

# **IFRS goodwill impairment test and earnings management: the influence of audit quality and the institutional environment**

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# **IFRS goodwill impairment test and earnings management: the influence of audit quality and the institutional environment**

**ABSTRACT:** In this paper, we examine empirically the influence of audit quality and the institutional setting on the use of the IFRS goodwill impairment test as a tool to manage earnings. Using a sample of listed companies from 15 E.U. countries over the period 2005-2006, our results show that the occurrence of goodwill impairments is highly influenced by financial reporting incentives and is not uniform across auditors and institutional settings, while controlling for economic factors. In particular, we find an audit quality effect: Big 4 auditors put a higher constraint on the use of the goodwill impairment test as a tool to manage earnings. Further, our results show that firms in countries with a high quality judicial system tend to be more conservative (i.e. take more impairments). Overall, these findings suggest that the benefits of introducing a single set of high-quality financial reporting standards may not be fully exploited in the presence of variation in audit quality and judicial settings.

**Keywords:** *IFRS, goodwill impairments, earnings management, audit quality, judicial setting*

**Data availability:** *All data are publicly available*

## I. INTRODUCTION

Currently, more than 100 countries worldwide, including the European Union (E.U.), require or permit the use of International Financial Reporting Standards (IFRS) by domestic listed companies. The objective is to improve financial reporting quality and increase comparability of financial statements in order to access capital more efficiently. Others, including the United States (U.S.),<sup>1</sup> are considering whether to take the same step in the future. Although a single set of accounting standards undoubtedly contributes to the comparability of financial statements, concerns have been expressed that differences in financial reporting quality across countries will be “pushed down to the level of implementation and now will be concealed by a veneer of uniformity” (Ball 2006). The purpose of this paper is to empirically address this concern by examining whether IFRS is implemented uniformly across auditors and judicial settings. In particular, we focus on the requirement contained in IFRS 3 and IAS 36 that goodwill is subject to a yearly impairment test and should be impaired to fair value if necessary. The choice for examining the implementation of the goodwill impairment test is motivated by doubts concerning whether managers and auditors perform assets impairment tests with the same degree of diligence in all countries (Ball 2006). One reason for this concern is that because fair values of impaired assets often rely on private information and therefore managerial discretion, opportunities arise for managers to manage earnings. Another concern is that, monitoring mechanisms still operate differently across countries. This paper addresses this concern empirically by investigating the influence of audit quality

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<sup>1</sup> The SEC issued in November 2008 a proposed IFRS roadmap which outlines milestones that, if achieved, could lead to mandatory transition to IFRS.

and the institutional setting on the use of the goodwill impairment test as a tool to manage earnings.

We study this research question in a European setting where IFRS became mandatory in 2005 with the aim of the E.U. to achieve harmonization in accounting practices. Empirically, it is still an open question whether this ‘de jure’ harmonization of accounting standards has led to ‘de facto’ harmonization of financial reporting practices. Using a sample of listed companies in 15 E.U. countries preparing financial statements under IFRS in the period 2005-2006, we find that the goodwill impairment decision is significantly associated with financial reporting incentives. In particular, our findings indicate that companies typically take their impairments when earnings are ‘unexpectedly’ high (smoothing) or when they are ‘unexpectedly’ low (‘big bath’ accounting).

Our results further show that overall there is no difference in the frequency of goodwill impairments between firms audited by Big 4 and non-Big 4 auditors. However, when income-decreasing reporting incentives are low, firms audited by Big 4 auditors tend to take more goodwill impairments than firms audited by non-Big 4 auditors. As income-decreasing reporting incentives increase, the likelihood of taking a goodwill impairment increases significantly, but only for firms audited by non-Big 4 auditors. These results suggest that Big 4 auditors do a better job in constraining the use of the goodwill impairment test as a tool to manage earnings.

Furthermore, it appears that the frequency of goodwill impairments is not uniform across countries, and depends on the quality of the judicial system of the country. In particular, we find that companies domiciled in countries with a weak legal regime take

less impairments compared to companies domiciled in countries with a strong legal system, while controlling for economic factors and financial reporting incentives. These results support earlier research by Bushman and Piotroski (2006) that higher quality judicial systems lead to more conservative reporting. While the results of Bushman and Piotroski (2006) relate to countries using different GAAP, our study is, to our best knowledge, one of the first to examine the impact of the judicial system on financial reporting practices in countries using the same GAAP.

Overall, these results suggest that asset impairment tests create opportunities for managers to engage in earnings management and that they are not implemented uniformly across auditors and countries. While the purpose of introducing IFRS as a single set of accounting standards is to increase financial reporting quality and comparability of financial statements, it seems that opportunities for earnings management and differences in earnings quality across auditors and countries continue to exist and have found their way in the implementation of the standards. An important policy implication of this study is that the benefits of introducing a single set of high-quality standards, as IFRS are claimed to be, may not be fully exploited in the presence of variation in audit quality and judicial settings.

Our paper contributes to the literature in at least three ways. First, we contribute to the recent but growing literature on the impact of IFRS on financial reporting quality. Insights from this type of research may be highly relevant for standard setters, regulators and oversight bodies, as confirmed by a recent call for additional study on IFRS by the Financial Accounting Standards Board (FASB) and the Financial Accounting Foundation (FAF) (FAF 2009). Second, we contribute to the auditing literature by looking at a

specific implementation issue of an IAS standard as a new proxy for audit quality, i.e. recognition of goodwill and goodwill impairment. Third, we extend prior research on the impact of the judicial setting on financial reporting quality by studying countries using the same set of GAAP. This is arguably a cleaner setting as observed differences in financial reporting practices cannot be attributed to differences in GAAP.

The remainder of this paper is organized as follows. In the next section, we summarize insights from prior research examining asset impairments and discuss accounting for business combinations under IFRS. In Section 3, we describe widespread concerns regarding the implementation of IFRS in practice and develop our research hypotheses. Our sample and research design are described in Section 4. Results and sensitivity analysis are presented in Section 5 and 6. We conclude our paper with a discussion of our main findings.

## **II. BACKGROUND**

### **A) PRIOR LITERATURE**

#### **Asset Impairments**

Numerous studies have examined causes and effects of asset impairments. There are several reasons why such impairments have been of interest to the business, legislative and academic communities. First, empirical evidence indicates that impairments can have a large impact on both accounting earnings and the book value of assets. Alciatore et al. (1998) document in a literature review of a decade of asset impairment research that the mean amount of the impairments ranges from 4 to 19.4

percent of total assets. Second, most accounting standards allow firms a great deal of flexibility in accounting for the impairment of some types of assets (e.g. long-lived assets). As noted by Elliot et al. (1988), asset impairments *'differ from most financial statement information because of greater discretion as to their magnitude and timing'*. Third, interest in this area has been stimulated by the issuance of new accounting standards on business combinations and asset impairments, both by the Financial Accounting Standards Board (FASB) (SFAS 142 and SFAS 121) and the International Accounting Standards Board (IASB) (IFRS 3 and IAS 36). These standards abandon the annual depreciation of goodwill and replace it with an annual impairment test based on 'fair value' estimates of the acquired business.

A main research question in the literature is to investigate the characteristics of firms taking an asset impairment, including the incentives of company management in these firms to manage earnings. This idea comes from the conjecture in the business press that firms could be using the discretion inherent in GAAP pertaining to asset impairments in their self interest. For example, firms may use GAAP flexibility to avoid taking impairments arising from concerns about potentially negative stock market reaction to such charges. Other firms could record an impairment when earnings are particularly high to smooth income, or, alternatively, they could 'take a bath' by accelerating an impairment when earnings are already poor to maximize profits in future periods. This flexibility suggests that impairment decisions could be strategically used by managers to adjust the timing and amounts of charges to income (Alciatore et al. 1998).

Empirical evidence is consistent with this strategic behaviour. Francis et al. (1996) show that managers use two different sorts of determinants in the asset impairment decision. On the one hand, managers take into account factors that reflect declines in the values of assets attributable to poor firm performance, increased competition and changes in economic climate. On the other hand, asset impairment decisions may be influenced by personal reporting incentives, i.e. management may take advantage of the discretion afforded by accounting rules to manipulate earnings by either not recognizing impairments when it needs to, or by recognizing impairments only when it is advantageous for them to do so. Francis et al. (1996) further investigate the extent to which proxies for economic asset impairments and proxies for managerial incentives to manipulate earnings explain impairment decisions. The study finds that in ‘discretionary’ impairment decisions (such as goodwill write-offs and restructuring charges) financial reporting incentives play a substantial role.

The degree to which managerial reporting incentives play a role in the impairment decision depends on the flexibility allowed by the accounting standards in place. In this regard, a study by Riedl (2004) shows a higher association between impairments and ‘big bath’ behavior after the introduction of U.S. SFAS 121, ‘*Accounting for the impairment of long-lived assets*’, a standard that, according to critics, introduced additional subjectivity into the impairment decision. The increased discretion allowed by SFAS 121 enables managers to more easily justify their reporting choices compared to before the introduction of the standard.

