Technische Universität Darmstadt
Fachbereich Rechts- und Wirtschaftswissenschaften
Fachgebiet Rechnungswesen, Controlling und Wirtschaftsprüfung
Prof. Dr. Reiner Quick

TECHNISCHE UNIVERSITÄT DARMSTADT

Dissertation

Benjamin T. Albersmann

IFRS Goodwill Impairment Test

Audit Approach, Earnings Management, and Capital Market Perception

Published online at TUprints and the Deutsche Nationalbibliothek (Open Access)

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Audit Approach, Earnings Management, and Capital Market Perception

Dissertation

approved in fulfilment of the requirements for the degree
Doctor of Economics and Social Sciences (Dr. rer. pol.)

submitted by
Dipl.-Wirtsch.-Ing. Benjamin Tobias Albersmann
from Mainz

First referee: Prof. Dr. Reiner Quick
Second referee: Prof. Dr. Dirk Schiereck

Date of submission: October 28, 2016
Date of oral examination: April 20, 2017

Darmstadt 2017
D17
Published online at TUprints and the Deutsche Nationalbibliothek (Open Access)

Danksagung (Acknowledgements)

Mein besonderer Dank gilt meinem akademischen Lehrer, Herrn Professor Dr. Reiner Quick, der mich bereits seit meinem Studium und der hilfswissenschaftlichen Tätigkeit an seinem Lehrstuhl begleitet und mein Promotionsvorhaben mit großem Interesse und konstruktiven Anregungen gefördert hat. Zudem möchte ich Herrn Dr. Claus Buhleier für die tiefgehenden fachlichen Diskussionen praktischer Fragestellungen und die wertvollen Anmerkungen zu meiner Dissertation danken. Ebenso möchte ich Frau Dr. Daniela Hohenfels für ein stets offenes Ohr, die konstruktiven Diskussionen und die sorgsamen Korrekturlesearbeiten danken. Professor Dr. Dirk Schiereck danke ich für die freundliche und zeitnahe Übernahme des Zweitgutachtens.

Mein größter Dank gilt meiner Familie, die mir stets Rückhalt gegeben hat und ohne die ein erfolgreicher Abschluss dieses sich über mehrere Jahre erstreckenden Projekts nicht möglich gewesen wäre. Meinen Eltern Sabine und Johannes möchte ich für die uneingeschränkte Unterstützung und Förderung meines Bildungswegs danken, dies erachte ich nicht als selbstverständlich und erfüllt mich mit großer Freude und Dankbarkeit. Meiner Frau Anna möchte ich für Ihre Unterstützung und Nachsicht während der letzten Jahre sowie die Motivation, die sie mir auch in schwierigen Zeiten gegeben hat, danken. Ebenso möchte ich meiner Schwester Sarah, meinem Bruder und besten Freund Tobias, meinem Stiefvater Dieter sowie meinen Schwiegereltern Sonja und Werner dafür danken, dass sie mir stets ein starker Rückhalt waren.

Ganz besonders danken möchte ich auch meinen Großeltern, und im Speziellen meinem Opa Günther. Er hat mich stets auf meinem akademischen Weg inspiriert und ohne seine Leidenschaft für Bildung wäre diese Arbeit nicht entstanden. Ihm sei diese Arbeit gewidmet.

Mainz, im Mai 2017 Benjamin T. Albersmann

Abstract

This dissertation addresses the goodwill impairment test under IFRS, which prescribes that goodwill is not amortized and instead tested for impairment at least once a year. The objective of introducing this impairment-only approach in 2004 was to provide more useful information to financial statement users. The dissertation is therefore motivated by the ongoing debate on the decision usefulness and reliability of goodwill impairment tests, as the IASB's recent post-implementation review on business combinations shows, and the high practical relevance of this topic for firms, auditors, enforcement institutions, and regulators. Against this background, the dissertation (1) sets forth and critically discusses the accounting requirements for goodwill, (2) develops an audit approach for goodwill impairment tests, (3) empirically assesses whether goodwill impairment tests are used as a device for earnings management, and (4) performs two empirical studies to analyze how goodwill impairments are perceived by capital market participants.

Based on the requirements of international and German auditing standards and the author's practical audit experience, a risk-based audit approach is developed that outlines the different audit steps necessary to verify the reasonableness of goodwill impairment tests including practical application guidance for auditors. Using a sample of German listed firms for the periods 2006 to 2013, the main findings of the three empirical studies are that (1) the likelihood to recognize goodwill impairments and the magnitude of impairment losses are influenced by earnings management incentives, (2) investors perceive goodwill impairments as value relevant, but not timely recognized, and (3) the announcement of goodwill impairments leads to a negative capital market reaction, but the reaction is considerably smaller than the goodwill amount written off. Moreover, the perceived timeliness of goodwill impairments is shown to be influenced by auditor characteristics, which serve as a proxy for perceived audit quality. Overall, the empirical results therefore indicate that the concept of impairment testing might generally have merits in reflecting the economic value and consumption of goodwill, but that current accounting requirements might not be sufficient to ensure a rigorous impairment test providing adequate decision useful information. Hence, improvements of the current approach or the implementation of a different approach, e.g. based on certain amortization requirements with indication-based impairment testing, should be discussed.

Content Overview

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Index of Abbreviations

AktG	Stock Corporation Act
Art.	Article
ASC	Accounting Standards Codification
Big 4	Biggest four audit firms (Deloitte, E&Y, KPMG, PWC)
BilMoG	German Accounting Law Modernization Act
CAPEX	Capital Expenditure
CAPM	Capital Asset Pricing Model
CDAX	Composite DAX
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CGU	Cash Generating Unit (also used for Group of CGUs)
DAX	German Stock Index
DID	Differences-in-Differences
DPR	German Financial Reporting Enforcement Panel
e.g.	for example
EBIT	Earnings before Interest and Taxes
EBITDA	Earnings before Interest, Taxes, Depreciation, and Amortization
ESMA	European Securities and Markets Authority
et al.	et alii / et aliae
etc.	et cetera
EU	European Union
EUR	Euro
FASB	Financial Accounting Standards Board
FAUB	Technical Committee for Business Valuations and Commerce (of the IDW)
FVLCD	Fair Value less Costs of Disposal
GAAP	Generally Accepted Accounting Standards
GAS	German Accounting Standards
GDP	Gross Domestic Product

HGB	German Commercial Code
i.e.	that is
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IDW PS	IDW Auditing Standards
IDW RS HFA	IDW Accounting Principles
IDW S	IDW Standards
IDW	Institute of Public Auditors in Germany
IFRIC	International Financial Reporting Interpretations Committee
IFRS	International Financial Reporting Standards
IOS	Investment opportunity set
IPO	Initial Public Offering
ISA	International Standards on Auditing
IT	Information Technology
IUC	Information used in the control
m.n.	marginal number
MDAX	Mid-Cap-DAX
MitbestG	Codetermination Act
n	Sample Size
no.	number
OLS	Ordinary Least Squares
OPEX	Operational Expenditure
p.	page
Par.	Paragraph
pp.	pages
ROA	Return on Assets
ROS	Return on Sales
RU	Reporting unit
SDAX	Small-Cap-DAX
SFAS	Statement of Financial Accounting Standards

SMEs	Small and Medium-sized Entities
TecDAX	Technology-DAX
UK	United Kingdom
UK-GAAP	United Kingdom Generally Accepted Accounting Standards
US	United States
USA	United States of America
USD	US Dollar
US-GAAP	United States Generally Accepted Accounting Standards
VHB-JOURQUAL3	Latest journal rating published by the German Academic Association for Business Research
WACC	Weighted Average Cost of Capital

1 Introduction

1.1 Motivation and Objectives

This dissertation addresses goodwill impairment testing under IFRS. Based on an analysis of the current accounting requirements for goodwill, the main objectives of the dissertation are:

- To develop an audit approach for goodwill impairment tests
- To investigate whether goodwill impairment tests are used as a device for earnings management
- To assess the capital market perception of goodwill impairment losses

The dissertation is particularly motivated by two aspects: First, goodwill represents an important economic resource for many firms. This is emphasized by the fact that goodwill often represents a high proportion of acquisition costs of acquired targets[1] as well as a high proportion of a firms' total assets and book value of equity[2]. Hence, goodwill and goodwill impairments might be of high relevance for auditors, management, capital market participants, creditors, and other stakeholders. Moreover, goodwill impairment tests are generally in the main focus of the German Financial Reporting Enforcement Panel (DPR)[3] and the European Securities and Markets Authority (ESMA)[4] (e.g., DPR (2013); ESMA (2013a)). Second, the recent post-implementation review on business combinations, which was completed by the International Accounting Standards Board (IASB) in June 2015, highlights the need for further research. Among other subjects, it addresses the goodwill impairment test. With the adoption of the revised IAS 36 on March 31, 2004, the long-accepted straight-line amortization of goodwill was replaced by a new impairment-only approach, i.e., goodwill has to be tested for impairment at least once a year. The IASB's objective was to devise a rigorous and operational impairment test which provides more useful information to users of a firm's financial statements than an approach in which goodwill is amortized

[1] For example, Glaum and Wyrwa (2011) find an average goodwill-to-acquisition cost ratio of 62 % for 322 large firms listed in 12 European countries in 2009. They also find that goodwill represents more than half of the acquisition costs in 46 % of the transactions. Similarly, Detzen and Zülch (2012) find a mean goodwill-to-acquisition cost ratio of 60 % regarding 123 acquisitions of European firms during the period 2005 to 2008.

[2] The high relevance for German listed firms is also confirmed by descriptive studies of Rogler et al. (2012), Küting (2013), and Gundel et al. (2014).

[3] The German Financial Reporting Enforcement Panel ("Deutsche Prüfstelle für Rechnungslegung") is a government-appointed privately organized institution, which examines the financial reporting of companies listed on the regulated market in Germany (www.frep.info).

[4] 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).

(IAS 36.BC131G). However, as the post-implementation review shows, there is still a lively debate on the usefulness of impairment testing even one decade later (IASB (2014, pp. 21-26)).

The debate discusses whether the impairment test is able to adequately reflect the economic value of goodwill and its consumption (i.e., goodwill impairments) and whether this time-consuming and costly exercise entails sufficiently high benefits.[5] On the one hand, proponents of the impairment-only approach argue that it better reflects the consumption of goodwill than arbitrary amortization, enables the management to convey private information on future cash flows, and helps stakeholders to assess and verify the success of an acquisition and the firm's future performance. Hence, it provides informational value and reduces information asymmetries between management and stakeholders (e.g., Jarva (2009); Li et al. (2011); IASB (2014, pp. 21-22)). On the other hand, opponents criticize that the current approach leads to a delayed recognition of economically necessary goodwill impairments and that the inherent high degree of discretion is used by management to engage in opportunistic earnings management. In particular, the impairment test requires a relatively high degree of subjectivity, as it depends in most cases on discounted cash flow methods and therefore on the management's assumptions and estimations concerning the future economic development (e.g., Küting (2013); Gundel et al. (2014); IASB (2014, p. 22)). This might also imply that auditors are less able to verify the reasonableness of goodwill impairment tests (Kothari et al. (2010, p. 262)). In this context, also Hans Hoogervorst (Chairman IASB) questioned whether the current requirements provide sufficient rigor to reliably report goodwill impairments (Hoogervorst (2012)) and suggested that goodwill impairments often came too late during the financial crisis (ESMA (2013b, p. 5)). Moreover, Hoogervorst perceives that firms might, in some cases, be hesitant to impair goodwill to avoid giving the impression of having made a bad investment decision. On the contrary, newly appointed CEOs might have a strong incentive to recognize hefty impairments in order to start with a clean slate (Hoogervorst (2012)).

As there are very different opinions among participants of the post-implementation review and therefore no clear conclusion exists, the IASB decided that conducting further research on the effectiveness, complexity, and efficiency of goodwill impairment testing as well as the

[5] According to the IASB's conceptual framework for financial reporting, the decision usefulness for capital market participants is the primary criterion to assess and compare financial information (IASB Framework QC1). However, especially costs represent a pervasive constraint on the financial information that can be provided by firms and those costs have to be justified by the benefits of reporting that information (IASB Framework QC3, QC35).

impairment-only approach in general is of great significance (IASB (2015a, p. 8)). In September 2015, the IASB therefore launched the "Goodwill and Impairment" research project, which evaluates whether the current impairment model can be improved and whether there is a different, more appropriate approach for subsequent goodwill accounting (IASB (2015b, p. 5-8)). Against this background, this dissertation seeks to address the three main objectives pointed out above by developing a detailed audit approach and three independent research papers. The three research papers contribute to the empirical research on goodwill accounting, and, more specifically, to the two research streams addressing earnings management related to goodwill impairment testing and capital market perception of goodwill impairments. In particular, they are the first studies to address these research questions for a German sample. As evidence for other continental European countries with a similar institutional setting[6] does also not exist or is very limited, the results might be of relevance for these countries as well (e.g., Austria, France, or Switzerland).

1.2 Structure

This dissertation is structured as follows: *Section 2* analyzes the current IFRS accounting requirements for goodwill. First, it presents the relevant standards and their accounting objectives, then the recognition and de-recognition of goodwill is shortly described. This is followed by the main part; the analysis of the requirements for goodwill impairment testing. It includes the structure and timing of impairment tests, the allocation of impairment losses, the interim analysis of goodwill impairment indications (triggering events), the definition of CGUs and allocation of goodwill to these CGUs, the determination of the recoverable amount (i.e., value in use and/or the fair value less costs of disposal) and the carrying amount, and the disclosures related to goodwill impairment testing. Subsequently, major differences between the IFRS accounting requirements for goodwill impairment tests and the respective requirements under German GAAP and US-GAAP are highlighted and the section is concluded with a critical discussion of goodwill impairment testing. This discussion analyzes the advantages and disadvantages of the current impairment test as well as potential improvements and alternative approaches.

Section 3 develops an audit approach for goodwill impairment tests. It is based on the accounting requirements for goodwill, but also incorporates the requirements of auditing

[6] See sections 5.2.3 and 6.2.3 for a discussion of the German institutional setting with respect to other continental European countries and Anglo-American countries.

standards and the author's practical audit experience. The section is structured on the basis of the different audit steps. First, auditors must understand the firm's processes and perform a risk assessment. They must then plan and perform audit procedures, evaluate the results of these procedures, and finally conclude on their audit including disclosures in the IFRS notes. Throughout the section, not only theoretical aspects of the audit approach are discussed, but also practical application guidance is provided. This particularly helps the reader to understand how and to what extent auditors are able to verify the reasonableness of goodwill impairment tests.

A review of literature concerning the empirical research on goodwill accounting is provided in *section 4*. This helps the reader to categorize the research papers subsequently presented and to gain an overview of the various research streams. The most relevant research streams are presented in more detail. This includes the economic relevance of goodwill, the informativeness and reliability of goodwill impairments, the influence of earnings management incentives on goodwill impairments, and the capital market perception of goodwill and goodwill impairments.

Sections 5 to 7 include the three research papers. These papers can be read independently and address the research questions pointed out in the previous section. The papers have a similar structure. After an introduction, background information concerning the research question is provided, prior literature is presented, and the paper's hypotheses are developed. Subsequently, the research design is explained. This includes the sample description, the definition of variables, and the specification of the empirical models. The results are then discussed, including a descriptive analysis of the sample, the univariate and multivariate results of the empirical models, and further tests to assess the robustness of the results. All of the papers finish with a conclusion.

The first research paper (*section 5*) theoretically analyzes the opportunities to engage in opportunistic earnings management related to goodwill impairment testing. Moreover, it develops hypotheses with respect to the different earnings management incentives that might influence the recognition of impairment losses. Then, variables to operationalize the earnings management incentives are defined and empirical models are specified. Based on these models, it is evaluated whether earnings management incentives like beating an earnings target, conservative smoothing, big bath accounting, changes in senior management, or avoidance of debt covenant violations have an influence on the likelihood and magnitude of goodwill impairments. The second research paper (*section 6*) theoretically analyzes the value

relevance and perceived timeliness of goodwill impairments and develops respective hypotheses. Moreover, hypotheses concerning the influence of auditor characteristics on the perceived timeliness are developed. Then, the regression models to measure value relevance (price level model) and perceived timeliness (return model) are specified. Based on these models, assessments are made as to whether goodwill impairments are perceived as value relevant and timely by capital market participants and whether this perception is mediated by auditor characteristics related to the perceived quality of audits such as Big 4 auditor, industry leader, non-audit fee ratio, and auditor tenure. The third research paper (*section 7*) theoretically analyzes the information content of goodwill impairments based on the IASB's conceptual framework of financial reporting. Moreover, it discusses influencing factors on the information content of goodwill impairment announcements. After this, the event study research design to measure market reactions to impairment announcements and a multivariate regression model to investigate influencing factors on the market reaction are specified. Based on these models, evaluations are made as to whether goodwill impairment announcements contain information content (i.e., do they lead to a negative capital market reaction) and whether the reaction is influenced by the management's provision of an external or internal reason explaining the goodwill impairments losses, the financial crisis, and the firms' financing structure.

Section 8 summarizes the dissertation and concludes with the aggregate findings and implications of the three research papers.

2 IFRS Accounting Requirements for Goodwill

2.1 Accounting Objectives and Relevant Standards

2.1.1 Revised Accounting Standards for Business Combinations

In 2001, the IASB started a project to review the accounting standards for business combinations, and therefore also for goodwill. The objective of this project was to improve the quality of the accounting for business combinations by providing more relevant, reliable, and comparable information and to seek international convergence in accounting standards, especially with US-GAAP. As a result of the first phase of this project, the IASB issued simultaneously IFRS 3 *Business Combinations* (replacing IAS 22) and revised versions of IAS 36 *Impairment of Assets* and IAS 38 *Intangible Assets* on March 31, 2004. The standards were adopted by the EU on December 31, 2004 and thus are applicable for all fiscal years starting from January 1, 2005 onwards. The second phase was concluded in 2008 by revising IFRS 3 including related amendments to IAS 27 *Consolidated and Separate Financial Statements* (IFRS 3.BC Background information).

A major change related to IFRS 3 was the elimination of the pooling of interests method and the mandatory use of the acquisition method. Moreover, IFRS 3 introduced substantial changes in the guidance for applying the acquisition method (e.g., less strict recognition criteria for assets acquired and liabilities assumed[7] or specific recognition and measurement guidance for particular assets and liabilities including non-controlling interests). Whereas the pooling of interests method records the net assets acquired at their carrying amounts (i.e., also no recognition of goodwill), the acquisition method recognizes almost all assets and liabilities at their fair values (and recognizes goodwill as residual value). The IASB observed that most business combinations are acquisitions and concluded that the acquisition method provides the most decision useful information as financial statement users are better able to assess and compare the initial investments and the subsequent performance related to these investments (IFRS 3.BC23-25).[8] Moreover, the acquisition method better reflects the market's expectation of future cash flows associated with the assets acquired and liabilities assumed, thereby enhancing the relevance of the information disclosed (IFRS 3.BC25). On the contrary, the

[7] In particular, the revised standard introduced the identifiability (see section 2.2.2) as a less strict recognition criterion for intangible assets (Kuhner (2014, p. 2)).

[8] This conclusion was supported by the observation that transactions were formally structured to meet the conditions of a merger of equals in order to apply the pooling of interests method, although the character of these transactions was clearly an acquisition (Kuhner (2014, p. 13)).

IASB concluded that the pooling of interests method provides less useful information about the net assets' cash-generating abilities, i.e., the predictive value and feedback value is lower (IFRS 3.BC37-38). With respect to the subsequent measurement of goodwill, the major change was the introduction of the impairment-only approach, which is discussed in the following.

2.1.2 Objective of Introducing the Impairment-Only Approach

With the adoption of the revised IAS 36, the IASB prohibited the straight-line amortization of goodwill and introduced an impairment-only approach. Since then, 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). The IASB's objective of introducing the impairment-only approach was to provide more useful information on goodwill to financial statement users compared to an approach in which goodwill is amortized since straight-line amortization of goodwill is expected to fail providing useful information (IAS 36.BC131E, BC131G). Hence, the goodwill impairment test was expected to better reflect the underlying economic value of goodwill and its consumption.

Before the revision of IAS 36, goodwill was amortized over the best estimate of its useful life. If the amortization period exceeded 20 years, goodwill had to be tested for impairment at least at each fiscal year-end (IAS 36.BC131A). When revising the standard, the IASB discussed whether a straight-line amortization with an impairment test whenever there is an indication for impairment, the impairment-only approach with at least annual impairment testing, or providing a choice between both approaches is more appropriate (IAS 36.BC131B). It was generally agreed that the last option should be rejected since it significantly reduces the decision usefulness of information provided to financial statement users in terms of comparability and reliability (IAS 36.BC131C). However, there was a broad discussion on the two other approaches.

Respondents to the exposure draft who supported the first approach raised several arguments. They stated that goodwill arising from a business combination is an asset that is consumed and replaced by internally generated goodwill over time. Hence, an amortization would reflect the consumption of goodwill more appropriately in the statement of profit and loss and it would ensure that internally generated goodwill is not recognized as an asset, which is consistent with the prohibition of IAS 38.48 to recognize internally generated goodwill in the balance sheet (IAS 36.BC131D (a)). Moreover, they argued that the useful life of goodwill is not indefinite. Although the pattern in which goodwill diminishes cannot be known, syste-

matic amortization over an arbitrary period would therefore provide an appropriate balance between conceptual soundness and operationality and would be the only practical solution to an intractable problem (IAS 36.BC131D (d)). The IASB agreed that the consumption of goodwill can hardly be predicted and that achieving an acceptable level of reliability while striking practicability issues is the primary challenge, indeed. Nevertheless, it also observed that amortization charges are at best an arbitrary estimate of goodwill consumption which fail to provide useful information (IAS 36.BC131E). Hence, the IASB decided that a rigorous and operational impairment test, as (in its opinion) devised by the revised IAS 36, provides more decision useful information to financial statement users (IAS 36.BC131G).

2.1.3 Relevant Standards

The most relevant IFRS for goodwill accounting are

- IFRS 3 *Business Combinations*,
- IAS 36 *Impairment of Assets*, and
- IFRS 13 *Fair Value Measurement*.

IFRS 3 addresses the purchases price allocation of business combinations, which also includes the determination of goodwill. The details of goodwill recognition are analyzed in section 2.2.2. The subsequent measurement of goodwill (i.e., goodwill impairment testing) is outlined in IAS 36. For details, see discussion of goodwill impairment tests in section 2.3. Before the introduction of IFRS 13, both standards included independent fair value definitions. However, from January 1, 2013 onwards, IFRS 13 provides a single framework for measuring fair value when required by another IFRS. Hence, both standards eliminated their independent fair value requirements and set respective references to IFRS 13.

In addition to the IFRS, the Institute of Public Auditors in Germany (IDW) issues Accounting Principles (IDW RS) which set forth the views of the auditing profession on specific accounting matters. They are de facto binding for German auditors.[9] This also means that German firms subject to external audits have to de facto comply with these requirements. With respect

[9] The de facto binding effect of IDW Accounting Principles for German auditors can be derived from the following IDW statement: "Deviations from IDW Accounting Principles are to be appropriately disclosed in writing (e.g., in the long-form audit report) with detailed justification. If the auditor does not observe IDW Accounting Principles without good reason, this departure from the views of the profession could count against him or her in respect of claims to damages, proceedings brought before the professional supervisory body or criminal proceedings." (IDW homepage, http://www.idw.de/idw/portal/n589244/n589350/n589344/index.jsp [Accessed October 1, 2016]).

to IAS 36 impairment tests and fair value measurements (also in the context of purchase price allocations), the IDW issued the following Accounting Principles:

- IDW RS HFA 40 *Einzelfragen zu Wertminderungen von Vermögenswerten nach IAS 36* (i.e., specific questions concerning impairments of assets under IAS 36)
- IDW RS HFA 47 *Einzelfragen zur Ermittlung des Fair Value nach IFRS 13* (i.e., specific questions concerning the determination of fair values under IFRS 13)

Moreover, the IDW Standard IDW S 1 *Grundsätze zur Durchführung von Unternehmensbewertungen*[10] (i.e., principles for the performance of business valuations) might be relevant with respect to general aspects of valuations not covered by IDW RS HFA 40 and IDW RS HFA 47. With the issuance of IDW RS HFA 40 on May 4, 2015, the IDW replaced IDW RS HFA 16 *Bewertungen bei der Abbildung von Unternehmenserwerben und bei Werthaltigkeitsprüfungen nach IFRS* (i.e., valuations used for the presentation of business combinations and impairment tests under IFRS).

2.2 Goodwill Recognition and De-recognition

2.2.1 Recognition of Goodwill

The IFRS accounting requirements for goodwill differentiate between internally generated goodwill and goodwill arising from a business combination. While the former is prohibited to be recognized (IAS 38.48), IFRS 3.32 requires the latter 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 actual "core goodwill" that meets the recognition criteria of an asset and therefore is supposed to be recognized generally comprises (1) the fair value of the going concern element of the acquiree's existing business and (2) the fair value of expected synergies and other benefits from combining the acquirer's and acquiree's net assets and businesses. However, due to the calculation of goodwill as a purchase premium, it might also include components that refer to mismeasurement or overpayment and thus should theoretically not be recognized

[10] In 2014, the IDW also issued questions and answers concerning the practical application of IDW S 1 (IDW FAUB (2014a)).

as goodwill. Mismeasurement might refer to the fact that, despite the far-reaching recognition requirements of IFRS 3, certain net assets (in particular intangible assets) are not recognized due to measurement difficulties or non-recognition requirements. Moreover, mismeasurement can refer to the fair value estimation of the acquiree's net assets or the consideration paid by the acquirer. Finally, overpayment (or underpayment) results in a misstatement of goodwill as these costs conceptually represent a loss (or a gain), respectively (Johnson and Petrone (1998, p. 295); IFRS 3.BC313-BC318).

Compared to other assets, the economic value of goodwill is more nebulous, which particularly is due to the fact that goodwill is only able to contribute indirectly (in combination with other assets) to future net cash flows (Johnson and Petrone (1998, p. 297)). The economic value of goodwill is therefore based on the expected future economic benefits related to synergies, restructurings, or strategic achievements of the business combination as well as other value relevant, but unrecognized intangible factors and competitive advantages like organizational structure, distribution network, firm reputation, exceptional attractiveness of products, market power, market potential, location advantages, or quality of assembled workforce (e.g., Pellens et al. (2012, pp. 735-736); Gundel et al. (2014, p. 131); Kuhner (2014, p. 20)).

2.2.2 Determination of Goodwill as Part of the Purchase Price Allocation

As goodwill cannot be measured on a stand-alone basis, it has to be determined with reference to the net assets acquired in a business combination. If a firm identifies a business combination,[11] IFRS 3.4 therefore requires the firm to account for this business combination by applying the acquisition method, i.e., the firm has to perform a purchase price allocation as of the acquisition date. The acquisition method requires (1) identifying the acquirer, (2) determining the acquisition date, (3) recognizing and measuring the identifiable assets acquired, the liabilities assumed, and any non-controlling interest in the acquiree, and (4) recognizing and measuring goodwill or a gain from a bargain purchase (IFRS 3.5). If the initial purchase price allocation is incomplete by the end of the reporting period in which the business combination occurs, provisional amounts are reported in the financial statements. During a one-year measurement period started at the acquisition date, these provisional amounts have

[11] IFRS 3 defines a business combination as a transaction or other event in which an acquirer obtains control of one or more businesses (IFRS 3.B5). A business consists of inputs and processes applied to those inputs that have the ability to create outputs (IFRS 3.B7).

to be retrospectively adjusted in order to reflect new information obtained about facts and circumstances that existed as of the acquisition date (IFRS 3.45).

In this context, the acquisition date is defined as the date on which the acquirer (i.e., one of the combining entities) obtains control of the acquiree (IFRS 3.6, 8). The recognition requirements of assets acquired and liabilities assumed refer to the general definitions of assets and liabilities in the IASB's conceptual framework for financial reporting (IFRS 3.11). Hence, in- or outflows of future economic benefits associated with the asset or liability have to be probable and its cost or value has to be measured reliably (IASB Framework 4.38). Moreover, recognized assets and liabilities have to be part of what was exchanged in the business combination (IFRS 3.11-12). However, IFRS 3 also provides a few exceptions to these recognition requirements. For example, contingent liabilities are recognized even if a future outflow of resources is not probable (i.e., not more likely than not)[12] (IFRS 3.23). In most cases, the focus of recognizing assets and liabilities might be on the recognition of intangible assets which the acquiree had not previously recognized in its financial statements. In particular, all intangible assets have to be recognized if they are identifiable, i.e., if they meet either the separability criterion[13] or the contractual-legal criterion[14] (IFRS 3.B31, IAS 38.34). Hence, this also means that the general recognition criteria of intangible assets (i.e., probability and reliable measurement of future cash flows) are always satisfied for identifiable intangible assets acquired in a business combination (IAS 38.33).

After identifying assets acquired and liabilities assumed, they have to be measured at their acquisition-date fair values as defined by IFRS 13 (IFRS 3.18). However, IFRS 3 also provides a few measurement exceptions like deferred taxes, which have to be measured in accordance with IAS 12 (IFRS 3.24-25). Non-controlling interests can be measured either at their fair value (full goodwill method) or as the proportional share of the identified net assets (partial goodwill method) (IFRS 3.19). Hence, only the full goodwill method leads to a recognition of goodwill attributed to non-controlling interests.

[12] With respect to provisions and contingent liabilities, IAS 37 defines the outflow of resources as probable if it is more likely than not to occur (IAS 37.23).

[13] The separability criterion refers to an intangible asset's capability of being (theoretically) separated or divided from the acquiree and sold, transferred, licensed, rented, or exchanged, either individually or together with a related contract, identifiable asset, or liability (IFRS 3.B33).

[14] The contractual-legal criterion refers to future economic benefits associated with intangible assets arising from contractual or other legal rights (e.g., favorable leasing contracts, licenses, or patents). These intangible assets are identifiable even if they are not transferable or separable from the acquiree or from other rights and obligations (IFRS 3.B32).

As last step, IFRS 3.32 requires goodwill to be recognized and measured as follows:

	Consideration transferred (measured at acquisition-date fair value)
+	Amount of any non-controlling interest (full or partial goodwill method)
+	Previously held equity interest in the acquiree (measured at acquisition-date fair value, only applicable if business combination was achieved in stages)
-	Amount of identified net assets (measured in accordance with IFRS 3)
	Goodwill (or gain from bargain purchase)

If the resulting goodwill is negative, the acquirer made a bargain purchase and the resulting gain has to be recognized in profit or loss (IFRS 3.34). However, before recognizing such a gain, the identification of assets and liabilities as well as their measurement have to be re-assessed to ensure that all available information as of the acquisition date is appropriately considered (IFRS 3.36).

After the business combination, any changes in a parent's ownership interest in a subsidiary that do not result in the parent losing control of the subsidiary are equity transactions (IFRS 10.23). Hence, if non-controlling interests decrease or increase, the carrying amounts of the controlling and non-controlling interests are adjusted to reflect the changes in their relative interests in the subsidiary. Any difference between the fair value of the consideration paid or received and the amount by which the non-controlling interests are adjusted is directly recognized in equity and attributed to the owners of the parent (IFRS 10.B96). Therefore, the amount of goodwill initially recognized as part of the purchase price allocation is not adjusted to reflect subsequent changes in ownership.

If goodwill arises from an acquisition of a foreign operation, its carrying amount is treated as asset of the foreign operation and hence is expressed in its functional currency.[15] If this functional currency differs from the presentation currency of the consolidated financial statements, goodwill has to be translated into the presentation currency at the closing rate and thus is subject to exchange differences recognized in other operating income (IAS 21.47). From an economic perspective that accounts for the economic value of goodwill, it would be appropriate to use the allocation of goodwill to different CGUs as a basis to incorporate effects of changes in foreign exchange rates (Brendle (2010, p. 220)). Nevertheless, the IASB

[15] The regulations of IAS 21.47 have to be applied prospectively to all acquisitions from 01.01.2005 onwards, but a retrospective application is also permitted. Before the revision of IAS 21, goodwill could be either treated as an asset of the foreign operation or the group (Brendle (2010, pp. 217)).

clarified that goodwill is necessarily treated as an asset of the acquired firm, irrespective of its allocation for the purpose of impairment testing (IAS 21.BC32). The intention might be to limit managerial discretion (Brendle (2010, p. 220)).

2.2.3 De-recognition of Goodwill in Case of Disposal

If a CGU to which goodwill is allocated (see sections 2.3.1 and 2.3.3) or an operation within such a CGU is disposed, goodwill associated with this disposal has to be de-recognized and included in the carrying amount of this CGU or operation when determining the gain or loss on disposal. If the whole CGU is disposed, goodwill is fully de-recognized. If only an operation within the CGU is disposed, goodwill has to be de-recognized based on the relative recoverable amounts of the operation disposed and the portion of the CGU retained. Alternatively, another method can be used if it better reflects the goodwill associated with the operation disposed (IAS 36.86).

As IAS 36 does not define the term operation, it remains unclear which kind of asset disposals require a de-recognition of goodwill. Firms might therefore have to consider the CGU structure and materiality reasons when identifying disposed operations. In this context, it is questionable whether the definitions of discontinued operations (IFRS 5) or businesses (IFRS 3) provide an appropriate indication. Following IFRS 5.A, a discontinued operation has to be a component of a firm that represents a separate major line of business or geographical area of operations. A component of a firm is defined as operations and cash flows that can be clearly distinguished, operationally and for financial reporting purposes, from the rest of the firm. Therefore, Hoffmann (2015a, m.n. 184-185) considers an appropriate definition of an operation in the context of IAS 36 as a part of the CGU which can be clearly distinguished, operationally and for financial reporting purposes, from the rest of the CGU. Hence, an operation might be much smaller than a discontinued operation. This is also highlighted by the fact that disposal groups as defined by IFRS 5.A might also be operations within CGUs, which do not necessarily have to be presented as discontinued operations (i.e., if the respective criteria are not met). Moreover, at least if the disposed part of the CGU represents a business as defined by IFRS 3, it also has to be considered as operation for IAS 36 purposes (IDW RS HFA 40.77). IFRS 3.A defines a business as an integrated set of activities and assets that is capable of being conducted and managed for the purpose of providing a return in the form of dividends, lower costs, or other economic benefits.

2.3 Goodwill Impairment Test

The following chapter provides a detailed analysis and discussion of the current requirements for goodwill impairment testing under IFRS. The advantages and disadvantages of this goodwill impairment testing approach are thoroughly discussed in section 2.5.

2.3.1 Structure, Timing, and Allocation of Impairment Losses

Goodwill impairment tests are performed in order to evaluate the recoverability of goodwill arising from business combinations. As goodwill does not generate cash flows independently of other assets and as it often contributes to the cash flows of multiple cash-generating units (CGUs), goodwill is allocated to and tested at the level of CGUs or groups of CGUs (IAS 36.81). In the following, CGU is used as abbreviation for both CGU and group of CGUs.

Goodwill has to be tested for impairment at least annually, even if some or all of the goodwill was newly acquired during the reporting period (IAS 36.90, 96). Moreover, a testing is required whenever there are triggering events indicating that goodwill might be impaired (IAS 36.90; see also section 2.3.2).The annual impairment tests can be performed at any time and at different dates for different CGUs, provided that they are performed at the same time every year (IAS 36.96). Nevertheless, changing the assessment date is possible if it is appropriately justified (e.g., change in timing of business planning process) and if the impairment test is preponed, i.e., the period between two tests is less than one year (IDW RS HFA 40.9). For practical reasons, it is recommended to conduct the annual impairment test after the approval of the business planning as its data is necessarily required (IDW RS HFA 40.8) and relatively close to the balance sheet date in order to reduce the probability of subsequent triggering events. If the annual impairment test is not performed as of or close to the balance sheet date, it is likely that an analysis of potential triggering events between the assessment date and the balance sheet date is necessary (PWC (2014, 18.70)).

The structure of goodwill impairment tests is presented in Figure 1. In order to determine whether goodwill impairments are required, the recoverable amount of a CGU to which goodwill has been allocated has to be compared with its carrying amount. If the recoverable amount exceeds the carrying amount (i.e., the impairment test has a positive headroom), the CGU is not impaired. On the contrary, if the recoverable amount is lower than the carrying amount (i.e., the impairment test has a negative headroom), the difference between both values has to be recognized as impairment loss. This loss is first allocated to reduce the

carrying amount of goodwill. Only a remaining impairment loss reduces the carrying amounts of the CGU's other assets on a pro rata basis (IAS 36.90, 104).

The recoverable amount of a CGU is defined as the higher of its fair value less costs of disposal (FVLCD) and its value in use (IAS 36.6). Hence, the standard considers two different utilization possibilities based on rational management behavior. The management has to make kind of an investment decision on whether it is economically more useful to (theoretically) sell a CGU or whether it generates a higher value for the firm to continue its regular operations. This decision is based on estimated net future cash flows expected from the CGU as both values (implicitly or explicitly) reflect a present value calculation (IAS 36.BCZ9, 36.BCZ11). The values might differ, though, since the market might not use the same assumptions as the individual firm (IAS 36.BCZ11). However, even if a disposal seems more useful and the management decides to keep a CGU, the extra loss (i.e., the difference between FVLCD and value in use) properly falls in later periods since it results from the management's future decision to avoid a disposal (IAS 36.BCZ22 (b)). Hence, it is not required to estimate both values if either of these amounts already exceeds the carrying amount (IAS 36.19).

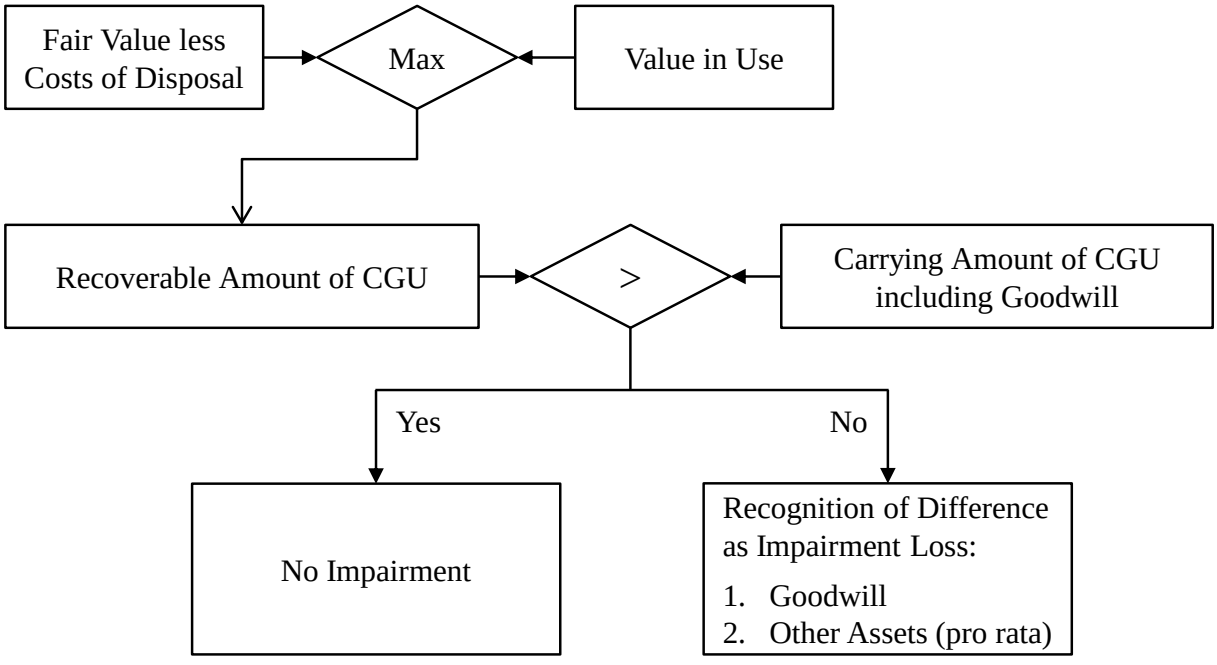

Figure 1: *Structure of IAS 36 goodwill impairment test*

However, before conducting impairment tests for CGUs with allocated goodwill, IAS 36 incorporates the general IFRS requirement to measure assets on an individual basis by using a

gradual bottom-up approach.[16] This approach also implies that CGUs within a group of CGUs with allocated goodwill are tested first if there is an indication for impairment (IAS 36.98). If there is an indication that an individual asset is impaired, the impairment test is performed at individual asset level and any impairment loss is recognized for this asset (IAS 36.59, 66). Only if the asset's FVLCD is lower than its carrying amount (or cannot be measured) and it is not possible to determine its value in use,[17] the impairment test is performed at CGU level (IAS 36.22). If the CGU as a whole is not impaired, no impairment loss is recognized for the individual asset. This even holds when the FVLCD of an asset which is still in use is less than its carrying amount (IAS 36.107 (b)).[18] On the contrary, if the CGU's impairment test requires the recognition of an impairment loss for the CGU, the carrying amount of any allocated goodwill is reduced first before reducing the carrying amounts of the CGU's other assets pro rata on the basis of their carrying amounts (IAS 36.104). However, the lower limit of reducing the assets' carrying amounts is the highest of their FVLCD (if measurable), value in use (if determinable), and zero (IAS 36.105). Moreover, the impairment loss is only allocated to assets within the scope of IAS 36 (IAS 36.2). Therefore, assets like inventories or trade receivables are not affected by impairment losses even if they are considered to be part of the CGU. If the CGU's total impairment loss cannot be fully allocated to its assets, a liability for the remaining impairment loss is only recognized if it is required by another standard (IAS 36.108).

Once goodwill impairment losses are recognized, it is prohibited to reverse them in subsequent periods as it is likely that any increase in the recoverable amount is rather due to an increase in internally generated goodwill than a reversal of the acquired goodwill's impairment (IAS 36.124, 125). This prohibition also holds for impairment losses recognized in previous interim periods (IFRIC 10.8).

[16] Hence, IAS 36 deviates from an exclusive individual measurement for the benefit of a sales market-oriented overall valuation (Völkner and Harr (2011, m.n. 61)).

[17] The value in use of an individual asset cannot be determined if its cash inflows are not largely independent of those from other assets. However, if its value in use can be estimated to be close to its FVLCD (if measurable), only the FVLCD is used to determine the asset's recoverable amount (IAS 36.67).

[18] As an example, IAS 36.107 refers to a physically damaged machine that is still working. Only if the management commits to replace the machine in near future and the remaining cash flows from the continuing use are negligible, the recoverable amount is estimated to be the FVLCD and an impairment loss is recognized. On the contrary, if the machine is not replaced in near future, it is not impaired as long as its CGU is not impaired.

Allocation of impairment losses for CGU's with non-controlling interests

For CGUs with non-controlling interests, IAS 36 provides additional guidance for the allocation of impairment losses. If a subsidiary with a non-controlling interest is itself a CGU, the impairment loss is allocated between parent and non-controlling interest on the same basis as profit or loss is allocated (IAS 36.C6). Consistently with the recognition of goodwill, goodwill impairments attributable to a non-controlling interest are only recognized in the financial statements if the full goodwill method (see section 2.2.2) is applied (IAS 36.C8). In this context, IDW RS HFA 40.110 points out that an allocation of a goodwill impairment based on relative goodwill amounts is also appropriate if goodwill was initially determined considering a control premium. With respect to the partial goodwill method, a control premium can be considered in allocating impairment losses if it is also considered in grossing-up goodwill for impairment test purposes (see section 2.3.7 for details). Moreover, IDW RS HFA 40 discusses several alternatives to allocate impairment losses after changes in non-controlling interests when the partial goodwill method is used (see IDW RS HFA 40.124-140 for details).

If the subsidiary with non-controlling interests, however, is part of a larger CGU, goodwill impairment losses have to be first allocated to the parts of the CGU that have a non-controlling interest and the parts that do not based on the relative carrying amounts of the parts' goodwill (i.e., the goodwill amounts associated with the respective business combinations). Any remaining asset impairment losses are also allocated to both parts based on the relative carrying amounts of the parts' net assets (IAS 36.C7).

Using the most recent calculation of preceding periods

Apart from the general requirement of an annual impairment test, IAS 36 applies the concept of materiality and thus allows using the most recent calculation made in a preceding period if the following criteria are met (IAS 36.15, 99):

- Assets and liabilities of the CGU did not change significantly.
- The most recent calculation showed a substantial margin.
- The likelihood of impairment is, based on an analysis of occurred events and changed circumstances, remote.[19]

[19] IAS 36.16 illustrates this criterion for a change in market interest rates. A re-estimation is not required if (a) the discount rate used is unlikely to be affected (e.g., because only short-term interest rates did change) or

Nevertheless, this exception rule is problematic as it is based on undefined expressions and thus requires a considerable amount of discretion. In practice, it might be relatively rarely applied as it might be difficult to reasonably proof that all criteria are met and to objectively clear up all remaining doubts (Erb et al. (2013, m.n. 8)). Moreover, it might be easier and less time-consuming in many cases to perform the regular impairment test instead of conducting and documenting a detailed analysis of the exception criteria that provides sufficient evidence for an external auditor.

2.3.2 Interim Analysis of Triggering Events for Goodwill Impairments

Additionally to the annual impairment test, goodwill has to be tested whenever there is an indication for impairment (IAS 36.90). These indications (also referred to as triggering events) have to be assessed at the end of each reporting period, i.e., also at interim reporting dates (IAS 36.9). The standard differentiates between external and internal sources of triggering events (IAS 36.12). These events do not only refer to recent one-time events, but also include impairment indications developing (and therefore becoming significant) over time (PWC (2014, 18.67); Hoffmann (2015a, m.n. 20)). When assessing potential triggering events, it is important to consider the result of the most recent impairment test. If the calculated headroom was significantly positive, it might be easier to rule out the existence of triggering events compared to CGU's that only showed a marginal headroom. Moreover, the results of a prior sensitivity analysis might help to assess the sensitivity of the CGU's impairment test to specific triggering events. Hence, the concept of materiality applies and the recoverable amount does not have to be re-estimated if no events have occurred that would eliminate the impairment test's headroom (IAS 36.15).

(b) a previous sensitivity analysis shows that the recoverable amount is unlikely to decrease significantly or the decrease is unlikely to result in a material impairment loss.

2.3.2.1 External Triggering Events

With respect to goodwill, the following external impairment indications have to be assessed as a minimum (based on IAS 36.12 (b) to (d)):[20]

- Significant current or near future changes in the technological, market, economic, or legal environment in which the CGU operates or in the market to which the CGU is dedicated.
- Increases in market interest rates or other market rates affecting the discount rate used in calculations which are likely to decrease the CGU's recoverable amount materially.
- The book value of equity (either CGU itself or firm as a whole) exceeds its market value.

The technological environment particularly refers to the technological process as new products, technologies, production processes, or manufacturing facilities might induce lower production costs, products of higher quality or with different characteristics, and higher production capacities (Baetge et al. (2012, m.n. 25)). Hence, the firm's current assets and products are subject to the risk of technological obsolescence (Kuhner and Hitz (2014, m.n. 16)). The technological environment is highly correlated with the market environment. For example, customers might change their consumer behavior (thereby influencing sales volume and/or prices), have new product requirements, or develop a higher quality or environmental awareness (Baetge et al. (2012, m.n. 25)). Moreover, the firm's competitive position might change due to the entrance of new competitors or a declining market due to the products' phases in their life cycles (Kuhner and Hitz (2014, m.n. 16)). With respect to the procurement market, significant changes in purchase prices, quality issues, or delivery, financial, and other problems of key suppliers might represent triggering events. Economic developments refer to changes in macroeconomic variables characterizing the firm's economic environment like the GDP growth, inflation rates, or exchange rates. Moreover, factors like a limitation on accessing capital might represent triggering events (ASC 350-20-35-3C a). The relevance of the legal (and political) environment is very different across industries. For example, regulatory measures that became effective or were initiated are particularly relevant if the CGU operates in a highly regulated industry (e.g., pharmaceutical/healthcare industry or energy sector). However, also non-regulated industries might be affected by changes in the legal (and political) environment. For example, a significant increase in sales tax might represent a triggering event (Deloitte (2015, A10.4.2.4.9)). In addition to the specific factors

[20] IAS 36.12 (a) refers to observable indications that an asset's value has declined significantly more during the reporting period than it would be expected as a result of the passage of time or normal use. However, as goodwill has an indefinite useful life, this indication cannot be applied for goodwill.

addressing the CGU's environment and market, a decline in market-dependent multiples or metrics (in both absolute terms and relative to peers) might be an impairment indicator from an overall industry perspective (ASC 350-20-35-3C b).

With respect to market interest rates, only an increase in current long-term interest rates represents a triggering event as goodwill is expected to have an indefinite useful life and as short-term interest rates generally do not have a significant influence on present value calculations. On the contrary, expected future increases in long-term interest rates are not considered (Baetge et al. (2012, m.n. 26); Brücks et al. (2013, m.n. 128)). Moreover, an increase in long-term interest rates does not necessarily indicate a potential impairment. For example, a scenario analysis might show that the headroom of the previous impairment test is sufficiently high to ensure a remote likelihood of impairment. Besides, interdependencies between interest rates and cash flow forecasts have to be considered. If the increase in interest rates is, e.g., compensated by an increase in revenues due to higher expected price levels, the CGU's recoverable amount does not change significantly (Brücks et al. (2013, m.n. 129)).

If the book value of equity exceeds its market value (either for the CGU itself, if listed, or the firm as a whole) or if the CGU/firm experiences a significant decline in share prices (in both absolute terms and relative to peers), it has to be evaluated whether this is an indication for potential impairments or whether it is attributable to other reasons (IFRS 36.12d; IDW RS HFA 40.10; ASC 350-20-35-3C g). For example, information asymmetries between management and capital market, subjective preferences of analysts, illiquidity of the market, or an overweighting of factors like an economic or financial crisis, the short-term firm development, negative news on the firm, or a high leverage ratio might result in a distorted share price (IDW RS HFA 40.10). Nevertheless, if the book value of equity exceeds its market value, the firm is generally required to perform an impairment test for all of its CGUs. Only if there is a clear indication that only specific CGUs are affected (e.g., in case of regional conflicts) or if the most recent impairment test of certain CGUs showed a substantial headroom and the likelihood of impairment is, based on an analysis of occurred events and changed circumstances, remote, a firm is allowed to deviate from testing all CGUs (IDW RS HFA 40.11). However, if the book value of equity exceeds its market value for a longer period, the firm is not necessarily required to consider this as a triggering event at each interim or annual reporting date. Only new impairment indications (e.g., a further decrease in share price or other triggering events) have to be evaluated (IDW RS HFA 40.12).

2.3.2.2 Internal Triggering Events

With respect to internal sources of information, the following impairment indications have to be assessed as a minimum (based on IAS 36.12 (e) to (g) and IAS 36.14):

- Evidence of obsolescence or physical damage of the CGU's assets (e.g., resulting in lower production capacities or higher operational costs).
- Significant current or near future changes in the extent to which, or manner in which, the CGU is used or is expected to be used. These changes include a significant increase in idle capacity, plans to discontinue or restructure (parts of) the CGU's operations, and plans to dispose (parts of) the CGU (if not classified as held for sale).
- Evidence from internal reporting that indicates that the CGU's economic performance is, or will be, worse than previously expected. This includes
  - cost factors like significant increases in raw materials, staff costs, or other operating costs,
  - an overall financial performance significantly below the budget (revenues, operating profit, or cash flows),
  - a significant decline in budgeted and forecasted revenues, operating profit, or cash flows, or
  - operating losses or negative cash flows.

As goodwill particularly relates to synergies arising from business combinations, it should also be considered whether the firm was actually able to realize these synergies. For example, expected cost savings from merging information systems or reducing employee headcount might not have been realized or research projects which were initially considered as feasible might have been abandoned. Another example might be that an expected increase in sales could not be realized due to a regulatory rule preventing the CGU from operating in certain markets or an earlier release of new products by competitors (Deloitte (2015, A10.4.2.4.6))

Triggering events explicitly considered by US-GAAP such as changes in strategy, key customers, top management, key personnel, or litigation risks might also represent indications for IFRS impairment tests. Moreover, the performance of impairment tests for significant assets within the group or the recognition of impairment losses in the financial statements of subsidiaries might be triggering events (ASC 350-20-35-3C e-f).

2.3.3 Definition of CGUs and Allocation of Goodwill

A cash-generating unit is the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets (IAS 36.6). Moreover, CGUs to which goodwill is allocated have to fulfill the following two criteria (IAS 36.80):

- The CGU represents the lowest level at which the goodwill is monitored for internal management purposes.
- The CGU is not larger than an operating segment as defined by IFRS 8.5 before aggregation permitted by IFRS 8.12.[21]

The intention of these additional criteria is to ensure that goodwill is tested on the lowest possible level without resorting to arbitrary allocations of goodwill and without developing additional reporting systems (Deloitte (2015, A10.8.2.8.1)).

2.3.3.1 Criterion of Independent Cash Inflows

In order to assess the independence criterion, various factors like the management's monitoring process of the firm's operations (by product lines, businesses, individual locations, districts, or regional areas) or the management's decision making process about continuing or disposing the firm's assets and operations have to be considered (IAS 36.69). Nevertheless, management's monitoring does not override the principal requirement of independent cash inflows (Deloitte (2015, A10.8.2.4); E&Y (2015, 20.4.1)). In particular, it should be considered whether the streams of revenues derived from groups of assets are not independent of one another and/or whether the core operating assets[22] of these groups operate together to such an extent that they do not generate independent revenue streams (KPMG (2014a, 3.10.70.20)). However, CGUs are not restricted by different countries, functional currencies, or legal entities (IDW RS HFA 40.60).

[21] As the standard refers to operating segments before aggregation, these segments might sometimes be smaller than the segments used for disclosure purposes. Following IFRS 8.5, an operating segment is defined as a component of the firm engaging in business activities from which it may (externally and/or internally) earn revenues and incur expenses, whose operating results are regularly reviewed by the firm's chief operating decision maker, and for which discrete financial information is available.

[22] In this context, corporate assets are not considered as core operating assets. While core operating assets are considered as the key to revenue generation within the CGU's business, corporate assets are peripheral to the generation of revenues (KPMG (2014a, 3.10.95.20)).

The identification of different CGUs is particularly challenging for firms which are horizontally integrated with respect to the sales market or the technologies used or which are vertically integrated (Hoffmann (2015a, m.n. 106)). Hence, firms should account for the following aspects that might induce a legal, economic, or technical dependency of cash inflows (Pawelzik and Dörschell (2012, m.n. 2033-2036); Erb et al. (2013, m.n. 87)):

- Contractual dependencies between cash inflows
- Interactions between cash inflows and interdependencies between the sales markets of the firm's products
- Supporting functions of assets in generating cash inflows

For example, if customers buy two products mainly as part of a package, there is a dependency between the cash inflows of both products (IDW RS HFA 40.59). Moreover, if the total production is allocated across two production sites determining the utilization of both sites, it is unlikely that future cash inflows can be determined individually (IAS 36.IE13). If the firm has a joint-product production or if a legal obligation to maintain different products or services simultaneously exists, the cash inflows generated by these products or services are not independent. An economic dependency might also arise if different products have the same customer base and ceasing the manufacturing of one product would probably lead to a substantial loss of customers (Pawelzik and Dörschell (2012, m.n. 2033-2035)). The same holds if the pricing for complementary products, which are mainly bought by the same customers, is not made independently (IDW RS HFA 40.59).

If an active market exists for the output of a group of assets, this group of assets is identified as a separate CGU, even if some or all of the output is used internally (e.g., products at an intermediate production stage or a differentiation between production, distribution, and sales) (IAS 36.70-71).[23] Nevertheless, the independency criterion still applies, i.e., the intermediate production stage must have cash inflows that would be largely independent if sold on an active market. For example, this is not the case if its degree of freedom in planning is very restricted since, due to strategic reasons or the business policy, the continuation of the production stage cannot be evaluated without considering all production stages simultaneously (Völkner and Harr (2011, m.n. 63); Kuhner and Hitz (2014, m.n. 103)). For example,

[23] In this context, an exception from the active market criterion exists. The definition of an operating segment does not require an active market for the segment's output (see footnote 21). Hence, if there is no active market for the output of a potential CGU, but using a broader CGU definition would cause the CGU to be larger than an operating segment before aggregation, the potential CGU has to be used for goodwill impairment testing purposes (PWC (2014, 18.225.14.2)).

operating an intermediate production stage might be strategically crucial for a firm in order to maintain the production know-how or to ensure certain quality standards (Pawelzik and Dörschell (2012, m.n. 2036)).

2.3.3.2 Criterion of Management's Goodwill Monitoring

The criterion of management's goodwill monitoring establishes the management approach by referring to the level at which goodwill is de facto allocated and measured. Hence, the level at which the success of an acquisition (and thus the resulting goodwill) is monitored has to be identified. This does not require that the internal reporting system explicitly reports goodwill numbers (Brücks et al. (2013, m.n. 231)). However, avoiding to test goodwill at a specific level by simply not monitoring goodwill explicitly is not appropriate, i.e., also indirect monitoring is sufficient (KPMG (2014a, 3.10.460.30)). For example, the criterion is already satisfied if the interest-bearing capital as a base for an internally pre-defined minimum rate of return includes goodwill (IDW RS HFA 40.75). The lowest monitoring level of goodwill might be, e.g., individual production sites or even isolated contractual positions (Völkner and Harr (2011, m.n. 69); Kuhner and Hitz (2014, m.n. 120)). However, these low levels might be the exception in practice and the criterion of management's goodwill monitoring rather leads to an allocation of goodwill to larger, more aggregated CGUs.

2.3.3.3 Allocation of Goodwill to CGUs

Goodwill has to be allocated to each of the CGUs that is expected to benefit from the synergies of the business combination. This allocation process is irrespective of whether other assets or liabilities of the acquiree are assigned to those CGUs (IAS 36.80). However, if the full goodwill method is applied, the goodwill attributable to non-controlling interests can only be allocated to assets or liabilities of the acquiree (Pawelzik and Dörschell (2012, m.n. 2049)).

When allocating goodwill, the IASB's definition of core goodwill has to be considered (i.e., the sum of (1) fair value of the going concern element of the acquiree's existing business and (2) fair value of expected synergies and other benefits from the business combination; see section 2.2.1). Hence, the goodwill allocation does not only refer to synergies and other benefits from combining the businesses like overhead cost savings, cost advantages due to higher purchasing volumes, or development cost savings (Pawelzik and Dörschell (2012, m.n. 2040)), but also has to account for goodwill arising from the acquiree's going concern element (i.e., stand-alone value less net assets identified) (IDW RS HFA 40.72). Therefore, an appropriate approach might be to quantify synergy effects and other benefits from the

business combination attributable to the firm's different CGUs by using the "with and without method". This method calculates the respective amounts of goodwill attributable to a CGU as difference between the CGU's fair value before and after the acquisition less the fair value of acquired net assets assigned to the CGU (E&Y (2015, 20.4.2.3)). If the acquired business itself represents a CGU, the going concern element of the acquiree's existing business might be calculated as difference between the stand-alone fair value and fair value of net assets (KPMG (2014a, 3.10.470.30-47)). Alternatively, any remaining goodwill not allocated to other CGUs based on the "with and without method" might be considered as goodwill related to the going concern element of the acquiree's existing business. However, other approaches to allocate goodwill can also be used if they reflect the synergy effects induced by the business combination appropriately. For example, a firm might use the CGUs' relative fair values or financial performance indicators like EBIT and EBITDA (IDW RS HFA 40.73).

If the initial allocation cannot be completed during the reporting period in which the business combination is effected, it has to be completed before the end of the subsequent reporting period (IAS 36.84). For example, this might be due to the fact that the initial purchase price allocation is incomplete (IAS 36.85, see section 2.2.2). However, if there is an impairment indication before the allocation is completed, it might be necessary to perform a goodwill impairment test based on a provisional allocation of goodwill. Any resulting impairment loss might be adjusted retrospectively when the allocation of goodwill is finalized (KPMG (2014a, 3.10.480.30); PWC (2014, 18.225.16); E&Y (2015, 20.4.2.5)).

2.3.3.4 Re-allocation of Goodwill

As CGUs have to be identified consistently over time (IAS 36.72), goodwill is generally not re-allocated. However, if the composition of CGUs to which goodwill has been allocated changes due to a re-organization of the firm's reporting structure, goodwill has to be re-allocated on the basis of relative values[24], unless a more appropriate method exists (IAS 36.87). However, only changing the reporting structure without a change in the monitoring of goodwill does not qualify for a re-allocation. Moreover, each re-organization represents a triggering event which requires an impairment test before the re-allocation of goodwill (IDW RS HFA 40.78, 82). A change in the monitoring of goodwill might be the result of

[24] The relative values generally refer to the relative values of the firm's parts which are re-organized. For example, goodwill might be allocated to a group of three CGUs and the re-organization integrates each of these CGUs into other CGUs. Goodwill might then be allocated to the other CGUs on the basis of the relative values of the three CGUs as they might still participate from goodwill after the re-organization (Hoffmann (2015a, m.n. 186, 188)).

changes in the firm's CGU structure, e.g., due to a change in sales structure, restructurings, disposals or acquisitions of productions sites and firms, or changes in the organizational structure (Erb et al. (2013, m.n. 108)). Moreover, it is possible that a firm changes the way it manages and monitors its existing CGUs with allocated goodwill, e.g., due to changes in the structure and responsibilities of management. However, it is always crucial to ensure that the firm's intention of re-allocating goodwill is not to avoid necessary impairment losses (IDW RS HFA 40.81).

2.3.4 Value in Use

The value in use is defined as the present value of the future cash flows expected to be derived from a CGU (IAS 36.6). As the useful life of goodwill is expected to be indefinite, it generally considers future cash flows from the CGU's continuing operations, discounted at an appropriate discount rate (IAS 36.31). The value in use represents an internal view of using the CGU, i.e., it refers to the way the firm uses the CGU in its current condition (IAS 36.44) and it also includes firm-specific synergies or other firm-specific factors (IAS 36.53A).

2.3.4.1 Discounted Cash Flow Approaches

IAS 36.30 requires the value in use calculation to reflect the following elements:

(a) Estimated future cash flows derived from the CGU's assets
(b) Expectations about possible variations in the amount or timing of those cash flows
(c) Time value of money, represented by the current market risk-free rate of interest
(d) Price for bearing the uncertainty inherent in the CGU's assets
(e) Other factors that market participants would reflect in pricing the future cash flows (e.g., illiquidity)

In order to incorporate all elements, IAS 36 provides two different discounted cash flow approaches to incorporate the risk adjustments (b), (d), and (e): The traditional approach and the expected cash flow approach.

The traditional approach embeds adjustment for elements (b) to (e) in the discount rate. Hence, a single discount rate is assumed to incorporate all expectations about the future cash flows and the appropriate risk premium, which emphasizes that the selection of the discount rate is a crucial step in determining the present value. The calculation then discounts a single set of estimated cash flows that represent the most likely scenario (IAS 36.A4).

On the contrary, the expected cash flow approach considers different sets of possible future cash flows. These sets are then weighted by their probability of occurrence to calculate a set of expected future cash flows instead of most likely cash flows (IAS 36.A7). Based on similar guidance on discounted cash flow approaches provided by IFRS 13, two methods can be differentiated.[25] Method 1 adjusts the estimated future cash flows for risk factors (b), (d), and (e) to receive risk-adjusted expected cash flows (IAS 36.32, A2; IFRS 13.B25). As a first step, different scenarios with respect to possible variations in the amount and timing of future cash flows are developed. Based on the probabilities assigned to these scenarios, the expected future cash flows are calculated (IAS 36.A7-A8). The second step evaluates the influence of the uncertainty inherent in the CGU's assets and other factors affecting the market participants' pricing and adjusts the expected future cash flows by subtracting a cash risk premium. This procedure yields the certainty equivalents of these cash flows, which then are discounted by the current risk-free interest rate (IAS 36.A2, A15). In contrast, method 2 only adjusts the estimated future cash flows for risk factor (b). Hence, it discounts the expected cash flows by a discount rate which includes the risk premium, i.e., an expected rate of return for bearing the risk inherent in the expected cash flows (IFRS 13.B26). Method 2 is therefore more similar to the traditional approach than method 1, but it differs from the traditional approach as it is based on expected cash flows instead of most likely cash flows.

Although the IASB points out that the expected cash flow approach is, in some situations, a more effective measurement tool than the traditional approach (IAS 36.A7), it does not have a preference for one of the approaches (IAS 36.BC59). In practice, firms might generally apply (explicitly or implicitly) method 2 of the expected cash flow approach since they are using the weighted average cost of capital (WACC) as discount rate (see section 2.3.4.4.1).[26] As the WACC represents an estimate of market participants' expected rate of return, it is crucial that expected cash flows are discounted (IFRS 13.B26, IDW S 1.90). When discounting most likely cash flows, which are conditional upon the occurrence of specified events, the respective discount rate is likely to be higher (IFRS 13.B18, B26). However, as a lot of firms might not have implemented a business planning that explicitly considers different cash flows scenarios and probabilities assigned to these scenarios, firms might implicitly assume that the

[25] IAS 36 only describes method 1. Nevertheless, also method 2 fulfills the requirements of IAS 36 and therefore has to be considered as appropriate.

[26] KPMG (2014b, p. 13) and Hoffmann (2015a, m.n. 47) also require the application of method 2 of the expected cash flow approach. Moreover, method 1 is rarely applied as it might generally not be possible to determine an appropriate and objective risk-utility function of capital market participants (Erb et al. (2013, m.n. 59, 61); Hoffmann (2015a, m.n. 48)).

single set of estimated cash flows adequately represents expected values.[27] Hence, it has to be evaluated whether this assumption is appropriate or whether it leads to material estimation errors (KPMG (2014, p. 13)).

