The value relevance of goodwill accounting for Europe between 2005 and 2018

Abstract

With a sample of 3695 firm-year observations, taken from firms listed on the European stock markets from 2005 to 2018, this paper examines the value relevance of goodwill accounting under IFRS 3 and IAS 36. Multivariate ordinary least squared regressions show a positive relationship between reported goodwill and market value and a negative relationship between goodwill impairments and market value. Therefore, this paper concludes that investors do account for goodwill numbers in their firm valuations. Further tests for individual countries show differences in value relevance of goodwill impairments. This paper adds further evidence in support of goodwill impairment testing. Furthermore, the long-term value relevance is confirmed by testing a larger period than previous studies.

Bachelor Thesis Financial Accounting

Economics & Business Economics

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Date: 20-07-2020

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1 Introduction

In March of 2020, the International Accounting Standards Board (IASB) published a discussion paper on IFRS 3 and IAS 36 (IASB, 2020). The reason for this discussion paper was a post-implementation review of IFRS 3 (IASB, 2015). In this review users, regulators and preparers of financial statements could give their feedback on the IASB's rules concerning accounting for goodwill. There still seems to be a demand for the amortisation of goodwill instead of a yearly impairment test (IASB, 2015). The supporters of amortization of goodwill believe that acquired goodwill is replaced over time by internally generated goodwill and thus, should be amortized over its economic life. In the discussion paper the IASB reiterated that there is no possibility for the reintroduction of goodwill amortisation since the impairment test is significantly the most informative way to account for goodwill (IASB, 2020). To investigate IASB's claim, I propose the following research question:

What is the value relevance of goodwill accounting for listed firms in the European markets?

To answer this research question, it is important to understand the current situation of goodwill accounting. Goodwill accounting is currently regulated through IFRS 3 and IAS 36. IFRS 3 concerns the recognition and measurement of acquired assets and liabilities (IASB, 2018). With the recognition of assets and liabilities the acquired goodwill can be calculated. The goal of the IASB with IFRS 3 is to enhance the relevance, reliability and comparability of the information firms provide about business combinations and the effects they have on the firm. Following the recognition of goodwill an impairment test must be carried out on a yearly basis (IASB, 2013). The impairment test for goodwill is elaborated in IAS 36 – Impairment of Assets. To better understand current rules and regulations and possible alternatives the following sub-questions are proposed:

1. *How is goodwill accounted for under IFRS 3?*
2. *How is the impairment test for goodwill set up under IAS 36?*
3. *How is goodwill accounted for under an amortization schedule?*

An issue arising from goodwill accounting under IFRS 3 and IAS 36 is that it largely relies on the fair value estimates of the acquired cash-generating units (Hamberg & Beisland, 2014). These estimates are under managements discretion. Investors also shared this concern in the post-

implementation review. They believe IFRS 3 and IAS 36 involve significant judgements for both allocating goodwill to cash-generating units and for assumptions used in the value-in-use calculations of cash-generating units (IASB, 2015). A research by Ramanna and Watts found evidence on the use of unverifiable estimates in goodwill impairment testing (Ramanna & Watts, 2012). According to agency-theory managers might use unverifiable discretion while performing impairment testing. Ramanna and Watts found some evidence for this in a sample of firms with market indications for goodwill impairment. Even tough these firms should have recorded an impairment loss, through managerial discretion no loss was recorded. However, even with the different opinions on the nature of acquired goodwill and the uncertainties concerning managements discretion in impairment testing there are investors who see more value in information obtained through the impairment testing of goodwill (IASB, 2015).

The value relevance of goodwill has been researched on multiple occasions. In the UK empirical tests revealed a significant negative relationship between goodwill impairment losses and market value (AbuGhazaleh, Al-Hares & Haddad, 2012). These results suggest that investors do believe impairment losses reliably measure a decline in the value of goodwill. A paper on the value relevance of goodwill accounting in the Swedish market show that prior to the adoption of IFRS 3 goodwill amortizations were not value relevant (Hamberg & Beisland, 2014). Under SFAS 142 a similar approach as IFRS 3 and IAS 36 is set for goodwill accounting. Xu and colleagues found that in this case goodwill impairment losses are also viewed negatively by investors (Xu, Anandarajan & Curatola, 2011). They conclude thereby that goodwill impairment charges do convey value relevant information to investors.

With this background the following sub-questions are proposed:

4. *What is the value relevance of accounting information?*
5. *What is the value relevance of goodwill accounting information?*
6. *What is the relationship between goodwill accounting and the market value of listed firms in European markets between 2005 and 2018?*

The final sub-questions will be answered through an empirical study. In this study listed firms from the European markets will be analyzed for the period of 2005 through 2018. Regressions

based on the Ohlson-model are used to find the association between goodwill accounting numbers and market value (Ohlson, 1995). The R^2 of the models are used to reflect the value-relevance of accounting numbers.