## Goodwill Impairments

In addition to the numerous studies on asset impairments in general, there also exists some research on goodwill impairments in particular. Hayn and Hughes (2006) find that the characteristics of the original acquisition are more predictive for the likelihood of an impairment than are the performance indicators of the acquired entities at the moment of the impairment, suggesting that the ability to predict goodwill impairment based on economic information provided in the financial statements at the moment of an impairment is limited. Beatty and Weber (2006) show that firms' debt contracting, bonuses, CEO turnover and exchange delisting incentives affect their impairment decision.

Overall, this evidence suggests that companies' impairment decisions are influenced by managerial reporting incentives other than purely economic factors. The role of these incentives in the impairment decision is associated with the potential for discretion induced by certain firm characteristics and the flexibility in the accounting standards in place.

### B) ACCOUNTING FOR BUSINESS COMBINATIONS UNDER IFRS

Before 2004, accounting treatment for mergers and acquisitions under IFRS was regulated by IAS 22 '*Business Combinations*', requiring an acquisition to be accounted for using the acquisition method of accounting<sup>2,3</sup>, whereby goodwill was recognized as an

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<sup>2</sup> Under the 'acquisition' or 'purchase' method the income statement should incorporate the results of the acquiree from the date of acquisition and the balance sheet should include the identifiable assets and liabilities of the acquiree and any goodwill or negative goodwill arising (IAS 22.19).

<sup>3</sup> The E.U.'s 7<sup>th</sup> Directive permits both capitalization or immediate write-off of goodwill. In practice, local GAAP of some E.U. Member States permitted write-offs (e.g. Italy), while others required capitalization (e.g. Belgium). In the beginning of the 21<sup>st</sup> century most national regulators followed the issuance of the IASC rules requiring capitalization and abandoned the write-off option. (FEE 2002; Sutton 2004)

asset and amortized over its useful life (IAS 22.19; IAS 22.44). In the ‘rare’ situations where an acquirer could not be identified (a uniting of interest) the pooling of interest method<sup>4</sup> was required (IAS 22.10; IAS 22.70). The use of different accounting treatments for similar transactions resulted in incentives to arrange transactions solely to take advantage of these differences.<sup>5</sup>

For these reasons and in the light of the IFRS/U.S. GAAP convergence project, the IASB issued a new standard on Business Combinations (IFRS 3) in March 2004, together with a revision of IAS 36 ‘*Impairment of assets*’ and IAS 38 ‘*Intangible assets*’. IFRS 3 supersedes the previous IAS 22 and requires that the ‘acquisition method’ of accounting must be applied to business combinations within the scope of the standard *without exceptions*. Under the ‘acquisition method’ of accounting the cost of acquisition is measured at its fair value, as are the assets, liabilities and contingent liabilities of the acquiree at the date of the acquisition. Any excess of the acquirer’s interest in the net fair value of the assets acquired over the cost of acquisition is treated as goodwill and recognized as an asset on the balance sheet. Goodwill is no longer amortised, but tested for impairment annually (IAS 36), or more frequently if events or changes in circumstances indicate that it might be impaired. This represents a significant change from the requirements under IAS 22 as amortisation of goodwill is no longer required or permitted.

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<sup>4</sup> Under the ‘pooling of interest’ method financial statements items of uniting entities should be combined, in both the current and prior periods as if they had been united from the beginning of the earliest period presented. Any difference between the amount recorded as share capital issued plus any additional consideration in the form of cash or other assets and the amount recorded for the share capital acquired should be adjusted against equity. (IAS 22)

<sup>5</sup> In practice the existence of the two different methods to account for similar transactions boiled down to a clear preference for the pooling of interest method, because this method allowed acquirers to avoid purchase’s negative effects on reported earnings in the years after the acquisition. In order to achieve these perceived benefits managers structured their M&A carefully to meet the requirements necessary to apply pooling of interest. (Walter 1999)

IAS 36 requires the recognition of an impairment loss whenever the asset's carrying amount exceeds its recoverable amount. An asset's recoverable amount is defined as the higher of its value in use (the present value of the future cash flows expected to be derived from the asset) and its fair value less costs to sell (the amount obtainable from the sale of an asset in an arm's length transaction between knowledgeable, willing parties, less the costs of disposal). Because goodwill in itself does not have an independent value in use or a fair value less costs to sell (because it cannot be sold independently of the other assets that make up the business), goodwill is allocated to cash-generating units to assess its recoverability.

Although IFRS 3 has cut a significant area of managerial discretion by eliminating the 'pooling method' to account for business combinations, critics argue that the replacement of the annual amortization of goodwill with an annual impairment test provides managers with another tool for earnings management (Ball 2006).<sup>6</sup> The assumptions by management needed to carry out the impairment test (i.e., to determine the cash-generating units, to allocate goodwill to them and to assess their recoverable amounts based on fair value estimates) introduce an additional layer of subjectivity.

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<sup>6</sup> The current IASB approach towards business combinations largely coincides with U.S. SFAS 142. In the due process of SFAS 142 the FASB initially proposed eliminating pooling accounting, and requiring all business combinations to be accounted for using the acquisition method, with amortization required for all acquired goodwill. This proposal met with strong opposition among lobbying firms. The FASB then revised its original proposal: it continued to advocate eliminating pooling and requiring purchase, but now proposed, instead amortization, goodwill impairment. A paper from Ramana (2007), studying the evolution of SFAS 142, provides evidence that pro-pooling firms can be linked – via political contributions- to U.S. Congresspersons pressuring the FASB to eliminate annual amortization in favour of the 'revised' impairment rules, based on unverifiable fair value estimates of goodwill extant value.

### **III. RESEARCH QUESTION AND DEVELOPMENT OF HYPOTHESES**

#### **A) CONCERNS ON THE HARMONIZATION OF ACCOUNTING PRACTICES**

International convergence of accounting standards has been gaining momentum in recent years. Since the Norwalk agreement in 2001 the FASB and IASB have been taken joint steps to develop a set of high quality, compatible accounting standards that could be used for both domestic and cross-border financial reporting. Based on the progress achieved by the IASB and FASB through 2007, the SEC removed the reconciliation requirement for non-U.S. companies that are listed in the U.S. and allowed them to use IFRS as issued by the IASB (FASB 2008). In the same period, a large number of countries around the world have adopted IFRS with the purpose of improving financial reporting quality and increasing the comparability of financial statements to facilitate the efficient access to capital worldwide.

The positive effects of evolving towards one single set of high quality accounting standards have been supported by studies examining the benefits of accounting harmonization. The results in Bae et al. (2008) suggest that differences in accounting standards are associated with economic costs for financial analysts, resulting in lower analyst following and lower forecast accuracy. Bradshaw et al. (2004) and Covrig et al. (2007) find that familiar accounting standards reduce information-processing costs and thereby increase foreign investor interest. Other studies document the effects of the adoption of IFRS around the world. For instance, Barth et al. (Barth et al. 2008) provide evidence on the relation between voluntary IAS adoption and several proxies of accounting quality, suggesting a positive effect. Daske et al. (2008) finds that capital

markets respond to the adoption of IFRS, using proxies for market liquidity and firm value.

However, the results of studies examining the effects of the harmonization of accounting standards are not univocal. One reason for this is that harmonization of accounting standards and harmonization of accounting practices can be two different things. For instance, studies show that accounting practices are highly influenced by differences in enforcement mechanisms across countries (Chen et al. 2002; Bradshaw and Miller 2008). Daske et al. (2008) find that capital market benefits of IFRS adoptions are present only in countries with strict enforcement and in countries where the institutional environment provides strong incentives for transparent earnings. For the other IFRS adoption countries in their study, market liquidity and firm value remained largely unchanged in the year of the mandate. The premise that harmonization of accounting standards automatically results in actual harmonization of accounting practices is also negated by Bradshaw and Miller (2008). The results of their study, examining non-U.S. firms that adopt U.S. GAAP, suggest that effective regulatory oversight is an important factor in reaching convergence in accounting practices. However, even similar litigious and regulatory environments do not necessarily result in accounting numbers of similar quality across firms. Findings in Lang et al. (2006) show that U.S. GAAP-based earnings of firms that cross-list on U.S. markets exhibit significantly more earnings management than do earnings of U.S. firms, despite the fact that cross-listed firms in principle share similar regulatory and legal environment as U.S. firms.<sup>7</sup> Differences in accounting practices within similar economic and legal frameworks can arise, depending on the

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<sup>7</sup> We do note that previous research has put the effectiveness of SEC regulation and its enforcement regarding foreign listed firms into question (Frost and Pownall 1994; Siegel 2005).

extent of enforcement and legal exposure and on managerial reporting incentives. Preparers of financial statements must make assumptions in estimating future costs and revenues on long-term contracts, future pension liabilities, asset lives and many other matters. Companies can deal in different ways with the assumptions underlying accounting for all kinds of complex transactions.