Due to the previous theoretical and practical argumentation, the next sections addressing the estimation of future cash flows and the determination of a suitable discount rate are only based on method 2 of the expected cash flow approach. For example, firms might determine the value in use by the following discounted cash flow model including a perpetuity based on the Gordon growth model for the years after the planning period (PWC (2014, 18.168)). The model applies the mid-year convention of cash flows, i.e., it assumes that cash flows are almost uniformly distributed within each year. Therefore, cash flows are discounted as if they were fully received in the middle of each year.[28]

$$Value\ in\ Use = \sum_{t=1}^{T} \frac{CF_t}{(1+r)^{t-0.5}} + \frac{CF_{T\ adj} * (1+g)}{(1+r)^{T-0.5} * (r-g)} \quad (1)$$

where:

CF_t = Expected cash flow estimates for planning period (see section 2.3.4.2)

$CF_{T\ adj}$ = Perpetuity cash flow (i.e., generally cash flow estimate of last planning year T, adjusted to represent a long-term cash flow basis (see section 2.3.4.2.3)

r = Discount rate (i.e., generally WACC, see section 2.3.4.4)

g = Long-term growth rate (see section 2.3.4.3)

[27] A recent survey conducted by KPMG (130 observations, mainly from Germany) showed that 86 % of the firms use a single set of cash flows to estimate expected cash flows, whereas only 14 % use simple scenarios (best, normal, worst case) and 0 % use complex scenario analyses (KPMG (2014b, p. 17)).

[28] The mid-year convention might not always be appropriate. For example, seasonal businesses might require a different assumption based on the actual timing of cash flows within each year.

2.3.4.2 Estimated Future Cash Flows

2.3.4.2.1 Basis for Cash Flow Estimates

The cash flow projections have to be based on the most recent budgets and forecasts approved by management, but adjustments for events occurring after the approval date might be required (including adjusting events after the reporting period as defined in IAS 10.3 (a)[29]). The projections have to use reasonable and supportable assumptions that represent the management's best estimate of the range of future economic conditions (IAS 36.33). This might include assumptions about developments of market volumes, market shares, competitive structure, sales prices, input factor prices, usage of production capacities, achievable rebates, and inflation rates (Völkner and Harr (2011, m.n. 44)). Thereby, greater weight shall be given to external evidence (IAS 36.33 (a)), e.g., referring to the general economic environment, industry information, peer group data, or analyst reports. Significant differences between the management's key assumptions and external evidence should be analyzed and understood (PWC (2014, 18.166.2)), and have to be explained as part of the disclosures (see section 2.3.8). As discussed in section 2.3.4.1, the cash flow estimates should generally represent expected cash flows. Hence, if the business planning does not explicitly consider different cash flow scenarios and probabilities assigned to these scenarios, it has to be evaluated whether the single set of estimated cash flows adequately represents expected values or whether it might lead to material estimation errors.

The budgets and forecasts have to be consistent with past actual outcomes. However, adjustments might be necessary to eliminate one-time effects of past actuals or to incorporate (expected) changes in conditions compared to previous years (IAS 36.34). Moreover, the management has to perform a retrospective analysis of its planning accuracy in order to assess the reasonableness of its assumptions. Causes of differences between past cash flow projections and actual cash flows have to be evaluated (IAS 36.34) and, e.g., a previous history of management consistently overstating or understating cash flow budgets and forecasts has to be appropriately considered (IAS 36.BC64).

[29] If new information addressing the conditions as of the balance sheet date indicates that assumptions used by the management are materially inappropriate, adjustments are required. For example, this could be new statistics showing a significant downturn in last year's demand, which was not considered by management. However, if the management appropriately anticipated this general trend (i.e., assumptions are still reasonable), adjustments for any deviations in assumptions are generally not required. Moreover, changes in exchange rates or effects of management decisions after the balance sheet date do not represent adjusting events and are therefore not considered in the cash flow projections (IDW RS HFA 40.20).

With respect to the planning period, IAS 36 assumes a maximum of five years since detailed and reliable forecasts for longer periods are expected to be generally not available. Only if the management is confident that longer projections are reliable and if past experience demonstrates that it is able to forecast long-term cash flows accurately, the forecast period might be extended (IAS 36.33 (b), 35).[30] As goodwill has an indefinite useful life, the total forecast period is generally infinite (IDW RS HFA 40.31).[31] Cash flows beyond the planning period are therefore extrapolated using a steady or declining long-term growth rate (see section 2.3.4.3). As this growth rate is expected to be sustainable, the CGU has to be in a steady state after the first five years. If this is not the case, a longer forecast period might be appropriate until a steady state is reached (Lienau and Zülch (2006, p. 309); Völkner and Harr (2011, m.n. 46); Brücks et al. (2013, m.n. 164)).

2.3.4.2.2 Composition of Cash Flow Estimates

The cash flow projections include all cash inflows from the CGU's continuing operations and all cash outflows necessary to generate these cash inflows which can be either directly attributed or allocated on a reasonable and consistent basis to the CGU (IAS 36.39). The cash outflows therefore also include day-to-day servicing costs, CAPEX necessary to maintain the CGU's operations, and an apportionment of overhead costs like management, administration, investor relations, IT services, purchasing, or research and development. It is generally not allowed to exclude specific overhead costs from the apportionment as this would also exclude them from impairment testing (IAS 36.41, 49; IDW RS HFA 40.23). As overhead costs are allocated to the CGUs, the corresponding intra-group charges have to be eliminated to avoid double-counting (IDW RS HFA 40.23). Using these charges, often called management charges, as a surrogate for overhead costs instead of allocating actual costs has to be considered very carefully as they are often based on what is permitted (e.g., by taxation authorities) rather than what actually occurs (E&Y (2015, 20.4.4.1.F)). Similarly, internal rent charges for the use of corporate assets have to be eliminated from the CGU's cash flow estimates as the corporate assets themselves are already included in the carrying amount. However, projected

[30] For example, a longer forecast period might be appropriate if cash flows are secured by long-term contracts (e.g., in case of utility or real estate firms) (Völkner and Harr (2011, m.n. 37)).

[31] If the allocated goodwill is only of minor importance compared to the CGU's other assets, the forecast period might not be infinite (IDW RS HFA 40.31). In this context, the importance is not necessarily determined by the amount of goodwill. For example, the useful life of a CGU containing the operation of a nuclear power plant is likely to be determined by the plant itself, irrespective of the goodwill amount allocated to this CGU (KPMG (2014a, 3.10.230.70)).

maintenance investments for these corporate assets have to be included in the CAPEX on a pro rata basis (Hoffmann (2015a, m.n. 136)).

Moreover, as the CGU's operations generally require working capital, cash flow projections also include expected changes in net working capital. The net working capital consists of all operating, non-interest-bearing, (short-term) assets and liabilities (IDW RS HFA 40.66).[32] Hence, it is defined in a broader sense. It does not only include inventories, cash necessary for operations, trade receivables, and trade payables, but also other receivables and other payables if non-interest bearing and considered as operational. Moreover, the working capital includes other provisions if considered as operational. However, particularly if these provisions are non-current, it is crucial that all cash outflows arising from these provisions (also those beyond the planning period) are appropriately included in the value in use calculation (see also section 2.3.4.2.4). The value in use represents an internal view of using the CGU, i.e., it also includes firm-specific synergies or other firm-specific factors like legal rights or restrictions and tax benefits or burdens (IAS 36.53A). If the CGU's cash inflows or outflows are affected by internal transfer pricing, the management's best estimate of future prices that could be achieved in arm's length transactions has to be used (IAS 36.70).

The cash flows have to be estimated for the CGU in its current condition, i.e., they particularly exclude future restructurings not yet committed to and future expansion investments (IAS 36.44; see section 2.3.4.2.4 for details). In order to avoid double-counting, cash inflows from assets generating cash flows largely independent from the CGU's cash inflows (e.g., financial assets) and cash outflows relating to obligations which are already recognized as liabilities (e.g., provisions not included in working capital) are excluded (IAS 36.43). For example with respect to pension provisions, future service costs are therefore considered as cash outflows, whereas future cash outflows already covered by existing provisions as well as interest costs are not included (IDW RS HFA 40.65). Moreover, the cash flows have to be consistent with the way the discount rate is determined in order to avoid double-counting or ignoring certain effects. In particular, cash flows from financing activities are excluded as the discount rate already considers the time value of money. This means that any cash flows arising from interest-bearing assets and liabilities have to be excluded. Similarly, the standard

[32] IAS 36 does not explicitly require the consideration of net working capital, but IAS 36.79 allows, for practical reasons, including assets that are not part of the CGU and liabilities that are recognized. Based on the general requirement to include all cash inflows from the CGU's continuing operations and all cash outflows necessary to generate these cash inflows (IAS 36.39), IDW RS HFA 40.66 explicitly requires the consideration of net working capital as it is necessary to maintain the CGU's operations.

requires the discount rate and thus the cash flows to be determined on a pre-tax basis. Hence, cash flows arising from assets and liabilities related to income taxes, e.g., deferred tax assets and liabilities, current tax assets and liabilities, and tax provisions, have to be excluded (IAS 36.50-51; IDW RS HFA 40.32). However, the value in use might often be determined on a post-tax basis in practice (see section 2.3.4.2.4 for IDW application guidance).

Based on the requirements of IAS 36, the estimated cash flows are therefore defined as free cash flows before taxes. They represent the cash flow surplus from the CGU's continuing operations in its current condition that remains after CAPEX necessary to maintain the CGU's operations (including pro rata corporate assets) and changes in net working capital (which are, as explained before, defined in a broader sense). Hence, the cash flow estimates might be determined as follows:

EBITDA (based on the CGU in its current condition)
- CAPEX (excluding expansion investments)
- Changes in net working capital (in a broader sense)

Cash flow estimate (for value in use)

2.3.4.2.3 Determination of Perpetuity Cash Flow

The cash flow estimate of the last planning year is generally used as basis to determine the perpetuity cash flow (i.e., the sustainable long-term cash flow). Since the CGU is expected to be in a steady state after the planning period, the last planning year's cash flow should already incorporate capacity optimizations and changes in the sustainable cost-to-revenue ratio (see section 2.3.4.3). Nevertheless, it might have to be adjusted to represent an appropriate long-term cash flow basis. For example, the perpetuity cash flow should exclude any material one-time time effects or other abnormal cash flows (e.g., abnormal research and development expenses or abnormal pension costs) which are forecasted for the last planning year (E&Y (2015, 20.4.4.1.C)). Moreover, it should include appropriate CAPEX and changes in net working capital that are necessary to achieve the long-term growth rate assumed (Pawelzik and Dörschell (2012, m.n. 2103, 2131)). This also includes inflation-related increases of operating fixed assets (and pro rata corporate assets) and net working capital. If the CGU has a cyclical business model, adjustments might be necessary (IDW RS HFA 40.21). For example, it might be more appropriate to use average cash flow projections as a basis to determine the perpetuity cash flow (i.e., cash flows of an average year instead of a year during a boom or recession).

2.3.4.2.4 Specific Aspects of Cash Flow Estimates

Income taxes

As explained in the previous section, IAS 36 requires the discount rate and therefore the cash flows to be determined on a pre-tax basis. However, as it is common practice to determine a post-tax discount rate, cash flows have to be determined on a post-tax basis as well (IDW RS HFA 40.33). The pre-tax discount rate then is iteratively calculated under the assumption that the value in use on a post-tax basis equals the value in use on a pre-tax basis (IAS 36.BCZ85, see also section 2.3.4.4.1).

However, IDW RS HFA 40.33-36 provides several alternatives to include income tax cash flows in the value in use calculation. The simplest alternative[33] is to use the CGU's projected EBIT to calculate theoretical tax cash flows. As the IFRS carrying amounts are used as tax basis to calculate depreciation and amortization, the projections do not include any actual cash flows arising from assets and liabilities related to income taxes. The theoretical tax cash flows therefore only ensure the consistency between cash flow estimates and discount rate without influencing the valuation result by using actual tax cash flows.[34] However, IDW RS HFA 40 also allows to include cash flows related to current tax assets and liabilities and tax provisions and/or to use the CGU's assets' tax carrying amounts as tax basis (i.e., to consider deferred tax assets and liabilities), even if this is contradictory to IAS 36. If this is the case, the respective assets and liabilities have to be included in the CGU's carrying amount. On the contrary, it is not allowed to consider cash flows related to deferred taxes on tax loss carry-forwards (IDW RS HFA 40.37). Whichever alternative is chosen, the interest expenses are not deducted from EBIT as the tax shield effect of debt is already included in the discount rate.

Inflation

Cash flow estimates have to be consistent with the discount rate used. Hence, if the discount rate includes general inflation effects, cash flows are estimated in nominal terms (IAS 36.40). This implies that the CGU-specific inflation incorporates both general inflation and CGU-specific increases or decreases in prices. However, it is important to consider that CGU-specific changes in prices might be different for different types of cash inflows and outflows

[33] This alternative might be the simplest one as it does not require estimating actual future tax cash flows and, if these tax cash flows cannot be determined on CGU basis, allocating them to different CGUs.

[34] For example, the consideration of cash flows related to deferred tax assets and liabilities might influence the valuation as these cash flows are discounted when determining the value in use, whereas the respective deferred tax assets and liabilities included in the carrying amount are measured on an undiscounted basis (IAS 12.53).

(e.g., the price development of revenues and costs of goods sold might be different, thus changing the gross profit margin). If the discount rate does not include general inflation effects, cash flows are estimated in real terms, i.e., they only consider CGU-specific changes in prices (IAS 36.40). Since real discount rates are not observable, it is generally easier to estimate future inflation developments than future real discount rates. In practice, cash flow projections for the planning period are therefore usually estimated in nominal terms. With respect to the perpetuity cash flow, the CGU-specific inflation is included in the long-term growth rate (see section 2.3.4.3).

Foreign currency cash flows

If cash flows are generated in a foreign currency, they are estimated in this currency and discounted using an appropriate rate for that currency. The resulting present value then is translated into the functional currency using the spot exchange rate at the assessment date (IAS 36.54). Differences in expected future rates of general inflation are not considered as these differences are already included in the present value calculation (IAS 36.BCZ48). Using a forward rate, which reflects the market's expectations of future interest rates, would also be inappropriate as the discount rate already considers the time value of money (IAS 36.BCZ49).

Consideration of cash flows related to other assets and liabilities

As pointed out in the previous section, cash outflows relating to obligations which are already recognized as liabilities (and not considered as part of the net working capital in a broader sense) are generally excluded. However, there is an exception if the recoverable amount cannot be determined without consideration of a liability. This might particularly occur if the disposal of the CGU would require the buyer to assume the liability, e.g., in case of a provision for restoration. Hence, the FVLCD cannot be estimated without considering this provision. In order to perform a meaningful comparison between carrying amount and recoverable amount, the carrying amount of the provision has to be deducted from both the CGU's value in use and its carrying amount (IAS 36.78). Alternatively, it is possible to include the related cash outflows in the value in use calculation (IDW RS HFA 40.64). If these cash outflows do not take place within the planning period, they have to be built in the calculation of the terminal value (E&Y (2015, 20.4.3.1.A)). However, as the carrying amount of such a long-term provision is usually determined using a discount rate lower than the CGU's WACC, the carrying amount is usually higher than the net present value of the respective cash outflows. Hence, the calculated headroom of the impairment test increases, shielding the CGU from impairment (Hoffmann (2015a, m.n. 122)). Therefore, a minority

opinion requires considering and adjusting such a distortion, if significant (E&Y (2015, 20.4.3.1.A)).

Moreover, it is appropriate, for practical reasons, to determine the recoverable amount after consideration of cash flows related to assets that are not part of the CGU (e.g., financial assets) or liabilities that have been recognized (e.g., provisions) (IAS 36.79). As these assets and liabilities are also included in the carrying amount, it is crucial that the cash flow estimates actually include all cash inflows and outflows arising from these assets and liabilities (also those beyond the planning period). Again, this might lead to a distortion of the impairment test due to different discount rates (E&Y (2015, 20.4.3.1); Hoffmann (2015a, m.n. 123)).

Future expansion investments

Future cash inflows arising from increased economic benefits associated with expansion investments (i.e., with cash outflows to improve or enhance the CGU's performance) are not included in the cash flow estimates until the respective cash outflows actually incurred (IAS 36.48).[35] Hence, the firm has to consider interdependencies between revenue, cost, and investment planning in order to eliminate those cash flows related to future expansion investments. However, if material cash outflows for an expansion investment in progress already incurred and it is sufficiently certain that the investment project will be completed in near future, the remaining cash outflows as well as the expected cash inflows arising from the investment are included (IDW RS HFA 40.27). Security or environmental investments do not directly increase the future benefits of any particular existing assets (IAS 16.11). Hence, they are not considered as expansion investments and included in the day-to-day servicing costs. The same holds for major inspections (IDW RS HFA 40.28).

IAS 36 does not explicitly define expansion investments, but refers to the CGU's current condition (IAS 36.44). Hence, the value in use only considers maintenance and replacement expenditures and the cash flow estimates are restricted to existing production capacities and have to reflect existing technologies and processes (PWC (2014, 18.173.2-3); E&Y (2015, 20.4.4.1.A)). With respect to new products or new production techniques, it therefore has to be evaluated whether they have a significant influence on the firm's current business model, strategic focus, market position, or production costs. For example, investments are incorpo-

[35] In this context, payment obligations for goods and services received are also considered as cash outflows (IDW RS HFA 40.26).

rated if they only replace old products and production facilities (thereby considering the natural process of technological advancement) or relate to new complementary products and hence do not change the CGU's current condition significantly. On the contrary, significant innovations representing a conscious effort to increase the business' value or investments to enter new markets or market segments have to be excluded (Brücks et al. (2013, m.n. 167); KPMG (2014a, 3.10.250.80)).

Under some circumstances, the standard's restriction to the CGU's current condition seems particularly unrealistic and therefore inappropriate. For example, this might be the case if the CGU operates in an emerging market (i.e., a significant increase in sales and therefore production capacities is very likely) or if the CGU's goodwill arises from synergies and other benefits related to future expansion investments assumed when acquiring a business (E&Y (2015, 20.4.4.1.A); Hoffmann (2015a, m.n. 164)). However, there are also dissenting opinions assuming that, contrary to the wording of IAS 36, investments to maintain a constant market share within an emerging market or investments that were part of the strategic planning of the business combination do not represent expansion investments (Pawelzik and Dörschell (2012, m.n. 2067-2069); Kuhner and Hitz (2014, m.n. 71)). If this dissenting opinion is not considered as appropriate, it might be necessary to estimate the FVLCD in order to include at least expansion investments that market participants would consider (E&Y (2015, 20.4.4.1.A)).

As the business planning of firms might often include expansion investments, the elimination of the respective cash flows attributable to these investments can induce considerable challenges in practice. On the one hand, the classification of expansion investments might require a substantial degree of judgment. On the other hand, it might be even more challenging to adjust the CGU's estimated operating cash flows for those cash flows attributable to the expansion investments (Dusemond (2014, pp. 432-433); PWC (2014, 18.196, 18.206)).

Future restructurings

The value in use does not reflect expected cash outflows and related cost savings (e.g., reductions in staff costs) or benefits arising from future restructurings not yet committed to (IAS 36.44 (a), 45 (a)). A restructuring is a program that is planned and controlled by the management and materially changes either the scope of the CGU's business or the manner in which it is conducted. The firm is only committed to a restructuring if it has to recognize a

restructuring provision in accordance with IAS 37 (IAS 36.46).[36] Only if this is the case, future cost savings and benefits are considered in determining the value in use. Future cash outflows for the restructuring are not included in the calculation as they are already recognized as provision (IAS 36.47). As explained for expansion investments, the adjustment of the business planning for cash flows attributable to future restructurings might also induce considerable challenges in practice (Dusemond (2014, p. 433); PWC (2014, 18.196)).

Cash flow hedges

If a firm hedges the CGU's cash flows and the hedging instruments are measured at fair value, the cash flow estimates might either use the non-contracted cash flows excluding the hedging instruments from the carrying amount or use the contracted cash flows considering the hedging instruments in the carrying amount. However, if the hedging instruments are not measured at fair value, the contracted cash flows have to be used (IDW RS HFA 40.69; PWC (2014, 18.181)).

2.3.4.3 Long-term Growth Rate

With respect to the long-term growth rate, IAS 36 requires a steady or declining rate[37] which is restricted by the long-term average growth rate for the products, industries, or countries in which the CGU operates, or for the market in which the assets are used, unless a higher rate can be justified (IAS 36.33). This is due to the fact that competitors are likely to enter markets with favorable conditions, thus restricting the growth and making it difficult for firms to exceed the average historical growth rate over the long term (e.g., 20 years) (IAS 36.37). An increasing growth rate is only appropriate if it matches objective information about patterns over a product or industry life cycle (e.g., if a CGU is at the beginning of such a life cycle). However, the growth rate might also be zero or negative (IAS 36.36).

Looking more generally at the sources of growth, it can be attributed to operational growth based on the optimization of existing capacities and capacity expansions as well as nominal growth due to CGU-specific inflation. Since the CGU is expected to be in a steady state after the planning period, capacity optimizations including changes in the sustainable cost-to-revenue ratio should already be incorporated in the cash flow projections. Hence, in order to

[36] A firm is only committed to a restructuring and therefore has to recognize a provision if it (1) has a detailed formal plan for the restructuring and (2) has raised a valid expectation in those affected that it will carry out the restructuring by starting to implement that plan or announcing its main features to those affected by it (IAS 37.72). For more details, see IAS 37.71-83.

[37] Different models of declining growth rates are discussed by Lienau and Zülch (2006 pp. 327-329).

avoid double-counting, the long-term growth rate does not include operational growth related to capacity optimizations. If a steady state based on the existing capacities at the end of the planning period is not reached, it might be necessary to consider a second, less detailed planning phase before proceeding to the perpetuity. Besides capacity optimizations to achieve a sustainable cash flow basis, this phase might also account for additional temporary growth effects which are based on a limited period of excess returns due to special market or industry conditions (KPMG (2013, pp. 34-35); IDW (2014, A.386-387)).

When considering growth during the perpetuity, the steady state assumption implies that re-investments of cash flows leading to operational growth based on capacity expansions have a present value of zero, i.e., the CGU is able to sustainably earn its cost of capital (IDW S 1.37). In practice, the sustainable free cash flow is generally expected to abstract from re-investments to generate operational growth and it therefore directly considers the main share of actual long-term growth. On the contrary, if the long-term growth rate included operational growth, the sustainable free cash flow would have to be reduced by corresponding re-investments. However, both methods would lead to the same result (KPMG (2013, pp. 34-35); IDW (2014, A.388, 395)). Moreover, including operational growth would be inconsistent with the IAS 36 requirement to exclude future expansion investments.

As a consequence of the previous argumentation, the long-term growth rate generally only includes growth effects related to CGU-specific inflation. When estimating this inflation rate, it has to be evaluated whether the management will be able to pass price increases on the procurement markets onto its customers (also considering market competition) and/or to compensate these price increases by efficiency enhancements. Hence, the evaluation requires a comprehensive analysis of future market and environmental developments as well as the CGU's future operational and financial development. On the contrary, the general inflation might not be in the management's focus and does therefore generally not represent an appropriate estimate of CGU-specific inflation. In fact, empirical studies show that German firms were only partly able to compensate inflation-related cost increases by price increases in the past (KPMG (2013, pp. 34-35); IDW (2014, A.390-392)).

2.3.4.4 Discount Rate

2.3.4.4.1 Requirements of IAS 36

Definition and determination of the discount rate are not clearly regulated in IAS 36. The discount rate is a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the CGU for which the future cash flow estimates have not been adjusted (IAS 36.55). The discount rate is the return that investors would require if they were to choose an investment generating cash flows of amounts, timing, and risk profile equivalent to those of the CGU (IAS 36.56).

In general, the WACC of listed firms that are sufficiently similar in terms of service potential and risks to the CGU under review is used as a basis to estimate the CGU's discount rate (IAS 36.56; IDW PS HFA 40.17). Hence, its determination is based on an objective market approach and particularly independent of the firm's or the CGU's capital structure (IAS 36.A19). In order to fulfill this criterion, the capital structure of typical market participants (generally a peer group) has to be used (IDW RS HFA 40.47). Moreover, it is important to consider CGU-specific risks as the listed firms used to determine the WACC might often not be similar with respect to all CGU characteristics. This includes risks such as country risk, currency risk, price risk, and other risks related to specific CGU characteristics (IAS 36.A18; IDW RS HFA 40.45). Also, if key management assumptions differ from capital market participant assumptions, the discount rate might have to be adjusted in order to fulfill the equivalence principle (IDW RS HFA 40.46).

As the WACC is determined on a post-tax basis, a transformation into a pre-tax discount rate is required (at least to fulfill the disclosure requirements of IAS 36) (IAS 36.A20; IDW RS HFA 40.52). The pre-tax discount rate therefore has to be iteratively calculated under the assumption that the value in use on a post-tax basis equals the value in use on a pre-tax basis (IDW 36.BCZ85; IDW RS HFA 40.53). A simple grossing-up of the WACC is generally not appropriate.[38] Moreover, if cash flows are estimated in real terms, the WACC has to be adjusted for the general expected inflation.

[38] The simple grossing-up divides the WACC by the term (1 – tax rate). This would only be appropriate if the recoverable amount was determined using only a perpetuity (IDW RS HFA 40.53).

2.3.4.4.2 Determination of Weighted Average Cost of Capital

The WACC represents the weighted average of the cost of equity and cost of debt based on the CGU's peer group. In order to calculate the weighted average, the peer group's capital structure (based on market values of equity and debt) is used. Moreover, the WACC considers the tax shield effect of debt. This leads to the following formula (Copeland et al. (2005, p. 569); Brealey et al. (2014, p. 221); KPMG (2014a, 3.10.300.40)):

$$WACC = r_E * \frac{MV_E}{MV_E + MV_D} + r_D * (1 - t) * \frac{MV_D}{MV_E + MV_D} \quad (2)$$

where r_E = cost of equity, r_D = cost of debt, MV_E = market value of equity, MV_D = market value of debt, and t = corporate tax rate.

The cost of equity are generally derived from the capital asset pricing model (CAPM) by using the following formula:[39]

$$r_E = r_f + \beta_{levered} * MRP \quad (3)$$

where r_E = expected return on equity, r_f = risk-free interest rate, $\beta_{levered}$ = levered beta factor, and MRP = market risk premium.

Hence, the CAPM calculates the expected return on equity by adding the risk-free interest rate and a risk premium that accounts for the systematic risk inherent to the CGU. The risk premium is determined by multiplying the peer group's levered beta factor and the market risk premium. However, it might be necessary to consider additional CGU-specific risk adjustments as generally not all CGU characteristics are similar to the characteristics of the peer group. For example, the peer group's unlevered beta factor might have to be adjusted for differences in operational risk between CGU and peer group. Moreover, it might be necessary to include additional CGU-specific risk premiums in addition to the market risk premium (e.g., country risk premium). Similarly, cost of debt might have to be adjusted as they are

[39] The CAPM was independently developed by Sharpe (1964), Lintner (1965a, b), and Mossin (1966). For an explanation of the CAPM, see e.g. Copeland et al. (2005, pp. 147-176), Perridon et al. (2009, pp. 261-270), Dörschell et al. (2012, pp. 20-28), or Brealey et al. (2014, pp. 191-204). The CAPM is not free of criticism. For example, its assumptions like homogenous expectations of investors or the fact that risk premiums are explained by only one independent variable are criticized (e.g., Franke and Hax (2009, p. 360); Dörschell et al. (2012, p. 25); Kruschwitz,(2014, p. 372)). Therefore, alternative models (e.g., arbitrage pricing theory) or multi-factor CAPM (e.g., Fama-French three factor model) were developed. Nevertheless, the CAPM is commonly used in practice as it based on observed capital market data (i.e., it increases the objectivity of discount rates) and as it provides a theoretical explanation for the relevance of risk-free interest rate, market risk premium, and levered beta factor for determining expected cost of equity (Dörschell et al. (2012, pp. 27-28)).

generally derived from the peer group as well. These adjustments are particularly critical as it might often be difficult to determine them objectively and appropriately. Hence, this significantly increases the complexity of the WACC determination, bears a risk of inappropriate adjustments, and provides management additional discretion when there are significant differences between the CGU and its peer group. Therefore, it should be thoroughly assessed whether significant adjustments are actually justified and can be determined with a reasonable degree of subjectivity or whether it is more appropriate to abstain from adjustments in favor of a more objective WACC determination.

Based on formulas (2) and (3), the calculation of WACC specifically requires the determination of the following factors:

- Risk-free interest rate
- Market risk premium
- Peer group
- Levered beta factor including capital structure
- Cost of debt
- Additional risk adjustments

These determinants are discussed in the following.

Risk-free interest rate

The risk-free interest rate represents the rate of return for an alternative capital market investment which is equivalent with respect to maturity and (quasi) risk-free with respect to currency and credit risk. It is determined based on interest rates of government bonds (IDW S 1.116-117). Since CGUs with allocated goodwill are generally expected to have an indefinite useful life, the maturity should (theoretically) also be indefinite. However, as government bonds with indefinite maturity do not exist (maximum 30 years), it is recommended to use yield curves to determine an appropriate risk-free interest rate (IDW S 1.117).

The yield curve for German government bonds shows the implied interest rates of zero-coupon bonds in relation to their time to maturity. As government bonds are generally coupon bonds and as these bonds are not traded for all times to maturity, the continuous yield curve has to be derived iteratively. It is generally estimated on the basis of market prices for different German government bonds using the Svensson method and respective parameters published by the German Central Bank. The estimated hypothetical yield curve is iteratively

adjusted until the resulting hypothetical interest rates of traded governmental bonds (i.e., coupon payments until the maturity date and payment of the face value on the maturity date are discounted by the yield curve's hypothetical interest rates with equivalent time to maturity) fit as good as possible with observed interest rates. It is recommended by the IDW to smooth the yield curve over a period of three month to account for market fluctuations and potential estimation errors. As the yield curve represents) interest rates of zero-coupon bonds, it is necessary to calculate a uniform risk-free interest rate which leads to the same present value of future cash flows as discounting these cash flows with different maturity equivalent risk-free rates.[40] This uniform risk-free interest rate is recommended to be rounded to 0.25 percentage points (IDW FAUB (2014a, no. 2.2)). For more details on determining an appropriate risk-free interest rate and related conceptual matters, see Damodaran (2011, pp. 101-105) and Dörschell et al. (2012, pp. 50-90).

Market risk premium

Based on the CAPM, the market risk premium represents the additional rate of return required by investors for holding a representative (risky) market portfolio. In literature, there is a dissent whether the market risk premium should be determined based on historical data or whether the implicitly estimated expected market risk premium[41] should be used (Laschewski (2015, p. 934)). The technical committee for business valuations and commerce (FAUB) of the IDW currently recommends a range between 5.5 % and 7.0 %. Based on the market conditions as of the assessment date and expected future developments, a reasonable market risk premium within this range should be chosen (IDW (2014, A.360)).[42] For more details on

[40] If the risk-free interest rate was directly extracted from the zero-coupon bond yield curve, it would be necessary to use a maturity equivalent rate for each period. However, as it is more practical to use a uniform risk-free interest rate, it is accepted to assume a typical yearly cash flow growth rate of 1 % and calculate a uniform rate leading to the same present value of future cash flows (IDW FAUB (2014a, no. 2.2)).

[41] The expected market risk premium is estimated on the basis of implicit cost of equity. For example, a reverse firm valuation is applied using the current market capitalization as firm value and setting this value equal to financial analysts' forecast of future dividends discounted by implicit cost of equity (Damodaran (2011, p. 115); Dörschell et al. (2012, p. 92)). Based on the CAPM, the expected market risk premium can be calculated as implicit cost of equity less risk-free interest rate divided by the firm's levered beta factor. The average or median market risk premium is then determined for a representative market index. As a simplification, it is also possible to directly perform this calculation on the basis of a market index and respective expectations concerning market dividends (Damodaran (2011, p. 116)). However, it seems questionable whether the expected market risk premium is more reliable than the historical market risk premium. In particular, the forecasts of financial analysts might not be sufficiently reliable with respect to long-term dividends, the outcome is based on a simplified model and highly sensitive to changes in model assumptions like long-term growth rate, and the market capitalization might not always be representative of the firm's value (Dörschell et al. (2012, p. 93-94)).

[42] For example, the market risk premium could be determined assuming that investors' yield expectations in real terms are constant in the long term, e.g., a long-term real interest rate for German government bonds of 2.0 % and a long-term market risk premium of 5.0 % (i.e., constant long-term real cost of equity of 7.0 % for the

the market risk premium, see Damodaran (2011, pp. 105-121) and Dörschell et al. (2012, pp. 91-129).

Peer group

The peer group is defined as the group of listed firms which are sufficiently similar to the CGU in terms of key qualitative and quantitative characteristics. Qualitative characteristics might refer to the CGU's business model, the geographic location of its major markets, or the current stage of its life cycle. Quantitative characteristics might include revenue, profit margin, or market capitalization (IDW RS HFA 40.48). In practice, all potential peer group firms are identified as a first step (long list). Then, suitable peer group firms are selected based on the qualitative and quantitative characteristics (short list). As last step, firms whose shares are not sufficiently liquid are eliminated (Dörschell et al. (2012, pp. 256-258)). Therefore, the peer group approach ensures a certain degree of objectivity and transparency. However, as pointed out before, it might often be difficult to define a peer group which is similar with respect to all CGU characteristics. This represents a limitation of the peer group approach and might require adjustments to the WACC model, thereby decreasing the objectivity.

Levered beta factor including capital structure

Based on the CAPM, the levered beta factor accounts for the CGU-specific systematic risk that cannot be diversified. It includes both operating and financial risk of equity investors and it can be either higher ($\beta_{levered} > 1$), equal ($\beta_{levered} = 1$), or lower ($\beta_{levered} < 1$) than the risk associated with the market portfolio (Hoffmann (2015a, m.n. 69, 71)). It is generally determined on the basis of the peer group's historical market data. Hence, the individual levered beta factor of each peer group firm is estimated using a linear regression analysis of its return on shares on the return of an appropriate share index. Alternatively, it can be estimated as the covariance of return on shares and share index return divided by the variance of the share index return (Dörschell et al. (2012, pp. 139-140)). In practice, beta factors are generally estimated over a two year period with monthly returns or a five year period with weekly returns. For volatile markets, the five-year beta is typically considered as more appropriate. Moreover, the analysis of beta factors might also comprise one-year betas

market portfolio). If the risk-free interest rate was 2.0 % and the expected inflation rate was 1.5 %, the required market risk premium would be 6.5 % (as the market portfolio's cost of equity would then be 2.0 % - 1.5 % + 6.5 % = 7.0 %). Moreover, implicitly estimated expected market risk premiums might be used to evaluate the reasonableness of a selected market risk premium (KPMG (2014b, p. 27)), see also footnote 41.

(weekly or daily returns) over a period of three to five years to assess the beta factor's stability and identify significant changes (Dörschell et al. (2012, p. 158); IDW (2014, A.365); KPMG (2014a, 3.10.300.140-150)). Then, the beta factors are unlevered considering the firms' capital structure and corporate tax rate. This yields the unlevered beta factor that only includes the operating risk (Damodaran (2011, p. 135); Dörschell et al. (2012, p. 201)):

$$\beta_{unlevered} = \frac{\beta_{levered}}{1 + (1 - t) * \frac{MV_D}{MV_E}} \tag{4}$$

In practice, the firms' (simplified) capital structure is often determined on the basis of market capitalization as market value of equity and book value of net debts as market value of debt (Damodaran (2011, p. 167); Dörschell et al. (2012, pp. 213-214)). Based on the peer group's mean (or median) unlevered beta factor and capital structure and the CGU's corporate tax rate, the CGU's levered beta factor is calculated. However, adjustments of the unlevered beta factor might be necessary to account for significant differences in operational risk between CGU and peer group.

$$\beta_{levered} = \beta_{unlevered} * (1 + (1 - t) * \frac{MV_D}{MV_E}) \tag{5}$$

The previous description of the beta determination only addressed the major steps. For a more detailed explanation as well as a discussion of other aspects (e.g., adjustment of beta, consideration of debt beta, statistical issues, or practical issues), see Damodaran (2011, pp. 121-150) and Dörschell et al. (2012, pp. 130-290).

Cost of debt

The cost of debt (risk-free interest rate plus credit spread) is determined using peer group market data. Again, adjustments for significant differences in CGU and peer group characteristics might be necessary. With respect to the estimated cash flows, it has to fulfill the equivalence principle concerning maturity, currency, and taxes (IDW RS HFA 40.49). In practice, the credit spread is generally determined on the basis of the peer group's average rating (rating method) as the difference in interest rates of industrial bonds and government bonds (using the longest maturity available). For more details on the determination of cost of debt and the rating method, see Damodaran (2011, pp. 155-165) and Dörschell et al. (2012, pp. 303-308).

Additional risk adjustments

If the CGU generates its cash flows in a country with specific country or currency risks, the WACC has to be adjusted for these risks (IAS 36.A18). Country risks refer to the country's political, fiscal, economic, or legal situation and development (Dörschell et al. (2012, p. 359); Hoffmann (2015a, p. 81)). Although the FAUB of the IDW believes that such risks should generally be incorporated in the cash flow estimates, it also accepts that the discount rate is adjusted for practicability and complexity reasons. In this context, credit spreads of the country's government bonds are expected to be a suitable risk indicator (IDW FAUB (2014a, no. 2.1))[43]. The currency risk has to be considered if the CGU generates its cash flows in another currency than the currency used to estimate the WACC. Therefore, the WACC should be adjusted using the inflation difference between both currencies (Vettinger and Hirzel (2010, p. 389); Hoffmann (2015a, p. 82)).

Moreover, particularly in Anglo-American valuation practice, other adjustments like size premiums for smaller firms or risk premiums for planning uncertainties or insolvency risks are considered. However, such adjustments are not commonly used in the Germany valuation practice since size premiums are (from a theoretical and empirical perspective) considered as questionable[44] and because other risk factors should already be included in the expected cash flow estimates (KPMG (2013, p. 27)).

2.3.5 Fair Value less Costs of Disposal

Contrary to the value in use, the FVLCD represents a market-based measurement referring to an exit price at the assessment date from the perspective of a market participant instead of a firm-specific perspective (IFRS 13.2). Before the introduction of IFRS 13, IAS 36 included an independent definition of fair value for impairment testing. However, from January 1, 2013 onwards, this definition was replaced by a reference to IFRS 13 which provides a single framework for measuring fair value when required by another IFRS. Although IFRS 13

[43] A generally accepted framework (in practice) to estimate country risk premiums based on country ratings or credit default swaps was developed by Damodaran (Hoffmann (2015a, p. 83)). The theoretical background is provided in the current version of his paper: Damodaran (2015).

[44] The FAUB of the IDW does particularly consider size premiums for small and medium-sized firms as not appropriate since they are considered as not consistent with capital market theory (IDW FAUB (2014b, m.n. 47)).

provides more detailed guidance, the changes with respect to the valuation of CGUs with allocated goodwill were not material.[45]

2.3.5.1 Definition

The FVLCD is defined as the price that would be received to sell a CGU in an orderly transaction between market participants at the assessment date, less the costs of disposal (IAS 36.6; IFRS 13.9). For further guidance on the determination of the fair value, IAS 36 refers to IFRS 13 (IAS 36.6). According to IFRS 13.B2, the fair value measurement approach requires to determine the valuation premise consistently with the CGU's highest and best use, to identify the principal (or most advantageous) market for the CGU, and to choose appropriate valuation techniques on the basis of the fair value hierarchy. However, if a binding sale agreement in an arm's length transaction exists, the purchase price has to be used and the fair value does not have to be estimated in accordance with IFRS 13 (Hoffmann (2015a, m.n. 33)).

The valuation premise refers to the highest and best use of a representative market participant (IFRS 13.27; IDW RS HFA 47.4). Nevertheless, the firm's current use of the CGU is presumed to be its highest and best use unless market or other factors suggest that a different use by market participants would maximize the CGU's value (IFRS 13.29). However, as this use might also include synergies with the firm's other CGUs, only those synergies which are also available to representative market participants are considered, whereas firm-specific synergies have to be excluded (IAS 36.53A (b); IDW RS HFA 40.5). On the contrary, if market participants consider a different use when pricing the CGU (e.g., due to future restructurings or expansion investments), the valuation premise has to incorporate the respective aspects (IDW RS HFA 40.5). Moreover, as the standard assumes an orderly transaction, the estimated price does not refer to a forced transaction like a forced liquidation or a distress sale, irrespective of the firm's current situation (IFRS 13.A; IDW RS HFA 47.5).

The identification of the principal (or most advantageous) market is generally less important for the fair value measurement of CGUs than for the measurement of individual assets. If the CGU itself is listed, the stock exchange might represent the appropriate market, at least for

[45] IAS 36 defined the fair value as the amount obtainable from the sale of a CGU in an arm's length transaction between knowledgeable, willing parties. IAS 36.25-27 differentiated the following different stages in determining the fair value: (1) price in a binding sale agreement in an arm's length transaction, (2) CGU's market price (i.e., share price) on an active market, (3) best information available to reflect the fair value, particularly considering recent transactions for similar CGUs (i.e., valuation multiples, but also discounted cash flows). These stages are similar to the stages currently defined by IAS 36 and IFRS 13.

the CGU's shares. Whether it also represents an appropriate market for the CGU as a whole is discussed in section 2.3.5.3. For all other CGUs, there might be no apparent market (and thus also no principal market) and it is therefore more important to appropriately define market participants representing the most advantageous market for a disposal of the CGU. Following IFRS 13.B, market participants have to be

- independent of the firm,
- knowledgeable, having a reasonable understanding about the CGU and the transaction (using all available information, including information that might be obtained through due diligence efforts that are usual and customary),
- able to enter into the transaction, and
- willing to enter into the transaction, i.e., motivated but not forced or otherwise compelled to do so.

IFRS 13.23 clarifies that it is not required to identify specific market participants. Rather, the characteristics of different types of market participants with whom the firm would enter into a transaction have to be considered. For example, it might be possible to differentiate strategic buyers and financial buyers and consider which of these types of market participants maximizes the amount received to sell the CGU (Deloitte (2015, A6.3.4.3)). Moreover, those market participants have to be in both a financial and operating position to purchase the CGU (E&Y (2015, 14.7.1)).

After the determination of the representative market participants' valuation promise and the respective market, appropriate valuation techniques have to be chosen considering the CGU characteristics and the data availability (IFRS 13.61). This can be either a single technique or multiple valuation techniques. If multiple valuation techniques are used, the reasonableness of the range of values has to be evaluated and the most representative point within that range has to be selected (IFRS 13.63). The valuation techniques have to be applied consistently, unless a change in a valuation technique or its application is justified (IFRS 13.65). The standard differentiates between three valuation techniques: market approach, income approach, and cost approach (IFRS 13.62). However, the cost approach is not considered as appropriate for impairment testing (IAS 36.BCZ29). Based on the fair value hierarchy, it is required to maximize the use of relevant observable inputs and to minimize the use of unobservable inputs (IFRS 13.61, 67). This also implies that multiple valuation techniques can only be used if the respective fair value measurements are categorized within the same fair value level (IDW RS HFA 47.72).

2.3.5.2 Fair Value Hierarchy

The fair value hierarchy differentiates three levels of input factors:

- Level 1: Quoted prices in active markets for identical assets or liabilities (IFRS 13.76)
- Level 2: Other directly or indirectly observable input factors (IFRS 13.81)
- Level 3: Unobservable input factors (IFRS 13.86)

With respect to the fair value measurement of CGUs, level 1 input factors are quoted prices of the CGU's own shares if these shares are traded on an active market. As an active market is defined as a market in which transactions for the asset or liability take place with sufficient frequency and volume to provide pricing information on an ongoing basis (IFRS 13.A), trading frequency and volume of the shares have to be sufficiently high to provide reliable pricing information.

Level 2 input factors can be the CGU's own share price if traded on an inactive market, share prices of similar firms (traded on active or inactive markets), recent transactions of similar firms, market data like interest rates, yield curves, implied volatilities, or credit spreads (i.e., also WACC), or market-corroborated inputs (IFRS 13.82). However, expectations and statements of market participants like analyst reports or industry studies are not considered as observable market inputs (IDW RS HFA 47.85). Level 2 input factors might have to be adjusted in order to ensure a sufficient comparability considering, e.g., the CGU's condition and location or to account for an insufficient market volume or activity level (IFRS 13.83). However, the necessary adjustment might represent a level 3 input factor (IFRS 13.84).

Level 3 input factors are unobservable inputs reflecting the assumptions that market participants would use and are only used if relevant observable inputs are not available (IFRS 13.87). They have to include all information which is reasonably available to market participants (IFRS 13.89). This might include publicly available information like analyst reports or industry studies, but also internal data like financial forecasts which is adjusted to represent a market participants view, if necessary (IDW RS HFA 47.86).

Based on the levels of input factors, the categorization of a fair value measurement is defined by the lowest level input factor that is significant to the entire measurement (IFRS 13.73). Although the fair value hierarchy is based on input factors and therefore does not prioritize the valuation techniques (IFRS 13.74), it is possible to implicitly categorize the valuation techniques with respect to goodwill impairment tests as follows:

- Level 1: Market approach using the CGU's own shares traded on an active market
- Level 2: Market approach using valuation multiples without significant level 3 adjustments
- Level 3: Market approach using valuation multiples with significant level 3 adjustments or income approach using discounted cash flows based on (adjusted) internal data

As suitable share prices of the CGU might often not exist and as valuation multiples might often require significant level 3 adjustments, firms might often use level 3 fair value measurements. If this is the case, it might be useful to apply a combination of market approach and income approach in order to obtain a more reliable fair value estimate. Different weights for the valuation techniques might be justified based on their reliability and the subjectivity of their input factors. For example, investors might place more emphasis on the market approach if there are sufficiently comparable guideline firms or transactions, whereas they might place more emphasis on the income approach if there are no close comparables and cash flows can be reliably estimated (KPMG (2014a, 2.4.130.40)). If both values substantially differ, the reasonableness of each estimate has to be evaluated and it is generally not appropriate to just use the average value as most representative point within the range of possible values (KPMG (2014a, 2.4.130.60)). For example, it is possible that the adjusted valuation multiples are not indicative for the CGU's fair value due to substantial differences between the characteristics of the comparables and the CGU or that the discounted cash flows might not be based on reasonable assumptions of market participants.

2.3.5.3 Market Approach

The market approach for goodwill impairment testing refers to the CGU's own shares or to valuation multiples based on guideline firms or transactions.

If a reliable price of the CGU's shares exists, it is expected to represent the best evidence of the fair value and has to be used without any adjustments (IFRS 13.77). Hence, the CGU's fair value has to be calculated as the product of share price at the assessment date and number of shares outstanding (i.e., market capitalization) (IFRS 13.80). However, as the "unit of account" that has to be measured for the purpose of impairment testing is the CGU as a whole and not only one share (IFRS 13.13-14), there is a discussion (based on IFRS 13.69) whether the share price can be adjusted for factors that market participants would consider when acquiring all of the CGU's shares. In September 2014, the IASB published Exposure Draft

ED/2014/4 addressing this problem.[46] The proposed amendments would clarify that the CGU's fair value equals the unadjusted share price multiplied with the number of shares outstanding (i.e., the unadjusted market capitalization). However, as these amendments are still under discussion, it might currently still be possible to justify reasonable adjustments like a control premium (KPMG (2014a, 2.4.830.20); Deloitte (2015, A6.3.2.1); Hoffmann (2015b, m.n. 68-69)).

If there is no (reliable) share price for the CGU, the market approach generally uses valuation multiples based on share prices of guideline firms or purchase prices observed in recent transactions to determine the fair value. Multiples are generally determined on the basis of key performance measures like revenues, EBITDA, EBIT, or net income (Damodaran (2011, pp. 650)). In order to determine the comparability of guideline firms or transactions, attributes like business model, types of products or services, geographic area of operation, market position, size, growth (historical and projected), profitability, capital intensity (fixed assets and working capital), leverage, liquidity, or diversification should be assessed (PWC (2014, 5.179.15)). Based on the assessment of these attributes, adjustments for factors like size, growth expectations, profitability, or risk might be necessary (Damodaran (2011, pp. 653-656); PWC (2014, 5.231)). Moreover, purchase prices observed in recent transactions have to be adjusted for specific market conditions, buyer-specific motives, or other specific aspects which influenced these prices (IDW RS HFA 47.60). A control premium might have to be considered when guideline firms are used (PWC (2014, 5.179.10)). For guideline transactions, the control premium is already included in the purchase price. Therefore, it has to be considered whether the transaction-specific control premium (i.e., particularly the synergies assumed) is also applicable for the CGU (PWC (2014, 5.179.12)). If necessary adjustments cannot be made objectively and reliably, valuation multiples can only serve as a plausibility check and the income approach should be used to estimate the fair value (Brücks et al. (2013, m.n. 151)).

As multiples might be different for each guideline firm or transaction, the selection of an appropriate multiple within the resulting range requires judgment, considering qualitative and quantitative factors specific to the measurement (IFRS 13.B6). If valuation multiples lead to a relatively large range of possible valuations (due to different characteristics of comparables and/or different types of multiples), the measurement should rather be classified as level 3

[46] As of October 1, 2016, there was no update on the IASB's Exposure Draft ED/2014/4 or the status of the project "Fair Value Measurement: Unit of Account".

(due to the subjectivity in selecting the most representative value) and it might be more appropriate to use multiple valuation techniques (Hoffmann (2015b, m.n. 49-50)). Moreover, it should be assessed whether the selection of comparables and the application of the method are appropriate and whether the large range might be an indicator that it is not possible to determine a sufficiently reliable and reasonable fair value estimate.

2.3.5.4 Income Approach

The income approach particularly refers to discounted cash flows and the general application guidance (IFRS 13.B12-B30) is similar to the guidance provided to determine the value in use (see section 2.3.4.1). However, the cash flows have to be estimated from a market participant's perspective considering all information which is reasonably available to market participants (IFRS 13.87, 89). This also includes internal information which would be obtained through due diligence efforts (IFRS 13.BC59). Hence, cash flow projections might be developed using internal data as a reference point (IFRS 13.89, B36 (e)). These projections then have to be adjusted to be consistent with assumptions that market participants would use when pricing the CGU. For example, key assumptions might be compared to publicly available information like analyst reports or industry studies (IDW RS HFA 47.86). With respect to the discount rate, there is generally no difference between the WACC used to determine fair value and value in use, respectively. Only if the risk inherent in the expected cash flows is different (due to differences pointed out in the following), there might be a difference in the risk premium (IDW RS HFA 40.17).

The main differences of cash flow projections used to determine the fair value compared to those used to estimate the value in use are listed in the following:

- Market participant's perspective instead of internal, firm-specific perspective.
- No consideration of firm-specific synergies which are generally not available to market participants (IFRS 13.89, IAS 36.53A (b)).
- No consideration of other firm-specific factors like legal rights or restrictions and tax benefits or burdens (IAS 36.53A).
- Inclusion of future restructurings not yet committed to and future expansion investments if market participants would consider them when pricing the CGU (IDW RS HFA 40.5).
- Adjustment of unusually high or low costs (e.g., management compensation or other overhead costs) (Völkner and Harr (2011, m.n. 32)).

- Consideration of income taxes as they would be considered by market participants (IDW RS HFA 47.63). However, as also the value in use is generally determined on a post-tax basis in practice (see section 2.3.4.2.4), there might actually be no difference (IDW RS HFA 40.33).
- No general restriction of planning period to five years (IDW RS HFA 40.5).[47]

2.3.5.5 Costs of Disposal

The costs of disposal are defined as incremental costs directly attributable to the disposal, excluding finance costs and income tax expense (IAS 36.6). Costs of disposal, other than those recognized as liabilities, are deducted from the fair value. The standard gives examples like legal costs, transaction taxes, and direct incremental costs to bring the CGU into condition for its sale (IAS 36.28). Termination benefits (as defined in IAS 19) and costs associated with reducing or re-organizing a business following the disposal of the CGU are not considered (IAS 36.28). In literature, the costs of disposal are quantified as 1% to 3% of the fair value (Schmusch and Laas (2006, p. 1052)). Nevertheless, they should be made plausible with respect to other observable transactions.

2.3.6 Plausibility Check of Recoverable Amount Estimates

Although not required by IAS 36, it is recommended for listed firms to perform a reconciliation between their market capitalization and the sum of all CGUs' recoverable amounts (IDW RS HFA 40.13). First, the market value of debt has to be added to the market capitalization and the fair value of assets not included in the firm's CGUs for impairment testing has to be deducted (Hoffmann (2015a, m.n. 172)). Then, material differences should be explained and the explanation requirements are particularly high if the recoverable amounts are based on fair values (IDW RS HFA 40.13). For example with respect to fair value estimates, it might be appropriate to add a control premium to the market capitalization in order to perform a meaningful comparison (KPMG (2014a, 3.10.210.20)). Such a premium might lie in a range between 10 % and 30 % (Hoffmann (2015a, m.n. 175)). On the contrary, it is not appropriate to consider a control premium for value in use estimates as this would assume a hypothetical acquisition (KPMG (2014a, 3.10.350.20)). Therefore, differences in the estimated firm value have to be explained by different assumptions used by management and market participants

[47] However, there might not necessarily be a difference in planning periods. On the one hand, cash flow projections used to determine the fair value might also use a five year period as longer forecasts are not expected to be sufficiently reliable. On the other hand, IAS 36 also allows to use longer planning periods if justified (see section 2.3.4.2.1)

(Hoffmann (2015a, m.n. 177)). For example, the management might have superior information about the firm's future economic performance.

Moreover, it might be useful to check the plausibility of the CGUs' individual recoverable amounts. If the CGU itself is listed, the value in use should be compared with the market capitalization. If the CGU is not listed and the recoverable amount was determined using discounted cash flows (either value in use or FVLCD), multiples might be used to evaluate the plausibility (KPMG (2014a, 3.10.210.20, 350.30); Hoffmann (2015a, m.n. 178)). For more details on the use of multiples, see section 2.3.5.3.

2.3.7 Carrying Amount

The carrying amount of a CGU has to be determined consistently with the way its recoverable amount is determined (equivalence principle, IAS 36.75). Hence, it includes all assets that can be attributed directly, or allocated on a reasonable and consistent basis, to the CGU and that will generate or are used to generate the future cash inflows used in determining the recoverable amount. It does generally not include the carrying amount of any recognized liabilities as the recoverable amount is generally determined excluding the cash outflows of these liabilities (IAS 36.76-77). However, if liabilities are included in the working capital, if the recoverable amount cannot be determined without consideration of a liability, or if the recoverable amount is, for practical reasons, determined after consideration of assets that are not part of the CGU or liabilities that have been recognized (see sections 2.3.4.2.2 and 2.3.4.2.4), the carrying amount also has to include these assets and liabilities in order to fulfill the equivalence principle (IAS 36.78, 79).

Based on the composition of cash flow estimates to determine the value in use or the FVLCD (see sections 2.3.4.2.2 and 2.3.5.4), the carrying amount generally includes all of the CGU's operating fixed assets, net working capital (in a broader sense)[48], corporate assets which can be allocated on a reasonable and consistent basis to the CGU, and goodwill allocated to the CGU. On the contrary, it does generally not include interest-bearing assets and liabilities (including pension provisions) as well as other non-operating assets and liabilities. Moreover, assets or liabilities related to income taxes like deferred tax assets and liabilities, current tax assets and liabilities, and tax provisions are excluded in case of the value in use. However, if the value in use is determined considering specific income tax assets or liabilities (see section

[48] IDW RS HFA 40.66 explicitly requires including the net working capital in the CGU's carrying amount. Alternatively, the net working capital at the assessment date can be deducted from the recoverable amount as an additional investment, which leads to the same outcome of the impairment test.

2.3.4.2.4), they have to be included in the carrying amount as well (IDW RS HFA 40.34). If the recoverable amount is based on the CGU's FVLCD using the market approach (i.e., fair value based on the CGU's own shares or valuation multiples, see section 2.3.5.3) instead of the income approach, the determination of the carrying amount also has to fulfill the equivalence principle. For example, if the CGU itself is a listed firm and the fair value therefore equals the firm's market capitalization, the carrying amount generally includes all of the firm's assets and liabilities as well as the goodwill allocated to the CGU.

Corporate assets are characterized by the fact that they do not generate cash inflows independent of other assets and that their carrying amount cannot be fully attributed to one CGU (e.g., headquarters, IT equipment, or research centers) (IAS 36.100). Depending on the firm and CGU structure, shared assets like warehouses or plant and machinery fall also under the definition of corporate assets (KPMG (2014a, 3.10.92.20)). They are only included in the carrying amount of a CGU if a portion of their carrying amount can be allocated on a reasonable and consistent basis (IAS 36.102). This can be the relative carrying amounts of the respective CGUs,[49] but also the relative revenues, relative numbers of employees, intra-group charges, other representative key figures, or the actual use of these corporate assets (IDW RS HFA 40.89; Erb et al. (2013, m.n. 110); KPMG (2014a, 3.10.150.40)). Hence, if a variable allocation basis is chosen, the allocation of portions of corporate assets to CGUs is not fixed (Brücks et al. (2013, m.n. 266.1)). An allocation based on the profitability of the CGUs is generally not appropriate (Hoffmann (2015a, m.n. 135)).

As last component of the CGU's carrying amount, goodwill allocated to the CGU has to be considered. As long as the CGU does not have any non-controlling interests or the full goodwill method is applied, the carrying amount only considers the goodwill amount recognized and allocated to the CGU. However, if goodwill attributed to non-controlling interests is not recognized (partial goodwill method), the amount of goodwill allocated to the CGU has to be grossed up to appropriately reflect the non-controlling interests for the purpose of impairment testing (IAS 36.C4). Although the standard does not define how to gross up the amount of goodwill, an illustrative example shows that a simplified grossing up proportional to the carrying amount is sufficient if the goodwill acquired does not include a control premium (IAS 36.IE65). If the goodwill acquired includes a control premium, the IDW considers the following three combinations of methods to gross-up goodwill and to allocate

[49] The standard's illustrative example also includes weights based on the remaining useful life of the CGUs in order to allocate corporate assets on the basis of weighted carrying amounts (IAS 36.IE75).

goodwill impairment losses (see section 2.3.1 for allocation) as appropriate (IDW RS HFA 40.122):

- Grossing-up and impairment allocation without consideration of the control premium
- Grossing-up with and impairment allocation without consideration of the control premium
- Grossing-up and impairment allocation with consideration of the control premium

The combination of methods selected has to be applied consistently, also for all other similar CGUs with non-controlling interests and goodwill including a control premium (IDW RS HFA 40.123).

2.3.8 Disclosures

The IASB identified the reliability of goodwill impairment testing and the capital market participants' assessment of the reliability as a major issue. Hence, it concluded that disclosures about goodwill impairment tests are necessary and relevant to financial statement users as they assist users in evaluating the reliability (IAS 36.BC201).

For each CGU with significant[50] amounts of allocated goodwill compared to the firm's total carrying amount of goodwill, the following information has to be disclosed (IAS 36.134):

- The carrying amount of goodwill allocated to the CGU.
- The basis on which the recoverable amount has been determined (i.e., value in use or FVLCD).
- A description of each key assumption (i.e., the assumptions to which the CGU's recoverable amount is most sensitive), but not necessarily the values assigned to these key assumptions.[51]
- A description of management's approach to determining the values assigned to each key assumption, whether those values reflect past experience or, if appropriate, are consistent with external sources of information, and, if not, how and why they differ from past experience or external sources of information.

[50] IAS 36 does not define the term "significant". However, the illustrative example (IAS 36.IE80-89) provides an indication as 16 % of total goodwill is considered to be significant, whereas 9 % is not (IDW RS HFA 40.101).

[51] It is not required to disclose the values assigned to key assumptions as long as a reasonably possible change in a key assumption would not cause an impairment (IAS 36.130, BC209, IE89).

- In case of value in use:
  - The length of the planning period, including a justification if the period exceeds five years.
  - The long-term growth rate, including a justification if this rate exceeds the long-term average growth rate for the products, industries, or countries in which the CGU operates, or for the market to which the CGU is dedicated.
  - The pre-tax discount rate.[52]
- In case of FVLCD, the valuation technique(s) used and, if fair value measurement is not categorized as level 1, the following information:
  - The fair value measurement's level of the fair value hierarchy.
  - Changes, if any, in the valuation technique(s) and the reasons for these changes.
  - If discounted cash flows are used, length of the planning period, long-term growth rate, and discount rate.
- If a reasonably possible change in a key assumption would cause an impairment:
  - The amount by which the CGU's recoverable amount exceeds its carrying amount.
  - The value assigned to the key assumption.
  - The break-even value of the key assumption, incorporating any consequential effects of that change on the other assumptions.

For clarity reasons, firms should also disclose the fact that a reasonably possible change in key assumptions would not cause an impairment (implicitly required by IAS 36.IE89). Disclosure requirements of IFRS 13 do not apply for FVLCD (IFRS 13.7(c)).

For all other CGUs with insignificant amounts of allocated goodwill, that fact has to be disclosed together with their aggregate carrying amount of goodwill. However, if any of those CGUs are based on some of the same key assumptions and if their aggregate goodwill is significant, that fact as well as the following information has to be disclosed (IAS 36.135, IE89; IDW RS HFA 40.99):

- The aggregate carrying amount of goodwill.
- A description of the same key assumptions (i.e., only those applicable for all of the aggregated CGUs),[53] but not necessarily the values assigned to these key assumptions.

[52] If the discount rate used for impairment testing is determined on a post-tax basis, which is generally the case when the WACC is used, the discount rate has to be adjusted to represent a pre-tax discount rate for disclosure purposes (IAS 36.A20; IDW RS HFA 40.52). For more details, see section 2.3.4.4.1.

- A description of management's approach to determining the values assigned to each of the same key assumptions, whether those values reflect past experience or, if appropriate, are consistent with external sources of information, and, if not, how and why they differ from past experience or external sources of information.
- If a reasonably possible change in one of the same key assumption would cause the aggregate of the CGUs' carrying amounts to exceed the aggregate of their recoverable amounts:
  - The amount by which the aggregate of the CGUs' recoverable amounts exceeds the aggregate of their carrying amounts.
  - The value assigned to the key assumption.
  - The break-even value of the key assumption, incorporating any consequential effects of that change on the other assumptions.

For CGUs which are impaired, the following additional information has to be disclosed (IAS 36.130):

- The events and circumstances that led to the recognition of the impairment loss.
- The amount of the impairment loss.
- A description of the CGU as well as any changes in the CGU's definition and the reasons for these changes.
- The recoverable amount of the CGU.
- The discount rate used in the previous recoverable amount calculation (in case of value in use and FVLCD based on discounted cash flows).

Moreover, if the initial allocation of newly acquired goodwill cannot be completed until the end of the reporting period, the amount of and reasons for unallocated goodwill have to be disclosed (IAS 36.133).

[53] In this context, only key assumptions influencing the aggregate recoverable amount of all CGUs are relevant. This is also highlighted by IAS 36.BC209 (d) and IAS 36.IE89. On the contrary, other key assumptions only influencing single CGUs are not relevant as the goodwill allocated to these CGUs is per definition insignificant compared to the firm's total carrying amount of goodwill.

2.4 Major Differences between IFRS, HGB, and US-GAAP

2.4.1 Subsequent Measurement under HGB

Contrary to the IFRS, which are primarily focused on the information function of financial statements including forward-looking information, the German Commercial Code (HGB) is more focused on the concept of prudence (§ 252 I 4 HGB). This still applies after the German Accounting Law Modernization Act (BilMoG) became effective in 2009. Moreover, the HGB traditionally has particularly high objectivity requirements leading to a more backward-looking perspective (Kuhner (2014, pp. 4-5)). With respect to goodwill impairment testing, the following major differences exist:

- Straight-line amortization of goodwill
- Allocation of goodwill to (business units of) subsidiaries instead of CGUs
- Goodwill impairment tests are only performed in case of triggering events
- Use of internal value instead of the recoverable amount
- Comparison of amortized goodwill with its implied current value (simplification permitted)

After the BilMoG, firms are required to apply the acquisition method to recognize goodwill arising from a business combination as the difference between the book value of the subsidiary and the proportional fair value of the subsidiary's equity as of the acquisition date (§ 301 HGB).[54] However, contrary to IFRS, goodwill has to be amortized using its estimated useful life (§§ 301 I, 253 III 1-2 HGB).[55] If its useful life cannot be estimated reliably, a period of ten years has to be used (§ 253 III 3-4 HGB). The useful life has to be explained as part of the disclosures (§ 314 I No. 20 HGB).[56] Moreover, impairments of goodwill have to be recognized if the impairment is expected to be permanent (§ 253 III 5 HGB). As under IFRS, it is prohibited to reverse impairments on goodwill in subsequent periods (§ 253 V 2 HGB).

Amortized goodwill has to be only tested for impairment if there is an indication for impairment as of the balance sheet date (GAS 23.127). Hence, the relevance of impairment testing is lower than under IFRS (especially if goodwill is amortized over a relatively short period) and it might often be possible to avoid goodwill impairment tests in practice (Dusemond (2014,

[54] Before BilMoG, firms could choose between recognizing goodwill using the acquisition method (§ 301 HGB 2008), directly offsetting goodwill against the reserves (§ 309 I 3 HGB 2008), or, under specific conditions, not recognizing goodwill using the pooling of interests method (§ 302 HGB 2008).

[55] Before BilMoG, goodwill had to be written-off either within four or less years (§ 309 I 1 HGB 2008) or over its estimated useful life (§ 309 I 2 HGB 2008).

