The Influence on Goodwill Impairment: The Factors Behind the Tool

A comparative research in the EU

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ABSTRACT

This study investigates what factors influence the use of goodwill impairment. Using a sample of 1.262 firm year observations, two aspects of goodwill impairment are examined. A pooled logit corrected for clusters is used to determine which factors influence the decision to impair goodwill. An OLS analysis looks at the effects of the factors on the magnitude of the impairments. In total seven factors are examined for these two effects. Three factors on a firm level: big bath strategy, smoothing strategy and the level of leverage of a firm. Furthermore, the effect of industry is examined, while on a country level once more three factors are under investigation: the strength of capital markets, national enforcement and national culture using the six dimensions of Hofstede. The big bath strategy, like size of the firm, has a significant positive effect on the use of goodwill impairment, while smoothing and operating in the financials and the consumer discretionary, consumer staples and health care industry indicate an opposite effect. Furthermore, indications are found that also leverage, the strength of capital markets, national enforcement and some cultural aspects have an effect on if and how much goodwill firms are willing to impair.

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1. Introduction

Accounting scandals during the early 2000s, such as Enron, HealthSouth, Tyco and WorldCom[1], followed by numerous smaller companies disclosing accounting in a wrong way, caused shareholders, investors and in particular the public to lose confidence in financial reporting. To restore the broken trust, regulatory institutions tried to improve accounting standards on ambiguous subjects, which encompasses accounting for goodwill, among others. As goodwill amortization was a questioned concept with a lack of relevance and driven by opportunistic decisions (Giner & Pardo, 2015), the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) made goodwill impairment mandatory in 2002 and 2005 respectively (Godfrey & Koh, 2009; Bugeja & Gallery, 2006). Goodwill impairment prescribes a test to determine the amount of goodwill left in a company at the end of a period and consequently calculate the amount necessary to impair. This should reflect the underlying economic value of goodwill in a better way (Chalmers, Godfrey & Webster, 2011). The combination of this new regulation and the increasing weight and size of goodwill, makes the need for management, auditors and investors to properly evaluate goodwill even more important (Hayn & Hughes, 2006). However, companies in the EU make use of these regulations in an effective way to manage their earnings, as it is a subjective and difficult area to fully comprehend and offers lots of possibilities and freedom to management to engage in such practices (Gowthorpe & Amat, 2005).

This study focusses on goodwill impairment for two main reasons. First of all, goodwill can be adjusted easily. Its value is very difficult to verify because of "the complex and multifaceted nature of the current IFRS goodwill impairment regime" (Chalmers et al., 2011, p. 636). It therefore enables earnings management without violating laws, by solely providing management with the flexibility and discretion inherent in the legislation (Choi & Pae, 2011). Moreover, goodwill impairment becomes an even better earnings management tool due to its large impact on financial statements and consequently on the users of this information. Goodwill is considered as an important item on the balance sheet for investors (Godfrey & Koh, 2001). Bloom (2009) states that intangible assets, which include goodwill, are often one of the largest value components on the balance sheet. An Ernst & Young (2009) report even claims that goodwill represented 47% of the value of an acquired company. Managing goodwill

[1] Accounting-degree (n.d.) *The 10 worst corporate accounting scandals of all time.* Waste Management scandal (1998); Enron scandal (2001); Worldcom scandal (2002); Tyco scandal (2002); Healthsouth scandal (2003); Freddie Mac scandal (2003); American Insurance Group scandal (2005); Lehman Brothers scandal (2008); Bernie Madoff scandal (2008); Saytam scandal (2009).

therefore has a large impact on the financial statements, decision making and firm value (Chalmers et al., 2011; Jennings, Robinson, Thompson & Duvall, 1996; Barth & Clinch, 1996; Godfrey and Koh, 2001).

To illustrate the impact of goodwill impairment on income, take a look at Deutsche Bank, quoted at the German stock exchange having the highest turnover. The company impaired a huge amount in 2015 (almost €5 billion) in a year they had an unavoidable loss of nearly €6.8 billion. The year before, however, only a relatively small impairment of €49 million was made, resulting in a profit of €1.7 billion. When this sudden impairment was spread out over these two years, the result of 2014 should have turned negative as well. Concluding, goodwill impairment can be used as an excellent tool to adjust earnings in the 'right' direction.

Considering its large impact on investment profits, share value (Shalev, Zang & Zang, 2010) and the possibilities to perform earnings management it is of importance to know which companies use this flexibility and what factors influence the decision to do so. Giner and Pardo (2015) already found that "managers are exercising discretion in the reporting of goodwill impairment losses" (p.36) to manage earnings in Spanish-listed firms and what factors could be influencing this on a firm level. Their results are however limited to only one country, hindering the generalizability to other countries in the EU. *This research explores the factors that influence the use of goodwill impairment.*

In order to obtain a comprehensive overview of factors that might influence the use of this tool, this study focuses on two main managerial decisions. First, the influence of a factor on the decision to do an impairment or not is analysed using a pooled logit corrected for clusters, while a pooled ordinary least square (OLS) corrected for clusters measures the correlation between the factors and the magnitude of the impairment. Factors on three levels will be examined: the firm level, the industry level and the country level. The firm level analysis will partially correspond with the Giner and Pardo (2015) research, but will be extended to a European setting. In total, three factors will be tested for their influence on goodwill impairment on a firm level.

Giner and Pardo (2015) were unable to provide significant results on the influence of operating in different industries on the use of the goodwill impairment tool, because their sample contained only 167 companies that were concentrated in two industries mainly. However, they found indicators that industry might matter. As this research uses a larger sample, it is possible to investigate the differences between five manually composed industry groups based on the Global Industry Classification Standard.

The country level analysis in this research provides an overview of factors that influence the use of the goodwill impairment tool on an international level, while other research normally reviews only one factor is within a particular country or set of countries. The Giner and Pardo (2015) research is thereby extended, not only placing their firm factors in a cross country study, but also adding country level elements that could explain differences between firms in Spain and other countries in the EU.

This study contributes to the literature and practice in several ways. First, this research creates a more comprehensive view on the use of managerial discretion on goodwill impairment by implementing a cross country element to point out differences between countries. Giner and Pardo (2015) investigate if the goodwill impairment tool is used to fulfil opportunistic motivations and to manage earnings in Spanish listed firms. However, this study tries to find if the factors used in the Giner and Pardo (2015) study also apply to other countries in the EU, making their results more robust and generalizable. The EU provides an ideal research area due to two aspects: the obligation for firms to apply the same regulation and the fact there are substantial cultural, institutional and capital market differences within the EU to enable a comparative research.

Second, this study investigates the effect of several factors for their influence on goodwill impairment, which have not been examined before. By this way an overview of factors on different levels is composed that was lacking in literature until this moment. Due to the use of the three level approach, the provided overview of factors will give a more comprehensive picture of the goodwill impairment tool than previous literature. On a country level, both capital market influences (Leuz, Nanda & Wysocki, 2003; Shleifer & Vishny, 1997; La Porta, Lopez-de-Silanes, Shleifer & Vishny, 1997, 1998, 2000) and the institutional context on a basis of legal enforcement (Leuz et al., 2003; Burgstahler, Hail & Leuz, 2006; Glaum, Schmidt, Street & Vogel, 2013) are covered. Even the influence of culture, as it is known to have an effect on accounting (Gray, 1988; Salter & Niswander, 1995; Ding, Jeanjean & Stolowy, 2005; Sutthachai & Cooke, 2009) is taken into account. Thereby it creates a deeper understanding of goodwill impairment, by shedding a light on the debate and raising questions about the impairment-only discussion.

"Because of the small sample size, we have not been able to perform some partitions by industry and period that could have added robustness to our results" (Giner & Pardo, 2015, p. 37). As this research covers the EU instead of only Spanish listed firms, the sample will contain enough observations to investigate possible differences between industries. Knowledge regarding industries creates insights for users of financial statements about when a certain firm

is more likely to use the goodwill impairment tool than others, because it operates in a particular industry. Therefore, the inclusion of industry as a possible factor for the use of the goodwill impairment tool is a third contribution.

Fourth, the results of this study provide knowledge on the value relevance of goodwill and show that there is a differentiation in the way it provides information to its users. Investors could use the knowledge of factors influencing goodwill impairment to distinguish companies that would most likely represent their financial information in a more transparent and reliable way from companies that can be perceived as riskier in that area. Especially because goodwill is very important to investors (Godfrey & Koh, 2001), it could lead to better investment decisions in a time where the economic crisis is still fresh in our memories.

Finally, by pointing out which factors encourage the use of the goodwill impairment tool, it could provide policymakers and standard setters of countries with a weak information providing function with valuable knowledge. With this knowledge they can improve their regulation for goodwill accounting or anticipate in any other way to the aspects in that country that cause this high level of influence. This could improve the competitiveness of their firms.

This research starts with a review of prior literature and the development of hypotheses regarding factors that encourage and enable the use of goodwill impairment in chapter two. Chapter three describes the research method, containing the sample selection and data collection. The next chapter depicts the empirical results, while chapter five answers the research question in a concluding remark and discusses the limitations and suggestions for further research.

2. Literature review and hypothesis development

2.1 Theoretical background

The given flexibility in goodwill impairment regulation is often used as a tool to manage earnings. In order to understand why earnings management is triggering the goodwill impairment tool, an understanding of the underlying theory that explains the existence of earnings management is necessary: the agency theory.

2.1.1 The agency theory

Agency problems only occur when a separation of ownership and management is present (Jensen & Meckling, 1976). With this separation a conflict of interest appears, considering that both parties are trying to maximize their personal utilities. As Scott (2015) explains: "The principle wants the agent to work hard on his/her behalf. However, the interests of the principal and agent conflict, since working hard requires effort, and the principal may want more effort than the agent is willing to exert" (p. 357). Levitt (1998) and Healy and Wahlen (1999) argue that good accounting standards are the primary input for high quality accounting that enable better performing firms to distinguish themselves from others. While principals strive to this goal, agency theory and its inherent conflict of interests explain the opportunity for managers to pursue their own interests by managing earnings.

The conflict of interest is characterized by two advantages the agent has over the principal. First, the agent possesses inside information that can be used to mask performance, but is difficult for the principal to collect. This information asymmetry is either classified as moral hazard or adverse selection. Moral hazard involves manager effort and represents the actions a manager takes, which are unobservable for other parties, like the owner of the company (Scott, 2015). Adverse selection, on the other hand, is more future oriented and insiders, like managers, have an information advantage regarding the current condition or future prospects of the firm over outsiders. (Scott, 2015). By means of this inside information the agent acquires a second advantage by also having the actual control over the decisions made in the company. The principal is namely unable to make the right decisions and allocate resources without proper inside information (Shleifer & Vishny, 1997). The principal's control problem originates from the difficult nature to observe the agent's effort. Scott (2015) compares this with the inability of a patient to observe his doctor's effort to treat him.

Monitoring the agent's effort more closely would be an option, but is mostly expensive, time-consuming and not beneficial to the productivity of the agent (Jensen & Meckling, 1976).

2.1.2 Earnings management

The last decades a lot has been written about earnings management (e.g. Healy & Wahlen, 1999; Phillips, Pincus & Rego, 2003; Roychowdhury, 2006; Franz, HassabElnaby & Lobo, 2014), which enables the formulation of a value-free definition. Earnings management is the strategy to generate accounting earnings through structuring transactions and judgment over financial reporting using managerial discretion to alter the presentation of the underlying economic performance of the company to achieve some specific earnings objective. A value-free definition is chosen as earnings management can either be used to mislead stakeholders about the financial situation of the company or to influence contractual outcomes (Healy & Wahlen, 1999), but also to enhance the informative function of accounting as a form of communication, using the inside knowledge to present the situation of a company that fits best (Burgstahler et al., 2006).

Although earnings management is often used to measure the broader concept of earnings quality as it is a better defined and measurable concept (Scott, 2015), it is still difficult to measure exactly. Leuz et al. (2003) point out that the difficulty lies in the fact that actual performance is sometimes hard to measure and it can manifest itself in multiple ways. Especially the distinction between different components of earnings management is perceived as a great challenge (Scott, 2015). While normally a single factor of earnings management is examined, other research[2] proved that it is also possible to measure multiple factors. For instance, the Giner and Pardo (2015) research is a good example that concentrates on multiple factors that influence the use of the goodwill impairment tool, being a form of earnings management, in Spanish listed firms.

2.1.3 Types of earnings management

Literature distinguishes three types of earnings management regarding the intention to use it and two types about the way it is conducted. Ronen and Yaari (2008) distinguish white, grey and black earnings management. These three forms reflect the two sides of the earnings management definition, being either used with good or bad intentions. White earnings management represents 'good earnings management' and tries to enhance transparency (Arya,

[2] E.g. the research of Beatty, Chamberlain and Magliolo (1995); Hunt, Moyer and Shevlin (1996); Gaver and Paterson (1999); Barton (2001); Pincus and Rajgopal (2002); Cohen, Dey and Lys (2008); Cohen and Zarowin (2010); Badertscher (2011).

Glover & Sunder, 2003). It uses the flexibility inherent in the given regulations as "managerial discretion is a means for managers to reveal to investors their private expectations about the firm's future cash flows" (Beneish, 2001, p. 3). Black earnings management is positioned at the other end of the spectrum by using tricks and fraud to misrepresent earning figures trying to obtain a personal gain (Schipper, 1989). Grey earnings management's intentions are more ambiguous, either using the flexibility in the regulations to maximize firm value and transparency, but possibly also using this flexibility to achieve an opportunistic goal (Watts & Zimmerman, 1990). The usage of the goodwill impairment tool is classified as white or grey earnings management, as it stays within the boundaries of the legislation without violating them.

The second distinction in literature, on how to conduct earnings management, describes two types: accrual-based earnings management (after: AEM) and real earnings management (after: REM). Most research focuses on AEM[3] as its existence was discovered earlier. Within this category Dechow, Sloan and Sweeney (1995) distinguished the use of non-discretionary accruals (after: NDA) and discretionary accruals (after: DA). NDA consider business conditions, while DA can be used by management to manage earnings due to the necessary judgement they require (Jones, 1991; Healy & Wahlen, 1999). DA are for example depreciation estimates and bad debt provisions (Teoh, Wong & Rao, 1998) or loan and claim loss reserves (Lui, Ryan & Wahlen, 1997). REM, on the other hand, is earnings management based on decisions that affect the actual business, like postponing investment decisions or accelerating sales (Zang, 2012), cutting or raising advertising and R&D expenditures (Cohen, Mashruwala & Zach, 2010; Baber, Fairfield & Haggard, 1991), or even selling profitable assets (Herrmann, Inoue & Thomas, 2003).

Goodwill impairment is a DA that requires estimations and managerial judgements. Therefore, earnings management conducted using this tool is a clear example of AEM. The reason that accounting for goodwill needs this high level of managerial discretion and therefore providing this opportunity for earnings management, is based in the controversy around the goodwill account itself.

2.2 Goodwill impairment

The definition of goodwill is remarkably often associated with acquisition, purchasing or mergers. Churyk (2005) states that "goodwill is measured and recorded as the amount paid to

[3] See for instance Schipper (1989), Healy and Wahlen (1999) and Fields, Lyz and Vincent (2001).

acquire a business in excess of the fair value of its net identifiable assets" (p. 1351), while also Gallimberti, Marra and Prencipe (2013) see goodwill as the expectations of future cash flows that are generated by an acquired firm. Remarkable is the focus on purchased goodwill only, while it is also possible to internally generate expected future cash flows. Although there is no qualitative difference between the two and Bloom (2009) shows that internally generated goodwill is approximately two and a half times as important as purchased goodwill, it is prohibited to put internally generated goodwill on the balance sheet. Double entry bookkeeping and historical cost based accounting prevent the logical and complete entry of this account, while purchased goodwill can be easily covered within this system, undermining the function of financial reporting to depict the true and complete financial situation of a company (Bloom, 2009).

There are two fundamental issues related to the recognition of purchased goodwill that cause even more controversy. Johnson and Petrone (1998) address whether goodwill should be considered as an asset like the Financial Accounting Standards Board (FASB) decided on their November 19th 1997 board meeting, or if it should be classified as something on its own. Schuetze (1993) notes that the FASB definition for assets is too vague and that goodwill cannot be an asset as it is not exchangeable and saleable. The ASB (1997) elaborates on this argument by stating that an asset that is not exchangeable is also not controllable. Despite these arguments almost all standard setters agreed to place goodwill as a non-current asset on the balance sheet. Chalmers et al. (2011) and Bugeja and Gallery (2006) discuss the second issue, namely how to deal with goodwill when it is classified as an asset.

