How does the association between goodwill impairments and auditor dismissals change when an event occurs where a goodwill impairment becomes more unambiguous?

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Abstract

This study researches whether an event when a goodwill impairment becomes more unambiguous impacts the result between goodwill impairments and auditor dismissals. Ayres, Neal, Reid and Shipman (2019) find that a goodwill impairment leads to a higher probability of an auditor dismissal. However, because of the technological developments and if there comes an event when a goodwill impairment becomes more unambiguous, the result of Ayres et al. (2019) might not hold. This study uses COVID-19 as the mechanism for an event when a goodwill impairment becomes more obvious. This research finds that there is no association between goodwill impairments and an event when a goodwill impairment becomes more expected. Moreover, this paper finds that there is no association between goodwill impairments and auditor dismissals when a goodwill impairment becomes more unambiguous. This study does find however that there are less auditor dismissals in an event when a goodwill impairment becomes more expected.

1. Introduction

COVID-19 has led to problems within the worldwide economy, like people which are at risk to fall into poverty due to these economic problems which has been caused by COVID-19 (World Health Organization, 2020). The countries which were affected by the Asian Financial Crisis in 1997 saw their exchange rate and GDP fall dramatically (Corporate Finance Institute, 2022). The Asian Financial Crisis of 1997 also led to

uncertainty for international investors, as they did not want to invest in developing countries and thus the Asian Financial Crisis of 1997 also had an effect for the worldwide economy (Corporate Finance Institute, 2022). The Financial Crisis of 2008 led to a loss of 2 trillion dollars worldwide in economic growth (The Washington Post, 2018).

The crises which are mentioned above are just some of the examples which lead to uncertainty within the economy or within the society (Mei & Guo, 2004). Because of this uncertainty, the society might accept worse company performance. Therefore, the crises which are mentioned above are examples of when a goodwill impairment becomes more obvious. Specifically, this project examines how the association between goodwill impairments and auditor dismissals is impacted by an event when a goodwill impairment becomes more unambiguous. Therefore, the research question of this study is: How does the association between goodwill impairments and auditor dismissals change when an event occurs where a goodwill impairment becomes more unambiguous?

In 2001, there came a switch from goodwill amortization to goodwill impairments (Ayres et al., 2019). This switch has led to a discussion whether the switch from a goodwill amortization to a goodwill impairment was a good decision. Regarding this discussion, the prior literature provides mixed evidence about this decision. Next to this, currently there is "opinion shopping" going on within the economy (Lennox, 2000). Opinion shopping means that companies are trying to get favorable opinions from an auditor (Krishnan & Stephens, 1995). There are certain measures taken to take action on opinion shopping, however it has no success (Dhaliwal, Lamoreaux, Lennox & Mauler, 2015). Regarding the association between goodwill impairments and auditor dismissals, Ayres et al. (2019) find that a goodwill impairment leads to a higher probability of auditor dismissals.

To check when a goodwill impairment becomes more obvious, this project is using COVID-19 as its mechanism. COVID-19 added uncertainty to the society (Altig et al., 2020) and therefore this might be a good mechanism to measure when a goodwill impairment becomes more unambiguous. Moreover, because of the impact of COVID-19, companies perform worse than expected (Atanasov, 2021). Next to this, Beams and Yan (2015) find that auditors are more conservative during COVID-19, which means that auditors require a higher verification for their audit evidence. Because of the findings of these papers, this study expects that there are more often goodwill impairments when a goodwill impairment becomes more unambiguous.

Moreover, Ismail, Aliahmed, Nassir and Hamid (2008) state that companies switch from auditor during the Asian Financial Crisis. Türegün (2020) finds that investors accept a poorer performance during crisis years. The finding of Türegün (2020) could say that there are less auditor dismissals during crisis years, since investors accept a poorer performance. Because of the development in recent years, like cryptocurrency, Internet

of Things and other technological developments, results of papers prior to these changes could not give a good view of what might happen currently with a certain association. Therefore, this study focuses more on the finding of Türegün (2020) in order to expect that there are less auditor dismissals following a goodwill impairment when a goodwill impairment becomes more unambiguous.

This project uses a regular logistic regression in order to estimate whether the frequency of goodwill impairments declines when a goodwill impairment becomes more unambiguous. In order to estimate whether the amount of auditor dismissals increase or decrease following a goodwill impairment in an event when a goodwill impairment becomes more obvious, this study uses a difference-in-difference logistic regression, whereby COVID-19 the exogeneous effect is. The control variables for both models are mainly based on the study of Ayres et al. (2019), since this project is an addition to Ayres et al. (2019).

The results of this study show that there is no association between an event when a goodwill impairment becomes more expected and goodwill impairments. Furthermore, this study shows that there is no association between goodwill impairments and auditor dismissals when a goodwill impairment becomes more obvious. Moreover, this study shows that there are less auditor dismissals during an event when a goodwill impairment becomes unambiguous. As last, regarding the control variables within this study, there might also be an increase in earnings management during an event when a goodwill impairment becomes more expected.

This study also does a robustness test in order to check whether the removal of immaterial goodwill impairments impacts the outcomes of this study. This study does not remove immaterial goodwill impairments, like Ayres et al. (2019) does, but this study computes the dummy variable related to a goodwill impairment to zero if a company has an immaterial goodwill impairment. The results of the robustness tests show that the association between an event when a goodwill impairment becomes more obvious and auditor dismissals turn insignificant when removing immaterial goodwill impairments off the study's sample.

This project is a contribution for the literature, because this project is the first to examine the difference between goodwill impairments and auditor dismissals when a goodwill impairment becomes more unambiguous. Moreover, since Pfizer expects that the COVID-19 pandemic will last at least until 2024 (Erman & Roy, 2021), there needs to come research about this topic, since an answer to this topic will indirectly also give an answer about the audit quality during COVID-19. Even though there might be less COVID-19 measures within the timeframe of COVID-19, there still is a possibility of a resurgence until 2024 (Kissler, Tedijanto, Goldstein, Grad & Lipsitch, 2020). This means that there

could be still uncertainty until 2024, since the COVID-19 measures could still vary in this timeframe. Therefore, this research is relevant, since it is a study in the middle of the expected timeframe of COVID-19, in order to evaluate the impact of COVID-19 on the previously mentioned association before the COVID-19 era finishes.

Moreover, there has been a previous study by Ayres et al. (2019), which finds that goodwill impairments lead to an increase in the probability of auditor dismissals. This effect might change if there is an addition in uncertainty during COVID-19 within the society. This uncertainty can influence the association between goodwill impairments and auditor dismissals, which might result in an acceptance of a higher amount of goodwill impairments or maybe a higher amount of auditor dismissals because of this uncertainty. Therefore, the finding of Ayres et al. (2019) might not hold when a goodwill impairment is more obvious, meaning that there needs to come new research about this association with a moderating role when goodwill impairments are more unambiguous. This paper chooses COVID-19 as the mechanism when goodwill impairments are more unambiguous, since this is the most recent event where uncertainty and the economy is being affected. Looking at previous events, this might lead to the other results, depending on the characteristics of these events, but using the most recent data might give a better view of the current stage of the economy, because of the technological developments in recent years.

The results of this study can still be used even after COVID-19 ends. There might be numerous other events or crises which might lead to a more expected goodwill impairment. Since this study uses the most up-to-date data, this might predict the outcomes of future events whereby the goodwill impairment becomes more unambiguous.

