

GOODWILL IMPAIRMENT TESTS AS A DEVICE FOR EARNINGS MANAGEMENT: EVIDENCE FROM GERMANY

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Abstract

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This study investigates whether goodwill impairments are influenced by earnings management incentives. It is motivated by the International Accounting Standards Board's (IASB) post-implementation review on business combinations, the ongoing debate on the reliability of impairment testing, and the high practical relevance of this topic. The sample consists of 2,127 firm-year observations from German listed firms for the periods 2006 to 2013. The results show that the likelihood to recognize goodwill impairments and the magnitude of impairment losses are not only determined by economic and other relevant factors but also influenced by earnings management incentives like beating an earnings target, conservative smoothing, big bath accounting, changes in senior management, and the firms' general earnings management behavior. Hence, goodwill impairment tests seem to be used by management as a device for earnings management. The results do not change over time, i.e., between the period before, during, and after the financial crisis.

Keywords: Goodwill Impairments, Earnings Management, Earnings Targets, Big Bath, Conservative Smoothing, Management Change

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1. INTRODUCTION

On March 31, 2004, the revised IAS 36 became effective replacing the long-accepted straight-line amortization of goodwill by a new impairment-only approach. Based on this approach, goodwill has to be tested for impairment at least once a year. The IASB¹ intended to increase the usefulness of

the information provided to users of financial statements (IAS 36.BC131G). However, with the post-implementation review on business combinations (IFRS 3), completed in June 2015 (IASB, 2015), the lively debate on the usefulness of impairment testing continued even one decade later (IASB, 2014, pp. 21-26). In particular, the IASB concluded that it

¹ The IASB is an independent, geographically diverse group of accounting experts from practice and academia that is responsible for the development of accounting standards, the IFRS standards ([www.ifrs.org/groups/international-](http://www.ifrs.org/groups/international-accounting-standards-board/)

[accounting-standards-board/](http://www.ifrs.org/groups/international-accounting-standards-board/)). It is part of the IFRS Foundation, a non-profit, public interest organization which follows the mission to develop and promote the IFRS as an international common set of standards to achieve transparent, accountable, and efficient capital markets (www.ifrs.org).

will be of high significance to conduct further research on the effectiveness and complexity of goodwill impairment testing as well as the impairment-only approach in general because review participants questioned whether the impairment test can adequately reflect the economic value of goodwill and its consumption (IASB, 2015, p. 8). While proponents of the impairment-only approach argue that it enables management to convey private information on future cash flows and, hence, reduce information asymmetries, opponents criticize that management uses the inherent high degree of discretion to engage in opportunistic earnings management. The impairment test highly subjective, as it is based on discounted cash flow methods and, hence, on management's assumptions and estimations of future economic development. This might also imply that auditors have a reduced possibility to verify the reasonableness of goodwill impairment tests (Kothari, Ramanna, & Skinner, 2010, p. 262). In this context, IASB chairman Hans Hoogervorst questioned whether the current requirements provide sufficient rigor to report goodwill impairments reliably and to mitigate opportunistic earnings management. For example, he suggested that firms might be hesitant to impair goodwill to avoid the impression that they made a bad investment decision. On the other hand, newly appointed chief executives might have strong incentives to recognize hefty impairments in order to start with a clean slate (Hoogervorst, 2012).

As a consequence, the IASB is carrying out a research project on goodwill and impairment following its post-implementation review of IFRS 3. The IASB is investigating how companies can provide users of financial statements with better information about business combinations at a reasonable cost. Recently, the IASB has prepared a discussion paper on these issues including the challenging question of how companies should account for goodwill after the business combination (IASB, 2020). According to it, making the impairment test more effective at recognizing impairment losses of goodwill is infeasible; the reintroduction of goodwill amortization would not provide better information to users; the IASB should reduce the cost and complexity of the impairment test; and the IASB should enhance transparency by requiring companies to present the total equity before goodwill in their balance sheets (Scott, 2019; IASB, 2020). However, some board members support the reintroduction of goodwill amortization claiming that the existing impairment model does not provide timely information to capital markets (Radigan, 2019). Moreover, the IASB emphasizes that the majority supporting the impairment-only approach is small, and encourages stakeholder feedback on this issue (IASB, 2020).

Against this background, we seek to gain additional empirical evidence on the reliability of goodwill impairment testing. In addition to the controversial debate pointed out above, goodwill impairment tests are a major focus of the *Deutsche Prüfstelle für Rechnungslegung* (DPR - German Financial Reporting Enforcement Panel)² and the

European Securities and Markets Authority (ESMA)³ (e.g., DPR-FREP, 2019; ESMA, 2017), highlighting the relevance of the topic. We focus on the question of whether earnings management incentives relate to the likelihood to recognize goodwill impairments and the magnitude of impairment losses. This indicates whether management uses goodwill impairment tests as a device for earnings management. Specifically, we test whether goodwill impairments serve as an earnings management device for all of a wide range of situations with earnings management incentives, which would be consistent with the major and ongoing regulatory concerns.

To empirically test the above question, we collect 2,127 firm-year observations from 354 German firms listed on the regulated market of the Frankfurt stock exchange (CDAX) for the period 2006-2013. Our results are consistent with the expectation that management uses goodwill impairment tests as a device for earnings management. We find that measures of earnings management incentives are significantly associated with the likelihood and magnitude of goodwill impairments. Specifically, firms are more likely to avoid impairments or report smaller impairment losses when they just beat an earnings target or when their general earnings management behavior is income-increasing. On the contrary, they are more likely to recognize (larger) impairment losses when they are subject to conservative smoothing or big bath accounting incentives or when they had a change in senior management. With respect to debt financing, we find a positive association between leverage and the likelihood (magnitude) of impairment (losses). This is inconsistent with prior US literature, which suggests that firms manage goodwill impairments to avoid costly debt covenant violations. Our results apply to periods before and after the financial crisis.

Prior studies on the associations of goodwill impairments and earnings management incentives have found somewhat inconsistent results. We revisit and extend this research to contribute to the literature as follows. First, some of the inconsistency in prior literature might be explained by statistical tests with low power, because most data sets only cover a short time period and, therefore, the number of observations is small (e.g., AbuGhazaleh, Al-Hares, & Roberts, 2011; Iatridis & Senftlechner, 2014; Avallone & Quagli, 2015; Giner & Pardo, 2015; Hassine & Jilani, 2017). We address this issue by providing evidence based on a larger data set. We contribute large sample evidence, which is inconsistent with studies that did not find results for some of the earnings management incentives. Moreover, our data structure allows us to perform some rigid robustness tests (especially introducing firm fixed effects), which indicate a robust association for most of the earnings management incentives we test.

Secondly, while most of the evidence is largely consistent across IFRS jurisdictions and the US, the influence of debt covenants as an incentive of earnings management on goodwill impairments seems to differ across jurisdictions. Specifically,

² The DPR is a government-appointed privately organized institution examining the financial reporting of companies listed in the regulated market in Germany (www.frep.info).

³ The European Securities and Markets Authority is an independent EU authority. Among other responsibilities, it coordinates the activities of national enforcement institutions and thereby also defines common enforcement priorities to be considered by all national institutions (www.esma.europa.eu).

debt and equity markets have fairly different structures in continental Europe and Anglo-Saxon countries. As we lay out below, the German setting provides a strong context to analyze the mechanism on a typical continental European capital market. In contrast to US-findings (Ramanna & Watts, 2012), we find a positive association of leverage and goodwill impairments. However, this finding has to be interpreted with caution, as it is somewhat sensitive to alternative specifications in our robustness tests. Still, our evidence does not provide any indication of a negative association in the German setting.

These first two contributions also motivate our choice of a German sample. Inconsistent results and small samples are a particular issue of IFRS studies, as they rely on smaller cross-sections than US studies. Furthermore, as there are additional institutional differences between Anglo-Saxon and continental European jurisdictions, even within IFRS countries, we chose Germany as a representative of the latter. Inconsistencies of prior studies and idiosyncrasies among IFRS countries make the choice of a single country preferable. It relieves the need to control for cross-country idiosyncrasies in the analysis, which cannot be completely solved by typical empirical approaches, such as using country dummies. Trying to compile a large data set makes Germany a convenient choice because of its overall large economy and importance in globalized markets, and because of the number of available observations. In addition, strong relationships with creditors, which might explain our results with respect to leverage, are traditionally particularly pronounced in Germany.

Thirdly, we integrate all earnings management incentives and, most importantly, add an additional proxy for the general direction of discretionary accruals management. By showing that these proxies are distinct and each has incremental explanatory power, we add to earlier literature, which has not yet combined such a complementary set of proxies. Hence, it did not allow for inferences on whether they are distinctly related to goodwill impairment decisions. Our evidence suggests that consistent with its overall large proportion of intangible assets and with ongoing and recent concerns of regulators, goodwill impairment testing seems to be a catch-all earnings management device.

Fourthly, we contribute the first formal test of differences between the financial crisis and post-crisis periods with respect to our associations of interest. Our insignificant results are inconsistent with descriptive evidence in Giner and Pardo (2015), although our data set largely provides us with more statistical power. Moreover, they are robust to different period cutoffs when creating subsamples. Therefore, we caution readers when interpreting findings with respect to differences between crisis and non-crisis periods.

The paper proceeds as follows. Section 2 provides background information on the IFRS accounting requirements for goodwill, opportunities for earnings management related to goodwill accounting, and the influence of the German institutional setting on earnings management behavior. Section 3 presents an overview of prior research, discusses relevant earnings management incentives, and develops the hypotheses. We then describe sample selection, variables definition, and model specification in Section 4, followed by

the empirical results in Section 5. Section 6 presents robustness checks of the main results. Finally, Section 7 concludes and discusses the limitations of the study.