[56] Before July 23, 2015, firms only had to justify an estimated useful life exceeding five years. Hence, a useful life exceeding five years might not be considered as unusual anymore.

pp. 425-426)). The HGB does not provide a detailed concept of impairment testing comparable to the approach outlined in IAS 36, but GAS 23 sets forth the general concept (GAS 23.128-129). The "HGB goodwill impairment test" might generally be based on a discounted cash flow approach in accordance with IDW S 1 as well as an analogous application of IDW RS HFA 10[57] (Hachmeister (2014, p. 408)).

In order to test amortized goodwill for impairment, it is allocated the subsidiary which was acquired or, if reasonably possible, to business units of this subsidiary (GAS 23.85). Aggregating (business units of) several subsidiaries is not permitted (GAS 23.87). Based on this allocation, the amortized goodwill of a subsidiary is compared with the implied current value of goodwill and an impairment loss is recognized if the former value exceeds the latter. Thereby, the implied current value of goodwill is defined as the current value of the parent company's investment in the subsidiary (generally determined as the net present value of the subsidiary's estimated future cash flows) and the current value of the subsidiary's net assets as recognized on the Group balance sheet (GAS 23.128; Senger (2013, m.n. 20); Förschle and Hoffmann (2014, m.n. 14)). Like the value in use, the cash flows are estimated from an internal perspective based on the current business model including firm-specific synergies. However, contrary to the value in use, the cash flows also consider future restructurings and expansion investments as actually planned (and documented) by the management as well as income taxes (IDW RS HFA 10.5-8; Hachmeister (2014, pp. 408-409)). As an alternative to the goodwill impairment test based on the implied current value of goodwill, GAS 23.129 allows using a simplified impairment test which is more comparable to the IFRS calculation of goodwill impairments. Under this simplification, the fair value of the parent company's investment in the subsidiary is compared with the book value of the subsidiary's net assets as recognized on the Group balance sheet including the book value of goodwill allocated to the subsidiary. A negative difference in then recognized as goodwill impairment.

[57] The IDW's Accounting Principle IDW RS HFA 10 outlines the application of the principles for the performance of business valuations (IDW S 1) with respect to the valuation of equity investments and shares in companies for the purposes of annual financial statements under HGB.

2.4.2 Goodwill Impairment Test under US-GAAP

The goodwill impairment test under US-GAAP is outlined in ASC 350-20 *Intangibles – Goodwill and Other: Testing Goodwill for Impairment* (formerly SFAS 142[58]) and summarized in Figure 2. It is comparable to the testing approach under IFRS, but the following major differences exist:

- Allocation of goodwill to reporting units instead of CGUs
- Annual impairment test only required if a qualitative assessment of impairment indications yields an impairment likelihood of more than 50 percent (i.e., more likely than not)
- Use of the fair value instead of the recoverable amount
- Two-step instead of one-step impairment test[59]

A reporting unit (RU) is defined as an operational segment or one level below an operational segment (ASC Glossary). Hence, it has the same upper level as a CGU under IFRS, but CGUs might be smaller if goodwill is monitored by management two or more levels below an operating segment.[60] Whether the difference in definition actually leads to a testing of goodwill at a lower level depends on the way the management monitors goodwill. In theory, the definition of CGUs under IFRS leads to a more appropriate testing level of goodwill, assuming that goodwill is monitored by management at an appropriately low level. However, the IFRS definition of CGUs with allocated goodwill might also offer a higher degree of discretion than the definition of RUs under US-GAAP.

[58] The Statement of Financial Accounting Standards (SFAS) has been superseded by the Accounting Standards Codification (ASC) in 2009. However, there was no change in accounting requirements for goodwill impairment.

[59] Note that after submission of the dissertation on October 28, 2016, the FASB issued Accounting Standards Update 2017-04 "Simplifying the Test for Goodwill Impairment" on January 26, 2017, which is effective for fiscal years beginning after December 15, 2019 in case of U.S. Securities and Exchange Commission filing firms (with early adoption permitted for goodwill impairment tests performed on testing dates after January 1, 2017). According to this update, the second step of the goodwill impairment test is eliminated, and goodwill impairments are recognized on the basis of step 1 as difference between fair value and carrying amount of a RU (limited to the total book value of goodwill allocated to the RU). This represents a convergence with IFRS and also reflects the criticism with respect to the complexity and costs of the second step as discussed in section 2.5.2.

[60] In deciding not to converge with US-GAAP, the IASB noted that several North-American round-table participants observed goodwill impairments that they knew existed at lower levels, but which disappeared once the lower level units were aggregated with other units containing sufficient headroom to offset the impairment loss (IAS 36.BC149 (b)). Moreover, US field visit participants expected information at CGU level to be more useful for financial statement users and management than at RU level (IAS 36.BC149 (a)).

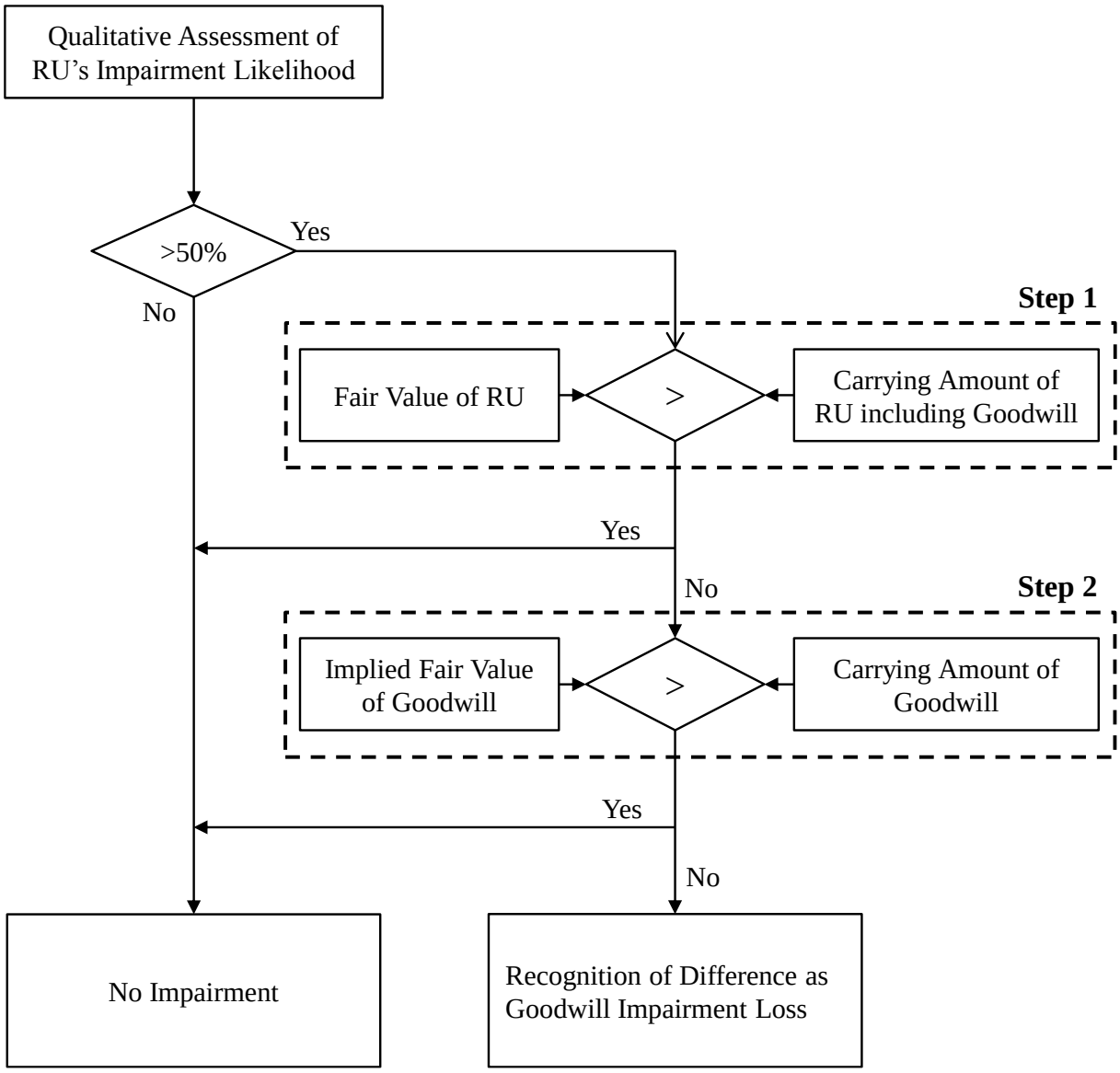

Figure 2: *Structure of US-GAAP goodwill impairment test*

Since its revision in 2011, ASC 350-20 also allows assessing qualitative impairment indications in order to determine whether it is required to perform the annual goodwill impairment test (ASC 350-20-35-3). Only if the impairment likelihood exceeds 50 percent (i.e., more likely than not), the two-step impairment test has to be conducted (ASC 350-20-35-3A, 3D). The Financial Accounting Standards Board's (FASB) objective was to reduce the cost and complexity of testing goodwill for impairment (ASC 350-20-BC7). When assessing the likelihood, external and internal triggering events comparable to the interim triggering event analysis under IFRS (see section 2.3.2) have to be evaluated (ASC 350-20-35-3C). However, it is also possible to bypass the qualitative assessment and to proceed directly to the first step of impairment testing (ASC 350-20-35-3B). IAS 36 does not include a comparable qualitative assessment. However, it is not clear whether this leads to a substantial difference in impair-

ment testing in practice. For example, it might be possible that most US firms do not use the option to perform the qualitative assessment or only use the option if the impairment likelihood is very low.

The US-GAAP impairment test itself uses a two-step approach which is based on the fair value of the RU (ASC 350-20-35-4). Hence, it does not consider the value in use as an alternative measure. On the one hand, this seems less appropriate as the RU's value might also (or even more appropriately) be represented by the value of its continuing use. On the other hand, considering both FVLCD and value in use might offer a higher degree of discretion. Particularly when a reliable fair value estimate can be observed, the consideration of a more subjective value in use estimate might lead to a less reliable impairment test. However, as observable fair value estimates might often not exist, the difference between US-GAAP and IFRS might only sometimes be of higher relevance.

The first step of the US-GAAP impairment test is similar to the IFRS impairment test. The RU's fair value is compared with its carrying amount (ASC 350-20-35 4). If the former exceeds the latter, no impairment loss is recognized (ASC 350-20-35-6). On the contrary, if the fair value is lower than the carrying amount, the second step of impairment testing has to be performed (ASC 350-20-35-8). The second step compares the implied fair value of goodwill with the carrying amount of goodwill (ASC 350-20-35-9). The implied fair value of goodwill is determined in the same manner as the amount of goodwill recognized in a business combination, i.e., a purchase price allocation that would be necessary to determine a new goodwill when acquiring the CGU's business (see section 2.2.2) as of the assessment date has to be performed or updated. Hence, the RU's fair value is assigned to all of its assets and liabilities (including any unrecognized intangible assets) and the excess fair value represents the implied goodwill (ASC 350-20-35-14, 16). Any difference between the carrying amount of goodwill and its implied fair value is then recognized as impairment loss (ASC 350-20-35-11). Since the second step generally leads to the consideration of the RU's hidden reserves, the resulting impairment loss is generally higher and more appropriately determined than under IFRS. However, RUs are still shielded from impairment by hidden reserves when applying step one. With respect to the IFRS impairment test, the IASB decided that the complexity and costs of such a two-step approach would outweigh its benefits (IAS 36.BC170).

2.5 Critical Discussion of Goodwill Impairment Testing

2.5.1 Advantages and Disadvantages of the Current Approach

As pointed out in section 2.1.2, the IASB's objective was to devise a rigorous and operational impairment test which provides more useful information to users of a firm's financial statements than an approach in which goodwill is amortized (IAS 36.BC131G). However, as the recent post-implementation review on business combinations, which was completed in June 2015 (IASB (2015a)), shows, there is still a lively debate on the usefulness of impairment testing even one decade later (IASB (2014, pp. 21-26)). Hence, the IASB concluded that it will be of high significance to conduct further research on the effectiveness, complexity, and efficiency of goodwill impairment testing as well as the impairment-only approach in general (IASB (2015a, p. 8)). In September 2015, the IASB therefore launched the "Goodwill and Impairment" research project, which evaluates whether the current impairment model can be improved and whether there is a different, more appropriate approach for subsequent goodwill accounting (IASB (2015b, p. 5-8)).

This section discusses the advantages and disadvantages of the current goodwill impairment testing approach, also considering the outcomes of the post-implementation review and the current status of the IASB research project.[61] The advantages and disadvantages are categorized by the following four general aspects:

- Economic value and consumption of goodwill
- High degree of subjectivity
- Informational value for investors and other stakeholders
- Other factors

The IASB's main argument of introducing the current impairment-only approach was that it is expected to better reflect the economic value and consumption of goodwill than an amortization approach (see section 2.1.2). Therefore, a higher degree of discretion was accepted in order to provide accounting information on goodwill which is expected to be more relevant to investors (Kuhner (2014, p. 22)). In particular, it was observed that investors, financial analysts, and the firms themselves often ignore amortization charges when valuing firms and measuring operating performance (SFAS 142.B90; Stewart (2003, p. 78)). This might be due to the fact that it is difficult to estimate the diminishment of competitive advantages determin-

[61] The current status of the IASB research project refers to the IASB meeting discussion papers published until October 1, 2016.

ing the value of goodwill and that goodwill consists of competitive advantages with different sustainability (Coenenberg and Schultze (2002, pp. 614-616)). Hence, amortization charges might rather be arbitrary estimates of goodwill consumption that do not appropriately represent the actual consumption of goodwill. Moreover, if goodwill is amortized and regular expenditures to maintain the economic value of goodwill are made (e.g., marketing, research and development, and staff training), earnings would be distorted due a double-counting of expenses (i.e., amortization charges plus maintenance expenditures). This would lead to a reduction of the profit and loss statement's decision usefulness (Kuhner (2014, pp. 21-22)). On the contrary, the impairment-only approach should lead to a periodically correct recognition of impairment losses if these maintenance expenditures are not made. However, the impairment test suffers from the inherent shortcoming that goodwill cannot be tested on a stand-alone basis. It has to be tested at CGU level and these CGUs might already contain or subsequently generate hidden reserves and internally generated goodwill (cushion against impairment). Hence, economically necessary goodwill impairments might be conceptionally delayed, which weakens the argument of appropriate impairment recognition. In particular, it is clear that goodwill is associated with competitive advantages enabling the firm to generate excess returns over an undefined, but limited period. Hence, if goodwill impairments are not or too late recognized due to conceptual weaknesses (or opportunistic earnings management as discussed in the following paragraph), the respective costs associated with excess returns are not appropriately presented (Hitz and Kuhner (2002, pp. 281-283)). Moreover, goodwill acquired in business combinations is likely to be replaced by internally generated goodwill over time. In extreme cases, it might therefore be possible to avoid impairments at all if sufficient goodwill is internally generated and if opportunities to engage in earnings management are exploited (Gundel et al. (2014, p. 133)). The IASB was aware of these shortcomings, but accepted the consequences (IAS 36.BCZ44, BC135, BC191).

Besides these shortcomings, the impairment test is subject to a relatively high degree of subjectivity. This is due to the fact that impairment tests usually depend on discounted cash flow methods and therefore on the management's assumptions concerning the future economic development. Hence, they require a substantial degree of management discretion (e.g., Küting (2013, pp. 1797-1800); Gundel et al. (2014, pp. 132-133)) and decisions might be considerably influenced by the human nature of decision makers (KPMG (2014c, p. 8)). Moreover, auditors might have a reduced possibility to verify the reasonableness of goodwill impairment tests (Kothari et al. (2010, p. 262)). As pointed out in section 2.3, the IASB implemented several precautions to constrain the subjective elements of impairment testing.

In particular, this refers to the application of the management approach with respect to CGU definition, goodwill allocation, and use of budgets and forecasts approved by management, the mandatory consideration of market data and other external evidence for assumptions if available, the performance of a retrospective analysis to assess previous years' planning accuracy, and the disclosure requirements concerning key assumptions including sensitivity analyses (see section 5.2.2 for a detailed discussion of this topic). Moreover, goodwill impairment testing is often in the main focus of enforcement activities of DPR and ESMA and generally represents key audit matters (see section 3.1). Nevertheless, goodwill impairment tests are still based on subjective assumptions made by the management, i.e., the management has a relatively high degree of discretion. It has to define CGUs, allocate goodwill to these CGUs, determine the carrying amount including allocation of corporate assets, estimate future cash flows (i.e., business assumptions), and define valuation assumptions like long-term growth rate and WACC. In particular the determination of business assumptions like market growth, market share, inflation rates of sales prices and cost elements, gross profit, EBITDA and/or EBIT margin, future (replacement and maintenance) investments, or changes in net working capital requires a relatively high degree of subjectivity. Moreover, the requirements to estimate the long-term growth rate are relatively vague and therefore subject to management discretion and the determination of WACC depends on sometimes subjective assumptions like definition of peer group, peer group beta, general market premium, cost of debt, and additional risk adjustments for CGU-specific characteristics.

On the one hand, this relatively high degree of discretion might enable managers to convey private information on the success of acquisitions and future cash flows, hence reducing information asymmetries between stakeholders and management. This represents the IASB's intention when introducing the impairment-only approach and might actually result in useful information for investors (Küting (2013, p. 1800)). However, it seems questionable whether the current requirements are sufficient to ensure the relevance and faithful representation of goodwill impairments (see section 7.2.1 for a detailed discussion of this topic). In particular, the inherent subjectivity might offer managers increased opportunities to engage in opportunistic earnings management. Hence, it is possible that information provided by goodwill impairment tests is rather influenced by the management's own interests than by private information. This would lead to information which is not useful for investors. The management's opportunities to engage in opportunistic earnings management as well as its potential incentives like beating an earnings target, conservative smoothing, big bath accounting,

changes in senior management, or avoidance of debt covenant violations are discussed in sections 5.2.2 and 5.3.2 and are empirically addressed by research paper 1 (section 5).

Based on the previous two aspects, the informational value of goodwill impairment testing is discussed controversially among participants of the post-implementation review. The post-implementation review is a representative indicator for the different existing opinions as a diverse range of participants (in particular preparers and industry organizations, accounting firms, investors, standard setters, regulators, and researchers) responded with comment letters or attended outreach activities.[62] Proponents of the impairment-only approach argue that it relates the purchase price to what was acquired (contrary to an arbitrary amortization) and thereby increases the meaningfulness of the return on investment. Moreover, it helps investors and other stakeholders to verify the success of acquisitions and to validate whether future economic benefits like synergies are still expected. This also provides an indication of the management's ability of stewardship, i.e., whether management is able to conduct successful business combinations or whether it overpays for acquisitions. Besides, goodwill impairments might sometimes act as a clearing event signalizing that management recognized previous mistakes and moves on. However, it is also possible that impairments are based on other (external) reasons (e.g., increase in interest rates) which are not attributable to management failures. In summary, proponents therefore consider the current impairment test to have at least confirmative value (IASB (2014, pp. 21-22)). On the contrary, opponents argue that investors generally anticipate failures of acquisitions earlier than firms recognize impairment losses. Hence, the predictive value, but also the confirmative value would be very limited and impairments might rather be ignored by market participants. Moreover, as goodwill has been paid for and represents future profits, they believe that it should be allocated over time. From their perspective, this is not sufficiently ensured by the impairment-only approach. As a consequence, they also believe that the comparability between firms growing organically and firms growing through acquisitions is reduced and that the former are discriminated due to a non-amortization of goodwill (IASB (2014, p. 22)). In summary, the informational value of the current impairment testing approach is therefore not clear. For a more detailed theoretical discussion and empirical analysis of the informational value of goodwill impairments, see research paper 2 addressing the value relevance and perceived timeliness of goodwill impairments (section 6) and research paper 3 addressing the information content of goodwill impairment announcements (section 7).

[62] The IASB received 93 comment letters and organized 30 outreach activities (IASB (2014, pp. 39-40)). The results are summarized and evaluated by IASB staff members (IASB (2014)).

With respect to other factors, an advantage might be the convergence with US-GAAP. Although there are some differences between the impairment-only approaches of IFRS and US-GAAP (see section 2.4.2), the general approach is similar. A major disadvantage, particularly compared to an amortization approach, is that impairment tests are complex, time-consuming, and costly (IASB (2014, pp. 23-25)).

The advantages and disadvantages of the current goodwill impairment testing approach are summarized in Table 1. In conclusion, the analysis shows that substantial disadvantages weaken the advantages of the current approach and that it is questionable whether the benefits of annual impairment tests outweigh their costs. Hence, it seems necessary to consider whether improvements of the current approach are possible or whether alternative approaches for subsequent goodwill accounting might be more favorable.

Table 1: *Advantages and disadvantages of current goodwill impairment testing approach*

Advantages	Disadvantages
Economic value and consumption of goodwill	
• Better reflects the consumption of goodwill than arbitrary amortization • No double-counting of expenses in case of expenditures to maintain the value of goodwill	• Goodwill shielded from impairment by hidden reserves and internally generated goodwill • Subsequent replacement by internally generated goodwill
High degree of subjectivity	
• Enables management to convey private information on the success of acquisitions and future cash flows	• Reduces the relevance and reliability of impairment testing • Increases the opportunities of opportunistic earnings management
Informational value for investors and other stakeholders	
• Relates the purchase price to what was acquired and thereby increases the meaningfulness of the return on investment • Helps to verify the success of acquisitions and to assess the management's ability of stewardship • Ability to act as a clearing event	• Investors generally anticipate failures of acquisitions • Goodwill has been paid for and represents future profits, thus it should be allocated over time • Reduces comparability between firms with internal and firms external growth
Other factors	
• Increased convergence with US-GAAP (compared to amortization approach)	• Complex, time-consuming, and costly

2.5.2 Improvements and Alternative Approaches

This section discusses potential improvements of the current impairment test and considers two alternative approaches: A two-step impairment-only approach similar to US-GAAP and an amortization approach with indication-based impairment testing comparable to IFRS for Small and Medium-sized Entities (SMEs).

Improvements of the current approach

Improvements of the current approach should address the disadvantages highlighted in the previous section, thereby increasing the effectiveness and efficiency of goodwill impairment testing. In the following, potential improvements are outlined.

In order to reduce the cushion against impairment, which might lead to a conceptually delayed recognition of goodwill impairments, it is crucial that impairment tests are performed at the lowest possible level. This was also the IASB's intention as it requires goodwill to be tested at the lowest level at which goodwill is monitored for internal management purposes, but at least at operating segment level (see section 2.3.3). However, although the management approach limits the inherent subjectivity, the application of this rule still requires exerting discretion. Moreover, the firms' monitoring processes might not always be disaggregated enough to test goodwill at a sufficiently low level in practice.[63] Many participants of the post-implementation review stated that it is not clear what represents the lowest level of monitoring (IASB (2014, p. 25)). Hence, it seems necessary to define and enforce a more precise and lower level at which goodwill is tested.[64] In particular, allocation of goodwill to a CGU is critical if the CGU's recoverable amount is predominantly determined by previously existing assets and internally generated goodwill and/or already has a high cushion against impairment before the business combination. Impairment testing then is not able to identify economically necessary impairments of goodwill due to compensating effects within the CGU. This might often be the case if goodwill is tested at operating segment level. However, testing at a lower level might also increase the number of impairment tests to be performed by firms (and therefore the costs) and adequate disaggregated financial information for impairment testing might not always be available.

[63] An analysis of SDAX firms for the periods 2007 to 2011 (Dreesen (2013)) shows that these firms have on average 3.05 CGUs. However, the variance is relatively high: 17 % only have 1 CGU, 31 % 2 CGUs, 41 % 3-5 CGUs, and 11 % more than 5 CGUs. The most common CGU definitions are operating segments (35 %), individual CGUs (30 %), and subsidiaries (14 %).

[64] Same opinion: EFRAG (2014, p. 36).

Another possibility to reduce the cushion against impairment could be the pre-acquisition headroom approach discussed at recent public IASB meetings.[65] If goodwill related to an acquisition will be allocated to an existing CGU of the firm, the CGU's headroom (i.e., the difference between its recoverable amount and its carrying amount) is measured at the acquisition date using pre-acquisition assumptions. This pre-acquisition headroom is then included in the CGU's carrying amount only for impairment testing purposes ensuring that newly allocated goodwill is not shielded from impairment by pre-existing internally generated goodwill or hidden reserves. If a subsequent annual impairment test indicates an impairment loss, this loss would reduce goodwill allocated to the CGU. If the firm makes a second acquisition and further goodwill is allocated to the same CGU, the pre-acquisition goodwill is re-estimated at the date of the second acquisition (IASB (2016a, pp. 4-6, 10)). In conclusion, the approach therefore has the definite advantage to reduce the cushion against impairment and therefore to reduce the risk of overstated goodwill. Moreover, additional costs related to this approach would be limited as it would be sufficient to update the CGU's most recent annual impairment test. However, there are also several arguments against such an approach. In particular, it implements an additional layer of subjectivity since the measurement of pre-acquisition headroom is based on management assumptions. Hence, management might be able to increase or reduce the likelihood of subsequent goodwill impairments by using more conservative or aggressive assumptions, respectively, when updating the CGU's most recent impairment test. Moreover, fully allocating future impairment losses to goodwill might not be appropriate, particularly if the pre-acquisition headroom is relatively large compared to the goodwill allocated to the CGU. In such cases, it is likely that an adverse change in CGU performance is rather attributable to a reduction of pre-acquisition headroom than to a decreased value of goodwill (i.e., goodwill would be understated). Similarly, relatively small increases in discount rate or decreases in long-term growth rate might lead to a reduction of pre-acquisition headroom which is then fully recorded as goodwill impairment loss. Hence, resulting goodwill impairments would not be related to a consumption of goodwill or to the failure of an acquisition and it might therefore be more appropriate to proportionately allocate impairment losses between goodwill and pre-acquisition headroom. However, this leads to an arbitrary and less transparent allocation of impairment losses which reduces the informational value of impairments. Overall it should therefore be carefully examined whether such an

[65] The pre-acquisition headroom approach was discussed at public IASB meetings in March and April 2016 (IASB (2016a)).

approach actually leads to more reliable and decision useful information or whether it is possible to define and enforce a more precise and lower level at which goodwill is tested.

With respect to the subjectivity of impairment testing, it might be important to lay more focus on the performance of a retrospective analysis of planning accuracy. Although IAS 36.34 requires management to consider causes of differences between past cash flow estimates and actual cash flows, it might be necessary to include stricter requirements. For example, the IASB discussed implementing a subsequent cash flow test similar to previous UK GAAP requirements when drafting the revised IAS 36 (IAS 36.BC195-BC198). This test required firms to re-perform impairment calculations of previous years if actual cash flows are significantly lower than forecasts and to recognize any resulting impairment losses. As implementing such a test seems very costly, IAS 36 should at least define more specific requirements for the assessment of planning accuracy including implications of an insufficient accuracy. This might also include disclosures requirements. For example, firms could disclose the variance between forecasts and actuals results over the last three to five years including explanations for significant deviations (EFRS et al. (2014, p. 45)). Similarly, some participants of the post-implementation review demand for a mandatory disclosure of a sensitivity analysis and for a clarification that this analysis has to cover more key assumptions than only long-term growth rate and discount rate (IASB (2014, p. 24)). This is supported by studies indicating that several firms do not even disclose sufficient information under the current disclosure requirements.[66] With respect to the discount rate, it might be useful to provide a more detailed guidance on the determination of WACC. This could increase objectivity, ensure a consistent application, and improve the comparability of discount rates used by different firms.

Another possibility to constrain opportunistic behavior might be the disclosure of values assigned to key assumptions other than long-term growth rate and discount rate.[67] This would allow financial statement users to better assess the reasonableness of impairment tests and is supported by a study showing that firms do not even sufficiently meet the current disclosure

[66] For a sample of DAX, MDAX, and SDAX firms in 2010 and 2011, Ruhnke and Schmidt (2013) show that 34 % and 30 %, respectively, do not disclose any information about their sensitivity analysis (i.e., also no negative confirmation). Similarly, the ESMA found that 25 % of 235 European firms in 2011 did not disclose any information. Moreover, a considerable number of firms provided only very vague information which is not useful for financial statement users (ESMA (2013b, p. 18)).

[67] This requirement was part of the initial exposure draft of IAS 36 (IAS 36.BC192 (d), BC209 (c)).

requirements.[68] Similarly, it might help the financial statement users' assessment to disclose the portion of the recoverable amount covered by the terminal value (EFRAG (2014, p. 44)). However, this would also substantially inflate the disclosures on goodwill impairment testing. Alternatively, the reasonableness might be documented as part of the disclosures by a reconciliation of the sum of the CGUs' recoverable amounts with the firm's market capitalization (Hoffmann (2015a, m.n. 242)). Moreover, it might be useful for financial statement users to obtain more direct information on the realization of synergies and other benefits of a business combination than provided by impairment testing at CGU level. In particular, the disclosure of key performance indicators for the next three to five years supporting the purchase price paid and therefore goodwill recognized might provide a suitable basis to evaluate the success of an acquisition. These indicators should be derived from the management's assessment which it performs when determining whether to undertake the acquisition and its subsequent monitoring. Moreover, a comparison of actual performance against these key performance targets might be disclosed for the subsequent three to five years, which might also add rigor and transparency to the impairment tests (IASB (2016b, pp. 4-9)). However, such information might often be very sensitive and it is questionable whether it can be determined reliably and consistently in practice. In particular, it might be difficult to provide useful information if the acquired business is integrated into the firm's existing operations and/or if goodwill is allocated to multiple CGUs (EFRAG (2014, p. 46)). Moreover, this kind of detailed monitoring might only be performed by management and useful for financial statement users in case of very significant acquisitions.

Another critical aspect is the use of discounted cash flows when estimating the CGU's FVLCD. In particular, it seems inconsistent that IAS 36 provides very detailed guidance to restrict the discretion related to the determination of the value in use, whereas it is possible to overcome these requirements when estimating the fair value based on IFRS 13 (Hoffmann (2015a, m.n. 168)). This is supported by studies indicating that several firms use fair value estimates, but that almost all of these estimates are based on discounted cash flows.[69] Hence,

[68] This view is supported by some participants of the post-implementation review demanding for more information about the assumptions fed into valuation models (IASB (2014, p. 24)). With respect to the current requirements to disclose a description of key assumptions and management's approach to determining the values assigned to these assumptions (see section 2.3.8), an analysis of the ESMA (235 European firms in 2011) showed that only 60 % of the firms disclosed such information, out of which 50 % did not provide sufficient firm-specific details. Hence, 70 % of the firms did not even sufficiently meet the current requirements of IAS 36 (ESMA (2013b, p. 3)).

[69] For a sample of DAX, MDAX, and TecDAX firms in 2013, Schwarz and Radde (2015) find that 26 % of the firms used the FVLCD, out of which 92 % applied a discounted cash flow approach. A recent survey conduct-

it might be more appropriate to reconsider the current guidance for value in use estimates and to implement suitable application guidance for both value in use and FVLCD based on discounted cash flows. For example, it might be more appropriate to include reasonably documented expansion investments in both values (see discussion in section 2.3.4.2.4).[70] Alternatively, the use of fair value estimates could be restricted to level 1 and 2 fair value estimates (i.e., no discounted cash flows).

Concerning the time-consumption and costs of impairment testing, it might be a promising approach to include an optional qualitative assessment similar to the US-GAAP impairment test (see section 2.4.2). Hence, depending on the outcome of the most recent impairment test and the assessment of subsequent triggering events, the annual impairment test would only have to be performed if the likelihood of impairment is more than 50 percent (i.e., more likely than not). In particular for CGUs with relatively high headroom and/or positive economic development, this might reduce the necessity of impairment tests substantially. However, particularly the 50 percent criterion can be critically discussed as it might not sufficiently ensure an appropriate valuation of goodwill and as it might offer too much discretion for the management. Therefore, it seems a more appropriate requirement that goodwill impairments are unlikely. Moreover, it should be ensured that management provides sufficient evidence that impairments are unlikely by performing a sensitivity analysis and/or a thorough qualitative assessment of triggering events.

Two-step impairment-only approach

An alternative to the current one-step approach could be a two-step approach similar to the US-GAAP impairment test (see section 2.4.2). While the first step is equal to the current impairment test, the second step would determine the impairment loss as the difference between the implied recoverable amount of goodwill and its carrying amount. However, this has only an influence on the magnitude of impairment losses in case of impaired CGUs (since goodwill then is not shielded from impairment by hidden reserves). The identification of CGUs which are impaired does not change. Hence, a two-step approach would not address the potentially delayed recognition of goodwill impairments as one of the major disadvantages,

ed by KPMG (130 observations, mainly from Germany) showed that 33 % of the firms estimated the FVLCD, out of which 81 % applied a discounted cash flow approach (KPMG (2014b, p. 45)).

[70] In this context, many participants of the post-implementation review considered the separation of maintenance and expansion investment and the impact on future cash flows as a major challenge (IASB (2014, p. 26)).

but would imply significant costs to determine the impairment amount.[71] Also the IASB concluded that the complexity and costs of a two-step approach would outweigh its benefits (IAS 36.BC170).

Amortization approach with indication-based impairment testing

Many participants of the post-implementation review on business combinations and parts of the academic literature favor an amortization approach with indication-based impairment testing. Their opinion is mainly based on the disadvantages of the current impairment-only approach discussed in the previous section. They believe that it would be more appropriate to amortize goodwill because it reasonably reflects the consumption of the economic resource acquired in the business combination over time, ensures that the allocation of acquisition costs cannot be avoided by opportunistic management behavior, and implies an adequate level of verifiability and reliability (e.g., Küting (2013, pp. 1802-1803); Gundel et al. (2014, pp. 137); IASB (2015a, p. 21)). Moreover, this approach would still include a robust impairment model, but time-consumption and costs associated with annual impairment testing would be significantly reduced (IASB (2014, pp. 23-24)).

With respect to the useful life, the facts and circumstances of the acquisition should be considered. For example, the period over which synergies and other benefits from the business combination are expected to be realized and/or the acquiree is expected to earn a higher rate of return on a standalone basis (i.e., going concern element of the acquiree's existing business) might represent an appropriate indicator. Moreover, factors like the useful life of the acquiree's primary asset might be considered, at least for goodwill which is highly related to the acquiree's business and its assets. However, in order to reduce potential incentives to avoid large amortization expenses by estimating an unreasonably long amortization period, it might be useful to define a maximum useful life. Besides, it should be discussed whether a straight-line amortization is appropriate or whether a different amortization method provides more useful information. For example, a declining amortization might be more appropriate if most benefits are expected to be realized in earlier years, whereas an increasing amortization might be more realistic if it takes time to realize synergies and other benefits from the business combination (IASB (2016c, pp. 22-31)).

[71] Another alternative could be to directly perform the second step for all CGUs. However, this is unrealistic as it would require estimating the fair values of all of the CGUs' assets and liabilities (including any unrecognized intangible assets).

The proposed approach is comparable to the IFRS for SMEs which require a straight-line amortization of goodwill over its useful life and an impairment test if there is an indication for impairment (IFRS for SMEs 18.19, 19.23). If the useful life cannot be established reliably, it has to be determined based on the management's best estimate but shall not exceed ten years (IFRS for SMEs 18.20). Moreover, the proposed approach is similar to HGB with respect to the straight-line amortization of goodwill (also maximum of ten years if there is no reliable useful life estimate). Concerning the indication-based impairment test, the HGB requires to recognize impairments if they are expected to be permanent, but it does not provide a specific concept of impairment testing (see section 2.4.1).

Concluding remarks

As discussed in section 2.5.1, it is questionable whether the current impairment testing approach is able to sufficiently provide useful information on the actual consumption of goodwill and particularly whether the related benefits outweigh their costs. Therefore, some potential improvements to increase the effectiveness and efficiency of impairment testing are discussed in this section. However, if it is not possible or too costly to implement and enforce such improvements in practice, the IASB should consider introducing an amortization approach with indication-based impairment testing. This approach could be based on the assumption that the decrease in the goodwill's value is related to a predictable consumption of goodwill associated with expected future excess returns and an unpredictable consumption of goodwill due to unpredictable future events and circumstances (Coenenberg et al. (2012, p. 1032)). If this approach uses a reasonable, relatively long amortization period and includes specific requirements for a regular assessment of impairment indications, it would ensure that the benefits of the current impairment test are sufficiently maintained and that the acquisition costs associated with goodwill are sooner or later allocated to the profits arising from the business combination. Moreover, this would significantly reduce time-consumption and costs.

Under such an approach, goodwill might be amortized over its estimated useful life and unreasonably long amortization periods might be avoided by defining a relatively long maximum useful life (e.g., twenty years). Alternatively, parts of the academic literature favor a default fixed useful life between ten and twenty years as it might generally be difficult and subjective to estimate the useful life of goodwill (Küting (2013, pp. 1803); Gundel et al. (2014, pp. 137)). Moreover, in order to maintain the benefits of the current impairment testing approach, impairment tests in the first two or three years after a (material) acquisition as well as less frequent mandatory impairment tests irrespective of impairment indications (e.g.,

every third or fifth year) could be required. The results of these impairment tests would also be very useful to evaluate the severity of impairment indications in the period between two mandatory impairments tests.

3 Audit of Goodwill Impairment Tests

The following chapter addresses the audit of goodwill impairment tests and develops a risk-based audit approach. It is primarily based on the IFRS accounting requirements for goodwill impairment testing outlined in section 2, the relevant auditing standards, and the author's practical audit experience.

3.1 Relevance for Annual Audits

For most firms, goodwill impairment testing is related to (significant) risks of material misstatement due to the fact that goodwill is often one of the firms' most important assets and that impairment tests are often associated with a higher degree of management discretion (Graf von Kanitz (2014, p. 531)). For German listed firms, the high relevance is, e.g., supported by descriptive studies showing that goodwill often represents a relatively high proportion of total assets and equity (see section 4.2 for more details on these studies). Hence, the risk of material misstatement is simply increased because of the high amount of goodwill. Moreover, accounting estimates like the recoverable amount are related to increased risks of material misstatement since they are subject to estimation uncertainty concerning conditions or events that influence the firm to date or in future (IDW PS 314.10; ISA 540.2-3). As discussed in section 2.5.1, the subjectivity might be particularly high for goodwill impairment tests.

Due to the increased risk of material misstatement, goodwill impairment tests are often one of the auditors' key audit matters.[72] This is highlighted by a review of 153 extended audit reports in the UK showing that impairment of goodwill is one of the Top 3 risks considered by auditors (FRC (2015, p. 18)). Moreover, goodwill impairment tests are generally in the main focus of DPR and ESMA. In particular, the DPR selected impairment testing as enforcement priority in every year from 2007 to 2014.[73] This also increases the relevance of goodwill impairment tests for annual audits.

[72] Key audit matters are those matters that, in the auditor's professional judgment, were of most significance in the audit of the financial statements of the current period. This particularly includes significant risks or areas of higher assessed risk of material misstatement as well as areas that involved significant management judgment, including accounting estimates having high estimation uncertainty (ISA 701.8-9).

[73] http://www.frep.info/pruefverfahren/pruefungsschwerpunkte.php [Accessed October 1, 2016].

3.2 Audit Approach

When applying an audit approach for goodwill impairment testing, auditors in Germany are required to comply with the German Auditing Standards issued by the IDW. With respect to the audit of goodwill impairment tests, the main Auditing Standard is IDW PS 314 addressing the auditing of accounting estimates including fair values, and therefore also the audit of a recoverable amount estimate used for impairment testing. IDW PS 314 implements the requirements of the International Standards on Auditing (ISA) and is materially equivalent to ISA 540.

While the management has the responsibility to appropriately determine and present accounting estimates (IDW PS 314.19),[74] auditors have to gain sufficient and appropriate audit evidence that accounting estimates are consistent with the relevant accounting principles and that the determination of accounting estimates is based on appropriate valuation techniques as well as appropriate and reasonable assumptions (IDW PS 314.20, 25). In this context, auditors also have to ensure that accounting estimates are plausible with respect to the firm's other financial statement information (IDW PS 314.23). However, it is not the auditors' responsibility to forecast future conditions or events, i.e., it is not their responsibility to exert its own accounting discretion (IDW PS 314.22; ISA 540.A8).

Following the risk-based audit approach (IDW PS 261.5-6, 10; ISA 330.6-7), auditors have to define an acceptably low level of audit risk which ensures that accounting estimates themselves (i.e., assertion level) as well as the financial statement as a whole (i.e., financial statement level) are not materially misstated. In the following, the focus lies on the audit of accounting estimates in accordance with IAS 314 and ISA 540 at assertion level only. Auditors have to understand the entity and its environment (i.e., assessment of the firm's business risks; IDW PS 261.13-15; ISA 315.11, 25-26) and have to assess the firm's process to determine accounting estimates including its internal control environment in order to identify material risks of misstatement. Hence, auditors have to assess inherent risks as well as control risks related to accounting estimates. Based on their risk assessment, auditors have to determine an audit strategy and define corresponding audit procedures (audit program) ensuring that the detection risk is sufficiently low to achieve the predefined audit risk (IDW PS 314.26, 28; IDW PS 261.5, 6; ISA 540.8, A52; ISA 330.7-8). Then, the audit

[74] This includes the implementation of appropriate processes, the selection of appropriate valuation techniques, the determination and explanation of appropriate key assumptions, and the performance of the valuation itself, which has to be compliant with the relevant accounting principles (IDW PS 314.19).

program, which might consist of control testing and substantive audit procedures, has to be performed (IDW PS 314.57-58; ISA 540.12-13). Finally, auditors have to conclude on their audit including a sufficient documentation with respect to the basis of their conclusion and indicators of possible management bias, if any. Moreover, the disclosures related to accounting estimates have to be tested (IDW PS 314.73, 79-82, 86; ISA 540.18-19, 21, 23).

Based on the previously described general approach for audits of accounting estimates, a more specific audit approach for goodwill impairment testing is developed. The main objective of this audit approach is to ensure at a sufficient assurance level that a firm's goodwill balance is not materially misstated. The audit approach is depicted in Figure 3.

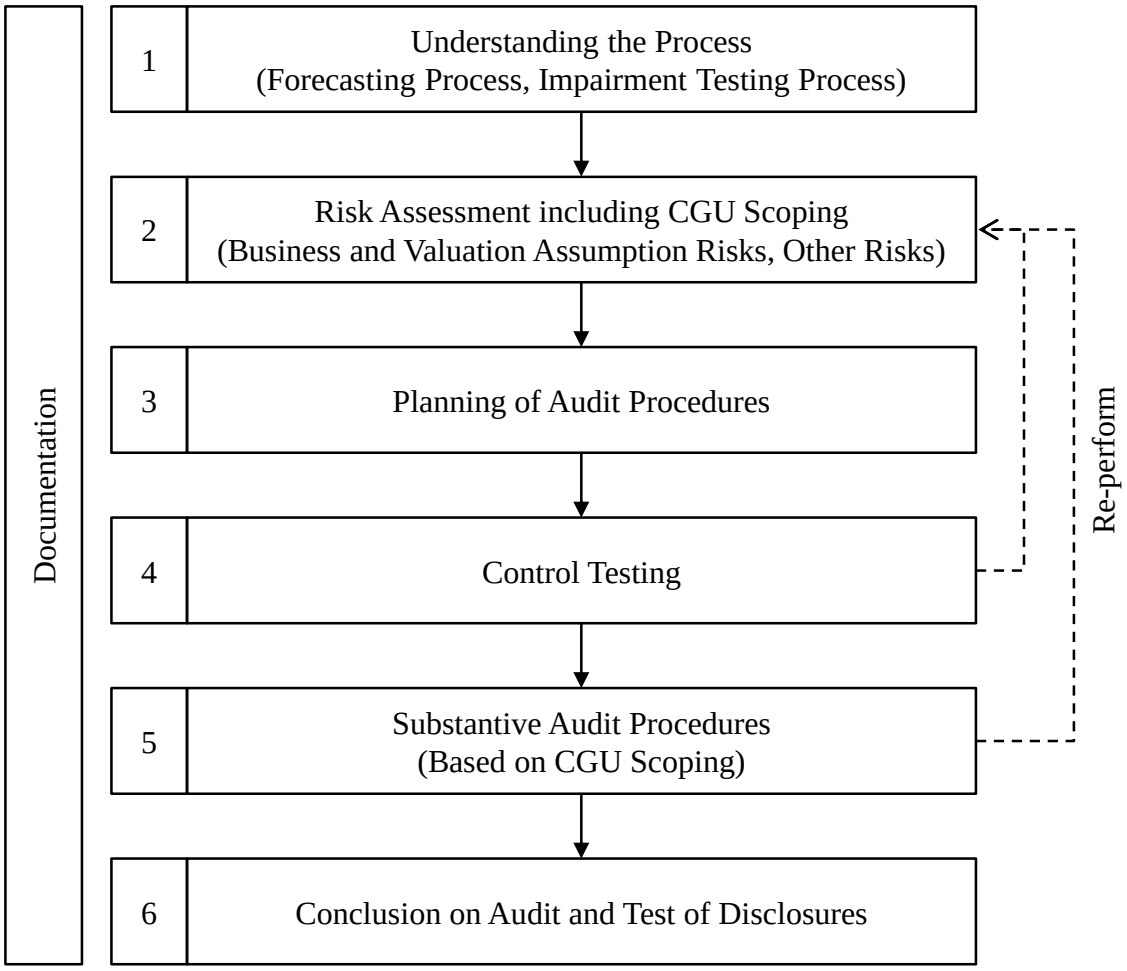

Figure 3: *Audit approach for goodwill impairment testing*

As first step, auditors have to understand the firm's process which might be divided into the general forecasting process (i.e., estimation of budgets and forecasts) and a specific impairment testing process. This also requires that auditors understand the entity and its environment in order to identify business risk that might have an impact on goodwill impairment testing. As second step, a risk assessment has to be performed in order to identify specific

material risks of misstatement and to assess which of these risks have to be considered as significant. This might comprise business assumption risks, valuation assumption risks, and other risks. Particular for firms with multiple CGUs, it might also be necessary to perform a scoping with respect to the CGUs tested for impairment (see section 3.4.1 for details) since the risk that goodwill is materially misstated might be different for each CGU. Based on the risk assessment including CGU scoping, an appropriate audit strategy has to be defined and the type, extent, and timing of corresponding audit procedures have to be planned (step three). Then, all controls relevant to the audit of goodwill impairment tests are tested (step four) and all selected substantive audit procedures are performed (step five). Particularly based on the CGU scoping, the audit strategies assigned to the firm's CGUs differentiate between more and less extensive audit procedures. However, depending on the audit evidence obtained during control testing and substantive audit procedures, it might be necessary to re-perform the risk assessment and/or CGU scoping if findings are significantly different from initial expectations. Finally, auditors have to conclude on their audit of goodwill impairment tests and test the related disclosures in the IFRS notes (step six). During all steps, auditors have to document their approach, their findings, and their conclusions. The following sections discuss the details of each audit approach step.

3.3 Understanding the Process

Following IDW PS 314.31 and ISA 540.8.c, auditors have to gain an understanding of the processes to determine accounting estimates including the relevant internal controls and the underlying data in order to perform a risk assessment and to plan suitable audit procedures. They also have to assess whether the measures to control and approve accounting estimates are performed at an appropriate management level and whether they are appropriately documented (IDW PS 314.32; ISA 540.A27). With respect to the audit of goodwill impairment tests, it is possible to differentiate between the general forecasting process and a specific impairment testing process. In order to understand these processes, it is necessary to understand the entity and its environment, which is already a compulsory part of the overall audit (IDW PS 230.5; ISA 315.11).

3.3.1 Forecasting Process

The forecasting process refers to the firm's process to estimate budgets (e.g., next planning year) and forecasts (e.g., second to fifth next planning year) and its relevant controls. Hence, the outcome of this process provides the data basis for the business assumptions used as input

into the impairment testing process (in particular cash flow forecasts). Particularly for larger firms, this process often involves different staff levels (e.g., top management, middle management, staff of central controlling and other departments, local management), might be based on a top-down or bottom-up approach (or a combination of both) with several planning phases, and might substantially depend on staff expertise and experience as well as information systems. In order to evaluate the forecasting process, auditors might address the following aspects:[75]

General process:

- Is the forecasting process performed at CGU level? What is the nature of the different CGUs? What are the major similarities and differences between the CGUs?
- How is the forecasting process including internal controls generally designed? Which forecasting techniques are applied? Does the process consider different scenarios? Are there different processes for different (types of) CGUs?
- Is the forecasting process based on a top-down approach, a bottom-up approach, a combination of both, or another type of approach?
- Is the length of the planning period appropriate (e.g., with respect to data availability and forecasting uncertainty, the business model, and the representation of a steady state in the final forecast year)? Is there a differentiation between budgets and forecasts?
- Are there any significant changes in the process compared to the previous year? Are these changes appropriate and do they lead to (additional) risks of material misstatement?
- Is there an appropriate documentation of the forecasting process?

Personnel involved:

- Are the budgets and forecasts prepared by staff members with appropriate expertise and experience?
- Are the budgets and forecasts challenged, reviewed, and approved at suitable management levels?
- Is there a review (and approval) of budgets and forecasts independent from top management to prevent or reduce management bias (e.g., internal revision or supervisory board)?

[75] The aspects of the forecasting process that might be addressed by auditors consider the general requirements of IDW PS 314.29-56 and ISA 540.8-9, A12-A44, the IFRS accounting requirements for goodwill impairment testing outlined in section 2, and aspects highlighted in internal practical audit guides of a Big4 audit firm. Moreover, they include the author's own thoughts and practical audit experience.

Business assumptions and underlying data:

- Which are the key business assumptions (e.g., revenues, revenue growth, gross profit margin, OPEX, EBITA, EBITDA growth, EBITDA margin, CAPEX, working capital requirements, etc.) used to prepare the budgets and forecasts and how are they identified and developed? Are there any missing key business assumptions?
- Are the budgets and forecasts based on historical financial information? Is this information appropriately adjusted for one-time effects (e.g., non-recurring revenues or costs)?
- Which internal and external sources of data are used to develop the key business assumptions? Are there any sources (in particular external sources) which are not considered or from which the key assumptions differ? If yes, is this appropriate and reasonable?
- Which measures have been taken to ensure that all necessary data is gathered and appropriately processed?
- Which measures have been taken to ensure that interrelations between key assumptions are appropriately considered?
- Which measures have been taken to ensure that special events are identified and appropriately incorporated into the budgets and forecasts?
- Which measures have been taken to ensure that changes in the firm's environment are identified and appropriately incorporated into the budgets and forecasts?
- Which measures have been taken to ensure that the key assumptions are consistent with those used by management for other purposes?
- Does the process ensure neutral budgets and forecasts, i.e., are both positive and negative information appropriately considered? Is the business planning realistic, aggressive, or conservative?
- Does the process evaluate past years' planning accuracy (retrospective analysis)? How does the management react to significant deviations?
- Is there any evidence for a systematic (intentional or unintentional) bias in budgets and forecasts?
- Which information systems are involved? How do these systems ensure that data is processed reliably?

3.3.2 Impairment Testing Process

The impairment testing process uses the outcome of the forecasting process as the goodwill impairment tests should be based on the most recent budgets and forecasts approved by management. Using these (potentially adjusted) business assumptions as well as certain valuation assumptions (e.g., discount rates, long-term growth rates, or valuation multiples), the impairment test is performed at the CGU level at which management reviews goodwill. Hence, the impairment testing process involves the definition of CGUs, the allocation of goodwill to these CGUs, the selection of valuation techniques, the determination of carrying amounts, the adjustment of business assumptions, the determination of valuation assumptions, and the actual performance and evaluation of impairment tests. Considering these steps of the impairment testing process, auditors might address the following aspects:[76]

General process:

- Is there a functional separation between forecasting process and impairment testing process?
- How is the impairment testing process including internal controls generally designed? Are there different processes for different (types of) CGUs?
- Are there any significant changes in the process compared to the previous year? Are these changes appropriate and do they lead to (additional) risks of material misstatement?
- Is there an appropriate documentation of the impairment testing process?
- Which information systems are involved? How do these systems ensure that data is processed reliably?

Personnel involved:

- Are the impairment tests prepared by staff members with appropriate expertise and experience?
- Are the impairment tests and their underlying assumptions challenged, reviewed, and approved at suitable management levels?
- Is there a review (and approval) of impairment tests and their underlying assumptions which is independent from top management (e.g., internal revision or supervisory board)?

[76] The aspects of the impairment testing process that might be addressed by auditors consider the general requirements of IDW PS 314.29-56 and ISA 540.8-9, A12-A44, the IFRS accounting requirements for goodwill impairment testing outlined in section 2, and aspects highlighted in internal practical audit guides of a Big4 audit firm. Moreover, they include the author's own thoughts and practical audit experience.

- Are external valuation specialists involved? If yes, do they possess sufficient expertise, experience, and capabilities? Is there a process to review the specialists' work?

CGU definition:

- How are CGUs defined? Does the definition comply with the requirements of IAS 36 (see section 2.3.3)?
- Are there any changes in the definition compared to the previous year and if yes, are these changes compliant with IAS 36 (see section 2.3.3)?
- Which measures have been taken to ensure that the current CGU definition is still appropriate?

Goodwill allocation:

- How is goodwill allocated to CGUs? Does the allocation method comply with the requirements of IAS 36 (see section 2.3.3.3)?
- Which measures have been taken to ensure that particularly newly acquired goodwill is appropriately allocated?
- Are there any re-allocations of goodwill compared to the previous year and if yes, are these changes compliant with IAS 36 (see section 2.3.3.4)?
- Which measures have been taken to ensure that goodwill is appropriately de-recognized in case of disposals of a CGU or an operation within a CGU (see section 2.2.3)?

Valuation techniques:

- Which measures have been taken to ensure that the valuation techniques are appropriate with respect to the requirements of IAS 36 (value in use, see section 2.3.4.1) or IFRS 13 (fair value, see section 2.3.5), the CGUs' business model and current condition, as well as other general, industry-, or CGU-specific factors? Are all CGU valuations based on the same valuation technique and if yes, is this appropriate?
- In case of fair value: Is the use of a single valuation technique or multiple valuation techniques appropriate (see sections 2.3.5.1 and 2.3.5.2)? If multiple valuation techniques are used, how are they weighted and how is the most representative valuation selected? Are significant deviations between different valuation results analyzed?
- Are the valuation techniques applied consistently? If not, are the changes appropriate?

Carrying amount:

- How is the carrying amount determined and which measures have been taken to ensure that the underlying CGU data is correctly imported and appropriately processed?
- Does the definition of the carrying amount comply with the requirements of IAS 36 (see section 2.3.7)?
- How is goodwill grossed-up or translated into another currency, if necessary?

Business assumptions:

- Are the business assumptions based on the most recent budgets and forecasts approved by top management?
- Are there any adjustments to the budgets and forecasts to ensure that they meet the requirements of IAS 36 (value in use, see section 2.3.4.2) or IFRS 13 (fair value, see section 2.3.5)?
- Are the budgets and forecasts adjusted for any systematic (intentional or unintentional) bias, e.g., if they are used as a motivational tool by management?
- Is there any need for other adjustments? Are these adjustments appropriate?
- Which measures have been taken to ensure that the underlying data is processed correctly and that necessary adjustments to budgets and forecasts are accurate and complete?

Valuation assumptions:

- Which valuation assumptions (discount rates, long-term growth rates, valuation multiples, etc.) are used and how are they determined? Do they meet the requirements of IAS 36 (value in use, see sections 2.3.4.3 and 2.3.4.4) or IFRS 13 (fair value, see section 2.3.5)?
- Is the determination of valuation assumptions (e.g., WACC) based on specific models? If yes, are these models appropriate?
- Which internal and external sources of data are used to develop the valuation assumptions? Are there any sources (in particular external sources) which are not considered or from which the valuation assumptions differ? If yes, is this appropriate and reasonable?
- Is the determination process of valuation assumptions including its data basis applied consistently? If not, are the changes appropriate?
- Which measures have been taken to ensure that all necessary data is gathered and appropriately processed?

- Which measures have been taken to ensure that the valuation assumptions are consistent with those used by management for other purposes?
- Is there any evidence for an intentional or unintentional bias in valuation assumptions?

Performance and evaluation of impairment tests

- Did the assessment date change? If yes, why is this justified?
- Does the impairment test include a sensitivity analysis with respect to key (business and valuation) assumptions? Does the management discuss and assess the likelihood that alternative values are also appropriate or even more appropriate?
- Are there any plausibility checks after performing the impairment tests (see section 2.3.6)?
- How are the impairment tests evaluated? Are any critical or unusual results analyzed and discussed with suitable management levels?

3.4 Risk Assessment including CGU Scoping

Following IDW PS 314.57 and ISA 540.10, auditors have to identify and assess risks of material misstatement related to accounting estimates based on their understanding of the estimation process and the resulting estimation uncertainty. The degree of estimation uncertainty might be influenced by factors like degree of judgment, sensitivity to changes in assumptions, length of forecast period, relevance of historic data, availability of reliable (external) data, or the ratio between observable and unobservable inputs (ISA 540.A45). The risks of material misstatement is determined and assessed by the magnitude, likelihood, and nature of the potential misstatement (IDW PS 261.64-65; ISA 315.26). In this context, significant risks of material misstatement have to be identified separately and independently from the firm's internal controls (IDW PS 261.65-66; ISA 315.26). Moreover, auditors have to continuously reconsider their risk assessment during their audit and a revision of the risk assessment might cause a modification of their audit strategy and program (IDW PS 261.85; ISA 315.30).

3.4.1 General Risk of Material Misstatement

Considering the potential results of impairment tests, it is possible to differentiate between two general risks of material misstatement. First, if the impairment test shows a positive headroom (i.e., the recoverable amount exceeds the carrying amount), the general risk refers to an overstatement of goodwill. Hence, audit strategy and program should be primarily designed to ensure at a sufficient assurance level that the actual headroom is not negative (i.e.,

focus on one-sided audit procedures). Second, if the impairment test shows a negative headroom (i.e., the recoverable amount is lower than the carrying amount), the general risk refers to both over- and understatement of goodwill. Hence, there is a risk that the calculated impairment loss is too low or too high, respectively. Therefore, audit strategy and program should be designed to ensure at a sufficient assurance level that the calculated negative headroom (and therefore the reported impairment loss) is reasonable (i.e., it lies in a range of acceptable valuations and is not affected by management bias).

Since the general risk of material misstatement is different for each CGU, it might be useful to perform a CGU scoping in order to ensure an effective and efficient risk-based audit approach. Therefore, the auditors' risk assessment for each CGU could be based on the following CGU and impairment test characteristics:

- Goodwill magnitude
- Relative headroom of impairment test
- Existence of triggering events
- Result of sensitivity analysis
- Result of retrospective analysis / Indication of management bias
- Significant changes in the process or the methodology of impairment testing
- Other CGU-relevant information obtained during the audit

Since it is difficult to simultaneously evaluate the influence of all characteristics on the general risk of material misstatement, it could be useful to start the scoping process based on a "scoping map" for CGUs with non-impaired goodwill which considers goodwill magnitude and relative headroom of the respective CGU (see Figure 4). The relative headroom of a CGU is defined as follows:

$$\frac{Recoverable\ Amount - Carrying\ Amount}{Carring\ Amount}$$

For example, if the CGU's recoverable amount is twice of its carrying amount, the relative headroom is 100 % and the recoverable amount could fall to half of its value until the break-even point is reached (i.e., relative headroom of 0 % indicating that goodwill is just not impaired). Therefore, the lower the impairment test's relative headroom and the higher the goodwill magnitude, the higher is the risk that the CGU's goodwill is materially misstated.

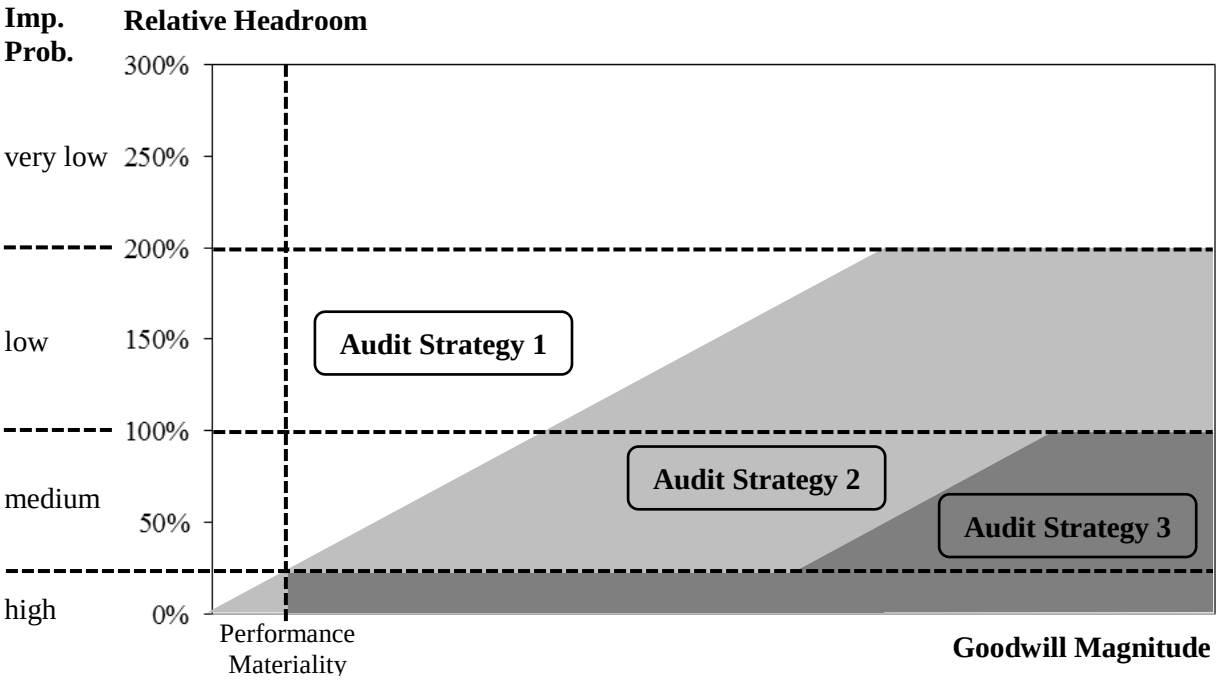

Figure 4: *Scoping map for CGU scoping based on goodwill magnitude and relative headroom (only CGUs with non-impaired goodwill)*

The "scoping map" divides the impairment probability based on the impairment tests' relative headrooms into different categories. For example, the impairment probability might be considered as high if the relative headroom is between 0 % and 20 %, as medium if it is between 20 % and 100 %, as low if it is between 100 % and 200 %, and as very low if it is above 200 %. However, these thresholds are subject to the auditors' professional judgment and should also consider the auditors' understanding of the firm's processes. Moreover, it is useful to show the performance materiality[77] in order to gain a feeling whether the goodwill allocated to a CGU is material or not. Based on this "scoping map" for CGUs with non-impaired goodwill, the CGUs are preliminarily assigned to different audit strategies. For example, using professional judgment, it could be possible to differentiate three audit strategies with respect to the type and extent of audit procedures:

[77] The performance materiality is defined as the amount or amounts set by the auditor at less than materiality for the financial statements as a whole to reduce to an appropriately low level the probability that the aggregate of uncorrected and undetected misstatements exceeds materiality for the financial statements as a whole. If applicable, performance materiality also refers to the amount or amounts set by the auditor at less than the materiality level or levels for particular classes of transactions, account balances or disclosures (IDW PS 250.11; ISA 320.9). The performance materiality is used for purposes of assessing the risks of material misstatement and determining the nature, timing and extent of audit procedures (IDW PS 250.11; ISA 320.11).

- Audit strategy 1 (*white area*): Audit procedures to ensure plausibility
- Audit strategy 2 (*gray area*): Extensive audit procedures
- Audit strategy 3 (*dark gray area*): More extensive audit procedures

CGUs with impaired goodwill might generally be assigned to audit strategy 3 (or at least 2) in order to sufficiently ensure that the reported impairment loss is reasonable. In particular, the risk of material misstatement might often be high as relatively small changes in key assumptions might have a material impact on the impairment amount recognized. Only in rare cases (e.g., if goodwill allocated to the CGU is considered as immaterial), it might be sufficient to apply audit strategy 1 (or to perform no procedures at all).

After the preliminary assignment of audit strategies to the CGUs, auditors should consider the existence of triggering events (see section 2.3.2) and the results of (the management's) sensitivity analysis in order to assess whether changes in the preliminary assignment are necessary. Particularly the assessment of triggering events also accounts for the possibility that a CGU's goodwill is rather low, but that there is a triggering event indicating that also other depreciable fixed assets have to be tested for impairment (i.e., goodwill magnitude might not be a suitable measure for the magnitude of the risk of material misstatement). Moreover, if triggering events exist for CGU's with large relative headroom, they could indicate that the calculated headroom is not appropriate. The sensitivity analysis should be conducted by the management as IAS 36.134 (f) requires disclosures if a reasonably possible change in a key assumptions leads to an impairment loss. Hence, auditors should use the results of the management's analysis when performing their risk assessment. However, auditors might need to perform additional sensitivity analyses in order to sufficiently assess the risk of material misstatement and to appropriately design their respective audit program. Such additional sensitivity analyses might include break-even analyses for single key assumptions and/or scenario analyses for key assumptions in aggregate. The sensitivity analysis might be particularly useful for CGUs with medium or low impairment risk or for CGUs which are already impaired in order to identify the most critical key assumptions for which a reasonable change might cause an impairment loss or significantly change the impairment loss. On the contrary, most key assumptions might be critical for CGUs with a high impairment risk, and CGUs with very low impairment risk might not be critically sensitive to any key assumptions. Hence, auditors might conclude that a sensitivity analysis for these CGUs is less useful.