In this regard, especially the use of 'fair value accounting' raises many doubts. Critics contend that 'fair value accounting' could be strategically used by managers to adjust the timing and amounts of charges to income. Sir David Tweedie, chairman of the IASB, agrees that accounting standards are only one pillar upon which a sound financial reporting structure should be built. He acknowledges that an important role is put aside for corporate governance, audit and enforcement mechanisms to improve the financial reporting environment in which the standards operate (Tweedie 2004). Previous research has demonstrated that audit quality is not uniform across audit firms (e.g. Francis and Wang 2008; Maijor and Vanstraelen 2006; Reynolds and Francis 2000). The increasing use of fair value accounting may even sharpen these differences. In a meeting of the U.S. Public Company Oversight Board (PCAOB), members of its advisory group expressed concerns that auditors lack the necessary training in valuation methods for estimating fair values (Johnson 2007). This raises serious questions with regard to the implementation of the fair value principle in practice. Moreover, it is questionable whether managers will determine fair value with the same degree of diligence in all countries (Ball 2006). One reason for this is that there is more judgment needed under fair value accounting, especially in countries with less liquid markets and poorer information about asset impairments.

To address these concerns, the E.U., for example, has taken several initiatives to improve audit quality and to create a single level playing field for the implementation of IFRS. These initiatives include the establishment of the Committee of European Securities Regulators (CESR), which aims at for example a consistent implementation of IFRS.<sup>8</sup> Further, in line with U.S. regulation, the E.U. also took steps for the regulation of audit oversight.<sup>9</sup> Moreover, the fact that the major large international audit firm networks are establishing central IFRS expertise desks makes that audit firms tend to be better internationally integrated, which should promote consistent implementation of IFRS.

For these reasons, it is still an open empirical question as to whether ‘de jure’ harmonization of accounting standards actually leads to ‘de facto’ harmonization of financial reporting practices<sup>10</sup>. The purpose of this paper is to contribute to this literature, by investigating for a sample of E.U. listed companies the influence of audit quality and the institutional environment on the use of the goodwill impairment test as a tool to manage earnings in Europe.

## B) DEVELOPMENT OF HYPOTHESES

As illustrated in the impairment matrix that we develop in Figure 1, irregularities in the goodwill impairment test can lead to two types of flaws in financial reporting. On

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<sup>8</sup> CESR, established in 2001, is a forum to enhance day to day consistent supervision and enforcement of securities activities across E.U. Member States. Since its creation, CESR adopted two ‘Standards on Financial Information’ that are developed to contribute to the creation within the E.U. of robust and consistent enforcement mechanisms for the introduction of IFRS (CESR 2003; 2004).

<sup>9</sup> In its Communication on statutory audit in 2003, entitled ‘Reinforcing Statutory Audit in the E.U.’, the European Commission sets out its priorities to improve audit quality within the E.U. (EC 2003). These priorities include amongst others the modernization of the 8<sup>th</sup> Council Audit Directive (effectuated in 2006) and the strengthening of public oversight of auditors at the Member States and at E.U. levels.

<sup>10</sup> Most studies examining the effects of IFRS adoption study the period where the adoption of IFRS was still voluntary and/or focus on a large set of countries with widely diverse legal backgrounds, business forms, investor protection and socioeconomic and political systems. Recent evidence on the harmonization of accounting practices within Europe is rather scarce.

the one hand, firms can fail to report a goodwill impairment, when goodwill is overvalued (type II error) and, on the other hand, they can report an impairment when it is not appropriate, i.e. when the fair value of goodwill is higher than its book value (type I error).

Using the impairment matrix, we develop our hypotheses below in terms of earnings management incentives, auditor type and institutional setting.

### **Earnings management incentives**

Compensation contracts between managers and shareholders are designed to align managerial incentives and shareholders benefits and thereby mitigate agency costs. For instance, stock options and earnings-based bonus plans encourage managers to maximize shareholders wealth by maximizing earnings. However, compensation contracts can create incentives for managers to take actions to maximize their private benefits rather than to maximize shareholder benefits. For example, we expect that managers have incentives to postpone impairments to maximize their wealth (type II error). However, in certain circumstances, maximizing reporting earnings may not be the optimal strategy for managers. Kirschenheiter and Melumad (2002) elaborate on one rationale for income-decreasing behavior by managers and present a model wherein large earnings surprises reduce the inferred precision of the earnings number, and thereby dampen the effect on firm value. Therefore, managers have incentives to smooth earnings in case of high unexpected earnings and, to underreport earnings by the maximum and take a ‘big bath’ in case of sufficiently low earnings. In particular, they could minimize reported earnings by not postponing impairments (less type II errors) and/or by accelerating impairments (type I error). The assumptions needed to carry out the goodwill impairment test may

provide managers with the necessary discretion to engage in these forms of earnings management. Therefore, we hypothesize that:

**H1a:** Firms are more likely to take a goodwill impairment when their earnings are ‘unexpectedly’ low, *ceteris paribus*.

**H1b:** Firms are more likely to take a goodwill impairment when their earnings are ‘unexpectedly’ high, *ceteris paribus*.

### **Auditor type**

In principle, auditors play an important role in constraining opportunistic earnings management behavior. However, previous research has shown that differences in audit quality exist and can be inferred by examining different classes of auditors. Based on the premise that audit firm size is a proxy for quality (e.g. DeAngelo 1981), the literature generally makes a distinction between large international auditors and all others, i.e., between Big 4 and non-Big 4 auditors.

As explained above managers of listed companies often have incentives to maximize reported earnings because of compensation contracts with the firm’s shareholders. As a consequence, in absence of incentives for income-decreasing behavior (i.e., large earnings surprises), we expect that managers will be reluctant to take impairments to maximize the value of their earnings-based bonus plans and stock options. The large amount of assumptions needed to carry out the goodwill impairment test may give managers enough discretion to postpone the write-down of impaired goodwill (type II error).

If we define audit quality as the probability that an audit firm will both discover a breach in a client's financial reporting and report the breach (DeAngelo 1981), high quality audit firms will both have the expertise and independence to find any overly optimistic assumptions in the impairment test and accordingly force firms to adjust these assumptions downwards, which could trigger an impairment. Lower quality audit firms, on the other hand, are less likely to be able to detect these flaws in the impairment test, or force firms to report the impairment. Therefore, we hypothesize that:

**H2a:** When income-decreasing reporting incentives are low, firms audited by Big 4 audit firms take more goodwill impairments than firms audited by non-Big 4 audit firms, *ceteris paribus*.

However, as stipulated in hypothesis 1, we expect managers to be encouraged to underreport earnings in case of large earnings surprises. In that case, firms have incentives to report all impairments (less type II errors) and even accelerate impairments (type I errors) to boost performance in the future. Similar to preventing income-increasing earnings management, high quality auditors are expected to be more likely to constrain this form of income-decreasing behavior and prevent firms from taking impairments when they are not required. Therefore, we hypothesize that:

**H2b:** When income-decreasing reporting incentives increase, the likelihood of taking a goodwill impairment will increase less for firms audited by a Big 4 audit firm, than for firms audited by a non-Big 4 audit firm, *ceteris paribus*.

## **Institutional setting**

As discussed above, it is unclear whether ‘de jure’ harmonization of accounting standards leads to ‘de facto’ harmonization of financial reporting practices. There is ample research that provides evidence for the fact that reported accounting numbers are shaped by the historical, economical and institutional structure in which firms are domiciled.

Bushman and Piotroski (2006) empirically analyze the relations between key characteristics of economy-level institutions and accounting conservatism. The underlying premise for their research is that a country’s institutional setting, securities laws, political context and tax regime create incentives that influence the behavior of managers, investors, regulators and other market participants. Bushman and Piotroski (2006) describe two channels through which high quality judicial systems will lead to more conservative reporting. First, stronger judicial regimes lead to a more prominent role for the use of accounting numbers in formal contracts. As a consequence, firms in countries with stronger judicial regimes may face higher contracting demand for conservative reporting. Second, high quality judicial systems can increase the potential litigation costs to firms from overstating economic performance. Therefore, we hypothesize that:

**H3a:** Firms in countries with a high quality judicial system take more goodwill impairments than firms in countries with a low quality judicial system, *ceteris paribus*.

However, in the case of large earnings surprises, firms have more incentives to be conservative and take an impairment. Given the lower litigation costs of violations of

accounting rules in countries with a low quality judicial system, this might result in an acceleration of goodwill impairments in years when goodwill is not impaired (type I errors). Because we hypothesize that firms in countries with a stronger judicial system are more conservative in general, we also expect the increase in the likelihood of recording a goodwill impairment in these countries to be smaller. Or:

**H3b:** When income-decreasing reporting incentives increase, the likelihood of taking a goodwill impairment will increase less for firms in countries with a high quality judicial system, than for firms in countries with a low quality judicial system, *ceteris paribus*.

