Master thesis Accounting and Audit

Does goodwill impairment influence management forecast characteristics?

Name student: Maurits Droogh

Student ID number: 425058

Supervisor: Dr. J. Pierk

Second assessor: Dr. W. Cao

Abstract

The purpose of this thesis is to examine the influence of goodwill impairment as a consequence of the implementation of SFAS 142 on the management earnings forecast characteristics. Recent years, the research on goodwill impairment has risen and it continues to be a relevant topic for auditors. Prior evidence showed that impairments lead to uncertainty this may influence management earnings forecast behaviour. Management earnings forecasts are voluntary disclosures which release financial prospects of a firm to the public. The forecast characteristics are used to assess management and these financial prospects. It is hypothesized that goodwill impairment is not associated with the following earnings forecast characteristics: likelihood, frequency and accuracy. To test these hypotheses a sample is used consisting of U.S. public firm-years between 2003-2019.

The results show that the likelihood of releasing an earnings forecast decreases by goodwill impairment and that the other characteristics are not associated with goodwill impairment. This suggests that goodwill impairment has a limit influence on the forecast characteristics. Management can take these outcomes into account when making impairment and forecast choices. The users of earnings forecasts can consider these outcomes when assessing financial prospects.

Table of Content

1. Introduction

Goodwill is an intangible asset recorded when the purchase price of the acquirer of a company is higher than the fair value of all identifiable assets. In 2001, the Financial Accounting Standards Board (FASB) issued a new standard, SFAS 142. This standard required companies, to conduct goodwill impairment tests at least once a year. The FASB issued this standard to increase the availability of information about intangible assets. These impairment tests are a two-step process, the first step consists of estimating the fair value of the goodwill. Secondly, if the amount of goodwill recorded in the financial statements of a company exceeds the fair value, then goodwill impairment takes place (FASB 2001). Goodwill impairment continues to be a relevant topic for auditors and other practitioners because it requires judgement to estimate the values and is therefore subject to subjectivity and managerial discretion (Chen, Krishnan and Sami 2015).

Since the implementation of SFAS 142, the research on goodwill impairment has risen. Previous literature (AAA Financial Accounting Standards Committee 2001; Verriest and Gaeremynck 2009) focused on the valuation of goodwill impairment and found that unless its intangibility and dependency on multiple factors, the impairment amounts can be estimated quite accurate. Xu, Anandarajan, and Curatola (2011) found that goodwill impairment is negatively viewed by investors and that impairment can lead to negative returns for profitable firms. In 2018 for example, The Kraft Heinz Company made an impairment charge on their intangible assets of 15.4 billion dollars made up of a $7.1 billion goodwill impairment. Which lead to a $12.6 billion loss after taxes, and a drop in stock price (Kraft Heinz 2018). Other literature on goodwill impairment researched the relation with financial reporting standards (Anderson et al. 2011; Gordon and Hsu 2018), CEO characteristics (Masters-Stout, Costigan and Lovata 2008) and earnings management (Jordan and Clark 2004; Jahmani, Dowling and Torres 2010).

This study provides new insights into the effects of goodwill impairment on management earnings forecasts. A management earnings forecast is a voluntary disclosure provided by a specific firm to inform stakeholders of the firm about the expected earnings. These forecasts are commonly disclosed quarterly or annually and are also known under the name earnings guidance. Due to economic or regulatory uncertainties, a company can choose not to disclose their earnings forecast. So when a firm is not forecasting, it will lead to a decrease in the forecast likelihood (Hirst, Koonce and Venkataraman 2008). This can have several consequences, Hirst et al. (2008) summarized that earnings forecasts lead to a stock market reaction and decreases the effect of earnings announcement on the stock price. This research also argues that forecasts have a direct and measurable effect on the trading of stocks and stock prices. The direction and the size of this effect depend on the content of the forecasts or

disclosure. When these disclosures are timely and detailed, they contain more information and due to the timeliness, the disclosure is more relevant. This generates more value for the users of the disclosure, therefore there is an increase in disclosure quality. The broader impact of disclosure quality has not only its importance for investors but also society in whole profits from a higher disclosure quality. First of all, disclosure quality affects the level information asymmetry which benefits all stakeholders of an entity (Brown and Hillegeist 2007). Secondly, higher disclosure quality leads to a lower cost of debt due to a decrease in effective interest cost (Sengupta 1998). Thirdly, Lobo and Zhou (2001) found that firms that have a higher disclosure quality tend to engage less in earnings management It is important to make a distinction between voluntary disclosures such as earnings forecast and obligated disclosure which are audited such as 10-K files. Voluntary disclosures reduce information asymmetry between management and investors. Less information asymmetry leads to a decrease in the cost of capital. Existing theories about forecasts characteristics (Baginski et al. 2002; Miller 2002) state that instability or even a decrease in earnings might lead to a reduction in management earnings forecasts. Other research shows that financial creditably companies are more likely to release an earnings forecast (Botosan and Harris 2002). I found several arguments that the impairment of goodwill and the valuation of goodwill can indicate unstable earnings. Therefore, I am going to examine whether there are effects for companies who conduct goodwill impairment on the frequency and likelihood of management earnings forecasts and whether this impacts the management forecast accuracy. Which leads to the following research question:

Does goodwill impairment influence management forecast characteristics?

As discussed above, this thesis examines the impairment effects after the implementation of SFAS 142 on management forecast characteristics for U.S. public firms. For this examination, I will use data on goodwill impairment charges and management earnings forecasts over the period 2003-2019. Earnings forecasts can be influenced by other underlying factors for example by an acquisition. These factors could impact the outcomes of my empirical tests. Therefore, I will make use of entropy balancing to generate a reweighted sample to estimate the causal effects. This method makes the results more robust by balancing the covariates of the control variables. In the empirical analysis, I will test whether goodwill impairment influences the forecast characteristics and if so, whether this association is positive or negative. Evidence from previous literature is mixed, providing arguments for both a positive and a negative association between goodwill impairment and management earnings forecast characteristics. These earnings forecast characteristics are important indicators of the released forecasts and therefore relevant for investors and other users. As mentioned before, management earnings forecasts have a substantial influence on the stock returns and are therefore interesting for (short-term) investors. Furthermore, when financial analysts as frequent users of

earnings forecasts understand the impact of goodwill impairment on the earnings forecasts it might support their forecasting as well. This study has also practical implications for management. When impairing goodwill, management now understands the potential impact on their forecast characteristics and they can use this as an advantage.

This thesis has three important contributions. First, when I investigated prior literature related to this topic I found that research can be categorized in the effects of forecasts antecedents on forecast characteristics (e.g. Bamber and Cheon 1998) and the effects of forecast characteristics on forecast consequences (e.g. Ajinkya and Gift 1984), for the second category is more literature available. This thesis examines the impairment effects on the following forecast characteristics: likelihood, frequency and accuracy. Therefore it contributes to the literature of the first category. Despite the significant effects of management earnings forecasts and characteristics, the existing literature on the forecasts antecedents is limited. Although prior research for example in Hirst et al. (2008), suggests that there are arguments for a theoretical link between goodwill impairment and management forecast characteristics, no study on this relationship can be found. Second, the implementation of SFAS 142 by the FASB, which requires goodwill impairment by overstatement, has it several effects for example on financial results and ratio's, behaviour of management, shareholders and other stakeholders. This thesis reviews a few possible effects of the implementation of SFAS 142 over the past nineteen years. Which can be relevant for law and policymakers such as the FASB. Third, this research gives further insights on management earnings likelihood, frequency and accuracy as management earnings forecast characteristic. These characteristics can be used by financial analysts for valuing the company and estimate further earnings, by investors as possible consideration to take into accounting when buying a stock, and by management for disclosure purposes.

In the next chapter, I will discuss the theoretical background of goodwill impairment and management forecast characteristics. Where I also develop the hypotheses of this thesis. Thereafter, the research design is explained in which the theoretical constructs will be operationalized, the data sources and research method will be discussed.

2. Theoretical background and hypotheses development

In this chapter, I discuss relevant theories and literature related to my research question: Does goodwill impairment influence management forecast characteristics? First, I summarize the concepts related to management earnings forecasts. Then I will discuss the management earnings forecasts characteristics. Thereafter, I describe the theory about goodwill and the difficulties with the valuation of goodwill. This chapter ends with hypotheses development, which will be based on the discussed concepts and theories.

2.1 Management earnings forecast

An earnings forecast is a voluntary disclosure announced by management for various reasons. Often this disclosure is released before an actual earnings announcement. Managers release earnings forecasts for multiple reasons which can be grouped in two broad categories.