Moreover, auditors might consider the results of a retrospective analysis of planning accuracy. In particular, it might indicate deficiencies in the forecasting process, a high degree of estimation uncertainty, or a systematic (intentional or unintentional) bias (e.g., "hockey stick" forecasts or motivational budgets and forecasts). With respect to the short-term planning accuracy, the previous year's (or two years') budget might be compared with actuals based on the different key business assumptions. Concerning the long-term planning accuracy, it might be useful to perform a more aggregated analysis. For example, the analysis could compare the previous five years' long-term plans with actuals on EBITDA basis. This also provides on overview how actual EBITDAs and long-term plans changed over the last five years. Figure 5 provides an example which might indicate a systematic positive bias in long-term plans over the last five years. As the current long-term plan also fits into the same pattern, it might be questionable whether it is a reliable estimate. Hence, if there is no other reasonable explanation for the positive bias, the risk associated with the current long-term plan seems to be significant. Even if the CGU's relative headroom is substantial, it might therefore be necessary to perform more extensive audit procedures in order to ensure at a sufficient assurance level that goodwill is not overstated.

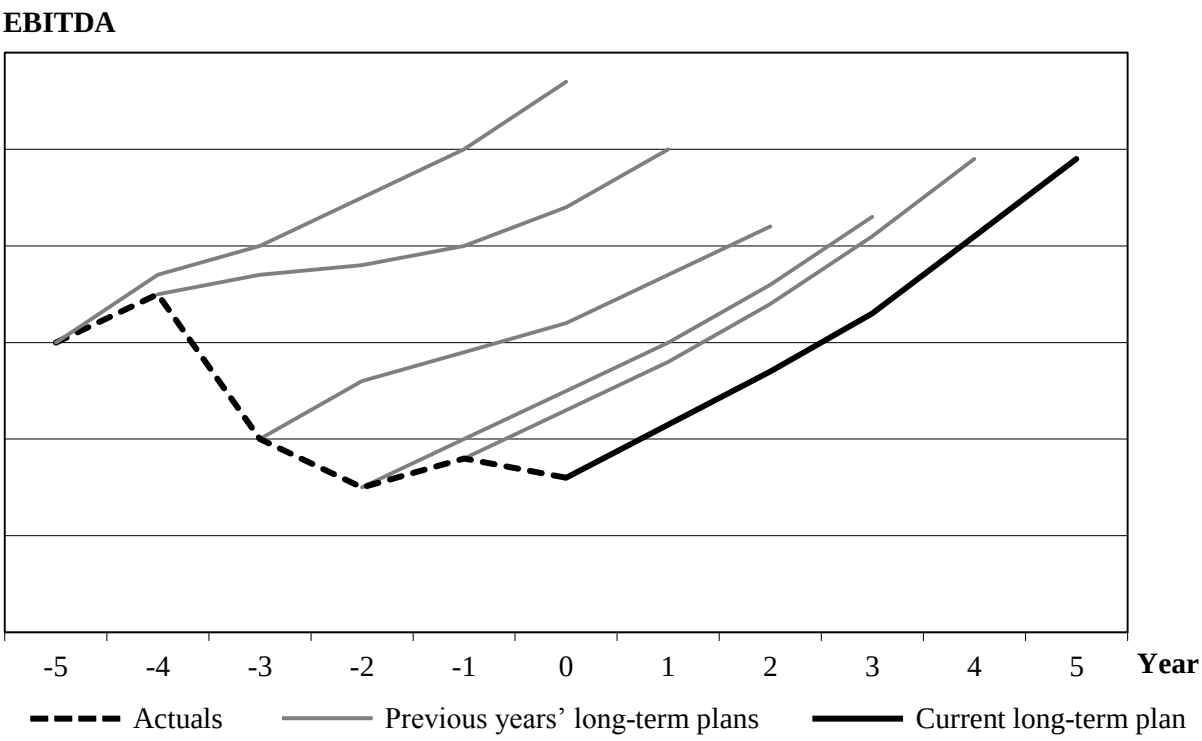

Figure 5: *Example of a retrospective analysis of long-term EBITDA planning accuracy*

Besides, significant changes in the process or the methodology of impairment testing and other information obtained during the audit should be considered in order to finalize the assignment of audit strategies to the CGUs. In summary, it is therefore important that auditors

do not only use the relative headroom calculated by the firm itself as indicator for the likelihood of impairments. They should also consider other information indicating that the headroom might actually be lower and that a different audit strategy than previously expected is required. Moreover, as pointed out before, auditors have to continuously reconsider their risk assessment during their audit.

3.4.2 Specific Risks of Material Misstatement

After the scoping process, auditors should identify the specific risks of material misstatement related to the impairment tests and should assess which of these risks have to be considered as significant. Thereby, auditors particularly use the information obtained during their evaluation of the forecasting and impairment testing process in section 3.3. Most risks will be identical for all CGUs (or at least groups of similar CGUs), but there might also be CGU-specific risks or risks which are only significant for specific CGUs. Nevertheless, based on the previously defined audit strategies, it might be necessary to perform more or less extensive audit procedures to appropriately address these specific risks. For example, auditors might come to the conclusion that a specific risk concerning key assumptions is generally applicable for the firm's impairment tests, but that extensive audit procedures are only required for CGUs with audit strategy 2 or 3. On the contrary, there might be no risk for CGUs with audit strategy 1 due to the fact that even if these key assumptions were materially misstated and if reasonable values were used instead, the CGU would have sufficient headroom to avoid an impairment loss.

The potential specific risks of material misstatement might include the following risks. In particular risks concerning the business and valuation assumptions might be considered as significant.

CGU definition:

- The CGU definition or changes in the definition do not comply with IAS 36.

Goodwill allocation:

- Newly acquired goodwill is not appropriately allocated to CGUs.
- Previously acquired goodwill is not appropriately re-allocated to CGUs.
- Goodwill is not appropriately de-recognized in case of disposals of operations.

Valuation techniques:

- The valuation techniques used are inappropriate (including inconsistent application).
- The valuation techniques are applied inaccurately.
- In case of fair value: If the valuation techniques yield a range of appropriate valuations, the selected valuation is not the most representative one.

Carrying amount:

- The data basis to determine the carrying amount is inaccurate or incomplete.
- The carrying amount definition does not comply with IAS 36.
- Grossing-up and currency translation of goodwill are not appropriate.

Business assumptions:

Management's key business assumptions are not appropriate and reasonable, including the following specific risks:

- Key business assumptions are based on inaccurate or incomplete data.
- Key business assumptions are not based on the most recent budgets and forecasts approved by top management.
- Key business assumptions are not appropriately derived from historical financial information.
- Key business assumptions are intentionally or unintentionally biased.
- Key business assumptions do not meet the requirements of IAS 36 (value in use) or IAS 36 and IFRS 13 (FVLCD).
- Key business assumptions are not consistent with each other.
- Key business assumptions are not consistent with external and internal evidence supporting the assumptions.

Valuation assumptions:

Management's valuation assumptions are not appropriate and reasonable, including the following specific risks:

- Key valuation assumptions are based on inaccurate or incomplete data.
- Specific models to determine key valuation assumptions are inappropriate (including inconsistent application).
- Key valuation assumptions do not meet the requirements of IAS 36 (value in use) or IFRS 13 (fair value).

- Key valuation assumptions are not consistent with external and internal evidence supporting the assumptions.
- Key valuation assumptions are intentionally or unintentionally biased.

Performance and evaluation of impairment tests

- The assessment date is not in line with the requirements of IAS 36.
- The impairment test is not appropriately evaluated.

If management uses the work of external valuation specialists:

- Management provides inaccurate or incomplete data to its external valuation specialists.
- Management does not appropriately review the external valuation specialists' work, thereby indicating a lack of appropriate responsibility.

3.5 Audit Procedures

3.5.1 Planning of Audit Procedures

Based on their risk assessment and the selected audit strategies, auditors have to plan a corresponding audit program defining the type, extent, and timing of audit procedures for the different CGUs. The audit procedures might consist of tests of controls and substantive audit procedures (IDW PS 314.28, 57-58; ISA 540.12-13, A52).

Tests of controls have to be performed for all controls that are assessed by auditors to be relevant to their audit (IDW PS 314.31; IDW PS 261.49; ISA 540.8.c.ii; ISA 315.20). In particular, auditors are required to identify and test relevant controls for all risks of material misstatement which are assessed to be significant or for which substantive audit procedures alone do not provide sufficient assurance (IDW PS 261.51; ISA 540.A50; ISA 315.28-29). However, it is generally sufficient to test the design and implementation of these controls. Only if the audit strategy relies on the effectiveness of controls, their operating effectiveness has to be tested as well (IDW PS 314.59, IDW PS 261.74; ISA 540.A85; ISA 330.8). Therefore, when defining audit strategies and planning control testing procedures, auditors should consider whether the forecasting and impairment testing process is similar for all CGUs or whether there are different processes for different (types of) CGUs. In practice, processes and internal controls might often be similar for all CGUs or at least different types of CGUs. This implicates that the testing of a set of controls might simultaneously address all or at least several CGUs. Hence, an efficient definition of audit strategies and planning of audit procedures leads to a reduced extent of audit procedures required. Potential control

testing procedures are outlined in section 3.5.2. With respect to the timing of control testing procedures, auditors are dependent on the timing of the forecasting and impairment testing process.

The extent and type of substantive audit procedures are determined based on the CGU scoping (i.e., the selected audit strategies for each CGU, see section 3.4.1) and the specific risks of material misstatement identified (see section 3.4.2). This process step cannot be generalized and requires professional judgment. Audit strategy 3 requires the most extensive audit procedures in order to ensure at a sufficient assurance level that goodwill is not materially misstated. Potential substantive audit procedures are outlined in section 3.5.3. Based on this "full scope" audit program, auditors should especially eliminate less efficient audit procedures, i.e., procedures with a low ratio between audit evidence and costs (particularly due to time consumption or experience/expertise requirements). This helps to define an effective and efficient audit program using audit strategy 2 (see section 3.5.3 for more details). For both strategies, auditors have to assess which audit evidence is required to ensure a sufficient assurance level concerning the different risks. For example, auditors should obtain more persuasive audit evidence about key assumptions with a greater likelihood of causing or influencing an impairment loss (e.g., those assumptions might be identified by a sensitivity analysis). With respect to audit strategy 1, auditors have to decide which audit procedures are required to ensure the plausibility of the respective impairment tests. These plausibility checks are generally not detailed and less costly, but they ensure that at least some audit procedures are performed for each CGU and that the initial risk assessment for these CGUs was appropriate (see section 3.5.3 for more details). With respect to the timing of substantive audit procedures, auditors are dependent on the timing of the forecasting and impairment testing process. If there is a substantial timespan between forecasting and impairment testing, it might be possible to perform audit procedures on business assumptions before the actual impairment tests are prepared. However, additional subsequent audit procedures have to be planned ensuring that the budgets and forecast are still appropriate as of the assessment date. Similarly, if annual goodwill impairment tests are performed during the fiscal year, it might be useful to prepone audit procedures. However, additional procedures during the main audit have to be planned ensuring that there are no triggering events between the assessment date and the balance sheet date.

Moreover, the planning of audit procedures should consider whether the involvement of specialists is necessary in order to obtain sufficient appropriate audit evidence (IDW PS

314.30; ISA 540.14). For more details on the involvement of internal valuation specialists during the planning and performance of audit procedures, see section 3.6.

3.5.2 Control Testing

As a first step, control testing should consider whether the control is appropriately designed to address the respective risk and to ensure an effective and consistent performance of the control. To test the design, auditors should perform a corroborative inquiry of the personal involved supplemented by inspection of control documentation and/or observation of actual control performance. Based on different design factors they should perform the following audit procedures:[78]

- Ensure that the purpose of the control is appropriate and that it is sufficiently correlated with the risks of material misstatement that the control addresses. Each risk should be considered separately.
- Evaluate whether the control is appropriate with respect to the nature and significance of the risks of material misstatement that the control addresses. In particular, controls relating to more complex or subjective key assumptions of impairment tests should be sufficiently precise to be effective.
- Assess whether the personal involved possesses a sufficient level of expertise, experience, and authority. This is particularly relevant for key assumptions of impairment tests as they often require a higher level of expertise and experience.
- Determine whether the control is performed with an appropriate frequency and consistency. In general, controls which are performed routinely and consistently are more precise than controls which are performed sporadically and do not have clearly defined control procedures. Similarly, automated controls operate generally more consistently than manual controls.
- Ensure that the control has an appropriate level of aggregation and predictability. Controls are generally more precise if they are performed at a more detailed level and if their outcome is more predictable. Nevertheless, particularly the key assumptions of impairment tests might require a combination of controls at detailed level and at aggregated level to ensure that they are not only developed appropriately on an individual basis, but also reasonable and consistent with each other from an aggregated perspective.

[78] Important aspects that should be addressed when testing controls are derived from internal practical audit guides of a Big4 audit firm. Moreover, they consider the author's own thoughts and practical audit experience.

- Assess whether the control's criteria for investigation and its follow-up process are appropriate. In particular, assess whether thresholds for investigating deviations are appropriate in relation to materiality and whether exceptions as well as unusual or open items are timely and appropriately resolved. However, controls on impairment testing are often not standardized and it is often not possible to identify and evaluation specific deviations between actual and expected figures. Therefore, particularly for controls on key assumptions, evaluate how the control owner builds its expectation for values of key assumptions and which range of values is accepted as reasonable. Moreover, consider how potentially unreasonable values of key assumptions are challenged and how the control owner finally concludes on their reasonableness.
- Determine whether the control is dependent on other controls or information used in the control (IUC). If yes, ensure that the other controls are designed effectively and that there are effective controls addressing the accuracy and completeness of IUC.

The type and extent of audit procedures to test the implementation and particularly the operating effectiveness of the control is then based on the risk associated with the control. This risk is determined by the risk of material misstatement the control addresses as well as the design characteristics of the control. The implementation of the control is tested by considering whether the control was performed as designed for one example. Often, the implementation is tested in conjunction with the test of control design. If the audit approach is based on control reliance, the operating effectiveness has to be tested by evaluating the performance of the control for a (randomly selected) sample. The higher the control frequency and the higher the risk associated with the control, the larger the sample size. Particularly depending on the nature of the control, the evaluation of testing selections might be based on inspection of control documentation, re-performance of the control, or observation of the actual control performance. If the control is dependent on other controls and/or IUC, auditors also have to consider the implementation and effectiveness of these controls as well as the controls ensuring the completeness and accuracy of IUC.

With respect to controls addressing annual goodwill impairment testing, the frequency of controls might often be annual as well. Hence, testing their implementation might already provide sufficient audit evidence of their operating effectiveness. Moreover, the controls might often be management review controls. Management review controls refers to the review of reports, analyses, or other IUC to reach or evaluate a conclusion concerning financial information. The testing of these controls as outlined above should therefore provide

sufficient audit evidence concerning the input the controls rely on (data or information), the review activities performed by the reviewer including how the input is used, and the consistency of the control's output with the review activities.[79]

In the following, potential controls are assigned to the previously defined categories of specific risks. Depending on the individual processes of each firm including the use of IT systems, the implemented controls might differ substantially between different firms and some controls might simultaneously address several risks. Hence, the controls listed below are rather generic and have to be specified with respect to a firm's individual processes. This also implies that the identification and testing of relevant controls is generally a non-standardized and complex audit task requiring a sufficient level of audit experience and expertise. As significant risks of material misstatement might often refer to business and valuation assumptions, auditors might have a particular focus on controls addressing these risks. However, the following controls represent only examples. Usually, not all of these controls are implemented and relevant to the audit.

CGU definition:

- Re-consideration of the existing CGU structure or approval of any changes as part of
  - the regular reporting to operating decision makers.
  - the review of the annual impairment tests by middle management.
  - the review (and approval) of the annual impairment tests' results including their key assumptions by top management and/or supervisory board.

Goodwill allocation:

- Review of goodwill allocation as part of the review process for purchase price allocations.
- Review of goodwill de-recognition in case of disposals of operations.
- Regular review (e.g., quarterly) of (changes in) goodwill allocation by middle management, top management, and/or supervisory board.

[79] Important aspects that should be addressed when testing management review controls are derived from internal practical audit guides of a Big4 audit firm. Moreover, they consider the author's own thoughts and practical audit experience.

Valuation techniques:

- Re-consideration of (changes in) valuation techniques as part of
  - the review of the annual impairment tests by middle management.
  - the review (and approval) of the annual impairment tests' results including their key assumptions by top management and/or supervisory board.
- Re-performance or detailed review of the application of valuation techniques by second staff member (i.e., four-eye principle).
- Review of the application of valuation techniques as part of the review of annual impairment tests by middle management.

Carrying amount:

- Manual controls or automated IT controls ensuring the accuracy and completeness of the data basis (including a potential currency translation of goodwill).
- Re-performance or detailed review of the carrying amount determination including data basis by second staff member (i.e., four-eye principle).
- Review of the carrying amount determination (including a comparison of current and previous year's carrying amount) as part of the review of annual impairment tests by middle management.

Business assumptions:

1) Controls related to the forecasting process:

- Manual controls or automated IT controls ensuring the accuracy and completeness of the data used in the forecasting process.
- Guidance setting by top and/or middle management if budgets and forecasts are developed based on a bottom-up approach.
- Detailed review including appropriateness, feasibility and consistency checks at lowest aggregation level if budgets and forecasts are developed based on a top-down approach.
- Detailed review and challenge of budgets and forecasts by different departments involved in the forecasting process using internal and external supporting evidence.
- Retrospective analysis of the short- and long-term planning accuracy in order to identify any systematic bias in previous years' budgets and forecasts.
- Review of budgets/forecasts by middle management.
- Review (and approval) of budgets/forecasts by top management and/or supervisory board.

2) Controls related to the impairment testing process:

- Manual controls or automated IT controls ensuring the accuracy and completeness of the data basis underlying the business assumption.
- Review of business assumptions by departments responsible for the business planning.
- Detailed review of business assumptions by second staff member (i.e., four-eye principle).
- Performance and evaluation of a sensitivity analysis to appropriately address estimation uncertainties with respect to key business assumptions.
- Review of key business assumptions as part of
  - the review of the annual impairment tests by middle management.
  - the review (and approval) of the annual impairment tests' results including their key assumptions by top management and/or supervisory board.

Valuation assumptions:

- Manual controls or automated IT controls ensuring the accuracy and completeness of the data basis.
- Review of valuation assumptions by specific departments with valuation expertise.
- Detailed review of valuation assumptions by second staff member (i.e., four-eye principle).
- Performance and evaluation of a sensitivity analysis to appropriately address estimation uncertainties with respect to key valuation assumptions.
- Review of key valuation assumptions as part of
  - the review of the annual impairment tests by middle management.
  - the review (and approval) of the annual impairment tests' results including their key assumptions by top management and/or supervisory board.

Performance and evaluation of impairment tests

- Review of the performance and evaluation of the impairment tests by middle management.
- Review (and approval) of the annual impairment tests' results by top management and/or supervisory board.

If management uses the work of external valuation specialists:

- Review of the data provided to external valuation specialists.
- Review of external valuation specialists' work by top and/or middle management.

3.5.3 Substantial Testing

When auditing accounting estimates, auditors have to perform substantive audit procedures addressing the appropriateness, consistency, and accurate application of the valuation techniques as well as the appropriateness and reasonableness of the underlying key assumptions and information. Moreover, auditors might, e.g., compare the accounting estimate to an independent estimate (IDW PS 314.60; ISA 540.12-13). If auditors identified significant risks of material misstatement, the requirements for sufficient and appropriate audit evidence concerning the appropriateness and reasonableness of key assumptions as well as the accordance with the relevant accounting principles are particularly high. This also includes the management's intent and ability to take any plans relevant for the valuation (IDW PS 314.67, 69; ISA 540.15, 17b). Moreover, auditors have to evaluate whether the management considered alternative assumptions or estimates and whether the management's reaction to these estimation uncertainties is appropriate. If the reaction is not appropriate, it might be necessary to assess the reasonableness of the accounting estimate based on an independently developed range of reasonable valuations (IDW PS 314.67-68; ISA 540.15-16).

In the following, potential substantive audit procedures are listed.[80] It is important that procedures for impairment tests with positive headroom particularly provide audit evidence ensuring that the key assumptions are not overly optimistic. On the contrary, audit evidence for impaired CGUs should focus on both over- and understatement of goodwill. Some of the procedures might have already been addressed as part of the understanding of the process. Since most procedures (especially concerning the key assumptions) are relatively detailed, they might rather be used for audit strategy 2 and 3. For audit strategy 1, less detailed plausibility checks might be used. For example, it might often be sufficient to ensure that

- assessment date, CGU definition, goodwill allocation, and valuation model are consistent with other CGUs (if these CGUs are considered as sufficiently similar) and prior periods,
- the carrying amount is determined consistently with other CGUs (if these CGUs are considered as sufficiently similar) and based on balance sheet data extracted from the system,

[80] These potential substantive audit procedures consider the general requirements of IDW PS 314.35-69 and ISA 540.12-17, 21, A52-A115, A124-A125, the IFRS accounting requirements for goodwill impairment testing outlined in section 2, and aspects highlighted in internal practical audit guides of a Big4 audit firm. Moreover, they include the author's own thoughts and practical audit experience.

- business assumptions are consistent with the most recent budgets and forecasts approved by top management and considered as plausible (i.e., particularly not overly aggressive if impairment test indicates a positive headroom) based on the information obtained during the audit of other CGUs as well as the annual audit in general, and
- valuation assumptions are determined consistently with other CGUs (if these CGUs are considered as sufficiently similar) and considered as plausible with respect to the values used in prior periods as well as for other CGUs.

As part of the following list of more detailed audit procedures, it is highlighted which of these procedures are likely to be only used for audit strategy 3.

CGU definition:

- Based on the knowledge of the firm's organizational, operational, and reporting structure, assess whether the CGU definition or changes in the definition comply with the requirements of IAS 36 (see section 2.3.3). In particular, consider whether CGUs with allocated goodwill (1) have largely independent cash inflows, (2) represent the lowest level at which goodwill is monitored for internal management purposes, and (3) are not larger than an operating segment before aggregation.

Goodwill allocation:

- Evaluate whether newly acquired goodwill is appropriately allocated to CGUs in accordance with IAS 36 (see section 2.3.3.3). In particular, consider whether goodwill is allocated to CGUs based on the expected synergies and other benefits of the business combination.
- Consider whether there are any changes in the allocation of goodwill to CGUs and whether these re-allocations are justified and appropriate (see section 2.3.3.4). If the allocation is consistent, ensure that there are no circumstances (e.g., change in CGU structure) that require a change.
- Consider whether there were any disposals of CGUs or operations within CGUs. If yes, evaluate whether goodwill allocated to these CGUs is appropriately de-recognized (see section 2.2.3). In particular, consider whether goodwill is fully derecognized in case of a CGU disposal or whether goodwill is de-recognized based on the relative recoverable amounts of the operations within a CGU (or a more appropriate method).

Valuation techniques:

Auditors might typically involve internal valuation specialists to assist in performing the following audit procedures (see section 3.6).

- Evaluate whether the valuation techniques applied are appropriate with respect to the requirements of IAS 36 (value in use, see section 2.3.4.1) or IFRS 13 (fair value, see section 2.3.5), the CGUs' business model and current condition, as well as other general, industry-specific, or CGU-specific factors.
- Consider whether the valuation techniques are applied consistently. If there is a change, assess whether this change is appropriate (e.g., because it better or more reliably reflects the firm's recoverable amount).
- In case of fair value: Assess whether multiple valuation techniques are applied if useful and whether the weights assigned to these techniques are appropriate (see sections 2.3.5.1 and 2.3.5.2). If the valuation techniques yield a range of appropriate valuations, ensure that the most representative valuation is selected without management bias. If the resulting valuations substantially differ, evaluate the reasons for the differences and assess whether they have implications on the audit.
- Evaluate the valuation model for logical and mathematical accuracy.

Carrying amount:

- Test the CGU balance sheet data as of the assessment date for accuracy and completeness.
- Evaluate whether the carrying amount is determined in accordance with IAS 36 (see section 2.3.7). In particular, consider equivalence principle and working capital definition.
- Assess whether corporate assets which can be allocated on a reasonable and consistent basis are appropriately allocated to the CGUs (see section 2.3.7).
  (in case of complex allocation methods more relevant for audit strategy 3)
- Evaluate whether goodwill is appropriately grossed up if non-controlling interests exist and the firm does not apply the full goodwill method (see section 2.3.7).
- Ensure that the currency translation of goodwill is appropriate (see section 2.2.2).

Business assumptions:

- Foot, cross-foot, and re-calculate the budgets and forecasts used for impairment testing.
- Compare the budgets and forecasts used for impairment testing to the firm's most recent budgets and forecasts. Investigate and reconcile any inconsistencies and verify that the

budgets and forecasts are approved by top management. If there is a substantial timespan between forecasting and impairment testing, evaluate whether budgets and forecasts are still appropriate.

- Evaluate whether the CGUs' budgets and forecasts appropriately consider all cash outflows which are necessary to generate the cash inflows (see section 2.3.4.2.2). In particular, consider whether day-to-day servicing costs, an apportionment of overhead costs, CAPEX, and changes in working capital are appropriately included.
- Assess whether budgets and forecasts are based on historical financial information and agree that this information is carried forward completely and accurately.
- Determine whether any circumstances indicate that historical information might not be representative of future conditions or events. Evaluate the reasonableness of any adjustments that might have been made to historical data to reflect the effects of one-time events. Evaluate if any additional one-time adjustments should be made.
  (more relevant for audit strategy 3)
- Perform a retrospective analysis of planning accuracy to assess the reasonableness of the current budgets and forecasts (already discussed in section 3.4.1). Ensure that management appropriately reacted to any systematic bias. If budgets and forecasts are used as a motivational tool, ensure that business assumptions are appropriately adjusted.
  (more relevant for audit strategy 3)
- Perform inquiries with non-accounting personnel to gain further evidence concerning the appropriateness of key assumptions and the existence of a potential management bias.
  (more relevant for audit strategy 3)
- Challenge if budgets and forecasts are consistent with short- and long-term operating plans. Also assess management's historic and current intent and ability to take such plans.
- In case of value in use: Consider whether the cash flow projections meet the requirements of IAS 36 (see section 2.3.4.2). In particular, ensure that cash flows arising from future restructurings not yet committed to and future expansion investments are not included.
- In case of fair value: Consider whether the cash flow projections meet the requirements of IFRS 13 and whether the costs of disposal are reasonable and appropriately determined (see section 2.3.5). In particular, consider the fair value hierarchy and ensure that business assumptions are based on a market participant's perspective.

- Assess whether the key business assumptions are consistent with each other (e.g., revenue growth vs. gross profit margin and incremental working capital requirements, CAPEX vs. revenue growth, EBITDA margin, and depreciation rates).
- Challenge the key business assumptions by using internal evidence. Internal evidence might refer to historical firm performance or non-financial information like production capacities, employee headcount, distribution center structure, product mix, customer structure, or orders on hand. Moreover, it might, e.g., include management presentations, meeting minutes, or internal analyses of key business assumptions.
  (more relevant for audit strategy 3)
- Compare the key business assumptions with other internal schedules (e.g., used for management bonus scheme, calculation of deferred taxes on loss carryforwards, or asset impairment tests). Investigate and reconcile any inconsistencies.
  (more relevant for audit strategy 3)
- Challenge the key business assumptions by using external evidence. External evidence might refer to the general economic environment, industry information, peer group data, or analyst reports. Also consider whether external data is an appropriate indicator for the firm's future performance by assessing its historical correlation with the key assumptions.
  (more relevant for audit strategy 3)
- Challenge how any technological or recently enacted or proposed regulatory changes impact the key business assumptions.
- Compare the key business assumptions with information that has been communicated to investors, lenders, or analysts. Investigate and reconcile any inconsistencies.
  (more relevant for audit strategy 3)
- Ensure that the CGU is in a steady state after the planning period and that the perpetuity cash flow represents a sustainable long-term cash flow basis (i.e., also considering appropriate CAPEX and changes in net working capital, see section 2.3.4.2.3).
- Compare the key business assumptions to those of the previous year and assess whether they are plausible based on changes in market, industry, and firm/CGU conditions.
- Compare the key business assumptions between different CGUs and assess whether differences are consistent with the characteristics of these CGUs.
  (more relevant for audit strategy 3)

Valuation assumptions:

The testing of valuation assumptions depends on the valuation techniques used. Key valuation assumptions might typically be the CGU's market capitalization or valuation multiples in case of a market approach and long-term growth rate and WACC in case of an income approach. Auditors might typically involve internal valuation specialists to assist in performing audit procedures (see section 3.6).

1) General plausibility

- Compare the key valuation assumptions to those of the previous year and assess whether they are plausible based on changes in market, industry, and firm/CGU conditions.
- Compare the key valuation assumptions between different CGUs and assess whether differences are consistent with the characteristics of these CGUs.
- Evaluate whether there are indications of management bias.

2) CGU's market capitalization

- If the CGU's shares are traded on an active market, ensure that market capitalization as of the assessment date is used as fair value estimate (see section 2.3.5.3).

3) Valuation multiples

- Evaluate whether guideline firms or transactions are appropriately selected (i.e., relevance and completeness) and whether the set of guideline firms or transactions is sufficient for a reliable valuation (see section 2.3.5.3).
- Compare capital market inputs to external evidence. If statistical methods are used to process market data, ensure that these methods are applied correctly.
- Assess whether the determination of valuation multiples is appropriate based on the CGU characteristics and whether differences between CGU characteristics and guideline firms or transactions are appropriately considered. In case of recent guideline transactions, evaluate whether they are still relevant or whether they are appropriately adjusted (see section 2.3.5.3).
- If valuation multiples lead to a relatively large range of possible valuations, assess whether the fair value can be reliably determined and whether the application of other or multiple valuation techniques would be more appropriate.
- Ensure that the most representative valuation is selected without management bias.

- Compare the valuation multiples to independently developed valuation multiples. Evaluate any material differences.
  (more relevant for audit strategy 3)

4) Long-term growth rate

- Consider whether the long-term growth rate is appropriate. In particular, the long-term growth rate should generally only include growth effects related to CGU-specific inflation (see section 2.3.4.3).
- Compare current and/or previous years' long-term growth rate to growth rates disclosed by competitors. Evaluate any material differences.
  (more relevant for audit strategy 3)
- Compare the long-term growth rate to an independently developed growth rate. Evaluate any material differences.
  (more relevant for audit strategy 3)

5) WACC

- Evaluate whether the "built up" model to calculate the WACC is appropriate (see section 2.3.4.4.2).
- Ensure that the peer group is appropriately selected (i.e., relevance and completeness).
- Compare capital market inputs to external evidence. If statistical methods are used to process market data, ensure that these methods are applied correctly.
- Compare the WACC to independently developed WACC. Evaluate any material differences.
  (more relevant for audit strategy 3)

Performance and evaluation of impairment tests

- Consider whether the assessment date did change. If yes, ensure that this is justified and that the period between current and most recent impairment tests is less than 12 months.
- Perform or review plausibility checks of the CGU's recoverable amounts (e.g., use of CGU's market capitalization or multiples in case of discounted cash flow estimates, see section 2.3.6).
  (more relevant for audit strategy 3)

- Perform or review a comparison between the firm's market capitalization and the sum of all CGUs' recoverable amounts. Assess whether differences can be reasonably explained (see section 2.3.6).
- For critical impairment tests, consider to perform an independent valuation using either different (more reasonable) key assumptions or alternative valuation techniques.
  (more relevant for CGUs with audit strategy 3 or CGUs with material disagreements between management and auditor)

3.6 Involvement of Internal Valuation Specialists

Due to the complexity of the process to estimate accounting estimates or the valuation techniques applied, it might be necessary for auditors to involve specialists that possess the required expertise and experience. However, even when using the specialists work, they still have to gain a sufficient understanding of the key assumptions and methods in order to assess their appropriateness with respect to the knowledge about the firm and the audit evidence of other procedures performed during the audit (IDW PS 314.30; ISA 540.14, A96-101).

When auditing goodwill impairment tests, the involvement of internal valuation specialists might improve the effectiveness of the audit's planning and performance. However, it is important that auditors appropriately review the specialists' work and conclude on the specialists' findings. During the planning phase of the audit, specialists might help to understand the appropriateness of certain steps of the forecasting and impairment testing process, provide industry information, or perform specific analyses concerning key assumptions to improve the risk assessment procedures (e.g., sensitivity analysis, retrospective analysis, or trend analysis). Moreover, specialists should be involved when planning audit procedures they are supposed to perform. During the performance of the audit, internal valuation specialists might be typically involved in the performance of substantive audit procedures addressing valuation techniques and valuation assumptions (see section 3.6 for detailed procedures). However, they might also provide external data or specific analyses (e.g., a benchmarking of CGU key figures against economic, industry, or peer group data) which auditors need to perform audit procedures concerning the business assumptions.

3.7 Conclusion on Audit and Test of Disclosures

Based on the audit evidence obtained, auditors have to conclude whether their risk assessment and their audit procedures are appropriate to ensure a sufficient assurance level (IDW PS 261.85; ISA 330.26-27) and whether the accounting estimates are reasonable and consistent with the relevant accounting principles (IDW PS 314.79; ISA 540.18). Only if the resulting valuation in the financial statements does not lie within an acceptable range of valuations, auditors have to ask for a correction of the resulting misstatements. If the management does not correct the valuation, they have to assess the materiality of these misstatements (IDW PS 314.81; ISA 540.A116; ISA 450.8, 11). Moreover, auditors have to assess the influence of subsequent events that occurred after the balance sheet date, but before the completion of the audit (IDW PS 314.70; ISA 540.A66). With respect to the disclosures related to accounting estimates, auditors have to ensure that they are in accordance with the requirements of the relevant accounting principles. This also applies for voluntarily additional disclosures relevant to financial statement users in understanding the accounting estimates. In particular for significant risks, auditors also have to consider the adequacy of disclosures on estimation uncertainty. Additional disclosures or a more detailed description of circumstances relating to the estimation uncertainty might be required if, in light of the circumstances and facts involved, such information is necessary for financial statement users to assess accounting estimates (IDW PS 314.73-76; ISA 540.19-20, A120-A123). To finalize the audit, written representations from management have to be obtained stating whether management believes that significant assumptions used in making the accounting estimates are reasonable and whether it has the intent and ability to carry out specific courses relevant to these accounting estimates. Moreover, written representation might include management statements concerning appropriateness and consistency in the application of measurement processes (including valuation techniques), completeness and appropriateness of disclosures, or subsequent events influencing accounting estimates (IDW PS 314.77-78; ISA 540.22, A126).

With respect to the conclusion on goodwill impairment test audits, auditors might, e.g., have to re-consider whether their risk assessment including their assignment of audit strategies to specific CGUs is still appropriate if their audit procedures indicate a different headroom than previously calculated by management. For example, this could be due to application errors or inappropriate assumptions. Other reasons impacting the risk assessment might be that audit evidence revealed the existence of additional triggering events, a higher estimation uncertainty than previously expected, or an indication of management bias. Moreover, findings of

substantive audit procedures could indicate potential control deficiencies. With respect to management bias, auditors should particularly consider whether the management has the incentive and the opportunity to opportunistically influence the outcome of impairment tests, whether there is evidence of management override of controls, and therefore whether a fraudulent situation exists. Such situations lead to a significant increase in risk (Graf von Kanitz (2014, pp. 546-547)). If the risk assessment has to be adjusted, additional audit procedures or more persuasive audit evidence might be necessary.

After the conclusion on the sufficiency of their audit procedures, auditors have to assess whether the valuation of goodwill (and other fixed assets in case of an impairment loss) is reasonable. Hence, they have to assess whether the headrooms of impairment tests and the recognized impairment losses are reasonable. If the headrooms are unreasonable, auditors have to conclude whether the use of reasonable headrooms has an influence on the recognition of impairment losses and if yes, whether this influence is material. Moreover, auditors have to assess the impact of subsequent events on goodwill impairment tests as part of their regular subsequent events analysis and have to test the disclosures in the IFRS notes. The disclosures have to be consistent with the audit evidence obtained during the audit of impairment tests and they have to comply with the disclosure requirements of IAS 36. For details on these requirements, see the analysis in section 2.3.8. In particular, auditors should assess the completeness of disclosures and whether unspecified disclosure requirements (e.g., a description of key assumptions, a description of management's approach to determining the values assigned to these assumptions, a sensitivity analysis, or a description of events and circumstances that led to the recognition of an impairment loss) are adequately presented. Moreover, it should be considered whether additional information is necessary for financial statement users to assess appropriateness and outcome of goodwill impairment tests. Finally, auditors have to obtain a written representation from management. In most cases, it might be sufficient that management explicitly signs the individual goodwill impairment tests, thereby confirming that the impairment tests (including their key business and valuation assumptions) are reasonable and represent management's best estimate and that it has the intent and ability to carry out specific courses relevant to the underlying assumptions.

4 Literature Review

4.1 Overview and Research Contributions of the Research Paper

As an introduction to the three research papers in sections 5 to 7, this section provides a literature review on the different empirical research streams related to goodwill accounting and highlights the research papers' contributions. As depicted in Figure 6, the research streams are categorized by the different subjects of goodwill accounting: recognition of goodwill (including initial measurement), goodwill impairments testing (i.e., subsequent measurement), and disclosures. The main research contributions of the research papers are related to goodwill impairment testing.

Concerning the recognition of goodwill, it is possible to differentiate between the economic relevance of goodwill and the perception of goodwill as an asset by the capital market. The former research stream includes the relevance of goodwill in purchase price allocations and the financial reporting (i.e., financial key figures) as well as the predictive value of goodwill as an indicator for future firm performance. The latter research stream particularly refers to the value relevance of goodwill for investors. Since this subject is highly related to the value relevance of goodwill impairments, both are outlined together.

The research on goodwill impairment testing is particularly related to three aspects: Informativeness and reliability of goodwill impairments, usage of goodwill impairment testing as a device for earnings management, and capital market perception of goodwill impairments. Research concerning the informativeness and reliability of goodwill impairments includes the ability of goodwill impairments to predict future firm performance and to indicate a firm's investment opportunities. With respect to the usage of goodwill impairment testing as a device for earnings management, prior research examines whether impairment decisions are influenced by earnings management incentives and not only by economic determinants. Capital market research investigates whether capital market participants perceive goodwill impairments as value relevant and timely and whether goodwill impairments have information content, i.e., whether market reactions can be observed after the announcement of goodwill impairments.

The research on disclosures related to goodwill accounting is not related to the research papers of this dissertation and therefore is not covered by the literature review. For example, this research stream assesses the quality (and influence factors on the quality) of disclosures on annual impairment tests or business combinations including goodwill recognition.

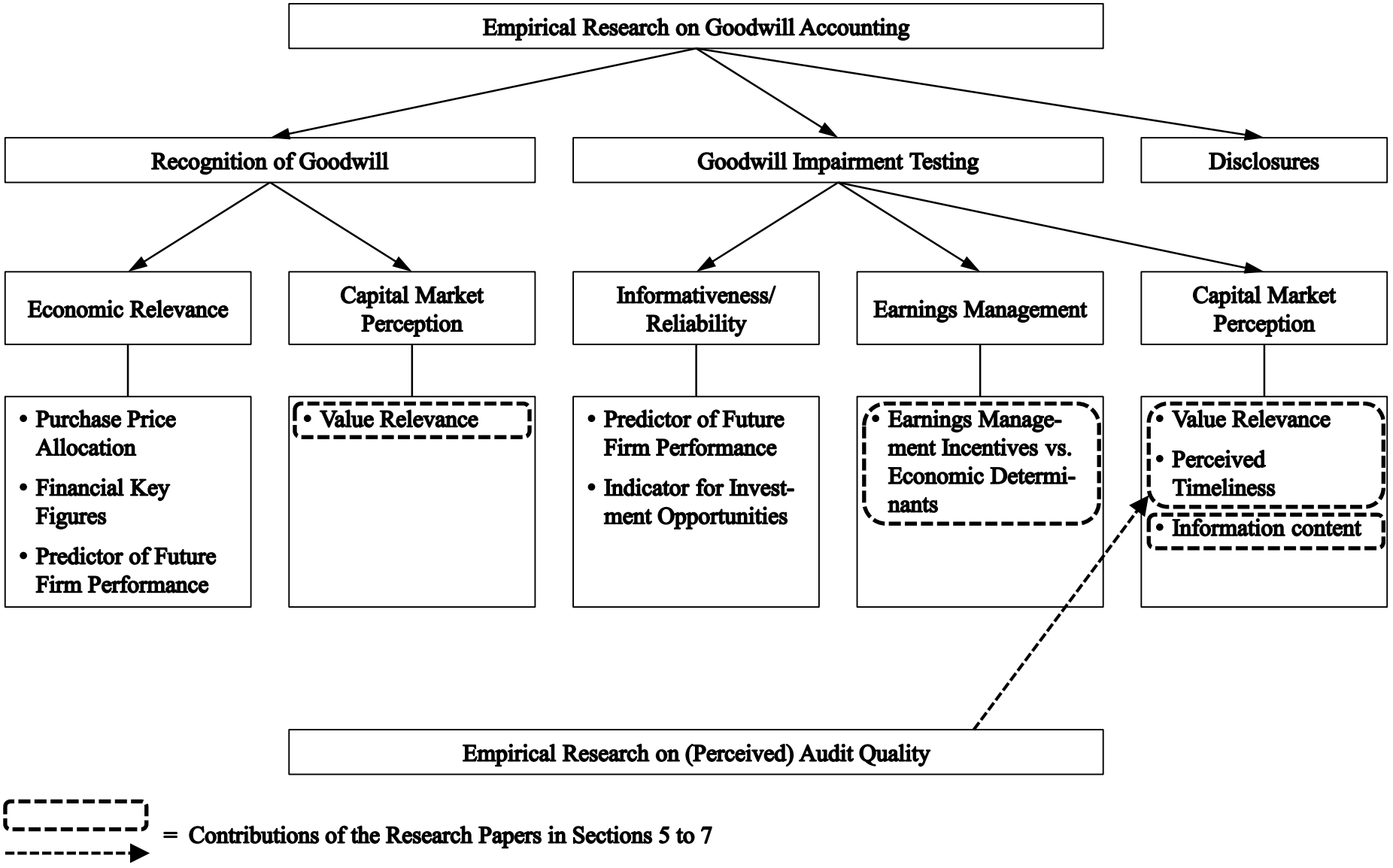

Figure 6: *Overview of empirical research on goodwill accounting and contributions of research papers*

Based on the overview of research streams, the literature review is organized as follows:

- Economic Relevance of Goodwill (Section 4.2)
- Informativeness and Reliability of Goodwill Impairments (Section 4.3)
- Influence of Earnings Management Incentives on Goodwill Impairments (Section 4.4)
- Capital Market Perception of Goodwill and Goodwill Impairments (Section 4.5)

The literature review also considers US studies to complement the evidence with respect to IFRS since US-GAAP also applies an impairment-only approach. However, the results might not be directly applicable as the impairment tests are not identical (see section 2.4.2). Moreover, prior research is often based on samples from Anglo-American countries (e.g., USA or UK). Hence, the results of these studies do not necessarily apply for the different institutional setting of continental European countries and more specifically for the German institutional setting (see sections 5.2.3 and 6.2.3 for a discussion of the institutional settings' influence on earnings management behavior as well as value relevance and perceived timeliness of goodwill impairments).

The three research papers in sections 5 to 7 contribute to the research on earnings management related to goodwill impairment testing and on the capital market perception of goodwill and goodwill impairments. Moreover, the second paper is the first to assess the link between perceived audit quality and perceived timeliness of goodwill impairments (see Figure 6). In the following, the individual papers' contributions are highlighted.

The first paper in section 5 – *Goodwill Impairment Tests as a Device for Earnings Management* – assesses whether the recognition of goodwill impairment losses in Germany is influenced by earnings management incentives. It contributes to the existing literature especially for two reasons. First, a study examining the influence of earnings management incentives on goodwill impairments in Germany as well as other continental European countries does not exist. Second, compared to previous studies, it includes general earnings management behavior not related to goodwill impairment accounting as an additional incentive variable. This helps to better specify the firms' earnings management incentives. See section 5 for more details.

The second paper in section 6 – *Goodwill Impairments - Value Relevance, Perceived Timeliness, and the Role of Auditors* – assesses whether goodwill impairments (and goodwill) are value relevant, whether goodwill impairments are perceived by the capital market as timely, and whether the perceived timeliness is mediated by auditor characteristics related to the

perceived quality of audits. It contributes to the existing literature especially for two reasons. First, a study examining the value relevance or perceived timeliness of goodwill impairments in Germany does not exist and evidence for other continental European countries is very limited. There is only one study assessing the value relevance for a sample of European firms (Laghi et al. (2013)) and one study addressing the value relevance and perceived timeliness of goodwill impairments in Sweden (Hamberg and Beisland (2014)). Second, the study is the first to evaluate the influence of auditor characteristics on the market perception of goodwill impairments. This provides additional insights on the perceived timeliness of impairment tests and complements the accounting literature on perceived audit quality. See section 6 for more details.

The third paper in section 7 – *Information Content of Goodwill Impairment Announcements* – assesses whether the announcements of goodwill impairments lead to a negative capital market reaction. Moreover, it investigates whether this effect is influenced by the management's provision of an external or internal reason explaining goodwill impairments. The study contributes to the existing literature since such an event study does not exist for the German capital market. With respect to European firms, there is only the study of Knauer and Wöhrmann (2016) encompassing the sample period 2005-2009. However, this study compares continental European countries with Anglo-American countries on an aggregate basis and not on individual country basis. See section 7 for more details.

4.2 Studies on the Economic Relevance of Goodwill

Studies relating to the economic relevance of goodwill acquired in business combinations are only shortly presented since they are not directly addressed by the research papers of this dissertation.

With respect to the relevance of goodwill in purchase price allocations, several studies show that a high proportion of acquisition costs of acquired targets is allocated to goodwill. For example, Glaum and Wyrwa (2011) consider 322 acquisitions of European firms in 2009 and find an average goodwill-to-acquisition cost ratio of 62 %, whereas Detzen and Zülch (2012) find a mean ratio of 60 % considering 123 acquisitions of European firms for the periods 2005 to 2008. Comparable results exist for the USA. Lys et al. (2012) use a sample of 2,123 acquisitions for the periods 2002 to 2006 and find a mean ratio of 40 %. Shalev et al. (2013) use a sample of 320 acquisitions for the periods 2001 to 2008 and find that goodwill accounts for 59 % of acquisition costs on average. Hence, these results indicate that goodwill might

have a high economic relevance for firms with acquisition activities. Nevertheless, it is possible that the relatively high goodwill ratios are also influenced by an over-allocation of acquisition costs to goodwill. In particular, the impairment-only approach might induce a management incentive to rather allocate acquisition costs to goodwill than to depreciable and amortizable assets in order to increase future earnings (if future goodwill impairments can be avoided). In this context, Detzen and Zülch (2012) and Shalev et al. (2013) show that managers with higher cash bonus intensity recognize more goodwill in relation to total acquisition costs. Since both studies control for economic determinants of goodwill, managers seem to opportunistically inflate goodwill balances if exposed to earnings-based bonuses.

Another method to analyze the relevance of goodwill is the descriptive analysis of financial key figures. With respect to German listed firms, all studies find that goodwill is an increasingly important asset and that the observed impairment rates are relatively low. This could either indicate that goodwill has a long useful life and is only sometimes consumed or that the impairment-only approach does not lead to a sufficient recognition of economically necessary impairment losses and therefore does not represent goodwill appropriately. Küting (2013) analyzes goodwill numbers of DAX, MDAX, SDAX, and TecDAX firms for the periods 2005 to 2012. He finds that goodwill increased by 78 % over this period and that the average goodwill represents between 8.7 % and 12.6 % of total assets or 33.5 % and 43.8 % of equity. For 11 of 134 firms in 2012, goodwill even exceeds equity. The impairment rate lies between 0.56 % and 3.39 % (overall average 1.87 %) indicating theoretical useful lives[81] between 29 and 179 years (53 years). Gundel et al. (2014) analyze the financial statements of 18 firms (DAX, MDAX, SDAX, TecDAX) with highest goodwill to equity ratios for the periods 2005 to 2012. Their findings highlight that reported goodwill, equity, and earnings numbers would substantially differ if a straight-line amortization over 10 years was applied. Moreover, 99 % of impairments are recognized by only 28 % of firms, and the theoretical useful life of 121 years seems unrealistic. Kümpel and Klopper (2014) analyze a sample of 25 DAX firms for the periods 2000 to 2011. They highlight that goodwill increased by 65 % from 2005 to 2011. This leads to a goodwill to total assets ratio of 17 % and a goodwill to equity ratio of almost 50 % in 2011. Moreover, they find that the impairment rate of 2 % (2005-2011) is substantially lower than the amortization rate of 7% (2000-2004). There are also other studies with results similar to these three studies: Leitner-Hanetseder and Rebhan (2012) using a DAX

[81] The theoretical useful life assumes that the impairment rate equals the first year linear depreciation. Hence, it is calculated as total goodwill before impairment divided by impairment loss.

sample for the periods 2002 to 2010, Rogler et al. (2012) with respect to DAX, MDAX, SDAX, and TecDAX firms for the periods 2008 to 2010, Wulf and Hartmann (2013) for a DAX sample covering the periods 2007 to 2011, and Dreesen (2013) analyzing SDAX firms for the periods 2007 to 2011.

As a third aspect of the economic relevance (and also reliability) of goodwill, some studies assess whether goodwill serves as a suitable indicator for future firm performance. Lee (2011) uses a sample of 14,202 observations from US firms during a pre-SFAS 142 (1996-1998) and post-SFAS 142 period (2002-2004). His findings suggest that goodwill is only positively related to one-year and two-year ahead cash flows after the introduction of the impairment-only approach (i.e., SFAS 142). Moreover, he does not find evidence that the predictive ability of goodwill is reduced for firms pre-disposed to manipulate goodwill numbers (i.e., either firms with high absolute discretionary accruals or firms with earnings exceeding an earnings target and goodwill which is likely impaired). Lys et al. (2012) (US study, see before) calculate the market return between announcement and completion of an acquisition and differentiate between acquisitions with expected economic profit and loss. They show that goodwill is only positively related to one-year and two-year ahead cash flows and EBITDAs if the acquisition has an expected economic profit. If it has an expected economic loss, the correlation is not or only weakly confirmed for one-year and two-year ahead performance, respectively. Moreover, they show that estimated "as-if" goodwill based on their calculation of expected economic profits and losses is a better predictor of future operating performance than actually recognized goodwill. Chalmers et al. (2012) investigate the ability of goodwill (and other intangible assets) to increase the accuracy of analysts' earnings forecasts for an Australian sample (n=1,885) for the periods 1993 to 2007 (i.e., before and after the adoption of IFRS in 2005).[82] With respect to recognized goodwill, they find that the positive association between goodwill and forecast accuracy becomes stronger after the introduction of IFRS (i.e., compared to the former amortization approach).

4.3 Studies on the Informativeness and Reliability of Goodwill Impairments

Studies relating to the informativeness and reliability of goodwill impairments are only shortly presented since they are not directly addressed by the research papers of this dissertation. They show that goodwill impairments are able to serve as a predictor of future firm

[82] Remark: This study could also be classified as a study of capital market perception. However, for the purpose of this literature review, it was considered to be more appropriately presented as a study assessing the ability of goodwill to predict future firm performance.

performance (Jarva (2009); Lee (2011); Li et al. (2011)) and to indicate a firm's investment opportunities (Godfrey and Koh (2009); Chalmers et al. (2011)).

Jarva (2009) examines whether goodwill impairments are related to future cash flows. He uses a sample of 327 observations from US firms with goodwill impairments for the periods 2002 to 2006. His findings suggest that only one-year and two-year ahead cash flows are significantly correlated with goodwill impairments, whereas the correlation with three-year ahead cash flows is insignificant. He therefore concludes that goodwill impairments lag behind their actual economic impairments. The study of Lee (2011) was already introduced in the previous section. Like for goodwill, he shows that goodwill charges are only negatively related to one-year and two-year ahead cash flows after the introduction of the impairment-only approach (i.e., goodwill impairments), whereas the correlation is even positive under the former amortization regime (i.e., mainly straight-line amortization plus less frequent trig-gered-based impairments).[83] Also similar to goodwill, he does not find evidence that the predictive ability of goodwill impairments is reduced for firms pre-disposed to manipulate goodwill numbers (i.e., either firms with high absolute discretionary accruals or firms with earnings exceeding an earnings target and goodwill which is likely impaired). After all, he therefore concludes that SFAS 142 improved the informativeness of goodwill accounting in terms of its ability to predict future cash flows. Li et al. (2011) also investigate the predictive character of goodwill impairments with respect to future firm performance in the USA for the periods 1996 to 2006 (n=1,584), but use the average growth in sales and operating income of the subsequent two years as (expected) performance proxy. Their results show that impair-ment losses are significantly negatively correlated with future 2-year sales growth and operating income. As the effect is stronger for the post-SFAS-142 period, they conclude that impairments under the impairment-only approach are more informative than impairments under the former amortization regime. As an additional test, they calculate expected impair-ments of firms with potentially impaired goodwill which do not report impairment losses. As they find expected impairments to be significantly negatively correlated with future perfor-mance, they argue that these firms might have opportunistically used their accounting discretion to postpone the recognition of impairment losses. Hence, the reliability of impair-ment testing might be an issue despite the significant correlation between impairments and future performance.

[83] As Lee (2011) is one of the few studies defining goodwill charges as negative numbers, the interpretation of coefficients had to be changed to simplify the comparability with other studies.

However, all three studies suffer from the problem that one-year or two-year ahead cash flows might not be a suitable proxy to measure the informativeness concerning (expected) future performance. In particular, impairment tests mainly dependent on long-term expected cash flows, i.e., it is unlikely that the main information conveyed is highly related to short-term cash flows. Moreover, goodwill impairments are based on CGU or RU level, whereas future cash flows are measured at firm level. Another issue might be that the research design of these studies is not able to sufficiently control for the influence of earnings management incentives. In fact, earnings management studies presented in section 4.4 generally show that goodwill impairments are indeed related to economic (and other) impairment factors, but are also influenced by earnings management incentives.

Godfrey and Koh (2009) examine whether goodwill impairments reflect firms‘ investment opportunities for a US sample of impairment firms for the periods 2002 to 2004 (n=575). They determine an investment opportunity set (IOS) factor by a factor analysis based on investment intensity, growth rate of market value of assets, market-to-book value of assets, research and development expenditures, market-to-book value of equity, and earnings-to-price ratio. Their results show that the amount of goodwill impairments is largely driven by investment opportunities and economic performance. Using a similar approach, Chalmers et al. (2011) come to the same conclusion for an Australian sample including both impairment and non-impairment firms for the periods 1999 to 2008 (n=4,310). Moreover, they show that investment opportunities are better reflected by IFRS impairments than prior Australian GAAP amortization charges. Both studies therefore conclude that the impairment-only approach enables management to better reflect firms' underlying economic attributes.

However, also these studies might suffer from the problem that it is not clear whether the IOS factor is able to adequately measure expectations on future long-term performance and that the research design of these studies is not able to sufficiently control for the influence of earnings management incentives. In particular, the IOS factor specifically addresses a firm's growth opportunities, which is not necessarily the only indicator for future firm performance.

4.4 Studies on the Influence of Earnings Management Incentives on Goodwill Impairments

The first research paper provides a brief overview of prior studies assessing whether the discretion in goodwill impairment accounting is used to engage in earnings management (section 5.3.1). The overview also includes studies addressing initial adoption impairments.

These goodwill impairments arising from the initial adoption of a new accounting standard differ from "normal" goodwill impairments. Depending on the respective GAAP, they are either charges to opening retained earnings (i.e., they are not included in net income) or earnings below the line (i.e., as effect of accounting changes below the net income from continuing operations). Hence, the results are not directly applicable because earnings management incentives might differ from "normal" impairments. The main characteristics and results of the studies are summarized at the end of this section (Table 2 for "normal" goodwill impairments and Table 3 for initial adoption impairments).[84] All of these studies show that several of the earnings management incentives tested have a significant influence on the recognition and/or the magnitude of goodwill impairments. For a more detailed discussion of the results with respect to the different earnings management incentives, see development of the earnings management hypotheses in section 5.3.2.

In the following, the studies of AbuGhazaleh et al. (2011), Stora (2013), Masters-Stout et al. (2008), and Ramanna and Watts (2012) are discussed in more detail since their relevance is considered as high for the research paper in section 5.[85]

Study of AbuGhazaleh et al. (2011)

AbuGhazaleh et al. (2011) examine whether the magnitude of reported goodwill impairments is influenced by earnings management incentives in the UK for the periods 2005 and 2006. They hypothesize that firms are more likely to report higher impairment amounts if they experienced a recent change in CEO or if they have abnormally high or low pre-impairment earnings compared to previous year's earnings (proxies for conservative smoothing and big bath accounting, respectively). With respect to a firm's leverage, they only predict that a correlation exists since they provide two competing arguments: On the one hand, highly leveraged firms might have an incentive to reduce impairment losses in order to avoid costly debt covenant violations. On the other hand, these firms might be under scrutiny from their debt holders, which could act as a disciplining device against opportunistic behavior. As an additional research question, they hypothesize that firms are more likely to report higher

[84] Another comparable research stream assesses the relation between fixed asset impairments and earnings management. However, the results are not directly applicable to goodwill impairments as they also refer to impairments of other intangibles and property, plant, and equipment. Hence, an important difference is that these assets are amortized and only tested for impairment if indications of impairment are identified, whereas goodwill is also subject to a mandatory annual impairment test. See section 5.3.1 providing a brief overview of these studies.

[85] The criteria to assess the relevance are subject (i.e., "normal" goodwill impairments), GAAP, institutional setting, and quality (using VHB-JOURQUAL3 ranking as proxy).

impairment amounts if they have stronger corporate governance mechanisms. However, this hypothesis might not necessarily be appropriate since it is only valid under the assumption that firms always have an incentive to avoid high impairment losses (when controlling for economic and other impairment factors as well as earnings management incentives).

In order to test their hypotheses, they use a sample of 528 observations from the Top 500 UK listed non-financial firms with positive goodwill balance and conduct a Tobit regression. The Tobit regression is used because the sample includes both impairment and non-impairment firm-years, i.e., the dependent variable (magnitude of goodwill impairment, *IMP_MAG*) is censored at zero. Their regression model has the following form:

$$IMP\_MAG = \beta_0 + \beta_1 CEO + \beta_2 Smooth + \beta_3 Bath + \beta_4 LEV + \boldsymbol{\beta_A CG} + \boldsymbol{\beta_X Controls} + \epsilon \quad (6)$$

As earnings management incentives variables, they use an indicator variable for the first two years of a new CEO (*CEO*), the pre-impairment change in earnings when this change is above (or below) the median of non-zero positive (negative) values of this variable for *Smooth* (*Bath*),[86] and the total debt to total assets ratio (*LEV*). As variables for corporate governance mechanisms (vector ***CG***), they use the share of independent non-executive directors, an indicator variable for a separation of chairman and CEO, the number of board meetings, the percentage of common shares held by blockholders, the percentage of common shares held by executive directors, and the percentage of common shares held by non-executive directors. As control variables for economic and other impairment factors, they use the pre-impairment book-to-market ratio, the pre-impairment goodwill balance, an indicator variable if the firm has more than one CGU, the change in revenues, the change in operating cash flow, and the pre-tax profit. Moreover, they include an indicator variable for firms with newly acquired goodwill, an indicator variable for US listings, the logarithm of lagged total assets to measure firm size, and year dummies. Most continuous variables are deflated by lagged total assets.

The regression results indicate that firms with recent CEO changes as well as firms that are assumed to have incentives for big bath accounting and conservative smoothing report significantly higher impairments. With respect to leverage, the results are insignificant. This is interpreted by the authors as an indication that there exist less information asymmetries between managers and (predominantly) private lenders in the UK compared to the USA and Canada (where prior literature confirmed a significant negative relation), and therefore fewer

[86] The definition of *Smooth* and *Bath* is based on Riedl (2004).

earnings management incentives. Moreover, the results show that all measures of stronger corporate governance mechanisms (except for the separation of chairman and CEO) are significantly positively related to the magnitude of reported impairment losses. As strong corporate governance is assumed to constrain opportunism, the authors conclude that "managers are more likely to be exercising their accounting discretion to convey their private information and expectations about the underlying performance of the firm than to be acting opportunistically". The authors support this interpretation by an additional analysis using interaction variables between earnings management incentives and a factor variable for strong corporate governance. They show that firms seem to report even higher impairments in case of CEO changes or incentives for conservative smoothing and big bath accounting if they are subject to strong corporate governance. However, it seems unclear whether such an interpretation of the results is necessarily appropriate. In particular, the main results indicate an influence of earnings management incentives on goodwill impairments and it is not clear what the positive influence of strong corporate governance on impairment losses actually means (see remark on hypothesis). Moreover, the coefficients of the earnings management variables remain significant when including interaction terms and the interpretation of the interaction terms is only valid under the assumption that strong corporate governance actually ensures appropriate impairment testing. Hence, an alternative conclusion could be that strong corporate governance is not able to constrain earnings management.

Study of Stora (2013)

Stora (2013) evaluates whether earnings management incentives related to earnings targets influence firms' goodwill impairment accounting behavior using a main sample of 19,846 IFRS observations from worldwide listed non-financial firms for the periods 2005 to 2010. More specifically, he hypothesizes that firms with pre-impairment earnings that barely exceed an earnings target manage earnings upwards through goodwill impairment accounting (i.e., report impairments below their fair amount), whereas firms with pre-impairment earnings that clearly exceed or miss an earnings target manage earnings downwards (i.e., report impairments above their fair amount).

In order to test the first hypothesis, he applies a distributional approach to identify firms barely exceeding an earnings target (either zero earnings or previous year's earnings). Using

an interval width of 0.005,[87] all firms with pre-impairment earnings in the +1 interval with respect to an earnings target are considered as treatment group firms and all firms in the +2 to +5 intervals represent the control group. Based on the following logistic regression models, he tests whether treatment group firms (*Interval*_1) are more likely to avoid goodwill impairment losses (*IMP*) and to stay in the same earnings distribution interval (*STAY*).

$$Prob(IMP) = \frac{1}{1+e^{-Z}} \;\; where\; Z = \beta_0 + \beta_1 Interval\_1 + \boldsymbol{\beta_X Controls} + \epsilon \tag{7}$$

$$Prob(STAY) = \frac{1}{1+e^{-Z}} \;\; where\; Z = \beta_0 + \beta_1 Interval\_1 + \boldsymbol{\beta_X Controls} + \epsilon \tag{8}$$

As control variables for economic and other impairment factors, Stora uses the pre-impairment book-to-market ratio, the pre-impairment goodwill balance, the change in revenues, the change in total cash flow, the logarithm of lagged total assets to measure firm size, industry dummies, and year dummies. Most continuous variables are deflated by lagged total assets. The results confirm the hypothesis, i.e., treatment group firms are significantly more likely to avoid impairments and to stay in the same interval (with respect to both earnings targets). However, Stora assumes that treatment and control group firms "are close to each other in the pre-impairment distribution" and therefore "are likely to record goodwill impairment losses of similar magnitudes". This assumption must not be true as the likelihood and magnitude of impairment losses is also associated with other, probably even more important economic and other factors. Hence, a matched-sample approach might be more reliable. Moreover, the definition of the control group does not consider other earnings management incentives like changes in senior management or a different earnings target than the one used.

In order to test hypotheses two and three, Stora defines the incentive variables for conservative smoothing and big bath accounting similar to AbuGhazaleh et al. (2011) as the change in the respective earnings metric (either pre-impairment earnings or pre-impairment change in earnings) when this change is above (or below) the median of non-zero positive (negative) values of this variable. All observations that do not meet one of the two criteria are considered as control group. Based on a logistic regression (using the full sample) and a linear regression (using a sample of impairment firms only), he then tests whether firms subject to these

[87] While it would be more appropriate to calculate the interval widths using a formula provided by prior literature, Stora (2013) provides evidence that the calculated interval widths do not substantially differ and that the regression results are insensitive to a change in interval width definition.

earnings management incentives are less likely to avoid goodwill impairments (*IMP*) and report higher impairment magnitudes (*IMP_MAG*).

$$Prob(IMP) = \frac{1}{1 + e^{-Z}} \;\; where\; Z = \beta_0 + \beta_1 Smooth + \beta_2 Bath + \boldsymbol{\beta_X Controls} + \epsilon \qquad (9)$$

$$IMP\_MAG = \beta_0 + \beta_1 Smooth + \beta_2 Bath + \boldsymbol{\beta_X Controls} + \epsilon \qquad (10)$$

As additional control variable, he includes the same earnings metric which is used to measure *Smooth* and *Bath*, i.e., either pre-impairment earnings or pre-impairment change in earnings.[88] The results show that firms clearly exceeding the zero earnings target (*Smooth*) are more likely to report goodwill impairments and report higher impairment magnitudes, whereas the coefficients for firms clearly missing this target (*Bath*) are not significant. With respect to the previous year earnings target, *Bath* indicates a significantly higher likelihood and magnitude of impairments, whereas *Smooth* is only significant with respect to the magnitude of impairments. Hence, Stora concludes that there is an indication for conservative smoothing and big bath accounting with respect to both recognition and magnitude of goodwill impairments. However, he does not consider both earnings targets (or other incentives like changes in senior management) simultaneously, i.e., the testing approach could lead to conflicting situations with respect to earnings management incentives. This could bias the results. Moreover, it would be more appropriate if the study controlled for differences in institutional settings (e.g., Anglo-American vs. continental European countries).[89]

Study of Masters-Stout et al. (2008)

Masters-Stout et al. (2008) investigate the relationship between CEO tenure and goodwill impairments in the USA for the periods 2003 to 2005. Their main hypothesis assumes that newer CEOs recognize higher impairment losses than their senior counterparts ("cleaning the decks" strategy). As a second hypothesis, they differentiate between types of new CEOs and assume that externally hired CEOs impair more goodwill than internally promoted CEOs.