2. BACKGROUND, LITERATURE REVIEW, AND HYPOTHESIS DEVELOPMENT

2.1. IFRS accounting requirements for goodwill

IFRS 3.32 requires goodwill arising from a business combination to be recognized as the excess of the consideration transferred for a business acquired over the net fair value of identifiable assets acquired and liabilities assumed, measured in accordance with IFRS 3. Therefore, goodwill recognized in a business combination represents the expected future economic benefits arising from assets acquired in a business combination that do not fulfill the criteria to be individually identified and separately recognized (IFRS 3.A). The recoverability of any recognized goodwill has to be tested annually and, in addition, whenever events or changes in circumstances indicate that goodwill might be impaired (IAS 36.90). In order to determine whether goodwill impairments are required, the recoverable amount of a cash-generating unit (CGU) to which goodwill has been allocated has to be compared with its carrying amount. If the carrying amount of a CGU exceeds its recoverable amount, a goodwill impairment loss has to be recognized (IAS 36.90, 36.104). The recoverable amount of a CGU is the maximum of (1) its fair value less costs of disposal and (2) its value in use (IAS 36.6). In most cases, estimations of the recoverable amount use discounted cash flow methods, i.e., the impairment test is based on management's assumptions and estimations concerning the future economic development of a CGU and the discount rate.

An inherent shortcoming of the impairment test is the non-separability of goodwill, which leads to a testing at CGU level. As a CGU might already contain or subsequently generate internal goodwill and hidden reserves, the carrying amount of goodwill is partially shielded from economically necessary impairments (in the following referred to as cushion against impairment) and replaced by internally generated goodwill over time. The IASB was aware of this shortcoming, but accepted the consequences (IAS 36.BCZ44, BC135, BC191).

2.2. Opportunities for earnings management

The impairment test conceptually provides a certain degree of discretion. Discretion in accounting does not have a negative connotation if it is restricted to an optimal degree, as it allows management to improve the information value of financial statements by signaling private information on future performance (see, e.g., Sankar & Subramanyam, 2001). Thereby, it helps stakeholders to assess and verify the success of an acquisition and the firm's future performance⁴. However, management might

⁴ In this context, empirical studies show that goodwill impairments relate to future firm performance (Jarva, 2009; Li, Shroff, Venkataraman, & Zhang, 2011) and investment opportunities (Godfrey & Koh, 2009; Chalmers, Godfrey, & Webster, 2011), and that the impairment-only approach has a positive influence on the accuracy of analysts' earnings forecasts (Chalmers, Clinch, Godfrey, & Wei, 2012).

also have incentives to exploit existing information asymmetries and to use discretion in accounting to engage in opportunistic earnings management (Schipper, 1989, pp. 95-96).

Opportunities for earnings management in the context of goodwill accounting particularly arise from goodwill impairment tests, which in most cases use a discounted cash flow calculation. The main steps of the test are the definition of CGUs and allocation of goodwill, which determine the cushion against impairments, and the estimation of future cash flows (business assumptions) and determination of long-term growth rate and discount rate (valuation assumptions), which directly influence the outcome of annual impairment tests.

The definition of CGUs and allocation of goodwill offer management a certain degree of discretion. If management has an incentive to reduce future impairments, it can define CGUs relatively broadly in order to compensate for negative and positive performances of more granular CGUs. Moreover, management can allocate goodwill to CGUs that perform well and have a high cushion against impairment (Gundel, Möhlmann-Mahlau, & Sündermann, 2014, p. 132; Müller & Reinke, 2009, p. 526). On the contrary, if management's objective is to quickly realize impairments, it might allocate goodwill to smaller, low-performing CGUs with a small cushion against impairment. Overall, earnings management opportunities are limited by the management approach, i.e., the definition of CGUs and allocation of goodwill have to be consistent with the way the firm manages its operations and monitors goodwill for internal management purposes (IAS 36.80, 82; Küting, 2013, p. 1798).

The determination of business and valuation assumptions offers much more flexibility to engage in earnings management based on subsequent impairment testing. Management has to estimate future cash flows based on business assumptions. In order to reduce opportunities to engage in earnings management, IAS 36 includes several restrictions. The cash flow projections have to be based on the most recent financial budgets and forecasts approved by management, normally covering a maximum period of five years, and greater weight shall be given to external evidence like market data, analyst reports, or industry studies (IAS 36.33 (a), (b)).

With respect to the long-term growth rate, IAS 36.33 (c) has the relatively vague requirement that the long-term cash flows shall be extrapolated using a steady or declining growth rate which shall not exceed the long-term average growth rate for the products, industries, or countries, in which the firm operates, or for the market in which the asset is used. As a discount rate, firms often use a CGU-specific WACC, which has to consider CGU-specific risks not yet incorporated into the cash flow projections (IAS 36.A18), and which have to be independent of the firm's capital structure (IAS 36.A19). The subjectivity of both valuation assumptions (i.e., long-term growth rate and discount rate) is partly reduced since it is possible, at least to a certain degree, to ensure their plausibility based on external market data and/or historical firm-specific data.

2.3. Institutional setting

We analyze the earnings management behavior related to goodwill impairment accounting for a sample of German listed firms. The German institutional setting is an important representative of the continental European institutional model (versus the Anglo-American institutional model). One of its major aspects is the legal system (civil law in continental European countries vs. common law in Anglo-American countries; La Porta, Lopez-De-Silanes, & Shleifer, 2006). The level of minority rights protection is higher in common law countries, and it provides investors extensive powers to sue management for violations of fiduciary duty (Shleifer & Vishny, 1997, p. 770). Moreover, Anglo-American countries have stronger capital market oversight and accounting enforcement. Based on these arguments, prior research shows that continental European countries have the weaker legal protection of investors than Anglo-American countries (Gul, Zhou, & Zhu, 2013; La Porta, Lopez-De-Silanes, Shleifer, & Vishny, 1997; La Porta, Lopez-De-Silanes, Shleifer, & Vishny, 1998; La Porta et al., 2006). An important part of investor protection is auditor litigation risk. In contrast to Anglo-American countries, auditor liability is limited in Germany and in several other continental European countries, and the scope of third party litigation is limited, as it generally requires an intentional violation, which puts a high burden of proof on the plaintiffs (Gietzmann & Quick, 1998). Since litigation is seen as one of the most effective disciplinary mechanisms for auditors in the literature (Hope & Langli, 2010), the low litigation risk does not create strong incentives for high audit quality and might make auditors more tolerant towards earnings management practices. Therefore, continental European countries are considered to be more vulnerable to opportunistic management behavior. Empirically, Leuz, Nanda, and Wysocki (2003) show that earnings management decreases with higher investor protection.

Compared to Anglo-American countries, which have a higher focus on equity financing with higher developed equity markets, debt financing historically plays a more important role in continental European countries. This is particularly true for Germany and might explain why the legal protection of creditors is traditionally high. In fact, the primary role of accounting in Germany, traditionally, is the protection of creditors. Moreover, as most debt financing consists of loans instead of bonds, banks have particularly high power and a long tradition in monitoring management decisions. Furthermore, banks tend to have seats on the supervisory board (and audit committee) and/or vote for significant blocks of shares (either own shares or shares from other shareholders) (Gietzmann & Quick, 1998, p. 84; Shleifer & Vishny, 1997, pp. 754, 757). Hence, providers of debt capital in Germany (and other continental European countries) have a more important role in monitoring management (Gietzmann & Quick, 1998, p. 83), and they might force management to make more conservative accounting decisions.

With respect to corporate governance, Germany and several other continental European countries employ a two-tier board system, i.e., there is

a separation between executive directors with management responsibilities (management board) and non-executive directors with duties to appoint, advise, and monitor management (supervisory board). Moreover, in Germany specifically, employee representatives make up half of the supervisory board of large firms (over 2,000 employees, section 7 Law on Co-Determination), and the other half consists of shareholder representatives. On the contrary, the one-tier system of Anglo-American countries has only one board of directors. Whether this has an influence on the earnings management behavior, particularly with respect to goodwill impairment accounting, is not clear. On the one hand, non-executive directors in the two-tier system are more independent and might therefore be stricter in constraining earnings management. On the other hand, they may be less effective monitors due to limited financial expertise and involvement in operations and accounting decisions (see Quick and Schmidt, 2018 for a detailed discussion). Hence, they may not be able to assess whether impairment tests are reasonable or whether there is an intention to engage in earnings management.

2.4. Prior literature

Ideally, a study on earnings management related to goodwill impairments would compare reported impairments to fair impairments. However, as fair impairments are not observable and difficult to estimate, our research approach 1) identifies incentives for income-increasing and/or income-decreasing earnings management, and 2) evaluates whether firms exposed to these incentives show a different goodwill impairment pattern than other sample firms not exposed to these incentives. Controlling for economic and other impairment factors, we are hence able to identify whether goodwill impairment accounting correlates with incentives for earnings management. This would indicate that management uses goodwill impairments as an earnings management device.

We present an overview of empirical studies assessing whether the discretion in goodwill impairment accounting is used to engage in earnings management. We consider studies with firms reporting under IFRS and US-GAAP, as both settings apply an impairment-only approach⁵. However, results from studies under US-GAAP might not directly apply, as the impairment tests are not identical⁶, and the institutional setting is different⁷. We structure our overview by earnings management incentives and discuss the findings of prior

literature in the same order as we use the incentives in our empirical analysis. For each incentive, we first present the findings with respect to IFRS-regimes and then add US-GAAP results.

Considering the first incentive, meeting or just beating earnings targets, there is sparse evidence in the IFRS setting, which finds that firms are less likely to report goodwill impairment losses if their pre-impairment earnings just exceed zero earnings or previous year's earnings (Stora, 2013, using a worldwide sample from 2005-2010). Sellhorn (2004) provides some evidence that such a negative association of meeting targets and goodwill impairments is also present in the US-setting. The second incentive relates to conservative earnings smoothing, i.e., situations in which pre-impairment earnings are well above earnings targets. There is strong empirical evidence in IFRS settings that incentives to smooth earnings conservatively associate with a higher likelihood of (higher) goodwill impairments (AbuGhazaleh et al., 2011, for the UK 2005-2006; Giner and Pardo, 2015, for Spain 2005-2011; Hassine and Jilani, 2017, for France 2006-2012; and Glaum, Landsman, and Wyrwa, 2018, for a worldwide sample 2005-2011). Stenheim and Madsen (2016), using UK data from 2005 to 2009, is the only study, of which we are aware, that finds no significant results. Similarly, these studies also look at big bath accounting (i.e., pre-impairment earnings are well below earnings targets) and generally find a positive relationship of it with goodwill impairments, although evidence is mixed (specifically Glaum et al., 2018, report no significant association). Other studies only looking at big bath accounting and also find mixed results (Iatridis and Senftlechner, 2014, find no results for Austria 2006-2011; Kabir and Rahman, 2016, find results for Australia 2007-2012). Evidence in the US is similar (Jordan & Clark, 2004; Jordan, Clark, & Vann, 2007).