First, managerial forecast behaviour is influenced by their environment. Previous research (Hirst et al. 2008) found both law and regulatory environment and analyst and investor environment impact forecasting behaviour. Finding that new laws can affect forecasting behaviour, a regulatory environment can stimulate forecasting. In some countries can be more litigious than others and therefore companies adapt their forecasting behaviour. In the past, the U.S. made some regulatory changes to allow and encourage companies to issue voluntary disclosures. In 2000, the SEC promulgated the Regulation Fair Disclosure, which forbids selective disclosure. So management only has the choice to publicly disclose or not to disclose at all. Another important environment is that of analysts and investors, who influences also the disclosing behaviour of management. Houston et al. (2007) for example, found that firms who more often meet or beat the analyst's forecasts in the past are more confident to release earnings forecasts. Leuz and Verrecchia (2000) suggest that management commits to continue to disclose forecasts. When a company is disclosing less, investors would see this as a signal that a company is less creditable. The expectations of investors also play a role, on some stock exchanges it is more common to release earnings forecasts than others. Investors more or less expect companies to release voluntary disclosures which leads to a change in disclosing behaviour of management. So the forecasting standard of a stock exchange can impact the forecast frequency. Scientific evidence shows that earnings forecasts lead to a stock market reaction and decreases the effect of earnings announcement on the stock price (Hirst et al. 2008). This is also known by the market (investors), which is used to anticipate earnings (forecasts) announcements. Therefore an effect can be seen in stock prices, even before the earnings forecast is released. Based on the current and past earnings releases of management, investors have a strong indication what the

earnings will be and what the possible effects are on the stock price (Ohlson and Buckman 1981; Trueman 1986). So forecast characteristics are used to make a more precise estimation what the earnings and subsequently the stock price will be.

Second, other forecast antecedents which are based on internal incentives or applicable on firm-level. Some examples of these types of antecedents are litigation concerns, information asymmetry, managing market earnings expectations or reporting transparency. The argument of litigation concerns works both ways on the likelihood and frequency of forecasting. Forecasting bad news can prevent claims and litigation costs since stakeholders are more likely to sue companies who are withholding bad news. On the other hand, management is less likely to disclose information based on future performance due to the uncertainty of this performance it can lead to extra litigation risks. The next antecedent is related to information asymmetry. Since management earnings forecasts drive the supply and demand for stock price considerations, releasing forecasts will reduce the information asymmetry between managers and investors (Kim and Verrecchia 2001). Another motive for management to release earnings forecasts is to increase market value. Managers have a lot of insights into internal information, financial and business prospects. Therefore, management could be able to release earnings forecasts without any prediction errors. However, in a rapidly changing economic environment or an uncertain operating environment, management has imperfect insights about business prospects. Which might lead to forecast errors (Gong, Li and Xie 2009). Disclosures also give investors information about the adjustment capacities of management to adapt to a changing economic environment. This is supported by the following reasoning: If management forecasts are more accurate, management is more able to foresee external effects on the firm. This ability gets valued by investors. Therefore, as a forecast supplier, management can use earnings forecasts to increase or even maximize the market value of the firm (Trueman 1986). Added market value is in the interest of both management and the shareholders of the company. The leadership its management has to be successful if a company increases in market value, at least that is a common thought. can profit from this, because they often receive a bonus for stock performance or reaching a certain market value (Kramer and Peters 2001). A recent example of management's incentive to increase the market value is that of Tesla, Inc. In January 2020, Tesla, Inc. is one of the most traded stocks in the world and had a market value of 100 billion dollars. CEO Musk will receive a large bonus for creating this market value (Campbell, P. 2020, January 14). For investors, there are financial advantages of higher market value. Added market value can lead to higher returns for investors when selling their stocks or other financial interests. Further, the company is more attractive to prospective investors. In my earlier example, I found that Tesla, Inc. is one of the most traded stocks worldwide (Campbell, P. 2020, January

14). Besides the likelihood of higher returns, added market value also indicates that a company has a brighter future business prospect and will continue to survive (Huang and Wang 2008).

Forecasting can have multiple consequences. As mentioned before, forecasts behaviour can trigger a stock market reaction. This reaction is caused by various reasons. A forecast contains (new) information or confirms analyst's expectations, both are motives for investors to trade. When making this decision to trade investors also take forecast history into account. Reliable forecasting leads to more trading. The content of the earnings forecast is also very important, 'good news' and 'bad news' has both a different effect on the share price. Some forecasts contain additional information, which can also lead more trading or influence the stock price (Baginski, Hassell and Kimbrough 2002; Hutton, Miller and Skinner 2003).

Prior research also showed that voluntary disclosures such as earnings forecast reduce the amount of information asymmetry. This leads to a lower cost of capital, in other words, companies can attract more capital with a lower interest. Furthermore, with forecasting management can build a reputation. When companies are disclosing accurate and open it influences investor and analyst behaviour. On the long term, this has some positive effects but transparency can also lead to more negative stock returns by bad news, although evidence is still mixed (Hirst et al. 2008).

2.2 Forecast Characteristics

Management earnings forecasts have attributes which are called forecast characteristics. In this research, I focus on three characteristics namely the forecast likelihood, the forecast frequency and the forecast accuracy.

Starting with the forecast likelihood and frequency, prior research has shown that credibly companies are proving disclosures more frequently (Botosan and Harris 2002). However, firms are less likely to release earnings forecasts in periods when earnings are decreasing (Baginski et al. 2002; Miller 2002). Indicating that good financial results and stable earnings are positively associated with management forecasting frequency and likelihood.

Currently, according to prior research, a high variation in management forecast accuracy can be seen. Hassell and Jennings (1986) show that on average management forecast is quite accurate while other research (Hirst et al. 2008) report also inaccurate results. This variation can be linked to multiple factors. Firstly, in general earnings forecast are more accurate over a shorter period. So quarterly forecasts contain fewer errors than annual forecasts. Secondly, managers experience in forecasting impacts the accuracy, more experience lead to more accurate disclosing. Thirdly, previous literature

shows a pessimistic bias in earnings forecasts for shorter horizons. Implying that actual earnings are reported consistently higher than forecasted numbers. Which is also in line with the theory that management uses forecast to downplay earnings expectations. This makes it easier for management to beat earnings expectations (Hirst et al. 2008).

2.3 Goodwill and the valuation of goodwill

Goodwill can be defined as the difference between the price an acquirer pays for a company and the value of all identified assets it acquires. Most large companies in the U.S. were or are active in mergers and acquisitions and for that reason, they have goodwill on their financial statements. Not only in the U.S. but in most countries it is required to carry goodwill in the balance sheet as an intangible asset. On the other hand, there is internally generated goodwill, this type of goodwill is generated by for example brand or reputation building. Current accounting standards do not allow internally generated goodwill on the balance sheet. Furthermore, internally generated goodwill can influence the (market) value of companies, some financial ratios and the company's ability to generate future earnings. When valuing goodwill there are methods to value the current amount of goodwill. However, it can be difficult to trace back whether goodwill is created internally or by mergers and acquisitions, especially over time. This can have a misleading effect when internally generated goodwill is used to compensate for normal goodwill value (Stefanović 2014). This indicates that internally generated goodwill also affect the amount of goodwill impaired. In other words, when companies create goodwill internally by for example actively promoting their brand, it can lead to a future reduction in goodwill impairments.

The valuation of goodwill is because of its intangible form, not always based on facts and most of the time done by estimations. When valuing goodwill, auditors and financial analysts are using professional judgement. Which can be defined as the use of accounting or ethical related training, knowledge and experience to make informed decisions. Since it is their judgement, the valuation of goodwill and the amount of goodwill impairment always consist of some degree of subjectivity (Hayes, Wallage and Gortemaker 2014). Several reasons indicate difficulties when estimating the amount of goodwill that should be recorded. First, goodwill or goodwill items are difficult or sometimes even impossible to buy or to sell. Since the market for goodwill items is limited, means that there is no ask and demand side which is determining market value. There are also not a lot of previous transactions, which are indicating a certain value for goodwill items. This is one of the reasons why it is difficult to put a price tag on goodwill. Another difficulty of valuating goodwill is the complexity of goodwill items. Goodwill includes multiple items such as reputation, intellectual property and brand recognition. These items often consist of revenue making potential but they indirectly contribute to revenues. The last reason

why it is difficult to quantify goodwill is that in contrast to other intangible assets, goodwill has an indefinite life (Ma and Hopkins 1988). The yearly valuation of goodwill, which is required due to the implementation of SFAS 142, might indicate the lifespan of goodwill. Goodwill will be removed as a balance sheet item at some point when the amount of goodwill is decreasing year-over-year. These difficulties are making it hard for an outsider to have full insight into components of goodwill.