As last, this research is important for regulators, in order to see whether regulators should impose measures on the association between goodwill impairments and auditor dismissals when goodwill impairments are more expected, so that the audit quality does not decrease in the future. Next to this, this study is also important for audit firms, so that they know what one of the reasons could be that client firms leave an audit firm when a goodwill impairment become more unambiguous. This study is also important for stakeholders of the audit firm’s clients, since this research might give the stakeholders a true view of a reason why a company might decide to leave an auditor.

This study is structured as follows: Chapter 2 will explain the literature review and the hypothesis development of this study. Chapter 3 will explain the methodology of this study. Chapter 4 will explain the results of this study. Chapter 5 will explain the robustness test results. As last, chapter 6 will explain the conclusion of this study.

2. Literature review and hypothesis development

The three main topics of this study are goodwill impairments, auditor dismissals and an event when goodwill impairments become more unambiguous. The mechanism of an event when goodwill impairments become more unambiguous is measured by COVID-19. These topics will be explained within the same order within this chapter. The associations between these topics will also be explained within this chapter.

2.1 Goodwill impairments

The study of Ayres et al. (2019) conducts their study because of the extra challenges auditors face due to the elimination of goodwill amortization in 2001. The Financial Accounting Standards Board (FASB) decided to eliminate goodwill amortization in order to give investors a better view of the current goodwill value and decided to create a new standard, SFAS 142, which goes about tests for impairments of goodwill (Chalmers, Godfrey & Webster, 2011). For a goodwill impairment, all assets of a company need to be tested for impairment (Verriest & Gaeremynck, 2009). For a goodwill impairment to occur, a company's asset's carrying amount should exceed the recoverable amount. When this happens, the goodwill impairment and the carrying amount will be equal to the recoverable amount. This information is stated in IAS 36 Impairment of Assets. Previously, companies were amortizing their goodwill. The amortization of intangible assets that usually have "a long life", such as goodwill, previously had a life expectancy that could not exceed forty years (Li & Sloan, 2017). Next to this, intangible assets which usually have "a long life" could also get impairment provisions, which was stated in SFAS 121 (Li & Sloan, 2017).

Chalmers et al. (2011) conclude with their analysis that the switch from goodwill amortization to goodwill impairments is a good decision, since the value of a company's goodwill now better reflects the economic value. As a contradiction, Li and Sloan (2017) find that there are inflated goodwill amounts currently on the company's balance sheet due to goodwill impairments, while this probably is not the case if there is goodwill amortization. The study of Li and Sloan (2017) gives multiple reasons why the authors think that a switch from a goodwill amortization to a goodwill impairment is not a good decision. The first reason of Li and Sloan (2017) is that the impairment test which is currently being executed in order to test for a goodwill impairment is subjective. The second reason of Li and Sloan (2017) is that a fair value estimate for goodwill is difficult to determine, resulting in managerial discretion. As last, Li and Sloan (2017) state that goodwill impairments eliminate the pooling method when a company acquired another company, because in the pooling method, goodwill is not recognized. The authors claim that this could lead to more aggressive accounting, since assets are only impaired when

there is evidence for it. As a result, the inflation of goodwill amounts is coming from the manager's discretion for goodwill impairments (Li & Sloan, 2017). After some revisions, IAS 36 requires companies to disclose the assumptions which they took in order to impair the company's goodwill and companies also need to disclose the approach which they made in order to calculate whether there needs to be a goodwill impairment (Camodeca, Almici & Bernardi, 2013). As a result, the findings of Chalmers et al. (2011), Li and Sloan (2017) and Camodeca et al. (2013) contribute to the debate whether the switch from SFAS 121 towards SFAS 142 is a good decision.

In addition to the second reason of why a goodwill impairment has inflated goodwill amounts by Li and Sloan (2017), the study of Giner and Pardo (2015) finds that managers use discretion for goodwill impairments in order to take a big bath or to smooth the earnings of a firm. When companies are taking a bath or when a company is smoothing their earnings, this is a sign of earnings management within a firm. A big bath means that a company uses discretionary accruals in order to reduce their period's earnings when a company is already experiencing a loss within that same period (Jordan & Clark, 2004). Earnings smoothing means that a company reduces the variation in dividend payout ratio and keep a constant dividend level by keeping their earnings constant (Liu & Espahbodi, 2014). As a contradiction, the study of Caruso, Ferrari and Pisano (2016) finds that there is no strong evidence which states that goodwill impairment is used in order to manage earnings.

Moreover, goodwill is not associated with any other item on the balance sheet and therefore, if a company plans their future in order to prevent goodwill impairments, this future plan can give satisfying results towards a company (Seetharaman, Sreenivasan, Sudha & Yee, 2006). However, a goodwill impairment could have several consequences for a firm. The study of Li, Shroff, Venkataraman and Zhang (2011) finds that the investors' expectation is going downward after a goodwill impairment and that a goodwill impairment is an important factor to show a decrease of future profits. In addition, the study of Bens, Heltzer and Segal (2011) concludes that if there is an unexpected goodwill impairment, the stock market reaction is negative. A reason for these negative consequences might be that He, Chen and Tang (2021) find that there is a higher chance to get a modified audit opinion if the amount of a company's goodwill impairment increases. Moreover, He et al. (2021) find that auditors look at a goodwill impairment as an information risk. Furthermore, Cowan, Jeffrey and Wang (2021) find that a forced CEO turnover is the result of goodwill impairments when the goodwill impairment is unexpected.

2.2 Auditor dismissals

A company can switch for several reasons from auditor (Davidson III, Jiraporn & DaDalt, 2006). If a company switches from auditor because of "opinion shopping", this might have negative consequences to the audit quality and the auditor independence of an engagement (Hunt, Rosser & Rowe, 2021). Opinion shopping occurs when a company switches from auditor with the goal to get an audit opinion which is favorable for the company (Krishnan & Stephens, 1995). Furthermore, Lennox (2000) finds that companies switch more often from auditor if a company gets a modified audit opinion. Lennox (2000) also finds that there is an increase in the probability that an audit opinion is changing when a company changes from auditor. Due to these two results, Lennox (2000) concludes that there is opinion shopping going on within the economy at the moment. The SEC has imposed several regulations in order to prevent opinion shopping, for example through the Form 8-k and the Sarbanes-Oxley Act of 2002. However, Dhaliwal et al. (2015) find that one of these regulations, the Sarbanes-Oxley Act of 2002, does not decrease the probability of opinion shopping that much as the management still has a lot of influence in the auditor selection of a company.

Furthermore, Davidson III et al. (2006) find that earnings management is higher when a company receives a modified audit opinion from a Big 6 auditor and then switches to a non-Big 6 auditor. In addition, DeFond, Zhang and Zhao (2019) find that if there is an auditor switch, the magnitude of discretionary income-increasing estimations is changing, resulting in the outcome that managers are opinion shopping, which is the same outcome as Lennox (2000). Singer and Zhang (2021) find that companies switch from auditor in order to prevent the discovery of a material misstatement. Moreover, auditor independence is influenced by audit tenure (Davis, Soo & Trompeter, 2002).

2.3 The association between goodwill impairments and auditor dismissals

Looking at the association between the two main topics which have been discussed so far, Ayres et al. (2019) conclude that goodwill impairments lead to an increase in the probability of auditor dismissals. Ayres et al. (2019) document that auditors also get relational challenges with the addition of goodwill impairments, next to the practical challenges of implementing the SFAS 142 standard. Furthermore, Chambers and Finger (2011) find that companies want to avert or that companies want to delay goodwill impairments. In addition, Carlin, Ji and Finch (2010) find that companies use mechanisms in order to avoid unwanted impairments. The findings of Chambers and Finger (2011) and Carlin et al. (2010) help to understand why the finding of Ayres et al. (2019) is reasonable.