Another popular incentive with strong empirical evidence relates to tenure or changes in top management. Most IFRS studies find that a change in top management (long top management tenure) relates positively (negatively) to goodwill impairments (AbuGhazaleh et al., 2011; Hamberg, Paananen, and Novak, 2011, for Sweden 2001-2007; Kabir and Rahman, 2016; Hassine and Jilani, 2017; Glaum et al., 2018). Again, some studies do not find significant associations (Iatridis and Senftlechner, 2014; Avallone and Quagli, 2015; Stenheim and Madsen, 2016, find mixed results). US studies find results consistent with a positive (negative) association of top management turnover (tenure) and goodwill impairments (Masters-Stout, Costigan, & Lovata, 2008; Ramanna & Watts, 2012). Finally, many studies use some measure of debt covenant pressure as an incentive for earnings management. The most popular, albeit arguably crude measure is leverage. Results are largely insignificant in the IFRS setting (AbuGhazaleh et al., 2011; Avallone & Quagli, 2015; Giner & Pardo, 2015; Hassine & Jilani, 2017; Glaum et al., 2018). However, for more refined measures of debt covenant pressure, there is some evidence for a positive association with goodwill impairments (Hamberg et al., 2011, find no results; Hassine and Jilani, 2017, repeat their analysis replacing leverage by a refined measure and find significantly positive results). Conversely, in the US setting, Ramanna and

⁵ We do not consider US studies, which look at the initial engagement year only (Beatty & Weber, 2006; Zang, 2008), because goodwill impairments were expensed below the line in the initial year of US-GAAP impairment-only, while they are expensed above the line in later US-GAAP years and under IFRS.

⁶ There are three major differences that might have an influence on the likelihood and magnitude of impairments. First, according to US-GAAP, goodwill is allocated to reporting units (i.e., operating segments or one level below) instead of CGUs. Second, the US-GAAP impairment test is only based on fair value, i.e., it does not consider the value in use as an alternative measure. Third, until January 2017, when ASU 2017-04 was issued, it applied a two-step approach. The first step was similar to the IFRS impairment test, but it only determined whether the second step is required. The second step then calculated the impairment loss as the difference between the implied fair value of goodwill and its carrying amount.

⁷ Similar research studies impairments of other assets, which are also subject to amortization (i.e., no impairment-only approach), e.g., Siggelkow and Zülch (2013) and Bond, Govendir, and Wells (2016) with regard to IFRS, and Riedl (2004) and Minnick (2011) with regard to US-GAAP.

Watts (2012) find a negative association of leverage and goodwill impairments. When interpreting the above-cited results, note that many of the sample sizes are rather small. Therefore, especially for insignificant results, it is unclear whether they are driven by limited statistical power or by the actual absence of an association.

In addition to these results on associations of earnings management incentives with goodwill impairments, some of the above papers analyze whether corporate governance mechanisms and potential differences between periods before, during, or after the financial crisis moderate the association between goodwill impairments and the earnings management incentives under study (Giner & Pardo, 2015; Kabir & Rahman, 2016; Glaum et al., 2018). While they find some indication for differences, many of the associations hold even when controlling for potential moderation. Moreover, the evidence on pre-, during, and post-crisis differences is incomplete. Giner and Pardo (2015) do not formally test differences, but just run two separate regressions. Glaum et al. (2018) consider crisis differences only for their measure of the timeliness of goodwill impairment and hence provide no results for the influence of earnings management across crisis and non-crisis times.

2.5. Earnings management incentives and hypotheses development

We consider the following five earnings management incentives, which might have an influence on the recognition of goodwill impairment losses: beating an earnings target, conservative smoothing, big bath accounting, changes in senior management, and debt covenants. Moreover, we add general earnings management behavior not related to goodwill impairment accounting as a sixth variable to capture incentive situations not (sufficiently) covered by the previous five indicators.

2.5.1. Beating an earnings target

Beating an earnings target refers to the incentive of management to achieve an earnings target and, hence, to engage in income-increasing earnings management if fair earnings fall short of a target. Prior studies indicate the economic relevance of earnings targets for the capital market as their results suggest that capital market participants use these targets as reference points and that beating (missing) them is considered as a positive (negative) signal (e.g., Barth, Elliott, & Finn, 1999; DeAngelo, DeAngelo, & Skinner, 1996; Dechow, Richardson, & Tuna, 2000). Moreover, several studies find that firms engage in income-increasing earnings management to beat earnings targets (Burgstahler & Dichev, 1997; Glaum, Lichtblau, & Lindemann, 2004; Holland & Ramsay, 2003). Analogous to these studies, we analyze two targets: zero earnings and previous year's earnings⁸. If a firm's earnings before goodwill impairment just exceed an earnings target,

management might have an incentive to avoid impairment losses or, if this is not possible, to record smaller goodwill impairments than economically necessary in order to still beat the target. Hence, the following hypothesis is tested:

H1: Firms whose earnings before goodwill impairment just exceed an earnings target are less likely to recognize goodwill impairments and report smaller impairment losses.

2.5.2. Conservative smoothing and big bath accounting

Conservative smoothing and big bath accounting refer to the incentive of a firm's management to engage in income-decreasing earnings management when fair earnings clearly exceed or miss an earnings target, respectively (Ronen & Yaari, 2008). Both strategies offer the possibility to inflate future earnings if goodwill impairments otherwise could be required in future periods. In the former case, a firm is clearly above the earnings target, which allows recognizing an impairment loss without falling below this target. In the latter, a firm recognizes an impairment loss in a situation, which is already bad. Moreover, a big bath could act as a clearing event signaling that management admits previous mistakes, and bad times are over (Alciatore, Dee, Easton, & Spear, 1998, p. 16; Zucca & Campbell, 1992, p. 35). Kirschenheiter and Melumad (2002) provide a complementing perspective based on management's incentive to maximize firm value. They show that reporting a larger earnings surprise reduces the inferred earnings precision and thus dampens the impact of this surprise on firm value. If the news is good, managers, therefore, have an incentive to smooth earnings, thus increasing the inferred earnings precision. On the other hand, bad news results in an incentive to take a big bath, as a larger negative surprise has a reduced overall effect on firm value due to a reduced inferred earnings precision. Both strategies lead to a maximization of firm value. This leads to the following two hypotheses:

H2: Firms whose earnings before goodwill impairment clearly exceed an earnings target are more likely to recognize goodwill impairments and report larger impairment losses (income smoothing).

H3: Firms whose earnings before goodwill impairment clearly miss an earnings target are more likely to recognize goodwill impairments and report larger impairment losses (big bath accounting).

2.5.3. Changes in senior management

Changes in senior management might have an influence on goodwill impairment accounting as new senior management has several incentives to record (larger) goodwill impairment losses. This strategy is also known as "cleaning the decks". In particular, it might blame low earnings on the old management and reduce the basis for future performance evaluation. Moreover, it offers new management the opportunity to inflate earnings in future periods (AbuGhazaleh et al., 2011, p. 175; Lapointe-Antunes, Cormier, & Magnan, 2008, p. 41; Riedl, 2004, p. 832; Zang, 2008, p. 43). In addition, old management has

⁸ International studies from other research streams than goodwill accounting also use consensus analyst forecasts as another target. However, due to an insufficient number of analysts to determine a consensus forecast for German listed firms, we cannot include this target in our analysis.

more likely been involved in the acquisition, which created goodwill. Therefore, it might be reluctant to recognize impairments, which investors could interpret as signs of unsuccessful transactions. Moreover, old management might have the intention to leave the firm with the best possible profitability, which might be achieved by postponing impairment losses. Additionally, there might be other social or psychological reasons to avoid impairments, whereas new senior management brings in an unbiased perspective (Hamberg et al., 2011, pp. 269-270; Lapointe-Antunes et al., 2008, p. 41; Masters-Stout et al., 2008, p. 1372; Ramanna & Watts, 2012, p. 759). However, changes in management could also be the result of poor firm performance or a poor market perception, which itself might economically necessitate impairments. Therefore, it is crucial that empirical analyses control for firm performance and market perception (AbuGhazaleh et al., 2011, p. 176; Riedl, 2004, p. 832). We focus on the two positions on the management board with arguably the highest influence on financial reporting decisions, such as goodwill impairments, chief executive officer (CEO) and chief financial officer (CFO) (Jiang, Petroni, & Wang, 2010), and test the following hypothesis:

H4: Firms whose CEO or CFO is newly appointed to the management board are more likely to recognize goodwill impairments and report larger impairment losses.

2.5.4. Debt covenants

The debt covenants hypothesis derives from the assumption that managers of highly leveraged firms have incentives to engage in income-increasing earnings management to avoid costly debt covenant violations (Watts & Zimmermann, 1986). Consistent with prior literature, we use leverage as a proxy for the intensity of this incentive, particularly for two reasons. First, higher leverage comes along with a higher probability to violate debt covenants, as debt covenants are often based on certain leverage limits. Second, the cost of violating debt covenants increases with the firm's debt, as violations usually lead to an adjustment of the terms of debt. This results in the following hypothesis:

H5: Firms with higher leverage are less likely to recognize goodwill impairments and report smaller impairment losses.

