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The Role of Large Institutional Ownership on Goodwill Impairment under the SFAS 142 Regime

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Abstract

This paper examines the effect of large institutional owners on accounting for goodwill and its resulting impairment charges. Economies of scale predict stronger incentives for large institutional owners to engage in monitoring. Employing a multivariate linear probability model on a sample of U.S. companies with goodwill on their balance sheets during the period from 2009 to 2019, I find that the likelihood of an impairment is more strongly related to an expected impairment when the share of equity held by the firm's largest institutional owners is higher. Results prove to be economically meaningful and are generally robust to different specifications. This evidence is consistent with the active monitor hypothesis by large shareholders to protect their significant investments.

Keywords: Goodwill accounting; goodwill impairment; institutional ownership; ownership concentration; monitoring; FASB; SFAS 142.

1. Introduction

This paper examines whether the presence of large institutional owners is associated with a firm's decision to impair goodwill.[1] In detail, this paper aims to shed light on the question whether an increase in the firm's largest institutional owners is associated with an increased likelihood of a firm to report an expected impairment of goodwill, as indicated by the firm's book-to-market ratio. Lapointe-Antunes, Cormier, and Magnan (2009) provide evidence that an impairment of goodwill is negatively associated with the firm's share price. Consistent with this, AbuGhazaleh, Al-Hares, and Haddad (2012) argue that goodwill impairments are significant accounting decisions that receive considerable attention by capital market participants. According to the annual goodwill impairment study by Duff and Phelps (2019), goodwill impairments by U.S. publicly listed companies reached a total of $78.9 billion in 2018. This is an increase of 125% over the amount recorded in 2017. Given its growing prevalence and that it negatively affects net income, goodwill impairment is subject to considerable debate by academics, standard setters, and practitioners. This has been noticed predominantly in recent years, as goodwill has become an increasingly larger portion of the assets transferred to a firm in business combinations due to the fact that the value of many firms has shifted from tangible assets to intangible assets. Hence, goodwill impairments have an increasing influence on the firm's financial reporting outcome and are therefore highly relevant to outside investors as any impairment directly affects their shareholdings. Yet, relatively little is known about how large institutional owners behave with regard to the goodwill impairment decision of firms. This paper aims to provide some insights on this association.

With the introduction of Statement of Financial Accounting Standards (SFAS) 142, standard setters usually refer to the private information argument when claiming the conceptual advantages of the impairment-only approach over the systematic amortization of goodwill (AbuGhazaleh, Al-Hares, & Roberts, 2011). The private information argument refers to the assumption that managers have private information that is unknown to outside shareholders. In this context of asymmetric information, the decision whether and to what extent goodwill is impaired reveals information to the

[1] Institutional ownership is defined following the Form 13F by the United States Securities and Exchange Commission (SEC). All institutional investment managers with over $100 million of equity assets under management report their shareholdings quarterly using the SEC's Form 13F filing.

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public about the expected future cash flows of the respective reporting unit to which goodwill has been allocated (Fields, Lys, & Vincent, 2001). However, this argument is subject to the implicit assumption that both managers and shareholders of firms pursue the same objectives. Consequently, the impairment-only approach has been discussed controversial among academics, standard setters and practitioners. While proponents argue that the impairment-only approach better reflects economic reality (Chalmers, Godfrey, & Webster, 2011), critics argue that it provides opportunities of managerial discretion as impairment tests are unverifiable (Ramanna & Watts, 2012). As a result, research has found strong evidence that decision makers at the firm-level may delay or avoid recording impairments by using the subjectivity inherent in the goodwill impairment test procedure opportunistically (e.g., Li & Sloan, 2017; Ramanna & Watts, 2012).

Regarding the role and behavior of institutional owners, corporate governance literature establishes monitoring as a powerful governance solution available to shareholders to influence managers (Demsetz, 1983; Shleifer & Vishny, 1986). In a seminal paper concerning the role of large shareholders, Shleifer and Vishny (1986) argue that a shareholder who owns a large stake of the firm has proper incentives to monitor its management to safeguard their significant shareholdings. However, monitoring comes with costs, and institutional owners may rely on governance mechanisms other than monitoring or pursue a passive investment strategy. In this vein, prior research finds evidence that, instead of engaging in costly monitoring, institutional owners might choose to rely on "exit" and sell off their shareholdings (Coffee, 1991; Manconi, Massa, & Yasuda, 2012).