If a company wants to avoid or delay a goodwill impairment, this could lead to an auditor dismissal.

2.4 An event when a goodwill impairment becomes more unambiguous

To check when a goodwill impairment is more unambiguous, this study uses COVID-19 as its mechanism. According to Altig et al. (2020), COVID-19 adds uncertainty within the society. This finding can influence the association between goodwill impairments and auditor dismissals since the society is becoming more uncertain, which could mean an acceptance of a higher amount of goodwill impairments or maybe a higher amount of auditor dismissals because of this uncertainty. In addition, the study of Atanasov (2021) also states that there were adverse changes in several environments which may affect companies, meaning in lower economic results than expected. Atanasov (2021) also states that the market capitalization of net assets is lower than the carrying amount.

Moreover, the study of Beams and Yan (2015) states that auditors become more conservative during the financial crisis. The financial crisis is another setting of when goodwill impairments become more unambiguous, because the global financial crisis is also linked with uncertainty (Nelson & Katzenstein, 2014). The findings of Beams and Yan (2015) might also give an indication for the result of how auditors react during COVID-19, since conservatism means that an auditor states that earnings follow bad news quicker than good news (Basu, 1997). This could mean that an auditor might require a higher degree of verification in order to prevent a goodwill impairment and thus this means that it could affect the association between goodwill impairments and auditor dismissals when a goodwill impairment becomes more expected. The study of Lee, Taylor and Taylor (2006) finds that if there is a higher audit quality, this leads to a higher level of conservatism. This finding could mean that there is a higher audit quality when a goodwill impairment becomes more obvious, which could result in a bigger chance for auditors to issue a higher quality goodwill impairment. Moreover, Shen, Fu, Pan, Yu and Chen (2020) find that COVID-19 has a negative association with firm performance. Specifically, Goswami, Mandal and Nath (2021) find that the result between COVID-19 and firm performance depends on the firm industry. Because of these findings, firms might accept a goodwill impairment faster, leading to a lower probability of auditor dismissals during such events.

The study of Mareque, López-Corrales and Pedrosa (2017) research the association for going concern reporting during the global financial crisis. Mareque et al. (2017) find that there is an increase of going concern reports during the global financial crisis. This result could indicate that goodwill impairments will increase when a goodwill impairment becomes more unambiguous. As a contradiction, Johnsson and Persson (2021) find that

the impact on audit quality is not that high during COVID-19 than what was expected before. Moreover, Johnsson and Persson (2021) state that there is an indication that a going-concern assessment is more complex during COVID-19 and threatens audit quality. The results of Johnsson and Persson (2021) cannot be taken for granted due to the paper's research method, but the results of the paper of Johnsson and Persson (2021) can be used in order to assess the audit quality and thus the chance of having an appropriate amount of goodwill impairment during COVID-19.

Nonetheless, when an environment accepts that a goodwill impairment becomes more unambiguous, this might also indicate that the audit quality is not as high as it has usually been. Shahzad, Pouw, Rubbaniy and El-Temtamy (2018) find that there is an increase in audit quality during the financial crisis. As a contradiction, Persakis and Iatridis (2016) state that audit quality is lower during the financial crisis.

2.5 The association between goodwill impairments and an event when a goodwill impairment becomes more unambiguous

The study of Chen, Schroff and Zhang (2019) finds that the frequency of a market-driven goodwill impairment triples during a financial crisis. Furthermore, André, Filip and Paugam (2016) find that US firms impair more likely when there are economic indicators of a potential impairment, especially in the beginning stages of a financial crisis. As a contradiction, Izzo, Luciani and Sartori (2013) conclude that the amount of a company's goodwill impairment does not change during the financial crisis. Sapkauskiene, Leitoniene and Vainiusiene (2016) also state that the financial crisis has no effect on the amount of goodwill impairments. Gaio, Gonçalves and Pereira (2021) state however that companies show less impairments during the financial crisis. Looking at the results of Schroff and Zhang (2019), André et al. (2016), Izzo et al. (2013), Sapkauskiene et al. (2016) and Gaio et al. (2021), there can be a conclusion made that prior literature provides mixed evidence. Because of the mixed evidence by prior research, this study will check what happens with the frequency of goodwill impairments when a goodwill impairment becomes more obvious. Therefore, the first hypothesis of this study is as follows:

H1: There is more often a goodwill impairment for clients of audit firms during an event when a goodwill impairment becomes more unambiguous.

2.6 The association between auditor dismissals and an event when a goodwill impairment becomes more unambiguous

Ismail et al. (2008) state that companies switch when they get a qualified opinion from their auditor during the Asian financial crisis. Furthermore, Richardson (2006) concludes that there are more switches from bigger audit firms to smaller audit firms during The Great Depression. Regarding the auditor dismissal theory by earnings management which has been stated before, Türegün (2020) finds that earnings management decrease during crisis years. Türegün (2020) states that this comes because investors accept a poorer performance during crisis years. Combining this result with the aforementioned results, this could mean that there could be less goodwill impairments when goodwill impairments are more expected, since goodwill impairments might be linked with earnings management.

2.7 Technological developments

However, there is a difference in the economy in the past few years. Bernanke and Olson (2016) find that the economic welfare increased compared to previous years. Next to this, there are also nowadays new types of firms within the economy. Companies which operate for example in Fintech could change the economy (Tao, Su, Naqvi & Rizvi, 2022). Tao et al. (2022) find that more Fintech developments lead to a greener and reduce gas emissions. Furthermore, there has also come an introduction of cryptocurrency in the recent economy. Cryptocurrency is a medium of exchange whereby it is not dependent on for example national borders and central banks (Maese, Avery, Naftalis, Wink & Valdez, 2016). Next to this, cryptocurrency only exists in the digital world (Ertz & Boily, 2019). “The digital world” is also an addition to the economy in the last couple of years, especially in the “circular economy”. Internet of Things (IoT), big data, digital technologies and data analytics are important for the circular economy (Kristoffersen, Blomsma, Mikalef & Li, 2020). These are just some examples in order to show how the economy has changed, related to prior crises or events whereby a goodwill impairment become more unambiguous. Therefore, the results of the financial crisis or other previous events cannot be used in order to predict what exactly shall happen during COVID-19 or an event in the future.

As last, the audit work has also changed due to the technological developments. For example, the study of Christ, Emett, Summers and Wood (2021) studies the usage of drones in order to measure the inventory of a company correctly and show that this is much more efficient than when auditors use manual techniques. Due to these technological developments, there is also a shift in the job offerings in the audit market,

because audit firms require specific skills and ultimately improve audit quality because of these requirements (Law & Shen, 2020). Looking at the changes within the economy and the changes within the audit profession, it is important to look at what happens within the current economy, whereby the previous crises could give an indication of what might happen during a crisis within the current economy. However, previous crises might not give an exact outcome of what will happen currently within the economy.

Following the discussion above and the research question which has been stated in the introduction, this research formulates the second hypothesis in the following way:

H2: There are less auditor dismissals following a goodwill impairment during an event when a goodwill impairment becomes more unambiguous.