#### IV. RESEARCH DESIGN

##### A) SAMPLE

Our sample consists of all domestic listed companies from the 15 European member countries before the E.U. enlargement in 2004 and 2007<sup>11</sup> (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and U.K.) that are required to prepare consolidated financial statements under IFRS during the period 2005 and 2006.<sup>12</sup> This yields 4,453 potential firm-year observations. We exclude financial institutions and insurance

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<sup>11</sup> Since 2004 twelve other countries joined the E.U. (Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia). We excluded these new Member States from our sample because of lack of data availability and data quality concerns.

<sup>12</sup> Because we fix the time period on the years 2005 and 2006, our sample contains first-time adopters of IFRS. As a consequence, our results can be influenced by transition effects from local accounting standards to IFRS. However, including an indicator variable that equals one in case of a first-time adoption of IFRS or excluding first-adopters from our regression analysis, leads to similar conclusions for the three hypotheses.

companies (SIC 60-67), firms for which data is not available for some variables, extreme observations and firms with no goodwill in their opening balance sheet.<sup>13</sup> This results in a final sample of 2,262 firm-year observations. Additionally, we define a subsample of firms with a higher likelihood of having overvalued goodwill on their balance sheet<sup>14</sup>. Similar to Beatty and Weber (2006), this subsample consists of companies with a difference between the market and book value of their equity that is less than their opening balance of goodwill. This is the case for 18 percent of our sample or 411 firm-year observations. All data are retrieved from Thomson Reuters' financial databases 'WORLDSCOPE FUNDAMENTALS'<sup>15</sup> and 'DATASTREAM'<sup>16</sup>.

## B) EMPIRICAL MODEL

### **Dependent variable and research design**

We analyze the effects of certain factors on the goodwill impairment decision using a logistic regression model, where the dependent variable is an indicator variable ( $IMP_{it}$ ) that takes the value of one if firm  $i$  takes a goodwill impairment in year  $t$  and zero otherwise.

### **Independent variables**

#### *Test variables*

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<sup>13</sup> Excluding companies that are cross-listed in the U.S. from the sample, leads to similar results as the ones reported in Table 4.

<sup>14</sup> In the ideal case, it would be interesting to split our sample between firms with truly impaired goodwill on their balance sheet and firms for which the recorded goodwill is not impaired. The existence of an observable proxy for truly impaired goodwill would conflict with our premise that the application of the goodwill impairment test leaves managers with enough discretion to manage their earnings.

<sup>15</sup> WORLDSCOPE FUNDAMENTALS is a financial database, distributed by Thomson Reuters, containing fundamental financial data, analysis and stock performance data on the world's leading public corporations, as well as a number of key private companies.

<sup>16</sup> DATASTREAM is a financial statistics database, distributed by Thomson Reuters, providing time-series data on a large set of historical financial content.

To test hypothesis 1, we follow Bartov (1993), Francis et al. (1996) and Riedl (2004) and include separate variables that indicate when earnings are ‘unexpectedly’ high and when they are ‘unexpectedly’ low. As a proxy for ‘big bath’ reporting behavior ( $BATH_{it}$ ), we include an indicator variable that equals one if the change in a firm’s prewrite-down earnings divided by lagged total assets is below the median of non-zero negative values and zero otherwise. In this case earnings are ‘unexpectedly’ low. Another indicator variable is included to proxy for ‘smoothing’ behavior ( $SMOOTH_{it}$ ). This variable is equal to one if the change in a firm’s prewrite-down earnings divided by lagged total assets is above the median of non-zero positive values for this variable and zero otherwise.

To test hypothesis 2, we use a dichotomous variable to indicate whether the firm has a Big 4 auditor or not ( $BIG4_{it}$ ). To examine the potential interaction effect between auditor type and income-decreasing incentives, we include interaction terms between the ‘big bath’ and ‘smoothing’ variables and the auditor indicator variable.

Finally, for testing hypothesis 3, we include the country-specific ‘rule of law’ score ( $LAW_{it}$ ) developed by the World Bank (Kaufmann et al. 2007). The ‘rule of law’ score measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence (Kaufmann et al. 2007). Further, we include interaction terms between this ‘rule of law’ score and the ‘big bath’ and ‘smoothing’ indicator variables.

### *Control variables*

All regression models include industry- and year- fixed effects. Thus, our specification controls for mean differences in impairment tests across industries and time trends. In addition, all regression models include country-fixed effects to test hypotheses 1 and 2 (model 1, 2 and 3) or country characteristics to test hypothesis 3 (model 4 and 5).

We include size ( $SIZE_{it}$ ) and the percentage of the goodwill opening balance on total assets ( $GW_{it-1}$ ) as a control for their effect on the impairment decision.

Because prior differences in local accounting standards can affect the composition and the opening balance of recognized goodwill, the coefficient on the ‘rule of law’ score (hypothesis 3) can also reflect the effect of prior differences in local accounting standards that influence the amount of goodwill on the opening balance sheet and as a consequence the likelihood of an impairment. One way to deal with this potential problem is to control for these a priori differences in goodwill treatment between countries. Therefore, we include in model 4 and 5 (hypothesis 3) a variable that equals the median proportion of goodwill on the opening balance sheet in a particular country ( $GW\_country_{it}$ ). By doing so, we mitigate pre-IFRS accounting differences between countries, which are reflected in the amount of goodwill that is recorded on the balance sheet (not expensed or written off to reserves).

We also include a number of variables designed to reflect the economic factors that affect an impairment decision. First, in model 4 and 5 (hypothesis 3), we include the percentage change in Gross Domestic Product ( $\Delta GDP_{it}$ ) in the country in which the firm is incorporated to capture macroeconomic effects. A negative evolution of the GDP over time indicates an overall economic decline which can negatively affect the fair value of a

firm's cash-generating units. In models 1 to 3 country effects are captured by the fixed effects.

Second, we control for the overall economic performance of the industry in which the firm operates by including the percentage change in the firm's industry return on assets ( $\Delta indROA_{it}$ ). Similar to Francis et al. (1996), we measure this construct as the change in industry median return on assets over the prior year. Industry is defined using the 2-digit SIC code.

Finally, we include two firm-specific factors that are associated with the economic condition of the firm. The first is the change in the firm's sales over the prior year divided by lagged total assets ( $\Delta SALES_{it}$ ). Similarly, we include the change in the firm's operating cash flow ( $\Delta CFO_{it}$ ).

Hence, our empirical models estimated at the firm-year level are as follows:

#### Model 1, 2 and 3

$$\begin{aligned} IMP_{it} = & \alpha_0 + \alpha_1 GW_{it-1} + \alpha_2 SIZE_{it} + \alpha_3 \Delta indROA_{it} + \alpha_4 \Delta SALES_{it} + \alpha_5 \Delta CFO_{it} + \alpha_6 BATH_{it} \\ & + \alpha_7 SMOOTH_{it} + \alpha_8 BIG4_{it} + \alpha_9 BATH_{it} * BIG4_{it} + \alpha_{10} SMOOTH_{it} * BIG4_{it} \\ & + \sum \alpha_j Controls_{ij} + \varepsilon_{it} \end{aligned} \quad (1)$$

#### Model 4 and 5

$$\begin{aligned} IMP_{it} = & \alpha_0 + \alpha_1 GW_{it-1} + \alpha_2 SIZE_{it} + \alpha_3 GW\_country_{it} + \alpha_4 \Delta GDP_{it} + \alpha_5 \Delta indROA_{it} + \alpha_6 \Delta SALES_{it} \\ & + \alpha_7 \Delta CFO_{it} + \alpha_8 BATH_{it} + \alpha_9 SMOOTH_{it} + \alpha_{10} LAW_{it} + \alpha_{11} BATH_{it} * LAW_{it} \\ & + \alpha_{12} SMOOTH_{it} * LAW_{it} + \sum \alpha_j Controls_{ij} + \varepsilon_{it} \end{aligned} \quad (2)$$

Where:

- $IMP_{it}$  = indicator variable (equal to one if an impairment is reported, else 0);
- $GW_{it-1}$  = ratio of firm  $i$ 's opening balance of goodwill on total assets;
- $SIZE_{it}$  = natural logarithm of firm  $i$ 's total assets;
- $GW\_COUNTRY_{it}$  = median proportion of goodwill on the opening balance sheet in the country in which firm  $i$  is domiciled;
- $\Delta GDP_{it}$  = the % change in Gross Domestic Product from year  $t-1$  to year  $t$  in the country in which firm  $i$  is domiciled;

$\Delta indROA_{it}$  = the median change in firm  $i$ 's industry return on assets from period  $t-1$  to  $t$ , where industry is defined on a 2-digit SIC level;  
 $\Delta SALES_{it}$  = firm  $i$ 's change in sales from year  $t-1$  to year  $t$ , divided by total assets at the end of year  $t-1$ ;  
 $\Delta CFO_{it}$  = firm  $i$ 's change in operating cash flows from year  $t-1$  to year  $t$ , divided by total assets at the end of year  $t-1$ ;  
 $BATH_{it}$  = indicator variable to proxy for 'big bath' reporting (equal to one if the change in firm  $i$ 's pre-impaired earnings from year  $t-1$  to  $t$ , divided by total assets at year  $t-1$  is below the median of non-zero negative values, else 0);  
 $SMOOTH_{it}$  = indicator variable to proxy for 'earnings smoothing' (equal to one if the change in firm  $i$ 's pre-impaired earnings from year  $t-1$  to  $t$ , divided by total assets at year  $t-1$  is above the median of non-zero positive values, else 0);  
 $BIG4_{it}$  = indicator variable (equal to one in case of a Big 4 auditor, else 0); and  
 $LAW_{it}$  = the 'rule of law' score for the county in which firm  $i$  is domiciled from Kaufmann et al. (2007).