To empirically examine whether large institutional owners compel managers to record an impairment of goodwill, I follow prior research (Beatty & Weber, 2006; Francis, Hanna, & Vincent, 1996; Ramanna & Watts, 2012) and use a market-based indicator of goodwill impairment: The firm's book-to-market ratio. This approach is based on the rationale that the firm's market capitalization is a suitable proxy for shareholders' estimate of the firm's net present value of future cash flows. As SFAS 142 requires an impairment whenever the fair value of the reporting unit is below its carrying value, I argue that shareholders expect an impairment when the firm's market value of equity is below its book value of equity. Consequently, there are only two explanations for the management not to record an impairment of goodwill when the market value of equity is below its book value. First, in line with the private information argument, managers possess inside information that the net present value of future cash flows is higher than expected by the market. Second, managers opportunistically use the available discretion to their own advantage and delay necessary impairments of goodwill.

Using a sample of U.S. publicly listed companies with goodwill on their balance sheets during the period from 2009 to 2019, I find evidence consistent with the monitoring view. Specifically, as the share of the largest institutional owners increases, there is a higher likelihood that the firm reports more timely goodwill impairments. Further, I perform an additional set of sensitivity analyses to stress the economic significance of the results. Results prove to be robust to narrowing the definition of goodwill impairments to only those that are material to the firm, using an alternative accounting-based indicator of goodwill impairment, and excluding the period of the financial crisis from the sample.

In summary, the paper adds to the literature in at least two ways. First, I contribute by examining a further determinant of accounting choices of goodwill impairment by managers. I find evidence that the accounting decision to record a necessary goodwill impairment is at least partly affected by monitoring activities of the firm by institutional owners. Second, I look at the effect of institutional owners on financial reporting outcomes by showing that institutional owners effectively serve as monitors on firm behavior. In this way, my results suggest that ownership concentration helps in mitigating agency frictions by reducing information asymmetries, making it more difficult for managers to refer to the private information argument and instead forcing them to record more timely impairments of goodwill.

2. Accounting for goodwill

For many years, goodwill acquired in business combinations was treated similarly to other intangible assets. It was presumed that goodwill has a finite life and thus should be amortized over its useful life. The maximum amortization period was up to 40 years. In June 2001, the U.S. Financial Accounting Standards Board (FASB) significantly changed the treatment for accounting for goodwill by introducing the SFAS 141 Business Combinations and SFAS 142 Goodwill and Other Intangible Assets (Financial Accounting Standards Board, 2001a, 2001b).

With the introduction of these standards, the amortization of goodwill approach was abolished. Instead, firms are required to conduct an impairment test based on the reporting unit's fair value at least once a year. The central objective of SFAS 142 is to improve the reflection of the true economic value of goodwill in financial reporting. Under the provisions of SFAS 142, the impairment-only approach is described as a two-step process. First, the firm needs to determine the fair value of the reporting unit and compare it to its carrying amount. According to paragraph 30 of SFAS 142, a reporting unit is defined as the lowest level of business units for which discrete financial information is available (Financial Accounting Standards Board, 2001b, para. 30). In the event the fair value exceeds the carrying amount, no further testing is required, and thus no impairment is required. Second, only in the event, the carrying amount of the reporting unit exceeds the fair value, the implied fair value of goodwill needs to be calculated by measuring the reporting unit's fair value of net assets other than goodwill. Finally, the calculated value needs to be subtracted from the fair value of the reporting unit, and the difference is subject to impairment.

To sum up, on the one hand, the use of estimates on goodwill's fair value allows managers to release their private information on future cash flows. On the other hand, managers

are granted a certain degree of discretion in exercising the associated accounting choices. The first accounting choice is the managerial flexibility in defining the reporting units. The second accounting choice is the managerial discretion in determining the fair value of the reporting unit. The assessment of the fair value requires the management to make subjective judgments on future economic performance, discount rate, and current replacement values of assets. Taken together, SFAS 142 allows for managerial discretion in estimating impairment charges with respect to its timing and amount.

3. Literature review

This section is divided into two parts. The first part offers a review of previous research on accounting for goodwill, focusing on the goodwill impairment decision and its determinants. The second part looks at research on the role and the behavior of institutional owners in monitoring firm behavior. Special attention is given to evidence on corporate governance mechanisms that impact the goodwill impairment decision.