2.4 Hypotheses development

Goodwill impairment takes place when the amount of goodwill recorded exceeds the fair value of the goodwill (FASB 2001). This differs from goodwill amortization, which is the value reduction of goodwill over the whole lifespan. When a company impairs goodwill it decreases the asset goodwill, so goodwill impairment is identified as a cost and therefore decreases the earnings (Higson 1998). Prior research showed that due to the subjectivity and the relation with earnings, goodwill impairment is likely to be subject to earnings management or other forms of managerial discretion. For these reasons, the impairment of goodwill leads to more dispersion and uncertainty. This dispersion and uncertainty create difficulties in forecasting earnings which lowers the accuracy of forecasts (Chen et al. 2015). The uncertainty related to the valuation of goodwill, its complexity and the subjective when estimating or accounting for goodwill can also indicate or even lead to unstable earnings. In line with the above theory about forecasts characteristics, instability or even a decrease in earnings might lead to a reduction in management earnings forecasts.

On the other hand, this implies that, if management has more precise expectations about the future, management can predict earnings more accurate. This is because management's ability to forecast improves when high-quality information about internal operations and external environment is available. This is under the assumption that management can process this information correctly (Goodman et al. 2014). Additionally, I argued based on existing theories that goodwill impairments lead to a reduction in earnings and when the earnings are decreasing, firms are less likely to issue a forecast. So following prior research, this study focusses on the disruptive effect of goodwill impairments on management forecast characteristics. The above arguments infer two relations between goodwill impairment and management earnings characteristics. First, goodwill impairment is negatively associated with the frequency and likelihood of management earnings forecasts. And second, that goodwill impairment has probably a negative effect on management earnings forecast accuracy. Both relations are under the assumption that the impairment amount increases with uncertainty.

Nevertheless, in prior research arguments can be found against the above theory. Uncertainty and information asymmetry are correlated (Lu, Chen and Liao 2010). Often has the management of a firm that does not release a forecast, has not a projection about the future earnings. Under this assumption, firms have before issuing the forecast more information asymmetry than firms who do not forecast. Because firms who forecast have detailed insights in future earnings and their stakeholders do not. After the release of the forecast, this difference in information asymmetry is eliminated. In this way, firms would like to give more disclosure to reduce information asymmetry (Coller and Yohn 1997). This concept suggests that goodwill impairment will lead to more uncertainty and information asymmetry, which has negative consequences for a firm and its stakeholders. Therefore, the likelihood and frequency of issuing management earnings forecasts increases. If voluntary disclosures are more accurate, they tend to give more information and are therefore more effective in reducing information asymmetry (Lang and Lundholm 2000). Therefore it is plausible that there is also a positive effect of goodwill impairment on management earnings forecast accuracy.

So prior literature shows the possibility of both a positive and a negative association between goodwill impairment and management forecast characteristics. For this reason, I need to investigate both directions. This means that the hypotheses will be formulated non-directional. Therefore, I hypothesize in null form:

Hypothesis 1: Goodwill impairment is not associated with the likelihood of issuing a management earnings forecast.

Hypothesis 2: Goodwill impairment is not associated with the frequency of management earnings forecasts.

Hypothesis 3: Goodwill impairment is not associated with management earnings forecast accuracy.

Although these hypotheses will be tested individually, the expectation is that the outcomes are moving in the same direction. So for example when hypotheses are tested positively, a company is likely to issue a management earnings forecast, the expectation is that a company is also issuing earnings forecasts more often. The same applies to earnings forecasts accuracy when a firm is likely to issue forecasts or more frequent in forecasting, the same firm is probably forecasting more accurate. Because when a firm release forecasts more often, a firm has more experience in forecasting. An increase in forecasting experience could result in higher accuracy. Furthermore, in a short timeframe between forecasts often means smaller differences between forecasted and expected earnings. Which decreases the chance of making an error in earnings estimations. Lastly, as explained before firms who are forecasting more often have often more stable earnings and therefore are more likely to forecast

more accurate. If the hypotheses have a negative association I also expect them to move into the same direction for the opposite reasons.

3. Research design

In my research design, I will describe how I am going to test the theoretical relations which are discussed in chapter two. First, I describe how the data is collected and the literature I follow. Then I explain how I clean the data and the construction of my samples. Second, I define the control variables of my empirical model. Third, I specified my empirical models. Thereafter, I formulate three regression models, one per hypothesis. I end this chapter with a description of Entropy balancing, a method I use to test the robustness of my treatment samples.

3.1 Data and sample

The sample selection is reported in Table 1, Panel A. For the adoption of SFAS 142 book-year 2002 was a transitional year. Therefore, I use 2003-2019 as sample period, consisting of U.S. public firms. First, I merge the I/B/E/S Guidance dataset which includes the predicted earnings per share (EPS), with the I/B/E/S Actual dataset which includes the actual EPS. When the predicted EPS is a range forecast, the midpoint of the range is calculated and used, this consistent with prior literature e.g. Goodman et al. (2014), Rogers and Stocken (2005). After combining these datasets, the combined file is merged with the pre-tax goodwill impairment and other variables collected from Compustat. The available firm-years with annual values for pre-tax goodwill impairment is now 11,261. Since tax rates can differ per company, pre-tax goodwill impairment data is used. Then the duplicates are dropped and thereafter the missing variables of the control variables. Then I have my final sample of 8,471 observations which match the criteria for the first two hypotheses. In the next step, the data is winsorized, I equalize the most extreme observations at the 1st and 99th percentiles. For the management earnings forecast accuracy sample, the missing forecast values are eliminated, dropping 6,597 observations. This leaves the final sample for the analysis of my last hypothesis with 1,874 firm-years.

I use the likelihood and frequency sample (full sample) to test the first two hypotheses, Panel B in Table 1. The full sample is used as a treatment sample. For robustness reasons, I also use an Entropy balanced sample[1]. The balancing is based on a distinction between firms that do and firms that do not who have a material amount of goodwill impairment. In the full sample, 5,778 of the 8,471 observations have a material amount of impairment (Panel B). Consistent with the other two hypotheses, I use for the third hypothesis a treatment sample and a balanced sample. This treatment sample, the accuracy sample is presented in Panel C. In this sample also the majority of the firm-years has a material impairment, 1,098 out of 1,874 observations. This may suggest that when firms impair goodwill they are more likely to impair greater (material) numbers.

[1] This balanced method will be further explained in the paragraph Entropy balancing

Table 1

Sample selection and materiality

Panel A: Sample selection

Sample selection	# of firm-years
Firm-years on the Compustat database that have annual values for pre-tax goodwill impairment from 2003 to 2019	11,261
Less: duplicates	(74)
Less: missing values of control variables	(2,716)
Final sample hypothesis 1 and 2: Management earnings forecast likelihood and frequency	**8,471**
Less: firm-years unavailable management earnings forecasts	(6,597)
Final sample hypothesis 3: Management earnings forecast accuracy	**1,874**

Panel B: Materiality of goodwill impairment for the likelihood and frequency sample

Materiality	# of firm-years
Material amount of goodwill impairment	5,778
No material amount of goodwill impairment	2,693
Final sample hypothesis 1 and 2: Management earnings forecast likelihood and frequency (full sample)	**8,471**

Panel C: Materiality of goodwill impairment for the accuracy sample

Materiality	# of firm-years
Material amount of goodwill impairment	1,098
No material amount of goodwill impairment	776
Final sample hypothesis 3: Management earnings forecast accuracy	**1,874**

3.2 Control variables

As described above, I use control variables which are based on prior research (Goodman et al. 2014). The list of definitions of all the (control) variables can be found in Table 2. The data for the control variables are from Compustat and the I/B/E/S Guidance dataset just as the (in)dependent variables. Using the same data sources leads to less deviation and missing values after merging the data. I include the following indicators variables who measure the firm related complexities and economic uncertainty: *Return On Assets (ROA)* is the income before extraordinary items dived by the total assets. Further, *Gross Margin (GM)* is used, which is the difference between sales and costs of goods or services sold divided by sales. So *GM* gives information about the profit margin a company is making.

The following two variables are directly related to the total assets of a firm and therefore also with *GWI*: *Book-to-Market (BM)* which is the book value of equity divided with the market value of equity, *Leverage (LEV)* is the ratio of total liabilities and total assets at the end of the fiscal year. In addition to Goodman et al. (2014), I use the *book value per share (BPS),* which is the total assets divided by the average number of common shares outstanding. *BPS* is a feasible measure to control for *EPS*. Lastly, I use *Return On Equity (ROE)*, is the income before extraordinary items dived by the equity.