## V. RESULTS

### A) DESCRIPTIVE STATISTICS

The full sample contains 2,262 firm-year observations. 15.03 and 16.10 percent of the companies have taken an impairment in 2005 and 2006 respectively. The average impairment represents 8.27 percent of the opening balance of goodwill. Some general impairment characteristics per country<sup>17</sup> and industry are presented in Table 1. Greece (Austria) has the lowest (highest) percentage of goodwill impairments. The average percentage of goodwill actually impaired is the lowest in Portugal (0.24 percent) and the highest in the Luxembourg (23.81 percent). The relative frequency of impairments ranges from 12.54 percent of the companies in the 'Wholesale trade' industry (SIC 50-59) to 19.05 percent in the 'Transportation, communication, electricity, gas and sanitary services' industry (SIC 40-49).

<sup>17</sup> Because approximately 25 percent of our firm-year observations are from U.K.-based firms, the current sample is heavily weighted towards observations from the United Kingdom. To alleviate the concern that our results are largely driven by the dominance of firms domiciled in the U.K., we also estimate our models without those observations. Untabulated results support our main conclusions.

The descriptive statistics of all variables are reported in Table 2. Panel A, B and C represent the statistics for the total sample, the impairment sample and the non-impairment sample respectively. As expected, the mean values for the economic factors,  $\Delta$ GDP,  $\Delta$ indROA,  $\Delta$ SALES and  $\Delta$ CFO (financial reporting incentives (i.e. BATH and SMOOTH)), are slightly lower (higher) for the impairment sample than for the non-impairment sample.

Table 3 includes Pearson correlation coefficients among all variables. As can be seen, the risk of bias arising from strong correlations is minimal.

## B) REGRESSION RESULTS

Table 4 reports the regression results for the pooled sample, containing all firm-year observations with goodwill on their balance sheet (sample 1), and a subsample of firm-year observations which we consider to have a higher likelihood of overvalued goodwill (i.e. opening balance of goodwill is higher than difference between market and book value of equity) (sample 2). We tabulate coefficients from logistic regression models and, in parentheses, p-values based on robust standard errors that are clustered by firm<sup>18</sup>.

Table 4 indicates that the likelihood of reporting a goodwill impairment is positively associated with the proportion of goodwill on the balance sheet (GW) and the size of the firm (SIZE) and negatively, as predicted, with the economic factors ( $\Delta$ GDP,  $\Delta$ indROA,  $\Delta$ SALES and  $\Delta$ CFO). The coefficients of the income-decreasing reporting incentives proxies are significantly positive, suggesting that firms impair their goodwill

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<sup>18</sup> Because institutional settings are similar for all firms in a specific country, clustering at the firm level might overstate statistical significance. Unreported sensitivity analyses show that clustering standard errors at the country level produces similar p-values to the ones reported in Table 4.

more often when earnings are unexpectedly low ('big bath') or high (smooth). These results indicate that firms strategically use the goodwill impairment test to manage their earnings, which is consistent with hypothesis 1a and b.

The results for the second hypothesis are reported in model 2 and 3. For the pooled sample (sample 1) the coefficient on the Big 4 indicator in model 2 is not significantly different from zero, suggesting that overall there is no difference in the likelihood of reporting a goodwill impairment across auditors. This result is not surprising, since we expect Big 4 auditors, on the one hand, to force firms to report write-downs in case of impaired goodwill (less type II errors) and, on the other hand, to prevent them from accelerating impairments (i.e. taking impairments that are not necessary (type I errors)). However, when we restrict the sample to observations with a high likelihood of overvalued goodwill (sample 2), the coefficient on the Big 4 indicator increases and becomes significantly positive (model 2). This means that firms audited by Big 4 auditors impair their goodwill more often than firms audited by non-Big 4 auditors, suggesting that non-Big 4 auditors give firms more discretion to engage in income-increasing earnings management by postponing goodwill impairments (type II errors). The positive coefficient on the Big 4 indicator in model 3 confirms this result (sample 1 and 2). Indeed, as stipulated in hypothesis 2a, firms audited by Big 4 auditors take significantly more impairments than firms audited by non-Big 4 auditors, when incentives to underreport earnings are low. Additionally, the results for model 3 show that the coefficients on the interaction terms between the Big 4 indicator and the income-decreasing reporting incentives have an opposite sign to and are smaller than their corresponding main effect (BATH and SMOOTH). Consistent with hypothesis 2b, this

finding indicates that, when there are incentives to underreport earnings, the likelihood of taking a goodwill impairment will increase more for firms audited by a non-Big 4 auditor than for firms audited by a Big 4 auditor.<sup>19</sup>

To test hypothesis 3, we include the variable ‘rule of law’ (LAW) as a proxy for the country’s legal environment in the regression model (model 4 and 5). The LAW variable coefficient is highly significant and positive, which indicates that firms in countries with a low quality judicial system take less goodwill impairments. These results support hypothesis 3a and are consistent with the findings of Bushman and Piotroski (2006) that a high quality judicial system can lead to more conservative reporting. On the contrary, we find no support for hypothesis 3b. The lack of significant results on the interaction terms between the ‘rule of law’ score and the income-decreasing incentives (model 5), could be caused by the fact that our study focuses solely on European countries. Continental European countries clearly show some similarities (e.g. code law system, stakeholder orientation). Therefore, differences in litigation costs caused by differences in the quality of the judicial systems might be too small to result in significant differences in earnings management.

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<sup>19</sup> Ai and Norton (2003) suggested that, for non-linear models, tests for the statistical significance of the interaction effect must be based on the estimated cross partial derivatives, not on the coefficient of the interaction term. The reason is that the interaction effect in non-linear models, as opposed to linear models, depends on other covariates and may therefore vary in magnitude and significance across the range of predicted values (i.e. probabilities recording a goodwill impairment). To account for these concerns, we used the ‘inteff’ command in Stata after running the logit model (Norton et al. 2004). The interaction effects are largely confirmed by the use of the ‘inteff’-command in Stata. The interaction effects of the auditor indicator variable and the income-decreasing reporting incentives are still negative across all predicted values, but somewhat smaller in magnitude, compared to the unconditional interaction coefficients. The mean coefficients on the interaction effects (mean p-values) for Sample 1 are -0.141 (0.066) and -0.105 (0.055) for the interaction of the big4 indicator and the bath- and smooth- proxy, respectively.

## VI. SENSITIVITY ANALYSIS

We performed a number of sensitivity analyses to check the robustness of our results.

### **Interaction between auditor type and income-decreasing incentives**

To provide a better insight into the interaction between auditor type and income-decreasing reporting incentives, we split the sample by auditor type (BIG4) and by the presence of income-decreasing incentives (BATH, SMOOTH). The results are reported in Table 5. The coefficients for most variables are not significantly different for the two groups. Yet, some interesting results emerge.

First, we find that the coefficients on the income-decreasing incentives (BATH, SMOOTH) are not significant for firms audited by a Big 4 audit firm, whereas they are highly significant for firms audited by non-Big 4 auditors (Panel 1). Moreover, the Chi-square statistics show that the differences between the corresponding coefficients are highly significant. These results suggest that reported goodwill impairments in firms audited by non-Big 4 (Big 4) auditors are (not) driven by earnings management incentives, which is consistent with the premise that Big 4 auditors provide a higher quality.

Second, the coefficient on the Big 4 indicator variable has an opposite sign for firms with income-increasing and income-decreasing incentives (Panel 2). More specifically, the coefficient is significantly positive (negative) for firms-year observations with low (high) income-decreasing reporting incentives. The positive coefficient for the low incentives group confirms our results for hypothesis 2a in Table 4, that, when

income-decreasing reporting incentives are low, firms audited by a Big 4 auditor will take more goodwill impairments than firms audited by non-Big 4 auditors. On the other hand, the negative sign for the Big 4 indicator in the high income-decreasing reporting incentives group suggest that, in case of large earnings surprises, the likelihood of taking a goodwill impairment is higher for firms audited by a non-Big 4 auditor. Although this does not provide direct evidence, these findings are consistent with the premise that firms audited by non-Big 4 auditors are more likely to accelerate goodwill impairments (type I errors) in case of large earnings surprises.