3.1. Goodwill impairment

The primary purpose of this paper is to extend the existing literature on accounting for goodwill and the determinants driving the goodwill impairment decision. A stream of literature closely related to the current paper includes studies on the antecedents of goodwill impairment reporting. Reviewing these papers indicates that the decision to write down goodwill balances is associated with characteristics of the initial acquisition and agency-theory based motives (e.g., Gu & Lev, 2011; Hayn & Hughes, 2006; Li & Sloan, 2017; Ramanna & Watts, 2012).

Specifically, Hayn and Hughes (2006) look at the post-acquisition performance of U.S. based firms between 1988 and 1998. They find that the likelihood of an impairment of goodwill "is related to an initial overpayment as indicated by acquisition characteristics such as payment of a large premium over the pre-acquisition stock price of the target and the use of stock rather than cash as a mean of payment" (Hayn & Hughes, 2006, p. 241). In the same vein, Gu and Lev (2011) find that the buyer's overvalued share price at acquisition induces managers to overpay for the target that ultimately results in the impairment of goodwill.

A large body of research finds that the impairment-only approach under the SFAS 142 regime provides opportunities for managerial discretion as impairment tests are unverifiable (e.g., Beatty & Weber, 2006; Li & Sloan, 2017; Ramanna & Watts, 2012). The underlying theoretical framework is referred to as agency theory and predicts the management to opportunistically use the available discretion in their own interests (Jensen & Meckling, 1976; Watts & Zimmermann, 1986). According to prior research, incentives for opportunistically managing goodwill impairments predicted by agency theory are based on: (i) contractual issues such as compensation agreements or debt covenants written on goodwill accounts (Fields et al., 2001; LaFond & Watts, 2008), (ii) management reputation concerns (Francis et al., 1996; Gu & Lev, 2011), or (iii) equity market valuation concerns (Beatty & Weber, 2006).

First, contractual issues refer to contracts linked to accounting ratios that include impairment effects of goodwill and thus incentivize managers to delay necessary impairments as they would be directly harmed by its consequences. Furthermore, the potential violation of debt covenants written on accounting ratios can cause the decision to delay necessary goodwill impairments (Fields et al., 2001).

Second, as an impairment decision by definition conveys information to shareholders that expected future cash flows no longer hold, the impairment decision bears the risk of reputational damages of the firm's management. In consequence and confirmed by prior research, shareholders may question the managerial capabilities of managers responsible for the underlying acquisition (Gu & Lev, 2011). In this regard, Francis et al. (1996) provide arguments that decision makers on the firm-level tend to manage goodwill impairment opportunistically to protect their reputation, such as the opportunistic reporting of goodwill impairments to meet market expectations.

Third, based on the reasoning that goodwill impairments impact the firm's stock price, managers could use the available managerial discretion to inflate earnings and thus, the stock price. Beatty and Weber (2006) examine the determinants of a (non-) impairment decision in the SFAS 142 transition period. They find that market incentives and contracting incentives impact managerial decisions on whether, when, and how much goodwill impairment to record. In detail, they find that the likelihood of managers to record an impairment of goodwill is associated with incentives related to earnings-based compensation, CEO tenure, and exchange delisting. This view is supported by Guler (2007), who finds that concerns of negative valuation consequences lead managers to manipulate financial statements with respect to the true value of goodwill. Thus, agency theory offers a strong theoretical framework for arguing that goodwill impairments are not a mere reflection of economic reality but rather the opportunistic use of the available managerial discretion to maximize manager's own utility.

Along these lines, Ramanna and Watts (2012) study a sample of firms with market indications of goodwill impairment and test whether a decision to not impair goodwill is either related to the release of private information held by the firm's management or the opportunistic use of available managerial discretions predicted by agency theory.[2] They find evidence in line with agency-based predictions. Based on these findings, the recent paper by Li and Sloan (2017) studies the timeliness of goodwill impairments both before and after the implementation of SFAS 142. They find that the elimination

[2] Ramanna and Watts (2012) define market indications of goodwill impairment as positive book goodwill and a book-to-market ratio above one.

of systematic amortization and the introduction of unverifiable impairment tests has resulted in a relative increase in inflated goodwill balances and less timely impairment decisions. Contrariwise, Lee (2011) finds that the adoption of SFAS 142 with its impairment-only approach has increased the ability of goodwill to forecast future cash flows.