To test their hypotheses, they use a sample of 990 observations from Forbes 500 listed firms with positive goodwill balance and conduct the following linear regression model:

[88] Following Riedl (2004), including the respective earnings metric allows *Smooth* and *Bath* to capture only the incremental effect of the earnings management incentives.

[89] As a robustness check, Stora (2013) includes dummy variables for each country. However, this approach does not sufficiently address the issue of different institutional settings and especially the influence of these settings on the firms' earnings management behavior (i.e., interaction with earnings management incentives).

$$IMP\_MAG = \beta_0 + \beta_1 CEO\_EXT + \beta_2 CEO\_INT + \boldsymbol{\beta_X Controls} + \epsilon \quad (11)$$

Using indicator variables, CEOs are considered as new if they became CEO within the last two years. Moreover, new CEOs are considered as external hires if they have been with the companies for less than three years before becoming CEO. As control variables for economic and other impairment factors, they use the pre-impairment goodwill balance, the pre-impairment net income, and an indicator variable for firms with a pre-impairment loss. Moreover, they include an interaction term between new CEOs (i.e., external and internal) and net income. The magnitude of impairments is deflated by either total assets or revenues, or not deflated at all. Goodwill balance and net income are not deflated, which is inconsistent if impairments are deflated and therefore might bias the results.

Their findings show that more goodwill is impaired within the first two years of a new CEO and that the level of net income is more relevant for new CEOs. This leads to the conclusion that accounting requirements are applied differently and that this is an indication of earnings management. Moreover, they do not find evidence that there exists a difference between external and internal CEO turnover. With respect to the research design, one might criticize that using a Tobit regression instead of a linear regression would be more appropriate since the sample also includes observations without goodwill impairments. When testing a sample of impairment firms only as a robustness check, the results for external hires are mixed and for internal promotion are non-significant. Moreover, several important control variables for economic and other impairment factors are missing (e.g., pre-impairment book-to-market ratio) and non-deflating of included variables seems to be an issue. Hence, the results might be biased and therefore should be interpreted with caution.

Study of Ramanna and Watts (2012)

Ramanna and Watts (2012) investigate determinants of goodwill impairments in the USA for the periods 2003 to 2006. In particular, they hypothesize that positive private information of managers on future cash flows, earnings management incentives predicted by agency theory (contracting, reputation, and valuation motives), and financial characteristics indicating reporting flexibility have a significant influence on the magnitude of goodwill impairments in situations when goodwill is likely impaired.

To test their hypotheses, they use a sample of 124 observations from listed firms whose goodwill is likely impaired. Goodwill is expected to be likely impaired if the pre-impairment market-to-book ratio turned from greater than one into less than one for two subsequent years.

However, it seems at least questionable whether the sample selection is actually successful since 86 out of 124 observations do not report an impairment loss and not all of these firms might have an incentive and the possibility to opportunistically avoid an impairment. After selecting the sample, Ramanna and Watts perform the following linear regression:[90]

$$\begin{aligned} IMP\_MAG = \beta_0 &+ \boldsymbol{\beta_A Private\_Information} + \boldsymbol{\beta_B Reputation\_Motives} \\ &+ \boldsymbol{\beta_C Contracting\_Motives} + \boldsymbol{\beta_D Valuation\_Motives} \\ &+ \boldsymbol{\beta_E Reporting\_Flexibility} + \boldsymbol{\beta_X Controls} + \epsilon \end{aligned} \tag{12}$$

They do not find evidence that managers with positive private information (measured by firms with either positive net share repurchases or net insider buying and firms with positive 1-year-ahead stock returns) report smaller goodwill impairments, i.e., no evidence that positive private information on future cash flows is conveyed by management. With respect to reputation motives, they find that firms with longer CEO tenure report significantly smaller goodwill impairments. Concerning contracting motives, their results indicate that higher CEO cash bonuses and higher leverage (if the firm has accounting-based debt covenants) lead to significantly higher impairment losses, whereas listings on stock exchanges with accounting-based delisting requirements do not have a significant influence. As proxy for valuation motives, they use the earnings response coefficient (i.e., a proxy for the capitalization of earnings in returns), but do not find a significant influence on impairment recognition. With respect to the reporting flexibility, they find that a higher number of segments which are more equally distributed leads to significantly smaller impairments.[91] As control variables, they use the number of quarters in the current year with a book-to-market ratio exceeding one, the pre-impairment goodwill balance, the current year's stock return, and the logarithm of lagged total assets to measure firm size. However, when interpreting the results, it should be considered that they are only valid under the relatively strict sample selection criteria. Moreover, the sample size is comparably small.

[90] Since Ramanna and Watts (2012) assume that most of the sample firms should have the necessity to report an impairment loss, the dependent variable is assumed to be mainly uncensored (i.e., the issue of restricting the outcome of impairment testing to zero is less prevailing). Hence, a linear regression instead of a Tobit regression seems to be less problematic than for other samples.

[91] Ramanna and Watts (2012) also include a variable to measure unverifiable net assets whose fair value has to be estimated when conducting the second step of impairment testing under US-GAAP (see section 2.4.2). However, this is not relevant for impairment testing under IFRS.

Table 2: *Overview of studies addressing the influence of earnings management incentives on "normal" goodwill impairments*

Author (Year)	GAAP	Country (Period)	Sample Characteristics	Research Design	Main Results
AbuGhazaleh et al. (2011)	IFRS	UK (2005-2006)	528 observations from the Top 500 UK listed non-financial firms with positive goodwill balance	Tobit regression	Firms with CEO changes as well as abnormally low or high pre-impairment earnings compared to the previous year (proxies for big bath accounting and conservative smoothing, respectively) report significantly higher impairments. Leverage (as a proxy for the degree of debt covenant slack) is not significantly associated with goodwill impairments. Effective corporate governance mechanisms (mainly measured by Board of Directors characteristics) lead to significantly higher goodwill impairments.
Stora (2013)	IFRS	Worldwide (2005-2010)	19,846 observations from listed non-financial firms with positive goodwill balance	Distributional Approach Logistic regression Linear regression (OLS)	Firms are less likely to report goodwill impairment losses if their earnings just exceed zero earnings or previous year's earnings compared to firms that are less threatened to fall below the respective earnings target. Firms clearly exceeding or falling short of one of these targets are more likely to report (higher) impairment losses.
Jordan and Clark (2004); Jordan et al. (2007)	US-GAAP	USA (2002; 2002-2004)	100 / 600 observations from Fortune 200 listed firms	Logistic regression	Impairment firms show significantly lower ROA and ROS than non-impairment firms for the periods 2002 and 2002 to 2004, respectively, and ROA is negatively correlated with impairment losses. Authors suggest that these firms take a big bath when earnings are already depressed. However, they do not control for other important influence factors and earnings management incentives, i.e., the relation between performance and impairments could rather be economically justified than motivated by earnings management incentives.
Masters-Stout et al. (2008)	US-GAAP	USA (2003-2005)	990 observations from Forbes 500 listed firms with positive goodwill balance	Linear regression (OLS)	Firms with new CEOs (i.e., first 2 years) recognize significantly higher goodwill impairments than firms with longer CEO tenure. No evidence for a significant difference between internally promoted and externally hired CEOs.

Ramanna and Watts (2012)	US-GAAP	USA (2003-2006)	124 observations from listed firms whose goodwill is likely impaired Goodwill is expected to be likely impaired if the per-impairment market-to-book ratio turns from greater than one into less than one for two subsequent years.	Linear regression (OLS)	No evidence that managers with positive private information (measured by firms with either positive net share repurchases or net insider buying and firms with positive 1-year-ahead stock returns) report smaller goodwill impairments, i.e., no evidence that positive private information on future cash flows is conveyed by management. Firms with longer CEO tenure, higher CEO cash bonuses, and higher leverage (if the firm has accounting-based debt covenants) report significantly smaller goodwill impairments. No significant impact of listings on stock exchanges with accounting-based delisting requirements and valuation motives (measured by earnings response coefficient) on impairment recognition.

Table 3: *Overview of studies addressing the influence of earnings management incentives on initial adoption goodwill impairments*

Author (Year)	GAAP	Country (Period)	Sample Characteristics	Research Design	Main Results
Hamberg et al. (2011)	IFRS	Sweden (2004)	180 observations from listed firms with positive goodwill balance	Probit regression	Firms with CEO tenure of five or more years are less likely to report initial adoption impairments. Earnings-based management compensation and leverage (as a proxy for the degree of debt covenant slack) do not have a significant influence on the recognition of initial adoption impairments.
Beatty and Weber (2006)	US-GAAP	USA (2002)	176 observations from listed firms whose goodwill is likely impaired Goodwill is expected to be likely impaired if the difference between market and book value of equity is less than goodwill.	Probit regression Censored regression	Initial adoption impairments are less likely and lower if CEO tenure is longer and if bonus plans include special items (i.e., also effects of accounting changes). Debt covenants only have a negative influence on initial adoption impairments if accounting changes are explicitly included. Listings on stock exchanges with accounting-based delisting requirements lead to reduced initial adoption impairments. Valuation motives (measured by earnings response coefficient) only lead to more and higher initial adoption impairments (in order to mitigate future impairments "above the line") if firm risk is higher (measured by standard deviation of previous year's daily stock returns).
Lapointe-Antunes et al. (2008)	Canadian GAAP (quasi US-GAAP)	Canada (2002)	345 observations from listed firms with positive goodwill balance	Tobit regression	CEO changes increase initial adoption impairments. A leverage higher than industry mean (as a proxy for the degree of debt covenant slack) and a subsequent issue of new equity or debt capital leads to smaller initial adoption impairments. Management compensation only has a significant negative influence if there are unrealized gains on exercisable stock options, whereas bonus payments do not have an impact on initial adoption impairments.
Zang (2008)	US-GAAP	USA (2002)	870 observations from listed firms with goodwill > 5 % of total assets	Tobit regression	CEO changes have a positive and leverage has a negative influence on the magnitude of initial adoption impairment losses.

4.5 Studies on the Capital Market Perception of Goodwill and Goodwill Impairments

4.5.1 Value Relevance of Goodwill and Goodwill Impairments

The second research paper provides a brief overview of prior studies assessing the value relevance of goodwill and/or goodwill impairments (section 6.3.1). The overview also includes one study (Lapointe-Antunes et al. (2009)) addressing initial adoption impairments, i.e., the results are not directly applicable to "normal" impairments (see section 4.4). The main characteristics and results of the studies are summarized in Table 4 at the end of this section. All of these studies use a commonly used empirical version of the Ohlson (1995) model based on per share values: the price-level model. This model expresses the market value of equity as a linear function of the book value of equity and earnings. All variables are scaled by the number of common shares outstanding. Moreover, goodwill is separated from the book value of equity and goodwill impairments are separated from earnings as these are the variables of interest (see section 6.4.2.1 for more details). The studies mostly show that goodwill and/or goodwill impairments are value relevant. Moreover, some studies also address differences between the IFRS impairment-only approach and the former local GAAP amortization regimes and find evidence that IFRS numbers provide incremental useful information.

In the following, the studies of AbuGhazaleh et al. (2012), Amel-Zadeh et al. (2013), Laghi et al. (2013), and Hamberg and Beisland (2014) are discussed in more detail since their relevance is considered as high for the research paper in section 6.[92]

Study of AbuGhazaleh et al. (2012)

AbuGhazaleh et al. (2012) examine the value relevance of goodwill and goodwill impairments in the UK for the periods 2005 and 2006. Their sample comprises 528 observations from the Top 500 UK listed non-financial firms with positive goodwill balance, i.e., impairment and non-impairment firms. They use a price-level model with share prices as of December 31 and therefore at the end of the reporting period. However, this approach could induce a bias in the results since financial information is not publicly available at this point of time. Hence, it cannot be processed by capital market participants and therefore cannot be included in share prices.

[92] The criteria to assess the relevance are subject (i.e., "normal" goodwill impairments), GAAP, institutional setting, and quality (using VHB-JOURQUAL3 ranking as proxy).

Their results confirm that both goodwill and goodwill impairments are indeed value relevant, i.e., positively associated with share prices. However, they do not perform any robustness checks to verify the validity of the results.

Study of Amel-Zadeh et al. (2013)

Amel-Zadeh et al. (2013) also perform a value relevance study in the UK using a sample of 4,052 observations from listed non-financial firms for the periods 1997 to 2011, i.e., they include both IFRS (2005-2011) and former UK GAAP amortization regime (1997-2004). They also apply a price-level model, but use share prices five months after the end of the reporting period. Moreover, they differentiate between goodwill acquired during the current year and previously acquired goodwill and control for firm-fixed and year-fixed effects.

Their results indicate that goodwill is generally value relevant, but recently acquired goodwill is more value relevant than accumulated goodwill acquired in previous years. Contrary to amortization charges under UK GAAP, which are not significantly correlated with share prices, they find goodwill impairments to be value relevant. When differentiating between profit and loss firm, the results remain unchanged and there is no significant difference between the value relevance of profit and loss firms. However, the study suffers from the general problem that UK GAAP allowed (under certain conditions) to apply the pooling-of-interests instead of the acquisition method (i.e., no recognition of goodwill). Moreover, it allowed to immediately write-off goodwill against reserves until 1998 (adopted by 98 % of the sample firms in 1997). Hence, goodwill and amortization charges are very small in the first sample years (which is confirmed by the descriptive statistics), which could also be a reason for the insignificant results with respect to the value relevance of amortization.

As an additional analysis, Amel-Zadeh et al. perform a differences-in-differences (DID) approach comparing main market firms (which were required to adopt IFRS in 2005) with a benchmark sample of alternative investment market firms (which were only required to adopt IFRS in 2007) for the periods 2002 to 2006. In order to increase the comparability of the different firms, they use a propensity score matched sample based on market value of equity and goodwill. With respect to goodwill, they find a positive DID term for IFRS numbers, which is interpreted as a sign that investors value more detailed information concerning goodwill disclosed under IFRS. For goodwill impairments, the DID term indicated a reduction in value relevance. As an explanation, the authors argue that the impairment test under

UK GAAP[93] was more stringent and therefore perceived as more reliable. However, the authors also state that the results should be interpreted with caution since impairments were relatively scarce due to positive economic conditions. Moreover, insufficient matching of relevant firm characteristics between treatment and benchmark sample could be an issue (e.g., main market firms are generally larger and subject to stronger public control than alternative investment market firms).

Study of Laghi et al. (2013)

Laghi et al. (2013) examine the value relevance of goodwill and goodwill impairments for the periods 2008 to 2011. As main sample, they use 835 observations from listed firms (UK, France, Germany, Italy, Portugal, Spain) reporting a goodwill impairment loss. They also perform a price-level model, but use share prices four months after the end of the reporting period. Moreover, they introduce an additional control variable to account for differences in country risks also influencing stock prices: the market price of credit default swaps with a maturity of five years. In order to test the validity of their model for observations in their sample period, they also build a UK sample based on the main criteria used by AbuGhazaleh et al. (2012). Hence, this sample also includes non-impairment firms. The findings are similar.

Their main results confirm other studies, i.e., goodwill and goodwill impairments are value relevant. In additional tests, they find that the coefficients of goodwill impairment losses are only significant for non-financial firms, firms writing off less than 5 % of goodwill, observations during the financial crisis (2008-2009), and firms stemming from France. However, these additional findings should be interpreted with caution since particularly the year and country specific regressions have relatively small sample sizes. Moreover, the research design might generally suffer from the fact that only impairment firms are considered. Hence, results might be biased since also zero impairments could contain value relevant (positive) information, i.e., it can be value relevant whether a firm reports an impairment loss or not. This concern is supported by the fact that goodwill and goodwill impairments are not value relevant for UK firms using the split main sample, whereas the sample assessing the model's validity yields significant results for both variables.

[93] UK GAAP implemented goodwill impairment tests either as additional (less regular) tests when using the amortization approach or as regular tests when choosing the option to use the impairment-only approach. However, the impairment-only approach was rarely applied (Amel-Zadeh et al. (2013, p. 8)). Hence, UK GAAP predominantly represents an amortization regime with additional impairment tests.

Study of Hamberg and Beisland (2014)

Hamberg and Beisland (2014) perform a value relevance study in Sweden using a sample of 2,052 observations from listed non-financial firms with positive goodwill balance for the periods 2001 to 2010. Hence, the sample includes both IFRS (2005-2010) and former Swedish GAAP amortization regime (2001-2004). They also apply a price-level model, but use share prices three months after the end of the reporting period.

Their results indicate that goodwill is value relevant and that there is no difference in value relevance between Swedish GAAP and IFRS. With respect to Swedish GAAP, they do not find a significant correlation of amortization charges with share prices, but goodwill impairments based on triggering events are value relevant. However, it is possible that the insignificant results of amortization charges are due to the fact that goodwill was amortized over a too short and therefore economically unrealistic period. During the sample period, the useful life was generally five to ten years (Hamberg and Beisland (2014, p. 60)). With respect to goodwill impairments under IFRS, the results do not confirm value relevance. The authors suggest different explanations. Goodwill impairment tests under IFRS might be more in the focus of opportunistic earnings management, thereby reducing the value relevance. Moreover, additional impairment losses based on triggering events under Swedish GAAP might be a stronger signal of value reduction than "regular" impairments under the IFRS impairment-only approach. However, one shortcoming of the study is that it does not differentiate between profit and loss firms when looking at the value relevance of impairment losses. This would provide further insights based on more differentiated results.

Table 4: *Overview of studies addressing the value relevance of goodwill and/or goodwill impairments*

Author (Year)	GAAP	Country (Period)	Sample Characteristics	Research Design	Main Results
Chalmers et al. (2008)	IFRS, Australian GAAP	Australia (2004)	599 observations from listed firms with either positive goodwill or positive other intangibles balance One-year sample just before the adoption of IFRS, extraction of Australian GAAP numbers and restated IFRS numbers from financial statements	Value relevance study based on Ohlson model Comparison between Australian GAAP numbers and restated IFRS numbers at the same point in time	Goodwill is value relevant in both regimes. However, IFRS numbers provide incremental useful information compared to the former Australian amortization approach (i.e., increased value relevance).
Aharony et al. (2010)	IFRS, local GAAP	Europe (2004-2005)	Two samples with 2,298 observations each from listed non-financial firms (14 European countries) First sample covers the pre IFRS adoption year (2004), second sample covers the IFRS adoption year (2005)	Value relevance study based on Ohlson model Return model based on Easton's approach	Goodwill and change in goodwill is value relevant for all countries in the adoption year, whereas the results are mixed in the pre-adoption year. The incremental value relevance from switching to IFRS is greater for countries where local GAAP strongly differs from IFRS.
Oliveira et al. (2010)	IFRS, Portuguese GAAP	Portugal (1998-2008)	354 observations from listed firms with either positive goodwill or positive other intangibles balance Years 1998-2004 cover Portuguese GAAP, years 2005-2008 cover IFRS	Value relevance study based on Ohlson model	Goodwill is value relevant in both regimes. However, IFRS numbers provide incremental useful information compared to the former Australian amortization approach (i.e., increased value relevance).
AbuGhazaleh et al. (2012)	IFRS	UK (2005-2006)	528 observations from the Top 500 UK listed non-financial firms with positive goodwill balance	Value relevance study based on Ohlson model	Goodwill and goodwill impairments are value relevant.
Amel-Zadeh et al. (2013)	IFRS, UK GAAP	UK (1997-2011)	4,052 observations from listed non-financial firms Years 1997-2004 cover UK GAAP, years 2005-2011 cover IFRS	Value relevance study based on Ohlson model	Goodwill is generally value relevant, but recently acquired goodwill is more value relevant than accumulated goodwill acquired in previous years. Goodwill impairments are value relevant, whereas amortization under UK GAAP is not.

Laghi et al. (2013)	IFRS	Europe (2008-2011)	835 observations from listed firms (UK, France, Germany, Italy, Portugal, Spain) reporting a goodwill impairment	Value relevance study based on Ohlson model	Goodwill and goodwill impairments are value relevant.
Hamberg and Beisland (2014)	IFRS, Swedish GAAP	Sweden (2001-2010)	2,052 observations from listed non-financial firms with positive goodwill balance Years 2001-2004 cover Swedish GAAP, years 2005-2010 cover IFRS	Value relevance study based on Ohlson model	Goodwill is value relevant. Goodwill impairments under Swedish amortization regime (i.e. trigger-based impairments) are value relevant, whereas they are not under IFRS impairment-only approach
Lapointe-Antunes et al. (2009)	Canadian GAAP (quasi US-GAAP)	Canada (2002)	345 observations from listed firms with positive goodwill balance One-year sample covering the adoption year of SFAS 142, which had to be applied retrospectively and therefore resulted in initial adoption goodwill impairments	Value relevance study based on Ohlson model	Goodwill is value relevant. Initial adoption goodwill impairments (i.e., retrospective catch-up adjustments to goodwill balance and equity) are value relevant. An increase in perceived reliability (measured by firms that are expected to report impairment charges or firms having a more independent and financially literate audit committee) enhances the value relevance of initial adoption goodwill impairments. Reporting goodwill information on reporting unit level instead of firm level does not have a significant influence on the value relevance of goodwill impair-ments.
Xu et al. (2011)	US-GAAP	USA (2003-2006)	431 observations from listed non-financial and non-utility firms reporting a goodwill impairment for the first time during the sample period	Value relevance study based on Ohlson model	Goodwill impairments are value relevant.

4.5.2 Perceived Timeliness of Goodwill Impairments

The second research paper provides a brief overview of prior studies assessing the perceived timeliness of goodwill impairments (section 6.3.2). The main characteristics and results of the studies are summarized in Table 5. As the table shows, empirical evidence is limited and mixed. Most studies use the commonly used return model based on Easton and Harris (1991) and Easton (1999). This model expresses the annual return on shares as a linear function of earnings and change in earnings market. Moreover, goodwill impairments are separated from earnings and change in earnings as these are the variables of interest (see section 6.4.2.2 for more details).

In the following, the studies of Amel-Zadeh et al. (2013), Hamberg and Beisland (2014), and Xu et al. (2011) are discussed in more detail since they are the only ones addressing "normal" impairmants, i.e., their relevance for the second research paper in section 6 is considered as high.

Study of Amel-Zadeh et al. (2013)

The study was already introduced in section 4.5.1 as part of the value relevance literature. Amel-Zadeh et al. (2013) perform a return regression to analyze the perceived timeliness of goodwill impairments under IFRS. Their findings suggest that goodwill impairments are significantly related to contemporaneous annual returns. However, they also show that next year impairments are stronger related to contemporaneous annual returns than current year's impairments. This is interpreted as a sign that impairment recognition might not be fully timely. Applying the DID approach does not yield any evidence that the perceived timeliness of impairments changed after the adoption of IFRS. However, as pointed out before, the DID result should be interpreted with caution.

Study of Hamberg and Beisland (2014)

The study was already introduced in section 4.5.1 as part of the value relevance literature. Hamberg and Beisland (2014) also perform a return regression to analyze the perceived timeliness of goodwill impairments under IFRS. Their findings suggest that goodwill impairments are not significantly related to contemporaneous annual returns. However, as part of their robustness checks, they show that next two year impairments are occasionally related to contemporaneous annual returns. This is interpreted as a sign that impairment recognition might not be timely.

Study of Xu et al. (2011)

Xu et al. (2011) address the perceived timeliness of goodwill impairments in the post-SFAS 142 regime for the periods 2003 to 2006. They use a sample of 431 observations from listed non-financial and non-utility firms reporting a goodwill impairment for the first time during the sample period. They also apply the common return regression including industry and year dummies. However, contrary to other studies, they also include additional control variables for restructuring charges, asset impairments, change in revenues, change in return on assets, asset turnover, market-to-book ratio, age of fixed assets, and logarithm of total assets.

They find that goodwill impairments are only significantly related to contemporaneous annual returns if profit firms are considered, whereas they do not establish a significant relationship for loss firms and the full sample. As an additional price-level regression shows that goodwill impairments of loss firms are not value relevant, they argue that the market views impairments as a signal that management is willed to take actions concerning existing economic problems. However, this explanation seems to be arguable as a positive market reaction should be observed to confirm this argumentation. For profit firms, they consider impairments as a (timely) sign that future profitability is reduced sustainably. As already discussed for the study of Laghi et al. (2013), the research design might generally suffer from the fact that only impairment firms are included.

Table 5: *Overview of studies addressing the perceived timeliness of goodwill impairments*

Author (Year)	GAAP	Country (Period)	Sample Characteristics	Research Design	Main Results
Amel-Zadeh et al. (2013)	IFRS, UK GAAP	UK (1997-2011)	4,052 observations from listed non-financial firms Years 1997-2004 cover UK GAAP, years 2005-2011 cover IFRS	Return model based on Easton's approach	Goodwill impairments are significantly related to contemporaneous annual returns. Next year impairments (i.e., lead impairment variable) are stronger related to contemporaneous annual returns than current year's impairments, i.e., impairment recognition might not be fully timely.
Hamberg and Beisland (2014)	IFRS, Swedish GAAP	Sweden (2001-2010)	2,052 observations from listed non-financial firms with positive goodwill balance Years 2001-2004 cover Swedish GAAP, years 2005-2010 cover IFRS	Return model based on Easton's approach	Goodwill impairments (trigger-based) are significantly related to contemporaneous annual returns under Swedish amortization regime, whereas they are not under IFRS impairment-only approach Next two year impairments (i.e., lead impairment variables) are occasionally related to contemporaneous annual returns, i.e., impairment recognition might not be timely.
Chen et al. (2008)	US-GAAP	USA (2002)	1,763 observations from listed firms with positive goodwill balance One-year sample covering the adoption year of SFAS 142, which had to be applied retrospectively and therefore resulted in initial adoption goodwill impairments as well as regular first year impairments	Return model based on Easton's approach Reverse regression (i.e., current and previous years' returns and their interactions with indicator variables for initial adoption and first year goodwill impairments on current earnings)	Initial adoption goodwill impairments (i.e., retrospective catch-up adjustments below the line) actually represent cumulative catch-up adjustments that were already impounded in prices, i.e., impairment recognition during the pre-SFAS 142 amortization regime was not timely. First year impairments represent timelier information, but they are also partly anticipated by previous year's return, i.e., there is still room for improvement in terms of timeliness.

Lapointe-Antunes et al. (2009)	Canadian GAAP (quasi US-GAAP)	Canada (2002)	345 observations from listed firms with positive goodwill balance One-year sample covering the adoption year of SFAS 142, which had to be applied retrospectively and therefore resulted in initial adoption goodwill impairments	Reverse regression (i.e., current and previous years' returns on initial adoption goodwill impairments)	Initial adoption goodwill impairments (i.e., retrospective catch-up adjustments to goodwill balance and equity) actually represent cumulative catch-up adjustments that were already impounded in prices, i.e., impairment recognition during the pre-SFAS 142 amortization regime was not timely.
Xu et al. (2011)	US-GAAP	USA (2003-2006)	431 observations from listed non-financial and non-utility firms reporting a goodwill impairment for the first time during the sample period	Return model based on Easton's approach	Goodwill impairments are only significantly related to contemporaneous annual returns if profit firms are considered, whereas no significant relationship is observed for loss firms and the full sample.

4.5.3 Information Content of Goodwill Impairments

The third research paper provides a brief overview of prior studies assessing the information content of goodwill impairments (section 7.2.2). The main characteristics and results of the studies are summarized in Table 6 at the end of this section. All studies find a negative capital market reaction to the announcement of goodwill impairments. However, this reaction is considerably smaller than the goodwill amount written off (in relation to the market capitalization). In the following, the studies of Li et al. (2011) and Knauer and Wöhrmann (2016) are discussed in more detail since their relevance is considered as high for the research paper in section 7.[94]

Study of Li et al. (2011)

Li et al. (2011) investigate the information content of unexpected goodwill impairments before and after the introduction of SFAS 142 in the USA. To test their hypothesis that abnormal returns are negatively correlated with impairments, they use a sample of 1,584 firms with goodwill impairment announcements for the periods 1996 to 2006. Moreover, they define a matched control sample of non-impairment firms with similar expected impairments in order to control for a potential self-selection bias. The matching criteria are same industry, same year and quarter, market value of equity ± 50 %, and closest book-to-market ratio (as proxy for expected impairment). The cumulative abnormal returns are estimated by the market model using a 3-day event window [-1;1].

Li et al. use three different measures for expected impairments. First, they assume an expectation of zero impairment, i.e., the full impairment magnitude is unexpected. Second, they use the excess of the firm's tangible net worth over its market value of equity as expectation. They state that this proxy is based on Beatty and Weber (2006). However, Beatty and Weber use the excess of the book value of equity over its market value. Hence, it remains unclear why Li et al. use a different definition that does not seem to be a suitable proxy.[95] Third, they conduct a Tobit regression to calculate the expected magnitude of impairments based on the impairments reported by the sample firms (both impairment and non-impairment). The regression model includes both economic impairment factors and earnings management

[94] The criteria to assess the relevance are GAAP and quality (using VHB-JOURQUAL3 ranking as proxy).

[95] The proxy is not suitable as it excludes the book value of intangible assets. If the tangible net worth equals the market value of equity, the proxy assumes an expected impairment of zero. However, this would actually indicate that the total amount of intangible assets is not covered by the market value. Hence, it would be more appropriate to consider this amount as expected impairment than to assume zero expected impairment.

incentives. The residuals are then used as unexpected impairment losses. However, this approach assumes that investors fully anticipate the influence of earnings management incentives on impairments, which should be considered at least as a limitation.

Looking at the univariate results, they find an average negative announcement effect of -1.7 % (-2.7 % pre-SFAS 142, -1.4 % post-SFAS 142 period) for impairment firms. The effect is significantly lower than the (slightly positive, but insignificant) effect observed for the control firms. The multivariate analysis uses the following regression of unexpected impairments (IMP_MAG) on cumulative abnormal returns (CAR) with unexpected earnings (UE; measured by change in quarterly earnings before impairment) as control variable:

$$CAR = \beta_0 + \beta_1 IMP\_MAG + \beta_2 UE + \epsilon \quad (13)$$

For all reporting regimes, they find a negative influence of all unexpected impairment measures. Further analyses based on interaction terms show that outcomes are mainly driven by impairment firms, whereas the market does not revise its expectations upwards in the case of unexpected zero impairments. However, the study suffers from the limitation that there are no zero impairment announcements for the control firms. Hence, it is not surprising that there is no significant market reaction. With respect to the pre- and post-SFAS 142 periods, further analyses confirm the univariate results, i.e., the reaction is stronger in the pre-SFAS 142 period. The authors explain this result by the fact that impairments are smaller and occur more frequently in the post-SFAS 142 period. Hence, they might be perceived by investors rather as a systematic, regular reduction of the firm's goodwill (similar to the straight-line amortization during the pre-SFAS 142 period) than a special event.

Study of Knauer and Wöhrmann (2016)

Knauer and Wöhrmann (2016) examine the information content of unexpected goodwill impairments and assess whether it is influenced by the countries' level of legal protection and the impairment reason provided by management. They use a sample of 564 goodwill impairment announcements from 20 European countries and the USA for the periods 2005 to 2009. They hypothesize that the market reaction to positive unexpected impairments (i.e., impairment is higher than expected by capital market participants) is stronger for continental European countries (i.e., civil law) than for Anglo-American countries (i.e., case law) as the level of legal protection is expected to be lower. With respect to the impairment reason, they assume that the market reaction is less (more) negative when an external (internal) reason is provided compared to no reason. Negative unexpected impairments are not considered in

developing the hypotheses. Both hypotheses are based on the assumption that investors generally expect management to report lower impairments than economically necessary. Hence, investors might consider impairments in continental European countries and impairments based on internal reasons to be subject to more managerial discretion, and therefore to be underreported. This would lead to a stronger market reaction also incorporating the expected non-reported impairment loss. However, whether investors generally expect managerial discretion to be used to reduce impairment losses seems questionable (e.g., considering earnings management incentives like big bath accounting, conservative smoothing, or changes in management).

Expected impairments are determined based on an adjusted Beatty and Weber (2006) approach. If a firm's book value of equity exceeds its market value, Beatty and Weber use the difference as expected impairment. The adjusted approach seeks to allocate the book value of equity to each of the firm's segments (based on relative sales) and to estimate the segments market value of equity using a sales multiple based on a peer group of at least five one-segment firms. Then, expected impairments are calculated for each segment and summed-up to represent the firm's total expected impairment. The positive difference between actual impairments and expected impairments is used as positive unexpected impairment loss (IMP_POS). For more details, see Knauer and Wöhrmann (2016, pp. 440-441). The cumulative abnormal returns (CAR) are estimated by the market model using a 3-day event window [0;2].

The univariate findings show a significant negative announcement effect of -1.0 % for firms from continental European countries, which is slightly lower than cumulated abnormal returns of Anglo-American firms (-1.5 %). The following regression model with an interaction between IMP_POS and a dummy variable for continental European countries ($CONT$) tests the first hypothesis:

$$CAR = \beta_0 + \beta_1 IMP\_POS + \beta_2 IMP\_POS * CONT + \beta_3 CONT + \boldsymbol{\beta_X Controls} + \epsilon \qquad (14)$$

The results indicate that the market reaction to positive unexpected impairments is stronger for continental European than Anglo-American countries. As control variables, Knauer and Wöhrmann use negative unexpected impairments, unexpected earnings (measured by change in quarterly earnings before impairment), extraordinary charges or credits of the current quarter, a dummy for the first two years of adopting IAS 36, the logarithm of market value of equity, earnings volatility, leverage, and the beta factor. With respect to the second hypothesis, the regression model is adjusted as follows:

$$CAR = \beta_0 + \beta_1 IMP\_POS + \beta_2 IMP\_POS * EXT + \beta_3 IMP\_POS * INT + \beta_4 EXT + \beta_5 INT + \boldsymbol{\beta_X Controls} + \epsilon \quad (15)$$

The results show that the market reaction to positive unexpected impairments is stronger if an internal (*INT*) and weaker if an external impairment reason (*EXT*) is provided (compared to no reason).

Table 6: *Overview of studies addressing the information content of goodwill impairments*

Author (Year)	GAAP	Country (Period)	Sample Characteristics	Research Design	Main Results
Knauer and Wöhrmann (2016)	IFRS, US-GAAP	Europe, USA (2005-2009)	564 goodwill impairment announcements from listed firms (20 European countries and USA) under the impairment-only approach Goodwill impairments only considered if either more than 1 % of total assets or EUR 10 million	Event study (3-day event window [0;2]) Estimation of expected goodwill impairments based on adjusted Beatty and Weber (2006) approach	Significant negative announcement effect of -1.0 % for firms from continental European countries, which is slightly lower than cumulated abnormal returns of Anglo-American firms (-1.5 %). Significant negative market reaction to positive unexpected impairments, no significant market reaction to negative unexpected impairments. Market reaction to positive unexpected impairments is stronger for continental European than Anglo-American countries. Market reaction to positive unexpected impairments is stronger if an internal and weaker if an external impairment reason is provided (compared to no reason).
Li et al. (2011)	US-GAAP	USA (1996-2006)	1,584 goodwill impairment announcements from listed firms before and after the adoption of SFAS 142 in 2002 1,584 matched control sample firms with zero impairments, but similar expected impairments (measured by book-to-market ratio)	Event study (3-day event window [-1;1]) Three measures for expected goodwill impairments: 1) Expected impairment equals zero, 2) Estimation of expected impairments based on Beatty and Weber (2006) approach, 3) Estimation of expected impairments based on regression model using prior indicators of impairments	Significant negative announcement effect of -1.7 % (-2.7 % pre-SFAS 142, -1.4 % post-SFAS 142 period). Significant negative market reaction to unexpected impairments (for all three measures). Market reaction is weaker, but still significant after the adoption of SFAS 142. No positive market reaction to unexpected non-impairments (limitation: there are generally no zero impairment announcements).

Bens et al. (2011)	US-GAAP	USA (1996-2006)	388 goodwill impairment announcements from listed firms before and after the adoption of SFAS 142 in 2002 Goodwill impairments only considered if more than 5 % of total assets and USD 1 million	Event study (2-day event window [0;1]) Estimation of expected goodwill impairments based on adjusted Beatty and Weber (2006) approach	Significant negative announcement effect of -3.3 % (-3.4 % pre-SFAS 142, -3.3 % post-SFAS 142 period). Significant negative market reaction to negative unexpected impairments, no significant market reaction to positive unexpected impairments. Overall market reaction does not significantly change after the adoption of SFAS 142. However, during the pre-SFAS 142 period, the market reaction to negative unexpected impairments is stronger for firms with high information asymmetries (low analyst following as proxy) and lower costs to implement sophisticated and therefore more reliable impairment tests (firm size as proxy), whereas this is not the case during the post-SFAS 142 period. Firm complexity (number of segments) does not have an influence on the perception of negative unexpected impairments.
Hirschey and Richardson (2002)	US-GAAP	USA (1992-1996)	80 goodwill impairment announcements from listed firms before the adoption of SFAS 142 in 2002	Event study (2-day event window [-1;0])	Significant negative announcement effect of -2.9 %. Negative cumulated abnormal returns of -41.7 % during the year prior to the announcement, i.e., a large share of the negative market reaction is already observed prior to the announcement (-11.0 % during the subsequent year, i.e., potential underreaction).

5 Research Paper 1: Goodwill Impairment Tests as a Device for Earnings Management

The following paper can be read independently and addresses the first research question raised in section 1.1: Is the recognition of goodwill impairment losses influenced by earnings management incentives like beating an earnings target, conservative smoothing, big bath accounting, changes in senior management, or avoidance of debt covenant violations?

The paper is currently under review for publication in an international financial accounting research journal.[96]

Abstract

This study investigates whether goodwill impairments are influenced by earnings management incentives. It is motivated by the IASB's recent 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. With respect to the avoidance of debt covenant violations, the findings do not confirm the earnings management hypothesis and are therefore not consistent with prior studies. Instead, they suggest that influential providers of debt capital, which are particularly prevalent in the German institutional setting, force management to account more conservatively.

5.1 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,

[96] Section 5 is largely based on the working paper of Albersmann and Quick with the title "Goodwill Impairment Tests as a Device for Earnings Management". After submission of the dissertation, this working paper was extended and is currently under review for publication as a working paper of Albersmann, Hohenfels, and Quick with the title "Goodwill Impairment Tests as a Device for Earnings Management: Evidence from Germany".

goodwill has to be tested for impairment at least once a year and the IASB's objective was to increase the usefulness of information provided to users of financial statements (IAS 36.BC131G). However, as the recent post-implementation review on business combinations, which was completed in June 2015 (IASB (2015a)), shows, there is still a lively debate on the usefulness of impairment testing even one decade later (IASB (2014, pp. 21-26)). In particular, the IASB concluded that it 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 as it was questioned by participants of the review whether the impairment test is able to adequately reflect the economic value of goodwill and its consumption (IASB (2015a, p. 8)). While proponents of the impairment-only approach argue that it enables the management to convey private information on future cash flows and hence reduce information asymmetries, opponents criticize that the inherent high degree of discretion is used by the management to engage in opportunistic earnings management. The impairment test requires a relatively high degree of subjectivity as it depends in most cases on discounted cash flow methods and therefore on the management's assumptions and estimations concerning the future economic development. This might also implicate that auditors have a reduced possibility to verify the reasonableness of goodwill impairment tests (Kothari et al. (2010, p. 262)). In this context, also Hans Hoogervorst (Chairman IASB) questioned whether the current requirements provide sufficient rigor to reliably report goodwill impairments and to mitigate earnings management. For example, he suggests that firms might in some cases be hesitant to impair goodwill to avoid giving the impression that they made a bad investment decision. On the other hand, newly appointed CEO's might have a strong incentive to recognize hefty impairments in order to start with a clean slate (Hoogervorst (2012)).

Against this background, the paper seeks to gain additional empirical evidence on the reliability of goodwill impairment testing. The relevance of this topic is not only highlighted by the controversial debate pointed out above, but also by the fact that goodwill impairment tests are generally in the main focus of the DPR and the ESMA (e.g., DPR (2013); ESMA (2013a)). The study focuses on the question whether earnings management incentives have an influence on the likelihood to recognize goodwill impairments and the magnitude of impairment losses. This provides an indication whether goodwill impairment tests are used by management as a device for earnings management.

The sample consists of 2,127 firm-year observations from 306 German firms listed on the regulated market of Frankfurt stock exchange (CDAX) encompassing the period 2006-2013.

The results suggest that goodwill impairment tests are used by management as a device for earnings management. Although the likelihood and magnitude of goodwill impairments is also determined by economic and other relevant factors, the findings suggest that earnings management incentives have a significant influence. Firms are more likely to avoid impairments or to report smaller impairment losses when they just beat an earnings target or when their general earnings management behavior is positive. 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 (i.e., CEO or CFO). With respect to the firms' leverage, the findings are not consistent with prior literature as they do not confirm that firms manage goodwill impairments to avoid costly debt covenant violations. Instead, firms with higher leverage seem to account more conservatively as they report more (larger) impairments. As discussed in section 5.2.3, this could be due to the specifics of the German institutional setting, which is particularly characterized by a higher importance of debt capital providers in monitoring the management.

The study contributes to the existing literature especially for three reasons. First, a study examining the influence of earnings management incentives on goodwill impairments in Germany does not exist and empirical evidence with respect to IFRS is limited. For Germany, there is only one study of Siggelkow and Zülch (2013) addressing the influence of earnings management incentives on asset impairments, which represents a different research stream (see section 5.3.1). The studies of AbuGhazaleh et al. (2011) and Stora (2013) address goodwill impairments, but refer to the UK and all firms worldwide applying IFRS, respectively, and therefore other institutional settings. Moreover, the results of other prior studies might not be generalizable as they refer to other institutional settings, the US-GAAP impairment test, and/or initial adoption impairments. Hence, the results of this study are also relevant for other continental European countries applying IFRS (e.g., Austria, France, or Switzerland; see section 5.2.3). Second, the study also includes general earnings management behavior not related to goodwill impairment accounting (based on pre-impairment discretionary accruals) as an additional incentive variable. This helps to better specify the firms' earnings management incentives. Moreover, the proxies for other earnings management incentives are refined compared to prior studies and more earnings management variables are analyzed simultaneously. Third, the study covers a longer sample period than prior studies also including the post financial crisis years.

The reminder of the paper is organized as follows. Section 5.2 provides background information on the IFRS accounting requirements for goodwill, opportunities for earnings management related to goodwill accounting, and the influence of the German and continental European institutional setting on earnings management behavior. Section 5.3 presents an overview of prior research, discusses relevant earnings management incentives, and develops the hypotheses of the study. Sample selection, variables definition, and model specification are described in section 5.4, followed by the empirical results in section 5.5. Section 5.6 presents robustness checks of the main results. Finally, section 5.7 draws conclusions and discusses limitations of the study.

5.2 Background

5.2.1 IFRS Accounting Requirements for Goodwill

The IFRS accounting requirements for goodwill differentiate between internally generated goodwill and goodwill arising from a business combination. While the former is prohibited to be recognized (IAS 38.48), IFRS 3.32 requires the latter 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).

With the adoption of the revised IAS 36 on March 31, 2004, the IASB prohibited the straight-line amortization of goodwill and introduced an impairment-only approach. The standard was adopted by the EU on December 31, 2004 and thus was applicable for all fiscal years starting from January 1, 2005 onwards. Since then, 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. A CGU is the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets (IAS 36.6). The CGU has to fulfill the following two criteria (IAS 36.80): (1) It represents the lowest level at which goodwill is monitored for internal management purposes; (2) It is not larger than an operation segment as defined by IFRS 8.5 before aggregation permitted by IFRS 8.12.

If the carrying amount of a CGU exceeds its recoverable amount, a goodwill impairment loss has to be recognized (IAS 36.90, 36.104).[97] The recoverable amount of a CGU is defined as the higher of its fair value less costs of disposal and its value in use (IAS 36.6).[98] In most cases, the recoverable amount depends on discounted cash flow methods, i.e., the impairment test is based on the 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 internally generated 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).

5.2.2 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 the management to improve the information value of financial statements by signaling private information on future performance (see e.g., Sankar and Subramanyam (2001)). With respect to goodwill impairment testing, the management is enabled to convey private information on future cash flows and thereby help stakeholders to assess and verify the success of an acquisition and the firm's future performance.[99] However, the management might 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)). These earnings management incentives are discussed in section 5.3.2.

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[97] Once goodwill impairment losses are recognized, it is prohibited to reverse them in subsequent periods as it is likely that any increase in the recoverable amount is rather due to an increase in internally generated goodwill than a reversal of the acquired goodwill's impairment (IAS 36.124, 125).

[98] Hence, the standard considers two different utilization possibilities based on rational management behavior. The values might differ since the market may not use the same assumptions as the individual firm (IAS 36.BCZ11). For example, the firm's management might have superior information about future cash flows than the market or it may use assets differently from the market's view of their best use (IAS 36.BCZ17 (a)). While the fair value less costs of disposal also considers future expansion investments, future restructurings not yet committed to, and costs of disposal, the value in use also includes firm-specific synergies.

[99] In this context, empirical studies show that goodwill impairments are related to future firm performance (Jarva (2009); Li et al. (2011)) and investment opportunities (Godfrey and Koh (2009); Chalmers et al. (2011)) and that the impairment-only approach has a positive influence on the accuracy of analysts' earnings forecasts (Chalmers et al. (2012)).

Opportunities for earnings management in the context of goodwill accounting also exist for the recognition of goodwill,[100] but specifically refer to the discretion related to goodwill impairment tests. The discretion can be categorized by the following steps of an impairment test, which in most cases is based on a discounted cash flow calculation: Definition of CGUs, allocation of goodwill, derivation of carrying amount, estimation of future cash flows (business assumptions), and determination of long-term growth rate and discount rate (valuation assumptions).

The first three steps offer the management a certain degree of discretion. If the management has an incentive to reduce future impairments, it can define CGUs relatively large (e.g., at segment level) in order to compensate negative and positive performances of lower level CGUs. Moreover, the management can allocate goodwill to CGUs that perform well and that have a high cushion against impairment (Müller and Reinke (2009, p. 526); Gundel et al. (2014, p. 132)). On the contrary, if the 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., 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 carrying amount of a CGU has to be derived in compliance with the equivalence principle (IAS 36.75).[101] Discretion particularly refers to the consideration of corporate assets (Küting (2013, p. 1798)), which have to be included in the carrying amount if they can be allocated on a reasonable and consistent basis to the CGU (IAS 36.102). In the subsequent years, accounting flexibility related to goodwill impairment tests is restricted as only a re-organization of the firm's reporting structure justifies a change in the CGU structure and/or a re-allocation of goodwill and as the allocation of (corporate) assets has to be consistent over time (IAS 36.72, 87; Küting (2013, p. 1798)).

On the contrary, the determination of business and valuation assumptions offers much more flexibility to engage in earnings management based on subsequent impairment testing. The

[100] The amount of goodwill recognized represents a strategic one-time accounting decision and therefore is a less flexible earnings management instrument. The purchase price allocation in accordance with IFRS 3 offers discretion related to the fair value measurement of the consideration transferred for a business acquired as well as the identification and fair value measurement of assets acquired and liabilities assumed. As goodwill is calculated as the difference between consideration transferred and net assets, this discretion directly influences the amount of goodwill recognized. Moreover, the amount of goodwill can be strategically influenced by the option to choose between full goodwill and partial goodwill method (e.g., Haaker (2008, pp. 192); Zwirner and Künkele (2010, pp. 254-255)).

[101] The equivalence principle requires the carrying amount to be determined on a basis consistent with the way the recoverable amount is determined (IAS 36.75).

management has to estimate future cash flows based on business assumptions like market growth, market share, inflation rates of sales prices and cost elements, gross profit, EBITDA and/or EBIT margin, future (replacement and maintenance) investments, or changes in net working capital. 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 covering a maximum period of five years[102] and greater weight shall be given to external evidence like market data, analyst reports, or industry studies (IAS 36.33 (a), (b)). Moreover, the management has to evaluate the reasonableness of its assumptions by conduction a retrospective analysis of planning accuracy (IAS 36.34). Hence, differences between actuals and previous years' budgets/forecasts have to be explained and their impact on current budgets and forecasts has to be analyzed. Besides, information on key assumptions including a sensitivity analysis (if a reasonably possible change in a key assumption would cause an impairment loss) has to be disclosed (IAS 36.134 (f)). This also reduces the opportunities and incentives to engage in earnings management. Nevertheless, the management's budgets and forecasts are still based on subjective estimates and might be biased by the management's individual objectives or used as motivational tools (Pottgießer et al. (2005, p. 1748); Gundel et al. (2014, p. 132)).

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 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). Hence, the discount rate is based on assumptions like definition of peer group, risk-free interest rate, cost of debt, general market premium, peer group beta, peer group leverage, tax rates, country risk, and inflation rates. 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.

[102] A projection period longer than 5 years may only be used if the management is confident that these projections are reliable and if it can demonstrate its ability, based on past experience, to forecast cash flows accurately over that longer period (IAS 36.35). For example, a longer forecast period might be appropriate if the CGU does not reach a steady state after 5 years (Lienau and Zülch (2006, p. 309); Völkner and Harr (2011, m.n. 46); Brücks et al. (2013, m.n. 164)).

In conclusion, although IAS 36 tries to constrain subjective elements as outlined above, the determination of business and valuation assumptions still requires a relatively high degree of subjectivity. Therefore, it can be considered as the main factor to engage in earnings management by influencing the outcome of impairment tests (Küting (2013, p. 1800)).

5.2.3 Influence of Institutional Setting on Earnings Management Behavior

The study analyzes the earnings management behavior related to goodwill impairment accounting for a sample of German listed firms. Hence, it refers to the German institutional setting, which is an important representative of the continental European institutional model (as opposite to the Anglo-American institutional model).

A major aspect of the institutional setting is the legal system, i.e., the legal rules and their enforcement. The legal system of continental European countries is referred to as civil law, which is characterized by state-employed judges, great reliance on legal and procedural codes, and a preference for state regulation over private litigation. On the contrary, the common law tradition of Anglo-American countries is characterized by independent judges and juries, relatively weaker reliance on statutes, and the preference for contracts and private litigation as a means of dealing with social harms (La Porta et al. (2006, p. 14)). The level of minority rights protection is higher and it provides investors extensive powers to sue management for violations of fiduciary duty (Shleifer and Vishny (1997, p. 770)). Moreover, Anglo-American countries are characterized by stronger capital market oversight and accounting enforcement. Based on these arguments, prior research shows that continental European countries have a weaker legal protection of investors than Anglo-American countries (La Porta et al. (1997); La Porta et al. (1998); La Porta et al. (2006); Gul et al. (2013)). Therefore, continental European countries are considered to be more vulnerable to opportunistic management behavior. For example, this is also supported by Leuz et al. (2003) showing that earnings management decreases with higher investor protection and Hung (2000) observing that the value relevance (and therefore effectiveness) of accrual accounting improves with higher 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 relatively high. Moreover, particularly banks as large creditors might have a higher power than in Anglo-American countries as they might 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) (Shleifer and Vishny (1997, pp. 754, 757); Gietzmann and Quick (1998, p. 84)). Hence, providers of debt capital in Germany (and other continental European countries) have a more important role in monitoring the management (Gietzmann and Quick (1998, p. 83)) and they might force the management to account more conservatively.

With respect to the corporate governance, Germany and several other continental European countries are characterized by 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 the management (supervisory board). 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, non-executive directors in the one-tier system are more involved in the firm's operations and have direct access to information. Hence, they might be better able to assess whether impairment tests are reasonable or whether there is an intention to engage in earnings management.

In summary, the German institutional setting is particularly different from the Anglo-American setting, although the influence on earnings management behavior related to goodwill impairment accounting is not clear. The results of the study are therefore particularly relevant for Germany and other continental European countries with a similar institutional setting like Austria, Belgium, Denmark, Finland, France, Netherlands, Sweden, and Switzerland.[103]

5.3 Prior Literature, Earnings Management Incentives, and Hypotheses Development

Ideally, a study on earnings management related to goodwill impairments would compare reported impairments to fair impairments (Stora (2013, p. 32)). However, as fair impairments are not observable and difficult to estimate, the research approach of this paper follows prior studies and (1) identifies incentives for income-increasing and/or income-decreasing earnings

[103] These countries have a similar level of investor protection (Leuz et al. (2003, pp. 519-520)) and also have two-tier systems, either mandatory (Austria, Denmark, Finland, Netherlands, Sweden) or voluntary (Belgium, France, Portugal) (Weil, Gotshal and Manges LLP (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 et al. (2006, p. 1204)).

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, it is therefore possible to indicate whether these firms use goodwill impairment accounting as a device for earnings management.

5.3.1 Prior Literature

In the following, empirical studies assessing whether the discretion in goodwill impairment accounting is used to engage in earnings management are presented. The literature review considers mainly US studies to complement the limited evidence with respect to IFRS since US-GAAP also applies an impairment-only approach. However, the results might not be directly applicable as the impairment tests are not identical[104] and as the institutional setting is different.

With respect to IFRS, AbuGhazaleh et al. (2011) examine the correlation between incentives to engage in earnings management and the magnitude of goodwill impairments in the UK for the periods 2005 and 2006. Their results indicate that firms with CEO changes as well as abnormally low or high pre-impairment earnings[105] compared to the previous year (proxies for big bath accounting and conservative smoothing, respectively) report significantly higher impairments. Leverage (which represents a proxy for the degree of debt covenant slack) is not significantly associated with goodwill impairments. Stora (2013) evaluates whether earnings management incentives related to earnings targets influence firms' goodwill impairment accounting behavior. Using a distributional approach[106] for a sample of all firms worldwide applying IFRS (2005-2010), he 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 compared to firms that are less threatened to fall below the respective earnings target. On the contrary, if firms' pre-impairment earnings clearly exceed or fall short of one of these targets, they are more likely to report (larger) impairment losses.

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[104] The results of US studies should also be considered as the impairment tests of IFRS and US-GAAP are comparable. Nevertheless, there are three major differences that might have an influence on the likelihood and magnitude of impairments. First, 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, it applies a two-step approach. The first step is similar to the IFRS impairment test, but it only determines whether the second step is required. The second step then calculates the impairment loss as the difference between the implied fair value of goodwill and its carrying amount.

[105] For previous studies' definition of abnormally low or high pre-impairment earnings, see section 5.4.2.2.

[106] For an explanation of the distributional approach, see section 5.4.2.1.

Concerning US-GAAP, Jordan and Clark (2004) and Jordan et al. (2007) examine the case of big bath accounting in relatively small US samples after the introduction of SFAS 142 in 2002. They find that impairment firms have significantly lower ROA and ROS than non-impairment firms for the periods 2002 to 2004. Moreover, ROA is negatively correlated with impairment losses. The results are interpreted by the authors as an indication of big bath accounting when earnings are already depressed. However, they do not control for other important influence factors and earnings management incentives. The relation between performance and impairments could therefore rather be economically justified than motivated by earnings management incentives. Hence, the results of these studies have to be interpreted with caution and their implications are rather limited. Masters-Stout et al. (2008) investigate the relation between CEO changes and goodwill impairment accounting in the USA. Covering the periods 2003 to 2005, they show that more goodwill is impaired within the first two years of a new CEO. They do not find evidence that there exists a difference between internal and external CEO turnover. Ramanna and Watts (2012) select US firm-years for the periods 2003 to 2006 with a pre-impairment market-to-book ratio that turned from greater than one into less than one for two subsequent years. Therefore, the economic necessity of the sample firms to report goodwill impairments should be relatively high. Their results suggest that some measures related to earnings management incentives (CEO tenure, CEO cash bonus, and leverage) have a significant negative influence on the magnitude of goodwill impairments, hence indicating opportunistic avoidance of goodwill impairments. They do not find an impact of valuation motives measured by the earnings response coefficient (i.e., a proxy for the capitalization of earnings, including impairments, in returns).

There are also studies addressing initial adoption impairments. These goodwill impairments arising from the initial adoption of a new accounting standard differ from “normal” goodwill impairments. Depending on the respective GAAP, they are either charges to opening retained earnings (i.e., they are not included in net income) or earnings below the line (i.e., as effect of accounting changes below the net income from continuing operations). Hence, the results are not directly applicable because earnings management incentives might differ from “normal” impairments. Hamberg et al. (2011) evaluate whether initial adoption impairments in Sweden (IFRS) are influenced by earnings management incentives. Their findings show that CEOs with a tenure of five or more years are less likely to report initial adoption charges to opening retained earnings, whereas earnings-based management compensation and leverage do not have a significant influence. Lapointe-Antunes et al. (2008) consider the magnitude of initial adoption impairments in Canada (quasi SFAS 142). Their findings suggest that CEO changes

increase initial adoption charges to opening retained earnings, whereas firms seem to minimize impairments if their leverage is higher than industry mean and if they subsequently issue new equity or debt capital. Management compensation only has a significant negative influence if there are unrealized gains on exercisable stock options, whereas bonus payments do not have an impact. Beatty and Weber (2006) examine SFAS 142 initial adoption impairments in the USA. Their results show that impairments during the adoption period are less likely and lower if CEO tenure is longer and if bonus plans include special items (i.e., also effects of accounting changes). The hypothesis that debt covenants have an influence is weakly supported. Also addressing SFAS 142 initial adoption impairments, Zang (2008) finds that CEO changes have a positive and leverage has a negative influence on the magnitude of initial adoption impairment losses.

Another comparable research stream assesses the relation between fixed asset impairments and earnings management. The results are not directly applicable to goodwill impairments as they also refer to impairments of other intangibles and property, plant, and equipment.[107] Hence, an important difference is that these assets are amortized and only tested for impairment if indications of impairment are identified, whereas goodwill is also subject to a mandatory annual impairment test. Therefore, only the most relevant studies are presented in the following. For a German sample of the Prime Standard indices DAX, MDAX, SDAX, and TecDAX of Frankfurt Stock Exchange for the periods 2004 to 2010, Siggelkow and Zülch (2013) examine whether the likelihood of fixed asset impairments is influenced by earnings management incentives. Their findings suggest that conservative smoothing incentives are significantly correlated with more impairment losses. With respect to big bath accounting, changes in the management board, earnings-based bonus payments, and leverage, they do not confirm a significant relationship. International studies mainly address the USA. Riedl (2004) finds that a change in senior management, big bath accounting incentives, and the existence of private debt (which is expected to be more likely associated with debt covenants) have a significant influence on the magnitude of asset impairments for the periods 1996 to 1998, whereas a significant influence of conservative smoothing is not confirmed. Focusing on consumer manufacturing firms for the periods 1980 to 2000, Minnick (2011) finds that asset

[107] This is for example highlighted by a comparison between this study and the German study of Siggelkow and Zülch (2013). Although the sample of this study comprises much more firms and a different sample period, it is clear that the goodwill impairment rate of 21.6 % (see section 5.5.1) is not comparable to the 60 % fixed asset impairment rate of Siggelkow and Zülch.

impairments are more likely if a change in senior management occurred and if firms implemented good corporate governance.

5.3.2 Earnings Management Incentives and Hypotheses Development

Earnings management incentives are primarily based on information asymmetries and conflicts of interests between management and shareholders. The management can use its judgment in financial reporting to either mislead investors (and other stakeholders) about the underlying economic performance of the firm or to influence contractual outcomes that depend on the reported earnings numbers (Healy and Wahlen (1999, p. 368)). The following five earnings management incentives which might have an influence on the recognition of goodwill impairment losses are considered: beating an earnings target, conservative smoothing, big bath accounting, changes in senior management, and debt covenants. Moreover, the general earnings management behavior not related to goodwill impairment accounting is considered as a sixth variable to capture incentive situations not (sufficiently) covered by the previous five indicators.

5.3.2.1 Beating an Earnings Target

Beating an earnings target refers to the incentive of a firm's management to achieve an earnings target and hence to engage in income-increasing earnings management when fair earnings fall short of a target. The economic relevance of earnings targets for the capital market was confirmed by prior studies suggesting that capital market participants use these targets as reference points and that beating (missing) them is considered as a positive (negative) sign (e.g., DeAngelo et al. (1996); Barth et al. (1999); Dechow et al. (2000)). Moreover, several studies find that firms engage in income-increasing earnings management to beat earnings targets (e.g., Burgstahler and Dichev (1997); Holland and Ramsay (2003); Glaum et al. (2004)). Analogous to these studies, two targets are analyzed: zero earnings and previous year's earnings.[108] If a firm's earnings before goodwill impairment just exceed an earnings target, the 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. This was confirmed by the study of Stora (2013).

[108] International studies from other research streams than goodwill accounting also use analysts' forecasted earnings as another target. However, since analyst forecasts are not available or not available with a sufficient number of analysts to determine a consensus forecast for German listed firms, this target is excluded from the analysis.

Hence, the following hypothesis is tested:

H_1: Firms whose earnings before goodwill impairment just exceed an earnings target are less likely to recognize goodwill impairments and report smaller impairment losses.

5.3.2.2 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 and 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 has already clearly beaten an earnings target and recognizing an impairment loss does not imply 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 signalizing that management admits previous mistakes and bad times are behind the firm (Zucca and Campbell (1992, p. 35); Alciatore et al. (1998, p. 16)). A complementing perspective based on the management's incentive to maximize firm value is given by the model of Kirschenheiter and Melumad (2002). 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 news is good, managers therefore have an incentive to smooth earnings thus increasing the inferred earnings precision. On the other hand, bad news result 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. Prior literature shows an influence of both earnings management incentives on the recognition of impairment losses.[109] This leads to the following two hypotheses:

H_2: 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).

H_3: 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).

[109] AbuGhazaleh et al. (2011) and Stora (2013) confirm the impact of both incentives on goodwill impairments. With respect to asset impairments, Riedl (2004) only finds big bath accounting and Siggelkow and Zülch (2013) only find conservative smoothing to have a significant influence.

5.3.2.3 Changes in Senior Management

Changes in senior management might have an influence on goodwill impairment accounting as a 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 its future performance evaluation. Moreover, it offers the new management the opportunity to inflate earnings in future periods (Riedl (2004, p. 832); Lapointe-Antunes et al. (2008, p. 41); Zang (2008, p. 43); AbuGhazaleh et al. (2011, p. 175)). These incentives are complemented by the fact that the old management is more likely to be involved in the acquisition related to goodwill. Therefore, it might be reluctant to recognize impairments as this could be interpreted as a sign of an initial overpayment or a failure to realize the promised synergies. Moreover, the old management might have the intention to leave the firm with the best possible profitability, which might, e.g., be achieved by postponing impairment losses. Additionally, there might be other social or psychological reasons to avoid impairments, whereas a new senior management brings in an unbiased look (Lapointe-Antunes et al. (2008, p. 41); Masters-Stout et al. (2008, p. 1372); Hamberg et al. (2011, pp. 269-270); Ramanna and 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 the research design specified in section 5.4.3 controls for firm performance and market perception (Riedl (2004, p. 832); AbuGhazaleh et al. (2011, p. 176)).

The focus is on two positions on the management board that might have the highest influence on goodwill impairment decisions: Chief Executive Officer (CEO) and Chief Financial Officer (CFO). Most prior studies confirm the relevance of changes in senior management.[110] Therefore, the following hypothesis is tested:

H_4: Firms whose CEO or CFO is newly appointed to the management board are more likely to recognize goodwill impairments and report larger impairment losses.

[110] Riedl (2004), Lapointe-Antunes et al. (2008), Masters-Stout et al. (2008), Zang (2008), AbuGhazaleh et al. (2011), and Minnick (2011) find a significant positive influence of a change in senior management on impairments, whereas Siggelkow and Zülch (2013) do not. With respect to senior management tenure, Beatty and Weber (2006), Hamberg et al. (2011), and Ramanna and Watts (2012) establish a significant negative relationship.

5.3.2.4 Debt Covenants

The debt covenants hypothesis is based on the assumption that managers of highly leveraged firms have incentives to engage in income-increasing earnings management to avoid costly debt covenant violations (Watts and Zimmermann (1986)). Consistent with prior literature, leverage is used as a proxy for the intensity of this incentive particularly for two reasons. First, a higher leverage comes along with a higher probability to violate debt covenants as debt covenants are often based on certain leverage limits. Second, the costs of violating debt covenants increase with the firm's debts as violations usually lead to an adjustment of the terms of debt. However, this is only a relatively crude proxy. Ideally, the firms' actual risk associated with the violation of debt covenants should be determined based on their specific debt covenants (i.e., specific leverage limits or other key figures) and costs of violating these covenants. As this data is not available for the sample, the limitation that leverage only represents a crude proxy has to be accepted.

With respect to goodwill impairments, higher leveraged firms are expected to have stronger incentives to avoid goodwill impairments or to report smaller impairment losses than firms with lower leverage. This results in the following hypothesis, which is partly supported by prior literature:[111]

H_5: Leverage is negatively correlated with the likelihood to recognize goodwill impairments and the magnitude of impairment losses.