### **Magnitude of goodwill impairments**

In practice, the goodwill impairment decision is composed of two accounting choices: (a) the decision to report an impairment and (b) the decision capturing the amount of the impairment. By running a logistic regression model, we limited our analysis to the first part of the decision process (i.e., whether or not an impairment is recorded). To test whether the same incentives also impact the magnitude of goodwill impairments, we repeat the analysis in Table 4 (Sample 1) using a Tobit regression model. By doing so, we simultaneously analyze the decision to report an impairment and the decision capturing the amount of the impairment and thereby take into account that the impairment is censored below at zero, and above at 100 percent. Hence, the dependent variable is the percentage of goodwill actually impaired. The results (not reported) are similar to the ones reported in Table 4 (Sample 1). First, firms appear to take larger impairments when earnings are unexpectedly low or high. Second, Big 4 auditors seem to put a higher constraint on the use of the occurrence and magnitude of goodwill impairments as a tool to manage earnings. In particular, firms audited by a Big

4 audit firm take larger goodwill impairments than firms audited by a non-Big 4 audit firm when income-decreasing reporting incentives are low. When income-decreasing reporting incentives increase, the magnitude of the goodwill impairment increases more for firms audited by a non-Big 4 audit firm, than for firms audited by a Big 4 audit firm. Finally, firms in countries with a higher quality judicial system tend to be more conservative and take larger impairments than firms in countries with a lower quality judicial system.

### **Institutional variables**

The results reported in Table 4 strongly support hypothesis 3a, suggesting that a country's 'rule of law' can influence incentives to produce conservative accounting numbers. In particular, we find that firms in countries with a high 'rule of law' score take more goodwill impairments than firms in countries with a lower score. Because country-level metrics are likely to have measurement error and because there are multiple dimensions to the judicial environment of a country, we test the effect of including alternative measures for this construct in our analysis.

In particular, we include the La Porta et al. (1998) estimates for 'efficiency of the judicial system', 'rule of law' and 'corruption' in the regression model. The 'efficiency of the judicial system' variable assesses the efficiency and integrity of the legal environment as it affects business. The 'rule of law' construct measures the law and order tradition in a country and the 'corruption' variable captures the level of corruption in government, with lower scores indicating a higher level of corruption. All three variables' coefficients are positive and significant at the 1 percent level ( $p = 0.000$ ).

Further, we include a measure of judicial impartiality as reported in the Economic Freedom of the World's 2007 annual report. This measure captures whether a trusted legal framework exists for private businesses to challenge the legality of government actions or regulation. This variable was also used in Bushman and Piotroski (2006) to examine the impact of the quality of a country's judicial system on conservative reporting. Consistent with hypothesis 3a, the coefficient of this variable is positive and highly significant ( $p = 0.000$ ).

Overall, these results suggest that the quality of a country's judicial setting is significantly associated with the frequency and the magnitude of goodwill impairments under IFRS, consistent with insights from prior research that a country's legal institutions can provide incentives to produce conservative accounting numbers. However, the interaction effects between the institutional variables and the proxies for income-decreasing behavior (BATH, SMOOTH) are not significant.

### **Analyses using market-based performance measures**

Prior research (Francis et al. 1996; Riedl 2004) often includes market-based performance measures to explain reported impairments. Indeed, stock prices might serve as comprehensive measures of the firm's economical conditions, as well as expectations of future performance. On the other hand, market-based measures are likely to be endogenous since impairments are also used as an input to determine firm value. Accordingly, we re-estimate equations (1) and (2) incorporating three market-based performance measures as additional economic factors: (1) the value-weighted stock market return (RETURN\_MARKET), (2) the 2-digit SIC industry value-weighted stock return (RETURN\_IND), and (3) the firm's stock return (RETURN). Untabulated

findings indicate that inferences relating to the test variables are similar to those previously reported.

## VII. CONCLUSION

Our study investigates the influence of audit quality and the institutional setting on the use of the IFRS goodwill impairment test as a tool to manage earnings. We focus on the goodwill impairment test as concern was raised by Ball (2006) that there is more judgment needed under IFRS 3 and therefore it is unlikely that managers and auditors will perform asset impairment tests with the same degree of diligence across countries. We find for a sample of European listed companies empirical support for this concern as our results show that the frequency of goodwill impairments are highly associated with financial reporting incentives and are not uniform across auditors and countries. In particular, we find that firms are more likely to take goodwill impairments when earnings are ‘unexpectedly’ low (‘big bath’ accounting) or ‘unexpectedly’ high (earnings smoothing). Further, our analyses suggest that Big 4 auditors do a better job than non-Big 4 auditors in constraining the use of the goodwill impairment test as a tool to manage earnings. In particular, our findings are consistent with the fact that, in absence of income-decreasing reporting incentives, firms audited by non-Big 4 auditors have a higher likelihood of postponing goodwill impairments (type II errors) whereas, in case of large earnings surprises, they have a higher likelihood of accelerating goodwill impairments in order to take a ‘big bath’ or smooth earnings (type I errors). Finally, we find that differences in the frequency of goodwill impairments are associated with the strength of the judicial setting, while controlling for economic factors and financial

reporting incentives. This is in line with previous findings of Bushman and Piotroski (2006) that high quality judicial systems lead to more conservative reporting (i.e. more impairments).

Overall, our results suggest that after the introduction of IFRS across the world, which attempts to increase financial reporting quality and comparability of financial statements, opportunities for earnings manipulation and differences in accounting across auditors and countries continue to exist and seem to have found their way in the implementation of the standards. An important policy implication of this study is that the potential benefits of introducing a single set of high-quality financial reporting standards are currently not fully exploited, and that one way forward would be to create more uniformity in audit quality and judicial settings.

A limitation of our study relates to the level at which the economic factors are measured. All economic factors defined in the current research design are measured at firm-level. However, as IAS 36 stipulates, impairment tests should be carried out at cash-generating unit level. Financial databases, however, only provide aggregated impairment numbers. Therefore, the role of economic factors in the impairment decision is likely to be underestimated.

While our results relate to European countries, future research could examine whether these results also hold for other countries across the world which have adopted IFRS. Further, it would be interesting to examine whether these results hold over time as public oversight and enforcement mechanisms are further developed.

**FIGURE 1**  
**The impairment matrix**

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		Financial reporting	
		Impairment reported	No impairment reported
Goodwill	Fair Value ^ Book value	OK	Type II error
	Fair Value v Book value	Type I error	OK

**TABLE 1**  
**Descriptive statistics: impairments**  
(n = 2,262)

**Panel A: Descriptives by country**

Country	# listed firms	# impairments (%)	mean % impaired
Austria	40	37.50	8.72
Belgium	78	15.38	7.17
Denmark	83	18.07	6.17
Finland	151	10.60	12.93
France	419	16.95	4.59
Germany	249	17.67	11.48
Greece	57	0.00	0.00
Ireland	31	12.90	0.50
Italy	121	4.13	6.04
Luxembourg	12	16.67	23.81
Netherlands	121	28.93	4.65
Portugal	17	11.76	0.24
Spain	100	11.00	1.42
Sweden	185	15.68	10.37
U.K.	598	15.22	11.03

**Panel B: Descriptives by industry**

Industry	# listed firms	# impairments (%)	mean % impaired
Mining and construction	144	18.06	6.45
Manufacturing	1,029	14.67	8.68
Transportation, communication, electricity, gas and sanitary services	231	19.05	4.84
Wholesale trade	295	12.54	6.21
Services	563	16.70	10.53

NOTE: This table presents an overview of the impairment characteristics of the total sample of listed firms from 15 E.U. countries that are compliant with IFRS and have goodwill on their opening balance sheet over the period 2005-2006. The descriptives are reported by country (Panel A) and industry (Panel B). The column '# listed firms' contains the number of firm-years included in the sample. The column '# impairments (%)' represents the percentage of firm-years in which a goodwill impairment is recorded. The column 'mean % impaired' contains the mean ratio of goodwill impairment on the opening balance of goodwill for firms that report an impairment.