At first goodwill was amortized, as was common for intellectual property like patents, trademarks and copyrights. Based on the idea that goodwill has a finite useful life, it was systematically reduced in value every year over a period of maximum 40 or 20 years under US GAAP and IFRS respectively (Chalmers et al., 2011). According to empirical evidence, amortization was criticized for lacking relevance and the ability to provide useful information (Henning, Lewis & Shaw, 2000). Henning and Shaw (2003) state that the determination of the useful life is an opportunistic decision. Wiese (2005) argues that a fixed yearly deduction is not representative as the value of goodwill can be stable or even increase through diligent management and the realization of growth options, and when it declines a straight line pattern is questionable (Chalmers et al., 2011).

Standard setters changed regulation to impairment, giving management a continuous responsibility to determine the fair value of goodwill (Hayn & Hughes, 2006). The value of goodwill has to be tested by comparing the recoverable and the carrying amount of the unit the

goodwill is linked to, and impairing the difference between them. Empirical research confirms the advantages of impairment (e.g. Hirschey & Richardson, 2003; Chalmers, Clinch & Godfrey, 2008), because it gives more meaningful information and reflects the economic reality in a better way, by being based on fair value measurements (Chalmers et al., 2011; Glazer, 2002). Ma and Hopkins (1988) formulate a first flaw as the future benefits of purchased goodwill are hard to determine, emerging mainly from synergy between the merging enterprises. Second, the difference between the recoverable and carrying amount is also difficult to determine due to the difficulty to separate internally generated and purchased goodwill (Bugeja & Gallery, 2006). Lastly, impairment can cause a decrease in the value relevance of goodwill, because it can trigger opportunistic behaviour in management (Morricone, Oriani & Sobrero, 2009), enabling it to be used for earnings management (Giner & Pardo, 2015).

Concluding, goodwill impairment can be used as an earnings management tool as it is full of controversy; internally generated and purchased goodwill are difficult to separate, the question if it is an asset and how to deal with it once it appears on the balance sheet.

2.3 Hypothesis development

2.3.1 Firm level factors

As it is known that goodwill impairment can be used to manage earnings, the question remains why managers would behave in such a way. What are the reasons to use goodwill impairment and what are consequently the factors that influence the use of this tool in general? Taking into account that goodwill impairment can be used to conduct earnings management, it could be argued that that the incentives for earnings management also apply as incitements to use the goodwill impairment tool. Giner and Pardo (2015) followed this reasoning and found significant results for some incentives in a Spanish context. These incentives are namely also used in other studies as predictors for earnings management in general (e.g. Riedl, 2004; Beatty & Weber, 2006; Zang, 2008; Strong & Meyer, 1987; Elliott & Shaw, 1988; AbuGhazaleh, Al-Hares & Roberts, 2011; Zucca & Campbell, 1992; Kirschenheiter & Melumad, 2002). However, Giner and Pardo's (2015) results are difficult to generalize as they are based on only one country. As one of the main objectives of this study is to enlarge the generalizability of their incentives, these will be the basis in the search for factors that influence the use of the goodwill impairment tool on a firm level.

Giner and Pardo (2015) tested three incentives for their effect on the decision to impair goodwill. From these three the big bath strategy was proven to have a significant effect on goodwill impairment. The big bath strategy is one of the four strategies for managing earnings and finds its origin in income minimization. Income maximization and minimization are the two basic strategies of earnings management. As Ronen and Yaari (2008) formulate, maximization means inflating reported earnings, while minimization is the strategy of deflating reported earnings. Income minimization uses for example fast depreciation and high expenditures for advertising and R&D, resulting in more 'reserves' that can be used to reach targets in other periods. Healy and Wahlen (1999) refer to this phenomenon as a cookie jar strategy. An extreme version of income minimization is the big bath strategy. Mulford and Comiskey (2002) define this as "a wholesale write-down of assets and accrual of liabilities in an effort to make the balance sheet conservative so that there will be few expenses to serve as a drag on future earnings" (p.15).

Besides Giner and Pardo (2015), also Jordan, Clark and Vann (2007) associate big bath behaviour with goodwill write-offs. Often new managers use this strategy to inform outsiders of the firm that bad times are over and higher earnings in the futures are expected. Especially as the manager knows that less goodwill impairment is necessary in upcoming years (Zang, 2008; Zucca & Campbell, 1992). It will namely appear in periods where companies have large and unavoidable losses which cannot be turned around by income maximization. Taking as much losses as possible in one year will increase the chance of writing black numbers in the next year. Therefore, a relation is expected between the earnings before impairment and the impairment expense itself, as the expense will only be made in situations the forecast of the current earnings is sufficiently bad and are beyond recovering in the current period (Kirschenheiter & Melumad, 2002).

H1a There is a positive association between firms with abnormally low pre-impairment earnings and the decision to record goodwill impairment expenses.
H1b There is a positive association between firms with abnormally low pre-impairment earnings and the magnitude of the impairment.

Besides income maximization, minimization and the extreme big bath strategy, the fourth strategy for goodwill impairment is income smoothing. This strategy involves the dampening of fluctuations that are inherent to earnings by using maximization and minimization in turns to maintain steady figures. This strategy has been used for decades (Buckmaster, 2001) by

mainly risk averse managers, who prefer predictable figures to meet investor and market expectations.

Giner and Pardo (2015) did not find significant results for the relation between the decision to impair and income smoothing in their research. They even did not found significant difference between the group that impaired goodwill and the group that did not. However, there are clues that the relationship between goodwill impairment and smoothing might be significant in a different setting. At 10% significance there was a difference in the amount of goodwill impairment, between the two previously mentioned groups. This indicates that the magnitude of the impairment decision is dependent on the use of the smoothing strategy. Kirschenheiter and Melumad (2002) support the claim that there is a relationship, specifically a positive relation between high earnings before impairment and the decision to impair. Managers namely have the tendency to avoid earnings surprises in order to report precise and predictable figures with the goal to remain high firm value.

H2a There is a positive association between firms with abnormally high pre-impairment earnings and the decision to record goodwill impairment expenses.
H2b There is a positive association between firms with abnormally high pre-impairment earnings and the magnitude of the impairment.

The threat of not meeting debt covenants might be the costliest risks a company can encounter. Not only does failing a debt covenant results in large penalties, but consequently a bad reputation and deteriorating relationships can lead to more difficulties lending money in the future or encountering higher costs to do so. Even though Giner and Pardo (2015) found that firm that do impair goodwill have significant higher leverage than firms that do not, no significant relation in a multivariate regression analyses was found between leverage and the decision to impair. However, it is reasonable to test if this effect is significant in an international context, as literature (Sweeney, 1994; DeFond & Jiambalvo, 1994) states that organizations tend to use income maximization to meet debt covenants. For example, Zang (2008) found that "more highly leveraged firms report lower goodwill impairment" (p.38) to avoid debt covenants violations.

However, Elliott and Shaw (1988) found that firms that have larger write-offs "are significantly larger with respect to revenues and assets and are more highly leveraged than the median firms in their industry" (p. 99-100). They argue that debt providers remain a strict review of the value of assets of highly leveraged firms in order to prevent possible opportunistic behaviour. By preventing this opportunistic behaviour, a more fair view of the performance of

the company and how well the debt covenants are met, can be given. So the closer review from their debt providers, leads to more 'honest' goodwill impairment by the companies, to maintain more trustworthy images. Based on these conflicting empirical results the relation between leverage and goodwill impairment will be tested without predicting a direction, like AbuGhazaleh et al. (2011) did.

H3a There is an association between the level of debt and the decision to record goodwill impairment expenses.
H3b There is an association between the level of debt and the magnitude of the impairment.

2.3.2 Industry level factor

Giner and Pardo (2015) tried to examine differences between industries as a factor that could influence the use of the goodwill impairment tool. They distinguished five large groups each comprising of similar industries: energy, materials and utilities; industrials; consumer discretionary, consumer staples and health care; financials; and information technology and telecommunication. In their effort to examine differences between them they encountered two problems. Firstly, their sample was too small to measure significant differences between industries. And second, two of their groups contained more than half of their sample, consumer staples and health care (32%) and financials (31%) respectively. They however found indications that differences between industries could matter as their two large groups mentioned above yielded significant results to "confirm the convenience of controlling for this aspect" (Giner & Pardo, 2015, p. 33).

This study uses the same categorization into 5 industry groups as Giner and Pardo (2015), due to the significant results already acquired by Giner and Pardo (2015) with a part of their sample and in order to avoid a further distinction that could lead to smaller groups that are not large enough to generate significant results. As the five distinguished industries shall be examined separately for their effect on the use of the goodwill impairment tool, it is expected that with a large enough sample the other industries would yield similar results as in the Giner and Pardo (2015) study.

H4a There is an association between industry and the decision to record goodwill impairment expenses.
H4b There is an association between industry and the magnitude of the impairment.

2.3.3 Country level factors

At the country level an effort is made to cover the international context as much as possible. On a national level there are broadly spoken three main elements that influence our economic thinking and how we act in economic situations. The basis is formed by the capital market forces that determine the invisible rules that companies have to follow. As governments try to influence what happens within these capital markets, they try to bend the rules with regulations and are responsible for the enforcement of these rules, representing the institutional factors. Culture can even be seen as a more compelling element operating at a higher level as it is a cause for both capital market and institutional factors (Gray, 1988; Doupnik & Tsakumis, 2004; Doupnik, 2008).

The first factor that could explain differences between countries on their use of the goodwill impairment tool is the strength of the capital markets in these countries. The strength of capital markets influences earnings and earnings management by resolving the information asymmetry and strengthening communication to outside parties (Watts & Zimmerman, 1986). Developed and strong capital markets rely more on decision-useful financial statements, because equity investors often lack access to private information. Therefore, "management is monitored more intensively in countries with more developed markets, thereby strengthening compliance" (Glaum et al., 2013, p. 174). Otherwise, if information is poor, investors are less willing to provide companies with capital (Burgstahler et al., 2006). In line with this reasoning Leuz et al. (2003) and Burgstahler et al. (2006) show that countries with developed capital markets engage in less earnings management. Beatty and Weber (2006) even see market incentives as factors that influence goodwill impairment in a similar way.

An important component that determines the strength of a capital market is the level of investor protection (e.g. Shleifer & Vishny, 1997; La Porta et al., 2000). Leuz et al. (2003) find a negative association between investor protection and earnings management, explaining a 39% variance between them. A high level of investor protection will reduce the information asymmetry mentioned in agency theory and "limits insiders' ability to acquire private control benefits, which reduces their incentives to mask firm performance" (Leuz et al., 2003, p. 505).

On the other hand, several studies suggest equity markets have a negative impact on accounting quality and earning management (e.g. Teoh, Welch & Wong, 1998a; 1998b; Beatty, Ke & Petroni, 2002). They argue that management tries to hide bad performance to ensure more favourable prices for financing the firm, being more important when operating in large and strong capital markets (Leuz et al., 2003; Dechow, Ge & Schrand, 2010). Management also tries to meet targets set by these markets as investors of large firms rely more on simple

heuristics (Beatty et al., 2002; Fischer & Stocken, 2004). These arguments could also apply to investor protection, as a high level of investor protection can cause more earnings management as closer monitoring and higher possible punishments increase the incentive to mask bad performance. Despite these critics, Burgstahler et al. (2006) and Leuz et al. (2003) show that strong capital markets with a high level of investor protection improve the informativeness of earnings and cause a reduction in earnings management. It is argued that argument for earnings management will also apply for goodwill impairment.

H5a There is a positive association between the strength of capital markets and the decision to record goodwill impairment expenses.
H5b There is a positive association between the strength of capital markets and the magnitude of the impairment.

An important cornerstone of the institutional context is the legal enforcement that is present in a particular country. This is closely related to capital markets in a sense that enforcement mechanisms are less effective or even not present in countries with less developed and weaker capital markets (FEE, 2001). Also, enforcement is higher when a country attaches higher value to the protection of company outsiders (Leuz et al., 2003). Although large differences existed among European countries, recent studies (Ernstberger, Stich & Vogler, 2012; Hitz, Ernstberger & Stich, 2012) show that enforcement in Europe is improving.

Better enforcement will enhance earnings quality as legal rules remain ineffective without proper enforcement. Shleifer and Vishny (1997) point out that the enforcement of these standards might even be more important than the standards themselves. A lack of effective governmental oversight will result in more discretion for management, leading to more opportunistic behaviour and biased financial reporting (Glaum et al., 2013). Higher legal enforcement results in less earnings management (Leuz et al., 2003; Ewert & Wagenhofer, 2005; Burgstahler et al., 2006; Glaum et al., 2013) and even shows higher goodwill impairments, as they are not withhold by opportunistic reasons, in countries with low enforcement, like Spain (Giner & Pardo, 2015) and Italy (Morricone et al., 2009).

H6a There is a positive association between legal enforcement and the decision to record goodwill impairment expenses.
H6b There is a positive association between legal enforcement and the magnitude of the impairment.

"Culture is crucial for understanding human behavior" (Richerson & Boyd, 2005, p. 3). Research has shown that culture influences our behaviour in many ways. Examples are our expectations and preferences (Guiso, Sapienza & Zingales, 2006), economic development (Shi, Huang, Ye & Yu, 2014), or investors' preferences for stocks (Grinblatt & Keloharju, 2001). More in general our economic reasoning and how we make economic decisions is influenced by culture (Henrich, 2000).

Gray (1988), Salter and Niswander (1995), Ding et al., (2005) and Sutthachai and Cooke (2009) show that accounting can be linked to national culture, explaining variation in accounting values, practices and methods. Doupnik (2008) and Han, Kang, Salter and Yoo (2010) found an effect on earnings management, because culture reaches the underlying causes of earnings management better. Finally, Glaum et al. (2013) provide evidence that national culture partially influences compliance with goodwill impairment rules. When even regulations are violated, it is highly plausible the flexibility within these rules will also be stretched as a consequence of culture.

H7a There is an association between national culture and the decision to record goodwill impairment expenses.
H7b There is an association between national culture and the magnitude of the impairment.

3. Research Method

3.1 Sample

For this cross country research the European Union (EU) is chosen as the scope, providing an ideal environment to investigate different factors that might influence the use of the goodwill impairment tool. First of all, the EU made the International Financial Reporting Standards (IFRS) that contains a goodwill impairment method, mandatory for all EU listed companies from 1 January 2005. IFRS is the most popular standard in the world, gaining relevance due to its adoption in an increasing amount of countries in the world and showing reasonable similarities with the other prominent international standard: the US GAAP (Gallimberti, Marra & Prencipe, 2013). Secondly, according to empirical research by Hofstede (2001), Hofstede, Hofstede and Minkov (2010), Leuz et al. (2003) and La Porta et al. (1997, 1998) there are substantial cultural and institutional differences within the EU to enable a comparative research. With the notion that all listed companies in the EU have to follow the same goodwill impairment regulations, the effect of cultural, capital market and institutional factors can be investigated separately. Finally, because Giner and Pardo (2015) investigate only Spanish listed firms and mention the usage of only one country as a limitation, an expansion to other European countries will enable this research to verify their results and make them more generalizable.

Unfortunately, it was not possible to include all 28 members of the EU in this research, as institutional information for smaller and Eastern European countries (e.g. Malta, Luxembourg, Poland and the Czech Republic) was not available. Therefore 14 countries, still containing sufficient variation among the examined country level factors, are taken into account. The last three available years, 2012 until 2014, are used for the analyses. Furthermore, companies are only included in the sample if they are still active, financial data is available for the three years under observation and the industry they operate in could be determined. Firms operating in the non-equity investment industry are excluded, as almost all of these companies lacked the required financial information necessary for the analyses. In total 3.892 companies covering 11.676 firm-year observation were retrieved from the DataStream database.

This database was chosen as it contains very comprehensive information about single entities, indices, markets and macro-economic data. Their data is not only collected from annual reports, but moreover provided by stock markets worldwide, national statistical bureaus and international organizations like the IMF and OECD for over 60 years. More important,

DataStream is one of the few databases that provides information on goodwill impairment for entities located outside the US. The data from DataStream is further supplemented with results from previous research to cover the country level variables, as will be set forth later.