This paper will be a valuable addition to existing literature regarding the value relevance of goodwill in two ways. First, according to the post-implementation review there still seems to be support for the amortization of goodwill (IASB, 2015). The supporters of goodwill amortization are not yet convinced that, under the current regulations, goodwill numbers provide more useful information to investors than under an amortization schedule. With this paper I would like to add evidence in support of the IASB's claim that impairment testing is the most effective option for goodwill accounting. Second, there has been a lot of research about the value-relevance of goodwill accounting in many different countries. This paper will add to the collection of papers by looking at the European market and discuss possible differences between countries.

The paper is structured as follows. The next section provides some theoretical background to better understand the subjects that are being examined. It will also provide answers to sub-questions one through four. Chapter 3 contains a literature review on the relevance of goodwill to answer sub-question four. Chapter 3 will also propose hypotheses needed for the empirical study. The methodology for the empirical study is described in chapter 4. Chapter 5 contains the data and sample selection. The main results are provided and discussed in chapter 6. Finally, in chapter 7 the findings are summarized and discussed.

2 Theoretical Background

In this section I describe background theory concerning the accounting for goodwill and value relevance of accounting information. First, current regulations will be discussed. Then a short explanation is given on goodwill amortization since this is the preferred alternative to impairment testing for goodwill. Finally, the value-relevance of accounting information in general is discussed. This section will provide answers to sub-questions one through four.

2.1 Goodwill accounting under IFRS 3 – Business Combinations

The accounting principles for goodwill are described by the IASB under IFRS 3 – Business Combinations (IASB, 2018). IFRS 3 – Business Combinations describes the accounting procedures when an acquirer gains control of a business through, for example, an acquisition or merger. These acquisitions are accounted for with the acquisition method, meaning assets and liabilities acquired must be measured at their fair value at the date of acquisition.

The acquirer has the option to pay more than the net fair value of assets, in which case goodwill must be recognized. This might be the case when an acquirer is willing to pay more for the value of a company's brand name, good customer relations and other intangible assets. Goodwill is more precisely measured as the difference between the purchase price and the sum of the net fair value of all the assets purchased in the acquisition and the liabilities assumed in the process of acquisition. This can be defined as the following equation:

Goodwill = Fair value of consideration transferred + Amount of non-controlling interest + Fair value of previous equity interests – Net assets recognized

Goodwill that is recognized must be allocated to the specific cash-generating unit (CGU) that is acquired. A CGU is defined as the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or group of assets (IFRS, 2020). This definition is of importance in IAS 36 – Impairment of Assets.

If the outcome of above equation is negative, there is a gain also known as a bargain purchase or negative goodwill. This is possible if the selling party is not doing well and has no option but to unload their assets for less than the fair values.

2.2 Impairment testing for goodwill under IAS 36 – Impairment of Assets

The main objective of IAS 36 – Impairment of Assets is to ensure that assets are carried at no more than their recoverable amount (IASB, 2013). The secondary objective is to define how the recoverable amount is determined. IAS 36 applies to assets such as land, buildings, machinery, and goodwill. Entities are required to conduct an impairment test for these assets where there is an indication of impairment. In the case of goodwill and some other intangible assets an annual impairment test is required. Impairment tests are conducted for specific assets or CGU's where the asset itself does not generate cash inflows independently.

As stated before, goodwill must be allocated to the acquired CGU. Every CGU to which goodwill has been allocated must be tested annually for impairment. The impairment test compares the carrying amount of the unit and the allocated goodwill with the recoverable amount of the CGU. The carrying amount of a CGU is the amount at which the CGU is recognized in the balance sheet. The recoverable amount depends on the choice of valuation. Entities can choose to value a CGU at fair value, which is the price that would be received if the CGU would be sold in the market at the measurement date. The other option is to use value-in-use calculations. In this case an entity will calculate the present value of the future cash flows expected to be earned with the CGU. In this calculation multiple assumptions are used by upper management. Future cash flows are calculated with forecasts using growth factors. The cash flows are then discounted with discount rates dependent on an entity's own cost of capital, an entity's incremental borrowing rate and other market borrowing rates. If the recoverable amount is less than the carrying value of the unit an impairment loss must be recognized by the entity. The impairment loss is first allocated to the goodwill of the CGU and any excess is allocated to the underlying assets of the CGU.

2.3 Goodwill amortization

Under an amortization schedule the cost of acquired goodwill is first recognized as an asset. This asset is then amortized over the economic life on a linear basis. The maximum amount of years of economic life can differ between countries and regulations. However, the notion of a maximum requirement on the economic life of goodwill reflects the view that goodwill does not have an indefinite life and will at some point stop benefiting the acquirer (Jennings, LeClere & Thompson,

2001). Over time this method became less favorable because of a shift from manufacturing to more knowledge-based activities. Goodwill also became a much larger part of the acquisition price over time, in some cases even more than two-thirds of the acquisition price (Ayers, Lefanowicz & Robinson, 2000). Overall preparers of financial statements believed goodwill was written off too soon relative to its actual economic life and goodwill amortization could potentially reduce reported earnings too much (Jennings, LeClere & Thompson, 2001).