Prior research (Higson 1998) found that goodwill impairment will lead to a decrease in earnings and impairment leads to a decrease in assets, therefore, I expect that when the impairment increases, the *ROA* and *BPS* will decrease and that the *LEV* will increase. This means that *GWI* has a positive effect on *ROA* and *BM,* and a negative relation between *GWI* and *LEV.* No evidence can be found on the effect of goodwill impairment on the *GM, ROE* and the *BM.* This is probably because goodwill impairment or *GWI* does not directly influence the *GM, ROE* and the *BM. BM* is computed by the total assets of a firm. Evidence showed that *LEV* and the *ROA* are effected by *GWI.* Both are also affected by the total assets. *GWI* has a negative effect on the assets of a firm e.g. the book value, and therefore it might also have on *BM*. *ROE* is computed with the use of the total equity of a firm. The equity of a firm consist of assets, for the same reasons as for *BM,* I expect that a positive relation between *GWI* and *ROE.* Because equity includes more than only assets, I expect a smaller positive effect than for *ROA. GM* has not a direct relationship with *GWI*, the assets or the earnings of a company. Therefore, I expect will be *GM* independent from *GWI*.

3.3 Models specification

First, I will use in this model a two-tailed t-test to compare the averages of the firms with and firms without a material impairment of goodwill (see Table 1, Panel B and Panel C). This will be done for the full sample and the accuracy sample. The two-tailed t-test is defined in equation (1) and (2), in this equation is μ_{GWI} the average mean of firms that have a material goodwill impairment and for firms that do not have a material impairment I use μ_{NGWI}. The t-test is a parametric test for testing hypotheses about the averages of continuous data. The t-test assumes that the average difference between the two groups is normally distributed (Olkin 2002). Additional, after conducting the t-test, a two-sample Kolmogorov-Smirnov test is used to measure the equality of the distribution functions. I again use the distinction in materiality to conduct the Kolmogorov-Smirnov test for both samples.

$$H_0: \mu_{GWI} = \mu_{NGWI} \quad (1)$$

$$H_{alternative}: \mu_{GWI} \neq \mu_{NGWI} \quad (2)$$

For all the hypotheses *GWI* is the independent variable[2]. The variable *GWI* is formulated as the goodwill impairment deflated by the total assets, in millions of dollar per firm-year. This done for comparability reasons, the impairment deflated by the total assets makes it easier and more understandable when analyzing firm-years that do and do not issue earnings forecasts. In the upcoming models, are for the variables *GWI* and management forecast characteristics[3], the same year (*t*) for a firm (*f*) used. This is under the assumption that management already has an indication of the impairment prospects before they are forecasting. So when the same firm-year is used, I measure the direct of goodwill impairment on the forecast characteristics.

3.4 Model: Management earnings forecast likelihood

Table 1 shows that 1,874 observations of the full sample (n = 8,471) release a management earnings forecast. This corresponds to a percentage of 22.123%. In this empirical analysis, I use a logistic regression to capture the effect of the impairment on whether a firm is likely to forecast, see equation (3). The use of logistic regression is more appropriate than for example an OLS regression when testing binary variables and to calculate the likelihood (Olkins 2002). In this model, the full sample and the balanced sample (Appendix A) will be used.

$$\rho\left(MF_{f,t}\right) = \beta_0 + \beta_1 GWI_{f,t} + Control\ variables + \varepsilon \quad (3)$$

The variable *MF* is binary and has value 0 if a firm is not releasing a forecast and the value 1 if the firm releases a forecast. The *MF* is used as the dependent variable, *GWI* will be tested on *MF* to measure whether it affects *MF.*

3.5 Model: Management earnings forecast frequency

For the second hypothesis, the same data and samples as for the analysis of the variable likelihood are used. In this model, I introduce the variable the *management forecast frequency (MFF). MFF* captures the number of earnings forecasts for a firm, firms are categorized based on their yearly amount of released forecasts. There are three possibilities, firms which are not forecasting, firms that are forecasting annually and firms that forecast more than once a year, often quarterly. So the maximal

[2] See Table 2 for the variable definitions.

[3] For the management earnings forecast characteristics the variables *MF, MFF* and *MFE* are used in the empirical tests.

amount of earnings forecasts per year is four. To test the effect of impairment an OLS regression model (4) is used.

$$MFF_{f,t} = \beta_0 + \beta_1 GWI_{f,t} + Control\ variables + Fixed\ effects + \varepsilon \quad (4)$$

In this equation. the *MFF* is the outcome or dependent variable. In this model, I use again the full sample and the balanced sample (Appendix A). In equation (4), I use fixed effects to control for systematic differences which may occur over time or across industries. These fixed effects are operationalized with the use of year and industry dummies. The dummies hold the average effects constant for each firm-year.

3.6 Model: Management earnings forecast accuracy

In the third hypothesis, I want to test the effect of goodwill impairment on management forecast accuracy. Consistent with prior literature (Hassell and Jennings 1986), *management forecast accuracy* (*MFA)* is estimated with the use of *management forecast error* (*MFE*). The *MFE* can be defined as the absolute difference between the predicted and the actual *EPS* than divided by the *EPS,* see formula (5). Thus, *MFE* is the absolute difference between the *forecasted EPS* and *EPS,* relative to *EPS.* When the difference between *MF* and *EPS* increases, *MFE* will increase as well. So an accurate forecast has a low deviation and has a *MFE* which is close to zero.

$$MFE_{f,t} = \frac{(MF_{f,t} - EPS_{f,t})}{EPS_{f,t}} \quad (5)$$

The *MFE* is measured with the use of annual earnings. annual earnings are audited and therefore more reliable (Rogers and Stocken 2005). The data on management earnings forecasts, the *forecasted EPS* and *EPS* is obtained from the I/B/E/S Guidance.

For the examination of goodwill impairment and management earnings forecast accuracy, an OLS regression (6) is used. For this regression model another sample is used, the accuracy sample, see Table 1 Panel C, this sample has a total of 1,874 observations.

$$MFE_{f,t} = \beta_0 + \beta_1 GWI_{f,t} + Control\ variables + Fixed\ effects + \varepsilon \quad (6)$$

The *MFE* is the dependent variable, the total impaired amount of goodwill at the end of year *t* is used as the independent variable without the distinction in materiality. In this model, the accuracy sample and the balanced sample (Appendix B) will be used. Consistent with equation (4) I use fixed effects to control for systematical differences.

3.7 Robustness: Entropy balancing

In this paragraph, I will explain some additional tests to judge the strength of the empirical models and to verify the procedures and the results which will be used in this research. Relying on strong results unaffected by outliers or smaller subsets within the data is decisive. This is important because the results of this research are used to form conclusions and implications. Establishing robust results can be achieved by multiple methods, in this research entropy balancing is used. Taking into account that when estimating causal effects it is important to balances covariates. The use of this method decreases the probability on selection bias and minimize the effects of (causal) inferences. Another advantage is that this rebalancing method does not lead to a loss of observations. Propensity matching, which is a well-known alternative used in prior research (Chen et al. 2015), has the same effect but new evidence shows that propensity scores are inefficient (King and Nielsen 2019). Entropy balancing differences from propensity scores because they are calculated with a logistic or probit regression to estimate weights and minimize covariate differences between both samples. So entropy balancing reweights the control sample to incorporate the data to equalize covariate distributions (Watson and Elliot,2016). Therefore Entropy balancing has high applicability with this thesis, because I made a distinction between firm-years which do have a material amount of goodwill impairment and firm-years that do not, see Table 1, Panel B and Panel C. The reweighting procedure is carried out based on this distinction in materiality. Following prior research (Elliott and Shaw 1988), the materiality is determined at ≥ 1% of the company's total assets. If the amount of goodwill is material it involves an auditor examination. This increases the reliability because impairment decisions that do not involve auditor examination are dropped (Carcello et al. 2017).

In Appendix A I illustrate the effect of entropy balancing when I apply this on my full sample (of 8,471 observations). The optimization algorithm used a tolerance level of 0.015, which is the default tolerance level (Hainmueller and Xu 2013). As explained above, Appendix A illustrates that the covariates of the treatment variable remain intact as the covariates of the control variables are reweighted to match with the treatment group. For the accuracy sample (n = 1,874), I apply again Entropy balancing for reweighting the control variables (see Appendix B).

4. Empirical results

In this chapter, I describe my statistical tests and results. I start with the descriptive statistics, here I discuss the mean, standard deviation and the distribution of my data. I also conduct four tests of differences (two per sample) and report correlations of the variables. Thereafter, I report and analyze the results of my three regression models, one per hypothesis. In this analysis, the results will be linked with the expectations and hypotheses formulated in the second chapter.