**TABLE 2**  
**Descriptive statistics: variables**

**Panel A: Total sample (n=2,262)**

<b>Variables<sup>a</sup></b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
IMP%	0.0129	0.0621	0.0000	0.9904
GW <sub>t-1</sub>	0.1592	0.1587	0.0000	0.9654
GW_country	0.0291	0.0187	0.0000	0.0607
SIZE	3,569,305	12,900,000	2,563	217,000,000
ΔGDP	0.0254	0.0109	0.0055	0.0612
ΔindROA	0.0063	0.0136	-0.0645	0.0615
ΔSALES	0.1183	0.2240	-0.8952	0.9967
ΔCFO	0.0076	0.0812	-0.4274	0.4938
BATH	0.1684	0.3743	0.0000	1.0000
SMOOTH	0.3271	0.4693	0.0000	1.0000
BIG4	0.7953	0.4036	0.0000	1.0000
LAW	1.5361	0.3791	0.3700	2.0300

**Panel B: Impairment sample (n=352)**

<b>Variables<sup>a</sup></b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
IMP%	0.0827	0.1381	0.0000	0.9904
GW <sub>t-1</sub>	0.1843	0.1609	0.0011	0.8387
GW_country	0.0296	0.0190	0.0000	0.0607
SIZE	7,577,712	22,700,000	5,057	181,000,000
ΔGDP	0.0249	0.0103	0.0055	0.0612
ΔindROA	0.0047	0.0140	-0.0645	0.0452
ΔSALES	0.0858	0.2106	-0.8911	0.7904
ΔCFO	-0.0026	0.0657	-0.4256	0.3227
BATH	0.1989	0.3997	0.0000	1.0000
SMOOTH	0.3438	0.4756	0.0000	1.0000
BIG4	0.8409	0.3663	0.0000	1.0000
LAW	1.6194	0.2677	0.3700	2.0300

**Panel C: Non-impairment sample (n=1,910)**

<b>Variables<sup>a</sup></b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
GW <sub>t-1</sub>	0.1545	0.1579	0.0000	0.9654
GW_country	0.0290	0.0187	0.0000	0.0607
SIZE	2,830,583	9,996,244	2,563	217,000,000
ΔGDP	0.0255	0.0110	0.0055	0.0612
ΔindROA	0.0066	0.0136	-0.0645	0.0615
ΔSALES	0.1243	0.2259	-0.8952	0.9967
ΔCFO	0.0095	0.0836	-0.4274	0.4938
BATH	0.1628	0.3693	0.0000	1.0000
SMOOTH	0.3241	0.4682	0.0000	1.0000
BIG4	0.7869	0.4096	0.0000	1.0000
LAW	1.5207	0.3943	0.3700	2.0300

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NOTE: This table presents the descriptive statistics for all variables for the total sample of listed firms from 15 E.U. countries with goodwill on their opening balance sheet over the period 2005-2006 (Panel A), the subsample of firm-years in which a goodwill impairment is recorded (Panel B) and the subsample of firm-years in which no goodwill impairment is recorded (Panel C).

<sup>a</sup> Variable definitions: IMP% is the ratio of goodwill impairment on the opening balance of goodwill ( $GW_{t-1}$ ).  $GW_{t-1}$  is the proportion of pre-impaired goodwill on pre-impaired total assets.  $GW\_country$  is the median proportion of goodwill on the opening balance sheet in the country in which firm  $i$  is domiciled. SIZE is equal to total assets.  $\Delta GDP$  is the percentage change in Gross Domestic Product from year  $t-1$  to year  $t$  in the country in which firm  $i$  is domiciled.  $\Delta indROA$  is the median change in firm  $i$ 's industry return on assets from period  $t-1$  to  $t$ , where industry is defined on a 2-digit SIC level.  $\Delta SALES$  is the change in firm  $i$ 's sales from period  $t-1$  to  $t$ , divided by total assets at the end of  $t-1$ .  $\Delta CFO$  is the change in firm  $i$ 's sales from period  $t-1$  to  $t$ , divided by total assets at the end of  $t-1$ . BATH is an indicator variable equal to one if the change in firm  $i$ 's pre-impaired earnings from year  $t-1$  to  $t$ , divided by total assets at year  $t-1$ , is below the median of non-zero negative values; else 0 (the proxy for 'big bath' reporting). SMOOTH is an indicator variable equal to one if firm  $i$ 's pre-impaired earnings from year  $t-1$  to  $t$ , divided by total assets at year  $t-1$ , is above the median of non-zero positive values; else 0 (the proxy for 'earnings smoothing'). BIG4 is an indicator variable equal to one if the firm is audited by Big 4 auditor; else 0. LAW is the 'rule of law' variable for the year 2005 and 2006 from Kaufmann et al. (2007). Higher values represent countries with higher quality legal enforcement.

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**TABLE 3**  
**Pearson Correlations**  
(n=2,262)

Variables <sup>a</sup>	GW <sub>t-1</sub>	SIZE	GW_country	ΔGDP	ΔindROA	ΔSALES	ΔCFO	BATH	SMOOTH
SIZE	-0.0165								
GW_country	0.0525**	0.0385*							
ΔGDP	-0.0216	0.0533**	-0.0046						
ΔindROA	-0.0177	-0.0788***	-0.0322	-0.0434**					
ΔSALES	0.0616***	-0.0347*	-0.0022	0.0969***	0.0900***				
ΔCFO	0.0394*	0.0004	-0.0147	-0.0015	0.0502**	0.1359***			
BATH	0.0221	-0.0219	-0.0436**	0.0136	-0.1229***	-0.2002***	-0.1425***		
SMOOTH	-0.0153	-0.0397*	-0.0155	0.0537**	0.1512***	0.1999***	0.1769***	-0.3138***	
LAW	0.0527**	0.0477**	-0.0252	0.2895***	0.0403*	0.0203	0.0019	0.0143	0.1039***

NOTE: This table presents the Pearson correlation coefficients among the test and control variables. \*, \*\*, \*\*\* indicates significantly correlated at the  $\alpha = 0.10$ ; 0.05; 0.01 level, respectively (two-tailed).

<sup>a</sup> Variable definitions: GW<sub>t-1</sub> is the proportion of pre-impaired goodwill on pre-impaired total assets. GW\_country is the median proportion of goodwill on the opening balance sheet in the country in which firm *i* is domiciled. SIZE is equal to total assets. ΔGDP is the percentage change in Gross Domestic Product from year *t-1* to year *t* in the country in which firm *i* is domiciled. ΔindROA is the median change in firm *i*'s industry return on assets from period *t-1* to *t*, where industry is defined on a 2-digit SIC level. ΔSALES is the change in firm *i*'s sales from period *t-1* to *t*, divided by total assets at the end of *t-1*. ΔCFO is the change in firm *i*'s sales from period *t-1* to *t*, divided by total assets at the end of *t-1*. BATH is an indicator variable equal to one if the change in firm *i*'s pre-impaired earnings from year *t-1* to *t*, divided by total assets at year *t-1*, is below the median of non-zero negative values; else 0 (the proxy for 'big bath' reporting). SMOOTH is an indicator variable equal to one if firm *i*'s pre-impaired earnings from year *t-1* to *t*, divided by total assets at year *t-1*, is above the median of non-zero positive values; else 0 (the proxy for 'earnings smoothing'). BIG4 is an indicator variable equal to one if the firm is audited by Big 4 auditor; else 0. LAW is the 'rule of law' variable for the year 2005 and 2006 from Kaufmann et al. (2007). Higher values represent countries with higher quality legal enforcement.

**TABLE 4**  
**Multivariate regression analysis: Goodwill impairment determinants**  
(dep. var. = impairment indicator variable)

Variables <sup>a</sup>	Sample 1 recorded goodwill <sub>t-1</sub> > 0					Sample 2 (Market value equity – Book value equity) < recorded goodwill <sub>t-1</sub>				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
GW <sub>t-1</sub>	1.278 (0.002)***	1.280 (0.002)***	1.256 (0.002)***	0.996 (0.011)**	0.990 (0.012)**	1.110 (0.191)	1.027 (0.228)	0.992 (0.246)	1.122 (0.138)	1.138 (0.132)
SIZE <sub>it</sub>	0.253 (0.000)***	0.248 (0.000)***	0.249 (0.000)***	0.263 (0.000)***	0.264 (0.000)***	0.284 (0.001)***	0.238 (0.009)***	0.246 (0.008)***	0.276 (0.002)***	0.277 (0.002)***
GW_country				3.945 (0.315)	3.938 (0.316)				4.087 (0.631)	4.248 (0.616)
<b>Economic factors</b>										
ΔGDP <sub>it</sub>				-22.990 (0.008)***	-22.865 (0.008)***				-7.413 (0.594)	-7.195 (0.604)
ΔindROA <sub>it</sub>	-12.845 (0.045)**	-12.870 (0.045)**	-13.219 (0.040)**	-12.430 (0.050)**	-12.361 (0.052)*	8.547 (0.576)	7.521 (0.624)	7.841 (0.604)	5.324 (0.714)	5.113 (0.725)
ΔSALES <sub>it</sub>	-0.738 (0.010)**	-0.737 (0.010)**	-0.748 (0.010)***	-0.620 (0.028)**	-0.618 (0.028)**	-1.240 (0.037)**	-1.103 (0.067)*	-1.135 (0.059)*	-1.082 (0.052)*	-1.144 (0.038)**
ΔCFO <sub>it</sub>	-2.277 (0.002)***	-2.268 (0.002)***	-2.275 (0.001)***	-2.270 (0.002)***	-2.254 (0.002)***	-4.065 (0.038)**	-4.019 (0.045)**	-4.078 (0.034)**	-3.793 (0.046)**	-3.799 (0.042)**
<b>Income-decreasing incentives</b>										
BATH <sub>it</sub>	0.445 (0.013)**	0.443 (0.013)**	1.399 (0.002)***	0.394 (0.025)**	0.037 (0.969)	1.286 (0.000)***	1.320 (0.000)***	2.762 (0.002)***	1.221 (0.000)***	2.202 (0.144)
SMOOTH <sub>it</sub>	0.408 (0.005)***	0.409 (0.005)***	1.213 (0.001)***	0.367 (0.011)**	0.562 (0.424)	0.881 (0.011)**	0.888 (0.009)***	1.642 (0.008)***	0.878 (0.008)***	0.826 (0.561)
<b>Auditor type</b>										
BIG4 <sub>it</sub>		0.099 (0.636)	0.700 (0.036)**				0.656 (0.096)*	1.689 (0.026)**		
BATH <sub>it</sub> *BIG4 <sub>it</sub>			-1.148 (0.019)**					-1.838 (0.052)*		
SMOOTH <sub>it</sub> *BIG4 <sub>it</sub>			-0.953 (0.018)**					-0.859 (0.232)		
<b>Institutional factors</b>										
LAW <sub>it</sub>				1.193 (0.000)***	1.187 (0.000)***				0.929 (0.027)**	1.111 (0.092)*
BATH <sub>it</sub> *LAW <sub>it</sub>					0.218 (0.697)					-0.633 (0.505)
SMOOTH <sub>it</sub> *LAW <sub>it</sub>					-0.118 (0.782)					0.031 (0.973)
Constant	-6.294 (0.000)***	-6.296 (0.000)***	-6.896 (0.000)***	-6.692 (0.000)***	-6.685 (0.000)***	-6.553 (0.000)***	-6.416 (0.000)***	-7.421 (0.000)***	-7.415 (0.000)***	-7.719 (0.000)***
Fixed effects	industry/ year/country	industry/ year/country	industry/ year/country	industry/ year	industry/ year	industry/ year/country	industry/ year/country	industry/ year/country	industry/ year	industry/ year
Observations	2262	2262	2262	2262	2262	411	411	411	411	411
Wald Chi <sup>2</sup>	131.24***	131.99***	135.39***	111.19***	111.65***	50.14***	55.45***	52.29***	48.09***	47.06***