5.3.2.5 General Earnings Management Behavior

The research approach considers the general earnings management behavior not related to goodwill impairment accounting to capture incentive situations not covered by the previous earnings management incentives. The sample is split into two subgroups depending on their earnings management behavior not related to impairment accounting. The focus is on accrual-based earnings management (measured by pre-impairment discretionary accruals, see section 5.4.2.5 for more details) since goodwill impairments are accruals as well. If a firm shows positive pre-impairment discretionary accruals, it is expected 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

[111] Beatty and Weber (2006), Lapointe-Antunes et al. (2008), Zang (2008), and Ramanna and Watts (2012) provide evidence consistent with this hypothesis, whereas AbuGhazaleh et al. (2011), Hamberg et al. (2011), and Siggelkow and Zülch (2013) do not find a significant influence of leverage on impairments.

incentive to opportunistically inflate impairment losses if it shows negative pre-impairment discretionary accruals and thus is expected to engage in income-decreasing accrual-based earnings management. Therefore, the following hypotheses are formulated:

H_6: Firms with positive pre-impairment discretionary accruals are less likely to recognize goodwill impairments and report smaller impairment losses.

H_7: Firms with negative pre-impairment discretionary accruals are more likely to recognize goodwill impairments and report larger impairment.

5.4 Research Design

5.4.1 Sample

The initial sample consists of all observations of German firms that are listed on the regulated market of Frankfurt Stock Exchange (CDAX) during the fiscal years 2006 and 2013.[112] Consolidated financial statement and market data stem from the Worldscope database, whereas information on the carrying amounts of goodwill, goodwill impairment losses, CEO/CFO changes, and number of segments are hand-collected from annual reports.[113] Banks, insurance companies, and other financial service firms are excluded.[114] Observations are omitted if firms undergo mergers and acquisitions, became insolvent, or were liquidated. Observations are also excluded if firms are financially distressed (negative book value of equity or zero sales) or subject to an IPO as these observations are likely to have a firm-specific background. Observations of firms applying accounting principles other than IFRS and observations related to short fiscal years are excluded as well. Then, only observations of firms having a non-zero closing goodwill balance or reporting a goodwill impairment loss are considered. To ensure a reliable estimation of pre-impairment discretionary accruals (see section 5.4.2.5), at least seven firms per industry and year are required (Bartov et al. (2001)). Hence, observations of industry-years with less than seven firms are dropped from the sample. Finally, observations with missing data are deleted. This leaves a final sample of 2,127 firm-

[112] The sample period does not cover the fiscal year 2005 as it was the first mandatory application year of IFRS in Germany and of the revised IAS 36 in general. Hence, as the research design also depends on prior year data, this would lead to an exclusion of many firms for which IFRS data for 2004 is not available. Moreover, goodwill impairments might be affected by the first-time application of the impairment-only approach.

[113] The carrying amounts of goodwill and goodwill impairment losses are hand-collected as the Worldscope database does not provide data for all sample firms and sometimes includes erroneous data. Nevertheless, the hand-collected data was compared to data from Worldscope database and all differences were resolved.

[114] 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.

year observations from 354 firms. The sample selection process is shown in Table 7. In order to account for potential outliers or erroneous data, all variables are winsorized at 1 % and 99 %.

Table 7: *Summary of sample size*

Observations of CDAX listed firms for the periods 2006 to 2013		**4,811**
Less		
Banking, insurance, and financial services firm-year observations	840	
Observations subject to insolvency, liquidation, merger and acquisition, other financially distresses, 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**

5.4.2 Operationalization of Earnings Management Incentives

This section defines the variables of interest used to operationalize the earnings management incentives discussed in section 5.3.2.

5.4.2.1 Beating an Earnings Target

In order to identify firms just beating an earnings target, two indicator variables ($Target\_1$ and $Target\_2$) are built 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. The first positive interval (i.e., the interval to the right of an earnings target) is assumed to consist of firms that just beat an earnings target. In order to mitigate scaling problems, the earnings metrics are scaled by lagged total assets. Following Holland and Ramsay (2003) and therefore based on Silverman (1986), the interval width is defined as[115]

$$Mean\,[0.9\,min(\sigma;\ IQR/1.34)\,n^{-1/5};\,0.79\,IQR\,n^{-1/5}] \tag{16}$$

[115] This combined formula was first used by Quick and Wiemann (2012). The calculated interval widths differ only marginally from an alternative definition of Degeorge et al. (1999), who use the formula $2\,IQR\,n^{-1/3}$. This would yield 0.0106 for zero pre-impairment earnings and 0.0077 for the pre-impairment change in earnings. Moreover, the robustness checks in section 5.6 test a substantially smaller interval width (0.005) which is, e.g., used by Stora (2013).

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 H_1 as these firms cannot fall below the earnings target, even if goodwill was fully written-off. Both incentive variables are expected to be negatively correlated with goodwill impairments.

5.4.2.2 Conservative Smoothing and Big Bath Accounting

Prior literature defines the group subject to conservative smoothing incentives as the observations with scaled pre-impairment earnings higher than the median scaled pre-impairment earnings exceeding an earnings target and the incentive group for big bath accounting as the firms with scaled pre-impairment earnings lower than the median scaled pre-impairment earnings missing an earnings target (Riedl (2004); AbuGhazaleh et al. (2011); Stora (2013)). However, these studies consider only one target or each earnings target separately, i.e., the 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, this paper uses a refined approach considering both earnings targets (zero earnings and previous year's earnings) simultaneously. The incentive group for conservative smoothing is defined as observations that clearly exceed the higher of both targets, whereas big bath accounting incentives are expected for observations clearly missing the lower of both earnings targets. This leads to two indicator variables for the incentive groups. $Smooth$ 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. As an additional criterion, observations are excluded from the incentive group (i.e., the variable takes a value of 0

instead of 1) if the higher earnings target is missed after recording an impairment loss. This is consistent with hypothesis H_2. $Bath$ 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. Both incentive variables are expected to be positively correlated with goodwill impairments.

5.4.2.3 Changes in Senior Management

As pointed out in section 5.3.2.3, firms are considered to have a change in senior management if a CEO or CFO is newly appointed to the management board. Two indicator variables for firm-year observations subject to a change in senior management are used. *CEO* takes the value of 1 if the firm's CEO is newly appointed to the management board, and 0 otherwise. *CFO* takes the value of 1 if the firm's CFO is newly appointed to the management board, and 0 otherwise. Both incentive variables are expected to be positively correlated with goodwill impairments.

5.4.2.4 Debt Covenants

According to section 5.3.2.4, leverage is used as a proxy for the degree of debt covenant slack. Therefore, the incentive variable *LEV* is defined as total debt divided by pre-impairment total assets. It is expected to be negatively correlated with goodwill impairments.

5.4.2.5 General Earnings Management Behavior

To operationalize the general earnings management behavior not related to goodwill impairment accounting, the following cross-sectional performance-adjusted Jones model (Kothari et al. (2005)) is used.[116] The model explicitly excludes the effects of impairment losses and therefore determines the firms' pre-impairment discretionary accruals.

$$DA_t^* = TA_t^* - [\ \alpha_t\ (1/A_{t-1}) + \beta_t\ (\Delta REV_t - \Delta AR_t)/A_{t-1} + \gamma_t\ (PPE_t/A_{t-1}) + \delta_t\ ROA_t^*\ ] \quad (17)$$

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

[116] The performance-adjusted Jones model is used as empirical studies show that controlling for firm performance improves the model's specification and increases its power to detect earnings management (e.g., Dechow et al. (1995); Peasnell et al. (2000); Kothari et al. (2005)).

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

$\alpha_t, \beta_t, \gamma_t$, and δ_t are industry-specific estimated coefficients in year t derived from the following cross-sectional regression:

$$TA_t^* = \alpha_t\,(1/A_{t-1}) + \beta_t\,(\Delta REV_t - \Delta AR_t)/A_{t-1} + \gamma_t\,(PPE_t/A_{t-1}) + \delta_t\,ROA_t^* + \epsilon \qquad (18)$$

Based on their pre-impairment discretionary accruals, observations are divided in two groups: Firm-years with positive and firm-years with negative pre-impairment discretionary accruals. According to hypotheses H_6 and H_7, the former are less likely to record (large) goodwill impairments, whereas the latter are more likely to recognize (large) impairment losses. 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. It is expected to be negatively correlated with goodwill impairments.

5.4.3 Model Specification

In order to examine the influence of earnings management incentives on goodwill impairment accounting, two types of goodwill impairment patterns are evaluated:

1) Recognition of goodwill impairments (*IMP*)
2) 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:

$$Prob(IMP) = \frac{1}{1 + e^{-Z}}$$
$$where\ Z = \beta_0 + \beta_1 Target_1 + \beta_2 Target_2 + \beta_3 Smooth + \beta_4 Bath + \beta_5 CEO + \beta_6 CFO + \beta_7 LEV + \beta_8 posDA + \boldsymbol{\beta_X X} + \epsilon \qquad (19)$$

With respect to the magnitude of impairment losses scaled by lagged total assets (*IMP_MAG*), the following Tobit regression is estimated:

$$IMP\_MAG = \beta_0 + \beta_1 Target\_1 + \beta_2 Target\_2 + \beta_3 Smooth + \beta_4 Bath + \beta_5 CEO + \beta_6 CFO + \beta_7 LEV + \beta_8 posDA + \boldsymbol{\beta_X X} + \epsilon \qquad (20)$$

A Tobit regression model is used as the 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. The coefficients of the Tobit regression therefore represent the unbiased linear effect of the independent variables on the magnitude of impairment losses.[117]

X is a vector of control variables accounting for influencing factors of goodwill impairments. Table 8 outlines all earnings management incentive variables and control variables used in the regression models. The earnings management incentive variables are already explained in more detail in section 5.4.2, the control variables are discussed in the following.

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 follows the approach of prior studies presented in section 5.3.1 and includes proxies related to economic impairment of goodwill at firm level. The control variables are organized by the following four categories: market perception, firm performance, impairment test characteristics, and other influencing factors.

Market Perception

First, two control variables based on the market's perception of firm value are included. 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. This is confirmed by Beatty and Weber (2006), Lapointe-Antunes et al. (2008), AbuGhazaleh et al. (2011), and Stora (2013). The reduced impairment necessity might also be the result of a higher cushion against

[117] 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.

impairment (see section 5.2.1). According to IAS 36.12 (d), a market to book value lower than one is an indication for impairments. From a firm-wide perspective, this is consistent if the market value represents a suitably estimate for the recoverable amount. Therefore, an indicator variable *MBV<1* is included which is expected to be positively associated with goodwill impairments.

Table 8: *Definition of regression variables*

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

Firm Performance

Similar to prior studies (e.g., Riedl (2004); Zang (2008); AbuGhazaleh et al. (2011); Stora (2013)), control variables for firm performance and change in firm performance are used. *Growth* measures the firm's change in sales. Growing firms are expected to 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 for 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). Firms with higher current performance are expected to 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, whereas a reduced profitability might indicate a long-term reduction in performance and therefore a higher likelihood of impairments. Therefore, all three performance variables are expected to be negatively correlated with goodwill impairments.

Impairment Test Characteristics

The next two variables control for 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. This is consistent with the findings of Lapointe-Antunes et al. (2008), Masters-Stout et al. (2008), Ramanna and Watts (2012), and Stora (2013). Following Ramanna and Watts (2012), the number of segments (*Segment*) is used as a proxy for the number of CGUs. This represents the minimum number of a firm's CGUs to which goodwill can be allocated (see section 5.2.1). The influence on goodwill impairments is not clear, though. 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 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). Therefore, a coefficient sign for *Segment* is not predicted, which is in line with mixed previous findings.[118]

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 firm 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. Hence, *Size* and *Year* particularly control for omitted variables.

5.5 Results

5.5.1 Descriptive Statistics

Table 9 provides descriptive statistics for goodwill impairment variables, earnings management incentive variables, and control variables.

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 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. CEOs are

[118] Ramanna and Watts (2012) find a negative association between number of segments and magnitude of goodwill impairments, whereas Lapointe-Antunes et al. (2008) establish a positive influence on the magnitude of initial adoption impairment losses. With respect to firms having more than one segment, Beatty and Weber (2006) find a positive influence on the likelihood of initial adoption impairments, whereas Beatty and Weber (2006) and AbuGhazaleh et al. (2011) do not find a significant impact on the magnitude.

newly appointed to the management board in 6.8 % of the observations (*CEO*), whereas new CFOs refer to 10.3 % (*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 9: *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[1]	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

[1] IMPonly equals IMP_MAG for a subsample of impairment observations. It is only used for the descriptive analysis.

5.5.2 Univariate Analysis

Table 10 shows the results of the univariate tests of differences between impairment and non-impairment observations for all earnings management incentive variables as well as control variables. First, indicator variables are tested using the chi-squared test. Then, the results for continuous variables based on t-test and Mann-Whitney U test are presented.

As expected, the results for *Target_1*, *Target_2*, and *posDA* show that the proportion of observations just exceeding an earnings target and observation with positive pre-impairment discretionary accruals are significantly higher in the case of non-impairment compared to impairment observations. Expectations are also met for the earnings management incentive variables *Bath*, *CEO*, and *CFO* as the proportion of observations in the case of a big bath incentive and a change in CEO/CFO is significantly higher for the impairment sample. *Smooth* does not meet expectations as a slightly higher, but insignificant proportion of non-impairment observations has a conservative smoothing incentive. However, this is not surprising since the test of differences does not control for the economic necessity of impairments. The lower impairment rate could rather be attributed to the higher performance of these firms than to a non-existing incentive for conservative smoothing. Hence, the multivariate results in the next section are more representative.[119] The earnings management incentive variable *LEV* does also not meet expectations as the mean and median leverage is significantly higher in the case of impairment observations. With respect to the German institutional setting, this is further discussed in the next section.

All control variables meet expectations, i.e., *MBV*, *Growth*, *OI*, and ΔOI are significantly higher for non-impairment observations, whereas *MBV<1* and *GW* is significantly higher for impairment observations. Moreover, the impairment sample shows significantly higher values for *Segment* and *Size*.

Table 11 shows the results of the correlation analysis. Considering the correlations of the earnings management incentive as well as control variables with the dependent impairment variables *IMP* and *IMP_MAG*, the results are consistent with the univariate findings. Multicollinearity seems not to be a serious issue as only the correlation between *MBV* and *MBV<1* shows a critical Spearman's rho of -0.727, which is not surprising since they are correlated by definition.

[119] This is also true for all other earnings management incentive variables since it is crucial that the research design controls for economic and other factors determining the likelihood and magnitude of goodwill impairments in order to yield reliable and representative results (see section 5.4.3).

Table 10: *Univariate analysis – test of differences*

	Impairment observation (n = 459)		***Non-impairment observation (n = 1,668)***		***Test of differences***	
	Proportion		*Proportion*		*Chi-squared test*	
Target_1	3.7 %		6.5 %		**	
Target_2	7.0 %		13.2 %		***	
Smooth	24.2 %		27.2 %			
Bath	17.0 %		5.0 %		***	
CEO	16.6 %		4.1 %		***	
CFO	21.4 %		7.3 %		***	
posDA	36.4 %		46.8 %		***	
MBV<1	27.2 %		21.6 %		***	
	Mean	*Median*	*Mean*	*Median*	*t-test*	*Mann-Whitney U test*
LEV	0.574	0.592	0.517	0.542	***	***
MBV	1.889	1.419	2.044	1.566	**	***
Growth	0.044	0.037	0.087	0.066	***	***
OI	0.011	0.035	0.057	0.057	***	***
ΔOI	- 0.010	- 0.001	0.006	0.007	***	***
GW	0.181	0.138	0.156	0.108	***	***
Segment	3.004	3.000	2.703	3.000	***	***
Size	6.198	5.759	5.657	5.310	***	***

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

Table 11: *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***
		0.000	0.012	0.000	0.201	0.000	0.000	0.000	0.000	0.000	0.034	0.006	0.000	0.000	0.000	0.002	0.000	0.000
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***
	0.000		0.143	0.001	0.039	0.000	0.000	0.000	0.452	0.003	0.002	0.000	0.086	0.000	0.000	0.000	0.475	0.000
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
	0.012	0.015		0.414	0.000	0.001	0.578	0.063	0.000	0.949	0.002	0.000	0.051	0.000	0.047	0.680	0.645**	0.604
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
	0.000	0.000	0.414		0.000	0.000	0.028	0.015	0.173	0.855	0.173	0.118	0.781	0.005	0.697	0.095	0.148	0.000
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***
	0.201	0.145	0.000	0.000		0.000	0.009	0.051	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.005	0.174	0.000
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***
	0.000	0.000	0.001	0.000	0.000		0.000	0.000	0.876	0.000	0.014	0.000	0.000	0.000	0.000	0.380	0.003	0.000
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
	0.000	0.000	0.578	0.028	0.009	0.000		0.000	0.008	0.139	0.022	0.026	0.001	0.000	0.000	0.193	0.178	0.556
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*
	0.000	0.000	0.063	0.015	0.051	0.000	0.000		0.003	0.000	0.434	0.042	0.050	0.000	0.001	0.572	0.049	0.063
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***
	0.000	0.000	0.000	0.120	0.000	0.578	0.007	0.003		0.078	0.000	0.000	0.150	0.000	0.516	0.020	0.000	0.000
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***
	0.000	0.000	0.949	0.855	0.004	0.000	0.139	0.000	0.142		0.002	0.560	0.000	0.215	0.131	0.000	0.557	0.003
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
	0.002	0.001	0.000	0.786	0.000	0.000	0.005	0.508	0.000	0.027		0.000	0.000	0.000	0.000	0.000	0.507	0.871
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***
	0.006	0.001	0.000	0.118	0.000	0.000	0.026	0.042	0.001	0.560	0.000		0.000	0.000	0.000	0.757	0.004	0.000
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***
	0.000	0.000	0.007	0.424	0.000	0.000	0.000	0.034	0.003	0.000	0.000	0.000		0.000	0.000	0.000	0.695	0.004
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***
	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000		0.000	0.391	0.010	0.000
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
	0.000	0.000	0.000	0.936	0.000	0.000	0.000	0.002	0.123	0.912	0.000	0.000	0.000	0.000		0.144	0.146	0.371
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***
	0.000	0.000	0.758	0.058	0.035	0.757	0.190	0.210	0.007	0.000	0.006	0.517	0.000	0.006	0.078		0.010	0.000
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***
	0.000	0.000	0.924	0.221	0.298	0.001	0.251	0.059	0.000	0.303	0.000	0.001	0.924	0.028	0.059	0.086		0.000
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***	-
	0.000	0.002	0.435	0.000	0.000	0.000	0.672	0.032	0.000	0.001	0.000	0.000	0.036	0.000	0.030	0.000	0.000	

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

5.5.3 Multivariate Analysis

The results of the multivariate analysis are presented in Table 12. Columns three and four refer to the logistic regression for the likelihood of impairment recognition (*IMP*), whereas columns five and six refer to the Tobit regression for the scaled magnitude of goodwill impairments (*IMP_MAG*). The coefficients of the logistic regression can be interpreted 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, the respective change in odds for indicator variables can be calculated by using the natural exponential function and the regression coefficients as argument. For continuous variables, it is more representative to use the change of the independent variable's value by one standard deviation, i.e., to use the regression coefficient times the standard deviation as argument. The coefficients of the Tobit regression represent the unbiased linear effect on the latent (uncensored) magnitude of impairment losses (see section 5.4.3). Hence, they can be interpreted analogously to an OLS regression, except for the difference that the coefficients are corrected for the censoring effect (Windzio (2013, pp. 268-269)).

The coefficients of *Target_1* and *Target_2* are significantly negative at 1 percent level for *IMP* (-0.704 and -0.637). Hence, firms just exceeding zero pre-impairment earnings are only 0.49 times as likely and firms with pre-impairment earning just exceeding previous year's earnings are only 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 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 (hypothesis H_1). As the regression models also control for economic and other factors determining the likelihood and magnitude of goodwill impairments, the results indicate that firms might opportunistically avoid (larger) goodwill impairments in order to beat an earnings target. This might serve as a positive signal to investors and other stakeholders using zero earnings or previous year's earnings as a reference point to evaluate the firm's performance and development. On the contrary, reporting a loss might particularly raise questions on the firm's profitability and not beating previous year's earnings might indicate a negative future trend in firm performance.

Table 12: *Regression results for impairment variables (IMP and IMP_MAG) on earnings management incentive variables and control variables*

	Predicted sign	***IMP***		***IMP_MAG***	
		β	*p-value*	β	*p-value*
Intercept		- 3.655***	0.000	- 0.015	0.104
Target_1	-	- 0.704***	0.007	- 0.013**	0.013
Target_2	-	- 0.637***	0.002	- 0.013***	0.003
Smooth	+	0.334**	0.016	0.006**	0.033
Bath	+	0.948***	0.000	0.021***	0.000
CEO	+	0.955***	0.000	0.026***	0.000
CFO	+	0.781***	0.000	0.015***	0.000
LEV	-	0.976***	0.009	0.014*	0.076
posDA	-	- 0.268**	0.013	- 0.006**	0.016
MBV	-	- 0.034	0.224	- 0.001	0.269
MBV<1	+	0.184	0.121	0.004	0.130
Growth	-	- 0.309	0.140	- 0.004	0.236
OI	-	- 2.925***	0.000	- 0.086***	0.000
ΔOI	-	- 0.931	0.167	- 0.010	0.311
GW	+	1.256***	0.001	0.056***	0.000
Segment	?	0.110**	0.039	0.002*	0.068
Size	?	0.167***	0.000	0.001*	0.096
Year		Yes		Yes	
Industry		Yes		Yes	
Nagelkerke R^2		0.201		- [120]	
χ-squared		297.4***		355.1***	
n		2,127		2,127	

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

For *Smooth*, the coefficient of the logistic regression is positive (0.334) and significant at 5 percent level. This means that firms clearly exceeding an earnings target are 1.40 times as likely to recognize an impairment loss as firms not clearly exceeding a target. With respect to the magnitude of impairment losses, the coefficient of the Tobit regression is also positive (0.006) at 5 percent level. Contrary to the insignificant univariate findings, both results therefore support hypotheses H_2. This is due to the fact that it is particularly crucial to control for economic (and other) impairment factors when considering incentives for conservative

[120] Note that it is not possible to calculate a meaningful pseudo R^2 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 (http://www.stata.com/support/faqs/statistics/pseudo-r2 [Accessed October 1, 2016]).

smoothing as the incentive variable itself is related to firm performance. Hence, firms clearly exceeding an earnings target have per definition a higher performance and might therefore have a reduced impairment likelihood compared to other firms. Accounting for these factors, the multivariate analysis indicates that firms report relatively more often (higher) goodwill impairments and therefore might opportunistically inflate impairment losses as they do not risk falling below an earnings target. Hence, smoothed earnings might be interpreted as a positive signal by investors and other stakeholders while providing the management the possibility to inflate future earnings.

With respect to incentives for big bath accounting, it is also crucial to account for economic (and other) impairment factors. In particular, these firms are characterized by a lower firm performance and therefore might have per definition an increased necessity to recognize (higher) impairment losses. Hence, not accounting for these factors could lead to biased results and the observation of more frequent and higher impairment losses could be misinterpreted as an indicator for earnings management. Looking at the multivariate results for *Bath*, the coefficient of the logistic regression (0.948; 1 percent level) shows that the likelihood to recognize an impairment loss increases by 158 % if a firm clearly misses an earnings target. Similarly, the Tobit coefficient is positive (0.021) at 1 percent level. Hence, hypothesis H_3 concerning big bath accounting is supported. Firms might opportunistically report impairments more frequently and with higher amounts than economically necessary as the earnings situation is already bad. Recognizing impairment losses in such a situation might therefore be a less negative signal than risking impairments in future periods with higher earnings. Moreover, the management might signalize to investors and other stakeholders that it is addressing the causes of impairments.

In line with the expectations of hypothesis H_4, the coefficients of *CEO* and *CFO* are significantly positive for *IMP* (0.955 and 0.781) at 1 percent level. This means that the likelihood to recognize an impairment loss increases by 160 % if a CEO is newly appointed to the management board and by 118 % if a CFO is newly appointed to the management board. The coefficients for *IMP_MAG* are also positive (0.026 and 0.015) at 1 percent level. This suggests that firms experiencing a change in CEO or CFO report larger impairment losses. The results therefore support the expectation that a new senior management might pursue a "cleaning the decks" strategy to decrease the risk of future impairments and to start from a lower performance level. On the contrary, the old management might be more reluctant to recognize (large) impairment losses, e.g., because these losses might be attributed to man-

agement failures or because the CEO or CFO has the intention to leave the firm with the best possible profitability. Similarly to the previous earnings management incentive variables, it is crucial that the research design controls for economic (and other) impairment factors. In particular, poor firm performance or poor market perception might be the reason for both the recognition of (large) impairment losses and the change in CEO or CFO. Therefore, the research design controls for these factors, i.e., the effects observed for *CEO* and *CFO* abstract from effects related to firm performance and market perception.[121]

Hypothesis H_5 concerning debt covenants is not confirmed, i.e., managers of highly leveraged firms do not seem to have incentives to avoid (large) goodwill impairments in order to avoid costly debt covenant violations. In fact, the coefficients of *LEV* (0.976 for *IMP* and 0.014 for *IMP_MAG*) are, contrary to expectations, significantly positive at 1 percent and 10 percent level, respectively. With respect to the likelihood to recognize an impairment loss, this indicates an increase by 20 % if the firm's leverage increases by one standard deviation. This might be due to different explanations. First, it is possible that *LEV* does not sufficiently measure the firms' actual exposure to costly debt covenant violations (e.g., because it is not sufficiently associated with the firms' likelihood and costs of violating debt covenants or because debt covenants might not always include goodwill in calculating leverage). However, this would imply insignificant regression coefficients. Therefore, the significant positive results might rather be an indicator for the influence of the specific German setting. As outlined in section 5.2.3, debt financing plays a more important role in continental European countries and particularly in Germany. Therefore, large creditors like banks have a more important role in monitoring the management and might have a stronger influence on the firm's accounting. Hence, influential providers of debt capital (indicated by a high leverage) might force the management to account more conservatively. 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 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 5 percent level. The results therefore

[121] Considering the correlation between *CEO*/*CFO* and the control variable for firm performance and market perception (*Growth*, *OI*, *ΔOI*, *MBV*, *MBV<1*), there is a negative correlation between changes in senior management and firm performance/market perception (see Table 11). However, there is no indication for a multicollinearity issue as the correlation coefficients are relatively low.

support hypotheses H_6 and H_7, i.e., firms exerting income-increasing accrual-based earnings management not related to impairment accounting are less likely to report goodwill impairments and report smaller impairment losses, whereas firms with income-decreasing accrual-based earnings management are more likely to report (larger) goodwill impairments. Hence, *posDA* seems to account for situations with earnings management incentives related to goodwill impairment accounting which are not covered by the previously discussed specific earnings management incentives. This increases the specification of the regression models and provides additional evidence that goodwill impairment accounting is used as a device for earnings management.

Looking at the control variables, all coefficients in both models show the predicted sign. *MBV* has negative coefficients (-0.034 and -0.001), whereas *MBV<1* has positive coefficients (0.184 and 0.004). However, the coefficients are insignificant, which seems to be attributable to the relatively high collinearity between both variables (see section 5.5.2). Including each variable separately yields significant results, but slightly reduces the coefficients of determination. Therefore, both variables are retained in the regression models and the results indicate that a firm's higher relative market value reduces the necessity of impairments, whereas a market value of equity below its book value seems to be an indication for impairments. All performance measures, i.e., *Growth* (-0.309 and -0.004), *OI* (-2.925 and -0.086), and ΔOI (-0.931 and -0.010), show negative coefficients. However, operating income seems to be the most important performance measure as it is the only significant one (at 1 percent level). Hence, the results confirm the expectation that firms are less likely to report (large) impairment losses if their financial performance is higher. This might be due to a lower economic necessity of impairment losses and goodwill impairment tests with a higher cushion against impairment. The coefficients of *GW* (1.256 and 0.056) are significantly positive at 1 percent level. This indicates that the likelihood for and magnitude of impairments increase with the goodwill amount recognized before impairments. With respect to *Segment* and *Size*, no coefficient signs were predicted. The number of segments is used as a proxy for the number of CGUs. The coefficients of *Segment* (0.110 and 0.002) are significantly positive at 5 percent and 10 percent level, respectively. This supports the argumentation that a larger number of CGUs increases likelihood and amounts of impairments as it does not allow netting potential impairment losses in one CGU with surpluses in other CGUs. Moreover, a higher number of CGUs might indicate that a firm carries out more impairment tests. The coefficients of *Size* (0.167 and 0.001) are also positive and significant at 1 and 10 percent level, respectively. The reason is not clear, though. 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.

5.6 Robustness Checks

Alternative variable definitions

For the earnings management incentive variables *Target_1*, *Target_2*, *CEO*, and *CFO*, alternative definitions are used. With respect to the beating of earnings targets, Stora (2013) uses an interval width of 0.005,[122] which is smaller than calculated in this study (i.e., 0.0108 and 0.0079, respectively). Using this smaller interval width does not change the results, though. The coefficients for *Target_1* (-1.177 for *IMP* and -0.023 for *IMP_MAG*) as well as the coefficients of *Target_2* (-0.617 and -0.014) are significantly negative at 1 percent level. Concerning changes in senior management, Masters-Stout et al. (2008) and AbuGhazaleh et al. (2011) use incentive variables referring to the first two years of a new CEO instead of only the first year. Using the first two years of a new CEO and CFO yields results consistent with the previous findings. The coefficients for *CEO* (0.872 and 0.018) and for *CFO* (0.490 and 0.013) are all positive and significant at 1 percent level.

Subsample of firms reporting an impairment loss at least once

As another robustness check, the main analyses are repeated using a subsample of firms reporting an impairment loss at least once during the sample period. Firms that did not report an impairment loss over the whole sample period 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 not able to use goodwill impairment tests as a device for earnings management. This could bias the findings. The results for the subsample of 1,445 observations (i.e., 67.9 % of full sample) are presented in Table 13. They are consistent with the main analyses, i.e., no significant bias is found and the findings remain unchanged.

[122] 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). Nevertheless, 0.005 is only used as robustness check as it is more appropriate to calculate a suitable interval width for each earnings distribution based on the formulas provided by literature (see section 5.4.2.1).

Table 13: *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*
Intercept		- 3.090***	0.000	- 0.001	0.922
Target_1	-	- 0.624**	0.018	- 0.012**	0.029
Target_2	-	- 0.399**	0.041	- 0.009**	0.029
Smooth	+	0.326**	0.024	0.005*	0.065
Bath	+	0.856***	0.000	0.017***	0.000
CEO	+	0.914***	0.000	0.024***	0.000
CFO	+	0.733***	0.000	0.013***	0.000
LEV	-	0.618	0.119	0.004	0.595
posDA	-	- 0.244**	0.029	- 0.005**	0.044
MBV	-	- 0.005	0.459	0.000	0.917
MBV<1	+	0.262*	0.060	0.006**	0.055
Growth	-	- 0.289	0.166	- 0.003	0.279
OI	-	- 1.999***	0.002	- 0.068***	0.000
ΔOI	-	- 0.152**	0.044	- 0.013	0.251
GW	+	1.125***	0.004	0.057***	0.000
Segment	?	0.069	0.233	0.001	0.269
Size	?	0.173***	0.000	0.001	0.307
Year		Yes	Yes	Yes	Yes
Industry		Yes	Yes	Yes	Yes
Nagelkerke R^2		0.185		-	
χ-squared		205.9***		281.6***	
n		1,455		1,455	

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

5.7 Conclusion

The study is motivated by the IASB's recent post-implementation review on business combinations, the ongoing lively debate on the reliability of impairment testing, and the high practical relevance of this topic. It focuses on the question whether earnings management incentives have an influence on the likelihood to recognize goodwill impairments and the magnitude of impairment losses and therefore whether goodwill impairment tests are used by management as a device for earnings management.

Using a sample of 2,127 firm-year observations from 354 firms listed on the regulated market of Frankfurt stock exchange (CDAX), 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. The findings suggest that firms just exceeding an earnings target (zero earnings or previous year's earnings) are less likely to recognize goodwill impairments and report smaller impairment losses in order to avoid missing this target, which would be a negative signal to investors and other stakeholders. On the contrary, firms whose earnings before goodwill impairment clearly exceed or clearly miss an earnings target are more likely to recognize goodwill impairments and report larger impairment losses (i.e., income smoothing and big bath accounting, respectively). The intention of management might be to inflate future earnings and to maximize firm value. The results also suggest that newly appointed CEOs and CFOs tend to engage in a "cleaning the decks" strategy and therefore report impairments more frequently and with higher amounts. Moreover, the findings indicate that management tends to align its goodwill impairment accounting with its general earnings management behavior, which provides additional evidence that firms use goodwill impairment tests as a device for earnings management. With respect to the avoidance of debt covenant violations, the findings are not consistent with prior literature as they do not confirm the earnings management hypothesis that managers of highly leveraged firms have incentives to engage in income-increasing earnings management. Instead, they suggest that the specifics of the German institutional setting with higher importance of debt financing lead to more frequent and larger goodwill impairments. Hence, influential providers of debt capital, which might for example be represented in the supervisory board (and audit committee) and therefore might have a stronger influence on the firm's accounting, might force the management to account more conservatively.

The findings have implications for the IASB and other regulators since it is questionable whether the current requirements are actually able to devise a sufficiently rigorous and operational impairment test to provide useful information to financial statement users. Hence, it should be discussed whether changes in regulation can provide more reliable information or whether a return to the amortization regime is useful. 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. Moreover, the results are of interest for capital market participants and other financial statement users when interpreting goodwill numbers.

The study is subject to some limitations. First, the results are based on a German sample, i.e., they refer to a distinctive continental European institutional setting. In particular compared to Anglo-American countries applying IFRS, it is characterized by a weaker legal protection of investors with a lower developed equity market and a higher importance of debt financing. Moreover, Germany has implemented a two-tier board system. Hence, the results are more relevant for Germany and other continental European countries with similar institutional setting (e.g., Austria, France, or Switzerland; see section 5.2.3 for a detailed discussion). Second, the research design is only able to control for economic and other relevant factors influencing the likelihood and amount of goodwill impairments at firm level instead of CGU level since such data is currently not available. If available in future, this could be subject to 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.

6 Research Paper 2: Goodwill Impairments - Value Relevance, Perceived Timeliness, and the Role of Auditors

The following paper can be read independently and addresses the second research question raised in section 1.1: Are goodwill impairments perceived as value relevant and timely by capital market participants and is this perception mediated by auditor characteristics related to the perceived quality of audits like Big 4 auditor, industry leader, non-audit fee ratio, and auditor tenure?

The paper is currently under review for publication in an international financial accounting research journal.[123]

Abstract

This study investigates whether goodwill and goodwill impairments are value relevant, whether goodwill impairments are perceived as timely, and whether specific auditor characteristics affect the perceived timeliness. It therefore contributes to central questions in accounting research: Is managerial discretion over accounting numbers (accounting choice) good or bad for stakeholders and does audit quality has an impact on this relationship? It is motivated by the IASB's recent post-implementation review on business combinations, the ongoing debate on the decision usefulness of impairment testing, and the high practical relevance of this topic. The sample consists of 1,841 firm-year observations from German listed firms for the periods 2006 to 2013. The results show that goodwill and goodwill impairments are value relevant and that the value relevance is stronger for profit firms than for loss firms. With respect to the timeliness, the results indicate that goodwill impairments are not perceived to be recognized timely, particularly in the case of profit firms. Moreover, the findings suggest that impairments are perceived as timelier when the firm is audited by a Big 4 auditor and an industry leader, whereas the perceived timeliness decreases with a higher non-audit fee ratio.

6.1 Introduction

With the adoption of the revised IAS 36 on March 31, 2004, the long-accepted straight-line amortization of goodwill was replaced by a new impairment-only approach, i.e., goodwill has to be tested for impairment at least once a year. The IASB's objective was to devise a

[123] Section 6 is largely based on the working paper of Albersmann and Quick with the title "Value Relevance, Perceived Timeliness, and the Role of Auditors".

rigorous and operational impairment test which provides more useful information to users of a firm's financial statements than an approach in which goodwill is amortized (IAS 36.BC131G). However, as the recent post-implementation review on business combinations, which was completed in June 2015 (IASB (2015a)), shows, there is still a lively debate on the usefulness of impairment testing even one decade later (IASB (2014, pp. 21-26)). It is discussed whether the impairment test is able to adequately reflect the economic value of goodwill and its consumption (i.e., goodwill impairments) and the IASB concluded that it 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 (IASB (2015a, p. 8)). On the one hand, proponents of the impairment-only approach argue that it enables the management to convey private information on future cash flows and helps stakeholders to assess and verify the success of an acquisition and the firm's future performance. On the other hand, opponents criticize that the current approach leads to a delayed recognition of goodwill impairments and that the inherent high degree of discretion is used by the management to engage in opportunistic earnings management (IASB (2014, pp. 21-26)). Also Hans Hoogervorst (Chairman IASB) questioned whether the current requirements provide sufficient rigor to reliably report goodwill impairments (Hoogervorst (2012)) and suggested that goodwill impairments often came too late during the financial crisis (ESMA (2013b, p. 5)). In this context, particularly auditors might be able to limit opportunistic management behavior as they play an important role in the institutional setting to improve financial reporting quality.

Against this background, the paper seeks to gain additional empirical evidence on the perceived relevance and timeliness of goodwill impairment testing. The relevance of this topic is not only highlighted by the controversial debate pointed out above, but also by the fact that goodwill impairment tests are generally in the main focus of the DPR and the ESMA (e.g., DPR (2013); ESMA (2013a)) and that they are a time-consuming and costly exercise which should come along with sufficiently high benefits (IASB (2014, p. 25)). The focus is on two aspects of goodwill impairment accounting. First, it is examined whether goodwill and goodwill impairments are value relevant. This provides insights on the impairment-only approach's ability to reflect the economic value of goodwill as perceived by capital market participants. Then, the perceived timeliness of goodwill impairments is evaluated. This refers to a more restrictive aspect of value relevance as goodwill impairments could be value relevant, but not perceived as timely information, which would reduce their informational value. In particular, it could be possible that the market anticipates impairments earlier than

they are recognized in financial statements. Moreover, the influence of auditor characteristics is examined as the perceived audit quality might have an influence on the perceived timeliness of goodwill impairments. Hence, the study contributes to central questions in accounting research: Is managerial discretion over accounting numbers (accounting choice) good or bad for stakeholders and does audit quality has an impact on this relationship?

To analyze these aspects, a sample of 1,841 firm-year observations from 306 German firms listed on the regulated market of Frankfurt stock exchange (CDAX) is used encompassing the period 2006-2013. The results suggest that goodwill and goodwill impairments are value relevant and that the association between goodwill impairments and a decrease in market value of equity is stronger for profit firms than for loss firms. Concerning the timeliness, the findings indicate that investors do not perceive goodwill impairments to be recognized timely. Particularly profit firms tend to delay impairment losses by one to two years, whereas loss firms seem to recognize goodwill impairments timelier. With respect to the influence of auditor characteristics, the findings suggest that impairments are perceived as timelier when the firm is audited by a Big 4 auditor and an industry leader. On the contrary, the perceived timeliness decreases with a higher non-audit fee ratio. Since goodwill impairment tests are often in the main focus of auditors, this might be due to an increase (decrease) in perceived audit quality. Hence, investors might perceive the results of impairment tests as more (less) reliable and therefore timely.

In a broader context, the study contributes to the literature on accounting choice (Fields et al. (2001)) and on fair value measurement (Landsman (2007)). More specifically, the study contributes to the existing literature especially for two reasons. First, a study examining the value relevance and perceived timeliness of goodwill impairments in Germany does not exist and evidence for other continental European countries is very limited. There is only one study assessing the value relevance for a sample of European firms (Laghi et al. (2013)) and one study addressing the value relevance and perceived timeliness of goodwill impairments in Sweden (Hamberg and Beisland (2014)). Moreover, the results of other prior studies might not be generalizable as they refer to other institutional settings and/or the US-GAAP impairment test (which is comparable, but not identical; see footnote 134). Hence, the results of this study are also relevant for other continental European countries applying IFRS (e.g., Austria, France, or Switzerland; see section 6.2.3). Second, the study is the first to evaluate the influence of different auditor characteristics on the market perception of goodwill impairments, thereby providing additional insights on the perceived timeliness of impairment tests.

This also represents a different way to investigate the role of auditors in improving financing reporting quality and therefore complements the accounting literature on perceived audit quality.

The reminder of the paper is organized as follows. Section 6.2 provides background information on the IFRS accounting requirements for goodwill, theoretical aspects of value relevance and (perceived) timeliness of goodwill impairments, and the influence of the German and continental European institutional setting on value relevance and perceived timeliness. Section 6.3 presents an overview of prior research and develops the hypotheses of the study. The sample selection and the model specification are described in section 6.4, followed by the empirical results including robustness checks in section 6.5. Finally, section 6.6 draws conclusions and discusses limitations of the study.

6.2 Background

6.2.1 IFRS Accounting Requirements for Goodwill

The IFRS accounting requirements for goodwill differentiate between internally generated goodwill and goodwill arising from a business combination. While the former is prohibited to be recognized (IAS 38.48), IFRS 3.32 requires the latter to be recognized as the excess of the fair value 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).

With the adoption of the revised IAS 36 on March 31, 2004, the IASB prohibited the straight-line amortization of goodwill and introduced an impairment-only approach. The standard was adopted by the EU on December 31, 2004 and thus was applicable for all fiscal years starting from January 1, 2005 onwards. Since then, 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)[124] to which goodwill has been allocated has to be compared with its carrying amount. If the

[124] A CGU is the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets (IAS 36.6).

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 defined as the higher of its fair value less costs of disposal and its value in use (IAS 36.6). In most cases, the recoverable amount depends on discounted cash flow methods, i.e., the impairment test is based on the management's assumptions and estimations concerning the future economic development of a CGU and therefore conceptually provides a certain degree of discretion.[125]

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 internally generated 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. This dilutes the information provided to financial statement users and is not compatible with the prohibition to recognize internally generated goodwill. Therefore, it is important to at least reduce these issues by appropriately allocating goodwill to the lowest possible CGU level. The IASB was aware of this shortcoming, but accepted the consequences (IAS 36.BCZ44, BC135, BC191).

6.2.2 Value Relevance and Perceived Timeliness of Goodwill and Goodwill Impairments

In order to be useful for the decision-making process of stakeholders, the conceptual framework of the IFRS demands accounting information to be relevant and faithfully represented. The relevance of accounting information can be based on its predictive value and/or its confirmatory value (IASB Framework QC7), whereas the faithful representation refers to information which is reliable and therefore complete, neutral, and free from errors (IASB Framework QC12). The decision usefulness is enhanced if the information conveyed is comparable, verifiable, timely, and understandable (IASB Framework QC4).

Value relevance studies, also referred to as association studies, represent an empirical operationalization of the IASB's criteria with respect to the capital market. They assess whether the information conveyed by accounting numbers is relevant to investors' firm valuation and measured reliably enough to be reflected in capital market figures (Barth et al. (2001, p. 80)). Hence, they examine the effectiveness of accounting data as a quantitative

[125] Discretion in accounting does not have a negative connotation if it is restricted to an optimal degree. While discretion might also offer room for opportunistic earnings management, it allows the management to improve the information value of financial statements by signaling private information on future performance (see e.g., Sankar and Subramanyam (2001)).

summary of the events that have affected the firm to date or over the fiscal (return) period (Easton (1999, p. 411)) and the primary focus of these studies is to extend the knowledge regarding the perceived relevance and reliability of accounting numbers (Barth et al. (2001, pp. 79-80)).

Based on two types of value relevance studies, the terms "value relevance" and "perceived timeliness" can be differentiated. The value relevance of accounting numbers is assessed by studies examining whether these accounting numbers are associated with the firms' market value of equity (level model, see section 6.4.2.1). This measures, as a key role of financial statements, the capability of accounting data to summarize relevant information that has affected the firm to date and might also be available from other sources (Barth et al. (2001, p. 80); Beaver (2002, p. 461)). With respect to goodwill and goodwill impairments, the value relevance therefore provides insights on the impairment-only approach's ability to reflect the economic value of goodwill as perceived by capital market participants. Perceived timeliness refers to a more restrictive aspect of value relevance as it addresses the association between the annual return on shares and accounting numbers (return model, see section 6.4.2.2). The objective of perceived timeliness studies is to assess not only whether, but also how quickly accounting numbers capture changes in the relevant information set (Kothari (2001, p. 116)). Hence, they measure the capability of accounting data to timely summarize relevant information that has affected the firm over the return period and do not consider financial information as timely if it is associated with events occurring before or after the respective return period. With respect to goodwill impairments, the perceived timeliness therefore addresses the question whether impairment losses are recognized during the appropriate fiscal period and therefore whether they are perceived as timely by capital market participants.

In order to assess the value relevance of goodwill impairments, it is crucial to consider the value relevance of goodwill first. Goodwill acquired in business combinations is an increasingly important economic resource for many firms, which is emphasized by the fact that goodwill often represents a high proportion of acquisition costs of acquired targets[126] as well as a high proportion of the firms' total assets and book value of equity.[127] The actual "core

[126] For example, Glaum and Wyrwa (2011) find an average goodwill-to-acquisition cost ratio of 62 % for 322 large firms listed in 12 European countries in 2009. They also find that goodwill represents more than half of the acquisition costs in 46 % of the transactions. Similarly, Detzen and Zülch (2012) find a mean goodwill-to-acquisition cost ratio of 60 % considering 123 acquisitions of European firms during the periods 2005 to 2008.

[127] The descriptive statistics in section 6.5.1 show that goodwill represents on average 14.7 % of total assets and 44.3 % of the book value of equity. The high relevance is also confirmed by descriptive studies with respect

goodwill" that meets the recognition criteria of an asset and therefore is supposed to be recognized might comprise (1) the fair value of the going concern element of the acquiree's existing business and (2) the fair value of expected synergies and other benefits from combining the acquirer's and acquiree's net assets and businesses (Johnson and Petrone (1998, p. 295); IFRS 3.BC313-BC318).[128] Compared to other assets, the economic value of goodwill is more nebulous, which particularly is due to the fact that goodwill is only able to contribute indirectly (in combination with other assets) to future net cash flows (Johnson and Petrone (1998, p. 297)). The value relevance of goodwill is therefore based on the expected future economic benefits related to synergies, restructurings, or strategic achievements of the business combination as well as other value relevant but unrecognized intangible factors and competitive advantages like organizational structure, distribution network, firm reputation, exceptional attractiveness of products, market power, market potential, location advantages, or quality of assembled workforce (e.g., Pellens et al. (2012, pp. 735-736); Gundel et al. (2014, p. 131); Kuhner (2014, p. 20)).

After the initial recognition of goodwill, it is tested for impairment as outlined in section 6.2.1. The IASB's objective of introducing the impairment-only approach was to provide more useful information on goodwill to financial statement users compared to an approach in which goodwill is amortized since straight-line amortization of goodwill is expected to fail providing useful information (IAS 36.BC131E, BC131G). This view is compelling as the amortization of goodwill is purely mechanical and as the determination of an amortization period is relatively arbitrary. Moreover, prior research indicates that amortization of goodwill does not provide relevant information to stakeholders (e.g., Jennings et al. (2001); Moehrle et al. (2001)).

By using internationally accepted valuation models and considering information of both internal and external perspective, the IASB introduced an impairment test that is expected to better reflect the underlying economic value of goodwill and its consumption. The management has to continuously compare the expectations on future performance related to acquired

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to the Prime Standard indices DAX, MDAX, SDAX, and TecDAX of Frankfurt Stock Exchange (Rogler et al. (2012); Küting (2013); Gundel et al. (2014)).

[128] Due to the calculation of goodwill as a purchase premium, it may also include components that refer to mismeasurement or overpayment and thus should theoretically not be recognized as goodwill. Mismeasurement might refer to the fact that, despite the far-reaching recognition requirements of IFRS 3, certain net assets (in particular intangible assets) are not recognized due to measurement difficulties or non-recognition requirements. Moreover, mismeasurement can refer to the fair value estimation of the acquiree's net assets or the consideration paid by the acquirer. Finally, overpayment (or underpayment) results in a misstatement of goodwill as these costs conceptually represent a loss (or a gain), respectively (Johnson and Petrone (1998, p. 295); IFRS 3.BC313-BC318).

goodwill with their initial expectations and thereby evaluate the success of its acquisitions (IASB (2014, pp. 21)). It is able to do this on the basis of information on the firm's assets that normally is more detailed and more reliable than information of outsiders. Providing a certain degree of discretion, the management is enabled to convey private information on future cash flows and the success of an acquisition that is not routinely available for market participants and might only be partly anticipated by other correlating information available to investors.[129] Additionally, proponents of the impairment-only approach highlight that (1) it relates the purchase price to what was acquired and increases the meaningfulness of the return on investment, (2) it helps to assess the management's ability of stewardship, and (3) it can act as a clearing event signalizing that management recognized previous mistakes and moves on (IASB (2014, p. 21)). Therefore, information asymmetries might be reduced and goodwill impairments could be relevant based on their predictive value and/or their confirmatory value.

However, the discretion related to goodwill impairment tests also leads to an inherent risk of opportunistic earnings management with respect to magnitude and timing of goodwill impairments, which might distort the informational value of goodwill numbers. Relying on management's assumptions and estimations leads to the conclusion that impairment tests are highly subjective (Kothari et al. (2010, p. 262)). Due to information asymmetries and conflicts of interests between management and shareholders, the management could use its judgment to either mislead investors about the underlying economic performance of the firm or to influence contractual outcomes that depend on the reported earnings numbers (Healy and Wahlen (1999, p. 368)). This would lead to a reduced reliability of goodwill information. Earnings management incentives to engage in such an opportunistic reporting might particularly be based on the beating of earnings targets, conservative smoothing, big bath accounting, senior management changes, management reputation or debt contracting.[130] While this could affect the value relevance of goodwill impairments in general, it might be even more important for the (perceived) timeliness of impairment recognition as the management might opportunistically use its flexibility in timing goodwill impairments that are necessary and inevitable in the long term. Moreover, it is possible that this uncertainty induces capital market participants to perceive goodwill impairments as generally not faithfully represented.

[129] In this context, empirical studies show that goodwill impairments are related to future firm performance (Jarva (2009); Li et al. (2011)) and investment opportunities (Godfrey and Koh (2009); Chalmers et al. (2011)) and that the impairment-only approach has a positive influence on the accuracy of analysts' earnings forecasts (Chalmers et al. (2012)).

[130] Several empirical studies show that earnings management incentives can have an influence on goodwill impairment accounting (e.g., Beatty and Weber (2006); Masters-Stout et al. (2008); AbuGhazaleh et al. (2011)).

Concerning the timeliness of impairments, opponents of the impairment-only approach also criticize that investors would often anticipate failures of an acquisition before impairment losses are recognized (i.e., no predictive value) and that goodwill arising from business combinations is shielded and replaced by internally generated goodwill and hidden reserves (IASB (2014, p. 22)).

In conclusion, the theoretical arguments indicate that goodwill impairment tests provide value relevant information, but that (perceived) timeliness is a serious issue. The main value of goodwill impairments might be rather based on its confirmative value than its predictive value, i.e., it either confirms or calibrates investors' expectations on the future economic benefits of a business (KPMG (2014c, p. 6)).

6.2.3 Influence of Institutional Setting on Value Relevance and Perceived Timeliness

The study analyzes the value relevance and perceived timeliness of goodwill impairments for a sample of German listed firms. Hence, it refers to the German institutional setting, which is an important representative of the continental European institutional model (as opposite to the Anglo-American institutional model).

A major aspect of the institutional setting is the legal system, i.e., the legal rules and their enforcement. The legal system of continental European countries is referred to as civil law, which is characterized by state-employed judges, great reliance on legal and procedural codes, and a preference for state regulation over private litigation. On the contrary, the common law tradition of Anglo-American countries is characterized by independent judges and juries, relatively weaker reliance on statutes, and the preference for contracts and private litigation as a means of dealing with social harms (La Porta et al. (2006, p. 14)). The level of minority rights protection is higher and it provides investors extensive powers to sue management for violations of fiduciary duty (Shleifer and Vishny (1997, p. 770)). Moreover, Anglo-American countries are characterized by stronger capital market oversight and accounting enforcement. Based on these arguments, prior research shows that continental European countries have a weaker legal protection of investors than Anglo-American countries (La Porta et al. (1997); La Porta et al. (1998); La Porta et al. (2006); Gul et al. (2013)). Therefore, the costs of opportunistic management behavior are expected to be lower for continental European countries. This might lead to the perception of investors that reported earnings (including goodwill impairments) are less reliable and hence less value relevant and timely. For example, this is supported by studies indicating that the value relevance of accounting data is lower for continental European than for Anglo-American countries (Ali and Hwang (2000); Hung

(2000)). Similarly, loss recognition in continental European countries was shown to be less timely (Ball et al. (2000)). With respect to goodwill impairment announcements, Knauer and Wöhrmann (2016) show that investors react more negatively to unexpected impairments in continental European countries as investors might perceive managers to opportunistically understate actual impairment losses.

With respect to the corporate governance, Germany and several other continental European countries are characterized by a two-tier board system, i.e., there is a separation between executive directors with management responsibilities (management board) and non-executive directors with monitoring duties (supervisory board).[131] On the contrary, the one-tier system of Anglo-American countries has only one Board of Directors. Whether this has an influence on the value relevance and perceived timeliness of goodwill impairments is not clear. The perception of investors might be influenced by opposing arguments. 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, non-executive directors in the one-tier system are more involved in the firm's operations and have direct access to information. Hence, they might be better able to assess whether impairment tests are reasonable. Similar to the one-tier system, audit committees can be formed as subgroup of the supervisory board to improve the board's monitoring process of financial reporting (§ 107 III 2 AktG). In particular, shared responsibilities in larger supervisory boards can result in coordination failures and lower effort of individual members (Köhler (2005, p. 235)), whereas audit committees might be able to work more flexible and intensive (Deckert (1996, p. 987)). Moreover, audit committees can improve the cooperation between supervisory board, auditor, and management (Steller (2011, pp. 109-110)) and might enforce the independence of auditors (Marten et al. (2015, p. 197)). As the formation of audit committees in Germany is voluntary, the value relevance and perceived timeliness of goodwill impairments might be higher for firms with audit committees.

[131] Contrary to the one-tier system, independence of supervisory board members due to the separation of duties seems to be a major advantage. However, there is considerable criticism concerning the effectiveness of supervisory boards. For example, mandates are generally not full time, meeting frequency might be too low, and some members might serve on too many supervisory boards (maximum number of ten mandates, § 100 II no. 2 AktG) (Roe (1998)). Moreover, it is common practice that former members of the management board serve on the supervisory board (cooling-off period of only two years, § 100 II no. 4 AktG) and supervisory boards might be used as platform for business relations between suppliers, clients, and creditors. This might affect the members' independence (Hopt and Leyens (2004); Jungmann (2006)). Moreover, qualification of supervisory board members might be an issue, particularly in case of employee representatives. In Germany, firms with more than 2,000 employees are required to implement a supervisory board with half of its members being employee representatives (§ 1 I no. 2, § 7 I MitbestG).

With respect to auditors, the German setting particularly differs from other countries due to the limited liability of auditors.[132] For listed firms, auditor's liability against the client for negligent misconduct is capped at four million euro (§ 323 II HGB). Third parties can hold the auditor liable for negligent violation of duties only in very specific situations (e.g., direct contact between auditor and third party) and even then, the aforementioned liability cap is applied by courts. This might reduce audit efforts as the expected liability losses decrease. Hence, investors might perceive that audit quality is lower, leading to less reliable and therefore timely goodwill impairments. However, it is also possible that this effect is mitigated by potentially more important expected reputational losses and/or that the liability cap is at a sufficient level, particularly for smaller and medium-sized firms. Hence, audit quality might not be perceived as impaired by investors. Compared to Anglo-American countries, public oversight as another way to hold auditors responsible and thereby increase (perceived) audit quality is modest and less transparent in Germany (and other continental European countries). Auditors are monitored by a professional body, the German Chamber of Auditors, which is constituted by law and supervised by the Auditor Oversight Authority, which is integrated in the Federal Office for Economic Affairs and Export Control. Moreover, the Auditor Oversight Authority is responsible for regular inspections of audit firms of public interest entities.

In summary, the German institutional setting is particularly different from the Anglo-American setting and there are more arguments suggesting that goodwill impairments are (perceived as) less value relevant and timely. The results of this study are therefore particularly relevant for Germany and other continental European countries with a similar institutional setting like Austria, Belgium, Denmark, Finland, France, Netherlands, Sweden, and Switzerland.[133]

[132] Besides Germany, auditor liability is also capped in the following EU countries: Austria, Belgium, Greece, and Slovenia. Moreover, Spain has a proportionate liability (London Economics and Ewert (2006, p. 153)).

[133] These countries have a similar level of investor protection (Leuz et al. (2003, pp. 519-520)) and also have two-tier systems, either mandatory (Austria, Denmark, Finland, Netherlands, Sweden) or voluntary (Belgium, France, Portugal) (Weil, Gotshal and Manges LLP (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 et al. (2006, p. 1204)).

6.3 Prior Literature and Hypotheses

This section develops hypotheses based on the theoretical background of section 6.2 and findings of prior literature. The literature review also considers US studies to complement the limited evidence with respect to IFRS since US-GAAP also apply an impairment-only approach. However, the results should be treated with caution as the impairment tests are not identical[134] and as the institutional setting is different (see section 6.2.3).

6.3.1 Value Relevance of Goodwill and Goodwill Impairments

Value relevance of goodwill and goodwill impairments are associated as value relevant goodwill impairments can be expected to maintain the value relevance of goodwill. Therefore, some studies evaluate the value relevance of goodwill and goodwill impairments simultaneously. All of the following studies use level models as defined in section 6.4.2.1 that separate the accounting numbers of interest from the book value of equity and/or earnings.

Chalmers et al. (2008) compare the difference in value relevance of goodwill and other intangibles between IFRS and Australian GAAP. They use a one-year sample of Australian firms just before the adoption of IFRS in 2005 in order to compare Australian GAAP numbers with restated IFRS numbers (extracted from the subsequent financial report) at the same point in time. Their findings show that goodwill is value relevant in both regimes, but there is also evidence that IFRS numbers provide incremental useful information compared to the former Australian amortization approach. Using a European sample and comparing the pre- and post-adoption year of IFRS, Aharony et al. (2010) find that goodwill is value relevant for all countries in the post-adoption year, whereas the results are mixed in the pre-adoption year. Moreover, they show that the incremental value relevance from switching to IFRS is greater for countries where local GAAP strongly differs from IFRS. Oliveira et al. (2010) examine the value relevance of goodwill in Portugal for a sample period from 1998 to 2008. Their findings suggest that goodwill is value relevant and that its relevance increased after the adoption of IFRS in 2005 compared to the previous amortization regime.

[134] The results of US studies should also be considered as the impairment tests of IFRS and US-GAAP are comparable. Nevertheless, there are three major differences that might have an influence on the likelihood and magnitude of impairments. First, 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, it applies a two-step approach. The first step is similar to the IFRS impairment test, but it only determines whether the second step is required. The second step then calculates the impairment loss as the difference between the implied fair value of goodwill and its carrying amount.

AbuGhazaleh et al. (2012) examine the value relevance of goodwill and goodwill impairments in the UK. Considering a sample period from 2005 to 2006, i.e., after the adoption of IFRS, they show that goodwill is positively and goodwill impairments are negatively associated with share prices. Laghi et al. (2013) examine a European sample for the periods 2008 to 2011. They also find that goodwill and goodwill impairments are value relevant. Hamberg and Beisland (2014) perform a value relevance study in Sweden using a sample period from 2001 to 2010, i.e., their sample includes both IFRS (2005-2010) and former Swedish GAAP amortization regime (2001-2004). Their results indicate that goodwill is value relevant and that there is no difference in value relevance between Swedish GAAP and IFRS. For goodwill impairments under IFRS, the results do not confirm value relevance.

With respect to US-GAAP, Lapointe-Antunes et al. (2009) evaluate the value relevance of initial adoption goodwill impairment losses after the introduction of a SFAS 142 compatible standard in Canada. They establish a positive association between goodwill and share prices and a negative association between initial adoption goodwill impairments and share prices. Moreover, they show that an increase in perceived reliability, measured by firms that are expected to report impairment charges or firms having a more independent and financially literate audit committee, leads to a more pronounced negative impact of initial adoption impairments. On the contrary, they do not find an influence of firms reporting goodwill information at reporting unit instead of firm level. The results, however, are not directly applicable to "normal" goodwill impairments as they are reported as adjustments to the opening balance of retained earnings (retrospective method) and as the motivation for initial adoption impairment losses might therefore be different. Xu et al. (2011) examine the value relevance of goodwill impairments in the US post-SFAS 142 regime (2003-2006). They show that goodwill impairments are negatively associated with share prices and that this relation is stronger for profit than for loss firms. Hence, they conclude that the market might view impairment losses for loss firms rather as a sign of forthcoming change to address the value deterioration than a signal of sustained reduction in future profitability.

Based on the theoretical reasoning in section 6.2 and the findings of prior literature, the following two hypotheses are formulated:

H_1: Goodwill acquired in a business combination is value relevant, i.e., the amount of goodwill is positively associated with the market value of equity.

H_2: Goodwill impairments are value relevant, i.e., the magnitude of impairment losses is negatively associated with the market value of equity.

6.3.2 Perceived Timeliness of Goodwill Impairments

Evidence on the perceived timeliness of goodwill impairments with respect to IFRS is very limited. A recent working paper of Amel-Zadeh et al. (2013) finds a significantly negative correlation between annual returns and current impairments as well as next year impairments (lead impairment variable) in the UK. This means that goodwill impairments do contain some timely information, but it remains unclear for the authors to draw any conclusions on the even stronger relationship between annual returns and the lead impairment variable. One reason might be that managers systematically delay impairments which are already anticipated by the market. As an opposite view, they argue that accounting standards and audit practitioners regard falling market values as an important triggering event for impairment losses. Another view not considered by the authors might be that the cushion against impairment provided by internally generated goodwill and hidden reserves is consumed first, which could explain the negative returns prior the recognition of goodwill impairments. Hamberg and Beisland (2014) also perform a return regression to analyze the perceived timeliness of goodwill impairments in Sweden. Their findings suggest that goodwill impairments are not significantly related to contemporaneous annual returns. However, as part of their robustness checks, they show that next two year impairments are occasionally related to contemporaneous annual returns. This is interpreted as a sign that impairment recognition might not be timely.

Chen et al. (2008) analyze the perceived timeliness of goodwill impairments in the context of the SFAS 142 adoption in the USA in 2002. They also use the return model as well as a complementing reverse regression to evaluate whether initial adoption impairments represent a cumulative catch-up effect and whether first year impairments are related to contemporaneous returns. Their results suggest that impairment recognition during the pre-SFAS 142 amortization regime was not timely as initial adoption impairments have caught up with their recognition in prior returns. This is consistent with the findings of Lapointe-Antunes et al. (2009). With respect to first year impairments under SFAS 142, Chen et al. (2008) show that there is still room for improvement in terms of timeliness. However, as they do not examine post-adoption periods, the potential to draw general conclusions for the SFAS 142 regime is limited. Xu et al. (2011) examine the perceived timeliness of goodwill impairments in the post-SFAS 142 regime (2003-2006). They find that goodwill impairments are only significantly related to contemporaneous annual returns if profit firms are considered, whereas they do not establish a significant relationship for loss firms and the full sample.

As the theoretical argumentation and empirical findings are not clear, it is not obvious whether a timely recognition of goodwill impairments can be expected. Nevertheless, the following hypothesis is tested to gain insights on the perceived timeliness of goodwill impairments:

H_3: Goodwill impairments are perceived as timely, i.e., the magnitude of impairment losses is negatively associated with the contemporaneous annual return on shares.

6.3.3 Influence of Auditors on Perceived Timeliness of Goodwill Impairments

With respect to accounting choices, restrictions in managerial discretion are particularly enforced by external auditors (Watts and Zimmerman (1990, p. 136); Roychowdhury and Martin (2013, p. 135)). Due to the high relevance of goodwill for many firms (see section 6.2.2), the relatively high management discretion applied in impairment tests, the corresponding generally high risk of material misstatement, and the fact that goodwill impairment testing is generally in the main focus of the DPR and other enforcement activities[135], goodwill impairment tests are often one of the auditors' key audit matters.[136] An increase in audit quality might increase the timeliness of goodwill impairments as strong external monitoring mechanisms are expected to reduce information asymmetries and deter management from engaging in opportunistic reporting practices due to an increased risk of detection and impending penalties (Jensen and Meckling (1976); Fama and Jensen (1983)). In particular, auditors can increase the quality of impairment testing by ensuring the appropriateness and reasonableness of goodwill allocation and impairment test models, which particularly includes valuation technique, business and valuation assumptions, and carrying amount. With respect to the assumptions used, auditors should, e.g., consider historical data, internal forecasts (including a retrospective analysis of management forecast ability), and non-financial internal information as well as external information related to the general economic environment, the capital market, the firm's industry and peer group, or the firm itself.

Hence, an external audit can increase the reliability of goodwill impairment tests and limit the management's opportunities to use the inherent discretion to engage in opportunistic earnings management. If investors perceive that auditors provide a high audit quality, they might also perceive that goodwill impairment testing is more reliable and that goodwill impairments are

[135] In particular, the DPR selected impairment testing as enforcement priority in every year from 2007 to 2014 (see http://www.frep.info/pruefverfahren/pruefungsschwerpunkte.php [Accessed October 1, 2016]).