Many critics of the current regulations believe the impairment test relies too much on managers discretion and annual amortization of goodwill is therefore the better option as stated in the introduction (IASB, 2015).

2.4 Value-relevance of accounting information

The value-relevance of accounting information can be described as the ability of accounting information to summarize the information underlying stock prices (Sami & Zhou, 2004). Value-relevance is commonly researched by comparing the R^2 of models that show the relationship between a certain accounting number and the firms share price. The R^2, or explanatory power of a model, is often viewed as a reflection of value-relevance (Dontoh, Radhakrishnan & Ronen, 2004).

According to Barth and colleagues value relevance studies are designed to provide evidence to accounting standard setters that can update their beliefs about how accounting numbers are reflected in share prices (Barth et al., 2001). Barth et al. (2001) offers a response to a previous paper on value-relevance by Holthausen and Watts (2001).

Holthausen and Watts (2001) conclude that, while there are many value relevance papers, their contribution to standard setting is modest. The major reason for this is that these papers do not try to evolve a descriptive theory of accounting and standard setting (Holthausen & Watts, 2001). Value relevance papers find correlations between certain accounting numbers and equity values and show that some numbers are more correlated than others. However, according to Holthausen and Watts (2001) it is too difficult to derive standard setting inferences from these papers due to a lack of descriptive theories.

In contrast to Holthausen and Watts (2001) Barth et al. (2001) find, through a literature study, that value-relevance papers do provide insight for standard setters. They focus mostly on the subset of research related to value-relevance of fair value accounting. They first discuss the hypotheses that are tested in value-relevance research. They then explain how results on these hypotheses provide answers to questions, concerning the usefulness of accounting information, that are of interest to standard setters. The underlying theory is that standard setters usually focus on two criteria when choosing among different accounting alternatives; relevance and reliability (Barth et al., 2001). The IASB states that accounting information is relevant if it can make a difference to the decisions made by users of financial statements (IFRS, 2018). Accounting information is reliable if it portrays what it is supposed to portray (Barth et al., 2001). Tests of value relevance are only an approach to conceptualizing the criteria used by standard setters. An accounting number can be called value relevant if it reflects information that investors deem relevant in valuing the firm and if it can be measured reliably enough to be reflected in share prices (Barth et al., 2001). Barth and colleagues do note that value relevance studies are designed to test whether an accounting number reflects information that investors use in valuing firm's equity, not to estimate the actual firm value (Barth et al., 2001).

2.5 The evolution of the value-relevance of accounting information

There have been a number of studies that have examined the longitudinal changes in the information content of certain accounting number to users of financial statements (Collins et al., 1997; Dontoh et al., 2004; Francis & Schipper, 1999; Givoly et al., 2017). Overall, these studies find a decrease in the value-relevance of accounting numbers over time.

Dontoh and colleagues (2004) assign this decline in value-relevance to a shift in the market from a more traditional capital-intensive economy to a more technology, service-oriented economy. They find that the decline is also driven by a rise in non-information-based (NIB) trading activity. As NIB-trading increases the R^2 of the value-relevance models declines meaning the accounting numbers become less informative in explaining stock prices (Dontoh, Radhakrishnan & Ronen, 2004).

In a study on the association between accounting numbers and bond valuations Givoly and colleagues (2017) find that in the case of debt holders the information content of accounting information has increased over time. In the case of equity holders however, they show a decline in information content. Their explanation for the decline in information content for equity holders is the accounting treatment of intangibles and, more importantly, the rise in use of fair values instead of historical costs (Givoly et al., 2017).

The differences between fair value accounting and historical cost accounting has also been examined by McInnis and colleagues (2018). They compare the value-relevance of banks' financial statements under GAAP with the financial statements based on fair value accounting. In their paper they conclude that fair value accounting does not produce significantly more useful financial statements. They find that income under fair value accounting is less value-relevant than GAAP income. In the case of equity, they do not find a difference in value-relevance between the two standards. One of the reasons they give for this decline in value-relevance is the high possibility of measurement errors in fair value estimates (McInnis, Yu & Yust, 2018).

2.6 Country-specific factors related to the value relevance of accounting information

The value relevance of accounting information seems to be dependent on country-specific factors (Ali & Hwang, 2000). Ali and Hwang used data from manufacturing firms from 16 different countries for the period 1986-1995. In their research they consider five country-specific factors.

First, they find that value relevance is lower for countries with a more bank-oriented market as opposed to a market-oriented market. In these countries, banks are the biggest suppliers of the capital needs of business and there is less need for other types of investors. Banks, in most cases, do have direct access to companies' financial information. These countries therefore have less need for published value-relevant accounting information (Ali & Hwang, 2000).