4.1 Descriptive statistics

In table 2, I compare the likelihood and frequency sample (n = 8,471) with the accuracy sample (n = 1,874), in other words, this is a comparison between firms who release management forecasts and firms that do not. Therefore, in this table, the variable *MFE* is excluded likelihood and frequency sample (full sample), and the variable *MF* is excluded from the accuracy sample. For the likelihood and frequency sample, Panel A reports the descriptive statistics and Panel B the test of differences between firms that do and firms that do not impair a material amount of goodwill. The test of differences in means is computed with the use of a t-test and a Kolmogorov-Smirnov test (K-S test). For the accuracy sample, this output can be found in Panel C and Panel D.

The results in Panel A and Panel C show that the *GWI* is lower in the full sample. So firms that issue an earnings forecast impair on average less than firms that do not. The *GWI* value of -0.139 in Panel A, can be interpreted as an average impairment of 13.9% of the total assets. Other performance indicators of a firm such as the *ROA, LEV* and *ROE* show more negative returns in the full sample. The *ROA* and *ROE* are more negative, -0.379 and -0.208 respectively and the *LEV* is higher, 0.705 versus a *LEV* of 0.585 in the other sample. The other control variables, *BPS, BM* and *GM* show a similar difference between the samples. These findings are consistent with Botosan and Harris (2002), who found that the management of firms with better performance is more likely to issue earnings forecasts. In the full sample are on average 0.779 forecasts released per observation, per year. When firms do a forecast, the release on average 3.473 earnings forecasts per year (Panel C). This suggests that most firms that release earnings forecasts will do this quarterly. The *MFE* (Panel C) is 1.392. This means that the forecasted earnings per share by management are on average more than twice as large as the actual *EPS*. This implies that management overestimates itself when releasing management earnings forecasts.

In Panel B, both the t-test as the K-S test report significant values, meaning that there is a significant difference between firms that do and firms that do not impair a material amount of goodwill. The averages for (non-) material goodwill impairment are shown in the third and fourth column and give

an impression of the differences in averages. Firms with a material impairment have on average a lower *MF, MFF, ROA, BM, BPS, GM, ROE* and a higher *LEV.* Indicating that firms without material impairments are performing better.

In Panel D, these values are significant at a 1% level for *GWI, ROA, BM, BPS* and *ROE*. So for firms that release management earnings forecasts, the difference in material impairment makes less a difference than for observations that do not issue a forecast.

Table 2

Descriptive statistics

Panel A: The likelihood and frequency sample (n = 8,471)

		Percentile					
Variable	**Mean**	**10%**	**25%**	**50%**	**75%**	**90%**	**Std. Dev.**
GWI	-0.139	-0.347	-0.123	-0.031	-0.006	-0.001	0.316
MF	0.224	0	0	0	0	1	0.417
MFF	0.779	0	0	0	0	4	1.546
ROA	-0.379	-0.789	-0.294	-0.062	0.018	0.065	1.209
BM	0.436	-0.049	0.316	0.69	1.216	2.114	3.963
LEV	0.705	0.248	0.409	0.594	0.798	1.044	0.668
BPS	11.543	-0.051	0.816	4.939	12.22	22.33	55.425
GM	0.293	0.081	0.189	0.32	0.482	0.658	0.441
ROE	-0.208	-1.456	-0.48	-0.063	0.102	0.509	2.6

Panel B: Tests of differences in means between firm-years with and without a material goodwill impairment (n = 8,471)

Variable	**t-test p-value**	**t-test degrees of freedom**	**Mean material impairment**	**Mean non-material impairment**	**K-S p-value**
GWI	0	5778.46	-0.203	-0.003	0
MF	0	4657.01	0.193	0.29	0
MFF	0	4655.97	0.676	1	0
ROA	0	6235.28	-0.554	-0.005	0
BM	0.007	7146.45	0.367	0.586	0
LEV	0	8218.47	0.745	0.617	0.001
BPS	0	3826.69	8.317	18.464	0
GM	0	7909.48	0.274	0.332	0.002
ROE	0	8192.67	-0.316	0.024	0

Panel C: Accuracy sample (n = 1,874)

		Percentile					
Variable	**Mean**	**10%**	**25%**	**50%**	**75%**	**90%**	**Std. Dev.**
GWI	-0.078	-0.217	-0.083	-0.018	-0.003	-0.001	0.153
MFF	3.473	1	4	4	4	4	1.142

MFE	1.392	-1	-0.235	0.618	2.922	4.254	9.301
ROA	-0.074	-0.307	-0.109	-0.001	0.05	-0.089	0.243
BM	0.635	0.171	0.321	0.554	0.911	1.41	1.739
LEV	0.585	0.279	0.428	0.581	0.724	0.858	0.24
BPS	14.217	1.9	5.035	9.903	17.793	27.614	40.149
GM	0.366	0.144	0.234	0.344	0.479	0.648	0.21
ROE	-0.152	-0.817	-0.244	0.006	0.123	0.236	1.691

Panel D: Tests of differences in means between firm-years with and without a material goodwill impairment (n = 1,874)

Variable	t-test p-value	t-test degrees of freedom	Mean material impairment	Mean non-material impairment	K-S p-value
GWI	0	1107.7	-0.13	-0.003	0
MFF	0.317	1632.11	3.5	3.445	1
MFE	0.5475	1865.92	1.291	1.536	0
ROA	0	1277	-0.157	0.044	0
BM	0.032	1313.09	0.698	0.549	0.708
LEV	0.163	1796.82	0.577	0.592	0.012
BPS	0.009	1494.32	12.098	17.106	0
GM	0.7925	1761.7	0.366	0.368	0.583
ROE	0	1675	-0.327	0.093	0

t-test for difference in means, p-values for both the t-test and the K-S test apply for $H_{alternative}$: $\mu_{GWI} \neq \mu_{NGWI}$

Satterthwaite's degrees of freedom are used assuming an unequal distribution between the samples.

Two-sample Kolmogorov-Smirnov test for equality of distribution functions.

Variable definitions:
MF (management forecasts) = Whether a firm is releasing a management earnings forecast
MFF (management earnings forecast frequency) = The yearly amount of released management earnings forecasts
MFE (management forecast error) =The MFE is the percentage difference between the predicted and the actual EPS
GWI (goodwill impairment) = The total impaired amount of goodwill in millions of dollars divided by the total assets, at the end of year *t*
ROA (return on assets) =The income before extraordinary items dived by the total assets
BM (book-to-market) = The book value of equity divided with the market value of equity
LEV (leverage) = The ratio of total liabilities and total assets at the end of the fiscal year
BPS (book value per share) = The total assets divided by the average number of common shares outstanding
GM (gross margin) = The difference between sales and costs of goods or services sold divided by sales.
ROE (return on equity) = The income before extraordinary items dived by the total equity

The Pearson correlation coefficients are presented in Table 3. In Panel A shows the correlations for the likelihood and frequency sample (n = 8,471), Panel B reports the correlations for the accuracy sample (n = 1,874). In Panel A, can be seen that *GWI* is significantly correlated on a 1% level with all the control variables and dependent variables except for *MFE*. A positive correlation with *GWI* means that a decrease in impairment or an increase in total assets leads to an increase in the correlated variable. On first sight some of the results might be contradicting, for example, *GWI* is significantly positively correlated with *ROA* and significant negatively with *ROE.* Although impairment leads to lower returns, it also reduces the assets of the company, therefore the *ROA* ratio can increase. The decrease has less effect on the total equity of a company, so therefore the *ROE* can decrease due to the reduction in earnings by the impairments.

The results in Panel B are less significant. In Table 2 was already reported that the differences between the variables are smaller for firms who issue earnings forecasts. The reported values in Panel B indicate that most control variables are independent of each other. *MFE* is only significantly correlated with *MFF. GWI* is also in Panel B correlated at a 1% significant level with *ROA, BM, BPS* and *ROE*. *GWI*ROA* has in the accuracy sample a correlation value of 0.833, which is relatively close to 1, implying an almost perfect correlation. *GWI*MFE* has a correlation of 0.022 which is not significant. Extended testing on the effect of *GWI* on *MFE* will be done with an OLS regression.

In Panel A, the positive correlation of *GWI* with *ROA* is line with the expectations and prior literature (Higson 1998), because impairment leads to a decrease in returns and a decrease in the total assets. Therefore, less impairment would have a positive effect on *ROA.* The significant correlations between *GWI*BM, GWI*LEV, GWI*BPS* confirm also my expectations. I did not expect a relation between *GWI* and *GM* since *GWI* does not directly influence the margin made on revenue. I expected a small positive relation between *GWI* and *ROE,* the correlation shows a significant negative correlation. This outcome might be caused by an intermediated variable. Panel B, on the other hand, shows a significant positive effect on *GWI*ROE*, and there is no significant correlation between *GWI* and *GM.* Both results conform to the expectations[4].