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NOTE: This table presents the regression results with as the dependent variable an impairment indicator variable, that takes the value of one if firm  $i$  records a goodwill impairment in year  $t$  (0 else). Sample 1 is the total sample, consisting of all listed firms from 15 E.U. countries with goodwill on their opening balance sheet over the period 2005-2006. Sample 2 is a subsample of firm-years with a higher likelihood of having overvalued goodwill on their balance sheet. Similar to Beatty and Weber (2006), this subsample consists of all firm-years for which the difference between the market and book value of equity is less than the opening balance of goodwill. The table reports coefficient estimates and p-values based on standard errors corrected for heteroskedasticity and for clustering of observations by firm (in parentheses). \*, \*\*, \*\*\* indicates significantly different from zero at the  $\alpha = 0.10; 0.05; 0.01$  level, for two-tailed tests.

<sup>a</sup> Variable definitions:  $GW_{t-1}$  is the proportion of pre-impaired goodwill on pre-impaired total assets.  $GW\_country$  is the median proportion of goodwill on the opening balance sheet in the country in which firm  $i$  is domiciled.  $SIZE$  is equal to total assets.  $\Delta GDP$  is the percentage change in Gross Domestic Product from year  $t-1$  to year  $t$  in the country in which firm  $i$  is domiciled.  $\Delta indROA$  is the median change in firm  $i$ 's industry return on assets from period  $t-1$  to  $t$ , where industry is defined on a 2-digit SIC level.  $\Delta SALES$  is the change in firm  $i$ 's sales from period  $t-1$  to  $t$ , divided by total assets at the end of  $t-1$ .  $\Delta CFO$  is the change in firm  $i$ 's sales from period  $t-1$  to  $t$ , divided by total assets at the end of  $t-1$ .  $BATH$  is an indicator variable equal to one if the change in firm  $i$ 's pre-impaired earnings from year  $t-1$  to  $t$ , divided by total assets at year  $t-1$ , is below the median of non-zero negative values; else 0 (the proxy for 'big bath' reporting).  $SMOOTH$  is an indicator variable equal to one if firm  $i$ 's pre-impaired earnings from year  $t-1$  to  $t$ , divided by total assets at year  $t-1$ , is above the median of non-zero positive values; else 0 (the proxy for 'earnings smoothing').  $BIG4$  is an indicator variable equal to one if the firm is audited by Big 4 auditor; else 0.  $LAW$  is the rule of law variable for the year 2005 and 2006 from Kaufmann et al. (2007). Higher values represent countries with higher quality legal enforcement.

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**TABLE 5**  
**Sensitivity analysis: Interaction between auditor type and income-decreasing incentives**  
(dep. var. = impairment indicator variable)

Variables <sup>a</sup>	PANEL 1 Auditor type			PANEL 2 Income-decreasing incentives		
	Non-Big4	Big4	Difference <sup>b</sup>	low <sup>d</sup>	high <sup>d</sup>	Difference <sup>c</sup>
GW <sub>t-1</sub>	0.611 (0.570)	1.425 (0.002)***	-0.814 (0.484)	0.309 (0.605)	2.118 (0.000)***	-1.809 (0.020)**
SIZE <sub>it</sub>	0.295 (0.007)***	0.227 (0.000)***	0.068 (0.557)	0.213 (0.000)***	0.266 (0.000)***	-0.053 (0.434)
<b>Economic factors</b>						
ΔindROA <sub>it</sub>	-0.662 (0.951)	-7.790 (0.131)	7.128 (0.549)	2.240 (0.788)	-12.062 (0.028)**	14.302 (0.153)
ΔSALES <sub>it</sub>	-0.536 (0.482)	-0.798 (0.013)**	0.262 (0.751)	-0.996 (0.056)*	-0.638 (0.076)*	-0.358 (0.566)
ΔCFO <sub>it</sub>	-1.682 (0.330)	-2.402 (0.002)***	0.720 (0.705)	-2.167 (0.230)	-2.562 (0.002)***	0.395 (0.850)
<b>Income-decreasing incentives</b>						
BATH <sub>it</sub>	1.794 (0.000)***	0.191 (0.324)	1.603 (0.003)***			
SMOOTH <sub>it</sub>	1.366 (0.001)***	0.246 (0.117)	1.120 (0.012)**			
<b>Auditor type</b>						
BIG4 <sub>it</sub>				0.784 (0.022)**	-0.473 (0.067)*	1.257 (0.002)***
Constant	-6.666 (0.000)***	-4.870 (0.000)***	-1.796 (0.301)	-5.204 (0.000)***	-5.005 (0.000)***	-0.199 (0.841)
Fixed effects	industry/ year/ country	industry/ year/ country		industry/ year/ country	industry/ year/ country	
Observations	463	1799		1141	1121	
Wald Chi <sup>2</sup>	643.77***			662.30***		

NOTE: This table compares the regression coefficients and their statistical significance for firms audited by a non-Big 4 versus a Big 4 auditor (Panel A) and for firms with low versus high income-decreasing reporting incentives (Panel B). The table reports coefficient estimates and p-values based on standard errors corrected for heteroskedasticity and for clustering of observations by firm (in parentheses). \*, \*\*, \*\*\* indicates significantly different from zero at the  $\alpha = 0.10$ ; 0.05; 0.01 level, for two-tailed tests.

<sup>a</sup> Variable definitions: GW<sub>t-1</sub> is the proportion of pre-impaired goodwill on pre-impaired total assets. GW<sub>country</sub> is the median proportion of goodwill on the opening balance sheet in the country in which firm *i* is domiciled. SIZE is equal to total assets. ΔindROA is the median change in firm *i*'s industry return on assets from period *t-1* to *t*, where industry is defined on a 2-digit SIC level. ΔSALES is the change in firm *i*'s sales from period *t-1* to *t*, divided by total assets at the end of *t-1*. ΔCFO is the change in firm *i*'s sales from period *t-1* to *t*, divided by total assets at the end of *t-1*. BATH is an indicator variable equal to one if the change in firm *i*'s pre-impaired earnings from year *t-1* to *t*, divided by total assets at year *t-1*, is below the median of non-zero negative values; else 0 (the proxy for 'big bath' reporting). SMOOTH is an indicator variable equal to one if firm *i*'s pre-impaired earnings from year *t-1* to *t*, divided by total assets at year *t-1*, is above the median of non-zero positive values; else 0 (the proxy for 'earnings smoothing'). BIG4 is an indicator variable equal to one if the firm is audited by Big 4 auditor; else 0.

<sup>b</sup> Difference between coefficients of firms audited by a Big 4 vs Non-Big 4 audit firm and p-values from Chi-square statistic (in parentheses).

<sup>c</sup> Difference between coefficients of firm-years with 'low' versus 'high' income-decreasing reporting incentives and p-values from Chi-square statistic (in parentheses).

<sup>d</sup> Firm-year observations are classified in the high income-decreasing incentives group, when their pre-impaired earnings are unexpectedly low (BATH=1) or high (SMOOTH=1). All other firm-year observations are classified as having low income-decreasing incentives.

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