[136] This is also highlighted by a review of 153 extended audit reports in the UK showing that impairment of goodwill is one of the Top 3 risks considered by auditors (FRC (2015, p. 18)).

therefore more faithfully represented with respect to magnitude and timing. In particular, investors might expect auditors to ensure that goodwill impairments are disclosed as early as possible and therefore recognized during the appropriate year as this is crucial for the relevance of financial information (IASB Framework QC29). However, it is also possible that auditors are not able or have a limited ability to ensure the appropriateness and reasonableness of goodwill impairment tests as the inherent degree of subjectivity is relatively high (Kothari et al. (2010, p. 262)). In particular the determination of reasonable key business and valuation assumptions might be a challenging task as they heavily depend on management's assumptions and estimations concerning the future economic development. Auditors might thus be able to ensure a certain objectivity by building their own opinion on an acceptable range of values assigned to key assumptions like revenue growth rates, gross profit and EBITDA margins or CAPEX, but management might still have sufficient discretion to opportunistically influence the outcome of impairment tests. Moreover, there is criticism that auditors rely too often on management evidence without sufficient challenge and independent audit evidence (Roychowdhury and Martin (2013, p. 143)). Hence, it is not clear whether audit quality actually has a positive influence on the timeliness of goodwill impairments. In order to gain more insights on this topic, the study therefore assesses the general hypothesis that perceived audit quality has an influence on the perceived timeliness of goodwill impairments. As pointed out in section 6.2.2, perceived timeliness refers to a more restrictive aspect of value relevance (i.e., the value relevance during the return period and hence the period addressed by annual audits) and therefore is a more suitable indicator for the influence of perceived audit quality. On the contrary, using the value relevance would not restrict the assessment of audit quality to the events that have affected the firm over the fiscal period and that are therefore subject to the annual audit. Hence, the focus lies on the influence of auditors on the perceived timeliness of goodwill impairments (i.e., impairment losses recognized during the period addressed by the annual audit). As proxy for perceived audit quality, the focus is on the following auditor characteristics that have been shown in prior research to be related with perceived audit quality: Big 4 auditor, industry leader, non-audit fee ratio, and auditor tenure.

The audit quality of Big 4 auditors might be perceived as higher since they are perceived as less dependent on individual clients. This is particularly based on their economic interest in their clients due to expected future quasi-rents. As Big 4 auditors have more clients, they are less dependent on the individual client and independence issues with one client bears a higher risk of losing even more other clients. Hence, their economic interest in individual clients is expected to be lower than for smaller audit firms (DeAngelo (1981a); DeAngelo (1981b)).

Another argument for higher audit quality of Big4 auditors is that the costs related to a loss of reputation associated with low audit quality or independence issues are expected to be higher. Hence, these costs might exceed the benefits from maintaining the client relationship and therefore reduce the auditor's willingness to collude with the management. This effect might be particularly strong in case of goodwill impairment tests as misstatements of goodwill can result in a relatively high loss of reputation when discovered by enforcement institutions. Moreover, Big 4 auditors have more resources in terms of general policy department, audit methodology, accounting specialists, internal experts, and staff training. This might be particularly relevant for the audit of impairment tests as it represents a task requiring specific knowledge and the involvement of internal valuation specialists. Further, more frequent and stringent internal practice reviews and external inspections might induce higher audit quality. Prior literature shows that Big 4 audits are perceived to ensure higher audit quality (e.g., Teoh and Wong (1993); Krishnan (2003)). Also, there is evidence that Big 4 auditors provide higher audit quality (e.g., Francis et al. (1999); Lennox and Pittman (2010); Eshleman and Guo (2014)). However, there are also studies that do not find a significant influence of Big 4 auditors on audit quality (e.g., Lawrence et al. (2011)) or studies indicating that the influence of Big4 auditors on earnings quality (Francis and Wang (2008)) or cost of debt (Gul et al. (2013)) is particularly strong for countries with higher investor protection like Anglo-American countries. Despite the mixed empirical findings, the following hypothesis is tested:

H_4: Goodwill impairments of firms audited by Big4 auditors are perceived as timelier.

While Big 4 auditors are already expected to have higher expertise and more resources than non-Big 4 auditors, this might be particularly true for auditors which are industry leaders.[137] These audit firms might invest more resources in industry-specific accounting specialization and staff training and might have more experience in the respective industry. As goodwill impairment tests also require industry-specific knowledge, in particular in order to identify key business assumptions and to ensure their reasonableness, industry leaders might be better able to ensure appropriate impairment tests and thus timely impairment recognition. Moreover, also the industry-specific reputation might be higher. Confirming these general arguments, prior studies show that industry specialization leads to higher audit quality (e.g., Krishnan (2005); Reichelt and Wang (2010); Rose-Green et al. (2011)), which is also priced in by the capital market (e.g., Balsam et al. (2003); Knechel et al. (2007)). With respect to different industry specialization measures, Audousset-Coulier et al. (2016) show that particu-

[137] In the sample, all industry leaders are Big 4 auditors.

larly market leadership based on audit fees is positively associated with fee premiums, which might represent higher audit quality and reputation, and negatively associated with discretionary accruals, which might indicate higher earnings quality and thus audit quality. Therefore, the following hypothesis is tested:

H_5: Goodwill impairments of firms audited by industry leaders are perceived as timelier.

With respect to the influence of non-audit fees on (perceived) audit quality, there are opposing arguments. A higher level of non-audit fees increases the economic interest of an auditor in its client and thus might impair its independence (DeAngelo (1981a); Ruddock et al. (2006); Quick and Warming-Rasmussen (2015)). This argumentation is emphasized by the recent EU regulation which generally requires that non-audit fees do not exceed 70 % of the last three year's average audit fees (EU Parliament (2014, Art. 4 Par. 2)). However, it is also possible that a knowledge spillover from performing non-audit services increases audit quality (Simunic (1984)). For Germany, prior research indicates a negative impact of high non-audit fees on audit quality (Quick and Sattler (2011); Krauss and Zülch (2013)). This could particularly be due to the German institutional setting with lower investor protection and lower auditor litigation risk (see section 6.2.3). Despite mixed international evidence,[138] it is therefore assumed that capital market participants perceive audit quality to be lower when observing a higher non-audit fee ratio leading to the following hypothesis:

H_6: A higher non-audit fee ratio leads to a decrease in perceived timeliness of goodwill impairments.

The influence of auditor tenure on (perceived) audit quality is not clear. A longer auditor tenure might threaten auditor independence (and therefore audit quality) due to the auditor's economic interest in the client based on expected future quasi-rents (DeAngelo (1981a); Stefani (2002)), an increased reliance on previous working papers and experiences with the client (Brody and Moscove (1998, pp. 34-35)), and a higher familiarity and identification with the management (Hoyle (1978, pp. 70-73)). On the contrary, a new auditor might have an unbiased look also considering prior audit experience with comparable clients, which e.g. might help to identify impairment tests that are not reasonable or influenced by a management bias. This argumentation is emphasized by the recent EU regulation which generally requires a mandatory auditor rotation after ten years for firms of public interest (EU Parliament (2014,

[138] Several studies also establish a negative association (e.g., Krishnan (2005); Gul et al. (2006)), whereas other studies only find a significant relation under restrictive conditions (e.g., Higgs and Skantz (2006); Eilifsen and Knivsflå (2013)) or do not find an association (e.g., Gosh et al. (2009)).

Art. 17 Par. 1)). On the other hand, a shorter auditor tenure might be related to a lower level of client-specific knowledge and therefore a higher dependence on management information. This could result in lower (perceived) audit quality (Knapp (1991, pp. 38-39)). With respect to goodwill impairment tests, it might therefore be more difficult for auditors to judge whether assumptions used by management are reasonable considering firm-specific factors and strategies as well as prior years' economic development. In the German context, there exist two studies analyzing the effect of auditor tenure on audit quality with mixed results, particularly with respect to long auditor tenure (Quick and Wiemann (2011); Quick and Wiemann (2012)). International evidence is also mixed[139]. Therefore, no specific association is predicted and the following hypothesis is tested:

H_7: Auditor tenure is associated with the perceived timeliness of goodwill impairments.

6.4 Research Design

6.4.1 Sample

The initial sample consists of all observations of German firms that are listed on the regulated market of Frankfurt Stock Exchange (CDAX) during the fiscal years 2006 and 2013.[140] Consolidated financial statement and market data stem from the Worldscope and Datastream database, whereas information on the carrying amount of goodwill, goodwill impairment losses, and auditor characteristics are hand-collected from annual reports.[141] Banks, insurance companies, and other financial service firms are excluded since 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. Observations are omitted if firms undergo mergers and acquisitions, became insolvent, or were liquidated. Observations are also excluded if firms are financially distressed (negative book value of equity or zero sales) or subject to an IPO as these observations are likely to have a firm-specific background. Observations of firms applying accounting principles other than IFRS

[139] For example, Ghosh and Moon (2005) find an increase in perceived earnings quality with longer auditor tenure, whereas Boone et al. (2008) find that the ex ante equity risk premium is higher for short and long auditor tenure.

[140] The sample period does not cover the fiscal year 2005 as it was the first mandatory application year of IFRS in Germany and of the revised IAS 36 in general. Hence, as the research design also depends on prior year data, this would lead to an exclusion of many firms for which IFRS data for 2004 is not available. Moreover, goodwill impairments might be affected by the first-time application of the impairment-only approach.

[141] The carrying amounts of goodwill and goodwill impairment losses are hand-collected as the Worldscope database does not provide data for all sample firms and sometimes includes erroneous data. Nevertheless, the hand-collected data was compared to data from Worldscope database and all differences were resolved.

and observations related to short fiscal years are excluded as well. Then, only observations with a non-zero closing goodwill balance or a goodwill impairment loss and observations of firms whose fiscal year ends on December 31 are considered.[142] Finally, observations with missing data are deleted. This leaves a sample of 1,841 firm-year observations from 306 firms for the value relevance and perceived timeliness analysis. With respect to the analysis of auditor characteristics, the sample size is further reduced by observations without data on auditor characteristics, leaving a sample size of 1,802 firm-year observations from 298 firms. The sample selection process is shown in Table 14. In order to increase the reliability and generalizability of the results, each regression is conducted excluding influential outliers on the regression results based on Cook's D statistic.[143] This is also the reason why the sample size slightly differs for each regression.

Table 14: *Summary of sample size*

Observations of CDAX listed firms for the periods 2006 to 2013		**4,811**
Less		
Banking, insurance, and financial services firm-year observations	840	
Observations subject to insolvency, liquidation, merger and acquisition, other financially distresses, IPOs	995	
Observations subject to accounting principles other than IFRS or short fiscal years	232	
Observations without goodwill	549	
Observations with fiscal year-end other than December 31	324	
Observations with missing data	30	
Sample size for value relevance and perceived timeliness (No. of firms = 306)		**1,841**
Less		
Observations without data on auditor characteristics	39	
Sample size for auditor characteristics (No. of firms = 298)		**1,802**

[142] All sample firms are required to have their fiscal year ends on December 31 in order to ensure a homogeneous point in time (time period) to determine the market value of equity (calculate the annual returns). This is a commonly used approach in literature (e.g., Hamberg and Beisland (2014, p. 64)).

[143] It is not the objective of the study to gain results that are largely driven by a small number of influential observations. Therefore, all observations with a Cook's D distance larger than 4/n are excluded, which is done for each regression separately. This reduces potential validity problems related to observations that have a high influence on the estimated regression parameters if either included or excluded from the regression analysis (which also includes potential outliers or erroneous data of the regression variables). Hence, additional truncation or winsorizing is not necessary.

6.4.2 Model Specification

For the purpose of this paper, the terms "value relevance" and "perceived timeliness" are differentiated (see section 6.2.2). In order to address these aspects, two different types of models used by prior value relevance literature are examined: level model and return model. The level model (section 6.4.2.1) is applied to assess the value relevance of goodwill and goodwill impairments. The return model (section 6.4.2.2) is used to evaluate the perceived timeliness of goodwill impairments.

6.4.2.1 Value Relevance of Goodwill and Goodwill Impairments

The paper refers to value relevance if the association between the market value of equity and accounting numbers is addressed (level model). The most commonly used level model is an empirical version of the Ohlson (1995) model[144] which expresses the market value of equity as a linear function of the book value of equity and earnings. The book value of equity is included to account for the book value of assets and liabilities recognized on the balance sheet, in particular those for which the book value represents a suitable measure for the firm's resources and commitments that determine future expected cash flows (e.g., property, plant, and equipment). Earnings are included to capture information about the value of a firm's assets and liabilities that are not recognized on the balance sheet or for which the book value alone is not a sufficient measure of future firm performance (e.g., human capital and other intangibles) (Easton (1999, p. 402); Barth (2000, pp. 12-14)). Goodwill is separated from the book value of equity and goodwill impairments are separated from earnings as these are the variables of interest leading to the following regression model:[145]

$$MV = \beta_0 + \beta_1 BV + \beta_2 EARN + \beta_3 GW + \beta_4 IMP + \sum \beta_Y YEAR + \sum \beta_I IND + \epsilon \qquad (21)$$

where:

[144] The theoretical valuation model of Ohlson (1995) is based on three major assumptions: (1) The market value equals the present value of expected future dividends, (2) accounting data and dividends satisfy the clean surplus relation, and (3) a linear model frames the stochastic time-series behavior of abnormal earnings (defined as current earnings minus cost of capital). Ohlson (1995) derives a linear, closed-form solution implying that the market value of equity equals the book value of equity plus the current profitability (measured by abnormal earnings) plus other information modifying the predicted future profitability. The third term can be neglected if current earnings sufficiently predict future profitability. In order to empirically evaluate this association, the empirical Ohlson model expresses the market value of equity as a linear function of the book value of equity and earnings.

[145] This is similar to the approaches used by prior studies presented in section 6.3.1.

MV = Market value of common equity 4 months after the end of the fiscal year (scaled by number of common shares outstanding)[146]

BV = Book value of common equity minus carrying amount of goodwill at the end of the fiscal year (scaled by number of common shares outstanding)

EARN = Net income before goodwill impairment loss (scaled by number of common shares outstanding)

GW = Carrying amount of goodwill at the end of the fiscal year plus goodwill impairment loss (scaled by number of common shares outstanding)

IMP = Goodwill impairment loss as a positive number (scaled by number of common shares outstanding)

YEAR = Set of year dummies

IND = Set of industry dummies

All variables except year and industry dummies are scaled by the number of common shares outstanding as this is the commonly used deflator in level models to reduce potential scale problems. The regression model is also known as price-level model since the dependent variable equals the share price. In order to address potential non-linear effects related to firm profitability that were observed in previous studies (Beaver (2002, p. 458)), additional subsamples differentiating between profit and loss firms are used.

Corresponding to model assumptions and empirical results, *BV* and *EARN* are expected to be positively correlated with *MV*. In order to address the value relevance of goodwill (hypothesis H_1) and goodwill impairments (hypothesis H_2), *GW* and *IMP* are included, respectively. *GW* is expected to be positively associated with *MV*, whereas the expected coefficient sign of *IMP* is negative. Finally, *YEAR* and *IND* are included. Year dummies account for differences between years that are incorporated in the decision-making process of investors, e.g., due to fluctuation in economic activity or macroeconomic events like the recent financial crisis and European debt crisis. Industry dummies control for industry-specific effects like specific industry characteristics or trends. Hence, both variables control particularly control for omitted variables.

[146] According to § 325 (4) HGB, German capital market-oriented firms have to publish financial statements during the first four month after the end of the respective fiscal year. Therefore, the measurement date of the market value of equity is adjusted for the timing of the earnings announcement, i.e., *MV* is measured 4 month after the end of the fiscal year. This ensures that the information on earnings and book value of equity is processed by capital market participants and that their reaction is included in the measure of the market value of equity.

6.4.2.2 Perceived Timeliness of Goodwill Impairments

Perceived timeliness in this paper refers to a more restrictive aspect of value relevance as it addresses the association between the annual return on shares and accounting numbers (return model). Similar to most empirical studies using a return model, the return model based on Easton and Harris (1991) and Easton (1999) is applied. This return model can be regarded as the first derivative of the Ohlson (1995) model with respect to the return period and expresses the annual return on shares as a linear function of earnings and change in earnings. However, only conducting a return model might lead to erroneous conclusions on the informational value of accounting information if it is indeed value relevant (measured by the previously presented level model), but not perceived as timely (Barth et al. (2001, p. 96)). Nevertheless, a lack in (perceived) timeliness is a serious issue as it might significantly reduce the informational value of goodwill impairments, e.g., because the market anticipates impairments much earlier than they are recognized in financial statements (i.e., no predictive value). Analogous to regression (21), goodwill impairments are separated from earnings.[147] This leads to the following regression model:

$$RETURN = \beta_0 + \beta_1 EARN + \beta_2 \Delta EARN + \beta_3 IMP + \sum \beta_Y YEAR + \sum \beta_I IND + \epsilon \qquad (22)$$

where:

RETURN = Annual return on common shares adjusted for dividends paid and calculated from 8 months before to 4 months after the end of the fiscal year[148]

EARN = Net income before goodwill impairment loss (scaled by market value of common equity 8 months before the end of the fiscal year)

Δ*EARN* = Change in net income before goodwill impairment loss (scaled by market value of common equity 8 months before the end of the fiscal year)

IMP = Goodwill impairment loss as a positive number (scaled by market value of common equity 8 months before the end of the fiscal year)

YEAR = Set of year dummies

IND = Set of industry dummies

All variables except year and industry dummies are scaled by the market value of common equity 8 months before the end of the fiscal year in order to be consistently scaled with the definition of *RETURN*. The return model might also be affected by potential non-linear

[147] This is similar to the approaches used by prior studies presented in section 6.3.2.

[148] According to § 325 (4) HGB, German capital market-oriented firms have to publish financial statements during the first four month after the end of the respective fiscal year. Therefore, the return period is adjusted for the timing of the earnings announcement, i.e., *RETURN* is calculated from 8 month before to 4 month after the end of the fiscal year. This ensures that the earnings information is processed by capital market participants and that their reaction is included in the return measure.

effects related to firm profitability (Easton (1999, p. 405)). Therefore, subsamples for profit and loss firms are used as well.

Corresponding to model assumptions and empirical results, *EARN* and $\Delta EARN$ are expected to be positively correlated with *RETURN*. In order to address the perceived timeliness of goodwill impairments (hypothesis H_3), *IMP* is included and the expected coefficient sign is negative. Finally, the model also includes year and industry dummies.

6.4.2.3 Influence of Auditors on Perceived Timeliness of Goodwill Impairments

In order to investigate the moderating effect of auditor characteristics on the perceived timeliness of goodwill impairments as a specific aspect of perceived audit quality (see section 6.3.3), regression model (22) is extended by interaction terms between the impairment variable and auditor characteristics:

$$\begin{aligned} RETURN = {} & \beta_0 + \beta_1 EARN + \beta_2 \Delta EARN + \beta_3 IMP + \beta_4 IMP * BIG4 + \beta_4 IMP \\ & * LEADER + \beta_4 IMP * NAF + \beta_4 IMP * TENURE + \beta_4 IMP * AC \\ & + \beta_4 IMP * SIZE + \beta_4 BIG4 + \beta_4 LEADER + \beta_4 NAF + \beta_4 TENURE \\ & + \beta_4 AC + \beta_4 SIZE + \sum \beta_Y YEAR + \sum \beta_I IND + \epsilon \end{aligned} \tag{23}$$

where:

BIG4 = Big 4 auditor, indicator variable with the value of 1 if the firm is audited by a Big 4 auditor, and 0 otherwise

LEADER = Industry leader, indicator variable with the value of 1 if the firm is audited by an auditor which is market leader (i.e., audit firm with highest audit fees) with respect to the respective industry and year, and 0 otherwise

NAF = Non-audit fee ratio, defined as non-audit fees divided by audit fees (of current fiscal year)

TENURE = Auditor tenure, defined as the number of consecutive years the firm has retained its current auditor

AC = Audit committee existence, indicator variable with the value of 1 if the firm has established an audit committee, and 0 otherwise

SIZE = Firm size, defined as the natural logarithm of lagged market value of equity

Based on hypotheses H_4 to H_6, the interaction coefficients of *IMP* with *BIG4* and *LEADER* are expected to be negative, whereas the interaction coefficient with *NAF* is expected to be positive. For *IMP*TENURE*, no sign is predicted (hypothesis H_7).

Moreover, audit committee existence (*AC*) and firm size (*SIZE*) are added as control interaction variables. Audit committees represent a competing corporate governance mechanism

whose duty is the monitoring of the financial reporting process. Hence, goodwill impairment testing should also be in the main focus of audit committee work and a negative coefficient for *IMP*AC* is predicted. Firm size controls for a potentially different perception of impairments between large and small firms as larger firms might be subject to stronger public control and corporate governance and might have more expertise and resources to carry out impairment tests. However, no sign is predicted. All auditor characteristic and control variables are also included as single variables for econometric reasons, i.e., the research design controls for their direct influence on returns.

6.5 Results

6.5.1 Descriptive Statistics

Table 15 provides descriptive statistics for unscaled variables and other key figures in Panel A, whereas scaled variables actually used in price-level model (21) and return model (22) are presented in Panel B and C, respectively. The descriptive statistics for audit characteristics and control variables used in auditor regression model (23) are provided in Panel D.

The sample firms' mean (median) market value of equity is EUR 2,692 million (EUR 170 million), which is approx. three times their book value of equity excluding goodwill of EUR 942 million (EUR 53 million). Net income and change in net income before impairment loss are both positive on average (median) with values of EUR 195 million (EUR 7.3 million) and EUR 1.88 million (EUR 0.63 million), respectively. The mean (median) goodwill before impairment loss is EUR 678 million (EUR 22.2 million). Its relevance for the sample firms is highlighted by the fact that year-end goodwill represents on average (median) 14.7 % (10.9 %) of total assets and 44.3 % (25.8 %) of the book value of equity. The mean goodwill impairment loss is EUR 14 million and the sample firms write off 4.4 % of their respective goodwill amounts before impairment on average.[149] However, only 22.4 % of the firm-year observations report a goodwill impairment loss, i.e., the key figures are influenced by non-impairment firms. Only considering impairment firms, the mean (median) impairment amount is EUR 64 million (EUR 2.6 million). In relation to the goodwill balance, this means that if impairments are reported, 19.8 % (7.7 %) of goodwill is written off on average (median).[150]

[149] The average write-off ratio of 4.4 % should not be confused with the fact that 2.1 % (=14/678) of the sample's total goodwill balance is written off.

[150] Again, the average write-off ratio of 19.8 % should not be confused with the fact that only 5.2 % of the impairment sample's total goodwill balance is written off.

Table 15: *Descriptive statistics*

Panel A: Unscaled variables of level and return model and other key figures

Variable	*n*	*Mean*	*Std. dev.*	*1. Quartil*	*Median*	*3. Quartil*
MV	1,841	2,692	8,831	46	170	926
BV	1,841	942	4,408	16	53	258
EARN	1,841	195	956	0.79	7.30	5.56
ΔEARN	1,841	1.88	623	- 4.77	0.63	7.53
GW	1,841	678	2,550	6.22	22.19	105.32
GW/ASSETS[1]	1,841	0.147	0.138	0.033	0.109	0.223
GW/BV[2]	1,841	0.443	1.342	0.084	0.258	0.566
IMP	1,841	14	152	0	0	0
IMP/GW[3]	1,841	0,044	0,152	0	0	0
IMPonly[4]	412	64	317	0.52	2.60	10.37
IMPonly/GW[5]	412	0.198	0.270	0.014	0.077	0.245

Panel B: Variables of price-level model (i.e., scaled by number of common shares outstanding)

Variable	*n*	*Mean*	*Std. dev.*	*1. Quartil*	*Median*	*3. Quartil*
MV	1,841	39.238	195.583	4.150	11.668	28.385
BV	1,841	17.841	70.986	1.338	4.007	10.974
EARN	1,841	1.819	20.387	0.068	0.572	1.877
GW	1,841	4.768	9.419	0.515	1.429	4.501
IMP	1,841	0.171	1.526	0	0	0

Panel C: Variables of return model (i.e., scaled by market value of common equity 8 months before the end of the fiscal year)

Variable	*n*	*Mean*	*Std. dev.*	*1. Quartil*	*Median*	*3. Quartil*
RETURN	1,841	0.110	0.511	- 0.202	0.046	0.326
EARN	1,841	0.027	0.363	0.014	0.057	0.092
ΔEARN	1,841	0.014	0.379	- 0.034	0.005	0.033
IMP	1,841	0.017	0.140	0	0	0

Panel D: Auditor characteristics and control variables used in auditor regression model.

Variable	*n*	*Mean*	*Std. dev.*	*1. Quartil*	*Median*	*3. Quartil*
BIG4	1,802	0.665	0.472	0	1	1
LEADER	1,802	0.233	0.423	0	0	0
NAF	1,802	0.491	0.560	0.100	0.321	0.684
TENURE	1,802	7.529	4.691	3	7	11
AC	1,802	0.542	0.498	0	1	1
SIZE	1,802	5.427	2.147	3.761	5.110	6.806

[1] GW/ASSETS equals year-end carrying amount of goodwill divided by year-end total assets

[2] GW/BV equals year-end carrying amount of goodwill divided by year-end book value of common equity

[3] IMP/GW equals goodwill impairment divided by carrying amount of goodwill before impairment

[4] IMPonly equals IMP for a subsample of impairment firms (i.e., not biased by non-impairment firms)

[5] IMPonly/GW equals goodwill impairment divided by carrying amount of goodwill before impairment for a subsample of impairment firms (i.e., not biased by non-impairment firms)

Looking at the per share values (Panel B), the average (median) market value is EUR 39.2 (EUR 11.7) per share. The book value of equity before goodwill impairment loss consists of EUR 4.8 (EUR 1.4) per share goodwill and EUR 17.8 (EUR 4.0) per share other assets and liabilities. Earnings before impairment loss are positive on average (median) with 1.8 EUR (0.6 EUR) per share, the mean goodwill impairment of all sample firms is EUR 0.17 per share. The descriptive statistics of the return model (Panel C) show that the annual return on share has a positive average value of 11.0 % and median of 4.6 %. As before, earnings and change in earnings before impairment loss are positive.

With respect to the auditor characteristics, 66.5 % of the firm-years are audited by Big4 auditors and 23.3 % are audited by industry leaders. The average (median) non-audit fee to audit fee ratio is 49.1 % (31.1 %), whereas the third quartil (68.4 %) is close to the 70 % cap recently implemented by the EU regulation (see section 6.3.3). The mean (median) auditor tenure is 7.5 (7) years and the third quartil (11 years) is above the general maximum auditor tenure of ten years recently implemented by the EU regulation (see section 6.3.3). Looking at the control variables of the auditor regression model, 54.2 % of the observations refer to firms with audit committees and the average (median) logarithmized size in terms of lagged market value of equity is EUR 5.4 (EUR 5.1) million.

6.5.2 Correlation Analysis

Table 16 shows the results of the correlation analysis. Considering the correlations of the impairment variables as well as control variables with the dependent variables *MV* and *RETURN*, the results are generally consistent with expectations. However, the correlation between $IMP_{(MV)}$ and *MV* is only significantly negative for Spearman's rho (-0.050; $p<0.05$). Similarly, the correlation between $IMP_{(RETURN)}$ and *RETURN* is only significantly negative for Spearman's rho (-0.087; $p<0.01$). With respect to the correlations of the control variables $BV_{(MV)}$, $EARN_{(MV)}$, $GW_{(MV)}$, $EARN_{(RETURN)}$, and $\Delta EARN_{(RETURN)}$ with the dependent variables *MV* and *RETURN*, respectively, all correlation coefficients are significantly positive at 1 percent level. Multicollinearity seems not to be a serious issue as all relevant correlation coefficients are smaller than 0.6 and therefore uncritical.

Table 16: *Correlation analysis – Pearson's (above the diagonal) and Spearman's (beyond the diagonal) correlation matrix*

	MV	$BV_{(MV)}$	$EARN_{(MV)}$	$GW_{(MV)}$	$IMP_{(MV)}$	RETURN	$EARN_{(RETURN)}$	$\Delta EARN_{(RETURN)}$	$IMP_{(RETURN)}$	BIG4	LEADER	NAF	TENURE	AC	SIZE
MV	-	0.753***	0.405***	0.279***	0.011	-0.001	0.021	-0.006	-0.020	-0.046**	-0.007	-0.012	-0.011	-0.016	0.148***
		0.000	0.000	0.000	0.622	0.980	0.372	0.812	0.383	0.050	0.771	0.611	0.654	0.496	0.000
$BV_{(MV)}$	0.675***	-	0.300***	0.288***	0.165***	-0.035	0.109***	-0.007	-0.026	-0.054**	-0.037	-0.027	0.010	0.010	0.160***
	0.000		0.000	0.000	0.000	0.131	0.000	0.763	0.256	0.021	0.111	0.250	0.672	0.678	0.000
$EARN_{(MV)}$	0.736***	0.533***	-	0.096***	-0.370***	0.049**	0.235***	0.087***	-0.040*	0.022	0.020	0.007	0.025	0.049**	0.107***
	0.000	0.000		0.000	0.000	0.034	0.000	0.000	0.088	0.349	0.383	0.779	0.296	0.037	0.000
$GW_{(MV)}$	0.466***	0.118***	0.362***	-	0.236***	-0.041*	0.021	-0.038	0.066***	0.094***	0.157***	0.094***	0.158***	0.121***	0.345***
	0.000	0.000	0.000		0.000	0.080	0.368	0.106	0.004	0.000	0.000	0.000	0.000	0.000	0.000
$IMP_{(MV)}$	-0.050**	-0.087***	-0.146***	0.133***	-	-0.108***	-0.157***	-0.105***	0.438***	-0.033	0.000	-0.002	-0.029	-0.020	-0.011
	0.015	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.152	0.985	0.930	0.219	0.395	0.640
RETURN	0.274***	0.074***	0.210***	0.025	-0.089***	-	0.165***	0.208***	-0.043	0.021	0.026	0.021	0.068***	0.032	-0.040*
	0.000	0.001	0.000	0.275	0.000		0.000	0.000	0.128	0.359	0.272	0.357	0.004	0.174	0.083
$EARN_{(RETURN)}$	0.273***	0.214***	0.709***	0.154***	-0.178***	0.348***	-	0.166***	-0.214***	0.038	0.036	0.057**	0.045*	0.057**	0.156***
	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.101	0.120	0.014	0.057	0.014	0.000
$\Delta EARN_{(RETURN)}$	0.053***	-0.010	0.309***	-0.032	-0.094***	0.281***	0.466***	-	-0.074***	-0.008	-0.014	-0.022	-0.014	-0.012	-0.066***
	0.010	0.662	0.000	0.168	0.000	0.000	0.000		0.001	0.736	0.548	0.343	0.553	0.614	0.005
$IMP_{(RETURN)}$	-0.091***	-0.118***	-0.177***	0.107***	0.995***	-0.087***	-0.195***	-0.091***	-	-0.002	0.007	0.034	-0.057**	-0.031	-0.109***
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.945	0.749	0.147	0.015	0.184	0.000
BIG4	0.229***	0.183***	0.152***	0.157***	-0.001	0.034	0.025	-0.020	-0.007	-	0.418***	0.130***	0.082***	0.366***	0.374***
	0.000	0.000	0.000	0.000	0.950	0.141	0.284	0.389	0.752		0.000	0.000	0.000	0.000	0.000
LEADER	0.160***	0.053**	0.158***	0.149***	0.042*	0.042*	0.087***	0.018	0.033	0.418***	-	0.059**	0.137***	0.194***	0.318***
	0.000	0.023	0.000	0.000	0.072	0.075	0.000	0.438	0.163	0.000		0.012	0.000	0.000	0.000
NAF	0.160***	0.049**	0.093***	0.156***	-0.019	0.038	0.051**	0.005	-0.025	0.158***	0.071***	-	0.122***	0.138***	0.215***
	0.000	0.037	0.000	0.000	0.414	0.104	0.030	0.836	0.286	0.000	0.002		0.000	0.000	0.000
TENURE	0.216***	0.119***	0.213***	0.155***	0.012	0.093***	0.153***	0.032	0.007	0.068***	0.136***	0.174***	-	0.198***	0.261***
	0.000	0.000	0.000	0.000	0.596	0.000	0.000	0.172	0.760	0.000	0.000	0.000		0.000	0.000
AC	0.309***	0.219***	0.252***	0.215***	0.043*	0.045*	0.071***	-0.009	0.034	0.366***	0.194***	0.189***	0.181***	-	0.510***
	0.000	0.000	0.000	0.000	0.065	0.054	0.002	0.689	0.148	0.000	0.000	0.000	0.000		0.000
SIZE	0.668***	0.391***	0.540***	0.422***	0.036	0.019	0.162***	-0.042*	0.007	0.375***	0.280***	0.261***	0.229***	0.529***	-
	0.000	0.000	0.000	0.000	0.118	0.408	0.000	0.068	0.771	0.000	0.000	0.000	0.000	0.000	

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

6.5.3 Regression Results of Value Relevance Analysis

The results of the price-level regression model (21) are presented in Table 17.[151] The variable *GW* addresses the value relevance of goodwill (hypothesis H_1). With respect to the full sample, the coefficient of *GW* (1.375) is significantly positive at 1 percent level. The coefficient is slightly larger than 1 and comparable to the coefficient of *BV* (1.514). Hence, the positive association between goodwill and market value of equity is not only significant, but also economically relevant. The coefficient close to 1 indicates that the carrying amount of goodwill is perceived as a suitable measure for its market value. Most previous studies do also find coefficients that are somewhat close to 1.[152] As an additional analysis examining differences in value relevance related to firm profitability, profit and loss firms are considered separately. For both subgroups, the findings are consistent to the full sample as the coefficients of *GW* are significantly positive at 1 percent level. Both coefficients have a value of 0.9, i.e., they are a bit lower, but even closer to 1 and comparable to the respective coefficients of *BV* (0.8 and 1.0, respectively). Overall, the findings are therefore consistent with hypothesis H_1, i.e., goodwill is perceived as a value relevant asset.

As another robustness check, the price-level regression is re-performed splitting the sample between impairment and non-impairment observations (results not tabulated). The coefficient of *GW* for the non-impairment sample (1.349) is almost equal to the full sample and significant at 1 percent level. For impairment observations, the coefficient is smaller (0.736), but also significant at 1 percent level. This indicates that goodwill represents considerably more value for non-impairment firms than for impairment firms and that the market value of goodwill for impairment firms seems to be lower than its carrying amount. Apparently, the capital market perceives that goodwill of firms without impairment represents more future economic benefits and that goodwill of impairment firms is overstated.

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[151] The main assumptions of the linear regressions are fulfilled. The variance inflation coefficients do not indicate a multicollinearity issue as they are in a normal, uncritical range (maximum value of 4.0). The same holds when looking at the correlation coefficients. Moreover, normal distribution and homoscedasticity of residuals are assessed based on normal distribution diagrams and scatter plots. There are no indications for a non-normal distribution or heteroscedasticity. Autocorrelation is not an issue as the regressions are cross-sectional.

[152] Chalmers et al. (2008), Lapointe-Antunes et al. (2009), AbuGhazaleh et al. (2012), and Laghi et al. (2013) find coefficients for goodwill between 0.8 and 1.4. Oliveira et al. (2010) also observe a coefficient of 1.5 when addressing the full sample, but the findings for the IFRS regime show a larger coefficient between 3 and 4.

Table 17: *Value relevance results of price-level regression (21)*

	Pred. sign	***Full sample***		***Profit firms***		***Loss firms***	
		β	p	β	p	β	p
Intercept		26.88***	0.000	24.96***	0.000	12.72***	0.002
BV	+	1.514***	0.000	0.795***	0.000	1.003***	0.000
EARN	+	2.400***	0.000	7.366***	0.000	- 0.255*	0.079
GW	+	1.375***	0.000	0.911***	0.000	0.892***	0.000
IMP	-	- 1.637**	0.017	- 5.698***	0.005	- 1.389***	0.000
YEAR		Yes		Yes		Yes	
IND		Yes		Yes		Yes	
Adjusted R^2		0.818		0.853		0.682	
F-statistic		324.63***		330.84***		33.07***	
n		1,805		1,425		375	

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

In order to assess the value relevance of goodwill impairments (hypothesis H_2), the results of variable *IMP* have to be interpreted. Looking at the full sample, the coefficient *IMP* (-1.637) is significantly negative at 5 percent level as expected. This is consistent with previous studies that also observe significant coefficients that are below -1.[153] Differentiating between profit and loss firms provides further insights on the economical relevance of goodwill impairments. While coefficients are significantly negative at 1 percent level and smaller than -1 for both subgroups, the coefficient for profit firms (-5.698) is four times as large as the coefficient for loss firms (-1.389). These findings are consistent with prior studies[154] as well as the theoretical discussion in section 6.2. A coefficient value below -1 means that the decrease in market value exceeds the reported impairment loss. This might be particularly based on two reasons. First, goodwill impairments convey bad news about the future economic benefits of a business that go beyond the value of goodwill. Second, the goodwill impairment test conceptually provides a cushion against impairment (see section 6.2.1). Hence, if goodwill is impaired, it is very likely that internally generated goodwill and hidden reserves (which are both not recognized) were consumed first, which could explain the additional reduction of

[153] While all significantly negative, coefficient values of prior studies do substantially differ and show values between -1.5 and -6.3 (Lapointe-Antunes et al. (2009); Xu et al. (2011); AbuGhazaleh et al. (2012); Laghi et al. (2013)).

[154] Lapointe-Antunes et al. (2009) and Xu et al. (2011) also find goodwill impairments to be more value relevant for profit firms than for loss firms.

market value. Since both reasons are more relevant for firms with higher profitability, it seems to be consistent with expectations that goodwill impairments of profit firms have a stronger association with a decrease in market value of equity than loss firms. Overall, the findings confirm hypothesis H_2 assuming goodwill impairments to be value relevant.

Again, the regression results for a sample of impairment observations only are considered as well (results not tabulated). The coefficient of *IMP* is smaller (-0.689) and significant at a lower level ($p<0.1$). This might indicate that zero impairments also contain value relevant (positive) information, i.e., it is value relevant whether a firm reports an impairment loss or not. Alternatively, it is also possible that the reduction in sample size leads to a lower significance level.

The coefficients of the control variables *BV* and *EARN* match the expectations. In general, the association between both variables and the market value of equity should be positive. This is reflected by the full sample results as the coefficients of *BV* (1.514) and *EARN* (2.400) are significantly positive at 1 percent level. With respect to the profitability of firms, prior value relevance literature indicates that the relevance of equity book value is inversely related to profitability. Moreover, the coefficient on positive earnings should be positive, whereas the coefficient on losses is expected to approach zero (Beaver (2002, p. 458)). This is consistent with the results of this study.[155]

6.5.4 Regression Results of Perceived Timeliness Analysis

The results of the return regression model (22) are presented in Table 18.[156] The variable *IMP* addresses the perceived timeliness of goodwill impairments (hypothesis H_3). With respect to the full sample, the coefficient of *IMP* (-0.023) is negative, but very small and insignificant. This indicates that goodwill impairments are not related to annual returns and therefore not perceived as timely. Differentiating between profit and loss firms reveals some inconsistencies, though. For profit firms, the coefficient (0.655) is insignificantly positive, whereas loss firms show a negative coefficient (-0.248) which is significant at 5 percent level. Apparently, goodwill impairments of loss firms are perceived by investors as timelier than profit firms.

[155] Lapointe-Antunes et al. (2009) and Xu et al. (2011) have very similar findings for profit and loss firms.

[156] The main assumptions of the linear regressions are fulfilled. The variance inflation coefficients do not indicate a multicollinearity issue as they are in a normal, uncritical range (maximum value of 1.5). The same holds when looking at the correlation coefficients. Moreover, normal distribution and homoscedasticity of residuals are assessed based on normal distribution diagrams and scatter plots. There are no indications for a non-normal distribution or heteroscedasticity. Autocorrelation is not an issue as the regressions are cross-sectional.

One explanation could be the discretion related to impairment testing. On the one hand, it might be more difficult for loss firms to opportunistically avoid impairments. It is easier to justify optimistic assumptions when firm performance is high and e.g. auditors might be more cautious when firm performance is low. On the other hand, investors might perceive that (at least some of) the impairments of profit firms are influenced by earnings management and therefore not recognized timely. Another reason could be the inherent recognition lag of the goodwill impairment test. It is likely that the cushion against impairment is lower for loss firms, which could lead to an earlier recognition of economically necessary impairments.

Table 18: *Perceived timeliness results of return regression (22)*

	Pred. sign	***Full sample***		***Profit firms***		***Loss firms***	
		β	p	β	p	β	p
Intercept		0.086	0.151	0.048	0.424	0.226	0.231
EARN	+	0.345***	0.000	0.424***	0.000	0.070**	0.041
ΔEARN	+	0.210***	0.000	0.690***	0.000	0.081***	0.003
IMP	-	- 0.023	0.414	0.655	0.535	- 0.248**	0.011
YEAR		Yes		Yes		Yes	
IND		Yes		Yes		Yes	
Adjusted R^2		0.459		0.460		0.428	
F-statistic		63.20***		49.64***		12.70***	
n		1,798		1,418		376	

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

As another robustness check, the return regression is re-performed for a sample of impairment observations only (results not tabulated). The results remain unchanged since the coefficient for *IMP* is also insignificant (-0.087).

The coefficients of the control variables *EARN* and Δ*EARN* match the expectations. In general, the association between both variables and the annual return on shares should be positive. This is reflected by the full sample results as the coefficients of *EARN* (0.345) and Δ*EARN* (0.210) are significantly positive at 1 percent level. With respect to the profitability of

firms, the estimates of the earnings-return relation can be expected to be lower for loss firms (Easton (1999, p. 405)). This is consistent with the results of this study.[157]

Given the finding that goodwill impairments are generally value relevant, but not perceived as timely, impairments seem to be recognized with a delay. Therefore, regression model (22) is modified to test whether future impairments are (partly) anticipated by the capital market.[158] By adding lead impairment variables for the next two years, this approach evaluates whether impairments that are perceived as economically necessary are already priced in by the market before they are reported as goodwill impairments. Therefore, based on the previous findings, the current annual return on shares is expected to be negatively associated with future goodwill impairments. This leads to the following regression model:

$$RETURN = \beta_0 + \beta_1 EARN + \beta_2 \Delta EARN + \beta_3 IMP + \beta_4 IMP_{t+1} + \beta_5 IMP_{t+2} + \sum \beta_Y YEAR + \sum \beta_I IND + \epsilon \quad (24)$$

where:

IMP_{t+1} = Goodwill impairment loss of the next year as a positive number (scaled by market value of common equity 8 months before the end of the current fiscal year)

IMP_{t+2} = Goodwill impairment loss of the second next year as a positive number (scaled by market value of common equity 8 months before the end of the current fiscal year)

The results of this modified return regression model (24) are presented in Table 19.[159] Addressing the full sample, *IMP* (-0.072) remains insignificant, whereas the recognition delay is reflected by the significantly negative coefficients of IMP_{t+1} (-0.692; $p<0.01$) and IMP_{t+2} (-0.094; $p<0.1$). This suggests that goodwill impairments seem to be delayed by one to two years. The first coefficient is six times higher, which indicates that most of the value relevant information of goodwill impairments is anticipated by the capital market one year ahead. As before, the results confirm that the recognition delay seems to be particularly present for profit firms. The coefficient of *IMP* (0.617) is insignificantly positive and the coefficients of IMP_{t+1}

[157] Xu et al. (2011) have similar findings for profit and loss firms. Amel-Zadeh et al. (2013) also find that earnings are less relevant for loss firms.

[158] This approach is similar to the studies of Chen et al. (2008), Amel-Zadeh et al. (2013), and Hamberg and Beisland (2014).

[159] The main assumptions of the linear regressions are fulfilled. The variance inflation coefficients do not indicate a multicollinearity issue as they are in a normal, uncritical range (maximum value of 1.5). The same holds when looking at the correlation coefficients. Moreover, normal distribution and homoscedasticity of residuals are assessed based on normal distribution diagrams and scatter plots. There are no indications for a non-normal distribution or heteroscedasticity. Autocorrelation is not an issue as the regressions are cross-sectional.

(-1.381; p<0.01) and IMP_{t+2} (-0.317; p<0.05) are significantly negative. On the contrary, a timely recognition for loss firms is indicated by the significantly negative coefficient of *IMP* (-0.334; p<0.1) and the insignificantly positive coefficients of IMP_{t+1} (0.039) and IMP_{t+2} (0.274). The overall results are therefore consistent with the previous findings of regression models (21) and (22).

Another robustness check accounts for the possibility that goodwill impairments could be recognized too early (e.g., based on earnings management incentives like big bath accounting or conservative smoothing) by adding impairment variables for the previous two years (i.e., IMP_{t-1} and IMP_{t-2}) instead of lead impairment variables. However, the findings do not confirm any significant influence on contemporaneous returns (results not tabulated).[160]

Table 19: *Perceived timeliness results of return regression (24) including lead impairment variables*

	Pred. sign	***Full sample***		***Profit firms***		***Loss firms***	
		β	p	β	p	β	p
Intercept		- 0.288***	0.000	- 0.344***	0.000	0.478*	0.072
EARN	+	0.520***	0.000	0.420***	0.000	0.114	0.181
ΔEARN	+	0.150***	0.002	0.663***	0.000	- 0.016	0.825
IMP	-	- 0.072	0.393	0.617	0.575	- 0.334*	0.053
IMP_{t+1}	-	- 0.692***	0.001	- 1.381***	0.001	0.039	0.905
IMP_{t+2}	-	- 0.094*	0.098	- 0.317**	0.031	0.274	0.442
YEAR		Yes		Yes		Yes	
IND		Yes		Yes		Yes	
Adjusted R^2		0.490		0.501		0.448	
F-statistic		50.70***		43.46***		9.16***	
n		1,240		1,014		232	

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

[160] For previous year's impairment loss, coefficients are insignificant for full sample (-0.056), profit sample (0.327), and loss sample (-0.061). The same holds for second previous year's impairment loss (-0.161 for full sample, -0.468 for profit sample, and -0.128 for loss sample).

6.5.5 Regression Results of Auditor Influence Analysis

In the following, it is evaluated whether the perceived timeliness of impairment losses is influenced by auditor characteristics. The results of regression model (23) are presented in Table 20.[161] As expected, the coefficients of *IMP*BIG4* (-0.794) and *IMP*LEADER* (-1.228) are significantly negative at 10 percent level. This means that the perceived timeliness of goodwill impairments increases if a firm is audited by a Big 4 auditor (hypothesis H_4) and further increases if the auditor is industry leader (since each industry leader in the sample is a Big 4 auditor) (hypothesis H_5). More generally, this can be interpreted as a perception of higher audit quality of Big 4 auditors and industry leaders leading to an increase in perceived reliability of goodwill impairment testing and therefore to an increase in perceived timeliness of impairment losses. The higher perceived audit quality of Big4 auditors might be due to a higher independence, an increased risk of reputation losses, and more resources to ensure high quality audits. Concerning industry leaders, especially the industry-specific knowledge might increase the perception of audit quality. With respect to non-audit fees, the significantly positive coefficient of *IMP*NAF* (0.475, $p<0.1$) confirms hypothesis H_6. Hence, the results indicate that auditors with a higher non-audit fee ratio are perceived as less independent by investors (i.e., lower perceived audit quality) resulting in a lower perceived timeliness of goodwill impairments. As expected, independence issues seem to be perceived as more important than potential positive effects due to knowledge spillover. The coefficient of *IMP*TENURE* (0.022) is positive, but insignificant. Hence, an influence of auditor tenure on perceived timeliness of impairment losses is not confirmed (hypothesis H_7). This might be due to opposing effects as a longer auditor tenure might threaten auditor independence, but comes along with a higher level of client-specific knowledge.

The coefficient of *IMP*AC* (-0.858) is negative as expected and significant at 1 percent level, which indicates that impairments of firms having established an audit committee are perceived as timelier, whereas *IMP*SIZE* (0.064) has an insignificant coefficient. The coefficients of *EARN* (0.418) and $\Delta EARN$ (0.207) are both significant at 1 percent level and comparable to the basic return regression model (22) in section 6.5.4. Moreover, the insignifi-

[161] The main assumptions of the linear regressions are fulfilled. Except for *IMP*, the variance inflation coefficients do not indicate a multicollinearity issue as they are in a normal, uncritical range (maximum value of 4.5). For *IMP*, the higher variance inflation coefficient of 9.3 is the logical consequence of introducing several interaction terms between *IMP* and auditor characteristics. However, this is not an issue as *IMP* is not the variable of interest in regression model (23). The same holds when looking at the correlation coefficients. Moreover, normal distribution and homoscedasticity of residuals are assessed based on normal distribution diagrams and scatter plots. There are no indications for a non-normal distribution or heteroscedasticity. Autocorrelation is not an issue as the regressions are cross-sectional.

cant coefficient of the single variable *IMP* (0.211) confirms that impairments are not generally perceived as timely.

Table 20: *Perceived timeliness results of return regression (23) for auditor characteristics*

	Pred. sign	***Basic model***		***Loss dummy***	
		β	p	β	p
Intercept		0.108	0.130	0.129*	0.066
EARN	+	0.418***	0.000	0.499***	0.000
EARN*LOSS	-			- 0.390***	0.000
ΔEARN	+	0.207***	0.000	0.782***	0.000
ΔEARN*LOSS	-			- 0.675***	0.000
IMP	-	0.211	0.670	0.405	0.657
IMP*LOSS	?			- 0.679	0.343
IMP*BIG4	-	- 0.794*	0.070	- 0.724*	0.086
IMP*LEADER	-	- 1.228*	0.083	- 1.644**	0.032
IMP*NAF	+	0.475*	0.087	0.641*	0.099
IMP*TENURE	?	0.022	0.716	0.022	0.706
IMP*AC	-	- 0.858***	0.009	- 0.441	0.109
IMP*SIZE	?	0.064	0.689	0.079	0.661
LOSS	?			- 0.184***	0.000
BIG4	?	- 0.008	0.658	- 0.002	0.915
LEADER	?	0.034*	0.087	0.031	0.113
NAF	?	- 0.004	0.784	- 0.003	0.820
TENURE	?	0.003*	0.099	0.002	0.184
AC	?	0.033*	0.069	0.028	0.113
SIZE	?	- 0.008*	0.099	- 0.009**	0.048
YEAR		Yes		Yes	
IND		Yes		Yes	
Adjusted R^2		0.466		0.502	
F-statistic		42.80***		44.29***	
n		1,763		1,761	

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

In order to control for a potential non-linearity related to firm profitability, an indicator variable for loss firms (*LOSS*) as well as interaction terms of *LOSS* with *EARN*, Δ*EARN*, and *IMP* are added. The results (also presented in Table 20) are consistent with the findings

related to firm profitability in section 6.5.4. The previous finding concerning auditor characteristics do not change, i.e., Big 4 auditors (-0.724; p<0.1) and industry leaders (-1.644; p<0.05) have a positive influence on perceived timeliness of goodwill impairments, whereas a higher non-audit fee ratio (0.641; p<0.1) has a negative influence. However, with respect to the existence of an audit committee, the negative coefficient of *IMP*AC* becomes slightly insignificant (-0.441; p=0.109).

As another robustness check, both regression models are re-performed using alternative definitions of auditor characteristic variables (results not tabulated). Instead of market leader, an indicator variable for industry leaders is used with the value of 1 if the firm is audited by an auditor whose industry market share is 30 % or higher.[162] The results remain unchanged for the basic model (-1.092; p<0.1) as well as the loss dummy model (-1.352; p<0.1). As an alternative measure for non-audit fee ratio, an indicator variable for non-audit fees exceeding 70 % of audit fees is used.[163] The results remain also unchanged for the basic model (0.985; p<0.1) as well as the loss dummy model (0.773; p<0.1). In order to check the robustness concerning audit tenure, indicator variables for short (< 4 years)[164] and long (> 10 years)[165] tenure as well as for first year audits are tested. The results are still insignificant for both regression models.

6.6 Conclusion

The study is motivated by the IASB's recent post-implementation review on business combinations, the ongoing lively debate on the usefulness of impairment testing, and the high practical relevance of this topic. In order to assess whether the impairment-only approach adequately reflects the economic value of goodwill and its consumption as perceived by the capital market, it is investigated (1) whether goodwill and goodwill impairments are value relevant and (2) whether goodwill impairments are perceived to be reported timely. Moreover, it is evaluated whether auditor characteristics (as a proxy for perceived audit quality) have an

[162] 30 % market share are considered as a suitable threshold since it ensures that the audit firm actually has a main focus on the respective industry leading to a sufficient degree of industry specialization. Moreover, as a Big 4 variable is also included in the regression, it is important that the industry leader variable is capable of differentiating between Big 4 auditors and actual industry leaders. The threshold of 30 % was also used by prior literature (e.g., Cahan et al. (2011)).

[163] The threshold of 70 % is based on the recent EU regulation which generally requires that non-audit fees do not exceed 70 % of the last three year's average audit fees (EU Parliament (2014, Art. 4 Par. 2)).

[164] This threshold was used by prior German studies of Quick and Wiemann (2011) and Quick and Wiemann (2012).

[165] This threshold is based on the recent EU regulation which generally requires a mandatory auditor rotation after ten years for firms of public interest (EU Parliament (2014, Art. 17 Par. 1)).

influence on the perceived timeliness of impairment losses. The study therefore contributes to central questions in accounting research: Is managerial discretion over accounting numbers (accounting choice) good or bad for stakeholders and does audit quality has an impact on this relationship?

Using a sample of 1,841 firm-year observations from 306 firms listed on the regulated market of Frankfurt stock exchange (CDAX), the results show that goodwill and goodwill impairments are value relevant. Moreover, the findings suggest that the association between goodwill impairments and a decrease in market value of equity is stronger for profit firms than for loss firms. This could be attributable to more pronounced bad news about future economic benefits and/or the larger conceptual cushion against impairment that is consumed first. The findings on the perceived timeliness indicate that profit firms tend to delay impairments losses by one to two years, whereas loss firms seem to recognize goodwill impairments timelier. The reason for such a behavior is not clear. One explanation could be the discretion related to impairment testing. Due to their financial situation, profit firms might be rather (perceived to be) able to influence the timing of goodwill impairments opportunistically than loss firms. Another reason could be the inherent recognition lag of the goodwill impairment test due to the cushion against impairment.

Concerning the influence of auditor characteristics, the findings indicate that impairments are perceived as timelier when the firm is audited by a Big 4 auditor and an industry leader, whereas the perceived timeliness decreases with a higher non-audit fee ratio. Since goodwill impairment tests are often in the main focus of auditors, this might be due to an increase (decrease) in perceived audit quality, which might also increase (decrease) the perceived reliability of goodwill impairment testing and therefore the perceived timeliness of impairment losses. Perceived audit quality might be higher for Big 4 auditors and industry leaders since capital market participants might assume them to be more independent from individual clients and to have a higher (industry-specific) level of resources and experience. On the contrary, a higher non-audit fee ratio might indicate that independence is a critical issue (especially for the German institutional setting). With respect to auditor tenure, the results are not significant.

The findings have implications for the IASB and other regulators since goodwill impairments seem to convey value relevant information, but it is questionable whether the current regulation provides a sufficiently rigorous impairment test to ensure a timely recognition of impairment losses. Hence, the decision usefulness of goodwill impairments might be reduced

and it should be discussed whether changes in regulation can provide more reliable and timelier information and whether the relatively high costs of impairment tests are justified by sufficiently high benefits. As an alternative, parts of literature demand a return to the amortization regime (e.g., Küting (2013, p. 1803); Gundel et al. (2014, p. 137)). With respect to auditors and supervisory bodies, the results imply that they should be aware of the timeliness issue related to goodwill impairments. It is crucial, not only for goodwill accounting, to ensure a sufficient degree of auditor independence as well as (industry-specific) resources and experience in order to provide a high audit quality and therefore reliable financial information. A timely recognition of impairment losses can help to facilitate efficient contracting between managers and shareholders and increase the capital market's investment confidence in the long run. Moreover, it might encourage managers to terminate bad investments earlier and provide disincentives for managers to undertake negative net present value projects to gain private benefits (LaFond & Roychowdhury, 2008, p. 102).

This study has some limitations which might suggest the need for future research. First, the results are based on a German sample, i.e., they refer to a distinctive continental European institutional setting. In particular compared to Anglo-American countries applying IFRS, it is characterized by a weaker legal protection of investors. With respect to auditors, Germany has a limited liability and the public oversight is rather modest and less transparent. Moreover, Germany has implemented a two-tier board system. Hence, the results are more relevant for Germany and other continental European countries with similar institutional setting (e.g., Austria, France, or Switzerland; see section 6.2.3 for a detailed discussion). With respect to the perceived timeliness and the influence of auditor characteristics, it could therefore be interesting to compare the results to other institutional settings applying IFRS. Second, the study only addresses investors as financial statement users. Future research could therefore focus on other stakeholders like creditors or financial analysts. 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. A further promising avenue for future research would be to investigate that consequences of more timely impairment decisions for firms with better audit quality.

7 Research Paper 3: Information Content of Goodwill Impairments

The following paper can be read independently and addresses the third research question raised in section 1.1: Do goodwill impairment announcements have information content (i.e., do they lead to a negative capital market reaction) and is the reaction influenced by the management's provision of an external or internal reason explaining goodwill impairments losses?

The paper is published in a German economic research journal.[166]

Abstract

This study investigates the information content of goodwill impairments under IAS 36. It is based on a sample of 84 ad hoc announcements of goodwill impairments issued by German listed firms for the periods 2005 to 2013. The results indicate that the announcement of goodwill impairments leads to a negative capital market reaction, but that this reaction is considerably smaller than the goodwill amount written off (in relation to market capitalization). Moreover, the results show that goodwill impairments with an external impairment reason do not lead to a significant capital market reaction. On the contrary, negative capital market reactions can be observed for impairments with an internal impairment reason as well as impairments without reason. However, the additional provision of an internal impairment reason does not have a significant influence on the capital market reaction. With respect to the financial crisis, significant differences cannot be observed, whereas the capital market reaction is stronger for firms with higher leverage.

7.1 Introduction

For many firms, goodwill represents an important economic resource. This is emphasized by the fact that goodwill often represents a high proportion of acquisition costs of acquired targets[167] as well as a high proportion of the firms' total assets and book value of equity.[168] Therefore, it can be assumed that goodwill impairments are relevant to the capital market. In

[166] Refer to Albersmann, Quick, and Walle (2017): Informationsgehalt von Goodwill Impairments. In: Betriebswirtschaftliche Forschung und Praxis, Vol. 69, pp. 32-56.

[167] For example, Glaum and Wyrwa (2011) find an average goodwill-to-acquisition cost ratio of 62 % for 322 large firms listed in 12 European countries in 2009. They also find that goodwill represents more than half of the acquisition costs in 46 % of the transactions. Similarly, Detzen and Zülch (2012) find a mean goodwill-to-acquisition cost ratio of 60 % considering 123 acquisitions of European firms during the periods 2005 to 2008.

[168] The high relevance for German listed firms is also confirmed by descriptive studies of Rogler et al. (2012), Küting (2013), and Gundel et al. (2014).

order to provide information to capital market participants which is more decision useful, the IASB replaced the straight-line amortization of goodwill by an annual goodwill impairment test as of March 31, 2004 (IAS 36.BC131G). With the EU adoption of the revised IAS 36 as of January 1, 2005, 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). As goodwill does (by definition) not generate independent cash inflows, it is allocated to a cash generating unit (CGU) for impairment test purposes at the time of the business combination. In order to determine whether goodwill impairments are required, the recoverable amount, defined as the higher of value in use and fair value less costs of disposal (IAS 36.6), is compared with the carrying amount of the CGU. If the carrying amount exceeds the recoverable amount, a goodwill impairment loss has to be recognized (IAS 36.90, 36.104). The determination of value in use as well as (in most cases) fair value is based on discounted cash flow methods, i.e., the goodwill impairment test is particularly based on the management's assumptions and estimations concerning the future economic development and therefore future cash flows of the CGU.

However, as the recent post-implementation review on business combinations, which was completed in June 2015 (IASB (2015a)), shows, there is still a substantial debate on the decision usefulness of goodwill impairment tests even one decade later (IASB (2014, pp. 21-26)). It is discussed whether the impairment test is able to adequately reflect the economic value of goodwill and its consumption (i.e., goodwill impairments) and the IASB concluded that it 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 (IASB (2015a, p. 8)). On the one hand, proponents of the impairment-only approach argue that it enables the management to convey private information to capital market participants who therefore are enabled to better estimate future cash flows and to better assess the success of past acquisitions. On the other hand, opponents criticize that the current approach leads to a delayed recognition of economically necessary goodwill impairments and that the inherent degree of discretion is used by management to engage in opportunistic earnings management. Both would decrease the decision usefulness of goodwill impairments (IASB (2014, pp. 21-26)).

Based on this debate, this event study investigates whether capital market participants perceive ad hoc announcements of goodwill impairments as new and decision useful information leading to a capital market reaction. The relevance of the topic is further increased as

goodwill impairment tests are considered to be time-consuming and costly. Hence, these costs have to be justified by sufficiently high benefits (IASB (2014, p. 25)). Moreover, it is investigated whether external or internal impairment reasons provided by management, the financial crises, and the firms' financing structure have an influence on the perceived decision usefulness and therefore the information content of goodwill impairments.

The study uses a sample of 84 ad hoc announcements of goodwill impairments issued by 66 German firms listed on the regulated market of Frankfurt stock exchange (CDAX) encompassing the period 2005-2013. The results show that the announcement of goodwill impairments leads to a significant negative capital market reaction, but that this reaction is relatively small compared to the goodwill amount written-off. Hence, goodwill impairments seem to only partly represent new and decision useful information. Moreover, differentiating by impairment reason shows that goodwill impairments with provision of an external impairment reason do not cause a significant capital market reaction. On the contrary, a significant negative capital market reaction can be observed for both impairments with provision of an internal reason and impairments without reason provided by management. With respect to the financial crisis, there are no significant differences in the reactions before, during, and after the crises. For firms that are more debt financed, a stronger capital market reaction is observed. This might be due to influential creditors like banks playing a more important role in monitoring the management.

The study contributes to the existing literature since such an event study does not exist for the German capital market as well as for the period after the financial crisis. With respect to European firms, there is currently only one study of Knauer and Wöhrmann (2016) encompassing the period 2005-2009, which performs an analysis differentiating between Anglo-American and continental European countries. Hence, the study of this paper allows drawing more specific conclusions on the information content of goodwill impairments with respect to the specific German institutional setting and analyzing the influence of the financial crisis on capital market reactions. Compared to Anglo-American countries, the institutional setting of Germany and other continental European countries is characterized by a weaker legal protection of investors and a lower developed equity capital market (La Porta et al. (1997); La Porta et al. (1998); La Porta et al. (2006); Gul et al. (2013)). This might lead to a reduction of the capital market's confidence in goodwill impairments. However, as debt financing historically plays a more important role in Germany, creditors like banks have a more important monitoring function. This might have a positive effect on the trust of investors in

financial information. With respect to the corporate governance, especially the two-tier board system with its separation between management board and supervisory board has to be mentioned. On the contrary, particularly Anglo-American countries, but also some other continental European countries (e.g., Italy and Spain) have implemented a one-tier system with only one Board of Directors. Comparing these two systems, there are arguments supporting the two-tier system (in particular independence of supervisory board members), but also advantages of the one-tier system (in particular full-time occupation of board members with more operating knowledge and better access to information). Based on the different institutional settings, different reactions to goodwill impairment announcements are possible. The results are therefore particularly relevant for Germany, but also for other continental European countries with similar institutional setting (e.g., Austria, France, or Switzerland).

The reminder of the paper is organized as follows. Section 7.2 provides a theoretical analysis of the information content of goodwill impairments and develops the hypotheses. The research design is described in section 7.3, followed by the empirical results in section 7.4. Finally, section 7.5 draws conclusions and discusses limitations of the study.

7.2 Information Content of Goodwill Impairments and Development of Hypotheses

7.2.1 Decision Usefulness of Goodwill Impairments

The IASB's objective of introducing the goodwill impairment test was to devise a rigorous and operational test on the recoverability of goodwill which provides more useful information to financial statements users than an approach in which goodwill is amortized (IAS 36.BC131G). In the following, it is evaluated whether this objective was achieved by the concept of goodwill impairment testing under IAS 36. Therefore, it is necessary to consider the IASB's conceptual framework first. The framework defines as main objective of financial reporting to provide financial information that is useful to existing and potential investors, lenders, and other creditors (primary target group) in making economic decisions concerning the provision of capital (IASB Framework OB2).[169] Information is particularly decision useful if it allows or supports the assessment of a firm's expected future cash flows and therefore an estimation of the firm's value (IASB Framework OB3, OB7). Hence, the decision usefulness for capital market participants is the primary criterion to assess and compare financial

[169] However, it is very likely that the provision of useful financial information to capital market participants also covers the information needs of other users (IASB Framework OB10).

information on the basis of the conceptual framework (IASB Framework QC1). However, especially costs represent a pervasive constraint on the financial information that can be provided by firms and those costs have to be justified by corresponding additional benefits (IASB Framework QC3, QC35).