Table 1 Overview of initial observations and observations used in the final sample after the exclusion of missing values per year and country

Panel A: Overview per year

Year	Initial sample	Final sample	%
2012	3.892	491	12,62
2013	3.892	388	9,97
2014	3.892	383	9,84
Total	11.676	1.262	10,81

Panel B: Overview per country

Country	Initial sample	Final sample	%
AUSTRIA	207	63	30,43
BELGIUM	345	43	12,46
DENMARK	420	29	6,90
FINLAND	330	52	15,76
FRANCE	1.740	231	13,28
GERMANY	1.827	228	12,48
GREECE	603	9	1,49
IRELAND	114	4	3,51
ITALY	669	78	11,66
NETHERLANDS	276	51	18,48
PORTUAL	141	17	12,06
SPAIN	384	45	11,72
SWEDEN	1.056	88	8,33
UNITED KINGDOM	3.564	324	9,09
Total	11.676	1.262	10,81

Although DataStream is the only database with information on goodwill impairment, a lot of data on this variable is missing. After the elimination of missing values, 1.280 firm-year observations were available. However, the sample was also checked for unusual and influential data, like outliers, leverage and influencing observations. To identify these data, three measures were used: studentized residuals, Cooks D and DFITS. The criteria for studentized residuals was set at a value of 2 or higher and -2 or lower, for Cooks D the common used limit is 4/n = 4/1280 = 0.031 and the criteria for DFITS is calculated with 2*square root (number of variables/n) = 2*square root (21/1280) = 0.26. In total 18 observations met all three criteria and were therefore removed from the sample. The final sample consists of 1.262 observation.

Table 2 Overview of dispersion among observations per year in absolute and relative figures; and the dispersion between observations that did and did not conduct a goodwill impairment, per country.

Panel A: Overview per year

Country	2012 (%)	2013 (%)	2014 (%)	Total
AUSTRIA	29 (46,03)	17 (26,99)	17 (26,99)	63
BELGIUM	18 (41,86)	14 (32,56)	11 (25,58)	43
DENMARK	17 (58,62)	6 (20,69)	6 (20,69)	29
FINLAND	19 (36,54)	18 (34,62)	15 (28,85)	52
FRANCE	85 (36,80)	71 (30,74)	75 (32,47)	231
GERMANY	111 (48,68)	61 (26,75)	56 (24,56)	228
GREECE	3 (33,33)	2 (22,22)	4 (44,44)	9
IRELAND	2 (50,00)	1 (25,00)	1 (25,00)	4
ITALY	24 (30,77)	24 (30,77)	30 (38,46)	78
NETHERLANDS	24 (47,06)	16 (31,37)	11 (21,57)	51
PORTUGAL	7 (38,89)	5 (27,78)	5 (33,33)	17
SPAIN	14 (31,11)	14 (31,11)	17 (37,78)	45
SWEDEN	29 (32,95)	29 (32,95)	30 (34,10)	88
UNITED KINGDOM	109 (33,64)	110 (33,95)	105 (32,41)	324
Total	491 (38,91)	388 (30,74)	383 (30,35)	1.262

Panel B: Overview of goodwill impairment versus no goodwill impairment

Country	GWI = 0 (%)	GWI = 1 (%)	Total
AUSTRIA	21 (33,33)	42 (66,67)	63
BELGIUM	14 (32,56)	29 (67,44)	43
DENMARK	11 (37,93)	18 (62,07)	29
FINLAND	17 (32,69)	35 (67,31)	52
FRANCE	61 (26,41)	170 (73,59)	231
GERMANY	96 (42,11)	132 (57,89)	228
GREECE	1 (11,11)	8 (88,89)	9
IRELAND	1 (25,00)	3 (75,00)	4
ITALY	21 (26,92)	57 (73,08)	78
NETHERLANDS	15 (29,41)	36 (70,59)	51
PORTUGAL	5 (29,41)	12 (70,59)	17
SPAIN	6 (13,33)	39 (86,67)	45
SWEDEN	21 (23,86)	67 (76,14)	88
UNITED KINGDOM	77 (23,77)	247 (76,23)	324
Total	367 (29,08)	895 (70,92)	1.262

Table 1 provides an overview of the initial and final sample per year and country. Noticeable is the small sample of some countries (e.g. four and nine observations for Ireland and Greece respectively). These low amounts of usable observations are mainly caused, because information on particularly goodwill impairment is lacking in these countries. A potential cause

could be the lower levels of enforcement and poorly functioning bureaucracies. Despite some countries' low number of observations, their observations remain part of the analyses as their observations impact the firm and industry level variables as much as observations from any other country. Their impact on the country level analyses would however be lower.

Although the sample faces many exclusions, it remained usable for conducting the analyses. On the one hand, after the eliminations in the initial sample, the final sample still contains a large amount of observations. Also, the sample seems equally distributed regarding the dispersion of observations per year. As shown in panel A of table 2, only a small bias towards 2012 exists. Some countries also show this bias (e.g. Austria, Denmark, Germany and the Netherlands), while other countries are more equally distributed per year (e.g. Italy, Spain, Sweden and the United Kingdom). Furthermore, panel B of table 2 depicts the dispersion of observation that did conduct a goodwill impairment and observations that did not. While this shows a similar pattern for most countries, the high non impairment of Germany stands out in this matter. This high amount might later on be explained with the use of their institutional and cultural characteristics (e.g. their weak capital market or the long term orientated mind-set of the German people, shown in table 5). Altogether, the sample consists of a reasonable distribution on several aspects to enable the comparison of countries and their aspects.

3.2 Measurement of variables

3.2.1 Dependent variables

This research examines the effect of the factors on the decision to impair goodwill and the amount of goodwill that is impaired. The dependent variable used in the first analysis is GWI and shows if a firm has impaired goodwill in a particular year or not. As the analysis involves a dichotomous decision, GWI is a dummy variable. GWI receives a value of 1 when a company made a goodwill impairment in a particular year, while a value of 0 is given to the dummy when the company did not impair any goodwill. Notice that observations without information on goodwill impairment are already excluded, meaning that a value of 0 on the dummy means the company actually decided to do no impairment.

The second analysis measures the effect of the factors on the magnitude of the impairment. GWILOSS is the dependent variable, representing the actual amount of goodwill impairment by a company in a particular year in Euros. In contrast to Giner and Pardo (2015) this variable is not conditional upon the decision to impair. Goodwill impairments with an amount of 0, representing no goodwill impairment, are also included. This study argues that 0

is also a magnitude of goodwill impairment and should not be excluded. Also, by this way the same control variables can be used for both analyses. Giner and Pardo (2015), exclude firm size from their second analysis as its controlling effect for doing an impairment test becomes obsolete. However, with the inclusion of the value 0 this controlling effect is still useful. Moreover, Ball and Foster (1982) and Chalmers et al. (2011) argue that size controls for more aspects including the capabilities of a firm to apply more complex impairment testing procedures.

3.2.2 Independent variables

The independent variables are used in different combinations to form several models. The models are described and explained after setting forth the measurement of the independent and control variables.

3.2.2.1 Firm level variables

The first hypothesis tests the effect of the big bath strategy. In order to measure the effect of the incentive for management to maximize the impairment of goodwill in years with significant losses (Kirschenheiter & Melumad, 2002), BIGBATH is used. This variable is based on Brochet and Welch (2011), who developed it as a proxy to measure reputation, and is later on used in the Giner and Pardo (2015) study. Brochet and Welch (2011) develop two conditions "to isolate firm-years where managers have greater incentives to take an impairment" (p. 12). Negative earnings before the deduction of goodwill impairment are required, while this loss should also be larger than last year's loss. Losses by itself could be an indicator for impairment as purchased components could have perceived lower value due to the bad performance. However, this does not always apply to goodwill, as it describes future benefits of a component which could be independent of its current performance (Giner & Pardo, 2015). Therefore, pre-impairment earnings should also be lower than last year's loss to capture the conditions for a big bath strategy. This strategy can only be used once every few years and only in extremely bad years, because after maximizing impairment in one year, the impairment amount should be low the next year to increase profits. The expected sign for this variable is positive.

Smoothing also finds its origin in the Brochet and Welch (2011) study, but is further developed by Giner and Pardo (2015). A positive association between SMOOTH and goodwill impairment is expected as big surprises are preferably avoided by management. According to Chih, Shen and Kang (2008) this strategy is not only used to mislead and pursue personal goals, but also to enhance transparency by providing users of financial statements with information

about general trends and developments of the company. The two conditions are based on the assumption of Kirschenheiter and Melumad (2002) that managers tend to report higher earnings when there are profits, but to avoid abnormally high earnings. Therefore, the dummy variable SMOOTH obtains a value of 1 if pre-impairment earnings are positive and higher than last year.

The third hypothesis tests if leverage is of influence to the use of goodwill impairment. Regarding this factor, the line of Giner and Pardo (2015) is followed. They use a widener definition of debt in contrast to previous research by Beatty and Weber (2006) and AbuGhazaleh et al. (2011). They used only debt as the numerator for calculating leverage, while Giner and Pardo (2015) use total liabilities. Giner and Pardo (2015) argue that especially Spanish firms rely more heavily on trade creditors for medium-term financing. As this kind of crediting is not included in debt it would give an incomplete picture of leverage for Spanish firms. Although other country, like the Netherlands, the UK and Germany, rely less on trade crediting, the Mediterranean countries do. In order to obtain the fairest and most complete picture of how firms finance themselves, other liabilities are included in calculating leverage.

3.2.2.2 Industry level variables

To investigate the influence of industry on goodwill impairment a manual categorization on the basis of the Global Industry Classification Standard (GICS) is made. The GICS is a methodology developed by Standard & Poor's and MSCI/Barrathat in 1999 to respond to the need for one complete, consistent set of sector and industry definitions (Standard & Poor's, 2006). The GICS classifies a company according to its principal business activity in one of the 10 sectors, 24 industry groups, 67 industries and 147 sub-industries. In the DataStream database companies were classified in either an industry or industry group.

For this research these classifications are manually converted into five broader categories also used by Giner and Pardo (2015). These five categories, composed by putting together similar sectors in the GICS, are used instead of the original GICS sectors to maintain large enough groups in the sample. Giner and Pardo (2015) found that consumer discretionary, customer staples and health care and financials had a significant effect on the use of goodwill impairment. Their sample was however too biased toward these two categories, containing 32% and 31% of the sample respectively, whereby the other categories were too small for reasonable comparison. Our sample, as shown in table 3, is more equally distributed, although it contains larger amounts for these two categories as well.

Table 3 Overview of dispersion among observations per industry in absolute and relative figures

Industry	Final sample	%
1. Energy, materials and utilities	223	17,67
2. Industrials	154	12,20
3. Consumer discretionary, consumer staples and health care	339	26,86
4. Financials	299	23,69
5. Information technology and telecommunication	247	19,57
Total	1.262	100,00

Industry is furthermore well distributed over the years, with the exception for a bias toward 2012 that is profoundly present in the financial industry, as displayed in panel A of table 4. Accordingly, through an equal dispersion and a large sample a comparison can be made between different industries.

Industry is measured in three ways to generate robust results for its influence on goodwill impairment. First, the five categories are coded into four dummy variables. The remaining industry, financials, is used as a baseline category in order to compare each other industry with the financials industry group. Financials is chosen of two reasons. "In unbalanced designs (in which the group sizes are unequal) it is important that the base category contains a fairly large number of cases to ensure that the estimates of the regression coefficients are reliable" (Field, 2009, p.351). Being the second largest group, financials is more suitable than the smaller industry groups and will create more reliable coefficients.

Moreover, in the Giner and Pardo (2015) study the financials industry group yielded significant results for their effect on goodwill impairment. This can be explaining looking at their activities. These are less visible and tangible, resulting in a more difficult way to determine goodwill or the necessary reduction of goodwill, creating more space to use the goodwill impairment tool for their own needs. Although small, this effect is visible in panel B of table 4 which shows the dispersion between observations of firms deciding to impair goodwill and firms that did not. The financials sectors has the highest amount of observations choosing not to impair.

After the division into four dummies, also two divisions into two groups each are used to measure the industry effects. One division compares the financials group against all other categories together. By this way the first analysis will be conducted the other way around in order to verify the results of Giner and Pardo (2015) about the financials group. The other division involves the largest group, which was also found significant by Giner and Pardo (2015) and also (partially) consists of less visible and tangible activities: consumer discretionary,

consumer staples and health care. This category will be compared with all other categories together as well.

Table 4 Overview of dispersion among observations per year in absolute and relative figures; and the dispersion between observations that did and did not conduct a goodwill impairment, per industry.

Panel A: Overview per year

Industry	2012 (%)	2013 (%)	2014 (%)	Total
1. Energy	86 (38,57)	68 (30,49)	69 (30,94)	223
2. Industrials	53 (34,42)	53 (34,42)	48 (31,17)	154
3. Consumer	128 (37,76)	106 (31,27)	105 (30,97)	339
4. Financials	142 (47,49)	81 (27,09)	76 (25,42)	299
5. Information	82 (33,20)	80 (32,39)	85 (34,41)	247
Total	491 (38,91)	388 (30,74)	383 (30,35)	1.262

Panel B: Overview goodwill impairment versus no goodwill impairment

Industry	GWI = 0 (%)	GWI =1 (%)	Total
1. Energy	55 (24,66)	168 (75,34)	223
2. Industrials	43 (27,92)	111 (72,08)	154
3. Consumer	92 (27,14)	247 (72,86)	339
4. Financials	99 (33,11)	200 (66,89)	299
5. Information	78 (31,58)	169 (68,42)	247
Total	367 (29,08)	895 (70,92)	1.262

3.2.2.3 Country level variables

Recalling, the strength of capital markets is the first country level factor that is tested for its influence on the use of goodwill impairment. It is measured using two constructs: the importance of equity market measure (STREN) created by La Porta et al. (1997) and the corrected anti-director rights index (PROTEC) created by Spamann (2010).

"The importance of equity market is measured by the mean rank across three variables used in La Porta et al. (1997): (1) the ratio of the aggregate stock market capitalization held by minorities to gross national product (2) the number of listed domestic firms relative to the population (3) the number of IPOs relative to the population. Each variable is ranked such that higher scores indicate a greater importance of the stock market" (Leuz et al., 2003, p. 516). Although the data are based on research conducted in the 1990's of the last century, it could provide a good indication of how strong equity markets in a country are. The figures are namely encompassing as they hold three different features of the equity market.

As there was no updated version of the La Porta et al. (1997) measure, an extra measure to test the strength of capital markets variable is added. The level of investor protection in a

country is an important component that determines the strength of a capital market (e.g. Shleifer & Vishny, 1997; La Porta et al., 2000). La Porta et al. (1998) developed this measure through an anti-director rights index. This aggregate index measures the strength of minority shareholder rights to influence the corporate decision making process against those of managers and dominant shareholders (Leuz et al., 2003). It consists of six constructs that measure the position of minority shareholders in a country. A lot of research is based on this famous index (e.g. Leuz et al., 2003; Pinkowitz, Stulz & Williamson, 2006; Durnev & Kim, 2005). Djankov, La Porta, Lopez-De-Silanes and Shleifer (2008) composed a new index for investor protection that "not only clarified but also substantially modified some of the index components" (Spamann, 2010, p. 476). However, this modification led to an inconsistent valuation without explaining how they were conducted. Spamann (2010) developed a more consistent and easily reproducible measure using a more consistent coding for all countries. Therefore, their corrected anti-director right index is used to measure investor protection (PROTEC). An overview of both measures are displayed per county in table 5.

Secondly, the influence of legal enforcement is tested. La Porta et al. (1998) is again at the origin of an index that scores multiply countries for their enforcing power. Their index is built on three components: the judicial system, the assessment of law and corruption. However, Preiato, Brown and Tarca (2015) display a shortcoming of the La Porta et al. (1998) index. They argue that three new proxies specifically developed for accounting and auditing by Brown, Preiato and Tarca (2014) have more explanatory power than more general proxies like the La Porta et al. (1998) index. In total nine proxies were tested in the Preiato et al. (2015) research to underline this statement. "We find that the three new proxies measuring differences between countries in the auditing environment and the enforcement of accounting standards recently published in this journal (Brown et al., 2014) indicate the marginal effect of enforcement on analysts' forecast accuracy and dispersion is stronger than has been found for more general legal proxies". (Preiato et al., 2015, p. 46). While AUDIT measures the activities of auditors and ENFORCE measures the activities of independent enforcement bodies, the summation of the two AETOTAL (Brown et al., 2014) is used as the enforcement variable in this study. The scores for this variable (ENFOR) per country are also displayed in table 5.