Another stream of literature closely related to my work includes studies on the impact of different governance mechanisms on the goodwill impairment decision. Glaum, Landsman, and Wyrwa (2018) research the effectiveness of monitoring by institutional owners as a substitute for a weak public enforcement environment. Using a sample of stock-listed firms from 21 countries, they find that monitoring by institutional owners compensates for a weak public enforcement environment with respect to the goodwill impairment decision. Ayres, Campbell, Chyz, and Shipman (2019) argue that the presence of financial analysts pressures managers towards more timely impairments of goodwill. In detail, they find that the likelihood of a firm to report a necessary impairment of goodwill increases with the number of analysts following a firm. In a somewhat related paper, L. H. Chen, Krishnan, and Sami (2015) finds that an increased level of institutional ownership mitigates the negative effects of goodwill impairments on analyst forecast dispersion. Lastly, the paper by Li and Sloan (2017) provides some initial evidence that higher institutional ownership mitigates the managerial discretion in goodwill testing and leads to more timely impairments of goodwill. All these findings stress the important effects of outside monitors on the firm's information environment

3.2. Institutional ownership

The prior section discussed some of the potential motives of managers to opportunistically manage goodwill impairment losses at the expense of the outside shareholders. This section provides an overview of prior research on the role and the behavior of institutional owners with regard to their shareholdings. Formally, the conflicting interests between outside shareholders and managers evolve from the separation of the decision and the risk-bearing function and is referred to as an agency problem (Berle & Means, 1932). Prior research has established several governance solutions that can mitigate agency frictions. Monitoring of the management by shareholders is regarded as such a mechanism and has been the subject of research for decades (e.g., Jensen & Meckling, 1976; Monks & Minow, 1995; Shleifer & Vishny, 1986).

In addition to monitoring, other mechanisms and governance devices have evolved to control for agency problems. For instance, the capital market exercises an inherent monitoring function by exerting pressure on a firm's management to drive decisions toward shareholder interests (Holmström & Tirole, 1993). Further, the market for corporate control disciplines the firm's management by providing external parties the opportunity to replace existing management with poor performance (Manne, 1965).

Nevertheless, monitoring has been frequently featured as a powerful governance mechanism available to shareholders (e.g., Brous & Kini, 1994; Demsetz, 1983; Shleifer & Vishny, 1986). As monitoring involves both costs and benefits, the ultimate decision on whether to engage in monitoring depends on the outcome of a cost-benefit analysis. Thus, based on the assumption of rationality, a shareholder is willing to engage in monitoring as long as the benefit of monitoring outweighs its costs.

The study by Bushee (1998) on the influence of institutional ownership on managerial incentives to decrease investments in research and development (R&D) finds a negative association between the level of institutional ownership and the likelihood to reduce R&D expenses to reverse a decline in earnings. This finding emphasizes that institutional owners favor long-term value creation over short-term profit generation. In a further paper, Bushee (2001) confirms that finding by showing that there is a positive association between institutional ownership and the proportion of firm value reflected in future earnings. Both findings suggest that a large capital investment in a firm provides incentives for institutional owners to monitor managers' actions to ensure that they aim for long-term profitability. In this vein, Chung, Firth, and Kim (2002) examine the effect of monitoring by institutional owners on opportunistic earnings management. They find that the degree of monitoring institutional owners prevents managers from the opportunistic steering of reported profits towards the level of profit desired by the managers of the firm.

With regard to the monitoring thesis, Monks and Minow (1995) provide evidence that sophisticated institutional owners with large stakes are likely to monitor and discipline managers towards actions that are aligned with the goal of long-term value creation instead of engaging in short-term profit generation. In line with that finding, Bethel, Liebeskind, and Opler (1998) argue that the acquisition of a larger stake by activist shareholders improves the long-term operating performance of firms. X. Chen, Harford, and Li (2007) postulate that within a cost–benefit framework, long-term oriented institutions focus on monitoring and influencing, rather than engaging in short-term profit trading. In a similar spirit, Jiambalvo, Rajgopal, and Venkatachalam (2002) test whether institutional owners engage in monitoring and mitigate firm agency costs or exacerbate these costs. They provide evidence consistent with the monitoring view.