2.5.5. General earnings management behavior

As a final proxy, we add the general earnings management behavior unrelated to goodwill impairment accounting to capture incentive situations not covered by the previous earnings management incentives. We split the sample into two subgroups depending on their earnings management behavior unrelated to impairment accounting. We use accrual-based earnings management (measured by pre-impairment discretionary accruals) since goodwill impairments are accruals as well. If a firm shows positive pre-impairment discretionary accruals, we expect it to exert income-increasing accrual-based earnings management. Hence, it might also have an incentive

to avoid goodwill impairments or to report smaller impairment losses. On the other hand, a firm might have an incentive to opportunistically inflate impairment losses if it shows negative pre-impairment discretionary accruals. Therefore, we formulate the following hypothesis:

H6: Firms with positive pre-impairment discretionary accruals are less likely to recognize goodwill impairments and report smaller impairment losses.

3. RESEARCH METHODOLOGY

3.1. Sample

The initial sample consists of all observations of German firms that are listed on the regulated market of the Frankfurt Stock Exchange (CDAX) during the fiscal years 2006 and 2013⁹. We obtain a consolidated financial statement and market data from Worldscope, and manually collect the carrying amounts of goodwill, goodwill impairment losses, CEO/CFO changes, and a number of segments from annual reports¹⁰. We exclude banks, insurance companies, and other financial service firms¹¹. We omit observations if firms undergo mergers and acquisitions or an IPO, became insolvent, were liquidated, or were in severe financial distress (negative book value of equity or zero sales), as these observations likely face unusual situations, which are not comparable to other firm-years. We also exclude observations of firms applying accounting principles other than IFRS and with shorter fiscal years. We only consider observations of firms having a non-zero closing goodwill balance or reporting a goodwill impairment loss. To ensure a reliable estimation of pre-impairment discretionary accruals, we require at least seven firms per industry-year (Bartov, Gul, & Tsui, 2001). Hence, we drop observations belonging to industry-years with less than seven firms. Finally, we delete observations with missing data. This leaves us with a final sample of 2,127 firm-year observations from 354 firms. Table 1 summarizes the sample selection process. In order to account for potential outliers or erroneous data, we winsorize all continuous variables at 1% and 99%.

⁹ The sample period does not cover the fiscal year 2005 as it was the first mandatory application year of the revised IAS 36, and we require prior year data for some variables. Moreover, the first-time application of the impairment-only approach might unusually affect goodwill impairments.

¹⁰ For a limited subsample Worldscope provides data for carrying amounts of goodwill and goodwill impairment losses. We compare it to our manually collected data as an additional check for the reliability of our data collection. We were able to resolve all differences.

¹¹ These firms are subject to different financial reporting requirements that lead to a different structure of balance sheets and income statements. This reduces the comparability with other sample firms.

Table 1. Summary of sample size

Observations of CDAX listed firms for the periods 2006 to 2013	4,811
<i>Less</i>	
Banking, insurance, and financial services firm-year observations	840
Observations subject to insolvency, liquidation, merger and acquisition, severe financial distress, IPOs	995
Observations subject to accounting principles other than IFRS or short fiscal years	232
Observations without goodwill	549
Observations of industry-years with less than 7 firms	40
Observations with missing data	28
Sample size (No. of firms = 354)	2,127

3.2. Operationalization of earnings management incentives

3.2.1. Beating an earnings target

In order to identify firms just beating an earnings target, we build two indicator variables (*Target_1* and *Target_2*) using a distributional approach for the earnings metrics (pre-impairment earnings and pre-impairment change in earnings). The distributional approach takes each earnings target (zero earnings and previous year's earnings) as the center of the respective earnings metric distribution and defines intervals based on distributional characteristics. We assume that the first positive interval (i.e., the interval to the right of an earnings target) consists of firms that just beat an earnings target. In order to mitigate scaling problems, we scale the earnings metrics by lagged total assets. Following Holland and Ramsay (2003), we define the interval width as:¹²

$$\text{Mean } [0.9 \min(\sigma; IQR/1.34) n^{-1/5}; 0.79 IQR n^{-1/5}] \quad (1)$$

where:

σ = standard deviation;

IQR = interquartile range;

n = number of observations.

For pre-impairment earnings, the interval width is 0.0108. Therefore, the incentive variable for zero earnings, *Target_1* takes the value of 1 if pre-impairment earnings scaled by lagged total assets are between 0 % and 1.08 %, and 0 otherwise. For the pre-impairment change in earnings, the interval width is 0.0078. Hence, *Target_2* refers to previous year's earnings as target and takes the value of 1 if the pre-impairment change in earnings scaled by lagged total assets is between 0 % and 0.78 %, and 0 otherwise. As an additional criterion, observations are excluded from the two incentive groups (i.e., the respective variable takes a value of 0 instead of 1) if the goodwill balance before impairments scaled by lagged total assets is less than the respective earnings metric. This is consistent with hypothesis *H1*, as these firms cannot fall below the earnings target, even if goodwill was fully written-off. Under *H1*, both incentive variables correlate negatively with goodwill impairments.

3.2.2. Conservative smoothing and big bath accounting

Prior literature determines conservative smoothing (big bath accounting) incentives to be present for observations with scaled pre-impairment earnings above (below) the median scaled pre-impairment earnings exceeding an earnings target (AbuGhazaleh et al., 2011; Riedl, 2004; Stora, 2013). However, these studies consider only one target or each earnings target separately. This approach does not account for firms subject to conflicting incentives if pre-impairment earnings are between two earnings targets. In such a situation, a firm might not have an incentive to inflate goodwill impairments.

Therefore, we use a refined approach considering both earnings targets (zero earnings and previous year's earnings) simultaneously and hence identify conservative smoothing (big bath accounting) only if the scaled pre-impairment earnings are above (below) the median scaled pre-impairment earnings exceeding both earnings targets. We hence define the following two indicator variables: *Smooth* takes the value of 1 if scaled pre-impairment earnings are higher than the median scaled pre-impairment earnings exceeding the higher earnings target, and 0 otherwise. However, *Smooth* is always 0 if the higher earnings target is missed after recording an impairment loss because such behavior is inconsistent with earnings management aimed at earnings smoothing. *Bath* takes the value of 1 if scaled pre-impairment earnings are lower than the median scaled pre-impairment earnings missing the lower earnings target, and 0 otherwise. Under *H2* and *H3*, both incentive variables correlate positively with goodwill impairments.

3.2.3. Changes in senior management

We identify changes in senior management if a CEO or CFO is newly appointed to the management board. Accordingly, we use two indicator variables: *CEO* takes the value of 1 in the fiscal year, in which the firm's CEO is newly appointed to the management board, and 0 otherwise. *CFO* takes the value of 1 in the fiscal year, in which the firm's CFO is newly appointed to the management board, and 0 otherwise¹³. Under *H4*, both incentive variables correlate positively with goodwill impairments.

¹² This combined formula was first used by Quick and Wiemann (2012). The calculated interval widths differ only marginally from an alternative definition of DeGeorge, Patel, and Zeckhauser (1999), who use the formula $2 IQR n^{-1/5}$. This would yield 0.0106 for zero pre-impairment earnings and 0.0077 for the pre-impairment change in earnings. Moreover, consistent with Stora (2013), the robustness checks in Section 6 test a substantially smaller interval width (0.005).

¹³ Note that we do not consider the reasons for these changes in senior management. Most of the time, those reasons are not communicated publicly and, if they are, it is uncertain whether the official reason reflects the true motivation. Moreover, the theoretical arguments provided in subsection 2.5.3 largely consider the incentives of the incoming manager, irrespective of the reason for the change. Therefore, knowing the reasons for senior management changes would not alter our predictions.

3.2.4. Debt covenants

We use leverage as a proxy for the degree of debt covenant slack. Therefore, the incentive variable *LEV* is total debt divided by pre-impairment total assets. Under *H5*, it correlates negatively with goodwill impairments.

3.2.5. General earnings management behavior

To operationalize the general earnings management behavior not related to goodwill impairment accounting, we use the following cross-sectional performance-adjusted Jones model (Kothari, Leone, & Wasley, 2005)¹⁴. The model explicitly excludes the effects of impairment losses and therefore determines the firms' pre-impairment discretionary accruals.

$$DA_t^* = TA_t^* - [\alpha_t (1/A_{t-1}) + \beta_t (\Delta REV_t - \Delta AR_t)/A_{t-1} + \gamma_t (PPE_t/A_{t-1}) + \delta_t ROA_t^*] \quad (2)$$

where:

DA_t^* = pre-impairment discretionary accruals in year t scaled by lagged total assets;

TA_t^* = pre-impairment total accruals in year t scaled by lagged total assets;

A_{t-1} = total assets at the beginning of year t ;

ΔREV_t = change in revenues from year $t-1$ to t ;

ΔAR_t = change in accounts receivable from year $t-1$ to t ;

PPE_t = gross property, plant, and equipment in year t ;

ROA_t^* = pre-impairment return on assets in year t .

α_t , β_t , γ_t , and δ_t are industry-specific coefficients in year t derived from the following cross-sectional regression:

$$TA_t^* = \alpha_t (1/A_{t-1}) + \beta_t (\Delta REV_t - \Delta AR_t)/A_{t-1} + \gamma_t (PPE_t/A_{t-1}) + \delta_t ROA_t^* + \epsilon \quad (3)$$

We divide observations into two groups based on the sign of their pre-impairment discretionary accruals. Accordingly, the indicator variable *posDA* takes the value of 1 if observations have positive pre-impairment discretionary accruals, and 0 if observations have negative pre-impairment discretionary accruals. Under *H6*, it correlates negatively with goodwill impairments.

3.3. Model specification

In order to examine the influence of earnings management incentives on goodwill impairment accounting, we study two types of goodwill impairment patterns as our dependent variables:

- 1) recognition of goodwill impairments (*IMP*);
- 2) the scaled magnitude of goodwill impairments (*IMP_MAG*).