[4] The exaltations are discussed in chapter 3.2 control variables

Table 3

Pearson Correlation Coefficients

Panel A: The likelihood and frequency sample (n = 8,471)

Variable	*MFF*	*MFE*	*ROA*	*BM*	*LEV*	*BPS*	*GM*	*ROE*
GWI	0.099***	0.022	0.728***	0.155***	-0.45***	0.066***	0.077***	-0.032***
MFF	1	0.09***	0.128***	0.025**	-0.094***	0.025	0.086***	0.012
MFE		1	0.031	-0.005	0.006	0.019	0	0.006
ROA			1	0.151***	-0.68***	0.064***	0.201***	-0.01***
BM				1	-0.384***	0.106***	-0.044	-0.116***
LEV					1	-0.06***	-0.01***	0.179***
BPS						1	0.011	0.008
GM							1	-0.013
ROE								1

Panel B: The accuracy sample (n = 1,874)

Variable	*MFF*	*MFE*	*ROA*	*BM*	*LEV*	*BPS*	*GM*	*ROE*
GWI	0.022	0.022	0.833***	0.063***	-0.005	0.086***	-0.055	0.209***
MFF	1	0.09***	0.022	-0.008	-0.029	0.012	0.009	0.013
MFE		1	0.031	-0.005	0.006	0.019	0	0.006
ROA			1	0.041	-0.011	0.105***	0.016	0.217***
BM				1	-0.346***	0.039	-0.046	-0.1***
LEV					1	-0.051	-0.175***	0.022
BPS						1	-0.048	0.026
GM							1	0.067***
ROE								1

See Table 2 for variable definitions.

***,**,* significance level at 1%, 5% or 10%, respectively.

4.2 Regression results for Hypothesis 1

In this paragraph, the results for the first hypothesis are reported and analyzed. Table 4 shows the logistics regression analysis on management forecast likelihood (n = 8,471). In the first column, the likelihood and frequency sample (full sample) is presented and in the second column the balanced sample, which is the pooled sample after applying entropy balancing. The p-value of the model for both samples is significant on a 1% level. The Pseudo R-squared, also known as the coefficient of determination is for the full sample, is equal to 6.8%. This is relative low, only 6.8% of the variation is explained by the goodwill impairment. For the balanced sample, Pseudo R-squared is higher with a value of 0.104. When analyzing the outcomes of the logistic regression I find a large overlap between the two samples, the results show significant outcomes for the variables *GWI, ROA, BM, LEV* and *GM*. The significance of *GWI* on the control variables is in line with my earlier findings presented in Table 2 and Table 3. This suggests that impairment affects some of the performance indicators of firms e.g. *ROA*. This outcome is supported in prior literature (Higson 1998) and in-line with the expectations.

The independent variable *GWI* is negatively significant on a 1% level in both samples. This implies that *GWI* has a negative effect on *MFL*, when the impairment increases, firms are less likely to issue an earnings forecast. For the full sample, it means that an increase of one percentage point in *GWI* will lead to a decrease in issuing forecasts of 2.342% and for the balanced sample a decrease of 3.023%. Therefore, I reject the null hypothesis and I assume a negative association between goodwill impairment and management forecast likelihood. This indicates that goodwill impairment has a disruptive effect on management forecast likelihood. I did not expect that goodwill impairment is associated with the forecast likelihood. The negative association does not reject the argument that impairment leads to fewer earnings, and existing theories (Baginski et al. 2002; Miller 2002) found that firms are less likely to release earnings forecasts when earnings are decreasing.

Table 4

Regressions of Goodwill impairment on management earnings forecast likelihood

	Full sample	Entropy balanced sample
Variable	**Coefficient (z-value)**	**Coefficient (z-value)**
Intercept	-1.019	-0.919
	(-12.72)***	(-11.85)***
GWI	-2.342	-3.023
	(-8.56)***	(-8.87)***
ROA	2.867	3.465
	(14.46)***	(12.3)***
BM	-0.018	-0.027
	(-2.01)**	(-3.65)***
LEV	-0.33	-0.436
	(-3.35)***	(-4.32)***
BPS	-0	0.001
	(-0.07)	(1.94)*
GM	0.567	0.403
	(5.22)***	(3.81)***
ROE	-0.022	-0.032
	(-1.32)	(-1.51)
n	8,471	8,471
Pseudo R^2	0.068	0.104
P-value (model)	<0.000	<0.000

See Table 2 for variable definitions.

***,**,* significance level at 1%, 5% or 10%, respectively, using a two-tailed test.

4.3 Regression results for Hypothesis 2

This paragraph reports the results for the second hypothesis: Goodwill impairment is not associated with the frequency of management earnings forecasts. Table 5 reports the results for the multivariate regression analysis of goodwill impairment on forecast frequency. Again the same two samples are presented in column 1 and 2. The significance of the coefficients in the OLS regression is based on the t-values. In this model the F-values are significant on 1% for both samples, the full sample has an F-value of 20.22 and the F-value of the balanced sample is 25.71. This means that the model explains the variation in the depending variable. The R-squared is 12.9% and 14.5% for the full and balanced sample, respectively. For the control variables, I found a significant effect on *ROA* and *GM* at a 1%-level and *ROE* at a 5%-level and *LEV* at a 10%-level in the full sample. Again, there is some overlap with the balanced sample, *ROA, BPS, GM* and *ROE* are in the balanced sample significant at a 1%-level. The effect of *GWI* on the variable *LEV* is significant at a 5%-level. Most of the outcomes in the balanced sample are conform to my expectations. I had expected a larger effect of *GWI* on *BM*, which was visible in the logistic regression (Table 4).

In the first column, *GWI* has a small positive effect on *MFF* with a coefficient of 0.092 and t-value of -1.17. For the balanced sample, on the other hand, the coefficient of *GWI* is negative, with a t-value of -1.48. So the treatment variable *GWI* is not significant in both samples. Therefore, I maintain the null hypothesis. I found no evidence that goodwill impairment is associated with the frequency of management earnings forecasts.

Table 5

Regressions of Goodwill impairment on management earnings forecast frequency

	Full sample	**Entropy balanced sample**
Variable	**Coefficient (t-value)**	**Coefficient (t-value)**
Intercept	0.102	0.185
	(0.59)	(1.25)
GWI	0.092	-0.107
	(1.17)	(-1.48)
ROA	0.103	0.172
	(4.01)***	(9.12)***
BM	0.001	0.001
	(0.13)	(0.18)
LEV	-0.066	-0.067
	(-1.76)*	(-2.09)**
BPS	0	0.002
	(1.21)	(3.91)***
GM	0.226	0.115
	(5.83)***	(3.26)***
ROE	0.014	0.029
	(2.11)**	(4.58)***
n	8,471	8,471
R^2	0.129	0.145
Adj. R^2	0.127	0.142
F-Value	20.22***	25.71***
Fixed effects	Included	Included

See Table 2 for variable definitions.

***,**,* significance level at 1%, 5% or 10%, respectively, using a two-tailed test.

4.4 Regression results for Hypothesis 3

Hypothesis 3 predicts that goodwill impairment is not associated with management earnings forecast accuracy. The multivariate regression analysis on management forecast accuracy is presented in Table 6. In the first column, the accuracy sample is reported which does not have missing forecasting values of management and is smaller (n=1,874) than my full sample. Also in this table, in the second column, I used an entropy balanced sample as an analytical weight for comparison and robustness reasons. For the accuracy sample, this model has an F-value of 11.59 and the balanced sample has an F-value of 12.9, which are both significant at a 1%-level. The R^2 is for the accuracy sample 12.1% and for the balanced sample 13.8%. For the adjusted R^2 these are 10.8% and 12.5% for the accuracy and balanced sample respectively. Consistent with the other tables, the R^2 is higher than for the treatment sample, implying that the balanced sample has a higher explanatory value. With a coefficient of 0.747 *MFF* is the only significant control variable in the full sample and the balanced sample. I find again a high overlap in the results between the treatment sample and a balanced sample. For the control variables, most of the outcomes differ when comparing the (balanced) accuracy sample with the (balanced) full sample[5]. Evidence from prior research (Higson 1998) showed that goodwill impairment will lead to a decrease in earnings and assets. This impacts the *ROA*, *BPS* and the *LEV*. The accuracy sample shows less significant results. This may imply that *GWI* has less effect on the control variables when firms issuing forecasts.