The most common measures for culture in literature are the dimensions of national culture by Hofstede (1981). Gray (1988) argues that these dimensions can be related to accounting values and practices. Borg, Groenen, Jehn, Bilsky and Schwartz (2010), on the other hand, argue that the Hofstede dimensions became obsolete as their data is derived from empirical study undertaken in the 1960's and 1970's, undermining their relevance in research

in the twenty-first century. Although the original Hofstede studies were indeed conducted in this period, the cultural data in the Hofstede et al. (2010) study are partly based on replications and extensions of the original study. Also, as culture is rooted deep into society it is difficult to change and only changes very slowly.

Table 5 Overview of values for the country level variables per country

Country	STREN	PROTEC	ENFOR	POWER	INDIV	MASC	UNCER	ORIENT	INDUL
AUSTRIA	7	2,5	27	11	55	79	70	60	63
BELGIUM	11,3	2	44	65	75	54	94	82	57
DENMARK	20	4	49	18	74	16	23	35	70
FINLAND	13,7	3,5	32	33	63	26	59	38	57
FRANCE	9,3	3	45	68	71	43	86	63	48
GERMANY	5	3	44	35	67	66	65	83	40
GREECE	11,5	2	26	60	35	57	100	45	50
IRELAND	17,3	4	41	28	70	68	35	24	65
ITALY	6,5	2,5	46	55	76	70	75	61	30
NETHERLANDS	19,3	3	43	38	80	14	53	67	68
PORTUGAL	11,8	2,5	29	63	27	31	99	28	33
SPAIN	7,2	5	42	57	51	42	86	48	44
SWEDEN	16,7	3,5	34	31	71	5	29	53	78
UNITED KINGDOM	25	5	54	35	89	66	35	51	69

STREN = the importance of equity markets index derived from the La Porta et al. (1997); PROTEC = the corrected anti-director right index by Spamann (2010); ENFOR = the combined AETOTAL proxy developed by Brown et al. (2014); POWER, INDIV, MASC, UNCER, ORIENT and INDUL represent the six dimensions from Hofstede et al. (2010), being Power Distance, Individualism, Masculinity, Uncertainty Avoidance, Long Term Orientation and Indulgence respectively.

Power Distance (POWER) shows the degree of people in lower hierarchical layers of the society to accept and expect that power is distributed unequally. Individualism (INDIV) is the dimension that shows the preference of individuals in a social framework to take care of themselves and their immediate families only, instead of others. The preference toward achievement orientation to gain material rewards for success, heroism is called Masculinity (MASC). Uncertainty Avoidance (UNCER) shows the individual preferences of members of the society to feel uncomfortable with uncertainty and ambiguity. How to deal as a society with traditions and challenges from the future is captured in the Long Term Orientation (ORIENT) dimension. This score will be high if traditions are of less importance and a more pragmatic approach is used to structure education and thinking. Lastly, Indulgence (INDUL), later added by Hofstede as the sixth dimension, shows the society's willingness to support recreation, leisure and other natural human drives. The six Hofstede dimensions, based on Hofstede et al. (2010), used in this research are displayed per country in table 5.

3.2.3 Control variables

To control for aspects that might influence the decision to impair and the magnitude of goodwill impairment, four control variables are added to the different analyses. First, the years under observation are used to control for external effects. As seen in panel A of table 2 and 4, the data is not equally distributed over the three years under observation due to the exclusion of missing values. The three years are dummified and added to the analyses.

Furthermore, company size (SIZE) is taken into account. Size can control for the impairment test as larger companies possess more capabilities to perform more complex impairment testing procedures (Giner & Pardo, 2015; Ramanna & Watts, 2012; Stokes & Webster 2009; AbuGhazaleh et al., 2011; Chalmers et al., 2011). It could also proxy for other factors like political costs, managerial expertise, quality of financial reporting and economics of scale and scope (Ball & Forster, 1982). SIZE is commonly measured as the natural logarithm of the amount of total assets in Euros and is expected to have a positive relation with the dependent variable.

Return on equity (ROE) is added to proxy for the accounting profitability of a company. Better performing companies are namely less likely to do an impairment as the good performance itself triggers less impairment, due to higher expected value of the firm in the future (Giner & Pardo, 2015; AbuGhazaleh et al. 2011; Chalmers et al. 2011). ROE is expected to have a negative effect on the dependent variable.

Finally, the market to book ratio (M/B) takes investors' perceptions of a firm into account, reflecting the investment opportunity set (IOS) of a firm (Giner & Pardo, 2015; Godfrey & Koh 2009; Chalmers et al. 2011). IOS cannot be captured by the accounting system (IASB, 2004), because it consists of synergies between the firm and the acquired components. It is therefore the origin to create goodwill. When the M/B ratio rises, the IOS of a company will increase and depict goodwill more accurately, reducing the need for fast impairment due to overstatement in the acquiring phase. A negative association with the dependent variable is expected.

3.3 Econometric model

3.3.1 General models

Panel data is used in this research resulting from the fact that both multiple years and multiple entities are used. The data therefore consists of both time series and cross-sectional data. This data "have more variability and allow to explore more issues than do cross-sectional or time-

series data alone" (Kennedy, 2008, p. 282). However, the data is unbalanced as the observations are not equally distributed over the three years. Because of the missing values that lead to the unbalanced sample, the pooled analysis needs to be corrected for clusters. Observations for the same entity might influence each other, due to compounded errors and similar characteristics within them. The cluster option will cluster the observations of the same firms together as these observations may be correlated within the same firm, but are considered independent between the firms (Chen, Ender, Mitchel & Wells, 2003).

The first analysis searches for factors that influence the decision to impair goodwill. To analyse the influence on a dichotomous decision like this, literature suggests particularly two types of analyses: the logit and probit analysis. Basically a probit assumes that the underlying variable is normally distributed, while the logit analysis is based on a logistic curve, which is characterized by the higher kurtosis. (Aldrich & Nelson, 1984; Hagle & Mitchell, 1992). Among others, Greene (1997) and Gill (2001) argue that this choice is not very fundamental and is rather a matter of taste. They argue that for most analyses the difference is only minimal and that they provide identical conclusions in a majority of research. Chambers and Cox (1967) show that differences can be found when sample sizes were large (e.g., $n \geq 1000$) and extreme independent variable levels, like large biases toward a particular value, are present.

As literature suggest rather small differences between the two, a logit analysis is chosen to conduct. Hence, the sample can be considered as large and exceeds 1.000 observations, as well as the underlying variable has a high kurtosis (153,32, non-tabulated data) considering a kurtosis value of 3 represents a normal distribution. Concluding, the first analysis will consist of a pooled logit corrected for clusters based on the following model:

$$\begin{aligned} GWI = {} & \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYcontrol + \\ & \beta_5 CAPITALMARKETcontrol + \beta_6 ENFORCEMENTcontrol + \\ & \beta_7 CULTUREcontrol + \beta_8 SIZE + B_9 ROE + \beta_{10} M/B + \sum_i \beta_{11i} YEAR_i + \varepsilon \end{aligned} \quad (1)$$

Where GWI = indicator variable taking a value of 1 if there is a goodwill impairment loss in year *t*, and 0 otherwise; BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; LEV = total liabilities in Euros / total assets in Euros at time *t*; INDUSTRYcontrol = multiple models based on

indicator variables taking a value of 1 if the firm belongs to one out of five manually composed categories based on matching sectors from the GICS, and 0 otherwise; CAPITALMARKETcontrol = multiple models based on two variables: STREN representing the value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); and PROTEC representing the value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFORCEMENTcontrol = multiple models based on the ENFOR variable, representing the value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); CULTUREcontrol = multiple models based on the six dimensions composed and updated by Hofstede et al. (2010), where POWER represents the Power Distance dimension; INDIV represents the Individualism dimension; MASC represents the Masculinity dimension; UNCER represents the Uncertainty Avoidance dimension; ORIENT represents the Long Term Orientation dimension; and INDUL represents the Indulgence dimension; SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*; YEAR*i* = indicator variables taking a value of 1 if the observation belongs to year *i* (*i* refers to fiscal year 2012, 2013 or 2014), and 0 otherwise.

The second analysis measures the influence of the factors on the magnitude of a goodwill impairment, measured as GWILOSS. As the same sample is used, a pooled analysis with a correction for clusters will be conducted. However, as no dichotomous dependent variable, but a continuous variable is used, an Ordinary Least Square (OLS) regression is most common. Therefore, a pooled OLS corrected for clusters will be conducted based on the following model:

$$\begin{aligned} GWILOSS = {} & \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYcontrol + \\ & \beta_5 CAPITALMARKETcontrol + \beta_6 ENFORCEMENTcontrol + \\ & \beta_7 CULTUREcontrol + \beta_8 SIZE + B_9 ROE + \beta_{10} M/B + \sum_i \beta_{11i} YEAR_i + \varepsilon \quad (2) \end{aligned}$$

Where GWILOSS = reported amount of goodwill impairment in year *t* in Euros. The other variables were described in (1).

3.3.2 Multicollinearity

An important aspect of this research is the issue of multicollinearity. Due to the use of multiple variables to measure the same construct, like for culture and the strength of capital markets, the chance of strong correlations between two or more predictors emerges. An OLS analysis can only generate unbiased and consistent estimations when no perfect multicollinearity is present. Although perfect multicollinearity is rare, high levels of collinearity also cause the problem of untrustworthy coefficients due to the increase of standard errors. They furthermore limit the size of the predictability of the model, as highly correlated variables predict less 'new variance'. Finally, they prevent the assessment of the importance of individual predictors, because multiple predictors explain the same piece of variance (Field, 2009).

To overcome the aspect of multicollinearity the independent variables will be used in different combinations to prevent situations where variables correlate too high with each other and cause problems with their predictability. Table 6 depicts the correlations of all variables, highlighting the correlations that hinder the correct functioning of the analyses in grey. Although hard-and-fast rules for problematic levels of correlation are lacking, Cohen (1988) provides a general rule as a starting point. He states that absolute values above 0,5 in the correlation matrix indicate large or strong correlations and deserve extra attention when conducting an analysis. Table 6 shows that especially the cultural, strength of capital market and enforcement variables cause problems. Therefore, several models are used with different combinations of these three categories of measures.

In order to definitely determine what variables can and cannot be put together in a model, the variance inflation factor (VIF) will be used. VIF indicates to what extend a predictor in a model has a strong linear relation with all other predictors together (Field, 2009). It detects more subtle correlations than the correlation matrix, with the advantage that more common rules on cut-off points can be used to indicate correlations. Myers (1990) suggests that VIF values above 10 are problematic, while Menard (1995) argues that the tolerance, which is its reciprocal (1/VIF), will pose a problem below a value of 0,2. In this research the standard of Myers (1990) will be followed as a hard measure, but keeping Menard's (1995) rule in mind to search for combinations of variables with the lowest possible VIF values.

Table 6 Pairwise correlation between the dependent, independent and control variables

	GWILOSS	GWI	BIGBATH	SMOOTH	LEV	INDUSTRY1	INDUSTRY2	INDUSTRY3	INDUSTRY4	INDUSTRY5
GWILOSS	1.000									
GWI	0.187***	1.000								
BIGBATH	0.169***	0.249***	1.000							
SMOOTH	-0.123***	-0.232***	-0.484***	1.000						
LEV	0.179***	0.086***	0.005	0.013	1.000					
INDUSTRY1	0.022	0.045	0.043	-0.041	-0.047*	1.000				
INDUSTRY2	-0.025	0.010	-0.072**	0.001	-0.022	-0.173***	1.000			
INDUSTRY3	-0.054*	0.026	0.018	-0.026	-0.046	-0.281***	-0.226***	1.000		
INDUSTRY4	0.109***	-0.049*	-0.063**	0.084***	0.167***	-0.258***	-0.208***	-0.337***	1.000	
INDUSTRY5	0.058**	-0.027	0.065**	-0.023	-0.065**	-0.229***	-0.184***	-0.299***	-0.275***	1.000
STREN	0.005	0.086***	0.102***	-0.091***	-0.119***	-0.047*	0.019	0.073***	-0.144***	0.102***
PROTEC	-0.001	0.085***	0.084***	-0.058**	-0.106***	-0.029	-0.010	0.085***	-0.127***	0.077***
ENFOR	-0.018	0.034	0.078***	-0.036	-0.102***	-0.068**	-0.028	0.119***	-0.099***	0.063**
POWER	0.014	0.052*	0.006	0.037	0.090***	0.017	-0.017	0.043	-0.029	-0.018
INDIV	-0.010	0.040	0.090***	-0.065**	-0.152***	-0.102***	0.005	0.096***	-0.105***	0.099***
MASC	-0.043	-0.034	0.005	-0.026	0.009	0.016	-0.005	0.009	0.091***	-0.118***
UNCER	-0.005	-0.021	-0.068**	0.062**	0.166***	0.063**	-0.005	-0.043	0.094***	-0.108***
ORIENT	-0.043	-0.110***	-0.069**	0.034	-0.059**	-0.042	-0.028	0.002	0.092***	-0.037
INDUL	-0.007	0.068**	0.056**	-0.071**	-0.138***	-0.052*	0.035	0.028	-0.103***	0.100***
SIZE	0.356***	0.117***	-0.201***	0.165***	0.483***	0.084***	-0.005	-0.067**	0.266***	-0.286***
ROE	-0.009	-0.039	-0.272***	0.260***	-0.159***	-0.025	0.018	0.048*	0.016	-0.061**
M/B	0.131***	0.008	-0.075***	0.056**	0.131***	-0.023	-0.018	0.032	0.040	-0.071**
YEAR1	0.033	0.024	0.039	-0.057**	-0.011	-0.003	-0.034	-0.014	0.098***	-0.058**
YEAR2	-0.036	0.033	-0.008	0.020	0.008	-0.003	0.030	0.007	-0.044	0.018
YEAR3	0.001	-0.059**	-0.036	0.041	0.004	0.006	0.007	0.008	-0.060**	0.044

Table 6 (continued)

	STREN	PROTEC	ENFOR	POWER	INDIV	MASC	UNCER	ORIENT	INDUL	SIZE
STREN	1.000									
PROTEC	0.797***	1.000								
ENFOR	0.545***	0.632***	1.000							
POWER	-0.307***	-0.300***	0.131***	1.000						
INDIV	0.733***	0.590***	0.823***	-0.124***	1.000					
MASC	-0.074***	0.120***	0.378***	-0.150***	0.193***	1.000				
UNCER	-0.778***	-0.697***	-0.362***	0.719***	-0.630***	0.077***	1.000			
ORIENT	-0.613***	-0.543***	-0.004	0.129***	-0.093***	0.309***	0.395***	1.000		
INDUL	0.829***	0.575***	0.133***	-0.488***	0.502***	-0.310***	-0.763***	-0.515***	1.000	
SIZE	-0.179***	-0.170***	-0.179***	0.129***	-0.204***	-0.099***	0.197***	-0.003	-0.108***	1.000
ROE	-0.047*	-0.010	0.045	-0.038	0.058**	0.033	-0.034	0.092***	-0.020	0.1418**
M/B	0.115***	0.139***	0.093***	0.004	-0.051*	0.017	-0.055*	-0.105***	0.042	0.266***
YEAR 1	-0.060**	-0.063**	-0.035	-0.050*	-0.047*	0.006	0.016	0.074***	-0.033	-0.028
YEAR 2	0.044	0.037	0.023	0.010	0.039	-0.008	-0.022	-0.030	0.034	0.008
YEAR 3	0.019	0.030	0.014	0.043	0.012	0.002	0.005	-0.049*	0.001	0.022

Table 6 (continued)

	ROE	M/B	YEAR 1	YEAR 2	YEAR 3
ROE	1.000				
M/B	0.086***	1.000			
YEAR 1	-0.034	-0.097***	1.000		
YEAR 2	0.019	0.038	-0.532***	1.000	
YEAR 3	0.018	0.065**	-0.527***	-0.440***	1.000

*** 1% significance, ** 5%, * 10%. Correlations exceeding an absolute level of 0.5 are highlighted in grey.

GWILOSS = reported amount of goodwill impairment in year *t* in Euros; GWI = indicator variable taking a value of 1 if there is a goodwill impairment loss in year *t*, and 0 otherwise; BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; LEV = total liabilities in Euros/ total assets in Euros at time *t*; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS (1 representing energy, materials and utilities, 2 representing industrials, 3 representing consumer discretionary, consumer staples and health care, 4 representing financials and 5 representing information technology and telecommunication); STREN = value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); PROTEC = value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFOR = value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); POWER = value given to a particular country on the Power Distance dimension composed and updated by Hofstede et al. (2010); INDIV = value given to a particular country on the Individualism dimension composed and updated by Hofstede et al. (2010); MASC = value given to a particular country on the Masculinity dimension composed and updated by Hofstede et al. (2010); UNCER = value given to a particular country on the Uncertainty Avoidance dimension composed and updated by Hofstede et al. (2010); ORIENT = value given to a particular country on the Long Term Orientation dimension composed and updated by Hofstede et al. (2010); INDUL = value given to a particular country on the Indulgence dimension composed and updated by Hofstede et al. (2010); SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*; YEAR = year the observation is allocated to (1 representing 2012, 2 representing 2013 and 3 representing 2014).