3. Methodology

3.1 Models used within this study

The model which will be used for hypothesis 1 within this study is the following:

$$\mathbf{IMPAIR=\alpha+ \beta_1*COVID + \beta_2*PCT\_PIA\_GW + \beta_3*LOSS + \beta_4*LEVERAGE + \beta_5*ROA + \beta_6*\Delta ROA + \beta_7*GOODWILL\_ACQ + \beta_8*\Delta EBITDA + \beta_9*MKTVAL\_BKVAL + \beta_{10}*BIG4 + \beta_{11}*\Delta SALES + \beta_{12}*SIZE + \beta_{13}*CASH + \beta_{14}*RESTRUCTURE + \beta_{15}*INDUSTRY + \varepsilon}$$

(Model 1)

This research checks for the first hypothesis whether COVID-19 has an impact on the frequency of impairments. Therefore, this study uses a model whereby the main variable *COVID* is, and this study uses control variables which are often used by prior research for goodwill impairments. The dependent variable *IMPAIR* is a dummy variable, whereby it is equal to “1” if there is a material goodwill impairment and it is equal to “0” if there is an immaterial goodwill impairment or if there is no goodwill impairment recorded for the company. The independent variable *COVID* is a dummy variable, which is equal to “1” if the timeframe is during the COVID-19 timeframe and “0” if not. The data which is used for the first model is collected from Compustat.

To clarify, this study uses the begin date of the 30th of January 2020 for the variable *COVID*, since the World Health Organization (WHO) announced the COVID-19 virus as a “public health emergency of international concern (PHEIC)” at that date (World Health Organization, 2020). The end date of the variable *COVID* is the 29th of January 2022. The reason for this is because this study is being conducted during 2022 and therefore

any future date might have an impact on the availability of data. The pre COVID-19 timeframe is being chosen from the 30th of January 2018 until the 29th of January 2020, in order to have an equal pre and during timeframe for this study's difference-in-difference design model.

Next to this, Ayres et al. (2019) use only firms within their database for which a goodwill impairment is material. This study shall not use the same decision which has been taken by Ayres et al. (2019). This study includes the firms whereby the goodwill impairment is immaterial within this study's database, however, if there is an immaterial goodwill impairment this study shall set the dummy variable *IMPAIR* to "0".

As explained in the literature review, the expectation of this study is that there is more often a goodwill impairment when a goodwill impairment becomes more obvious. Next to this, the control variables which are being used for the first model are mainly from Ayres et al. (2019), since this study is an addition to Ayres et al. (2019). Furthermore, $\Delta EBITDA$ and ΔROA are control variables from Hayn and Hughes (2006)**,** which is a paper that goes about what the determinants of goodwill impairments are. In order to know more specifically about the variables which are used within this model, Table 13 in the Appendix gives the variable description.

The model which will be used for hypothesis 2 within this study is the following:

$$\mathbf{DISMISS=\alpha+ \beta_1*IMPAIR + \beta_2*COVID + \beta_3*IMPAIR*COVID + \beta_4*SIZE + \beta_5*INDUSTRY + \beta_6*TRT + \beta_7*DISCRACCR + \beta_8*GROWTH + \beta_9*SHORTAUTENURE + \beta_{10}*RECEIVABLES + \beta_{11}*ROA + \beta_{12}*CASH + \beta_{13}*LOSS + \beta_{14}*LEVERAGE + \beta_{15}*G\_CONC + \beta_{16}*MERG\_ACQ + \beta_{17}*BIG4 + \beta_{18}*RESTATEMENT + \varepsilon}$$

(Model 2)

For the second model, this research uses a difference-in-difference design whereby COVID-19 the exogeneous effect is. The data will be collected from Compustat and Audit Analytics. All financial related data is collected from Compustat and the audit related data is collected from Audit Analytics. The reason for the choice of these databases is because the second hypothesis of this study is an addition to the first hypothesis of Ayres et al. (2019) and therefore this research shall choose the same databases as their research.

Moreover, for the variable *IMPAIR*, this study computes this variable in the same way as explained for the variable *IMPAIR* in the first model. Next to this, this study removes all of the observations whereby the auditor is resigning, just like in Ayres et al. (2019).

As explained in the literature review, this study expects that there are less auditor dismissals following a goodwill impairment when a goodwill impairment becomes more expected. Regarding the control variables of this study, there is a higher probability of a change in auditor if the audit risk increases (Landsman, Nelson & Rountree, 2009). Following Ayres et al. (2019), audit risk increases depending on the sign and the size of discretionary accruals, the growth rate of a company, a short audit tenure and if there is a large number of receivables. Therefore, audit risk is thus decomposed into these control variables, like in Ayres et al. (2019). Moreover, Landsman et al. (2009) state that companies with more financial risk have a higher probability of an auditor switch. Hereby, Ayres et al. (2019) use ROA as a measure of financial risk and this is decomposed into cash, losses, high amount of leverage, and financial distress. Therefore, this research shall also decompose financial risk into these aforementioned components. Next to this, Mande and Son (2013) find that a company changes auditor after a restatement is issued. As last, in Table 13 in the Appendix, the variable description is given.

3.2 Sample

Regarding this study's sample selection, this is stated in Table 1 and 2. This study's timeframe is from the 30th of January 2018 until the 29th of January 2022 for both models. This study removes the financial firms within both samples, due to the complex structure which these companies have. Furthermore, for the second model, this study removes the observations where the auditor resigned, since this study focuses on the choice of auditor dismissals by the company itself and therefore it removes the observations where the auditor chose to resign from the company. As last, missing values which are needed to compute the control variables within this study are removed and the observations where companies have negative equity and negative revenues are removed. Only Compustat is being used for Model 1. For Model 2, the data comes from Compustat and Audit Analytics. The final sample for Model 1 contains 11,152 observations and the final sample for Model 2 contains 13,858 observations.

To clarify, Ayres et al. (2019) remove the observations based on their sample of their first model, however this study choses to have two separate samples, as otherwise observations may be removed which do not have to be removed in order to find an answer for the second hypothesis.

Table 1: Sample selection for Model 1

Sample selection – Model 1	
Initial sample	11,070 firms and 37,224 observations
Less: Removal of financial firms	4,969 firms and 16,210 observations
Less: Removal of missing values and negative equity and revenue observations for control variables	2,602 firms and 9,862 observations
Final sample	3,499 firms and 11,152 observations

Table 2: Sample selection for Model 2

Sample selection – Model 2	
Initial sample	11,065 firms and 37,986 observations
Less: Removal of financial firms	4,968 firms and 16,380 observations
Less: Years when the auditor resigned	4 firms and 335 observations
Less: Removal of missing values and negative equity and revenue observations for control variables	1,754 firms and 7,413 observations
Final sample	4,339 firms and 13,858 observations

3.3 Industry

In Table 3 and Table 4, the industry selection can be found. This study has a limitation when looking at the outcomes of this study. Most of the companies have an industry code which is between 2000 and 3999. These industry codes are manufacturing companies. Furthermore, a lot of companies also have an industry code which is between 7000 and 8999. These industry codes are service companies. Because the biggest part of this study's sample comes from these two industries, the results will mainly be biased for these industries.

Table 3: Industry selection for Model 1

Industry code	Observations
0100-0999	40
1000-1499	737
1500-1799	167
1800-1999	0
2000-3999	5,636
4000-4999	1,133
5000-5199	433
5200-5999	686
7000-8999	2,293
9100-9729	0
9900-9999	27

Table 4: Industry selection for Model 2

Industry code	Observations
0100-0999	55
1000-1499	822
1500-1799	168
1800-1999	0
2000-3999	6,639
4000-4999	1,887
5000-5199	469
5200-5999	765
7000-8999	3,014
9100-9729	0
9900-9999	39

4. Results

4.1 Descriptive statistics

In Table 5 and Table 6, the descriptive statistics are given for Model 1 and Model 2 respectively after the variables have been winsorized. In Table 5, the mean of *COVID* is 50%, which means that there is approximately an equal distribution between the pre COVID-19 timeframe and the during COVID-19 timeframe. Next to this, for Model 1, 10% of the observations has a material impairment. Moreover, approximately 42% of the observations recorded a loss and 47% of the observations have a market value of the company which is below the book value of the company. As last, 66% of the

observations use a Big 4 auditor and 35% of the observations have a restructuring process going on within the firm.