The indicator variable *IMP* captures the recognition of goodwill impairments, i.e., it takes the value of 1 if an impairment loss is recognized, and 0 otherwise. This leads to the following logistic regression model:

Model 1

$$Prob(IMP) = \frac{1}{1+e^{-Z}}$$

where,

$$Z = \beta_0 + \beta_1 Target_1 + \beta_2 Target_2 + \beta_3 Smooth + \beta_4 Bath + \beta_5 CEO + \beta_6 CFO + \beta_7 LEV + \beta_8 posDA + \beta_X X + \epsilon \quad (4)$$

The magnitude of impairment is captured by impairment losses scaled by lagged total assets (*IMP_MAG*). The following Tobit regression is estimated^{15,16}:

Model 2

$$IMP_MAG = \beta_0 + \beta_1 Target_1 + \beta_2 Target_2 + \beta_3 Smooth + \beta_4 Bath + \beta_5 CEO + \beta_6 CFO + \beta_7 LEV + \beta_8 posDA + \beta_X X + \epsilon \quad (5)$$

In both models, X is a vector of control variables accounting for influencing factors of goodwill impairments (all other variables are as described above). In order to receive reliable results, it is important to control for economic and other factors determining the likelihood and magnitude of goodwill impairments. As pointed out by Riedl (2004, p. 830), an ideal economic factor would include management's unbiased expectations on future performance of CGUs to which goodwill has been allocated. However, as these expectations are not observable and as financial information at CGU level is not sufficiently available, the research design includes proxies related to economic impairment of goodwill at firm level. Below, we describe our control variables, which each belong to one of the following four categories: market perception, firm performance, impairment test characteristics, and other influencing factors. Table 2 summarizes variable definitions for all earnings management incentive and control variables used in the regression models. For all of our regressions, we cluster robust standard errors at the firm level.

¹⁴ The literature shows that controlling for firm performance improves the model's specification and increases its power to detect earnings management (e.g., Dechow, Sloan, & Sweeney, 1995; Kothari et al., 2005; Peasnell, Pope, & Young, 2000).

¹⁵ We use Tobit regressions as IFRS do not allow to reverse any previous impairment losses or to increase the carrying amount of goodwill beyond its initially recognized costs (i.e., no negative impairments). Hence, the dependent variable is censored at zero and applying a linear regression model would bias the results. The Tobit regression combines a Probit model to estimate the likelihood that *IMP_MAG* has a positive value and a linear model for a latent (uncensored) dependent variable. Therefore, the coefficients of the Tobit regression represent the unbiased linear effect of the independent variables on the magnitude of impairment losses.

¹⁶ For the theoretical background and interpretation of the Tobit regression see Windzio (2013, pp. 263-267). As Windzio points out, the Tobit regression model assumes that the likelihood of being censored as well as the observed value of the dependent variable are determined by the same set of independent variables. With respect to goodwill impairments, this condition is satisfied as the independent variables determine both likelihood and magnitude of impairment losses.

Table 2. Definition of regression variables

Variable	Pred. sign	Definition
<i>Earnings management incentive variables</i>		
<i>Target_1</i>	-	Indicator variable with the value of 1 if pre-impairment earnings scaled by lagged total assets are (1) between 0 % and 1.08 % and (2) smaller than the scaled goodwill balance before impairments, and 0 otherwise
<i>Target_2</i>	-	Indicator variable with the value of 1 if a pre-impairment change in earnings scaled by lagged total assets is (1) between 0 % and 0.78 % and (2) smaller than the scaled goodwill balance before impairments, and 0 otherwise
<i>Smooth</i>	+	Indicator variable with the value of 1 if scaled pre-impairment earnings are (1) higher than the median scaled pre-impairment earnings exceeding the higher earnings target and (2) higher earnings target is still achieved, and 0 otherwise
<i>Bath</i>	+	Indicator variable with the value of 1 if scaled pre-impairment earnings are lower than the median scaled pre-impairment earnings missing the lower earnings target, and 0 otherwise
<i>CEO</i>	+	Indicator variable with the value of 1 if a CEO is newly appointed to the management board, and 0 otherwise
<i>CFO</i>	+	Indicator variable with the value of 1 if a CFO is newly appointed to the management board, and 0 otherwise
<i>LEV</i>	-	Total debts divided by pre-impairment total assets
<i>posDA</i>	-	Indicator variable with the value of 1 if pre-impairment discretionary accruals are positive, and 0 otherwise
<i>Control variables</i>		
<i>MBV</i>	-	Pre-impairment market to book value of equity
<i>MBV < 1</i>	+	Indicator variable with the value of 1 if $MBV < 1$, and 0 otherwise
<i>Growth</i>	-	Change in sales compared to the previous fiscal year
<i>OI</i>	-	Operating income (i.e., also excluding goodwill impairments) scaled by lagged total assets
ΔOI	-	Change in OI compared to the previous fiscal year
<i>GW</i>	+	Goodwill before impairment scaled by lagged total assets
<i>Segment</i>	?	Number of segments
<i>Size</i>	?	Natural logarithm of lagged total assets
<i>Year</i>	?	Set of year dummies
<i>Industry</i>	?	Set of industry dummies

3.3.1. Market perception

First, we include two control variables based on the market's perception of firm value. The pre-impairment market to book value of equity (*MBV*) is a fair value proxy for the firm-wide necessity of goodwill impairments. The more the market value of a firm's net assets exceeds the book value, the less likely is the necessity of impairments (Beatty & Weber, 2006; Lapointe-Antunes et al., 2008; AbuGhazaleh et al., 2011; Stora, 2013). The reduced impairment necessity might also be the result of a higher cushion against impairment. According to IAS 36.12 (d), a market to book value lower than one is an indication of impairments. From a firm-wide perspective, this is consistent if the market value represents a suitable estimate for the recoverable amount. Therefore, we include an indicator variable $MBV < 1$, which we expect to associate positively with goodwill impairments.

3.3.2. Firm performance

Similar to prior studies (e.g., AbuGhazaleh et al., 2011; Riedl, 2004; Stora, 2013; Zang, 2008), we use control variables for firm performance and change in firm performance. *Growth* measures the firm's change in sales. Growing firms likely have higher future prospects and therefore a reduced necessity of goodwill impairments. According to IAS 36.14, lower operating profits than expected or a decrease in operating profits can be an indication of impairment. *OI* and ΔOI capture the firm's current profitability and the change in profitability based on operating income (i.e., also excluding goodwill impairments). Following IAS 36.14, firms with higher current performance have a reduced likelihood that goodwill is economically impaired and might have a higher cushion against impairment. An increase in

profitability might also decrease the necessity of impairments.

3.3.3. Impairment test characteristics

The next two variables control the characteristics of goodwill impairment testing. *GW* measures the relative amount of goodwill exposed to impairment testing. The higher the amount, the higher the likelihood that goodwill is impaired, and the higher a potential impairment loss (Lapointe-Antunes et al., 2008; Masters-Stout et al., 2008; Ramanna & Watts, 2012; Stora, 2013). Following Ramanna and Watts (2012), we use the number of segments (*Segment*) as a proxy for the number of CGUs. It represents the minimum number of a firm's CGUs to which goodwill can be allocated (see subsection 2.1). The influence of the number of CGUs on goodwill impairments is theoretically unclear. A relatively large number of CGUs could increase goodwill impairments as more impairment tests might be conducted and as potential impairment losses in one CGU cannot be netted with surpluses in other CGUs. However, a higher number of CGUs also offers more flexibility in allocating goodwill to CGUs and, therefore, in determining future impairment losses. Goodwill could either be allocated to low-performing CGUs with a low cushion against impairment (to accelerate impairment losses) or to high-performing CGUs with a high cushion against impairment (to avoid future impairment losses)¹⁷.

¹⁷ Moreover, prior empirical findings are mixed. Ramanna and Watts (2012) find a negative association between number of segments and magnitude of goodwill impairments, whereas Lapointe-Antunes et al. (2008) find a positive influence on the magnitude of initial adoption impairment losses. For firms with more than one segment, Beatty and Weber (2006) find a positive influence on the likelihood of initial adoption impairments, but, consistent with AbuGhazaleh et al. (2011), do not find a significant impact on the magnitude.

3.3.4. Other influencing factors

Following prior literature, firm size (*Size*), year dummies (*Year*), and industry dummies (*Industry*) are included in the regression models and coefficient signs are not predicted. Firm size controls for various size-related aspects that might have an influence on the recognition of impairment losses. For example, larger firms might be subject to stronger public control and corporate governance and might have more expertise and resources to carry out impairment tests. The research design controls for different years as macroeconomic factors might generally influence the outcome of impairments tests (e.g., financial crisis or different

market interest rates). Moreover, it controls for potential differences between industries in the necessity of impairments and the cushion against impairment due to factors like growth prospects, business risk, or level of hidden reserves and internally generated goodwill.

4. RESEARCH RESULTS

4.1. Descriptive statistics

Table 3 provides descriptive statistics for goodwill impairment variables, earnings management incentive variables, and control variables.

Table 3. Descriptive statistics

Panel A: Goodwill impairment variables						
Variable	n	Mean	Std. dev.	1. Quartil	Median	3. Quartil
IMP	2.127	0.216	-	-	-	-
IMP_MAG	2.127	0.005	0.017	0	0	0
IMPonly ^a	459	0.025	0.047	0.001	0.006	0.027
Panel B: Earnings management incentive variables						
Variable	n	Mean	Std. dev.	1. Quartil	Median	3. Quartil
Target_1	2.127	0.059	-	-	-	-
Target_2	2.127	0.119	-	-	-	-
Smooth	2.127	0.265	-	-	-	-
Bath	2.127	0.076	-	-	-	-
CEO	2.127	0.068	-	-	-	-
CFO	2.127	0.103	-	-	-	-
LEV	2.127	0.529	0.190	0.395	0.554	0.676
posDA	2.127	0.445	-	-	-	-
Panel C: Control variables						
Variable	n	Mean	Std. dev.	1. Quartil	Median	3. Quartil
MBV	2.127	2.011	1.610	1.041	1.539	2.432
MBV < 1	2.127	0.228	-	-	-	-
Growth	2.127	0.078	0.226	-0.024	0.061	0.158
OI	2.127	0.047	0.109	0.006	0.053	0.100
ΔOI	2.127	0.003	0.069	-0.019	0.005	0.031
GW	2.127	0.162	0.159	0.036	0.115	0.237
Segment	2.127	2.768	1.193	2	3	3
Size	2.127	5.774	2.129	4.096	5.392	7.096

Note: IMPonly equals IMP_MAG for a subsample of impairment observations. It is only used for descriptive analysis.

