no determinate impact on the volatility of reported earnings. While we found that asset write-offs may aggravate earnings underperformance under negative earnings surprises, no similar relationship can be detected under positive earnings fluctuations.

Second, we demonstrated the lack of a statistically significant relationship between the timing and value of asset impairment recognition, on the one hand, and total senior executive compensation on the other. Having analyzed managerial remunerations in firms, which tie compensation to stock performance, we found that compensation mechanisms may not be attributed to the role of an underlying incentive-driven factor promoting the timing of asset write-off recognition for pecuniary motives.

Third, we reported a strong associative link between the timing of asset impairment recognition and corporate governance settings. The variables that approximate the boards' ability to exercise independent corporate supervision are found to be positively correlated with firms' proclivity to time asset impairment recognition by delaying or avoiding write-offs under positive earnings surprises and under negative operating performance. In line with existing empirical literature, we found that asset impairment recognition accompanying unsatisfactory operating performance is positively associated with the likelihood of management departure, which may be characteristic of a "big bath."

The study has several limitations. To start with, it focuses on indirect manifestations of the "big bath" phenomenon, such as asset impairment recognition and the concomitant fluctuations in reported earnings. Due to the significant managerial discretion in the analyzed area of decision-making, establishing causal links pertaining to the phenomenon of "big bath" may necessitate the use of qualitative research methodology. Secondly, the research sample used in the study is constrained to publicly listed companies, which may limit the possibility of generalization of the presented empirical findings.

Model No	IMP.BIN*NEG.OP.MARG 1		IMP.BIN*NEG.OP.MARG 2		IMP.BIN*NEG.OP.MARG 3		IMP.BIN*NEG.OP.MARG 4		IMP.BIN*NEG.OP.MARG 5		IMP.BIN*NEG.OP.MARG 6		IMP.BIN*NEG.OP.MARG 7	
Constant	1.40497		0.496814		1.41786		1.94251		1.79786		0.962940		1.21817	
	(1.346)		(1.343)		(1.334)		(1.415)		(1.395)		(1.347)		(1.349)	
IMPAIRMENT	149.228	***	151.681	***	150.105	***	149.273	***	149.690	***	149.580	***	148.808	***
	(10.88)		(11.03)		(10.91)		(10.90)		(10.94)		(10.90)		(10.89)	
AVG.TENURE	−0.0912563	***												
	(0.02559)													
AFFILIATIONS			−0.410556	***										
			(0.1423)											
INDEPENDENT					−0.00648736	*								
					(0.003455)									
UNITARY.BOARD							−0.503707	**						
							(0.2386)							
CEO.MEMBER									−0.584119	***				
									(0.2287)					
exCEO.CHAIR											−0.192375			
											(0.2021)			
MGM.LEAVE													0.721014	**
													(0.3205)	
Log-likelihood	−546.211973		−548.095922		−551.242748		−550.877175		−549.954037		−552.484326		−550.736665	
Chi^2	332.05	***	328.28	***	321.99	***	322.72	***	324.57	***	319.51	***	323	***

Note(s): The table presents the maximum likelihood estimates of a binary logit model. All models include firm-level control variables, which are not reported. Asymptotic standard errors are reported in parentheses under the coefficients. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively

Source(s): Own elaboration

Table 6.
The likelihood of impairment recognition under negative operating margins ($N = 4291$)

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