In Table 6, the mean of COVID is 24%, which means that 24% of the observations are during the COVID-19 timeframe and 76% are in the pre COVID-19 timeframe. Next to this, 5% of the observations dismiss their auditor and 10% of the observations have a material goodwill impairment. The difference in the mean of *COVID* in Table 5 and Table 6 is because Table 6 uses two databases, while Table 5 uses only one database. Furthermore, an auditor dismissal is the consequence of an event which happens in the year prior to the auditor dismissal. Therefore, this study deducts one year of the auditor dismissal in order to match the data with the correct year. Since this study is being performed during 2022, there are not many observations for auditor dismissals in 2022, which is 2021 after deducting one year. Therefore, the mean of *COVID* is lower than in Table 5.

Moreover, 70% of the observations use a Big 4 auditor and 41% of the observations have a loss. As last, 44% of the observations have a short audit tenure and 4% of the observations get a restatement.

Table 5: Descriptive statistics for Model 1

Variable	Observations	Minimum	Maximum	Mean	Std. Deviation
IMPAIR	11,152	.000	1.000	.100	.304
COVID	11,152	.000	1.000	.500	.500
PCT_PIA_GW (in %)	11,152	.000	51.873	12.231	14.968
LOSS	11,152	.000	1.000	.420	.494
LEVERAGE	11,152	.000	4.835	1.611	1.427
ROA (x100%)	11,152	-.370	.320	-.029	.157
∆ROA (x100%)	11,152	-.169	.173	.002	.091
GOODWILL_ACQ	11,152	.000	1.000	.230	.421
∆EBITDA (in %)	11,152	-32.104	23.296	-.026	.705
MKTVAL_BKVAL	11,152	.000	1.000	.470	.499
BIG4	11,152	.000	1.000	.660	.473
∆SALES (in %)	11,152	-44.532	62.232	9.852	26.623
SIZE (x$1,000,000)	11,152	-.041	13.025	6.623	2.311
CASH	11,152	.000	.565	.161	.164
RESTRUCTURE	11,152	.000	1.000	.350	.478

Note: Table 5 provides the descriptive statistics for Model 1. The variables which have outliers have been winsorized at a 5% level. The description of the variables used within this study can be found in Table 13 in the Appendix. Furthermore, the log transformed variables are being represented as the absolute value for the descriptive statistics.

Table 6: Descriptive statistics for Model 2

Variable	Observations	Minimum	Maximum	Mean	Std. Deviation
DISMISS	13,858	.000	1.000	.050	.223
COVID	13,858	.000	1.000	.240	.429
IMPAIR	13,858	.000	1.000	.100	.303
SIZE (x$1,000,00)	13,858	-3.352	9.199	6.643	2.114
TRT	13,858	-.017	.350	.144	.091
DISCRACCR	13,858	-3.414	4.285	.505	1.321
GROWTH (in %)	13,858	-45.755	65.024	10.451	26.813
SHORTAUTENURE	13,858	.000	1.000	.440	.496
RECEIVABLES	13,858	.000	1.000	.111	.102
ROA (x100%)	13,858	-.338	.272	-.027	.139
CASH	13,858	.000	.998	.168	.201
LOSS	13,858	.000	1.000	.410	.492
LEVERAGE	13,858	.000	4.181	1.553	1.193
G_CONC	13,858	.000	1.000	.010	.093
MERG_ACQ	13,858	.000	1.000	.350	.477
BIG4	13,858	.000	1.000	.700	.458
RESTATEMENT	13,858	.000	1.000	.040	.199

Note: Table 6 provides the descriptive statistics for Model 2. The variables which have outliers have been winsorized at a 5% level. The description of the variables used within this study can be found in Table 13 in the Appendix. Furthermore, the log transformed variables are being represented as the absolute value for the descriptive statistics.

4.2 Logistic regression and linear regression results

In Table 7, the logistic regression and the linear regression results are given from the first model. This study finds that there is no association between COVID-19 and goodwill impairments, since the coefficient is insignificant. This finding means that the first hypothesis is rejected. Furthermore, this study shows that if the percentage of pre impairment assets divided by goodwill increases, the more likely it is that there is a goodwill impairment and if there is a loss within a company, the more likely a goodwill impairment will follow. Moreover, if the return on assets increases, the less likely a goodwill impairment follows. Furthermore, if the market value is below the book value of the company, the size of a company gets bigger or if the goodwill increases because of an acquisition, the more likely a goodwill impairment will follow. As last, if a company uses a Big 4 auditor, have an increase in the cash divided by assets ratio or have an increase in sales compared to the previous year, the less likely a goodwill impairment will follow.

The insignificant result between *COVID* and *IMPAIR* shows why the prior literature provides mixed evidence of this association. The result of this study is the same as the paper of Sapkauskiene et al. (2016), which documents that there is no relation between

a crisis and goodwill impairments. If there is a change within the research setting, a study might find a negative or positive effect. Therefore, the association between a crisis and goodwill impairments must be further looked upon in future research.

In Table 8, the logistic regression and the linear regression results of Model 2 are given. There is an insignificant result for auditor dismissals following a goodwill impairment during COVID-19. This means that the second hypothesis is rejected, because there is no association between goodwill impairments and auditor dismissals when a goodwill impairment becomes more unambiguous. However, the coefficient between *DISMISS* and the interaction variable *IMPAIR*COVID* is significant in a linear regression. This difference might come because this study is being conducted during 2022, meaning that in the future, with more data and thus more power, a significant result could be found in a logistic regression. Furthermore, the coefficient between COVID-19 and auditor dismissals is negative and significant at a 10% level. This means that the probability of auditor dismissals is lower during COVID-19. Future research might look further into this result to find out what the exact reason is that there is a lower probability of auditor dismissals during COVID-19. Moreover, a goodwill impairment leads to a higher probability of auditor dismissals and this is the same finding as Ayres et al. (2019).

Furthermore, if a company gets bigger in size and uses a Big 4 auditor, this leads to a lower probability of auditor dismissals. As last, if a company has a higher trade receivable divided by turnover ratio, a company has a loss, if a company engages in a merger or acquisition or if a company gets a restatement, there is a higher probability of an auditor dismissal.

Table 7: Logistic regression and linear regression results for Model 1

	LOGISTIC REGRESSION		LINEAR REGRESSION
Variable	Coefficient	Wald stat.	Coefficient
(CONSTANT)	-4.266**	64.995	-.090***
			(-6.975)
COVID	-.017	.060	.002
			(.352)
PCT_PIA_GW	.014***	26.415	.001***
			(4.748)
LOSS	.903***	88.435	.103***
			(11.994)
LEVERAGE	-.026	1.091	-.001
			(-.442)
ROA	-1.747***	19.512	-.033
			(-1.140)
∆ROA	-5.303***	111.839	-.400***
			(-11.894)
GOODWILL_ACQ	.148*	2.941	.000
			(-.036)
∆EBITDA	.066	2.664	.003
			(.762)
MKTVAL_BKVAL	.840***	105.564	.073***
			(11.605)
BIG4	-.484***	25.068	-.043***
			(-5.533)
∆SALES	-.008***	26.633	.000***
			(-4.174)
SIZE	.268***	114.966	.019***
			(9.856)
CASH	-1.737***	28.985	-.074***
			(-3.450)
RESTRUCTURE	.532***	50.221	.054***
			(8.396)
INDUSTRY FIXED EFFECTS	No		Yes
PSEUDO R2	.227		
ADJUSTED R2			.108

Note: Table 7 shows the logistic regression and linear regression results of this study for Model 1. The variable description of the variables used within this study can be found in Table 13 in the Appendix. Furthermore, the T-value is defined in parentheses for the linear regression results. ***, ** and * tells the statistical significance of a coefficient, which means that it is significant at a 1%, 5% and 10% level respectively.