Looking at the goodwill impairment variables in *Panel A*, goodwill impairments represent, on average, 0.5 % of lagged total assets (*IMP_MAG*), and 21.6 % of the firm-year observations report an impairment loss (*IMP*). If only a subsample of observations with impairments is considered, the impairment loss has a mean (median) value of 2.5% (0.6 %) of lagged total assets (*IMPonly*).

With respect to the variables of interest in *Panel B*, the pre-impairment earnings of 5.9 % of the observations just exceed zero earnings (*Target_1*), and 11.9 % just exceed the previous year's earnings (*Target_2*). The incentive variables for conservative smoothing and big bath accounting represent 26.5 % (*Smooth*) and 7.6 % (*Bath*) of the sample, respectively. Firms appoint new CEOs to the management board in 6.8 % of firm-years (*CEO*), and new CFOs in 10.3 % of firm-years (*CFO*). Sample firms show an average (median) pre-impairment leverage (*LEV*) of 52.9 % (55.4 %). Finally, 44.5 % of the observations show positive pre-impairment discretionary accruals (*posDA*).

The control variables are presented in *Panel C*.

Table 4 presents differences between the two subsamples of firm-years with and without a goodwill impairment for all earnings management incentive and control variables. We test the significance of these differences with chi-squared tests (indicator variables), and t-tests, and Mann-Whitney U tests (mean and median of continuous variables, respectively).

The differences of all of our variables of interest are in the expected direction and significant on conventional levels, with the exception of *Smooth*, which is insignificant, and *LEV*, which is significant, but in the opposite than expected direction. As these simple tests do not control for the economic necessity of impairments, we discuss potential interpretations of our findings after presenting the more reliable multivariate results.

All control variables meet expectations and are significant. Moreover, the impairment sample shows significantly higher values for *Segment* and *Size*.

Table A.1 shows the results of the correlation analysis. Multicollinearity is unlikely to be an issue as the highest VIF of our variables of interest or controls is 2.02 (*Size*).

Table 4. Univariate analysis - the test of differences

Variable	Impairment observation (n = 459)		Non-impairment observation (n = 1.668)		Test of differences	
	Proportion		Proportion		Chi-squared test	
<i>Target_1</i>	3.7 %		6.5 %		**	
<i>Target_2</i>	7.0 %		13.2 %		***	
<i>Smooth</i>	24.2 %		27.2 %			
<i>Bath</i>	17.0 %		5.0 %		***	
<i>CEO</i>	16.6 %		4.1 %		***	
<i>CFO</i>	21.4 %		7.3 %		***	
<i>posDA</i>	36.4 %		46.8 %		***	
<i>MBV < 1</i>	27.2 %		21.6 %		***	
	Mean	Median	Mean	Median	t-test	Mann-Whitney U test
<i>LEV</i>	0.574	0.592	0.517	0.542	***	***
<i>MBV</i>	1.889	1.419	2.044	1.566	**	***
<i>Growth</i>	0.044	0.037	0.087	0.066	***	***
<i>OI</i>	0.011	0.035	0.057	0.057	***	***
Δ <i>OI</i>	-0.010	-0.001	0.006	0.007	***	***
<i>GW</i>	0.181	0.138	0.156	0.108	***	***
<i>Segment</i>	3.004	3.000	2.703	3.000	***	***
<i>Size</i>	6.198	5.759	5.657	5.310	***	***

Notes: *, **, and *** denote significance at 10%, 5%, and 1% level, respectively (p-values are one-tailed when the direction is as predicted, and two-tailed otherwise). Variables of interest are in italics.

4.2. Multivariate analysis

Table 6 presents the results of the multivariate analysis. The first (second) column contains coefficients and p-values of the logistic regression for the likelihood of impairment recognition (*IMP*) (Tobit regression for the scaled magnitude of goodwill impairments - *IMP_MAG*). We can interpret coefficients of the logistic regression as the change in the logarithm of the odds that a firm recognizes an impairment loss if the independent variable's value changes by one. Hence, we can calculate the respective change in odds for indicator variables

as the natural exponential function with the regression coefficient as its argument. For continuous variables, the appropriate argument for the exponential function is the change of the independent variable's value by one standard deviation multiplied with the regression coefficient. The coefficients of the Tobit regression represent the unbiased linear effect on the latent (uncensored) magnitude of impairment losses. Hence, we can interpret them analogously to OLS coefficients, except for the difference that the coefficients are corrected for the censoring effect (Windzio, 2013, pp. 268-269).

Table 6. Regression results for impairment variables (*IMP* and *IMP_MAG*) on earnings management incentive variables and control variables

Variable	Predicted sign	<i>IMP</i>		<i>IMP_MAG</i>	
		β	p-value	β	p-value
<i>Target_1</i>	-	-0.704***	0.006	0.013**	0.017
<i>Target_2</i>	-	-0.637***	0.002	0.013***	0.002
<i>Smooth</i>	+	0.334**	0.021	0.006**	0.035
<i>Bath</i>	+	0.948***	0.000	0.021***	0.000
<i>CEO</i>	+	0.955***	0.000	0.026***	0.000
<i>CFO</i>	+	0.781***	0.000	0.015***	0.000
<i>LEV</i>	-	0.976**	0.048	0.014	0.173
<i>posDA</i>	-	-0.268**	0.016	0.006**	0.019
<i>MBV</i>	-	-0.034	0.334	0.001	0.348
<i>MBV < 1</i>	+	0.184	0.167	0.004	0.165
<i>Growth</i>	-	-0.309	0.161	0.004	0.274
<i>OI</i>	-	-2.925***	0.002	0.086***	0.000
Δ <i>OI</i>	-	-0.931	0.168	0.010	0.339
<i>GW</i>	+	1.256***	0.007	0.056***	0.000
<i>Segment</i>	?	0.110	0.126	0.002	0.131
<i>Size</i>	?	0.167***	0.002	0.001	0.212
<i>Year</i>		Yes		Yes	
<i>Industry</i>		Yes		Yes	
Nagelkerke R ²		0.201		note ¹⁸	
χ -squared		297.4***		355.1***	
n		2.127		2.127	

Notes: *, **, and *** denote significance at 10%, 5%, and 1% level, respectively (p-values are one-tailed when the direction is as predicted, and two-tailed otherwise). Robust standard errors are clustered at the firm level. Intercepts are not reported.

¹⁸ Note that it is not possible to calculate a meaningful pseudo R² for Tobit regression models as values smaller than 0 and greater than 1 are possible. Therefore, the χ -squared provides a more meaningful indication of the model's goodness of fit.

The coefficients of *Target_1* and *Target_2* are significantly negative at the 1 percent level for *IMP* (-0.704 and -0.637). Hence, firms with pre-impairment earnings just exceeding zero (previous year's earnings) are only 0.49 (0.53) times as likely to recognize an impairment loss as firms not beating these targets. With respect to *IMP_MAG*, the coefficients are also negative at the 5 and 1 percent level, respectively (-0.013 and -0.013). Hence, the results show that firms are less likely to recognize goodwill impairments and report lower impairment losses if they just beat an earnings target. Consistent with hypothesis *H1*, this indicates that firms might opportunistically avoid (larger) goodwill impairments in order to beat an earnings target.

For *Smooth*, the coefficient of the logistic regression is positive (0.334) and significant at the 5 percent level. This means that firms with pre-impairment earnings above the median of all firms exceeding both earnings targets are 1.40 times as likely to recognize an impairment loss as firms below this median. With respect to the magnitude of impairment losses, the coefficient of the Tobit regression is also positive (0.006) and significant at the 5 percent level. Consistent with *H2*, the multivariate analysis indicates that firms report (higher) goodwill impairments relatively more often and, therefore, might opportunistically inflate impairment losses as they do not risk falling below an earnings target.

Looking at the multivariate results for *Bath*, the coefficient of the logistic regression (0.948; significant at the 1 percent level) shows that the likelihood to recognize an impairment loss is 2.58 times as high if firm pre-impairment earnings are below the median of all firms missing an earnings target. Similarly, the Tobit coefficient is positive (0.021) at the 1 percent level. Hence, consistent with *H3*, firms might opportunistically report impairments more frequently and with higher amounts than economically necessary when the earnings situation is already bad, incentivizing big bath accounting.

The coefficients of *CEO* and *CFO* are significantly positive for *IMP* (0.955 and 0.781) at the 1 percent level. This means that the likelihood to recognize an impairment loss is 2.6 (2.18) times as high for firms that appoint a new CEO (CFO) compared to firms that do not. The coefficients for *IMP_MAG* are also positive (0.026 and 0.015) and significant at the 1 percent level. This suggests that firms experiencing a change in CEO or CFO report larger impairment losses. Hence, the results are consistent with the expectations of *H4* that new senior management might use goodwill impairments in pursuit of a "cleaning the decks" strategy to decrease the risk of future impairments and to start from a lower performance level.

Partially consistent with univariate comparisons, and inconsistent with *H5*, the coefficients of *LEV* (0.976 for *IMP* and 0.014 for *IMP_MAG*) are significantly positive at the 5 percent level, and insignificant, respectively. This indicates that a one standard deviation increase in leverage corresponds to an impairment likelihood which is 1.2 times as high as that of an average firm. This result could be explained by a lack of construct validity. It is possible that *LEV* does not sufficiently measure the firms' actual exposure to costly debt covenant violations, e.g., because it does not

sufficiently capture the firms' likelihood and costs of violating debt covenants, or because debt covenants might not always include goodwill in calculating leverage. However, this would likely lead to insignificant regression coefficients. Therefore, the significant positive results might rather be an indicator of the influence of the specific German setting. As explained above, debt financing plays a more important role and large creditors (like banks) have a more prominent role in monitoring management and a stronger influence on the firm's accounting. Hence, influential creditors (indicated by high leverage) might force management to make more conservative accounting decisions. With respect to goodwill impairments, this means that firms might recognize more (larger) goodwill impairments.