4. Results

4.1 Descriptive statistics

Table 7 shows the descriptive statistics for the variables used in the analyses. A majority of observations, 71%, made an impairment to goodwill. This is in high contrast to the Giner and Pardo (2015) research, where only 19% of the sample impaired their goodwill. A possible cause for this large difference might be the lack of goodwill impairment information provided by firms. It might be possible that firms not impairing goodwill are less likely to distribute information on this topic than firms that do impair goodwill.

Also, table 7 shows that firms often apply either a big bath or smoothing strategy. Big bath is a strategy that can only be applied once every couple of years. Considering that 760 unique firms (non-tabulated data) could perform only one big bath per firm, because only three years were under observation, and the sample includes 1.262 observations, this means a maximum of 60% of the observations could have performed a big bath. Almost half of them actually applied this strategy. Furthermore, the firms in the sample are highly leveraged, as firms financed themselves on average for almost 60% with debt. Other features regarding the sample are very diversified. Total assets, the basis for the SIZE variable, variates from 171 EUR to 3,48 billion EUR (non-tabulated data). ROE is in a large proportion of the observation negative, while firms also differ a lot in their M/B ratio.

Table 8 shows the results of a two tailed *t*-test measuring the difference between the mean of the independent variables for firms impairing goodwill and firms that do not. It provides a first indication if a variable may have influence on the decision to impair or not. The three firm level variables show a significant difference between the two groups. Especially big bath is significantly higher for the group that impairs (35%) than the group that did not (11%). Smoothing follows a different pattern displaying 30% for the impairment group and 55% for the non-impairment group. These differences indicate these variables have a high chance of influencing the decision to impair.

Industry is less decisive in separating between impairment and non-impairment. Only industry 1 and industry 4 are significant at 10% and 5% respectively. However, it shows that industry 4 has the most chance of being a significant factor for influencing the decision to impair goodwill. Regarding the strength of capital market measures, both STREN and PROTEC show a significant difference between the two groups. Even the *t*-test coefficients are similar (-3,071 and -3,013), indicating that both measures represent this factor in a similar way, making them both robust measures for strength of capital markets.

Table 7 Descriptive statistics

Continuous variables	Mean	SD	Min.	Median	Max.	*n*
GWILOSS	38.118	130.619	0	1.590	1.595.000	1.262
LEV	0,598	0,232	0,001	0,604	1,267	1.262
INDUSTRY	3,153	1,352	1	3	5	1.262
STREN	13,681	7,754	5	9,3	25	1.262
PROTEC	3,563	0,990	2	3	5	1.262
ENFOR	44,497	7,705	26	45	54	1.262
POWER	42,788	16,241	11	35	68	1.262
INDIV	73,082	12,346	27	71	89	1.262
MASC	51,740	20,926	5	66	79	1.262
UNCER	60,151	22,491	23	65	100	1.262
ORIENT	60,439	14,102	24	60,5	83	1.262
INDUL	55,389	14,223	30	57	78	1.262
SIZE	13,878	2,912	5,142	13,819	21,971	1.262
ROE	-9,645	78,153	-1.444,47	4,79	272,75	1.262
M/B	621,426	2.401,049	-41.767,37	86,826	29.144,37	1.262

Dichotomous variables	Proportion dummy = 1 (%)	Median	*n*
GWI	70,92	1.00	1.262
BIGBATH	28,13	0.00	1.262
SMOOTH	37,48	0.00	1.262

GWILOSS = reported amount of goodwill impairment in year *t* in Euros; LEV = total liabilities in Euros/ total assets in Euros at time *t*; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS; STREN = value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); PROTEC = value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFOR = value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); POWER = value given to a particular country on the Power Distance dimension composed and updated by Hofstede et al. (2010); INDIV = value given to a particular country on the Individualism dimension composed and updated by Hofstede et al. (2010); MASC = value given to a particular country on the Masculinity dimension composed and updated by Hofstede et al. (2010); UNCER = value given to a particular country on the Uncertainty Avoidance dimension composed and updated by Hofstede et al. (2010); ORIENT = value given to a particular country on the Long Term Orientation dimension composed and updated by Hofstede et al. (2010); INDUL = value given to a particular country on the Indulgence dimension composed and updated by Hofstede et al. (2010); SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*; GWI = indicator variable taking a value of 1 if there is a goodwill impairment loss in year *t*, and 0 otherwise; BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise.

Enforcement, however, seems to have no effect, as the mean difference is minimal (44,663 for the impairment group and 44,093 for non-impairment). The six Hofstede dimensions used to measure culture have varying effects. ORIENT and INDUL are significant at 1%, measuring reasonable differences between the two groups. MASC and UNCER are on the other hand not significant, while POWER is significant at 5% and INDIV at 10%.

Table 8 Comparison per variable between observations that impaired goodwill and observations that did not impair goodwill

Variables	Mean when GWI=1	Mean when GWI=0	Mean difference *t*-test	*n*
BIGBATH	0,353	0,106	-9,137***	1.262
SMOOTH	0,303	0,550	8,478***	1.262
LEV	0,611	0,567	-3,075***	1.262
INDUSTRY1	0,188	0,150	-1,601*	1.262
INDUSTRY2	0,124	0,117	-0,338	1.262
INDUSTRY3	0,276	0,251	-0,920	1.262
INDUSTRY4	0,223	0,270	1,757**	1.262
INDUSTRY5	0,189	0,213	0,964	1.262
STREN	14,109	12,638	-3,071***	1.262
PROTEC	3,616	3,432	-3,013***	1.262
ENFOR	44,663	44,093	-1,194	1.262
POWER	43,323	41,482	-1,830**	1.262
INDIV	73,398	72,313	-1,418*	1.262
MASC	51,291	52,837	1,192	1.262
UNCER	59,847	60,894	0,751	1.262
ORIENT	59,442	62,869	3,943***	1.262
INDUL	56,009	53,877	-2,423***	1.262
SIZE	14,066	13,314	-4,189***	1.262
ROE	-11,595	-4,889	1,385*	1.262
M/B	633,697	591,500	-0,283	1.262

*** 1% significance, ** 5%, * 10%.

BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; LEV = total liabilities in Euros/ total assets in Euros at time *t*; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS (1 representing energy, materials and utilities, 2 representing industrials, 3 representing consumer discretionary, consumer staples and health care, 4 representing financials and 5 representing information technology and telecommunication); STREN = value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); PROTEC = value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFOR = value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); POWER = value given to a particular country on the Power Distance dimension composed and updated by Hofstede et al. (2010); INDIV = value given to a particular country on the Individualism dimension composed and updated by Hofstede et al. (2010); MASC = value given to a particular country on the Masculinity dimension composed and updated by Hofstede et al. (2010); UNCER = value given to a particular country on the Uncertainty Avoidance dimension composed and updated by Hofstede et al. (2010); ORIENT = value given to a particular country on the Long Term Orientation dimension composed and updated by Hofstede et al. (2010); INDUL = value given to a particular country on the Indulgence dimension composed and updated by Hofstede et al. (2010); SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*.

The effect of the control variables is as diversified as the cultural measures. Larger firms with more assets impair their goodwill significantly more often (14.1) than smaller firms (13.3). ROE is only significant at 10%. Although M/B is slightly higher for the impairment group, it is not significant.

4.2 Pooled logit corrected for cluster analysis

In order to measure the effect of the factors on the decision to impair goodwill, the analysis was conducted for different combinations of measures that were put together in six models. These models are based on the VIF scores calculated from the OLS regression in next paragraph, as VIF scores can only be determined on regressions and not for logit analyses. Therefore, the choice for the six models is explained in the next paragraph.

Table 10 shows the results of this analysis. BIGBATH and SMOOTH are both significant predictors of the impairment decision, except that SMOOTH shows a negative effect in contrast to the expected positive effect. This means that firms with high pre-impairment earnings are less prone to goodwill impairment and will more likely withhold necessary deductions of their goodwill. In fact, no smoothing strategy can be followed if high earnings lead to no impairment, because the impairments are needed to adjust earnings to reach similar levels of income over the years. These results lead to the acceptance of hypothesis 1a regarding the big bath strategy, but to the rejection of hypothesis 2a, as an opposite effect for smoothing is found. The last firm level factor, leverage, is not significant in all six models, resulting in the rejection of hypothesis 3a.

Industry has an effect the decision to impair. Industry 3 and 5 are both significantly different from the base line industry group ‘financials’ on a 10% significance level. The positive effect of both groups suggest that firms in these industries are more likely to impair, than firms in the financial sector. This is confirmed by the INDUSTRYNONFIN variable that measures the effect of all other industries in contrast to the financials group. As this effect is in both models, where this variable is included, significant at a 5% level, it shows that the financials industries will be less likely to impair goodwill. That this effect applies only to the financial industry is shown by INDUSTRYNONCUS. There is no significant difference between the consumer discretionary, consumer staples and health care sector and the others. Hypothesis 4a is accepted, as it matters if a firm operates in the financial sector or not, although the effect is only significant at a 10% and 5% level respectively.

Table 10 Results of pooled logit corrected for clusters analysis

Variable	Expected sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	?	-2,684***	-3,891***	-2,767***	-4,255***	-2,896**	-3,736***
		(-3,25)	(-4,85)	(-2,99)	(-3,38)	(-2,26)	(-2,95)
BIGBATH	(+)	1,476***	1,469***	1,453***	1,464***	1,455***	1,454***
		(6,56)	(6,52)	(6,51)	(6,51)	(6,55)	(6,47)
SMOOTH	(+)	-0,730***	-0,740***	-0,743***	-0,746***	-0,739***	-0,758***
		(-4,98)	(-5,02)	(-5,06)	(-5,10)	(-5,10)	(-5,22)
LEV	(±)	0,198	0,223	0,149	0,190	0,173	0,163
		(0,56)	(0,63)	(0,42)	(0,54)	(0,49)	(0,46)
INDUSTRY1	(±)	0,344	0,334				
		(1,42)	(1,37)				
INDUSTRY2	(±)	0,422	0,430				
		(1,61)	(1,61)				
INDUSTRY3	(±)	0,360*	0,353*				
		(1,86)	(1,81)				
INDUSTRY5	(±)	0,377*	0,364*				
		(1,77)	(1,69)				
INDUSTRYNONFIN	(±)			0,370**	0,367**		
				(2,20)	(2,18)		
INDUSTRYNONCUS	(±)					-0,108	-0,112
						(-0,72)	(-0,75)
STREN	(+)	0,058***		0,028		0,057**	
		(3,19)		(1,19)		(1,96)	
PROTEC	(+)		0,502***		0,290*		0,293*
			(4,25)		(1,73)		(1,72)
ENFOR	(+)	-0,008	-0,054**	0,010	0,004	-0,003	0,005
		(-0,36)	(-2,06)	(0,70)	(0,30)	(-0,18)	(0,32)
POWER	(±)	0,014**	0,020***				
		(2,20)	(3,05)				
INDIV	(±)	-0,012	0,016				
		(-0,75)	(1,27)				
MASC	(±)	0,005	0,004				
		(0,99)	(0,92)				
UNCER	(±)			0,007	0,012**	0,010*	0,013**
				(1,32)	(2,09)	(1,79)	(2,17)
ORIENT	(±)			-0,012	-0,008		-0,009
				(-1,46)	(-1,13)		(-1,25)
INDUL	(±)				0,010	-0,001	0,011
					(1,25)	(-0,10)	(1,32)
SIZE	(+)	0,191***	0,189***	0,191***	0,190***	0,181***	0,179***
		(5,84)	(5,76)	(6,23)	(6,17)	(5,99)	(5,91)
ROE	(–)	0,002*	0,002	0,002	0,002	0,002*	0,002*
		(1,85)	(1,56)	(1,64)	(1,56)	(1,70)	(1,66)
M/B	(–)	-0,000	-0,000	-0,000	-0,000	-0,000	-0,000
		(-1,62)	(-1,53)	(-1,59)	(-1,62)	(-1,49)	(-1,62)
YEAR1	(±)	0,334**	0,381**	0,329**	0,338**	0,275*	0,302**
		(2,17)	(2,46)	(2,14)	(2,20)	(1,82)	(1,99)
YEAR2	(±)	0,321*	0,336*	0,322*	0,327*	0,306*	0,320*
		(1,84)	(1,93)	(1,85)	(1,88)	(1,76)	(1,84)
n		1.262	1.262	1.262	1.262	1.262	1.262
Pseudo R^2		0,124	0,128	0,123	0,125	0,118	0,122

Table 10 (continued)

Displayed the coefficients, between parenthesis the t-value of the coefficient, *** 1% significance, ** 5%, * 10%.

Model 1: $GWI = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 STREN + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 2: $GWI = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + B_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 3: $GWI = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 SIZE + \beta_{10} ROE + \beta_{11} M/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 4: $GWI = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 5: $GWI = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONCUS + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 INDUL + \beta_9 SIZE + \beta_{10} ROE + \beta_{11} M/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 6: $GWI = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONCUS + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; LEV = total liabilities in Euros/ total assets in Euros at time *t*; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS (1 representing energy, materials and utilities, 2 representing industrials, 3 representing consumer discretionary, consumer staples and health care, 4 representing financials and 5 representing information technology and telecommunication); INDUSTRYNONFIN = industry group representing all industries in the sample except financials to compare the effect with this group; INDUSTRYNONCUS = industry group representing all industries in the sample except consumer discretionary, consumer staples and health care to compare the effect with this group; STREN = value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); PROTEC = value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFOR = value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); POWER = value given to a particular country on the Power Distance dimension composed and updated by Hofstede et al. (2010); INDIV = value given to a particular country on the Individualism dimension composed and updated by Hofstede et al. (2010); MASC = value given to a particular country on the Masculinity dimension composed and updated by Hofstede et al. (2010); UNCER = value given to a particular country on the Uncertainty Avoidance dimension composed and updated by Hofstede et al. (2010); ORIENT = value given to a particular country on the Long Term Orientation dimension composed and updated by Hofstede et al. (2010); INDUL = value given to a particular country on the Indulgence dimension composed and updated by Hofstede et al. (2010); SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*; YEAR = year the observation is allocated to (1 representing 2012, 2 representing 2013 and 3 representing 2014).

The results for the strength of capital market factor are not univocal as their measures are correlating with some cultural characteristics. Both STREN and PROTEC show the same results. When these measures are put in a model with POWER, INDIV and MASC they show a very significant effect on the impairment decision (on a 1% level), while in combination with the other three characteristics only significance is reached at 5% or 10%. STREN is not significant in model three, probably because it has high levels of correlations with ORIENT. Altogether it can be assumed that stronger capital markets in a country, cause firms to more likely do a goodwill impairment. With five out of six models support this claim, hypothesis 5a can be accepted.

Hypothesis 6a has to be rejected, because ENFOR is only significant in one out of six model at a 5% level. Also, a negative effect was found for this factor, while literature predicts a positive effect. Finally, hypothesis 7a can be partially accepted. Although four cultural characteristics are not significant, power distance and uncertainty avoidance are. This means that when there is an establishment of hierarchy and people experience uncertainty about the future with more discomfort, firms will more likely impair goodwill.