Table 8: Logistic regression and linear regression results for Model 2

	LOGISTIC REGRESSION		LINEAR REGRESSION
Variable	Coefficient	Wald stat.	Coefficient
(CONSTANT)	-1.999*	3.614	.094***
			(9.072)
COVID	-.202*	3.096	-.007*
			(-1.666)
IMPAIR	.430***	9.974	.021***
			(3.331)
IMPAIR*COVID	-.679	1.944	-.029*
			(-1.719)
SIZE	-.226***	49.583	-.010***
			(-6.838)
TRT	1.604***	9.697	.066***
			(2.767)
DISCRACCR	-.027	.437	-.001
			(-.389)
GROWTH	-.001	.235	.000
			(-.447)
SHORTAUTENURE	-.081	.897	-.003
			(.885)
RECEIVABLES	.107	.061	.022
			(.971)
ROA	.372	.691	-.007
			(-.324)
CASH	-.008	.001	-.007
			(-.583)
LOSS	.264**	4.071	.007
			(1.236)
LEVERAGE	.026	.496	.001
			(.795)
G_CONC	23.796	.000	.917***
			(49.112)
MERG_ACQ	.381***	15.144	.014***
			(3.512)
BIG4	-.403***	12.186	-.021***
			(-4.155)
RESTATEMENT	.401**	5.636	.024***
			(2.686)
INDUSTRY FIXED EFFECTS	No		Yes
PSEUDO R2	.218		
ADJUSTED R2			.179

Note: Table 8 shows the logistic regression and linear regression results of this study for Model 2. The variable description of the variables used within this study can be found in Table 13 in the Appendix. Furthermore, the T-value is defined in parentheses for the linear regression results. ***, ** and * tells the statistical significance of a coefficient, which means that it is significant at a 1%, 5% and 10% level respectively.

4.3 Correlation matrix

In Table 9a and Table 9b and in Table 10a and Table 10b, the correlation matrices for Model 1 and Model 2 are given. Regarding Table 9a and Table 9b, the correlation between *COVID* and *IMPAIR* is insignificant. Overall, for almost all variables there is not a strong correlation between variables. There is a moderate correlation between *SIZE* and *BIG4*. However, the correlation between *LOSS* and *ROA* is higher than 0.75, resulting in a strong correlation. Although, *LOSS* and *ROA* are uncorrelated with the variable of interest.

Regarding Table 10a and Table 10b, the correlation between *COVID* and *DISMISS*, the correlation between *IMPAIR* and *DISMISS* and the correlation between *IMPAIR* and *COVID* are uncorrelated. Regarding the control variables, there are some variables which have a moderate correlation with each other. These are the correlations between the variables *RECEIVABLES* and *TRT* and the correlation between *BIG4* and *SIZE*. There is one strong correlation between *LOSS* and *ROA*, because it exceeds 0.75. In Model 1, there is also a strong correlation between both variables. However, *LOSS* and *ROA* are uncorrelated with the variables of interest.

Table 9a: Correlation matrix for Model 1

Variable	IMPAIR	COVID	PCT_PIA_GW	LOSS	LEVERAGE	ROA	∆ROA	GOODWILL_ ACQ
IMPAIR	1.000	-.005	.086**	.137**	.100**	-.095**	-.184**	.030**
COVID		1.000	-.013	.049**	.002	-.022*	.081**	-.012
PCT_PIA_GW			1.000	-.192**	.068**	.194**	.007	.414**
LOSS				1.000	.020**	-.756**	-.225**	-.146**
LEVERAGE					1.000	-.009	-.045**	.049**
ROA						1.000	.301**	.152**
∆ROA							1.000	-.003
GOODWILL_ ACQ								1.000

Table 9b: Correlation matrix for Model 1 (continued)

Variable	∆EBITDA	MKTVAL_BKVAL	BIG4	∆SALES	SIZE	CASH	RESTR UCTUR E
IMPAIR	-.037**	.167**	.031**	-.123*	.010**	-.113**	.146**
COVID	-.008	-.071**	-.001	.013	.036**	.124**	.013
PCT_PIA_GW	-.030**	-.101**	.191**	.012	.319**	-.268**	.296**
LOSS	-.084**	.033**	-.180**	-.077**	-.388**	.270**	-.091**
LEVERAGE	-.032**	.253**	.196**	-.049**	-.300	-.265**	.160**
ROA	.099**	.000	.204**	.082**	.439**	-.333**	.119**
∆ROA	.158**	-.072**	-.006	.287**	.009	.066**	-.037**
GOODWILL_ACQ	.023*	-.102**	.143**	.138**	.246**	-.145**	.157**
∆EBITDA	1.000	-.041**	-.012	.126**	-.013	.020*	-.024*
MKTVAL_BKVAL		1.000	-.005	.179**	.127**	-.335**	.067**
BIG4			1.000	.000	.641**	-.191**	-.246**
∆SALES				1.000	.007**	-.065**	-.147**
SIZE					1.000	.429**	.331**
CASH						1.000	-.175**
RESTRUCTURE							1.000

Note: Table 9a and Table 9b present the correlation matrix for the first model of this study. The variable description of the variables used within this study can be found in Table 13 in the Appendix. If a correlation contains **, this means that it is significant at a 1% level. If a correlation contains *, this means that it is significant at a 5% level.

Table 10a: Correlation matrix for Model 2

Variable	DISMISS	COVID	IMPAIR	SIZE	TRT	DISCRACCR	GROWTH	SHORTAUTENURE	RECEIVABLES
DISMISS	1.000	-.028**	.021*	-.162**	.049**	-.053**	-.007	-.006	.055**
COVID		1.000	-.090**	.039**	.009	-.023**	.207**	-.047**	-.055**
IMPAIR			1.000	.100**	-.013	-.054**	-.123**	-.011	.008
SIZE				1.000	-.114**	.172**	-.032**	-.005	-.224**
TRT					1.000	-.219**	-.021*	-.002	.506**
DISCRACCR						1.000	-.097**	.008	-.159**
GROWTH							1.000	-.020*	-.019*
SHORTAUTENURE								1.000	-.006
RECEIVABLES									1.000

Table 10b: Correlation matrix for Model 2 (continued)

Variable	ROA	CASH	LOSS	LEVERAGE	G_CONC	MERG_ACQ	BIG4	RESTATEMENT
DISMISS	-.106**	.072**	.095**	-.018*	.399**	.000	-.136**	.042**
COVID	.019*	.070**	-.019*	-.026**	-.003	.020*	.010	-.117**
IMPAIR	-.065**	-.101**	.114**	.087**	-.006	.103**	.030**	.009
SIZE	.442**	-.476**	-.397**	.289**	-.124**	.248**	.642**	-.070**
TRT	-.081**	.046**	.107**	-.069**	.011	.088**	-.109**	.003
DISCRACCR	.232**	-.327**	-.189**	.131**	-.043**	-.170**	.045**	-.020*
GROWTH	.037**	.101**	-.027**	-.065**	-.003	.066**	.009	.001
SHORTAUTENURE	.006	-.001	-.016	-.012	.006	-.001	.005	-.006
RECEIVABLES	.124**	-.106**	-.060**	.012	-.004	.019*	-.197**	.027**
ROA	1.000	-.405**	-.753**	.013	-.133**	.113**	.192**	-.029**
CASH		1.000	.323**	-.304**	.094**	-.166**	-.193**	.010
LOSS			1.000	-.008	.092**	-.078**	-.176**	.007
LEVERAGE				1.000	-.008	.090**	.186**	-.023**
G_CONC					1.000	-.017*	-.089**	.024**
MERG_ACQ						1.000	.153**	-.001
BIG4							1.000	-.067**
RESTATEMENT								1.000

Note: Table 10a and Table 10b present the correlation matrix for the second model of this study. The variable description of the variables used within this study can be found in Table 13 in the Appendix. If a correlation contains **, this means that it is significant at a 1% level. If a correlation contains *, this means that it is significant at a 5% level.