The last earnings management incentive variable is *posDA*. The coefficient of the logistic regression (-0.268) is significantly negative at the 5 percent level. I.e., firms with positive pre-impairment discretionary accruals are only 0.76 times as likely to recognize an impairment loss as firms with negative pre-impairment discretionary accruals. Similarly, the coefficient of the Tobit regression (-0.006) is significantly negative at the 5 percent level. Consistent with *H6*, firms with overall income-increasing accrual-based earnings management are less likely to report goodwill impairments and report smaller impairment losses. Hence, *posDA* seems to account for situations with earnings management incentives beyond the previously discussed specific incentives. This improves the specification of the regression models and provides additional confidence for our evidence that management uses goodwill impairment accounting as a catch-all device for earnings management.

Consistent with univariate comparisons, all coefficients of the control variables in both models show the predicted sign. With respect to the coefficients without predictions, the coefficients of *Segment* (0.110 and 0.002) are insignificant at conventional levels. The coefficients of *Size* (0.167 and 0.001) are positive and significant at the 1 percent level, and insignificant, respectively. We can only speculate about potential explanations. For example, stronger public control and corporate governance or more resources to carry out sophisticated impairment tests might influence larger firms to report more goodwill impairment losses.

5. ROBUSTNESS CHECKS

5.1. Alternative variable definitions

As a first robustness check (all results untabulated), we use alternative definitions of the earnings management incentive variables *Target_1*, *Target_2*, *CEO*, *CFO*, and *posDA*. With respect to the beating of earnings targets, Stora (2013) uses an interval width of 0.005¹⁹, which is smaller than the interval we use to create *Target_1* and *Target_2* (0.0108 and 0.0079,

¹⁹ Stora (2013) uses an interval width of 0.005 based on the interval width used in prior distributional studies of Burgstahler and Dichev (1997) and Kerstein and Rai (2007). We do not follow this approach in our main tests, as it is more appropriate to calculate a suitable interval width for each earnings distribution based on the formulas provided by the literature.

respectively). Using this smaller interval width does not change our results. The coefficients for *Target_1* (-1.177 for *IMP* and -0.023 for *IMP_MAG*) and *Target_2* (-0.617 and -0.014) are significantly negative. Concerning changes in senior management, Masters-Stout et al. (2008) and AbuGhazaleh et al. (2011) use the first two years of a new CEO instead of only the first year. Our results are robust to using this alternative definition. The coefficients for *CEO* (0.872 and 0.018) and for *CFO* (0.490 and 0.013) are all positive and significant. As an alternative definition for *posDA*, we calculate discretionary working capital accruals derived from the cross-sectional version of the Dechow and Dichev (2002) model as follows:

$$DWCA_t = WCA_t - [\beta_0(1/A_{(t-1)}) + \beta_1CFO_{t-1}/A_{t-1} + \beta_2CFO_t/A_{t-1} + \beta_3CFO_{t+1}/A_{t-1}] \quad (6)$$

where:

$DWCA_t$ = discretionary working capital accruals in year t scaled by lagged total assets;

WCA_t = working capital accruals (measured as $EBITDA_t$ less CFO_t) in year t scaled by lagged total assets;

CFO_{t-1} = cash flow from operations in year $t-1$;

CFO_t = cash flow from operations in year t ;

CFO_{t+1} = cash flow from operations in year $t+1$.

Our results are robust to this alternative measure of pre-impairment discretionary accruals. The coefficients of *posDA* remain negative and significant (-0.408 and -0.010).

5.2. Subsample of firms reporting an impairment loss at least once

As a second robustness check, we repeat the main analyses using a subsample of firms reporting an impairment loss at least once during the sample period. Firms that did not report an impairment loss in any sample year are excluded since it is possible that their impairment tests have a cushion against impairment which does not provide a sufficient degree of discretion to opportunistically recognize goodwill impairments. Hence, even if they are subject to an income-decreasing earnings management incentive, they are unable to use goodwill impairments as a device for earnings management. This could bias the findings. Table 7 presents the results for the subsample of 1,445 observations (i.e., 67.9 % of the full sample). They are consistent with the main analyses despite reduced statistical power.

Table 7. Regression results for impairment variables (*IMP* and *IMP_MAG*) on earnings management incentive variables and control variables for a subsample of firms with at least one impairment

	Predicted sign	IMP		IMP_MAG	
		β	p-value	β	p-value
<i>Target_1</i>	-	-0.624**	0.015	-0.012**	0.036
<i>Target_2</i>	-	-0.399**	0.036	-0.009**	0.020
<i>Smooth</i>	+	0.326**	0.035	0.005*	0.070
<i>Bath</i>	+	0.856***	0.000	0.017***	0.001
<i>CEO</i>	+	0.914***	0.000	0.024***	0.000
<i>CFO</i>	+	0.733***	0.000	0.013***	0.001
<i>LEV</i>	-	0.618	0.175	0.004	0.637
<i>posDA</i>	-	-0.244**	0.035	-0.005**	0.050
<i>MBV</i>	-	-0.005	0.473	0.000	0.469
<i>MBV < 1</i>	+	0.262*	0.081	0.006*	0.073
<i>Growth</i>	-	-0.289	0.184	-0.003	0.316
<i>OI</i>	-	-1.999**	0.016	-0.068***	0.001
ΔOI	-	-0.152	0.439	-0.013	0.294
<i>GW</i>	+	1.125***	0.015	0.057***	0.000
<i>Segment</i>	?	0.069	0.354	0.001	0.330
<i>Size</i>	?	0.173***	0.001	0.001	0.407
<i>Year</i>		Yes	Yes	Yes	Yes
<i>Industry</i>		Yes	Yes	Yes	Yes
Nagelkerke R ²		0.185		-	
χ -squared		205.9***		281.6***	
n		1.455		1.455	

Notes: *, **, and *** denote significance at 10%, 5%, and 1% level, respectively (p-values are one-tailed when the direction is as predicted, and two-tailed otherwise). Robust standard errors are clustered at the firm level. Intercepts are not reported.

5.3. Differences caused by time-frame effects

The main analyses include year dummies to control for economic fluctuations between different years. To specifically examine whether results differ for potentially economically different periods within the investigation period, we divide the full sample into a subsample representing the period before/during and after the financial crisis in 2008/2009. This cut-off point is chosen as the financial crisis may have changed earnings management behavior, in particular resulting from a change in managements' attitude towards earnings management. The results are reported in Table 8.

There are no significant differences between the sub-samples either for the likelihood of impairing the goodwill (*Panel A*) or the amount of goodwill impairment (*Panel B*). This suggests that earnings management behavior has not changed over the investigation period. As an additional robustness test, we repeat this analysis by splitting the sample into the financial crisis years of 2008 and 2009, and all non-crisis years. Again, there are no significant differences between the two subsamples with respect to our variables of interest (untabulated).

Table 8. Regression results for impairment variables (*IMP* and *IMP_MAG*) on earnings management incentive variables and control variables for the subsample before/during and after the financial crisis

	Period 2006-2009			Period 2010-2013		Differences	
<i>Panel A: Logit regression with dependent variable IMP</i>							
	<i>Pred. sign</i>	β	<i>p-value</i>	β	<i>p-value</i>	<i>Difference</i>	<i>p-value</i>
<i>Target_1</i>	-	-0.735*	0.056	-0.644**	0.048	0.091	0.884
<i>Target_2</i>	-	-0.828**	0.019	-0.537*	0.031	0.291	0.565
<i>Smooth</i>	+	0.358*	0.071	0.395**	0.045	0.037	0.911
<i>Bath</i>	+	1.090***	0.000	0.787**	0.027	-0.302	0.542
<i>CEO</i>	+	0.740***	0.008	1.190***	0.000	0.450	0.285
<i>CFO</i>	+	0.892***	0.000	0.631***	0.004	-0.261	0.442
<i>LEV</i>	-	0.999*	0.098	0.999	0.152	0.000	1.000
<i>posDA</i>	-	-0.265*	0.075	-0.288*	0.062	-0.023	0.932
<i>MBV</i>	-	-0.028	0.336	-0.045	0.336		
<i>MBV < 1</i>	+	0.295*	0.092	0.070	0.406		
<i>Growth</i>	-	-0.040	0.458	-1.022**	0.020		
<i>OI</i>	-	-3.695***	0.002	-1.976**	0.045		
ΔOI	-	-1.046	0.199	-1.063	0.250		
<i>GW</i>	+	1.594***	0.004	0.661	0.185		
<i>Segment</i>	?	0.173*	0.085	0.060	0.478		
<i>Size</i>	?	0.173**	0.010	0.174***	0.006		
<i>Year</i>		Yes	Yes	Yes	Yes		
<i>Industry</i>		Yes	Yes	Yes	Yes		
Nagelkerke R ²		0.238		0.194			
χ -squared		182.8***		138.5***			
n		1.088		1.039			
<i>Panel B: Tobit regression with dependent variable IMP_MAG</i>							
	<i>Pred. sign</i>	β	<i>p-value</i>	β	<i>p-value</i>	<i>Difference</i>	<i>p-value</i>
<i>Target_1</i>	-	-0.016**	0.048	-0.009	0.155	0.006	0.650
<i>Target_2</i>	-	-0.014**	0.042	-0.012**	0.015	0.001	0.946
<i>Smooth</i>	+	0.008*	0.063	0.006*	0.092	-0.001	0.909
<i>Bath</i>	+	0.023***	0.000	0.016*	0.057	-0.006	0.573
<i>CEO</i>	+	0.019***	0.006	0.034***	0.000	0.016	0.095
<i>CFO</i>	+	0.019***	0.001	0.009**	0.044	-0.009	0.247
<i>LEV</i>	-	0.019	0.188	0.009	0.478	-0.008	0.632
<i>posDA</i>	-	-0.007*	0.046	-0.005*	0.082	0.002	0.784
<i>MBV</i>	-	-0.001	0.272	0.000	0.420		
<i>MBV < 1</i>	+	0.004	0.198	0.003	0.278		
<i>Growth</i>	-	0.001	0.453	-0.019**	0.040		
<i>OI</i>	-	-0.104***	0.001	-0.065***	0.008		
ΔOI	-	-0.022	0.256	0.004	0.448		
<i>GW</i>	+	0.066***	0.000	0.040***	0.005		
<i>Segment</i>	?	0.003	0.108	0.001	0.549		
<i>Size</i>	?	0.001	0.523	0.002	0.153		
<i>Year</i>		Yes	Yes	Yes	Yes		
<i>Industry</i>		Yes	Yes	Yes	Yes		
χ -squared		212.2***		164.8***			
n		1.088		1.039			

Notes: *, **, and *** denote significance at 10%, 5%, and 1% level, respectively (*p*-values are one-tailed when the direction is as predicted, and two-tailed otherwise). Robust standard errors are clustered at the firm level. Intercepts are not reported. We test differences of coefficients with a stacked regression of both subsamples with interaction terms of an indicator variable for the later subsample with each of the variables but year dummies. *P*-values for the test of difference refer to the two-tailed *p*-value of the respective interaction term in the stacked regression.