Second, Ali and Hwang (2000) discuss the standard-setting process. In some countries private-sector bodies are less involved in the standard-setting process. The value-relevance of accounting information is lower for these countries. The reasoning behind this is that government standard setters try to satisfy regulatory needs such as computing income tax, compliance with national

government rules or macroeconomic issues. There is less emphasis on providing accounting information that is useful for investors (Ali & Hwang, 2000).

Third, they find that value-relevance is higher for British-American model countries than for Continental model countries. Fourth, value-relevance seems to be lower for countries where tax rules have a big influence on financial accounting measurements. Finally, they look at external auditing expenditures. Value-relevance is higher for countries where more is spent on external auditing services. This implies that the amount of money spent on auditing can be linked to the demand for proper financial accounting (Ali & Hwang, 2000).

3. Literature review

In this section previous studies on the value-relevance of goodwill, goodwill amortization and goodwill impairment will be discussed to answer sub-question five. These studies will also provide information to formulate hypotheses for the empirical study.

3.1 Value-relevance of goodwill

To assess whether the market perceives goodwill to the same degree as other assets are perceived Yamaji and Miki (2011) have researched the value-relevance of goodwill. In the Japanese stock market Yamaji and Miki find a significant positive relationship between goodwill and stock prices. Their results indicate goodwill is perceived as an incremental factor in valuing a firm (Yamaji & Miki, 2011). In line with the earlier mentioned shift in markets they additionally find a stronger relationship for non-manufacturing firms than for manufacturing firms.

Li and colleagues (2010) also find a positive relationship between goodwill and market value. They looked at 532 firms from the UK stock market for the period 1997 to 2002. For this period, they find a significantly positive relationship between the book value of goodwill and market value of the firm. Additionally, they find that, even though goodwill is value-relevant for the year of purchase, its value-relevance decays in following years (Li, Amel-Zadeh & Meeks, 2010).

Dahmash et al. (2009) looked at the value relevance and reliability of goodwill under an amortization schedule under Australian GAAP for the period 1994-2003. Their findings showed that while goodwill was value relevant, it was not reliable, but very biased. Goodwill was reported more conservatively under Australian GAAP. According to Dahmash and colleagues a move from Australian GAAP to IAS would reduce the level of bias with which goodwill was reported (Dahmash, Durand & Watson, 2009).

3.2 Value-relevance of goodwill impairments

In an analysis of the UK stock market some evidence is found for a negative association between goodwill impairment and market values (Li, Amel-Zadeh & Meeks, 2010). Li and colleagues do note that in the period of 1997-2002 this relationship seems weak and somewhat difficult to interpret. This weak relationship could be explained by the structural changes in goodwill

accounting that took place in this period. They do find a much stronger negative relationship between goodwill impairment announcements and market values. This relationship did seem stronger for firms that hold a larger fraction of assets as goodwill (Li, Amel-Zadeh & Meeks, 2010).

AbuGhazale and colleagues (2010) also looked at the relationship between goodwill impairments and share price in the UK stock market. They used a sample of 528 firm-year observations from the top 500 listed firms for 2005 and 2006. In this sample they found a significant negative association between goodwill impairment losses and reported goodwill. They therefore conclude that goodwill impairments reliably measure a decline in the value of goodwill and investors incorporate this decline in their valuation of the firm (AbuGhazaleh, Al-Hares & Haddad, 2012).

To investigate the value relevance of goodwill impairments Lapointe-Antunes, Cormier and Magnan (2009) looked at Canadian firms following the adoption of revised standards on purchased goodwill. For the Canadian market they find a negative relationship between reported goodwill impairment losses and share prices. Therefore, they conclude investors perceive impairment losses to reliably measure a reduction in value (Lapointe-Antunes et al, 2009).

Contrary to above results Hamberg and Beisland (2014) do not find a significant relationship between goodwill impairments and stock returns under the impairment-only regime of IFRS 3 in Sweden. They do find however, that goodwill amortization under Swedish GAAP is not value-relevant but goodwill impairments reported in addition to goodwill amortization are related to stock returns (Hamberg & Beisland, 2004).

3.3 Value-relevance of goodwill amortization

Yamaji and Miki (2011) also looked at the value relevance of goodwill amortization. They show that earnings before amortization are more value-relevant than earnings after amortization. Jennings and colleagues (2001) also found this relationship in a sample of publicly traded companies from America over the 1993-98 period. They also find that earnings before goodwill amortization explained more of the distribution of share prices than earnings after goodwill amortization. They conclude that goodwill amortization only adds noise to the measurement of earnings (Jennings, LeClere & Thompson, 2001).

In contrast to finding a negative relation between goodwill impairments and market values, Li and colleagues find no relationship between goodwill amortization and market values. This confirms again that investors did not see goodwill amortization as a useful source of information for future firm earnings (Li, Amel-Zadeh & Meeks, 2010).