The decision usefulness is determined by qualitative characteristics of financial information (IASB Framework QC3). It can be differentiated between fundamental qualitative characteristics and enhancing qualitative characteristics. Fundamental qualitative characteristics of financial information are relevance[170] and faithful representation[171]. Both characteristics have to be fulfilled simultaneously (to a certain degree) in order to make information useable and decision relevant for capital market participants (IASB Framework QC4, QC5, QC17). Enhancing qualitative characteristics are less critical than fundamental qualitative characteristics. Nevertheless, they should be fulfilled as good as possible in order to increase the decision usefulness of financial information. The IASB classifies comparability, verifiability, timeliness, and understandability as enhancing qualitative characteristics (IASB Framework QC19, QC33).[172]

As goodwill impairments are generally determined on the basis of discounted cash flow methods, they can be particularly relevant since they might enable capital market participants to better assess the expected future cash flows of the firm and its CGUs as well as the success of past acquisitions and management decisions (IASB (2014, p. 21)).[173] Moreover, the impairment test should lead to a more appropriate presentation of goodwill as a relatively vague economic resource and a timelier recognition of its consumption. Providing a certain degree of discretion, the management is enabled to convey private information to capital market participants which might only be partially anticipated by the market. Hence, information asymmetries can be reduced and it might be assumed that goodwill impairments are decision relevant based on their predictive and/or confirmatory value (if the impairment was

[170] Financial information is relevant if it capable in making a difference in decisions of capital market participants (IASB Framework QC6).

[171] Faithful representation particularly refers to three criteria which should be maximized to the extent possible: completeness, neutrality, and absence of errors (IASB Framework QC12).

[172] In this context, it has to be emphasized that the maximization of qualitative characteristics is an iterative process. Moreover, it is possible that the optimization with respect to one characteristic has a negative impact on other characteristics (IASB Framework QC18, QC34).

[173] In this context, empirical studies show that goodwill impairments are related to future firm performance (Jarva (2009); Li et al. (2011)) and investment opportunities (Godfrey and Koh (2009); Chalmers et al. (2011)) and that impairment tests have a positive influence on the accuracy of analysts' earnings forecasts (Chalmers et al. (2012)).

already anticipated by the capital market).[174] However, there are also aspects that could reduce the decision relevance. In particular, the method of goodwill impairment tests to test goodwill at CGU level could imply that economically necessary impairments of goodwill are avoided by a CGU's hidden reserves and internally generated goodwill which already existed as of the allocation date or was subsequently generated.[175] Hence, the relevance and particularly the predictive value of goodwill impairments could be affected by a reduced comparability and timeliness. Moreover, it is questionable whether comparability and timeliness are reduced by the material discretion related to impairment tests. In particular, capital market participants could assume that uncertainty is so high that the relevance of information based on these tests is also impaired if the management seeks to achieve a faithful presentation and does not act opportunistically. Moreover, prior studies also show that firms apply goodwill impairment tests very differently and sometimes inconsistently (Petersen and Plenborg (2010)). This could also constrain the relevance of goodwill impairments.

The faithful presentation of goodwill impairments has to be considered as critical. Particularly based on information asymmetries between management and capital market participants, the management could use the inherent degree of discretion opportunistically to either mislead investors about the underlying economic performance of the firm or to influence contractual outcomes that depend on financial key figures[176] (Healy and Wahlen (1999, p. 368)).[177] If this is the case (or if this is perceived by capital market participants), the (perceived) reliability and therefore also the decision usefulness of goodwill impairments decrease. In order to ensure a more complete presentation of information on goodwill impairments, IAS 36 requires additional disclosures (in particular IAS 36.134: valuation concept used, description of management approach, main business and valuation assumptions, duration of detailed planning phase, sensitivity analysis). These disclosures are also supposed to increase comparability, verifiability, and understandability of goodwill impairments. However, it is questionable whether the current disclosure requirements satisfy these objectives. In particular, the management might be reluctant to disclose sensitive internal (and therefore decision useful) information. Moreover, IAS 36 only requires disclosing the value assigned to a key assump-

[174] Based on the conceptual framework, the value of information can be either predictive, confirmatory, or both (IASB Framework QC7).

[175] The IASB was aware of this shortcoming, but accepted the consequences (IAS 36.BC135).

[176] Contracts that depend on financial key figures could, e.g., be management contracts with variable compensation or credit contracts including debt covenants.

[177] In this context, several empirical studies show that earnings management incentives can have an influence on the recognition of goodwill impairments (e.g., Beatty and Weber (2006); Masters-Stout et al. (2008); AbuGhazaleh et al. (2011)).

tion other than long-term growth rate and discount rate if a reasonably possible change in this assumption would cause an impairment (IAS 36.134). The disclosures might also have a positive influence on the neutrality and absence of errors. In particular, they could provide evidence of a bias or manipulation as well as inappropriate business and valuation assumptions or material valuation uncertainties. However, it is not clear whether this can actually mitigate opportunistic behavior and whether a presentation which is neutral and free of errors is therefore achieved. Due to the highly subjective character of goodwill impairment tests, auditors and other control mechanisms as well as capital market participants have only a limited possibility to verify whether the information is actually reliable (Kothari et al. (2010, p. 262)). Hence, the management should have a substantial leeway to avoid goodwill impairments or to determine the timing and magnitude of impairment losses emphasizing critical questions concerning the reliable and timely recognition of goodwill impairments (Knauer and Wöhrmann (2016, pp. 426-427)). This (perceived) uncertainty could have a negative impact on the (perceived) decision usefulness of goodwill impairments.

7.2.2 Influencing Factors on the Information Content of Ad Hoc Announcements of Goodwill Impairments

Particularly based on their relevance, goodwill impairments can be either communicated as part of the regular financial reporting in quarterly or annual reports or published as separate announcements prior to these reports. As quarterly or annual reports disclose a variety of other financial information, an isolated analysis of goodwill impairments is not possible. Hence, only ad hoc announcements can be used for the event study. In general, it can be assumed that goodwill impairment announcements tend to contain more material and decision useful goodwill impairments as the management decided to announce them earlier and separately to the capital market. However, the previous theoretical analysis also suggests that the value of these announcements is rather confirmatory and only partly predictive. Moreover, goodwill impairments might be influenced by earnings management. Hence, the expected capital market reaction is on the one hand dependent on the timeliness and the circumstances of the announcement. On the other hand, it is crucial whether the capital market considers this information as relevant and whether it perceives the information as faithful.

Prior literature on the information content of goodwill impairments was primarily concentrated on the USA. For the periods 1992 to 1996, Hirschey and Richardson (2002) confirm a significant negative announcement effect of -2.9 % on average during the two-day event window surrounding the announcement date [-1;0]. However, they also find negative

cumulated abnormal returns of -41.7 % during the year prior to the announcement, i.e., a large share of the negative market reaction is already observed prior to the announcement. More recent studies of Bens et al. (2011) and Li et al. (2011) also find significant negative abnormal returns of -3.3 % (two-day event window [0;1]) and -1.7 % (three-day event window [-1;1]) during the period from 1996 to 2006. Moreover, as part of a regression analysis, both studies show a significant negative relationship between the magnitude of goodwill impairments and cumulated abnormal returns. The only European study stems from Knauer and Wöhrmann (2016), who examine a sample of goodwill impairment announcements from European and US-American firms for the periods 2005 to 2009. For firms from continental European countries, they find a significant average announcement effect of -1.0 % during the three-day event window surrounding the announcement date [0;2], which is slightly lower than cumulated abnormal returns of British-American firms (-1.5 %). They also establish a significant negative relationship between the magnitude of goodwill impairments and cumulated abnormal returns. Summarizing all studies, they confirm a negative capital market reaction to goodwill impairments. However, they also show that this reaction is relatively small compared to the magnitude of reported goodwill impairments (in relation to market capitalization). Hence, the capital market might anticipate goodwill impairments at least partly before they are announced and the informational value might be rather confirmatory than predictive.[178] On the contrary, it is also possible that capital market participants consider goodwill impairments only partly as relevant and faithfully presented.

Based on the theoretical reasoning in combination with the findings of prior literature, the following hypotheses are formulated:

H_{1a}: The announcement of goodwill impairments leads to a negative capital market reaction.

H_{1b}: The announcement of goodwill impairments leads to a capital market reaction which is smaller than the impairment magnitude (in relation to market capitalization).

However, the capital market reaction should not only dependent on the magnitude of goodwill impairments, but also on the surrounding circumstances. In particular, management can announce additional information on the reasons for impairments and thereby influence the perceived decision usefulness. If the management provides an external impairment reason,

[178] In this context, value relevance studies show that goodwill impairments represent value relevant information for the capital market, i.e., goodwill impairments are negatively associated with share prices (AbuGhazaleh et al. (2012); Laghi et al. (2013)). However, findings also suggest that goodwill impairments are not or not fully recognized timely (Amel-Zadeh et al. (2013); Hamberg and Beisland (2014)).

capital market participants are enabled to better verify the appropriateness of goodwill impairments. The management might therefore have a lower incentive to engage in earnings management or might signalize a lower level of earnings management (Knauer and Wöhrmann (2016, p. 428)). Hence, the presentation could be perceived as more faithful and the market reaction could thus be stronger. However, it can also be assumed that the capital market already anticipated the influence of external reasons and that goodwill impairments based on these reasons have therefore less or no relevance. Hence, the influence of the provision of external reasons on the decision usefulness of goodwill impairments and therefore on the capital market reaction is not clear.

The influence of internal reasons is also not clear. On the one hand, internal reasons might suggest that management conveys private information to the capital market and that goodwill impairments based on these reasons are therefore more relevant. On the other hand, it is more complicated to assess the appropriateness of goodwill impairments in these cases and capital market participants might doubt the faithful representation. This could lead to a weaker market reaction as capital market participants could rely more on other, more reliable financial information of the firm. However, it is also possible that the capital market generally assumes a management tendency to withhold bad news, particularly for impairments which are difficult to verify for third parties. Therefore, it might expect reported impairment losses to be too low.[179]

In summary, the influence of the provision of impairment reasons on the capital market reaction is therefore not clear and the following non-directional hypotheses are examined:

H_{2a}: *The capital market reaction to the announcement of goodwill impairments is influenced by the provision of an external impairment reason (compared to no reason).*

H_{2b}: *The capital market reaction to the announcement of goodwill impairments is influenced by the provision of an internal impairment reason (compared to no reason).*

Contrary to prior studies, the sample also includes observations of the period after the financial crisis in addition to observation before and during the crisis in 2008 and 2009. Therefore, it can also be analyzed whether capital market reactions for these periods differ. On the one hand, reactions before and after the crisis could be different as the events of the financial crisis might lead to a different investor perception of respective capital market

[179] This corresponds with the argumentation of Knauer and Wöhrmann (2016, p. 428).

information. However, the specific influence is not clear. On the contrary, goodwill impairments during the financial crisis might be less surprising and meaningful for the capital market or investors might have a stronger focus on alternative financial information. Hence, the capital market reaction might be weaker during this period and the following hypotheses are tested:

H_{3a}: The capital market reaction to the announcement of goodwill impairments before the financial crisis differs from the reaction after the crisis.

H_{3b}: The capital market reaction to the announcement of goodwill impairments during the financial crisis is weaker than the reaction after the crisis.

Moreover, the specific institutional setting of the German capital market could have an influence on capital market reactions. Particularly in Germany, debt financing plays a more important role. In particular banks as large creditors might exert a stronger influence as they often have seats on the supervisory board (and audit committee) or have a more direct access to information and management (Shleifer and Vishny (1997, pp. 754, 757); Gietzmann and Quick (1998, p. 84)). Hence, creditors in Germany have a more important role in monitoring the management and thus might force the management to account more conservatively and recognize goodwill impairments timelier. This might have a positive influence on the decision usefulness of goodwill impairments, leading to the following hypothesis:

H_{3b}: The capital market reaction to the announcement of goodwill impairments is stronger for firms having a higher degree of debt financing.

7.3 Research Design

7.3.1 Sample

The sample consists of first-time ad hoc announcements of goodwill impairments in Germany which were published by firms listed on the regulated market of Frankfurt Stock Exchange (CDAX) during the periods 2005 to 2013. In order to identify ad hoc announcements and their exact date, the investor relation section of the respective firm websites were considered and a LexisNexis keyword search[180] was conducted. As starting point for the search, all goodwill impairments reported in the IFRS annual reports of CDAX firms during the periods 2005 to

[180] The information database LexisNexis is regularly used for event studies (e.g., Beatty and Weber (2006); Knauer and Wöhrmann (2016)). Following these prior studies, the LexisNexis search was conducted using a combined keyword approach with the firm name and different keywords for goodwill impairments.

2013 were used. However, firm-year observations from banks, insurance companies, and other financial service firms and observations which are subject to other exclusion criteria were excluded.[181] In order to enhance the power of the tests and to ensure an appropriate likelihood that an ad hoc announcement actually exists, only impairment losses exceeding either 1 % of total assets or EUR 10 million are considered as relevant based on materiality aspects.[182]

In total, there are 289 relevant goodwill impairments during the sample period for which a search for ad hoc announcements was conducted. An ad hoc announcement is only considered if the impairment magnitude is explicitly disclosed and if it is the first announcement of the impairment.[183] The ad hoc announcements identified are sometimes also related to pre-announcements of quarterly or annual reports and therefore include in some cases additional information, in particular concerning earnings. The research design controls for a potential bias of additional information by a multivariate regression model (see section 7.3.3). The final sample consists of 84 ad hoc announcements of 66 firms. The distribution of these announcements based on their announcement dates is provided in Table 21. As expected, the financial crisis leads particularly in 2009 to an increased number of 17 goodwill impairment announcements. During the other years from 2006 to 2013, the number of announcements per year lies between 7 and 13. The reason for only 1 announcement in 2005 was the introduction of the revised IAS 36. Hence, there are no announcements of goodwill impairments with respect to 2004 and goodwill impairments determined at the end of 2005 might rather be announced at the beginning of 2006.

Table 21: *Distribution of goodwill impairment announcements by year (based on announcement date)*

Announcement year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of announcements	1	8	10	9	17	11	13	7	8

[181] Goodwill impairments are hand-collected from annual reports and additionally compared with data from Worldscope database, if available. Any differences were resolved. Banks, insurance companies, and other financial service firms are excluded since they are subject to different financial reporting requirements that lead to a reduced comparability with other sample firms. Exclusion criteria are IPO, delisting, merger and acquisition, liquidation, insolvency, and other financial distresses (negative book value of equity, goodwill impairments exceeding market value of equity, zero sales). These firm-year observations are excluded to mitigate a bias due to firm-specific circumstances or an increased uncertainty concerning the firm's future.

[182] This approach is similar to Jarva (2009) and Knauer and Wöhrmann (2016). Moreover, it was tested for a subsample of goodwill impairments whether impairment announcement below this threshold exist. This was not the case.

[183] The publication of quarterly or annual reports cannot be used as an event as the report discloses a variety of other financial information to the capital market. Hence, it is not possible to isolate the announcement effect of goodwill impairments.

Consolidated financial statement and market data stem from the Worldscope database, whereas the daily closing prices for all sample firms as well as the CDAX index are extracted from Bloomberg Professional Service. In order to minimize the potential bias of outliers or erroneous data, all continuous variables used in this study are winsorized at 5 % and 95 %.[184]

7.3.2 Event Study

The event study design is used to evaluate whether announcement effects to ad hoc announcements of goodwill impairments can be observed on the capital market and therefore whether goodwill impairments have information content. The research design therefore seeks to isolate the capital market reaction to goodwill impairment as good as possible from other financial information or firm activities. Event studies are based on the assumption that market reactions (i.e., abnormal returns) can only be observed if announcements to the capital market contain new and decision useful information concerning the change in value of an underlying asset (Serra (2004, p. 2)). Hence, event studies are based on the theory of efficient capital markets (Fama (1991, p. 1602)). It assumes that all new and price-relevant information is immediately priced in by capital market participants (Schmidt and Terberger (1997, p. 210); Serra (2004, p. 2)). Therefore, if a (sufficiently) efficient market exists and if the isolated consideration of an event is possible, the price change can be attributed to this event. This assumption is not uncritical. Nevertheless, the event study as a capital market approach represents a well-established method in financial research (e.g., Corrado (2011)).

In order to estimate the announcement effect, the standard event study approach of Brown and Warner (1985) and MacKinlay (1997) is used. The event date (i.e., the date of the ad hoc announcement) is defined as day $t_0 = 0$ and the event window $[t_0 ; t_0 + \tau]$ is defined as the period during which the capital market reaction is measured. In order to ensure the robustness of the results, the study particularly uses two common event windows: The two-day window [0;1][185] and the three-day window [0;2][186]. Moreover, the event windows [-1;1] and [-2;2] are considered as sensitivity tests. The abnormal returns of a share at one day during the event window (AR_t) are estimated as the difference between the observed return (R_t) and the

[184] Due to the sample size of 84 observations, the 5 % and 95 % percentiles are used. The 1 % and 99 % percentiles, which are more commonly applied for larger sample sizes, cannot be used as the minimum and maximum of 84 announcements already equal the 1 % and 99 % percentiles. Hence, there would be no winsorizing effect.

[185] The two-day event window [0;1] was, e.g., used by Bens et al. (2011).

[186] The three-day event window [0;2] was, e.g., used by Knauer and Wöhrmann (2016).

share's estimated normal return ($E(NR_t)$). The normal return represents the return which would have been expected in absent of the ad hoc announcement (Serra (2004, p. 3)):

$$AR_t = R_t - E(NR_t) \tag{25}$$

The normal returns are estimated based on the market model using a typical estimation period of 250 trading days (i.e., one calendar year) (e.g., Eckbo (2007, pp. 11)). It associates the returns of an individual share with the returns of the market portfolio.[187] The market portfolio serves as benchmark for eliminating market-wide effects. These effects have an influence on the firm's share price, but they are not associated with the event under consideration (Serra (2004, p. 2)). In line with the sample, the CDAX is used as market portfolio and the following linear association between the daily return of an individual share and the daily return of the CDAX is assumed:

$$NR_t = \alpha - \beta * R_{m,t} + \epsilon \tag{26}$$

$R_{m,t}$ is the return of the CDAX at day t and ϵ are the residuals with an expected value of zero. The share-specific parameters α (representing the firm-specific portion of the return) and β (representing the market dependent portion of the return), which are required to determine the expected normal returns, are estimated based on a linear regression using the method of least squares[188] and the previously defined estimation period.

Then, the abnormal returns of all days during the event window are summed up. This leads to the cumulated abnormal return (*CAR*) of the respective announcement (Eckbo (2007, p. 10); Serra (2004, p. 3)):

$$CAR_{[t_0;t_0+\tau]} = \sum_{t=t_0}^{t_0+\tau} R_t - E(NR_t) \tag{27}$$

7.3.3 Multivariate Regression Model

In order to examine influence factors on the information content of ad hoc announcements and to account for potential distorting effects of additional information, a multivariate regression model is tested. The following basic model uses impairment magnitude (*IMP*) as variable of interest and unexpected quarterly earnings (*UE*) as well as firm size (*Size*) as

[187] Concerning the preference for the market portfolio, see e.g. Armitage (1995).

[188] In order to minimize potential heteroscedasticity problems, a heteroscedasticity-resistent estimator based on White (1980) is applied.

control variables. *IMP* and *UE* are (analogous to the return figure *CAR*) scaled by the market value of equity before the announcement.[189]

$$CAR = \beta_0 + \beta_1 IMP + \beta_2 UE + \beta_3 Size + \epsilon \quad (28)$$

where:

CAR = Cumulated abnormal return during the event window

IMP = Magnitude of the announced goodwill impairments scaled by the market value of equity at the last day of the estimation period

UE = Unexpected quarterly earnings, defined as the difference between the pre-impairment net income of the announcement quarter and the corresponding prior-year quarter, scaled by the market value of equity at the last day of the estimation period (if the announcement does not include a pre-announcement of earnings figures, *UE* takes a value of 0)

Size = Firm size, defined as the natural logarithm of the market value of equity at the last day of the estimation period

In line with hypotheses H_{1a} and H_{1b}, the coefficient of *IMP* is expected to be negative and larger than -1. As the ad hoc announcements are sometimes also related to pre-announcements of quarterly or annual reports including particularly additional information concerning earnings, the research design controls for a potential distorting effect by including unexpected quarterly earnings as control variable.[190] The correlation between *UE* and *CAR* is expected to be positive. Moreover, the variable *Size* controls for potential effects related to firm size not covered by the scaling of variables.

In order to test hypotheses H_{2a} and H_{2b}, the basic model is extended by interaction terms between *IMP* and variables for the provision of an external impairment reason (*EXT*) as well as an internal impairment reason (*INT*). Due to econometrical reasons, both variables are also included as single variables in the following regression model:

$$CAR = \beta_0 + \beta_1 IMP + \beta_2 IMP * EXT + \beta_3 IMP * INT + \beta_4 EXT + \beta_5 INT + \beta_6 UE + \beta_7 Size + \epsilon \quad (29)$$

[189] This approach is similar to Li et al. (2011) and Knauer and Wöhrmann (2016).
[190] This approach is similar to Bens et al. (2011), Li et al. (2011), and Knauer and Wöhrmann (2016).

where:

EXT = Indicator variable with the value of 1 if an external impairment reason is provided by the ad hoc announcement, and 0 otherwise

INT = Indicator variable with the value of 1 if an internal impairment reason is provided by the ad hoc announcement, and 0 otherwise

In line with the undirected hypotheses, no signs are predicted for the coefficients of the interaction terms of interest $IMP * EXT$ and $IMP * INT$. The indicator variables for impairment reasons are defined based on the list of impairment indications provided by IAS 36.12.[191]

The models to test hypotheses H_{3a} and H_{3b} as well as H_4 are built analogously to regression model (29). They include interaction terms between *IMP* and variables for the period before (*Pre_Crisis*) and during the financial crisis (*Crisis*) and a variable to measure leverage (*LEV*), respectively:

$$CAR = \beta_0 + \beta_1 IMP + \beta_2 IMP * Pre\_Crisis + \beta_3 IMP * Crisis + \beta_4 Pre\_Crisis + \beta_5 Crisis + \beta_6 UE + \beta_7 Size + \epsilon \quad (30)$$

$$CAR = \beta_0 + \beta_1 IMP + \beta_2 IMP * LEV + \beta_3 LEV + \beta_4 UE + \beta_5 Size + \epsilon \quad (31)$$

where:

Pre_Crisis = Indicator variable with the value of 1 if the impairment is announced before the financial crisis

Crisis = Indicator variable with the value of 1 if the impairment is announced during the financial crisis or if it refers to this period, and 0 otherwise (the second half-year 2008 and the year 2009 are defined as period of the financial crisis)

LEV = Book value of debt (as proxy for its market value) divided by market value of equity at the last day of the estimation period

In line with the hypotheses, no coefficient sign for $IMP * Pre\_Crisis$, a positive sign for $IMP * Crisis$, and a negative sign for $IMP * LEV$ is expected.

[191] As external impairment indications, IAS 36 considers, e.g., significant unfavorable changes in the technological, market, economic or legal environment and a significant increase in market interest rates (IAS 36.12 (b) und (c)). Internal impairment reasons are, e.g., significant unfavorable changes in the CGU's business model or substantial evidence from internal reporting that the economic performance is worse or will be worse than expected (IAS 36.12 (f) und (g)).

7.4 Results

7.4.1 Descriptive Statistics

Table 22 presents the descriptive statistics of the sample. The cumulated abnormal returns are considered in more detail as part of the univariate analysis in section 7.4.2. The goodwill impairments account on average (median) for 21.2 % (8.7 %) of the pre-impairment market value of equity and therefore have to be classified as material.[192] The relatively high values are probably due to the fact that ad hoc announcements tend to report more material goodwill impairments. For 28.6 % of goodwill impairments, an external impairment reason is provided, whereas 23.8 % are related to an internal impairment reason. During the financial crisis, 28.6 % of the impairment losses are announced. However, only half of these impairments are related to an external impairment reason (i.e., there is no multicollinearity issue). 28.6% of the observations are from the period prior to the financial crisis, i.e. 42.8% relate to the period after the crisis. The average (median) leverage is 2.0 (1.3). The unexpected quarterly earnings are negative on average (-0.047), i.e., goodwill impairments tend to be (as expected) accompanied by unfavorable earnings development. However, as not all firms report additional earnings figures as part of their ad hoc announcements, the median is 0. The logarithmized market value of equity is on average (median) EUR 5.7 million (EUR 5.2 million). This is representative for the CDAX.[193]

Table 22: *Descriptive statistics*

Variable	*n*	*Mean*	*Std. dev.*	*1. Quartil*	*Median*	*3. Quartil*
CAR[0;1]	84	-0.036	0.082	-0.072	-0.007	0.011
CAR[0;2]	84	-0.048	0.095	-0.081	-0.018	0.008
IMP	84	0.212	0.271	0.038	0.087	0.248
EXT	84	0.286	0.454	0	0	1
INT	84	0.238	0.428	0	0	0
Pre_Crisis	84	0.286	0.454	0	0	1
Crisis	84	0.286	0.454	0	0	1
LEV	84	1.969	2.043	0.489	1.272	2.537
UE	84	-0.047	0.160	-0.024	0.000	0.000
Size	84	5.653	2.747	3.175	5.210	7.887

[192] For example, 3 % to 5 % of equity are considered as an appropriate materiality threshold for annual audits in literature (Marten et al. (2015, p. 251)).

[193] An own analysis of the full CDAX sample with recognized goodwill shows on average (median) a logarithmized market value of equity of EUR 5.4 million (EUR 5.0 million). Hence, there are no material differences between the sample of this study and the full sample.

7.4.2 Univariate Analysis

The univariate analysis of cumulated abnormal returns during the event windows is presented in Table 23. Considering the event window [0;1], mean (median) *CAR* of -3.6 % (-0.7 %) are observed, which are significantly different from 0 at 1 % (5 %) level. The event window [0;2] shows similar findings as the mean (median) *CAR* are -4.8 % (-1.8 %) with a significance level of 1 %. The proportion of negative *CAR* is 60.7 % for the event window [0;1] and 65.5 % for the event window [0;2]. The univariate findings are therefore consistent with hypotheses H_{1a} and H_{1b}. Similar to prior studies, a significantly negative capital market reaction to the announcement of goodwill impairments is observed which is substantially smaller than the magnitude of goodwill impairments in relation to the market capitalization (mean value 21.2 %, median 8.7 %).

Table 23: *Univariate analysis of cumulated abnormal returns (CAR)*

		CAR		
Event window	*n*	*Mean*	*Median*	*Negative CAR*
[0;1]	84	-0.036***	-0.007**	60.7 %
[0;2]	84	-0.048***	-0.018***	65.5 %

*, **, and *** denote significance at 10 %, 5 %, and 1 % level, respectively (t-test for mean, Wilcoxon signed-rank test for median).

The negative capital market reaction as well as the appropriateness of the event windows examined are also highlighted by Figure 7. The diagram shows that the capital market reaction takes mainly place during the period between the announcement date and the second day after the announcement. The highest abnormal return can be observed at the first day after the announcement. Although the cumulated abnormal returns also show a slightly negative trend before and after the event window, they are substantially smaller than during the event window. Moreover, not only slightly negative, but also slightly positive abnormal daily returns can be observed.

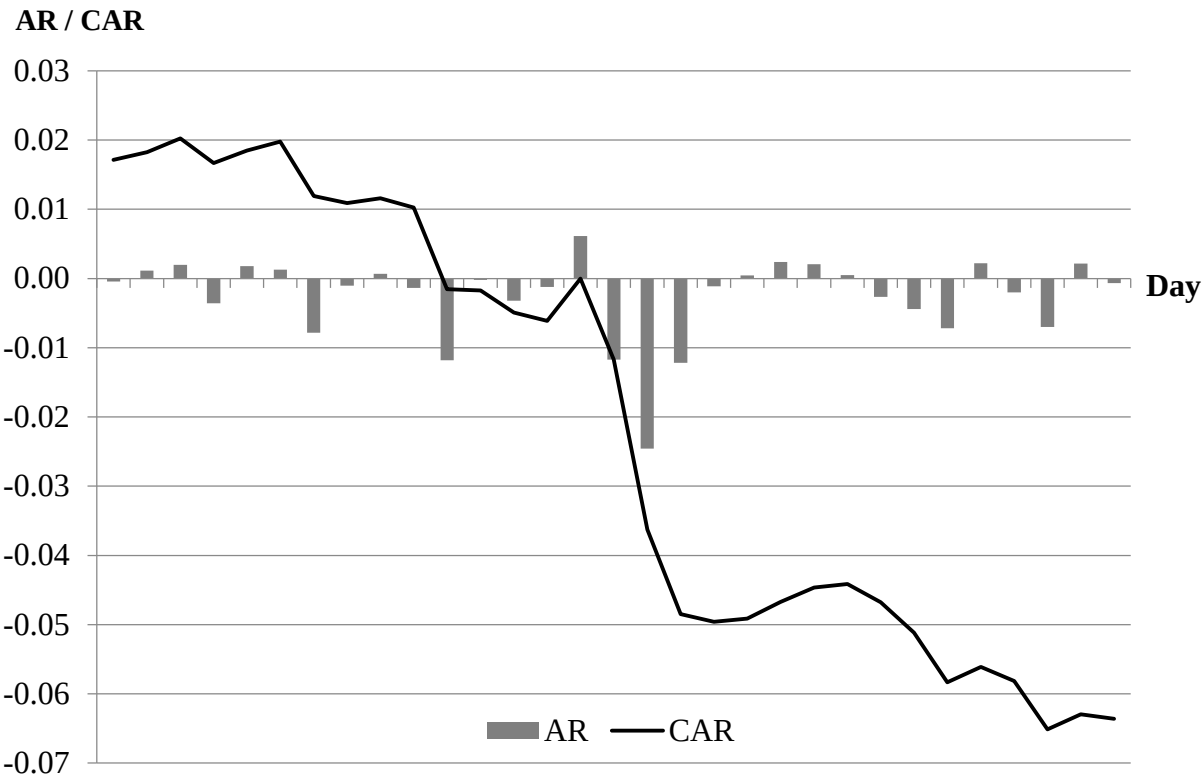

Figure 7: *Abnormal return (AR) and cumulated abnormal return (CAR) surrounding the announcement date (calculation as mean; defined zero point for CAR is the trading start at day 0)*

7.4.3 Multivariate Analysis

In the following, the multivariate regression models are analyzed.[194] The results of the basic model are presented in Table 24. The variable *IMP* addresses the influence of the goodwill impairment magnitude on cumulated abnormal returns. The coefficient is significantly negative (-0.105 and -0.126) at 1 % level for both event windows [0;1] and [0;2] and therefore robust with respect to the event window selected.[195] This means that about 10 % to 13 % of the impairment magnitude can be observed as announcement effect at the capital market. On the one hand, the results therefore confirm hypothesis H_{1a} as a significantly negative capital market reaction to the announcement of goodwill impairments can be observed.

[194] For all regression models, the main assumptions of linear regressions are fulfilled. There is no indication for a multicollinearity issue as the correlation coefficients between the independent variables (maximum absolute value of 0.48) as well as the variance inflation coefficients (maximum value of 4.3 in the extended regression model (29)) are in a normal, uncritical range. Moreover, normal distribution and homoscedasticity of residuals are assessed based on normal distribution diagrams and scatter plots. There are no indications for a non-normal distribution or heteroscedasticity. Autocorrelation is not an issue as the regressions are cross-sectional.

[195] As additional robustness checks (not tabulated), the event windows [-1;1] and [-2;2] are examined. With respect to *IMP*, they also show significantly negative coefficients of -0.085 ($p<0.05$) and -0.118 ($p<0.01$).

On the other hand, the findings are also consistent with hypothesis H_{1b} assuming a weaker capital market reaction in relation to the impairment magnitude. A respective test shows that the regression coefficient of *IMP* is significantly larger than -1 at 1 % level.[196] Hence, goodwill impairments seem to be only partly perceived as new and decision useful information by capital market participants.

In line with expectations, unexpected quarterly earnings also have a significantly positive influence on the capital market reaction. Hence, the variable seems appropriate to control for additional information on earnings which is disclosed as part of the ad hoc announcement of goodwill impairments. The control variable *Size* is not significant, i.e., there is no indication for a distorting size-related effect.

Table 24: *Regression results of basic model (28)*

	Pred. sign	***CAR[0;1]***		***CAR[0;2]***	
		β	p	β	p
Intercept		- 0.020	0.418	- 0.031	0.282
IMP	-	- 0.105***	0.002	- 0.126***	0.001
UE	+	0.078*	0.075	0.119**	0.027
Size	?	0.004	0.607	0.006	0.509
Adjusted R^2		0.177		0.223	
F-statistic		6.934***		8.928***	
n		84		84	

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

[196] In order to test whether the coefficient of *IMP* is larger than -1, the t-statistic related to the null hypotheses H_0: $\beta_1 = -1$ is calculated as follows: $t = (\beta_1 - (-1))/\, SE$ where SE = standard error of the regression coefficient. The significance level was determined in accordance with respective t-statistics tables (t-values of 25.3 and 21.8, respectively).

Hypotheses H_{2a} and H_{2b} assume that the provision of an external or internal reason for goodwill impairments has an influence on the capital market reaction. However, no direction of the effect was predicted. In order to test these hypotheses, the basic regression model was extended by respective interaction variables. The results are presented in Table 25.

Table 25: *Results of the extended regression model (29) – Impairment reason*

	Pred. sign	***CAR[0;1]***		***CAR[0;2]***	
		β	p		
Intercept		- 0.016	0.520	- 0.022	0.458
IMP	-	- 0.168***	0.000	- 0.187***	0.000
IMP*EXT	?	0.196***	0.003	0.202***	0.008
IMP*INT	?	- 0.043	0.609	- 0.065	0.506
EXT	?	- 0.027	0.277	- 0.040	0.171
INT	?	0.028	0.237	0.015	0.595
UE	+	0.083**	0.045	0.128**	0.017
Size	?	0.001	0.723	0.002	0.552
Adjusted R^2		0.274		0.282	
F-statistic		5.474***		5.658***	
n		84		84	

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

The findings of the basic model concerning *IMP* are confirmed. However, the coefficients are slightly larger (-0.168 and -0.187), i.e., the capital market reaction to goodwill impairments without provision of an impairment reason is stronger than the undifferentiated reaction observed for the basic model.[197] For the interaction between *IMP* and *EXT*, i.e., the influence of providing an external impairment reason on the capital market reaction to the magnitude of goodwill impairments, the positive coefficients (0.196 and 0.202) are significant at 1 % level.[198] This means that the capital market reaction is significantly weaker if an external reason is provided compared to no reason. Based on a rearranged regression model, it can be shown that the combined coefficient of *IMP* and *IMP*EXT* is even slightly positive

[197] As additional robustness checks (not tabulated), the event windows [-1;1] and [-2;2] are examined. With respect to *IMP*, they also show significantly negative coefficients of -0.134 ($p<0.01$) and -0.157 ($p<0.01$).

[198] As additional robustness checks (not tabulated), the event windows [-1;1] and [-2;2] are examined. With respect to *IMP*EXT*, they also show significantly positive coefficients of 0.167 ($p<0.05$) and 0.124 ($p<0.1$).

(0.028 [= -0.168 + 0.196] and 0.015 [= -0.187 + 0.202]), but insignificant.[199] Hence, a significant capital market reaction cannot be observed. This might indicate that goodwill impairments based on external impairment reasons do not represent new and decision relevant information for the capital market and that the influence of these reasons on firm value might already be anticipated. Moreover, it is possible that capital market participants perceive goodwill impairments in some cases as a signal that management admits and addresses previous mistakes.

For the interaction between *IMP* and *INT*, negative but insignificant coefficients (-0.043 and -0.065) are observed.[200] Hence, there is no significant difference between the perceived decision usefulness of goodwill impairments with an internal reason and impairments without reason. Both announcements lead to a significantly negative capital market reaction.[201] This might be due to two factors. On the one hand, capital market participants might assume that most impairments without reason are actually based on internal impairment reasons not communicated by management. In both cases, the respective goodwill impairments might therefore not be fully anticipated by the capital market and be at least partly perceived as decision relevant. On the other hand, the findings might suggest that the perceived reliability does not change with the additional provision of an internal impairment reason.

The results of the basic model concerning the control variable *UE* are confirmed as the coefficient is significantly positive. The coefficient of *Size* remains insignificant. The single variables *EXT* and *INT*, which are included for econometrical reasons, are insignificant.

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[199] In order to rearrange the regression model, the variable *IMP* is replaced by the variable *IMP*NoReason* (with *NoReason* defined as indicator variable with the value of 1 if no impairment reason is provided by the ad hoc announcement, and 0 otherwise). This leads to the following rearranged regression model:
$CAR = \beta_1 IMP * NoReason + \beta_2 IMP * EXT + \beta_3 IMP * INT + \beta_4 NoReason + \beta_5 EXT + \beta_6 INT + \beta_7 UE + \beta_8 Size + \epsilon.$
Remark: The variables of interest are presented as interaction variables for consistency reasons. They are defined as impairment magnitude IMP when an external/internal impairment reason is provided or when no reason is provided, respectively (i.e. no interaction variables in nature).
For the variables of interest, the results of the rearranged regression model are consistent with the extended regression model (29): *IMP*NoReason* (-0.168; p=0.000 and -0.187; p= 0.000), *IMP*EXT* (0.028; p=0.596 and 0.015; p=0.803), *IMP*INT* (-0.211; p=0.007 and -0.252; p=0.006).

[200] As additional robustness checks (not tabulated), the event windows [-1;1] and [-2;2] are examined. With respect to *IMP*INT*, they also show negative, but insignificant coefficients of -0.083 and -0.042.

[201] As presented in footnote 199, this can be shown by rearranging the regression model.

Hypotheses H_{3a} and H_{3b} investigate differences between the periods before, during, and after the financial crisis. The results of the respective regression model are presented in Table 26. Both interaction terms *IMP*Pre_Crisis* and *IMP*Crisis* show positive, but insignificant coefficients.[202] Hence, the results indicate a weaker capital market reaction before and during the financial crisis, but a significant impact of the financial crisis on the capital market perception of goodwill impairments is not confirmed.[203] Whether it would be possible to establish a significant influence based on a larger sample size (e.g., when also considering other European countries with similar institutional setting) cannot be answered conclusively, though.

Table 26: *Results of the extended regression model (30) – Financial crisis*

	Pred. sign	***CAR[0;1]***		***CAR[0;2]***	
		β	p		
Intercept		- 0.038	0.170	- 0.064**	0.041
IMP	-	- 0.147***	0.004	- 0.159***	0.005
IMP*Pre_Crisis	?	0.135	0.221	0.158	0.199
IMP*Crisis	+	0.048	0.234	0.045	0.267
Pre_Crisis	?	0.014	0.579	0.036	0.205
Crisis	?	0.031	0.241	0.033	0.263
UE	+	0.081*	0.068	0.116**	0.029
Size	?	0.003	0.467	0.004	0.264
Adjusted R^2		0.207		0.278	
F-statistic		4.102***		5.568***	
n		84		84	

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

[202] As additional robustness checks (not tabulated), the event windows [-1;1] and [-2;2] are examined. The coefficients of *IMP*Pre_Crisis* (0.193 and 0.202) as well as *IMP*Crisis* (0.045 and 0.068) are also positive, but insignificant.

[203] As additional test (not tabulated), the capital market reactions before and during the financial crisis are compared. There is also no significant difference.

The results concerning hypothesis H_4 are shown in Table 27. The interaction term *IMP*LEV* examines the influence of the financing structure on the capital market reaction. The coefficient is significantly negative (-0.021 and -0.028) at 5 % level.[204] This is in line with the expectation that influential providers of debt capital like banks, which particularly play an important role in Germany, force the management as part of their monitoring activities to account more conservatively and recognize goodwill impairments timelier. Hence, the results indicate that the decision usefulness of ad hoc announcements of goodwill impairments increases.

Table 27: *Results of the extended regression model (31) – Debt financing*

	Pred. sign	***CAR[0;1]***		***CAR[0;2]***	
		β	p		
Intercept		- 0.030	0.247	- 0.043	0.139
IMP	-	- 0.039	0.230	- 0.045	0.226
IMP*LEV	-	- 0.021**	0.044	- 0.028**	0.022
LEV	?	0.006	0.364	0.009	0.209
UE	+	0.059	0.140	0.093*	0.067
Size	?	0.001	0.722	0.002	0.687
Adjusted R^2		0.188		0.243	
F-statistic		4.842***		6.334***	
n		84		84	

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

7.5 Conclusion

The study is motivated by the IASB's recent post-implementation review on business combinations and the ongoing substantial debate on the decision usefulness of goodwill impairment tests. Based on ad hoc announcements of goodwill impairments, it evaluates whether these impairments represent new and decision useful information for capital market participants and therefore whether announcement effects can be observed on the capital market. Moreover, it assesses whether the provision of an external or internal impairment

[204] As additional robustness checks (not tabulated), the event windows [-1;1] and [-2;2] are examined. With respect to *IMP*LEV*, they also show significantly negative coefficients of -0.030 ($p<0.01$) and -0.032 ($p<0.01$).

reason, the financial crisis, and the firms' financing structure have an influence on the perceived decision usefulness and thus the information content of goodwill impairments.

The analysis uses a sample of 84 ad hoc announcements of goodwill impairments issued by 66 German firms listed on the regulated market of Frankfurt stock exchange (CDAX) during the periods 2005 to 2013. The results show a significant negative capital market reaction to the announcement of goodwill impairments. However, this reaction is substantially smaller than the impairment magnitude (in relation to the market capitalization). Hence, goodwill impairment generally seem to have information content, but there is also a certain indication that particularly the predictive value of goodwill impairments is limited and that the capital market might already anticipate a large share of the impairment before its announcement. On the contrary, it is also possible that capital market participants show a lower reaction since they perceive goodwill impairments as only partly relevant and reliable information. Both effects would reduce the (perceived) decision usefulness of goodwill impairments.

With respect to impairment reasons, almost no capital market reaction is observed for goodwill impairments with external impairment reason, i.e., these impairments do not seem to represent new and decision useful information. On the contrary, both impairments with internal impairment reason and impairments without reason lead to significant negative capital market reactions. However, the provision of an internal impairment reason does not have an additional significant influence on the reaction. Hence, the disclosure of an additional internal impairment reason does not seem to influence the perceived reliability and relevance of goodwill impairments or capital market participants might also assume an internal impairment reason when no reason is provided. Nevertheless, the market reaction is lower than the goodwill amount written-off (in relation to the market capitalization). A comparative analysis of the periods before, during, and after the financial crisis in 2008 and 2009 does not show significant differences in reactions. Hence, a significant influence of the financial crisis on the capital market perception is not observed. On the contrary, the results indicate that investors of firms with a higher leverage show a stronger reaction. This could be attributable to influential providers of debt capital like bank playing a more important role in the monitoring of management, thereby forcing management to account more conservatively and recognize goodwill impairments timelier.

In conclusion, the results indicate that goodwill impairments only contain limited private management information concerning the expected future cash flow development and/or that goodwill impairments are only partly perceived as relevant and faithfully represented by

capital market participants. Therefore, it seems necessary to critically re-consider the cost-benefit relation of goodwill impairment tests as they are a time-consuming and costly exercise. Moreover, it might be discussed whether it is possible to provide other financial information to the capital market which is less costly and/or more decision useful (e.g., more detailed information on the actual realization of synergies and other benefits which were planned when acquiring the business or on the expected future development of CGUs). However, this might be problematic as such internal information is often sensible. Hence, management might be reluctant to disclose this kind of information and it might also be in the best interest of the firm and its investors to protect this information. As an alternative, parts of literature demand a return to the straight-line amortization (e.g., Küting (2013, p. 1803); Gundel et al. (2014, p. 137)). However, it is not possible to conclusively answer this general question at this point.

The results of this study are subject to some limitations. First, the results are based on a sample of German listed firms applying IFRS and they are only valid for the sample period and its regulatory environment. Second, it is only possible to analyze the information content of ad hoc announcements of goodwill impairments, which might tend to contain more material and decision useful goodwill impairments than those disclosed in quarterly or annual reports as part of the regular financial reporting. Hence, it can be assumed that the announcement effects observed tend to be larger. Moreover, the study only addresses investors as financial statement users. Future research could therefore focus on other stakeholders like creditors or financial analysts. Furthermore, future research could investigate whether a significant influence of the financial crisis on capital market reactions can be observed when using a larger sample size (e.g., when also considering other European countries with similar institutional setting). Third, it is not possible to measure the (positive) market reaction to and therefore the information content of non-impairments. Fourth, the study measures the perceived decision usefulness, i.e., conclusions on the actual decision usefulness of goodwill impairments can only be drawn indirectly assuming economically useful decisions of investors.

8 Summary and conclusion

This dissertation addresses goodwill impairment testing under IFRS and pursues the following three main objectives:

1) Development of an audit approach for goodwill impairment tests.
2) Empirical analysis of the influence of earnings management incentives on the recognition of impairment losses.
3) Empirical analysis of the capital market perception of goodwill impairments.

With the adoption of the revised IAS 36 on March 31, 2004, the long-accepted straight-line amortization of goodwill was replaced by a new impairment-only approach. The standard was adopted by the EU on December 31, 2004 and thus was applicable for all fiscal years starting from January 1, 2005 onwards. One decade later, this dissertation is motivated by the IASB's recently completed post-implementation review on business combinations, which highlights the need for further research on goodwill impairment testing, and the ongoing lively debate on the reliability of impairment testing. The dissertation is the first to develop a detailed audit approach and the three research papers contribute to the empirical research on goodwill accounting as they are the first studies to address the research questions for a German sample and also as evidence for other continental European countries does not exist or is very limited. Moreover, the topic is of high practical relevance and goodwill impairment testing is often related to (significant) risks of material misstatement.

The findings of the dissertation are of particular interest for auditors (and supervisory bodies) when assessing the appropriateness of goodwill impairment tests in practice. Moreover, they have implications for the IASB and other regulators when considering whether the current requirements are able to devise a sufficiently rigorous and operational impairment test to provide decision useful information to financial statement users. Besides, the results are of interest for capital market participants, creditors, and other financial statement users when interpreting goodwill numbers. As the empirical analyses are based on data from German listed firms, their findings are particularly relevant for Germany, but also for other continental European countries with a similar institutional setting (e.g., Austria, France, or Switzerland; see sections 5.2.3 and 6.2.3 for a detailed discussion).

In order to provide a basis for analyzing the three main aspects pointed out above, *section 2* discusses in detail the current IFRS accounting requirements for goodwill. First, the accounting objectives of the relevant standards for business combinations (in particular IFRS 3) and

the impairment-only approach (in particular IAS 36) are presented. Then, the recognition of goodwill as part of the purchase price allocation and de-recognition of goodwill in case of disposals is shortly described. This is followed by the main part, the analysis of the IFRS accounting requirements for goodwill impairment testing. Goodwill impairment tests have to be performed on an annual basis for each CGU with allocated goodwill and in addition whenever an interim analysis of triggering events indicates that goodwill might be impaired. In order to determine whether goodwill impairments are required, goodwill is allocated to CGUs based on the management's goodwill monitoring and considering the synergies and other benefits from the business combination. Then, the recoverable amount of a CGU, defined as the higher of its FVLCD and its value in use, is compared with its carrying amount. Only if the carrying amount exceeds the recoverable amount, an impairment loss has to be recognized.

The value in use is defined as the present value of the future cash flows expected to be derived from a CGU and specific guidance is provided by IAS 36. In particular, IAS 36 addresses the general discounted cash flow approach, the basis and composition of estimated future cash flows, the long-term growth rate, and the discount rate. With respect to the FVLCD, the main guidance is provided by IFRS 13, i.e., the FVLCD has to consider the fair value hierarchy. Based on the fair value levels of input factors, the FVLCD is determined based on (1) the CGU's own shares in case of an active market, (2) valuation multiples without significant adjustments, and (3) valuation multiples with significant adjustments or discounted cash flows based on (adjusted) internal data. In practice, the FVLCD is often determined based on discounted cash flows from a market participant's perspective. Finally, the carrying amount must be determined consistently with the way its recoverable amount is determined (equivalence principle) and IAS 36 requires specific disclosures with respect to goodwill impairment tests. However, as there is still room for interpretation, Accounting Principles issued by the IDW, commentaries addressing goodwill impairment testing, and the author's practical audit experience are considered to complement the IFRS accounting requirements and to cover topics and issues relevant in practice.

The section concludes with an analysis of the major differences between IFRS, HGB, and US-GAAP and a critical discussion of goodwill impairment testing. The discussion highlights that it is questionable as to whether the current impairment testing approach is able to sufficiently provide useful information on the actual consumption of goodwill and particularly whether the related benefits outweigh the relatively high costs. Potential improvements to increase the

effectiveness and efficiency of impairment testing and particularly an amortization approach with indication-based impairment testing as a potentially beneficial alternative approach are discussed (for details, see the summary at the end of this section as well as section 2.5.2). Moreover, the critical discussion of goodwill impairment testing emphasizes the need for research concerning the three main objectives addressed by this dissertation.

Section 3 develops an audit approach for goodwill impairment tests and provides practical application guidance for auditors. This also includes the involvement of internal valuation specialists. It is based on the IFRS accounting requirements for goodwill, but also incorporates the requirements of international and German auditing standards for auditing accounting estimates and the author's practical audit experience. Hence, the section also helps the reader to understand how and to what extent auditors are able to verify the reasonableness of goodwill impairment tests.

The risk-based audit approach is structured on the basis of the different audit steps. First, auditors have to understand the firm's processes, which are often divided into forecasting process and specific impairment testing process. Therefore, questions that should be addressed by auditors when understanding these processes are provided. Then, auditors have to perform a risk assessment to identify material risks of misstatement (e.g., different business assumption risks, valuation assumption risks, and other risks). Moreover, a scoping process with respect to the CGUs tested for impairment is introduced. The process includes a scoping map based on goodwill magnitude and relative headroom of impairment tests as well as other CGU and impairment test characteristics influencing the risk assessment. Based on the risk assessment, three different audit strategies for CGUs are defined and the type, extent, and timing of corresponding audit procedures have to be planned (audit program). Therefore, the audit approach proposes several control testing and substantive audit procedures that might be selected by auditors based on the audit strategy selected and the specific risks identified. The procedures are clustered by different tasks of impairment tests, namely CGU definition, goodwill allocation, valuation techniques, carrying amount, business assumptions, valuation assumptions, and performance and evaluation of impairment tests. Finally, auditors must evaluate the results of their procedures, conclude on their audit of goodwill impairment tests, and assess the appropriateness of related disclosures in the IFRS notes.

As an introduction to the three research papers in sections 5 to 7, which can also be read independently, a review of literature concerning the empirical research on goodwill accounting is provided in *section 4*. This helps the reader to categorize the subsequently presented

research papers, to evaluate the research papers' contributions, and to gain an overview of the various research streams. In particular, the research streams include the economic relevance of goodwill, the informativeness and reliability of goodwill impairments, the influence of earnings management incentives on goodwill impairments, and the capital market perception of goodwill and goodwill impairments.

The first research paper in *section 5* focuses on the question as to whether earnings management incentives influence the likelihood to recognize goodwill impairments and the magnitude of impairment losses and therefore whether goodwill impairment tests are used by management as a device for earnings management. The hypotheses are developed based on a theoretical analysis of the opportunities to engage in opportunistic earnings management related to goodwill impairment testing, the influence of the German (continental European) institutional setting on earnings management behavior, and specific theoretical aspects of different earnings management incentives. Moreover, prior literature (mainly US studies, only limited evidence with respect to IFRS) is considered, which shows that several of the earnings management incentives tested have a significant influence on the recognition and/or the magnitude of goodwill impairments.

Using a sample of 2,127 firm-year observations from 354 German listed firms, the results show that the likelihood of recognizing 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. In particular, firms just exceeding an earnings target (zero earnings or previous year's earnings) are less likely to recognize goodwill impairments and report smaller impairment losses in order to avoid missing this target, which would be a negative signal to investors and other stakeholders. On the contrary, firms whose earnings before goodwill impairment clearly exceed or clearly miss an earnings target are more likely to recognize goodwill impairments and report larger impairment losses (i.e., income smoothing and big bath accounting, respectively). The management might intend to inflate future earnings and to maximize firm value over multiple periods. The results also suggest that newly appointed CEOs and CFOs tend to engage in a "cleaning the decks" strategy; thus reporting impairments more frequently and with higher amounts. As an additional finding to prior studies, the results indicate that management tends to align its goodwill impairment accounting with its general earnings management behavior, which provides additional evidence that firms use goodwill impairment tests as a device for earnings management. With respect to the avoidance of debt covenant violations, the findings are not

consistent with prior studies, showing that managers of highly leveraged firms have incentives to engage in income-increasing earnings management. Instead, they suggest that the specifics of the German institutional setting with higher importance of debt financing lead to more frequent and larger goodwill impairments. Hence, influential providers of debt capital like banks, which might, for example, be represented in supervisory boards (and audit committees) and therefore might have a stronger influence on the firm's accounting, might force the management to account more conservatively.

The second research paper in *section 6* assesses whether the impairment-only approach adequately reflects the economic value of goodwill and its consumption as perceived by the capital market. It investigates (1) whether goodwill and goodwill impairments are value relevant based on a price level regression model and (2) whether goodwill impairments are perceived to be reported timely based on a return regression model. The hypotheses are developed considering a theoretical analysis of value relevance and perceived timeliness of goodwill impairments and the influence of the German (continental European) institutional setting on capital market perception. Moreover, prior literature mostly demonstrates that goodwill and/or goodwill impairments are value relevant. With respect to perceived timeliness, empirical evidence is limited and mixed. As an additional aspect, the research paper is the first to evaluate whether auditor characteristics (and therefore perceived audit quality) influence the perceived timeliness of impairment losses. The respective hypotheses consider theoretical aspects of audit quality as well as the findings of prior studies addressing the association between auditor characteristics and (perceived) audit quality.

Using a sample of 1,841 firm-year observations from 306 German listed firms, the results show that goodwill and goodwill impairments are value relevant. Moreover, the findings suggest that the association between goodwill impairments and a decrease in market value of equity is stronger for profit firms than for loss firms. This could be attributable to more pronounced bad news about future economic benefits and/or the larger conceptual cushion against impairment (i.e., positive headroom of respective impairment tests shielding goodwill from impairment losses) that is consumed first. The findings on perceived timeliness indicate that profit firms tend to delay impairments losses by one to two years, whereas loss firms seem to recognize goodwill impairments timelier. The reason for such behavior is not clear. One explanation could be the discretion related to impairment testing. Due to their financial situation, profit firms might rather be (perceived to be) able to opportunistically influence the timing of goodwill impairments than loss firms. Another reason could be the inherent

recognition lag of the goodwill impairment test due to the cushion against impairment. Concerning the influence of auditor characteristics, the results show that impairments are perceived as timelier when a firm is audited by a Big 4 auditor and an industry leader, whereas the perceived timeliness decreases with a higher non-audit fee ratio. Since goodwill impairment tests are often in the main focus of auditors, this might be due to an increase (decrease) in perceived audit quality, which might also increase (decrease) the perceived reliability of goodwill impairment testing and therefore the perceived timeliness of impairment losses. Perceived audit quality might be higher for Big 4 auditors and industry leaders since capital market participants might assume them to be more independent from individual clients and to have a higher (industry-specific) level of resources and experience. On the contrary, a higher non-audit fee ratio might indicate that independence is a critical issue (especially for the German institutional setting with limited liability of auditors). With respect to auditor tenure, the results are not significant. This might be due to opposing effects, as a longer auditor tenure might threaten auditor independence, but comes along with a higher level of client-specific knowledge.

Based on an event study research design, the third research paper in *section 7* assesses whether market reactions to ad hoc impairment announcements can be observed and whether these market reaction are influenced by impairment magnitude and impairment reasons provided by management. Moreover, the impact of the financial crisis and the firms' financing structure is analyzed. Hence, the paper provides insights on the question whether goodwill impairments provide new and decision useful information to capital market participants. The research question is based on the theoretical analysis of the information content of goodwill impairments based on the IASB's conceptual framework of financial reporting. Prior studies find a negative, but relatively small capital market reaction to the announcement of goodwill impairments.

The empirical analysis uses a sample of 84 goodwill impairment announcements issued by 66 German listed firms. The results demonstrate that the announcement of goodwill impairments leads to a significant negative capital market reaction, but that this reaction is substantially smaller than the impairment magnitude (in relation to market capitalization). Hence, goodwill impairments seem to have information content. However, the results might also provide a certain indication that particularly the predictive value is limited and that capital market participants might anticipate a large share of impairments before their announcement. On the contrary, it is also possible that capital market participants exhibit a lower reaction since they

perceive goodwill impairments as only partly relevant and reliable information. Both effects would reduce the (perceived) decision usefulness of goodwill impairments. With respect to impairment reasons, almost no capital market reaction is observed for goodwill impairments with external impairment reason, i.e., these impairments do not seem to represent new and decision useful information. On the contrary, both impairments with internal impairment reason and impairments without reason lead to significant negative capital market reactions. However, the additional provision of an internal impairment reason does not have a significant influence on the capital market reaction. Hence, the disclosure of an additional internal impairment reason does not seem to influence the perceived reliability and relevance of goodwill impairments or capital market participants might also assume an internal impairment reason when no reason is provided. Nevertheless, the market reaction is lower than the goodwill amount written-off (in relation to the market capitalization). In addition to prior research, a comparative analysis of the periods before, during, and after the financial crisis in 2008 and 2009 as well as an analysis of the influence of debt financing on market reactions is performed. The results do not show a significant impact of the financial crisis on the capital market perception. On the contrary, a stronger reaction in case of firms with higher leverage is observed. This could be attributable to influential providers of debt capital like banks, which historically play a more important role in the monitoring of management in Germany. Hence, they might force management to account more conservatively and recognize goodwill impairments timelier. In conclusion, the results therefore indicate that goodwill impairments only contain limited private management information concerning the expected future cash flow development and/or that goodwill impairments are only partly perceived as relevant and faithfully represented by capital market participants.

The empirical results of the three research papers confirm the aspects and issues raised in the critical discussion of goodwill impairment testing in section 2.5. On the one hand, goodwill impairments also appear to be determined by economic and other relevant factors, they are perceived as value relevant by the capital market, and the perceived timeliness of impairment losses is influenced by perceived audit quality. Moreover, a capital market reaction to goodwill impairment announcements is observed. Hence, there are indications that the concept of impairment testing might generally be able to reflect the economic value and consumption of goodwill. However, the results also provide strong evidence that impairment tests are used as a device for earnings management, that goodwill impairments are generally not perceived as timely, that particularly their predictive value is limited, and that impairment losses might only partly be perceived as relevant and reliable information. Hence, the current

accounting requirements might not be sufficient to ensure a rigorous impairment test providing adequate decision useful information to investors and other stakeholders. Moreover, it seems questionable whether the related benefits outweigh their costs.

Therefore, improvements of the current approach increasing the effectiveness and efficiency of goodwill impairment testing should be discussed. In particular, this might include

- defining a more precise and lower level at which goodwill is tested and/or implementing a pre-acquisition headroom approach to reduce the cushion against impairment,
- reconsidering the current guidance for value in use estimates and aligning the requirements for the determination of value in use and FVLCD (or restricting the fair value estimates to level 1 and 2, i.e., no discounted cash flows),
- laying more focus on the performance of a retrospective analysis of planning accuracy,
- disclosing a more suitable sensitivity analysis or values assigned to key assumptions other than long-term growth rate and discount rate,
- providing more direct information on the realization of expected synergies and other benefits of a business combination, e.g., key performance indicators related to acquisitions, and/or
- including an optional qualitative assessment of impairment likelihood determining, as a pre-step, the necessity of annual impairment tests (similar to US-GAAP) in order to reduce the costs associated with goodwill impairment testing.

As an alternative, parts of literature demand a return to the amortization regime (e.g., Küting (2013, p. 1803); Gundel et al. (2014, p. 137)). An amortization approach with indication-based impairment testing might be beneficial if it is not possible or too costly to implement and enforce improvements of the current approach in practice. In particular, this approach would relate to both the predictable consumption of goodwill associated with expected future excess returns and the unpredictable consumption of goodwill due to unpredictable future events and circumstances (Coenenberg et al. (2012, p. 1032)). If this approach implemented suitable guidance on determining the estimated useful life of goodwill (including a maximum useful life of twenty years, for example) and included specific requirements for a regular assessment of impairment indications, this would ensure that the benefits of the current impairment test are sufficiently maintained and that the acquisition costs associated with goodwill are, sooner or later, allocated to the profits arising from the business combination. In this context, it might also be discussed as to whether allowing the use of different amortiza-

tion methods provides more useful information on the consumption of goodwill than straight-line amortization. Moreover, this approach would significantly reduce time consumption and costs. Nevertheless, a less frequent additional performance of impairment tests, irrespective of impairment indications, could be required, in particular during the first years after an acquisition. This would also help firms to evaluate the severity of impairment indications in the following periods.

As already discussed in the conclusions of each research paper, the empirical research of this dissertation is subject to certain limitations, which might suggest the need for future research. With respect to the first research paper addressing earnings management, the research design is only able to control for economic and other relevant factors influencing the likelihood and amount of goodwill impairments at firm level instead of CGU level since such data is currently not available. If available in future, this could be subject to further research. Moreover, future research could also focus on earnings management aspects related to initial goodwill recognition or specific disclosed key assumptions, such as growth rate or discount rate. With respect to the analysis of value relevance and perceived timeliness, the second research paper only addresses investors as financial statement users. Future research could therefore focus on other stakeholders like creditors or financial analysts. Moreover, as it is the first study assessing the influence of auditor characteristics on the perceived timeliness of impairment losses, it could be interesting to compare the results to other institutional settings applying IFRS. Concerning the third research paper, it has to be emphasized that it is only possible to analyze the information content of ad hoc announcements of goodwill impairments, which might tend to contain more material and decision useful goodwill impairments than those disclosed in quarterly or annual reports as part of the regular financial reporting. Hence, it the assumption can be made that the announcement effects observed tend to be larger and the results should thus be considered in combination with the results of the perceived timeliness analysis of the second research paper. Moreover, the study measures the perceived decision usefulness, i.e., conclusions on the actual decision usefulness of goodwill impairments can only be drawn indirectly assuming economically useful decisions of investors. Additionally, it is also not possible to measure the (positive) market reaction to and therefore the information content of non-impairments. As before, future research could focus on other stakeholders, such as creditors or financial analysts.

List of Standards

ASC 350-20 Intangibles - Goodwill and Other: Testing Goodwill for Impairment (Revised September 2011).

GAS 23 Accounting for Subsidiaries in Consolidated Financial Statements Acquisition Accounting in Consolidated Financial Statements (Issued February 2016).

HGB (German Commercial Code, as of October 30, 2015).

IAS 10 Events after the Reporting Period (Latest Amendment July 2014).

IAS 12 Income Taxes (Latest Amendment July 2014).

IAS 16 Property, Plant and Equipment (Latest Amendment May 2014).

IAS 19 Employee Benefits (Latest Amendment September 2014).

IAS 21 The Effects of Changes in Foreign Exchange Rates (Latest Amendment July 2014).

IAS 36 Impairment of Assets (Latest Amendment July 2014).

IAS 37 Provisions, Contingent Liabilities and Contingent Assets (Latest Amendment July 2014).

IAS 38 Intangible Assets (Latest Amendment May 2014).

IASB Framework: The Conceptual Framework for Financial Reporting (Issued September 2010).

IDW PS 230 Kenntnisse über die Geschäftstätigkeit sowie das wirtschaftliche und rechtliche Umfeld des zu prüfenden Unternehmens im Rahmen der Abschlussprüfung (Latest Amendment December 8, 2005).

IDW PS 250 Wesentlichkeit im Rahmen der Abschlussprüfung (Latest Amendment December 12, 2012).

IDW PS 261 Feststellung und Beurteilung von Fehlerrisiken und Reaktionen des Abschlussprüfers auf die beurteilten Fehlerrisiken (Latest Amendment March 13, 2013).

IDW PS 314 Die Prüfung von geschätzten Werten in der Rechnungslegung einschließlich von Zeitwerten (Revised September 9, 2009).

IDW RS HFA 10 Anwendung der Grundsätze des IDW S 1 bei der Bewertung von Beteiligungen und sonstigen Unternehmensanteilen für die Zwecke eines handelsrechtlichen Jahresabschlusses (Latest Amendment November 29, 2012).

IDW RS HFA 16 Bewertungen bei der Abbildung von Unternehmenserwerben und bei Werthaltigkeitsprüfungen nach IFRS (superseded by IDW RS HFA 40).

IDW RS HFA 40 Einzelfragen zu Wertminderungen von Vermögenswerten nach IAS 36 (Issued May 4, 2015).

IDW RS HFA 47 Einzelfragen zur Ermittlung des Fair Value nach IFRS 13 (Issued December 6, 2013).

IDW S 1 Grundsätze zur Durchführung von Unternehmensbewertungen (Issued April 2, 2008).

IFRIC 10 Interim Financial Reporting and Impairment (Latest Amendment July 2014).

IFRS 3 Business Combinations (Latest Amendment July 2014).

IFRS 5 Non-current Assets Held for Sale and Discontinued Operations (Latest Amendment September 2014).

IFRS 8 Operating Segments (Latest Amendment December 2013).

IFRS 10 Consolidated Financial Statements (Latest Amendment December 2014).

IFRS 13 Fair Value Measurement (Latest Amendment July 2014).

IFRS for SMEs (Latest Amendment May 2015).

ISA 315 Identifying and Assessing the Risks of Material Misstatement through Understanding the Entity and Its Environment (Effective on or after December 15, 2009).

ISA 320 Materiality in Planning and Performing an Audit (Effective on or after December 15, 2009).

ISA 330 The Auditor’s Responses to Assessed Risks (Effective on or after December 15, 2009).

ISA 450 Evaluation of Misstatements Identified During the Audit (Effective on or after December 15, 2009).

ISA 540 Auditing Accounting Estimates, Including Fair Value Accounting Estimates, and Related Disclosures (Effective on or after December 15, 2009).

ISA 701 Communicating Key Audit Matters in the Independent Auditor's Report (Effective on or after December 15, 2016).SFAS 142 Goodwill and Other Intangible Assets (superseded by ASC 350-20).

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