The variable of interest *GWI* has a coefficient of -0.505 and T-value of -0.19 in the treatment sample. In the balanced sample, *GWI* has a coefficient of -0.955 with a t-value of -0.5. So *GWI* is for both samples negative but not significant. This means that the null hypothesis will be maintained, the results indicate that the forecast accuracy measured by *MFE* and *GWI* is not associated.

[5] The regression analyses where I used the full sample and the balanced full sample are reported in Table 4 and in Table 5.

Table 6

Regressions of Goodwill impairment on Management earnings forecast accuracy

	The accuracy sample	Entropy balanced sample
Variable	**Coefficient (t-value)**	**Coefficient (t-value)**
Intercept	-2.351	-2.725
	(-1.67)*	(-2.32)**
GWI	-0.505	-0.955
	(-0.19)	(-0.5)
ROA	1.122	1.262
	(0.66)	(1.02)
BM	-0.017	-0.003
	(-0.13)	(-0.03)
LEV	0.449	0.783
	(0.45)	(0.88)
BPS	0.002	0.001
	(0.43)	(0.4)
GM	0.168	-1.126
	(0.16)	(-1.61)
ROE	-0.038	-0.053
	(-0.29)	(-0.46)
MFF	0.747	0.666
	(3.97)***	(3.56)***
n	1,874	1,874
R^2	0.121	0.138
Adj. R^2	0.108	0.125
F-Value	11.59***	12.9***
Fixed effects	Included	Included

See Table 2 for variable definitions.

***,**,* significance level at 1%, 5% or 10%, respectively, using a two-tailed test.

5. Conclusion

In this chapter, I revisit the contents of the empirical analysis by discussing the main results. Thereafter, I will answer my research question: Does goodwill impairment influence management forecast characteristics? Besides explaining the influence of goodwill impairment, I will also discuss alternative explanations and the practical implications of this research on the effects of impairments after the implementation of SFAS 142. Thereafter, I review the limitations of this thesis. Lastly, I will discuss the possibilities for future research.

In the hypothesis development, I discussed that goodwill impairment can have both a positive effect and a negative on the management forecast characteristics. Management has an incentive to forecast more (accurate) because forecasting reduces the information asymmetry (Lang and Lundholm 2000). This asymmetry is caused by the uncertainty which impairment creates. Prior research showed that Uncertainty and information asymmetry are correlated (Lu, Chen and Liao 2010). The negative effect of goodwill charges on forecast characteristics can be explained by consequences of impairment on the earnings. Goodwill impairment leads to lower earnings. A decrease in earnings is for management an incentive to forecast less (Baginski et al. 2002; Miller 2002). When management is forecasting less, the accuracy of the forecasts are dropping as well (Chen et al. 2015). I expected that the outcomes of the hypotheses for the three forecast characteristics are moving into the same direction. So either goodwill impairment has a positive or a negative effect on all the management forecast characteristics. The results of the empirical test reported for the first hypothesis a significant negative association between goodwill impairment and management forecast likelihood. The results of the second hypothesis are dispersed. I found no evidence that goodwill impairment is associated with the frequency of management earnings forecasts. The regression used to test the third hypothesis reported negative but not significant results. Therefore, I maintained the null hypothesis: goodwill impairment is not associated with management earnings forecast accuracy. After conducting these empirical tests, I did not find any evidence for a positive effect of goodwill impairment on management forecast characteristics.

Therefore, I conclude that goodwill impairment has a limit influence on the forecast characteristics. Goodwill impairment has a negative effect on forecast likelihood. I found no evidence for an association between impairment and forecast frequency or with forecast accuracy. This conclusion is not in line with the expectation that all the associations between goodwill impairment and the management forecast characteristics move into the same direction. Still assuming that firms release earnings forecasts less frequent in periods when earnings are decreasing. This may suggest that the

effect of goodwill impairment on the earnings is not large enough to withhold management from issuing earnings forecasts or to affect the accuracy of the forecast.

I examined the influence of goodwill impairment as a consequence of the SFAS 142 on the management earnings forecast characteristics and I found implications for multiple stakeholders. The first stakeholders I will discuss is the management of the firm. The outcomes of this thesis might influence impairment choices which have to be made by management. Furthermore, the results can be used to improve the relationship with investors. Because this research reflects the reliability and accountability of the forecasts it might influence management's track record of earnings forecasts. The second group are (potential) investors, investors are using earnings forecast to assess the judgement of management and financial position of a firm. Investors can take the outcomes of this thesis into consideration when assessing the forecasts or when a firm did not release an earnings forecast. Thirdly, the government and society have an interest in increasing the publicly available information about firms. A decrease in forecast likelihood due to goodwill impairments affects this interest. Further, the government can use forecast data and research on earnings forecast characteristics to refine the tax system. An earnings forecast is also be used to estimate future tax revenues (Kima, Schmidt and Wentland 2015). I found no evidence that goodwill impairment has a disruptive effect on forecast accuracy. This suggests that impairment does not impact the prospects for future tax revenues. Lastly, accountants observe voluntary disclosures such a earnings forecasts, when the forecasting behaviour due to impairments are changing or do not change at all it might influence account choices.

This thesis has three major limitations, two of which are related to the data. First, although I used for my full sample over eight thousand firm-years, a larger sample size might lead to more compelling results. Second, the available data on goodwill impairments and management earnings forecast characteristics before the implementation of SFAS 142 was limited. Therefore, I was not able to measure the effect of goodwill impairments on the earnings forecast characteristics before SFAS 142. Third, prior research (Masters-Stout et al. 2008) found that new CEOs impair more goodwill than CEOs with a longer tenure. Despite using a long sample period, I did not compensate for this effect.

Further research on this topic is warranted. It might be interesting to test the influence of goodwill impairment on the management earnings forecast characteristics outside the United States. Its might be possible that a different sample, regulatory and financial environment leads to other new insights. Recent developments around the spread of the Coronavirus causes uncertainty by consumers and businesses. Additionally, the consequences of the pandemic can lead to changes in both impairment choices as management forecast behaviour. The impact of these influences should be investigated for the short and long term.

6. References

AAA Financial Accounting Standards Committee. (2001). Equity valuation models and measuring goodwill impairment. *Accounting Horizons*, *15*(2), 161-170.

Ajinkya, B. B., & Gift, M. J. (1984). Corporate managers' earnings forecasts and symmetrical adjustments of market expectations. *Journal of Accounting Research*, 425-444.

Anderson, H. D., Marshall, B. R., Carlin, T. M., & Finch, N. (2011). Goodwill impairment testing under IFRS: a false impossible shore? *Pacific Accounting Review*.

Baginski, S. P., Hassell, J. M., & Kimbrough, M. D. (2002). The effect of legal environment on voluntary disclosure: Evidence from management earnings forecasts issued in US and Canadian markets. *The Accounting Review*, *77*(1), 25-50.

Bamber, L. S., & Cheon, Y. S. (1998). Discretionary management earnings forecast disclosures: Antecedents and outcomes associated with forecast venue and forecast specificity choices. *Journal of Accounting Research*, *36*(2), 167-190.

Brown, S., & Hillegeist, S. A. (2007). How disclosure quality affects the level of information asymmetry. *Review of accounting studies*, *12*(2-3), 443-477.

Botosan, C. A., & Harris, M. S. (2000). Motivations for a change in disclosure frequency and its consequences: An examination of voluntary quarterly segment disclosures. *Journal of Accounting Research*, 38(2), 329-353.

Campbell, P (2020, January 14). Tesla valuation nears Elon Musk's bonus trigger of $100bn. *Financial Times*. Retrieved from https://www.ft.com/content/a9080142-36d9-11ea-a6d3-9a26f8c3cba4

Carcello, J. V., Neal, T. L., Reid, L. C., & Shipman, J. E. (2017). Auditor Independence and Fair Value Accounting: An Examination of Nonaudit Fees and Goodwill Impairments. *Contemporary Accounting Research*.

Chen, L. H., Krishnan, J., & Sami, H. (2015). Goodwill impairment charges and analyst forecast properties. *Accounting Horizons*, 29(1), 141-169.

Coller, M., & Yohn, T. L. (1997). Management forecasts and information asymmetry: An examination of bid-ask spreads. *Journal of accounting research*, *35*(2), 181-191.

Elliott, J. A., & Shaw, W. H. (1988). Write-offs as accounting procedures to manage perceptions. *Journal of accounting research*, 91-119.

Financial Accounting Standards Board (FASB). 2001. *Goodwill and Other Intangible Assets*. Statement of Financial Accounting Standards No. 142. Norwalk, CT: FASB.

Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: a guide for non-statisticians. *International journal of endocrinology and metabolism*, 10(2), 486.

Gong, G., Li, L. Y., & Xie, H. (2009). The association between management earnings forecast errors and accruals. *The Accounting Review*, *84*(2), 497-530.

Goodman, T. H., Neamtiu, M., Shroff, N., & White, H. D. (2014). Management forecast quality and capital investment decisions. *The Accounting Review*, *89*(1), 331-365.

Gordon, E. A., & Hsu, H. T. (2018). Tangible long-lived asset impairments and future operating cash flows under US GAAP and IFRS. *The Accounting Review*, *93*(1), 187-211.

Hainmueller, J., & Xu, Y. (2013). Ebalance: A Stata package for entropy balancing. *Journal of Statistical Software*, 54(7).

Hassell, J. M., & Jennings, R. H. (1986). Relative forecast accuracy and the timing of earnings forecast announcements. *Accounting Review*, 58-75.

Hayes, R., Wallage, P., Gortemaker, H. (2014). Principles of auditing: An introduction to International Standards on Auditing. Third edition.

Higson, C. (1998). Goodwill. *The British Accounting Review*, *30*(2), 141-158.

Hirst, D. E., Koonce, L., & Venkataraman, S. (2008). Management earnings forecasts: A review and framework. *Accounting horizons*, 22(3), 315-338.

Houston, J. F., Lev, B., & Tucker, J. W. (2010). To guide or not to guide? Causes and consequences of stopping quarterly earnings guidance. *Contemporary Accounting Research*, *27*(1), 143-185.

Huang, C., & Wang, M. C. (2008). The effects of economic value added and intellectual capital on the market value of firms: An empirical study. *International Journal of Management*, *25*(4), 722.

Hutton, A. P., Miller, G. S., & Skinner, D. J. (2003). The role of supplementary statements with management earnings forecasts. *Journal of Accounting Research*, *41*(5), 867-890.

Jahmani, Y., Dowling, W. A., & Torres, P. D. (2010). Goodwill impairment: A new window for earnings management?. *Journal of Business & Economics Research (JBER)*, *8*(2).

Jordan, C. E., & Clark, S. J. (2004). Big bath earnings management: the case of goodwill impairment under SFAS No. 142. *Journal of Applied Business Research* (JABR), 20(2).

Kim, O., & Verrecchia, R. E. (2001). The relation among disclosure, returns, and trading volume information. *The Accounting Review*, *76*(4), 633-654.

Kima, S., Schmidt, A. P., & Wentland, K. (2015). Analysts and taxes. *University of Illinois.* Retrieved from https://pages.business.illinois.edu/accountancy/wp-content/uploads/sites/12/2015/09/Tax-2015-Kim-Schmidt-Wentland.pdf

King, G., & Nielsen, R. (2019). Why propensity scores should not be used for matching. *Political Analysis*, 27(4), 435-454.

Kraft Heinz (2018), *Kraft Heinz annual report 2018*.

Kramer, J. K., & Peters, J. R. (2001). An interindustry analysis of economic value added as a proxy for market value added. *Journal of Applied Finance*, *11*(1), 41-49.

Lang, M. H., & Lundholm, R. J. (2000). Voluntary disclosure and equity offerings: reducing information asymmetry or hyping the stock?. *Contemporary accounting research*, *17*(4), 623-662.

Leuz, C., & Verrecchia, R. E. (2000). The economic consequences of increased disclosure. *Journal of accounting research*, 91-124.

Lobo, G. J., & Zhou, J. (2001). Disclosure quality and earnings management. *Asia-Pacific Journal of Accounting & Economics*, 8(1), 1-20.

Lu, C. W., Chen, T. K., & Liao, H. H. (2010). Information uncertainty, information asymmetry and corporate bond yield spreads. *Journal of Banking & Finance*, *34*(9), 2265-2279.

Ma, R., & Hopkins, R. (1988). Goodwill—An Example of Puzzle-Solving in Accounting. *Abacus*, 24(1), 75-85.

Masters-Stout, B., Costigan, M. L., & Lovata, L. M. (2008). Goodwill impairments and chief executive officer tenure. *Critical Perspectives on Accounting*, 19(8), 1370-1383.

Miller, G. S. (2002). Earnings performance and discretionary disclosure. *Journal of accounting research*, *40*(1), 173-204.

Ohlson, J. A., & Buckman, A. G. (1981). Toward a theory of financial accounting: Welfare and public information. *Journal of Accounting Research*, 399-433.

Olkin, G. C. S. F. I. (2002). Springer Texts in Statistics.

Rogers, J. L., & Stocken, P. C. (2005). Credibility of management forecasts. *The Accounting Review*, 80(4), 1233-1260.

Stefanović, D. (2014). Internally generated goodwill assessment: contemporary times requirement or not?. *FINIZ 2014-The Role of Financial Reporting in Corporate Governance*, 81-84.

Sengupta, P. (1998). Corporate disclosure quality and the cost of debt. *Accounting review*, 459-474.

Trueman, B. (1986). Why do managers voluntarily release earnings forecasts?. *Journal of accounting and economics*, *8*(1), 53-71.

Verriest, A., & Gaeremynck, A. (2009). What determines goodwill impairment?. *Review of Business and Economics*, *54*(2), 1-23.

Watson, S. K., & Elliot, M. (2016). Entropy balancing: a maximum-entropy reweighting scheme to adjust for coverage error. *Quality & quantity*, *50*(4), 1781-1797.

Xu, W., Anandarajan, A., & Curatola, A. (2011). The value relevance of goodwill impairment. *Research in Accounting Regulation*, *23*(2), 145-148.

7. Appendices

Appendix A: Entropy balancing the likelihood and frequency sample

Appendix A: Entropy balancing

The likelihood and frequency sample (n = 8,471)

Panel A: Before weighting

	Treatment			Control		
Variable	**Mean**	**Variance**	**Skewness**	**Mean**	**Variance**	**Skewness**
GWI	-0.203	0.134	-3.848	-0.003	0	-0.78
BPS	8.318	2164	20.8	18.46	4951	12.97
GM	0.274	0.242	-4.199	0.332	0.089	-3.804
LEV	0.745	0.608	4.344	0.617	0.087	2.342
BM	0.367	18.65	-5.426	0.586	9.35	-7.938
ROA	-0.554	2.03	-5.104	-0.005	0.039	-13.49
ROE	-0.316	9.249	0.478	0.024	1.305	-0.012

Panel B: After weighting

	Treatment			Control		
Variable	**Mean**	**Variance**	**Skewness**	**Mean**	**Variance**	**Skewness**
GWI	-0.203	0.134	-3.848	-0.203	0.376	-0.97
BPS	8.318	2164	20.8	8.318	261	5.25
GM	0.274	0.242	-4.199	0.274	0.452	-3.705
LEV	0.745	0.608	4.344	0.745	0.359	3.64
BM	0.367	18.65	-5.426	0.367	9.558	-6.565
ROA	-0.554	2.03	-5.104	-0.554	1.972	-2.639
ROE	-0.316	9.249	0.478	-0.316	6.542	-0.721

See Table 2 for variable definitions.

Appendix B: Entropy balancing accuracy sample

Appendix B: Entropy balancing

Accuracy sample (n = 1,874)

Panel A: Before weighting

	Treatment			Control		
Variable	**Mean**	**Variance**	**Skewness**	**Mean**	**Variance**	**Skewness**
GWI	-0.13	0.033	-3.774	-0.003	0	-0.983
BPS	12.1	1374	28.4	17.11	1913	24.22
GM	0.366	0.047	-2.418	0.369	0.039	0.085
LEV	0.577	0.064	1.359	0.592	0.049	0.792
BM	0.698	4.876	-10.83	0.549	0.33	4.455
ROA	-0.157	0.081	-3.461	0.044	0.004	-1.823
ROE	-0.327	4.127	1.092	0.094	0.908	-1.344

Panel B: After weighting

	Treatment			Control		
Variable	**Mean**	**Variance**	**Skewness**	**Mean**	**Variance**	**Skewness**
GWI	-0.13	0.033	-3.774	-0.13	0.102	-1.203
BPS	12.1	1374	28.4	12.1	4354	17.2
GM	0.366	0.047	-2.418	0.366	0.1325	-1.237
LEV	0.577	0.064	1.359	0.577	0.045	0.244
BM	0.698	4.876	-10.83	0.698	1.189	2.99
ROA	-0.157	0.081	-3.461	-0.157	0.029	-0.09
ROE	-0.327	4.127	1.092	-0.326	1.975	7.552

See Table 2 for variable definitions.