The control variable SIZE was very significant for a positive effect in all models. This can be explained with the argument that smaller firms are often less able to execute the complex impairment calculations and comply with their requirements (Verriest & Gaeremynck, 2009; Bens, Heltzer & Segal, 2011; Glaum et al., 2013). M/B on the other hand, is not significant as is in the research by Giner and Pardo (2015). This means that the external perception of the firm does not influence the decision of the firm to impair goodwill. ROE is only partially significant, being significant at 10% in three out of six models, while in the other three models no effect was found. However, this indicates that profitability causes more impairment instead of less. This could be seen as a way of smoothing income, when firms are more likely to impair when they are more profitable. However, previous results showed no smoothing effect. Lastly, more impairment was found in 2012 and 2013 in comparison to 2014.

4.3 Pooled OLS corrected for cluster analysis

With the use of the OLS analysis that measures the impact of the factors on the magnitude of goodwill impairment, it is possible to explain the composition of the models used in this and the previous analysis. With the VIF scores taking into account, it is not possible to put the two measures for strength of capital markets into one model. STREN and PROTEC are very similar measures and correlate to a large extend, leading to the decision to divide them between the models. Because the measures used for national culture correlated with the strength of capital market, enforcement and even other culture measures their distribution over different models and preventing too high VIF values is more difficult.

As a starting point, two groups are created to separate the measures that correlate the strongest. The first group consists of POWER, INDIV and MASC, while UNCER, ORIENT and INDUL are the second group. This division prevents most of the problems. Only the second group is problematic as INDUL could not be put in a model with both ORIENT and STREN. This led to the exclusion of ORIENT in one model and INDUL in the other when STREN was part of the selection. The reason some models still have high VIF values is due to the inclusion of the ENFOR measure, which correlates strongly with multiple variables. However, as

ENFOR is the only measure for the enforcement factor it was desirable to include this variable in multiple models. Lastly, three types for measuring industry are used.

In total six models are created in order to include all measures at least twice and in most cases even three times. For the pooled OLS corrected for cluster analysis the VIF values are considered as low, especially regarding model 1 (ENFOR and INDIV with highest VIF value of 5,33 and 5,28 respectively), model 3 (STREN with VIF value of 6,10) and the models 4 and 6 with no VIF value higher than Menard's (1995) criteria of five. Model 2 and 5 poses higher VIF values, but are necessary to meet the condition to include every variable at least twice and in equal conditions. The highest VIF value for model 2 and 6 are caused by STREN (7,79 and 9,00 respectively).

The results of the OLS are depicted in table 11 and show similar results with the logit analysis regarding the firm level factors. The big bath strategy displays a significant positive effect on the magnitude of goodwill impairment, leading to the acceptance of hypothesis 1b. SMOOTH is also significant, but the effect is again opposite to the prediction, causing the rejection of hypothesis 2b. Hypothesis 3b needs to be rejected as well as leverage shows no significant results in all six models.

Regarding industry, the OLS analysis shows contradicting results with the logit. While the logit shows that operating in the financial industry group influences the decision to impair, it seems to have no effect on the magnitude of the impairment. The coefficients of industry 1, 2, 3 and INDUSTRYNONFIN are even negative, besides being not significant. On the other hand, INDUSTRYNONCUS shows a negative effect, significant at 10%, on the size of the goodwill impairment. This means that operating in industry 3 (consumer discretionary, consumer staples and health care) leads to less goodwill impairment when it is compared with the other industries together. Therefore, hypothesis 4b can be accepted. Not the financial sector, but the customer discretionary, consumer staples and health care sector has a negative effect on the magnitude of goodwill impairments.

The country level factors differ from the logit analysis as well, because none of the factors are significant, leading to the rejection of hypothesis 5b, 6b and 7b. As a remark for culture, UNCER is significant at 10% in one out of four models where this variable is included. Due to the low level of significance in one models and the fact that UNCER is not significant in the other models, to few evidence is collected to assume that the level of uncertainty avoidance in a country has an effect on goodwill impairment.

Table 11 Results of pooled OLS corrected for clusters analysis

Variable	Expected sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	?	-253.037,7***	-250.603,2***	-193.408,3***	-191.594,5***	-240.879,4***	-211.670,9***
		(-5,46)	(-5,66)	(-3,94)	(-2,77)	(-3,54)	(-2,87)
BIGBATH	(+)	60.354,4***	60.303,53***	60.075,64***	60.206,63***	60.626,53***	60.326,21***
		(5,32)	(5,32)	(5,31)	(5,29)	(5,36)	(5,28)
SMOOTH	(+)	-25.207,42***	-25.034,03***	-24.954,51***	-24.600,84***	-24.431,81***	-24.509,81***
		(-4,06)	(-4,05)	(-3,95)	(-3,86)	(-3,87)	(-3,86)
LEV	(±)	-13.778,98	-14.014,4	-12.576,63	-12.247,47	-9.867,259	-11.571,79
		(-1,22)	(-1,24)	(-1,06)	(-1,04)	(-0,83)	(-0,96)
INDUSTRY1	(±)	-10.363,24	-11.073,19				
		(-0,84)	(-0,90)				
INDUSTRY2	(±)	-7.182,829	-7.687,946				
		(-0,54)	(-0,58)				
INDUSTRY3	(±)	-12.628,23	-13.017,91				
		(-1,28)	(-1,32)				
INDUSTRY5	(±)	7.546,374	7.418,419				
		(0,71)	(0,70)				
INDUSTRYNONFIN	(±)			-7.132,262	-7.312,386		
				(-0,74)	(-0,76)		
INDUSTRYNONCUS	(±)					11.193,05	11.152,09
						(1,86)*	(1,86)*
STREN	(+)	-478,081		-1.178,73		-704,573	
		(-0,75)		(-1,04)		(-0,61)	
PROTEC	(+)		1.512,474		-1.597,251		-1.387,756
			(0,25)		(-0,17)		(-0,15)
ENFOR	(+)	537,569	217,506	746,698	365,504	584,391	397,475
		(0,42)	(0,14)	(1,06)	(0,44)	(0,77)	(0,48)
POWER	(±)	-345,605	-223,757				
		(-1,09)	(-0,59)				
INDIV	(±)	463,352	332,25				
		(0,70)	(0,50)				
MASC	(±)	-186,672	-108,116				
		(-0,76)	(-0,43)				
UNCER	(±)			-459,009*	-385,413	-391,723	-383,531
				(-1,75)	(-1,18)	(-1,43)	(-1,17)
ORIENT	(±)			-344,788	-165,889		-140,477
				(-0,84)	(-0,41)		(-0,34)
INDUL	(±)				-206,169	102,335	-209,253
					(-0,47)	(0,16)	(-0,49)
SIZE	(+)	19.381,34***	19.420,61***	18.748,71***	18.794,42***	18.878,16***	18.941,12***
		(7,79)	(7,79)	(8,02)	(7,94)	(7,62)	(7,61)
ROE	(–)	-2,360	2,811	-2,020	1,630	0,135	4,252
		(-0,08)	(0,10)	(-0,07)	(0,05)	(0,00)	(0,15)
M/B	(–)	2,402	2,234	2,220	2,156	2,354	2,217
		(0,92)	(0,86)	(0,85)	(0,82)	(0,91)	(0,85)
YEAR1	(±)	5.563,518	6.030,114	12.877,24*	13.023,86*	13.230,88*	13.530,33*
		(0,74)	(0,82)	(1,70)	(1,72)	(1,74)	(1,78)
YEAR2	(±)	-7.685,647	-7.631,058				
		(-1,06)	(-1,05)				
YEAR3	(±)			7.474,383	7.632,74	7670,916	7.566,83
				(1,03)	(1,05)	(1,06)	(1,05)
n		1.262	1.262	1.262	1.262	1.262	1.262
F-statistic		5,23	5,19	6,56	6,21	6,05	5,73
Adjusted R^2		0,204	0,204	0,201	0,201	0,202	0,202

Table 11 (continued)

Displayed the coefficients, between parenthesis the t-value of the coefficient, *** 1% significance, ** 5%, * 10%.

Model 1: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 STREN + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 2: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 3: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 SIZE + \beta_{10} ROE + \beta_{11} M/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 4: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 5: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONCUS + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 INDUL + \beta_9 SIZE + \beta_{10} ROE + \beta_{11} M/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 6: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONCUS + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; LEV = total liabilities in Euros/ total assets in Euros at time *t*; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS (1 representing energy, materials and utilities, 2 representing industrials, 3 representing consumer discretionary, consumer staples and health care, 4 representing financials and 5 representing information technology and telecommunication); INDUSTRYNONFIN = industry group representing all industries in the sample except financials to compare the effect with this group; INDUSTRYNONCUS = industry group representing all industries in the sample except consumer discretionary, consumer staples and health care to compare the effect with this group; STREN = value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); PROTEC = value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFOR = value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); POWER = value given to a particular country on the Power Distance dimension composed and updated by Hofstede et al. (2010); INDIV = value given to a particular country on the Individualism dimension composed and updated by Hofstede et al. (2010); MASC = value given to a particular country on the Masculinity dimension composed and updated by Hofstede et al. (2010); UNCER = value given to a particular country on the Uncertainty Avoidance dimension composed and updated by Hofstede et al. (2010); ORIENT = value given to a particular country on the Long Term Orientation dimension composed and updated by Hofstede et al. (2010); INDUL = value given to a particular country on the Indulgence dimension composed and updated by Hofstede et al. (2010); SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*; YEAR = year the observation is allocated to (1 representing 2012, 2 representing 2013 and 3 representing 2014).

In the OLS, SIZE is influencing the use of the goodwill impairment tool to a large extend. The larger companies are, the more resources they have to conduct the complex calculations and to fulfil the requirements for determining the amount of goodwill impairment. ROE and M/B seem to have no effect. Finally, 2012 and 2014 have higher amounts of goodwill impairment, but only for 2012 there is a significant difference on a 10% level when it is compared to 2013.

4.4 Robustness analyses

This research already incorporated robustness issues to some extent, in two ways. First, the effect on the use of the goodwill impairment tool is analysed by measuring the effect on the decision to impair and the effect on the magnitude of the impairment. Two aspects of the impairment tool are thus covered. On the other hand, the variables are used in six different combinations to account for their effects on each other. To further cover the aspect of robustness four check are done. Two checks are performed to see if the exclusion of the outliers discussed in paragraph 3.1 have an effect on the results of the OLS. The third check tests if

there is a difference between the method used in this research and the one used by Giner and Pardo (2015), who exclude the value of 0 for GWILOSS in their OLS analysis. A last analysis compares the use of country dummies as a substitute for the used country characteristics.

4.4.1 No exclusion of outliers

This check examines the difference between the OLS analysis with and without the exclusion of the 18 outliers, leverage and influencing observations. A pooled OLS corrected for clusters is conducted using the same six models defined earlier. This analysis is also checked for extreme VIF values, but they are at a comparable and even slightly lower level than in the original analysis. An overview of the results of this analysis can be found in table 12.

The exclusion of the 18 observations has a large impact on the results, altering the effect for five factors and even the conclusion of three hypotheses. This large impact can be explained by the extreme values for especially the dependent variable. For example, the average of the 18 observations for GWILOSS is a factor 100 higher than the average of the 1.262 observations in the original sample. Also, leverage shows higher values than in the original sample. Lastly, the F-statistic in this model, calculating the predicting power of the model against the predicting power of the error in the model, is only half the value of the F-statistic of the original analysis. This means the error in the model explains a larger proportion of the effects than in the original analysis, possibly explaining different significant results.

Differences on the firm level are found for the effect of leverage. Although LEV was already negative in the original analysis, it became significant at a 5% level, supporting the claim of Sweeney (1994), DeFond and Jiambalvo (1994) and Zang (2008) to impair less when firms use more debt for financing their operations to increase the chance of meeting debt covenants. This refutes the argument of Elliott and Shaw (1988) stating that a closer review by credit providers will lead to more ‘honest’ impairments. In this analysis hypothesis 3b has to be accepted. Further, the effect of being in the consumer discretionary, consumer staples and health care industry group became more significant, to a 1% level. On the country level the significance for STREN and PROTEC stand out. This negative effect supports the theory of Leuz et al. (2003) and Dechow et al (2010), that firms try to hide bad performance more in strong capital markets as it is more important to gain favourable prices for financing. However, this does not affect hypothesis 5b as a positive effect was predicted.

Table 12 Robustness check by conducting pooled OLS corrected for clusters analysis on the original sample of 1.280 observation (without the exclusion of outliers)

Variable	Expected sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	?	-1.005.631***	-871.797,8***	-537.781,3***	-96.172,77	-534.900,9**	-180.048,8
		(-4,44)	(-4,15)	(-3,21)	(-0,33)	(-2,03)	(-0,68)
BIGBATH	(+)	235.218,5***	236.643,9***	237.063,3***	234.669,8***	238.767,1***	234.197,3***
		(4,34)	(4,33)	(4,39)	(4,40)	(4,35)	(4,41)
SMOOTH	(+)	-40.991,99**	-39.780,57**	-40.703,05**	-38.702,67**	-39.339,28**	-39.865,68**
		(-2,37)	(-2,28)	(-2,28)	(-2,18)	(-2,52)	(-2,38)
LEV	(±)	-162.102,6**	-165.893,3**	-160.059**	-170.746,9**	-155.502,6**	-168.447,6**
		(-1,97)	(2,01)	(-2,17)	(-2,30)	(-2,02)	(-2,24)
INDUSTRY1	(±)	-15.741,11	-15.738,47				
		(-0,30)	(-0,31)				
INDUSTRY2	(±)	-30.288,54	-30.402,18				
		(-0,79)	(-0,82)				
INDUSTRY3	(±)	-51.216,9	-49.890,66				
		(-1,32)	(-1,33)				
INDUSTRY5	(±)	90.914,04	92.892,69				
		(1,35)	(1,39)				
INDUSTRYNONFIN	(±)			-13.027,03	-11.866,37		
				(-0,33)	(-0,30)		
INDUSTRYNONCUS	(±)					70.018***	67.826,25***
						(3,19)	(3,13)
STREN	(+)	-6.551,823**		-10.786,8*		-1.406,773	
		(-2,28)		(-1,75)		(-0,27)	
PROTEC	(+)		-55.644,12*		-97.313,66**		-96.064,93**
			(-1,85)		(-2,27)		(-2,25)
ENFOR	(+)	2.003,782	7.402,891	7.361,163**	8.822,458***	3.367,415	9.129,415***
		(0,25)	(0,69)	(2,39)	(2,70)	(1,15)	(2,80)
POWER	(±)	-1.230,388	-1.918,877				
		(-0,58)	(-0,71)				
INDIV	(±)	4.632,709	1.334,401				
		(1,18)	(0,32)				
MASC	(±)	-203,35	-145,420				
		(-0,12)	(-0,08)				
UNCER	(±)			-2.292,154	-3.503,213**	-2.316,064*	-3.445,109**
				(-1,59)	(-2,20)	(-1,84)	(-2,12)
ORIENT	(±)			-2.295,18	-3.236,854		-3.166,197
				(-1,11)	(-1,56)		(-1,57)
INDUL	(±)				-3.183,067*	-2.931,874	-3.121,566*
					(-1,78)	(-1,00)	(-1,70)
SIZE	(+)	58.749,4***	59.051,37***	54.792,25***	55.050,52***	55.260***	54.681,79***
		(4,79)	(4,82)	(4,78)	(4,85)	(4,65)	(4,72)
ROE	(–)	-58,954	-41,556	-51,309	-47,770	-19,487	-25,092
		(-0,55)	(-0,41)	(-0,49)	(-0,48)	(-0,19)	(-0,26)
M/B	(–)	36,535	26,312	25,262	25,688	25,295	25,789
		(1,35)	(1,34)	(1,25)	(1,26)	(1,26)	(1,27)
YEAR1	(±)	40.933,16	37.873,68	5.061,66	3.845,522	5.034,588	4.238,193
		(1,08)	(0,95)	(0,15)	(0,11)	(0,15)	(0,13)
YEAR2	(±)	32.964,75	32.762,91				
		(0,82)	(0,81)				
YEAR3	(±)			-34.436,76	-33.992,55	-33.086,99	-33.773,87
				(-0,88)	(-0,86)	(-0,83)	(-0,86)
n		1.280	1.280	1.280	1.280	1.280	1.280
F-statistic		2,76	2,91	3,24	3,15	3,13	3,17
Adjusted R^2		0,164	0,165	0,156	0,162	0,158	0,165

Table 12 (continued)

Displayed the coefficients, between parenthesis the t-value of the coefficient, *** 1% significance, ** 5%, * 10%.