5.4. Industry \times year fixed effects and firm fixed effects

Although we have a number of control variables and we control for industry and year fixed effects, it is possible that unobserved industry-specific behaviour varies across time. Therefore, we repeat our main analyses with industry \times year fixed effects instead of separate industry and year fixed effects. However, this design is problematic, due to the incidental parameter problem when estimating non-linear specifications with a large number of fixed effects. Therefore, we have to run a linear probability model instead of the logit regression (i.e., an OLS regression; we also have to run an OLS instead of the Tobit regression). Still, results remain largely unchanged (untabulated). For *IMP* as the dependent variable, all variables of interest have the same sign and remain significant. For *IMP_MAG* as our dependent variable, all variables of interest have

the same sign, but the results for *Smooth*, *LEV*, and *posDA* become insignificant. An even more rigid approach is to include firm fixed effects and year fixed effects as the fixed effects structure. An additional advantage of this choice is that it estimates variation within a firm, and hence excludes that differences are driven by inherent firm characteristics. Again, we have to use OLS because of the incidental parameter problem. Untabulated results are largely robust. *Target_2* and *LEV* become insignificant in both regressions. While all other variables remain significant for *IMP* as the dependent variable, *Smooth* also becomes insignificant for *IMP_MAG* as the dependent variable.

6. CONCLUSION

The IASB's post-implementation review on business combinations, its currently conducted research project on goodwill and impairment, the ongoing

lively debate on the reliability of impairment testing, and the high practical relevance of goodwill impairment testing make it a topical issue that warrants continuous examination. We focus on the question of whether earnings management incentives have an influence on the likelihood to recognize goodwill impairments and the magnitude of impairment losses and, therefore, whether management uses goodwill impairment tests as a device for earnings management. Using a sample of 2,127 firm-year observations from 354 firms listed on the regulated market of the Frankfurt Stock Exchange (CDAX), our results show that the likelihood to recognize goodwill impairments and the magnitude of impairment losses strongly correlate with a number of earnings management incentives.

The findings have implications for the IASB and other regulators. At least in the context of the German and similar institutional settings (e.g., Austria, Belgium, Denmark, Finland, France, Netherlands, Sweden, and Switzerland)²⁰, it is questionable whether the current requirements mandate a sufficiently rigorous and operational impairment test to fully provide useful information to financial statement users. Hence, the IASB's current discussion on whether changes in regulation can provide more reliable information, or whether a return to the amortization regime is useful, is justified. In light of our findings, its present proposal to present the total equity before goodwill in balance sheets may be useful for investors. It may even be complemented by the disclosure of pre-impairment earnings. With respect to auditors and supervisory bodies, the results imply that they should be aware of the discretion related to goodwill impairment accounting as well as the influence of earnings management incentives on the opportunistic application of this discretion when

assessing the appropriateness of goodwill impairment tests. Accordingly, future research could test how certain governance and auditor characteristics might interact with findings from our study and prior literature in the context of goodwill impairments. Moreover, the results are of interest for capital market participants and other financial statement users when interpreting goodwill numbers.

Our study is subject to some limitations. First, we use a German sample, i.e., a distinctive continental European institutional setting. In particular, compared to Anglo-Saxon countries applying IFRS, it is characterized by weaker legal protection of investors with a lower developed equity market, and higher importance of debt financing. Moreover, Germany has implemented a two-tier board system. Hence, the results are more relevant for continental European countries with similar institutional settings (e.g., Austria, France, or Switzerland). Second, we measure all variables for the empirical analyses at the firm level, instead of the CGU level, since such data is currently not available. If available in the future, this could be an interesting avenue for further research. Moreover, future research could also focus on earnings management aspects related to initial goodwill recognition or specific disclosed key assumptions like growth rate or discount rate. Third, the results do not apply for non-listed, banking, insurance, and financial services firms, and the results are only valid for the sample period and its regulatory environment. Finally, as our findings indicate the overall importance of goodwill as an earnings management device for many different purposes, it is important to understand how management uses the different available judgments to manage goodwill impairments, and how this could be governed. We defer these questions to future research.

²⁰ These countries have a similar levels of investor protection (Leuz et al., 2003, pp. 519-520) and also have mandatory (Austria, Denmark, Finland, Netherlands, Sweden) or voluntary (Belgium, France, Portugal) two-tier systems (Weil and Manges, 2002, pp. 33-44). In this context, Finland and Sweden are classified as two-tier systems since a separate general manager or managing director is required. Moreover, Swiss firms also have the right to adopt a two-tier structure (Ruigrok, Peck, & Keller, 2006, p. 1204).

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APPENDIX

Table A.1. Univariate analysis – Pearson's (above the diagonal) and Spearman's (beyond the diagonal) correlation matrix

	IMP	IMP_MAG	Target_1	Target_2	Smooth	Bath	CEO	CFO	LEV	posDA	MBV	MBV < 1	Growth	OI	ΔOI	GW	Segment	Size
IMP	-	0.501***	-0.048**	-0.080***	-0.028	0.187***	0.203***	0.191***	0.123***	-0.086***	-0.040**	0.055***	-0.077***	-0.174***	-0.098***	0.065***	0.104***	0.105***
IMP_MAG	0.990***	-	-0.023	-0.073***	-0.045**	0.233***	0.256***	0.175***	-0.003	-0.060***	-0.064***	0.111***	-0.030*	-0.245***	-0.139***	0.192***	-0.015	-0.106***
Target_1	-0.048**	-0.047**	-	-0.018	-0.150***	-0.072***	-0.012	0.040*	0.091***	0.001	-0.069***	0.088***	-0.042*	-0.082***	-0.043**	-0.009	-0.010	0.011
Target_2	-0.080***	-0.086***	-0.018	-	-0.221***	-0.105***	-0.048**	-0.053**	0.030	-0.004	-0.030	-0.034	0.006	0.061***	0.008	0.036*	0.031	0.124
Smooth	-0.028	-0.032	-0.150***	-0.221***	-	-0.172***	-0.057***	-0.042*	-0.105***	0.062***	0.150***	-0.152***	0.283***	0.330***	0.368***	0.060***	-0.029	-0.100***
Bath	0.187***	0.207***	-0.072***	-0.105***	-0.172***	-	0.141***	0.119***	0.003	-0.106***	-0.053**	0.115***	-0.165***	-0.441***	-0.438***	-0.019	-0.064***	-0.125***
CEO	0.203***	0.224***	-0.012	-0.048**	-0.057***	0.141***	-	0.356***	0.058***	-0.032	-0.050**	0.048**	-0.073***	-0.163***	-0.087***	0.028	0.029	-0.013
CFO	0.191***	0.202***	0.040*	-0.053**	-0.042*	0.119***	0.356***	-	0.065***	-0.083***	-0.017	0.044**	-0.043**	-0.127***	-0.069***	0.012	0.043**	0.040*
LEV	0.121***	0.111***	0.091***	0.034	-0.113***	0.012	0.058***	0.064***	-	-0.038*	0.094***	-0.079***	-0.031	-0.076***	0.014	-0.050**	0.241***	0.450***
posDA	-0.086***	-0.090***	0.001	0.004	0.062***	-0.106***	-0.032	-0.083***	-0.032	-	-0.066***	0.013	0.082***	-0.027	0.033	-0.098***	-0.013	-0.064***
MBV	-0.062***	-0.073***	-0.100***	0.006	0.181***	-0.079***	-0.060***	-0.014	0.108***	-0.048**	-	-0.443***	0.157***	0.265***	0.159***	0.095***	0.014	0.004
MBV < 1	0.055***	0.066***	0.088***	-0.034	-0.152***	0.115***	0.048**	0.044**	-0.075***	0.013	-0.727***	-	-0.159***	-0.237***	-0.127***	-0.007	-0.063***	-0.106***
Growth	-0.100***	-0.105***	-0.059***	0.017	0.345***	-0.195***	-0.091***	-0.046**	-0.063***	0.081***	0.190***	-0.173***	-	0.236***	0.337***	0.137***	0.009	-0.062***
OI	-0.163***	-0.179***	-0.170***	0.073***	0.368***	-0.381***	-0.162***	-0.108***	-0.127***	-0.043**	0.403***	-0.324***	0.302***	-	0.412***	0.019	0.056***	0.135***
ΔOI	-0.095***	-0.104***	-0.083***	-0.002	0.478***	-0.334***	-0.099***	-0.066***	-0.033	0.002	0.196***	-0.155***	0.420***	0.417***	-	0.032	-0.032	-0.019
GW	0.087***	0.105***	0.007	0.041*	0.046**	-0.007	0.028	0.027	-0.058***	-0.127***	0.059***	-0.014	0.104***	0.060***	0.038*	-	-0.056***	-0.130***
Segment	0.097***	0.087***	-0.002	0.027	-0.023	-0.075***	0.025	0.041*	0.223***	-0.022	0.076***	-0.070***	0.002	0.048**	-0.041*	-0.037*	-	0.427***
Size	0.096***	0.067***	0.017	0.132***	-0.106***	-0.123***	-0.009	0.047**	0.459***	-0.072***	0.103***	-0.106***	-0.045**	0.134***	-0.047**	-0.149***	0.363***	-

Notes: *, **, and *** denote significance at 10%, 5%, and 1% level, respectively (*p*-values are one-tailed when the direction is as predicted, and two-tailed otherwise).