4.4 Independent t-test

In Table 11 and Table 12, the independent t-test for Model 1 and Model 2 are given respectively. Regarding Table 11, this study's sample shows that the mean of *IMPAIR* does not change if *COVID* turns into "1" and that it is insignificant. Therefore, it is reasonable to expect that the logistic or linear regression shows insignificant results. Furthermore, Table 11 shows that the observations within this study's sample make on average less losses and the change in sales becomes lower when *COVID* becomes "1". Moreover, there are more observations that shows that the company's market value is below the book value when *COVID* turns "1".

Regarding Table 12, this study's sample shows that there are less auditor dismissals during COVID-19 than before COVID-19. It is thus reasonable to expect also a negative coefficient in the logistic regression or within the linear regression within this study's results. There are also less goodwill impairments during COVID-19 than before COVID-19. This result shows that future research needs to find a better model in order to predict goodwill impairments, since the outcome for goodwill impairments depends on the control variables used.

There are also less observations which show losses when *COVID* turns "1" and the growth of revenues is higher than before COVID-19. Moreover, the ratio between cash and assets is higher during COVID-19. These findings could mean that companies use earnings management during COVID-19. This is a contradicting statement to the paper of Türegün (2020). Therefore, future research might try to look into the association between COVID-19 and earnings management because of these results.

Table 11: Independent t-test for Model 1

Variable	Observations	*COVID=0*	Observations	*COVID=1*	Mean difference	T-stat
IMPAIR	5,570	.010	5,582	.010	.000	-.568
PCT_PIA_GW	5,570	12.033	5,582	12.431	-.398	-1.404
LOSS	5,570	.450	5,582	.400	.050	5.160***
LEVERAGE	5,570	1.614	5,582	1.607	.007	.248
ROA	5,570	-.032	5,582	-.026	-.006	-2.274***
∆ROA	5,570	.009	5,582	-.006	.015	8.628***
GOODWILL_ACQ	5,570	.230	5,582	.240	-.010	-1.231**
∆EBITDA	5,570	-.032	5,582	-.020	-.012	-.872
MKTVAL_BKVAL	5,570	.440	5,582	.510	-.070	-7.561***
BIG4	5,570	.660	5,582	.660	.000	-.119
∆SALES	5,570	10.195	5,582	9.507	.688	1.365***
SIZE	5,570	6.707	5,582	6.539	.168	3.829*
CASH	5,570	.182	5,582	.141	.041	13.179***
RESTRUCTURE	5,570	.360	5,582	.350	.010	1.343***

Note: Table 11 provides the independent t-test for Model 1. Regarding the variables used within this study, this can be found in Table 13 in the Appendix. Furthermore, the mean difference is being calculated as *COVID=0* minus *COVID=1*. ***, ** and * define the statistical significance, whereby this means that is significant at a 1%, 5% and 10% level respectively.

Table 12: Independent t-test for Model 2

Variable	Observations	*COVID=0*	Observations	*COVID=1*	Mean difference	T-stat
DISMISS	10,481	.060	3,377	.040	.020	-3.279***
IMPAIR	10,481	.120	3,377	.050	.060	-10.673***
SIZE	10,481	6.597	3,377	6.790	-.373	4.617***
TRT	10,481	.143	3,377	.145	-.002	1.029
DISCRACCR	10,481	.522	3,377	.453	.069	-2.659
GROWTH	10,481	7.346	3,377	20.269	-12.923	24.887***
SHORTAUTENURE	10,481	.480	3,377	.420	.060	-5.489***
RECEIVABLES	10,481	.114	3,377	.101	.013	-6.481***
ROA	10,481	-.029	3,377	-.023	-.006	2.235
CASH	10,481	.161	3,377	.194	-.033	8.303***
LOSS	10,481	.420	3,377	.400	.020	-2.188***
LEVERAGE	10,481	1.568	3,377	1.496	.072	-3.085
G_CONC	10,481	.010	3,377	.010	.000	-.316
MERG_ACQ	10,481	.340	3,377	.370	-.030	2.400***
BIG4	10,481	.700	3,377	.710	-.010	1.176**
RESTATEMENT	10,481	.050	3,377	.000	.050	-13.870***

Note: Table 12 provides the independent t-test for Model 2. Regarding the variables used within this study, this can be found in Table 13 in the Appendix. Furthermore, the mean difference is being calculated as *COVID=0* minus *COVID=1*. ***, ** and * define the statistical significance, whereby this means that is significant at a 1%, 5% and 10% level respectively.

5. Robustness test

In Table 14 and Table 15 in the Appendix, the robustness tests are given for both Model 1 and Model 2 respectively. Ayres et al. (2019) decide to remove the observations which has an immaterial goodwill impairment off the study's sample. This study does not decide to do this. This study makes the *IMPAIR* dummy variable "0" if an observation shows an immaterial goodwill impairment. However, in order to test whether this change in the research method leads to significant changes in the outcome, this study performs a robustness test in order to check for such a significant change.

In Table 14, this study shows that the main variable of interest stays insignificant. The control variable that shows the percentage of pre impairment assets divided by goodwill changes from the sign of the coefficient. The control variable *GOODWILL_ACQ* becomes insignificant. As last, the pseudo R2 increases with removing immaterial goodwill impairments off the sample.

In Table 15, *COVID* turns insignificant. Furthermore, *ROA* becomes significant and *LOSS* becomes insignificant. This shows that the finding about a lower probability for auditor dismissals during COVID-19 should be taken into consideration.

6. Conclusion

COVID-19, The Great Depression, the Asian Financial crisis and other crises have led to uncertainty within the society (Mei & Guo, 2004). Regarding the current literature about goodwill impairments, the change from goodwill amortization to goodwill impairments provides mixed evidence about this change and thus it is reasonable to expect that there is uncertainty about this switch from goodwill amortization to goodwill impairments. Ayres et al. (2019) state that there is a higher probability of auditor dismissals when a goodwill impairment follows. However, due to the added uncertainty resulting from crises, the result of Ayres et al. (2019) might not hold. Therefore, this study focuses on whether an event when a goodwill impairment becomes more unambiguous is impacting the association between goodwill impairments and auditor dismissals.

This study finds that there is no association between an event when a goodwill impairment becomes more expected and the frequency of goodwill impairments. Furthermore, this study does not find an association between goodwill impairments and auditor dismissals during an event when a goodwill impairment becomes more unambiguous. Although, this study finds that there is a lower probability of auditor dismissals during an event when a goodwill impairment becomes more expected. This study also finds, through control variables within the models, that there might be earnings management during an event when a goodwill impairment becomes more unambiguous, which is a contradicting statement to the findings of Türegün (2020).