3.4 Cross-country differences

There has been little research done on the differences in value relevance of goodwill accounting numbers between different countries. One paper compared 42 studies published between 2008 and 2017 on IFRS goodwill accounting (d'Arcy & Tarca, 2018). They first find evidence in support of IFRS 3 and IAS 36 for goodwill recognition, impairment, and disclosures for many countries. However, they find mixed evidence on the value-relevance of goodwill accounting between countries.

An earlier study in 2013 looked at listed companies in the European Union during the period from 2008 to 2011 (Laghi, Mattei & Di Marcantonio, 2013). Overall, they find a significant negative relationship between impairment losses and market values. Therefore, goodwill impairments do reliably measure a decrease in market value according to investors. However, they do find significant differences in value-relevance of goodwill impairment losses between countries. The French stock market for instance seemed to be much more sensitive when an impairment loss was recognized than other countries. Country-specific factors must therefore have a significant influence on the investment decisions of investors (Laghi, Mattei & Di Marcantonio, 2013).

Additionally, during the financial crisis of 2008 the association between impairment losses and market value seemed to be stronger than other years. The value relevance of goodwill impairment losses could therefore be higher during times of financial distress (Laghi, Mattei & Di Marcantonio, 2013). Finally, Laghi and colleagues found that in 2008 the differences between countries was significantly smaller than other years. Differences in value-relevance between countries could also be mitigated during times of financial stress (Laghi, Mattei & Di Marcantonio, 2013).

3.5 Hypotheses

To conclude above findings, there is a significant positive association between reported goodwill and the market value of a firm (Dahmash et al., 2009; Li et al., 2010; Yamaji & Miki, 2011). While evidence is somewhat mixed, there are indications for a negative association between goodwill impairment losses and market value (AbuGhazaleh et al., 2012; Li et al., 2010). Over time there has been a decrease in value relevance of accounting numbers, meaning that investors do not give financial statement numbers the same weight in valuations they did in the past (Collins et al., 1997; Dontoh et al., 2004; Francis & Schipper, 1999; Givoly et al., 2017). There is some evidence that shows value relevance of accounting numbers, including impairment losses, are significantly different between countries (Ali & Hwang, 2000; d'Arcy & Tarca, 2018; Laghi et al., 2013). These differences, however, are smaller during periods of stress in the markets. Additionally, the negative relationship between impairment losses and market values is stronger during periods of financial stress (Laghi, Mattei & Di Marcantonio, 2013).

With this background information the following hypotheses are proposed:

H1: There is a positive relationship between reported goodwill numbers and the market value of a firm.

H2: There is a negative relationship between reported goodwill impairment losses and the market value of a firm.

4 Methodology

To test the value relevance of goodwill accounting information I will use a market valuation model popularized by Ohlson (1995). Ohlson first makes a few specific assumptions about the relationship between earnings information and market value. The first assumption Ohlson makes is that the market value of a firm is determined by the present value of expected dividends. The second assumption is the clean surplus relationship. This relationship states that all changes in assets and liabilities unrelated to dividends must pass through the income statement (Ohlson, 1995). The third and final assumption states that the time-series behavior of abnormal earnings is framed by a linear and stationary model.

Through these assumptions Ohlson (1995) links the market value of a firm with a stock element of value and a flow element of value. The stock value element is represented as the book value of equity. The flow element is represented by earnings. This results in the following model also used by Collins, Pincus and Xie (1999) and Barth (1998):

$$Market\_Value\_E_{it} = \beta_0 + \beta_1 \, Book\_Value\_E_{it} + \beta_2 \, Earnings_{it} + e_{it}$$

Where:

$Market\_Value\_E_{it}$	The market value of equity of firm *i* at the end of year *t*.
$Book\_Value\_E_{it}$	The book value of equity of firm *i* at the end of the year *t*.
$Earnings_{it}$	The pre-tax profit of firm *i* at the end of the year *t*.

Barth (1998) along with other papers used this model to test the value relevance of specific accounting numbers. They built upon this model by extracting the variables of interest from the book value of equity and earnings variable.

To test the value relevance of goodwill numbers I will more specifically follow the work of Lapointe-Antunes et al. (2009) and AbuGhazale et al. (2012). To test hypothesis 1 and 2 the following ordinary least squares regression will be performed in Stata:

$$Market\_Value\_E_i = \beta_0 + \beta_1 \, Book\_Value\_E_i + \beta_2 \, Pretax\_Earnings_i + \beta_3 \, Goodwill_i + \beta_4 \, Goodwill\_Imp_i$$

Where:

$Market\_Value\_E_i$	The market value of equity of firm *i* at the end of the year in which the impairment test has been performed.
$Book\_Value\_E_i$	The book value of equity of firm *i* at the end of the year in which the impairment test has been performed minus the Goodwill value.
$Pretax\_Earnings_i$	The pre-tax profit of firm *i* at the end of the year in which the impairment test has been performed plus Goodwill_Imp.
$Goodwill_i$	The carrying value of goodwill of firm *i* at the end of the year in which the impairment test has been performed.
$Goodwill\_Imp_i$	The goodwill impairment loss of firm *i* reflected as a positive number. This value is 0 for firms that do not record an impairment loss.