Regarding the impact of institutional ownership on the firm's financial reporting behavior, Liu (2014) researches a sample of firms that surpassed analysts' expectations over a period from 1988 to 2006. Their results indicate that institutional owners reduce distortions in financial reporting and concurrently pressure managers to release bad news earlier. Burns, Kedia, and Lipson (2010) find that an increased concentration of monitoring institutional owners reduces the likelihood of financial misreporting. This view is supported by McCahery, Sautner, and Starks (2016), who find evidence that institutional owners frequently employ their voice in order to intervene if they are dissatisfied with the managers'

actions.

Institutional owners are considered a heterogeneous rather than a homogeneous group (Gompers & Metrick, 2001). Prior theoretical research argues that the largest institutional owners are an important source in mitigating agency problems through monitoring (Huddart, 1993; Maug, 1998; Shleifer & Vishny, 1986). For instance, Maug (1998) argues that independent institutions with large shareholdings have increased incentives to monitor because they can profitably trade private information acquired by monitoring. Based on that theoretical work, empirical research provides further evidence that large institutional owners perform successful monitoring (Bethel et al., 1998; Brav, Jiang, Partnoy, & Thomas, 2008; Del Guercio & Hawkins, 1999; Gillan & Starks, 2000). Del Guercio and Hawkins (1999) empirically examine the motivation of the five largest pension funds by studying their shareholder proposals from 1987 to 1993. They find that these funds actively engage in monitoring to maximize fund value. Using the theory of economies of scale, Gillan and Starks (2000) argue that institutions with large shareholdings have an increased incentive to monitor as a larger claim on the firm leads to a higher share of the benefit resulting from monitoring and are therefore more likely to offset the costs incurred. They further argue that their shareholdings are frequently so large that selling off their holdings drives down the share price, thereby incurring additional losses.

However, there is a body of research arguing that institutional owners may behave less activistic and more short-term focused (e.g., Coffee, 1991; Manconi et al., 2012). Within a cost-benefit framework, institutional owners may rely on governance mechanisms other than monitoring. In this regard, prior research finds evidence that institutional owners may prefer to sell off their holdings in the case of unfavorable performance rather than engaging in monitoring activities (Coffee, 1991; Manconi et al., 2012). Furthermore, there is empirical support that institutional owners themselves exert pressure on the short-term performance of firms, and thus biasing management towards short-term profit generation (Bushee, 1998; Graves & Waddock, 1990). Besides empirical evidence, Bolton, Scheinkman, and Xiong (2006) provide a theoretical framework on short-termism by presenting a multiperiod agency model demonstrating that institutional owners use executive compensation contracts as a mean to incentivize managers to take short-term actions „ which increase the speculative component in the stock price“ (Bolton et al., 2006, p. 577).

4. Hypothesis development

As Ramanna and Watts (2012) stated, the annual impairment test for goodwill under the SFAS 142 regime allows for a certain degree of discretion as impairment tests are unverifiable. Agency theory provides a strong theoretical framework and predicts the management to use the available discretion opportunistically, which is line with prior empirical evidence (e.g., Li & Sloan, 2017; Ramanna & Watts, 2012).

The objective of this paper is to investigate the role of large institutional owners in explaining variation in the reporting of goodwill impairment that has potentially lost its economic value. In light of the costs and benefits of monitoring, institutional owners face a decision whether to engage in monitoring or instead rely on other governance mechanisms. In this context, monitoring is both the process of information collection and activities to influence managers' actions. The prior literature provides ambiguous evidence regarding the role and behavior of large institutional owners on the governance of corporations.

The body of literature arguing for the monitoring view, suggests that monitoring by institutional owners is a frequently applied governance solution to influence management towards shareholders' interests in order to protect their significant investments (e.g., Monks & Minow, 1995; Shleifer & Vishny, 1986). Among the group of institutional owners, the largest institutional owners are particularly likely to monitor (Brav et al., 2008; Del Guercio & Hawkins, 1999) for at least two reasons. First, economies of scale suggest that monitoring is particularly attractive to large shareholders if the cost of monitoring has a constant component. Second, as large institutional owners often have significant holdings, it is both difficult and costly to sell their shareholdings (Graves & Waddock, 1990). Furthermore, due to their professionalism, these investors have the required capabilities and expertise to monitor management and ensure that they are not engaging in activities that adversely affect shareholders' wealth.