Model 1: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 STREN + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 2: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 3: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 SIZE + \beta_{10} ROE + \beta_{11} M/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 4: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 5: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONCUS + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 INDUL + \beta_9 SIZE + \beta_{10} ROE + \beta_{11} M/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 6: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONCUS + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; LEV = total liabilities in Euros/ total assets in Euros at time *t*; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS (1 representing energy, materials and utilities, 2 representing industrials, 3 representing consumer discretionary, consumer staples and health care, 4 representing financials and 5 representing information technology and telecommunication); INDUSTRYNONFIN = industry group representing all industries in the sample except financials to compare the effect with this group; INDUSTRYNONCUS = industry group representing all industries in the sample except consumer discretionary, consumer staples and health care to compare the effect with this group; STREN = value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); PROTEC = value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFOR = value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); POWER = value given to a particular country on the Power Distance dimension composed and updated by Hofstede et al. (2010); INDIV = value given to a particular country on the Individualism dimension composed and updated by Hofstede et al. (2010); MASC = value given to a particular country on the Masculinity dimension composed and updated by Hofstede et al. (2010); UNCER = value given to a particular country on the Uncertainty Avoidance dimension composed and updated by Hofstede et al. (2010); ORIENT = value given to a particular country on the Long Term Orientation dimension composed and updated by Hofstede et al. (2010); INDUL = value given to a particular country on the Indulgence dimension composed and updated by Hofstede et al. (2010); SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*; YEAR = year the observation is allocated to (1 representing 2012, 2 representing 2013 and 3 representing 2014).

A different conclusion can be drawn for hypothesis 6b and 7b. Enforcement displays an expected positive effect at 1% and 5% significance in three out of six models. Therefore, it can be argued that enforcement has a positive effect on the magnitude of goodwill impairment. The situation for the cultural aspects is more nuanced, as UNCER and INDUL are partially significant for a negative effect. Some cultural aspects have a negative effect on the magnitude of goodwill impairment, resulting in a partial acceptance of hypothesis 7b.

4.4.2 Winsorized variables

The second robustness check is also performed to test the exclusion of the 18 outlier observations by dealing with the extreme values in the sample in a different way. To do so, four variables in the original sample of 1.280 observation, are winsorized at a 1% level: GWILOSS, ROE, M/B and LEV, being the continuous variables of the analyses. SIZE is not winsorized, because this variable is already the natural logarithm of total assets.

Table 13 Robustness check by conducting pooled OLS corrected for clusters analysis with winsorized variables (GWILOSS, LEV, ROE and M/B) on the original 1.280 observation (as an alternative for the exclusion of outliers)

Variable	Expected sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	?	-492.634,2***	-437.426,6***	-299.899,5***	-119.444,3	-294.389,3***	-158.096,7
		(-6,22)	(-5,94)	(-4,02)	(-1,03)	(-2,78)	(-1,39)
BIGBATH	(+)	114.335,9***	114.819,1***	115.903,7***	114.239,8***	116.877,5***	114.592,4***
		(5,89)	(5,89)	(5,86)	(5,84)	(5,90)	(5,85)
SMOOTH	(+)	-30.840,03***	-29.929,74***	-30.584,69***	-29.333,81***	-30.354,9***	-30.144,04***
		(-3,65)	(-3,55)	(-3,47)	(-3,32)	(-3,59)	(-3,50)
wLEV	(±)	-73.875,89**	-76.496,03***	-74.004,83***	-80.348,39***	-72.570,24**	-78.753,93***
		(-2,52)	(-2,60)	(-2,63)	(-2,82)	(-2,49)	(-2,72)
INDUSTRY1	(±)	-3.866,09	-4.721,117				
		(-0,20)	(-0,24)				
INDUSTRY2	(±)	-15.200,49	-15.802				
		(-0,89)	(-0,94)				
INDUSTRY3	(±)	-24.742,3*	-24.556,5*				
		(-1,71)	(-1,71)				
INDUSTRY5	(±)	38.021,29	38.835,34*				
		(1,64)	(1,67)				
INDUSTRYNONFIN	(±)			-6.024,223	-5.569,768		
				(-0,40)	(-0,37)		
INDUSTRYNONCUS	(±)					32.767,59***	31.866,03***
						(3,47)	(3,36)
STREN	(+)	-3.206,629***		-4.541,974**		-806,286	
		(-2,79)		(-2,18)		(-0,42)	
PROTEC	(+)		-20.578,67**		-37.137,47**		-36.459,7**
			(-2,05)		(-2,49)		(-2,46)
ENFOR	(+)	-613,735	1.170,16	2.601,249**	2.940,204**	1.045,637	3.078,491***
		(-0,27)	(0,42)	(2,29)	(2,47)	(0,94)	(2,59)
POWER	(±)	-165,611	-299,421				
		(-0,28)	(-0,42)				
INDIV	(±)	2.613,109**	1.142,821				
		(2,10)	(0,99)				
MASC	(±)	1,098	120,965				
		(0,00)	(0,24)				
UNCER	(±)			-822,636*	-1.305,21**	-853,860*	-1.276,053**
				(-1,85)	(-2,44)	(-1,91)	(-2,37)
ORIENT	(±)			-848,146	-1.144,083		-1.111,712
				(-1,21)	(-1,64)		(-1,62)
INDUL	(±)				-1.412,887*	-1.243,863	-1.385,166*
					(-1,94)	(-1,13)	(-1,90)
SIZE	(+)	30.920,33***	31.164,36***	29.451***	29.641,15***	29.626,45***	29.390,73***
		(7,43)	(7,48)	(7,40)	(7,47)	(7,35)	(7,43)
wROE	(–)	-98,671	-92,073	-98,415	-120,839	-71,055	-91,916
		(-0,84)	(-0,78)	(-0,84)	(-1,06)	(-0,61)	(-0,81)
wM/B	(–)	20,845**	20,552**	20,207**	20,744**	20,058**	20,842**
		(2,40)	(2,34)	(2,20)	(2,23)	(2,20)	(2,26)
YEAR1	(±)	34.431,83***	33.811,54**	23.946,84*	23.590,56*	23.865,88*	23.684,58*
		(2,58)	(2,52)	(1,73)	(1,72)	(1,77)	(1,76)
YEAR2	(±)	8.689,941	8.706,126				
		(0,70)	(0,70)				
YEAR3	(±)			-9.185,262	-9.042,532	-8.706,547	-8.974,064
				(-0,75)	(-0,74)	(-0,71)	(-1,39)
n		1.280	1.280	1.280	1.280	1.280	1.280
F-statistic		5,41	5,48	6,40	6,05	6,46	6,13
Adjusted R^2		0,259	0,258	0,248	0,254	0,252	0,257

Table 13 (continued)

Displayed the coefficients, between parenthesis the t-value of the coefficient, *** 1% significance, ** 5%, * 10%.

Model 1: $wGWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 wLEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 STREN + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} wROE + \beta_{12} wM/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 2: $wGWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 wLEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} wROE + \beta_{12} wM/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 3: $wGWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 wLEV + \beta_4 INDUSTRYNONFIN + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 SIZE + \beta_{10} wROE + \beta_{11} wM/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 4: $wGWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 wLEV + \beta_4 INDUSTRYNONFIN + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} wROE + \beta_{12} wM/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 5: $wGWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 wLEV + \beta_4 INDUSTRYNONCUS + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 INDUL + \beta_9 SIZE + \beta_{10} wROE + \beta_{11} wM/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 6: $wGWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 wLEV + \beta_4 INDUSTRYNONCUS + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} wROE + \beta_{12} wM/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; wLEV = total liabilities in Euros/ total assets in Euros at time *t*, winsorized at 1%; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS (1 representing energy, materials and utilities, 2 representing industrials, 3 representing consumer discretionary, consumer staples and health care, 4 representing financials and 5 representing information technology and telecommunication); INDUSTRYNONFIN = industry group representing all industries in the sample except financials to compare the effect with this group; INDUSTRYNONCUS = industry group representing all industries in the sample except consumer discretionary, consumer staples and health care to compare the effect with this group; STREN = value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); PROTEC = value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFOR = value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); POWER = value given to a particular country on the Power Distance dimension composed and updated by Hofstede et al. (2010); INDIV = value given to a particular country on the Individualism dimension composed and updated by Hofstede et al. (2010); MASC = value given to a particular country on the Masculinity dimension composed and updated by Hofstede et al. (2010); UNCER = value given to a particular country on the Uncertainty Avoidance dimension composed and updated by Hofstede et al. (2010); ORIENT = value given to a particular country on the Long Term Orientation dimension composed and updated by Hofstede et al. (2010); INDUL = value given to a particular country on the Indulgence dimension composed and updated by Hofstede et al. (2010); SIZE = natural logarithm of total assets in Euros at time *t*; wROE = return on equity for year *t*, winsorized at 1%; wM/B = market value of equity divided by book value of equity as an average of the year *t*, winsorized at 1%; YEAR = year the observation is allocated to (1 representing 2012, 2 representing 2013 and 3 representing 2014).

The winsorize effect on GWILOSS and M/B are the most prevailing. In comparison to the original analysis, the mean for GWILOSS increased by almost 20.000, while its standard deviation is nearly twice the size (non-tabulated data). For M/B all negative values are adjusted. As a consequence of the high values in GWILOSS and the adjustment of extreme values of the continuous variables, other variables will more likely be significant as these extreme values no longer explain their predicting power. The results are therefore very similar to the first robustness check, except they are significant at higher levels.

Two aspects that are different from the first robustness check are the significance of INDIV and M/B. The first leads to the conclusion that more cultural aspects influence the magnitude of goodwill impairment, making the partial support for hypothesis 7b stronger. For M/B, significant at a 5% level, a higher ratio will cause more impairment, although the opposite was expected. The total results of this pooled OLS corrected for clusters are displayed in table 13.

Table 14 Robustness check by conducting pooled OLS corrected for clusters on the sample with the exclusion of observations with no goodwill impairment. Observations with the value 0 for the variable GWILOSS were excluded from the sample. Remaining 895 observations from the original 1,262 observation (367 observations excluded)

Variable	Expected sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	?	-376.432,6***	-369.162,9***	-265.697,8***	-244.197,1**	-321.979,2***	-264.886,2***
		(-6,13)	(-6,30)	(-4,00)	(-2,54)	(-3,35)	(-2,61)
BIGBATH	(+)	73.478,79***	73.795,33***	72.786,17***	72.938,77***	73.844,81***	73.381,7***
		(5,35)	(5,36)	(5,34)	(5,30)	(5,40)	(5,30)
SMOOTH	(+)	-29.293,64***	-29.148,51***	-30.438,24***	-29.905,08***	-29.770,08***	-30.072,45***
		(-3,26)	(-3,24)	(-3,25)	(-3,18)	(-3,18)	(-3,19)
LEV	(±)	-17.519,09	-17.446,26	-16.093,7	-16.083,2	-12.831,22	-15.701,8
		(-1,06)	(-1,07)	(-0,94)	(-0,94)	(-0,74)	(-0,90)
INDUSTRY1	(±)	-8.644,765	-8.680,71				
		(-0,55)	(-0,55)				
INDUSTRY2	(±)	45,033	-65,363				
		(0,00)	(-0,00)				
INDUSTRY3	(±)	-13.465,63	-13.033,58				
		(-1,01)	(-0,98)				
INDUSTRY5	(±)	16.038,24	16.663,44				
		(1,02)	(1,06)				
INDUSTRYNONFIN	(±)			-5.132,557	-4.629,186		
				(-0,39)	(-0,35)		
INDUSTRYNONCUS	(±)					16.196,65**	15.695,09**
						(2,07)	(2,00)
STREN	(+)	-960,762		-1.811,036		-981,131	
		(-1,05)		(-1,15)		(-0,59)	
PROTEC	(+)		-302,447		-7.957,567		-7.717,766
			(-0,04)		(-0,67)		(-0,66)
ENFOR	(+)	425,026	155,024	1.103,891	881,626	808,607	945,225
		(0,24)	(0,07)	(1,16)	(0,81)	(0,75)	(0,87)
POWER	(±)	-489,451	-338,758				
		(-1,11)	(-0,63)				
INDIV	(±)	1.053,46	760,605				
		(1,19)	(0,82)				
MASC	(±)	-276,644	-157,111				
		(-0,81)	(-0,45)				
UNCER	(±)			-694,125*	-655,660	-606,521	-655,007
				(-1,91)	(-1,50)	(-1,60)	(-1,50)
ORIENT	(±)			-518,065	-426,704		-403,769
				(-0,91)	(-0,73)		(-0,69)
INDUL	(±)				-321,709	64,804	-325,646
					(-0,52)	(0,07)	(-0,53)
SIZE	(+)	26.926,6***	27.039,92***	26.022,26***	26.136,72***	25.995,77***	26.162,05***
		(8,59)	(8,59)	(8,80)	(8,68)	(8,30)	(8,31)
ROE	(–)	-59,314	-48,622	-46,293	-40,980	-45,894	-38,240
		(-1,08)	(-0,87)	(-0,82)	(-0,71)	(-0,82)	(-0,68)
M/B	(–)	4,253	4,011	3,746	3,763	3,957	3,808
		(1,54)	(1,45)	(1,33)	(1,32)	(1,44)	(1,35)
YEAR1	(±)	1.053,368	853,841	1.021,903	514,769	1.404,237	908,225
		(0,10)	(0,08)	(0,10)	(0,05)	(0,13)	(0,09)
YEAR2	(±)	-13.368,56	-13.462,14	-12.504,03	-12.613,91	-12.807,99	-12.634,88
		(-1,32)	(-1,33)	(-1,25)	(-1,27)	(-1,28)	(-1,27)
n		895	895	895	895	895	895
F-statistic		5,96	5,92	7,25	6,86	6,64	6,21
Adjusted R^2		0,256	0,255	0,251	0,251	0,252	0,253

Table 14 (continued)

Displayed the coefficients, between parenthesis the t-value of the coefficient, *** 1% significance, ** 5%, * 10%.

Model 1: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 STREN + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 2: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 POWER + \beta_8 INDIV + \beta_9 MASC + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 3: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 SIZE + \beta_{10} ROE + \beta_{11} M/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 4: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

Model 5: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONCUS + \beta_5 STREN + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 INDUL + \beta_9 SIZE + \beta_{10} ROE + \beta_{11} M/B + \sum_i \beta_{12} YEAR_i + \varepsilon$

Model 6: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONCUS + \beta_5 PROTEC + \beta_6 ENFOR + \beta_7 UNCER + \beta_8 ORIENT + \beta_9 INDUL + \beta_{10} SIZE + \beta_{11} ROE + \beta_{12} M/B + \sum_i \beta_{13} YEAR_i + \varepsilon$

BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; LEV = total liabilities in Euros/ total assets in Euros at time *t*; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS (1 representing energy, materials and utilities, 2 representing industrials, 3 representing consumer discretionary, consumer staples and health care, 4 representing financials and 5 representing information technology and telecommunication); INDUSTRYNONFIN = industry group representing all industries in the sample except financials to compare the effect with this group; INDUSTRYNONCUS = industry group representing all industries in the sample except consumer discretionary, consumer staples and health care to compare the effect with this group; STREN = value given to a particular country on the importance of equity markets index as a mean rank across three variables derived from La Porta et al. (1997); PROTEC = value given to a particular country on the corrected anti-director right index as an aggregate measure of minority shareholder rights indices derived from Spamann (2010); ENFOR = value given to a particular country on the summation index (AETOTAL) from two proxies measuring the activities of auditors and independent enforcement bodies by Brown et al. (2014); POWER = value given to a particular country on the Power Distance dimension composed and updated by Hofstede et al. (2010); INDIV = value given to a particular country on the Individualism dimension composed and updated by Hofstede et al. (2010); MASC = value given to a particular country on the Masculinity dimension composed and updated by Hofstede et al. (2010); UNCER = value given to a particular country on the Uncertainty Avoidance dimension composed and updated by Hofstede et al. (2010); ORIENT = value given to a particular country on the Long Term Orientation dimension composed and updated by Hofstede et al. (2010); INDUL = value given to a particular country on the Indulgence dimension composed and updated by Hofstede et al. (2010); SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*; YEAR = year the observation is allocated to (1 representing 2012, 2 representing 2013 and 3 representing 2014).