This model will be used for the whole sample and for subsets of the sample. Subsets will consist of individual countries and of individual years.

All variables are deflated by the number of common shares outstanding at the end of the year in which the impairment test has been performed in accordance with Lapointe-Antunes et al. (2009) and AbuGhazale et al. (2012).

As mentioned before the book value of equity and earnings are value relevant factors that reflect information about future earnings (Ohlson, 1995). Therefore, I expect the book value of equity (Book_Value_E) and earnings (Pretax_Earnings) to be positively related to the market value of equity (Market_Value_E).

Prior research has shown a positive relationship between reported goodwill and the market value of a firm (Dahmash et al., 2019; Li et al., 2010; Yamaji & Miki, 2011). Consequently, I expect a positive relationship between the carrying value of goodwill (Goodwill) and the market value of equity (Market_Value_E).

Finally, some studies show a significant negative association between goodwill impairment losses and market values (AbuGhazale et al., 2012; Lapointe-Antunes et al., 2009; Li et al., 2010). The final expectation is a negative relationship between the reported goodwill impairment losses (Goodwill_Imp) and the market value of equity (Market_Value_E).

5 Data

5.1 Sample selection

The data for the value relevance test are obtained from the Worldscope database through Thompson One. The entire sample selection process is presented in table 1. The initial benchmarks in Thompson One were set to extract date from the available European stock markets for all industries between 2005 and 2018. Firm-year observations belonging to the financial sector are firstly removed. This was done by removing code 7000 from the list of Industry Classification Benchmark (ICB) codes. Financial firms are excluded because the financial industry is regulated differently and therefore, their financial reports do not match with other industries (AbuGhazale et al., 2012). This step resulted in an initial sample of 4362 firm-year observations. Since I am testing the value relevance of goodwill values and goodwill impairments, observations without any goodwill on the balance sheet have been excluded as well. Finally, observations with missing value for any one of the variables have been removed. This results in a final sample of 3695 firm-year observations from 1228 unique firms.

Table 1

Sample selection process

Sample selection step	Firm-year observations
Non-financial firms listed on European markets between 2005 and 2018 with existing data for the required variables	4362
Observations with a 0-goodwill balance	-449
Observations with missing data	-218
Final sample	3695

This table shows the sample selection process used to gather the final sample used in the multivariate OLS regression.

5.2 Data transformation

As mentioned in the methodology all variables are deflated by the amount of year-end common outstanding shares. This data was therefore also gathered for all firm-year observations. The variables for the book value of equity, pretax earnings, goodwill, and goodwill impairment are divided by the year-end common outstanding shares resulting in the deflated values. Since the

market value of equity divided by common shares outstanding results in the share price of a firm, year-end share prices are also gathered for all firm-year observations. Observations originally in different currencies are converted to Euros with the conversion option in Thompson One. Outliers from continuous variables in the final sample have been eliminated with a 90% Winsorization step in Stata. This way values below the 5th percentile and values above the 95th percentile are Winsorized following Laghi et al. (2013). Finally, the multivariate OLS regressions are corrected for heteroscedasticity in Stata by using robust standard errors.

6 Results

6.1 Descriptive statistics

Table 2 shows descriptive statistics for the variables included in the multivariate OLS regression. The average share price of the sample is €33.91 with a minimum share price of €0.40 and maximum of €195.33. The average book value of equity is €8.38 per share. In the non-Winsorized sample the average market-to-book ratio is 5.33. In that sample 339 (9%) observations have a market-to-book ratio below 1, meaning the book value of equity exceeds the market value of equity. This is in general an indication for recoding a goodwill impairment loss. Of these 339 firms only 225 recorded an impairment loss in the year that their market-to-book ratio was below 1. Of all firm-year observations 2510 observations (68%) recorded a goodwill impairment loss and 1185 (32%) observations consisted of non-impairments. On average firms have a pretax profit of €2.94 per share. For goodwill, the average is €5.17 per share with a minimum of 0.04, as was filtered for in the sample selection process. The average goodwill impairment charge is €0.18 per share and a minimum value of €0 for firms that did not record a goodwill impairment.

Table 2

Descriptive statistics

Variable	N	Mean	Median	Minimum	Maximum
Market_Value_E	3695	33.91	13.92	0.40	195.33
Book_Value_E	3695	8.38	3.03	-1.84	51.27
Pretax_Earnings	3695	2.94	1.14	-1.04	16.83
Goodwill	3695	5.17	1.89	0.04	26.22
Goodwill_Imp	3695	0.18	0.02	0	1.47

This table shows the descriptive statistics for the variables used in the multivariate OLS regression. These values are deflated by the number of common outstanding shares. Values in Euro's.