According to this active monitoring hypothesis, institutional owners who engage in monitoring diminish the available managerial discretion in the goodwill impairment decision. This leads to fewer direct agency conflicts between management and shareholders and disciplines the management towards shareholders' interest (Shleifer & Vishny, 1986). Consequently, monitoring by institutional owners' pressure managers to make timelier goodwill impairments. Presupposing that large institutional owners engage in monitoring the firm leads to the hypothesis that in the presence of market indications of goodwill impairment, the share of equity held by the largest institutional owners is positively associated with the firm's likelihood to report an expected impairment of goodwill.

However, there are at least two reasons why I would expect to find no association. First, monitoring actions are difficult to trace. For instance, it may be in the interest of the large shareholders to not record an expected impairment of goodwill. Because goodwill impairments have a negative impact on the share price (AbuGhazaleh et al., 2012), large institutional owners may have motives to prevent a necessary impairment, as they suffer the greatest losses in absolute terms on their shareholdings. Second, institutional owners may choose not to engage in costly monitoring activities and rely on other governance mechanisms or pursue a passive investment strategy. For example, they may prefer to sell off their holdings in the case of unfavorable performance rather than engaging in costly monitoring (Coffee, 1991; Manconi

et al., 2012).

Ultimately, it is an empirical question to which extent ownership concentration compels managers to record an expected impairment of goodwill. Therefore, I formulate my hypothesis in its null form as follows:

> Hypothesis: The likelihood of firms to record an expected goodwill impairment is not associated with the share of equity held by the firms largest institutional owners.

5. Research methodology

5.1. Empirical model

In this section, I will discuss and develop the empirical strategy for estimating how monitoring by institutional owners affects the likelihood of goodwill impairment. To test the hypotheses established, I estimate a multivariate linear probability model where the dependent variable, $Impair$, is a dichotomous variable that equals 1 if goodwill is impaired in a given firm-year, and 0 otherwise.

On the lines of Francis et al. (1996), I include the firm's book-to-market ratio with a value above unity, Btm, as an indication that a firm's goodwill is economically impaired. Following the argumentation that a book-to-market ratio above one suggests that the market expects an impairment of goodwill, Btm equals 1 if the firm's book-to-market ratio in a given firm-year is above one, and 0 otherwise. Hence, Btm is expected to be positively related to the impairment decision.[3]

In order to examine the effect of monitoring by institutional owners, I use two different proxies for firm's institutional ownership structure. First, I estimate the equation with the proportion of equity shares held by the firm's top one institutional owner in a given firm-year, OS_Top1. As a second model, I estimate the equation using a variable, OS_Top3, defined as the cumulative proportion of equity shares held by the firm's top three institutional owners in a given firm-year. From a methodological point of view, the research question to be tested aims at the effect of monitoring by the largest institutional owner when a firm shows market indications of goodwill impairment. This specification helps in exploring whether firms with market indications of goodwill impairment may be more likely to report an impairment of goodwill, the higher the proportion of equity shares held by the largest one (three) institutional owners. An interaction term incorporates the joint effect of two variables on the dependent variable ($Impair$) over and above their separate effect.

For this reason, the model includes an interaction effect between the dichotomous variable of the book-to-market ratio and the share of the largest institutional owners, namely $Btm \times OS\_Top$.[4]

Based on prior literature, I control for several factors that have been documented to affect the impairment decision. In detail, control variables include proxies for economic determinants, managerial and firm-level incentives, monitoring and governance indicators.

Following the research by Francis et al. (1996), I include the firm's stock market return as a market-based measure of economic performance. I interpret a negative (positive) stock market return as an indicator that the firm lost (gained) its abilities to generate future cash flows. Thus, the stock market return serves as an indicator of necessary goodwill impairments. Consequently, I include the firm's stock market return in a given firm-year, $Return$, and the respective stock market return in the prior year, $ReturnLag$. Everything else equal, I expect a negative sign on both variables.