4.4.3 Exclusion of no impairment

Next, the exclusion restriction used by Giner and Pardo (2015) is reproduced to check for differences with the original analysis. They exclude the value 0 from GWILOSS when analysing the influence of multiple factors on the magnitude of goodwill impairment. They argue that the effect on the magnitude can only be measured after firms have decided to actually do an impairment. To perform this analysis, all observations with a value of 0 for GWILOSS were dropped from the sample used in the original OLS. 367 observations were eliminated, leading to a sample of 895 observations.

The results, displayed in table 14 above, are similar to the original OLS. BIGBATH, SMOOTH and SIZE are still significant at a 1% level and UNCER is only significant at a 10% level in one out of four models where the variable is included. This effect is too weak to state that uncertainty avoidance has an effect on the magnitude of goodwill impairment. The only differences with the original OLS are that operating in the consumer discretionary, consumer

staples and health care industry became more significant (from a 10% to a 5% level) and that the year of the observation did not matter anymore.

4.4.4 Country dummies

Lastly, the country effect as a whole is tested for its influence on the goodwill impairment tool. By this way it is possible to check if countries with a high or low score on a particular country characteristic, score also high or low on goodwill impairment as a country. The pooled OLS corrected for clusters analysis is reproduced using country dummies and variables representing groups of countries. The groups of countries are based on the legal origin of the company law or commercial code of a particular country (La Porta et al., 1998). Reynolds and Flores (1989) identified four possible origins, being either German, French, English or Scandinavian, which were afterwards allocated to several countries by La Porta et al. (1998).

When comparing the individual countries, the United Kingdom and France function in turns as the baseline category to compare the effect of the other countries against these two. They are chosen as they are the two largest countries, resulting in better comparisons (Field, 2009) and because they differ a lot regarding their country characteristics. When comparing country groups based on legal origins a similar argumentation is followed and the English and French origins are used as baseline categories in turns. This resulted in four models, where the different ways of measuring industry are applied as well. These models are tested for high levels of multicollinearity, but all four models have no VIF values higher than two.

The results, depicted in table 15, are similar to the original OLS analysis for the firm level, industry level and control variables. Big bath and smoothing are significant at a 1% level, while smoothing again shows a negative effect. The consumer discretionary, consumer staples and health care industry groups seems to have a negative effect on the magnitude of goodwill impairment and the control variables SIZE still is significant at 1%. Regarding the country level effect, some countries show significant results. Although Ireland, Greece and Portugal are significant at 5% and 1% levels, they consist of low amounts of observations. In fact, these three countries consist of the lowest amounts among the sample. This is probably the reason for the significant results and therefore not representative. However, also the Netherlands show a significant difference when compared to impairment in the United Kingdom. As the Netherlands hold 51 observations, it is possible to conclude that the Netherlands impair significantly less goodwill than companies in the United Kingdom. Remarking that the difference in observations is still large, this has to be taken into account when formulating conclusions.

Table 15 Robustness check by conducting pooled OLS corrected for clusters with the use of country dummies in contrast to the previous used country characteristics on the original sample of 1.262 observations

Variable	Expected sign	Model 1	Model 2	Model 3	Model 4
Constant	?	-220.529,7***	-231.669,9***	-233.215,9***	-233.977,8***
		(-7,29)	(-6,99)	(-6,63)	(-6,75)
BIGBATH	(+)	59.642,46***	59.692,85***	60.873,97***	60.720,42***
		(5,21)	(5,21)	(5,28)	(5,29)
SMOOTH	(+)	-25.827,97***	-25.234,18***	-24.218,39***	-25.036,17***
		(-4,13)	(-4,07)	(-3,89)	(-3,97)
LEV	(±)	-14.295,83	-10.500,55	-8.667,054	-12.908,78
		(-1,24)	(-0,91)	(-0,76)	(-1,15)
INDUSTRY1	(±)	-11.628,03			-12.032,68
		(-0,91)			(-0,96)
INDUSTRY2	(±)	-9.603,761			-8.711,131
		(-0,68)			(-0,66)
INDUSTRY3	(±)	-13.199,35			-12.691
		(-1,29)			(-1,30)
INDUSTRY5	(±)	6.342,337			7.101,863
		(0,60)			(0,70)
INDUSTRYNONFIN	(±)		-8.635,025		
			(-0,85)		
INDUSTRYNONCUS	(±)			10.371,37*	
				(1,77)	
AUSTRIA	(+)	-22.030,61	-11.676,67		
		(-1,21)	(-0,67)		
BELGIUM	(+)	-10,906,88	58,229		
		(-0,66)	(0,00)		
DENMARK	(+)	20.313,88	34.832,58		
		(0,56)	(0,94)		
FINLAND	(±)	20.241,67	33.832,97		
		(0,80)	(1,32)		
FRANCE	(±)	-12.742,19			
		(-1,19)			
GERMANY	(±)	-8.719,061	3.164,921		
		(-0,92)	(0,28)		
GREECE	(±)	-68.272,03***	-57.742,25***		
		(-2,96)	(-2,75)		
IRELAND	(±)	-18.825,58**	-10.629		
		(-2,47)	(-1,30)		
ITALY	(±)	-9.598,241	735,127		
		(-0,44)	(0,03)		
NETHERLANDS	(±)	-29.127,31**	-14.770,97		
		(-2,13)	(-1,13)		
PORTUGAL	(±)	-47.276,33**	-38.271,93**		
		(-2,51)	(-2,09)		
SPAIN	(±)	-20.363,03	-9.422,359		
		(-0,77)	(-0,37)		
SWEDEN	(±)	-5.743,52	8.282,494		
		(-0,38)	(0,56)		
UNITED KINGDOM	(±)		11.738,28		
			(1,10)		

Table 15 (continued)

Variable	Expected sign	Model 1	Model 2	Model 3	Model 4
GERMANORIGIN	(±)			-11.456,26	4.774,636
				(-1,25)	(0,50)
FRANCEORIGIN	(±)			-15.779,34	
				(-1,57)	
ENGLISHORIGIN	(±)				15.994,3
					(1,59)
SCANDIORIGIN	(±)			8.424,571	23.241,11*
				(0,60)	(1,74)
SIZE	(+)	19.660,05***	18.941,59***	18.720,82***	19.313,24***
		(7,59)	(7,75)	(7,55)	(7,74)
ROE	(–)	-3,201	-4,580	12,700	10,399
		(-0,11)	(-0,16)	(0,46)	(0,73)
M/B	(–)	2,484	2,483	2,428	2,375
		(0,96)	(0,95)	(0,93)	(0,91)
YEAR1	(±)	6.005,305	13.096,83*	13.836,89*	6.300,26
		(0,80)	(1,72)	(1,81)	(0,83)
YEAR2	(±)	-7.666,33			-7.491,398
		(-1,05)			(-1,03)
YEAR3	(±)		7.992,762	7.663,594	
			(1,09)	(1,05)	
n		1.262	1.262	1.262	1.262
F-statistic		4,59	4,94	6,83	5,93
Adjusted R^2		0,209	0,207	0,203	0,205

Displayed the coefficients, between parenthesis the t-value of the coefficient, *** 1% significance, ** 5%, * 10%.

Model 1: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \sum_i \beta_5 COUNTRY_i + \beta_6 SIZE + \beta_7 ROE + \beta_8 M/B + \sum_i \beta_9 YEAR_i + \varepsilon$

Model 2: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \sum_i \beta_4 INDUSTRY_i + \sum_i \beta_5 COUNTRY_i + \beta_6 SIZE + \beta_7 ROE + \beta_8 M/B + \sum_i \beta_9 YEAR_i + \varepsilon$

Model 3: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 GERMANORIGIN + \beta_6 FRANCEORIGIN + \beta_7 SCANDIORIGIN + \beta_8 SIZE + \beta_9 ROE + \beta_{10} M/B + \sum_i \beta_{11} YEAR_i + \varepsilon$

Model 4: $GWILOSS = \beta_0 + \beta_1 BIGBATH + \beta_2 SMOOTH + \beta_3 LEV + \beta_4 INDUSTRYNONFIN + \beta_5 GERMANORIGIN + \beta_6 ENGHLISHORIGIN + \beta_7 SCANDIORIGIN + \beta_8 SIZE + \beta_9 ROE + \beta_{10} M/B + \sum_i \beta_{11} YEAR_i + \varepsilon$

BIGBATH = indicator variable taking a value of 1 if pre-impairment earnings are negative at time *t* and lower than pre-impairment earnings at *t*-1, and 0 otherwise; SMOOTH = indicator variable taking a value of 1 if pre-impairment earnings are positive at time *t* and higher than pre-impairment earnings at *t*-1, and 0 otherwise; LEV = total liabilities in Euros/ total assets in Euros at time *t*; INDUSTRY = industry a firm operates in a particular year categorized in one out of five manually composed categories based on matching sectors from the GICS (1 representing energy, materials and utilities, 2 representing industrials, 3 representing consumer discretionary, consumer staples and health care, 4 representing financials and 5 representing information technology and telecommunication); INDUSTRYNONFIN = industry group representing all industries in the sample except financials to compare the effect with this group; INDUSTRYNONCUS = industry group representing all industries in the sample except consumer discretionary, consumer staples and health care to compare the effect with this group; COUNTRY = country where a firm is on the stock exchange; GERMANORIGIN = group of countries with a German legal origin (Austria and Germany) where a firms is on the stock exchange; FRANCEORIGIN = group of countries with a French legal origin (Belgium, France, Greece, Italy, the Netherlands, Portugal and Spain) where a firms is on the stock exchange; ENGLISHORIGIN = group of countries with a English legal origin (Ireland and the United Kingdom) where a firms is on the stock exchange; SCANDIORIGIN = group of countries with a Scandinavian legal origin (Denmark, Finland and Sweden) where a firms is on the stock exchange; SIZE = natural logarithm of total assets in Euros at time *t*; ROE = return on equity for year *t*; M/B = market value of equity divided by book value of equity as an average of the year *t*; YEAR = year the observation is allocated to (1 representing 2012, 2 representing 2013 and 3 representing 2014).

More interesting is the weak significant positive effect of countries with a Scandinavian legal origin when compared to their English counterparts. As these groups consist of more observations than in the country level, more reliable conclusions can be formulated. However, it should be taken into account that the Scandinavian group also consists of less observations and that the individual Scandinavian countries do not show a significant effect when compared to impairment in the United Kingdom. This could be caused by other countries in the English origin group besides the United Kingdom itself.

5. Conclusion

The change of the most prominent accounting standards from a goodwill amortization regime to a system of impairment was the origin of numerous discussion in literature (e.g. Johnson & Petrone, 1998; Bugeja & Gallery, 2006; Chalmers et al., 2011). On the one hand, there is consensus on the shortcomings of the questioned concept of goodwill amortization. Empirical research shows it lacks relevance (Henning et al., 2000) as it has difficulties to produce useful information. In that sense, an opportunistic decision has to be made to determine the useful life of goodwill (Henning & Shaw, 2003) and even if this is reasonably determinable, a fixed yearly deduction of goodwill will not be representative for the value of the underlying component (Wiese, 2005). However, the method of goodwill impairment, which is prescribed by the most important standards at this moment, is questionable as well. Although it represents the underlying economic situation of a company in a better way, being based on fair value measurements (Chalmers et al., 2011; Glazer, 2002), it creates new opportunities to manage earnings (Morricone et al., 2009; Giner & Pardo, 2015).

To know what influences the impairment of goodwill is crucial to stakeholders of the firm. To investors it can be an indication which firms are more likely to depict their financial figures in a more transparent and fair way, creating opportunities to determine if they are good investment opportunities. For policy makers and standard setters on the other hand, it is useful to know why some firms act in more opportunistic ways. It enables them to create regulation for firms with riskier characteristics, that are operating in particular industries or to anticipate on cultural aspects that cause opportunistic use of the goodwill impairment tool.

As Giner and Pardo (2015) found several factors that influenced the use of the goodwill impairment tool for Spanish listed firms, this research tries to verify and extend their results in a European setting. The big bath and smoothing strategy used by firms and the level they are leveraged for financing their activities are factors that are tested on a firm level. Furthermore, industry and difference between countries regarding their capital market, enforcement and culture are examined. In order to test these factors for their influence on the use of goodwill impairment, the effect on the decision to impair, as well as the effect on the magnitude of the impairment is taken into account.

Based on a sample consisting of 1.262 observations divided over 760 unique firms covering a period from 2012 to 2014 these seven factors are investigated for the effect on goodwill impairment. A pooled logit corrected for cluster analysis was used to test the influence on the decision of a firm to do an impairment. By using six different models, it is possible to

argue that the big bath and smoothing strategy are influencing this decision. However, smoothing does not lead to make firms decide to use of goodwill impairment more often as Giner and Pardo (2015) argue, but instead lower the likelihood of an impairment. The leverage of a firms seems to have no impact. For industry, operating in the financial sector did have a negative effect on the decision to impair or not, probably due to the less tangible and verifiable activities in this sector. Furthermore, a strong capital market leads to more impairment, while legal enforcement is not influencing this decision. Lastly, some cultural aspects are of influence, like power distance and the uncertainty avoidance of the people in a country.

The influence of the factors on the magnitude of goodwill impairment is less decisive, as the data seems to be sensitive to the way of dealing with extreme values in the sample. In general, for big bath and smoothing the same effect as in the logit were found. Further, leverage seems to have an effect on the magnitude of goodwill impairments. Although it cannot be proven by all analyses, there is a strong indication of a negative effect. This means that it supports the argumentation of Sweeney (1994), DeFond and Jiambalvo (1994) and Zang (2008). They state that firms, when using more debt for financing their operations and thereby increasing their chance of meeting debt covenants, impair less goodwill. On the industry level, not the financial sector, but the consumer discretionary, consumer staples and health care industry group is supported for its negative effect on the amount of goodwill impairment.

The strength of capital markets and legal enforcement show varying results regarding the different analyses. However, there is in indication that weaker capital markets and stronger national enforcement can lead to more impairment, although these results are not always significant. Culture shows some weaker effects only. Uncertainty avoidance and indulgence are associated with a decrease in the amount of goodwill impairment. Lastly, the strong effect of the size of a firm on the use goodwill impairment tool stands out. Larger firms have more resources to comply with the complex requirements and assessments that need to be done, leading to larger amounts of impairment.

Examining factors on different levels for their influence on goodwill impairment on a scale as in this research, initiates a new area of goodwill impairment literature. Its exploring character and the first results open multiple possibilities for further research. First of all, the influence of bonuses on goodwill impairment could be interesting to add as a possible factor. Many studies (e.g. Masters-Stout, Costigan & Lovata, 2008; Zang, 2008; Ramanna & Watts, 2012) show that goodwill impairment is indeed influenced by management incentives. Healy (1985) shows that managers use accruals, like goodwill, to maximize bonuses, especially when earnings are high. It could be interesting to see if this effect is also found outside the bonus

oriented environment of the United States, where most of the previous research is conducted. Especially the integration of bonuses in a comprehensive research like this would add to the understanding of the use of goodwill impairment. However, the information of compensation plans for management outside the US is limited available and would require an in-depth investigation of multiple firms to acquire the information for a European scaled study.

Furthermore, a higher amount of firms with data on goodwill impairment will enhance the robustness and generalizability of results in a similar research. This would also require a more in-depth analysis of firms and their goodwill policies. In total it would benefit the understanding and creation of a comprehensive overview of influencing factors of goodwill impairment. Finally, with the use of more country level information and the addition of other European countries the robustness and generalizability of the results would be further increased, especially for variables that showed varying results like culture, strength of capital markets and enforcement.

To conclude, we now know that following a big bath strategy and the size of the firm have a positive influence on goodwill impairment, while smoothing and operating in the financials and the consumer discretionary, consumer staples and health care industry have a negative effect. Furthermore, a strong indication exists that leverage, strength of capital markets, legal enforcement and some cultural aspects, like power distance, uncertainty avoidance and indulgence have an effect on the way we deal with goodwill impairment. Now it is up to society to put these handles to use.

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