Table 3 shows the Pearson correlation matrix for the variables used in the multivariate OLS regression. From the bivariate correlations the matrix initially shows a positive correlation between the market value of equity and the book value of equity (0.6336). There is a positive

correlation between the pretax earnings and market value of equity as well (0.6329). The correlation between goodwill values and the market value of equity is also positive (0.4672). Between goodwill impairments and the market value the correlation matrix shows a positive correlation (0.1719), contrary to expectations. All correlations are significant at 1% ($p<0.001$). However, a multivariate analysis will offer more viable results. Finally, the correlation matrix shows that the independent variables are not too highly correlated with one another. The highest correlation between the independent variables is between the pretax earnings and the book value of equity (0.6065). Therefore, in this sample multicollinearity does not seem to cause a problem.

Table 3

Pearson correlation matrix

Variable	Market_Value_E	Book_Value_E	Pretax_Earnings	Goodwill	Goodwill_Imp
Market_Value_E	1.0000***				
Book_Value_E	0.6336***	1.0000***			
Pretax_Earnings	0.6329***	0.6065***	1.0000***		
Goodwill	0.4672***	0.3404***	0.5164***	1.0000***	
Goodwill_Imp	0.1719***	0.1902***	0.1312***	0.4121***	1.0000***

This table shows bivariate correlations between the variables used in the multivariate OLS regression.

*** p<0.01, ** p<0.05, * p<0.1

6.2 Regression results for the entire sample

Table 4 provides results for the multivariate OLS regression used to test the value relevance of goodwill numbers for the final sample. Model 1 shows the results for the model popularized by Ohlson (1995). In accordance with expectations, both the book value of equity per share and the pretax earnings per share are positively associated with share prices. This relationship is also significant with a p-value below 0.001 for both variables. The adjusted R^2 of model 1 is 49.93%, indicating that this model explains about 50% of the variance in the sample. In model 2 and model 3 the goodwill numbers are added to the model. The signs of all coefficients in model 3 are as expected. Model 3 shows that goodwill per share is also positively associated with the market value of a firm and significant at 1% ($p<0.000$). A coefficient of 1.28 indicates that on average an

increase of €1.00 in reported goodwill results in an increase of €1.28 in share price. For goodwill impairment charges the coefficient is -2.428, meaning on average every €1.00 increase in impairment charges decreases the share price by €2.43. This coefficient is significant at 10% (p=0.0975). Finally, the adjusted R^2 of model 3 shows that about 50% of the variance in the sample is explained.

Table 4
Multivariate OLS regression results

		Model		
Market_Value_E	Predicted sign	1	2	3
Book_Value_E	+	1.485***	1.456***	1.467***
		(0.093)	(0.087)	(0.087)
Pretax_Earnings	+	4.338***	3.381***	3.340***
		(0.271)	(0.276)	(0.278)
Goodwill	+		1.221***	1.280***
			(0.650)	(0.123)
Goodwill_Imp	-			-2.428*
				(1.915)
Constant	N/A	8.713***	5.457***	5.626***
		(0.603)	(0.650)	(0.669)
Observations		3,695	3,695	3,695
Adjusted R^2		0.4993	0.5222	0.522

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.3 Regression results for individual countries

The results of the multivariate OLS regression for the individual countries are provided in table 5. The table shows the coefficient value and standard deviation of the goodwill impairment variable. The R^2 of the model is also provided. In the final sample, data from 15 different countries was gathered. Of these 15 countries 6 countries had enough observations (>100) to reliably run a regression. In this sample goodwill impairment charges are value relevant in France, England, and The Netherlands. For these 3 countries the coefficient was significant (p<0.001) and negatively associated with share prices. The adjusted R^2 was 62.30% for France, 59.31% for England, and 71.89% for The Netherlands. For The Netherlands both the coefficient (-8.176) and the R^2

(71.89%) indicate that impairment charges are an important negative factor in explaining share prices. For the other 3 countries results differed. Coefficients were positive for Germany and Switzerland, but negative for Austria. However, in all 3 cases the coefficients were not significant and therefore do not show value relevance of goodwill impairments. For the remainder of the variables the results for all countries were in line with expectations.

Table 5
Multivariate OLS regression model performed for individual countries

Country	Goodwill_Imp coefficient	Adjusted R^2	Observations
France	-7.840***	62.48%	801
	(2.492)		
England	-5.840***	59.51%	802
	(1.483)		
Germany	2.958	72.65%	996
	(2.651)		
The Netherlands	-8.176***	72.44%	204
	(3.991)		
Switzerland	0.290	68.70%	281
	(5.672)		
Austria	-5.337	25.27%	126
	(4.666)		

Standard errors in parentheses
*** p<0.01, ** p<0.05, *p<0.1

6.4 Regression results for individual years

The same regression model was also performed on individual years between 2005 and 2017. The final year did not have enough observations and was therefore omitted. The results did not show any interpretable data. For all 13 years the goodwill impairment coefficient was not significant at 10%. The coefficient also seemed to be positive for some years and negative for others without any pattern between years. Finally, the R^2 of the models was between 40% and 65%, but again there did not seem to be a pattern. There was no apparent decrease in the R^2 over time. An overview of these results can be found in appendix A, table 1.