Regarding the robustness test within this study, this study finds that removing immaterial goodwill impairments makes the association between an event when a goodwill impairment becomes more unambiguous and auditor dismissals insignificant. Therefore, future research might take this result into consideration and develop a better model in order to test whether there are less auditor dismissals during an event when a goodwill impairment becomes more expected. Regarding the association between an event when a goodwill impairment becomes more expected and auditor dismissals, future research might try to find out what the reasons are for a lower probability of auditor dismissals. Moreover, future research might want to study whether there is an increase in earnings management during an event when goodwill impairments become more obvious. Due to the technological developments, previous study's results might not hold and therefore a study for an association between earnings management and an event when a goodwill impairment becomes more unambiguous might give outcomes which can be used for the current, circular economy. Moreover, this study has a limitation regarding the industry selection, since most of the companies come from a specific industry. Future research might develop a better sample, which shows a more equal distribution of industries. Future research could also focus on the mixed evidence about the switch from goodwill amortization to goodwill impairments. Future research might take into consideration whether an event when a goodwill impairment becomes more unambiguous could influence the outcomes of this debate. Moreover, future research

could provide a better model to test for goodwill impairments when a goodwill impairment becomes more expected. Finally, future research could also reperform this study's test when there are more observations available for this study's mechanism for when a goodwill impairment becomes more expected, which is COVID-19.

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8. Appendix

Table 13: Variable description

Variable description	
BIG4	Dummy variable equal to “1” if the auditor is either PricewaterhouseCoopers, Ernst & Young, Deloitte or KPMG, “0” otherwise (Ayres et al., 2019).
CASH	Ratio of a firm’s cash divided by its assets (Ayres et al., 2019).
COVID	Dummy variable equal to “1” if the date is within the COVID-19 timeframe, “0” otherwise.
DISCRACCR	Ratio of a firm’s discretionary accruals divided by the lag of assets within a firm. This study uses the measurement of Jones (1991) to calculate the discretionary accruals.
∆EBITDA	Change of a company’s EBITDA compared to the previous year (Hayn and Hughes (2006).
G_CONC	Dummy variable equal to “1” if a company receives a going concern opinion within a certain year, “0” if not (Ayres et al., 2019).
GROWTH	Change of a company’s revenues compared to the previous year (Ayres et al., 2019).
GOODWILL_ACQ	Dummy variable equal to “1” if a company acquired another company, and this acquisition increased the goodwill of the acquirer, “0” if not (Ayres et al., 2019).
IMPAIR	Dummy variable equal to “1” if a company has recorded a material goodwill impairment within a certain year, “0” if not (Ayres et al., 2019).
INDUSTRY	Dummy variables denoting in which industry a company is operating with the use of SIC Codes.
LEVERAGE	Ratio of a firm’s total liabilities divided by a firm’s total equity (Khattak, Salam, Abbas & Khusnood, 2018).
LOSS	Dummy variable equal to “1” if a company’s net income is negative, “0” otherwise (Ayres et al., 2019).
MERG_ACQ	Dummy variable equal to “1” if a company did a merger or acquisition, “0” otherwise (Ayres et al., 2019).
MKTVAL_BKVAL	Dummy variable equal to “1” if a company’s market value is below a company’s book value, “0” otherwise. Based on Ayres et al. (2019).
PCT_PIA_GW	Ratio of a company’s pre impairment assets divided by the amount of a company’s goodwill (Ayres et al., 2019).
RESTATEMENT	Dummy variable equal to “1” if a company got a restatement, “0” otherwise (Ayres et al., 2019).
RESTRUCTURE	Dummy variable equal to “1” if a company has restructuring costs, “0” otherwise (Ayres et al., 2019).

ROA	Ratio of a firm's net income divided by the firm's sales multiplied by the firm's total sales divided by a firm's total assets.
∆ROA	Change of a company's ROA compared to the previous year (Hayn & Hughes (2006).
∆SALES	Change of a company's sales compared to the previous year (Hayn & Hughes (2006).
SHORTAUTENURE	Dummy variable equal to "1" if a company has the same auditor for three or less years, "0" otherwise (Ayres et al., 2019).
SIZE	Log transformed amount of a company's assets (Qin, Huang, Shen & Fu, 2020).
TRT	Ratio of a firm's trade receivables divided by the firm's turnover (Qin et al., 2020).

Table 14: Robustness test: Logistic regression and linear regression results for Model 1

	LOGISTIC REGRESSION		LINEAR REGRESSION
Variable	Coefficient	Wald stat.	Coefficient
(CONSTANT)	-2.781***	26.434	-.005
			(.237)
COVID	-.021	.086	.003
			(.381)
PCT_PIA_GW	-.007***	6.848	-.001***
			(3.496)
LOSS	.726***	39.907	.132***
			(9.781)
LEVERAGE	-.071**	6.809	-.007**
			(-2.342)
ROA	-3.820***	29.456	-.198***
			(-2.841)
∆ROA	-6.185***	100.628	-.797***
			(-12.488)
GOODWILL_ACQ	-.026	.093	-.012
			(-1.332)
∆EBITDA	-.101	.996	-.044***
			(-3.559)
MKTVAL_BKVAL	.790***	85.070	.093***
			(10.177)
BIG4	-.435***	17.537	-.046***
			(-4.085)
∆SALES	-.010***	32.552	-.001***
			(-6.429)
SIZE	.189***	48.862	.018***
			(6.268)
CASH	-1.814***	19.651	-.154***
			(-3.762)
RESTRUCTURE	.430***	29.665	.054***
			(6.283)
INDUSTRY FIXED EFFECTS	Yes		Yes
PSEUDO R2	.256		
ADJUSTED R2			.159

Note: Table 14 shows the logistic regression and linear regression results of this study's robustness test for Model 1. The variable description of the variables used within this study can be found in Table 13 in the Appendix. Furthermore, the T-value is defined in parentheses for the linear regression results. ***, ** and * tells the statistical significance of a coefficient, which means that it is significant at a 1%, 5% and 10% level respectively.

Table 15: Robustness test: Logistic regression and linear regression results for Model 2

	LOGISTIC REGRESSION		LINEAR REGRESSION
Variable	Coefficient	Wald stat.	Coefficient
(CONSTANT)	-1.792	2.710	.099***
			(7.316)
COVID	-.223	2.125	-.007
			(-1.387)
IMPAIR	.476***	10.510	.022***
			(3.433)
IMPAIR*COVID	-.773	2.407	-.032**
			(1.981)
SIZE	-.216***	25.079	-.009***
			(-5.253)
TRT	1.536**	4.308	.059*
			(1.853)
DISCRACCR	.003	.002	.000
			(.125)
GROWTH	.001	.075	.000
			(.391)
SHORTAUTENURE	.064	.350	.003
			(.716)
RECEIVABLES	.330	.277	.019
			(.662)
ROA	-1.866*	3.546	-.133***
			(-3.338)
CASH	.217	.347	.004
			(.261)
LOSS	.005	.001	-.006
			(-.843)
LEVERAGE	.029	.419	.001
			(.818)
GOINGCONCERN	23.833	.000	.911***
			(33.205)
MERG_ACQ	.269**	5.518	.008*
			(1.841)
BIG4	-.320**	4.669	-.018***
			(-2.956)
RESTATEMENT	.470**	4.894	.026**
			(2.441)
INDUSTRY FIXED EFFECTS	No		No
PSEUDO R2	.185		
ADJUSTED R2			.140

Note: Table 15 shows the logistic regression and linear regression results of this study's robustness test for Model 2. The variable description of the variables used within this study can be found in Table 13 in the Appendix. Furthermore, the T-value is defined in parentheses for the linear regression results. ***, ** and * tells the statistical significance of a coefficient, which means that it is significant at a 1%, 5% and 10% level respectively.