To summarize the results, the book value of equity per share, pretax earnings per share and goodwill per share are positively correlated with share prices and significant at 1%. These results are in accordance with expectations. Impairment charges per share show a negative correlation with share price but are only significant at 10%. After performing the regression for every country individually, impairment charges are significantly value relevant for some countries. For France, England, and the Netherlands impairment losses per share seem to be value relevant with a high explanatory power, depicted by the R^2 of the model. The results for the individual years were not useful for interpretation as both the coefficient as the R^2 of the model did not show any patterns.

7 Conclusion and discussion

In recent months, the IASB has shown more interest in discussing possible changes to the goodwill impairment test (IASB, 2020). There have also been more critics claiming goodwill amortization is a more reliable option than impairment testing (IASB, 2015). With a sample of 3695 firm-year observations from European countries between 2005 and 2018 this study tests the value relevance of goodwill accounting numbers under IFRS 3 and IAS 36. The following research question is proposed: *What is the value relevance of goodwill accounting for listed firms in the European markets?*

Proving goodwill impairments are value relevant could provide the IASB with the empirical proof in defense of goodwill impairment testing. While the value relevance of goodwill impairments has been studies before, it is usually done for single countries over a shorter timeframe. AbuGhazaleh et al. (2012) for instance, has looked at the value relevance of goodwill impairments for the UK market for 2005 and 2006. They propose the same study should be conducted over a longer period to test whether the value relevance of goodwill accounting holds over time (AbuGhazaleh et al., 2012).

Initially, empirical data shows a significant and negative relationship between goodwill impairment losses and share prices. For goodwill, book value of equity and pretax earnings there is a significant positive relationship with share prices. These 3 variables remain significant and positive for the remainder of the tests as well. Upon further investigation goodwill impairment losses seem to be more value relevant for some countries than others. For the Netherlands, France, and the UK the coefficients are negative and the R^2 of the models are high. For these countries it seems impairment losses are seen as an important factor in calculating future earnings by investors. For Germany, Switzerland, and Austria the results are not significant, and the coefficient are not as expected. Finally, the yearly tests do not show any interpretable results. Both the coefficient of goodwill impairments and the R^2 of the models show no patterns.

The answer to the research question is that for Europe goodwill accounting numbers are indeed value relevant. However, there are differences between countries as to what extent they are value relevant. For the value relevant countries investors seem to positively account for goodwill

numbers and negatively for goodwill impairment losses in their valuations of future firm earnings. The results are overall in line with previous studies on the value relevance of goodwill accounting (AbuGhazaleh et al., 2012; Li et al., 2010; Yamaji & Miki, 2011). Compared to the study on value relevance of goodwill impairments for European countries by Laghi and colleagues (2013) this paper differs in results. Between 2008 and 2011 they showed a significant negative relationship for goodwill impairments for France only (Laghi et al., 2013). This study finds a negative relationship for England and The Netherlands as well.

The main limitation of this study resulted from the use of a database as the only source of data. Many studies that tested the value relevance of accounting numbers initially extracted data from a database but added data from annual reports where data was missing. For the shorter time frames and focus on single countries this task was executable. This study expanded both the time frame as well as the number of countries. Therefore, it was not possible to work with missing data. In the database any observations with missing data were therefore omitted. The final sample could be missing many observations that could theoretically drastically change the results.

A follow-up study could focus on one interesting result from the individual country tests. Germany was the country with the most firm-year observations with 996 observations. However, the coefficient and significance of the goodwill impairment variable were rather unexpected. The coefficient had a positive sign instead of a negative sign, while not being significant ($p=0.122$). With this many observation, Germany could be an interesting case study. Merging database data with data from annual reports could provide a more reliable sample to show whether goodwill impairments are value relevant for Germany or whether investors in the German market do not account for goodwill impairment losses.

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Appendix A

Table 1

Multivariate OLS regression model performed for individual years

Year	Goodwill_Imp coëfficient	Adjusted R	Observations
2005	10.397	45.92%	245
	(9.619)		
2006	0.048	56.42%	266
	(6.941)		
2007	-5.723	56.31%	263
	(6.485)		
2008	-5.816	45.03%	351
	(5.291)		
2009	6.230	51.92%	359
	(5.486)		
2010	-2.792	59.77%	310
	(6.667)		
2011	-1.950	48.94%	333
	(6.033)		
2012	1.812	51.47%	275
	(6.472)		
2013	10.215	46.13%	248
	(8.943)		
2014	1.414	64.07%	250
	(7.609)		
2015	-3.057	64.94%	196
	(7.085)		
2016	-4.365	66.86%	286
	(5.104)		
2017	-7.172	64.61%	272
	(7.777)		

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1