Furthermore, the model contains variables reflecting managerial incentives associated with a potential influence on the impairment of goodwill. According to the literature on earnings management, a firm's management is intended to reduce earnings when it is abnormal high to avoid raising expectations of stakeholders for future earnings, i.e. income smoothing (e.g., Acharya & Lambrecht, 2015; Riedl, 2004). On the contrary, firms with abnormal low earnings in a given firm-year may take discretionary actions to reduce even further the current periods' earnings, as management is not penalized proportionately more for additional losses to its already low earnings (Riedl, 2004). Because goodwill impairment is one mechanism available to the management to perform these two types of earnings management, I include two dichotomous variables accounting for this. The first variable, $Smooth$, equals 1 if a firm's net income in a given firm-year is positive, and the change in income is above the median change of firms with a positive change in income, otherwise the variable equals 0. The second variable, $Bath$, equals 1 if a firm's net income in a given firm-year is negative, and the change in income is below the median change of the firms with a negative change in income, otherwise the variable equals 0. I expect a positive relation to the goodwill impairment decision for both variables, $Smooth$ and $Bath$.

As a further incentive-related variable, I add a dichotomous variable equal to 1 if the CEO received a cash bonus in a given firm, named $Bonus$, and 0 otherwise. Prior research has shown that in the case of firm performance-related managerial compensation, managers may have an incentive to make use of the managerial discretion available and avoid or delay necessary impairments of goodwill (Beatty & Weber, 2006; Ramanna & Watts, 2012). Consequently, I expect a negative association between Bonus and $Impair$. Additionally, I include a further CEO-related variable, $CeoChange$, which is a dichotomous variable that equals 1 if there is a change in the CEO in a given firm-year, and 0 otherwise. This follows the findings by Francis et al. (1996) that a recent change in top management is associated with more frequent and greater impairments of goodwill. All other things being equal, I expect a positive sign on this variable.

Furthermore, prior research establishes a link between debt contracting and the decision of whether to impair good-

[3] Additionally, Beatty and Weber (2006) and Ramanna and Watts (2012) also use the firm's book-to-market ratio as a dichotomous expected impairment measure.

[4] I estimate the model for the proportion of equity shares held by the top one institutional owner (OS_Top1) and the cumulated proportion of equity shares held by the top three institutional owners (OS_Top3) separately.

will (Beatty & Weber, 2006; Ramanna & Watts, 2012). Debt contracts written on goodwill accounts have proven to provide incentives to a firm's management to delay or avoid goodwill impairments. The model takes this into account by incorporating a variable, $Leverage$, which is the firm's total liabilities divided by total assets before goodwill impairment in a given firm-year.

Following prior research (e.g., Lapointe-Antunes, Cormier, & Magnan, 2008; Ramanna & Watts, 2012), I include independent variables related to the balance sheet item of goodwill. The first is a proxy for the number of reporting units, $Segment$, which is defined as the number of operating segments of a firm in a given year. The second variable captures the ratio of goodwill before impairment of goodwill divided by total assets before impairment of goodwill, GW/TA.

Further, I add a set of additional control variables related to incentives at the wider firm-level, which have been included in prior studies (e.g., Beatty & Weber, 2006; Francis et al., 1996; Ramanna & Watts, 2012). As a proxy for the size of a firm, I include the variable $Size$, which is the logarithm of the firm's total assets at the end of the year before goodwill impairment (Li & Sloan, 2017). The variable $AnalystFollow$ is defined as the logarithm of one plus the average number of security analysts that follow a firm over a given year.[5] As indicated by Moyer, Chatfield, and Sisneros (1989), security analysts perform an important monitoring activity and thus reduce agency costs. Consequently, I expect a positive relation to the impairment decision. The variable Roa captures information about the firm's economic performance and is defined as a firm's net income divided by its total assets in a given year. Based on economic reasoning, I expect a negative relationship with the impairment decision.

To sum up, the statistical equation for the multivariate linear probability model has the following general form. Following Petersen (2009), I use robust standard errors clustered at the firm-level. I estimate the equation including industry and year fixed effects to control for unobserved differences in industry characteristics and time specific trends, potentially reducing bias or inconsistency. To obtain meaningful coefficients for the main effects, I standardize the independent continuous variables. Therefore, the coefficient of each of the independent continuous variables represents its typical effect on the goodwill impairment decision. This is its effect when the other independent continuous variables are at their mean, and the magnitude of the coefficient represents the change in the dependent variable ($Impair$) associated with a change of one standard deviation in the independent continuous variable. The subscripted t represents the different time periods, while i typifies each sample firm included in the model.

$$\begin{aligned} Impair_{i,t} =& \beta_0 + \beta_1 Btm_{i,t} + \beta_2 OS\_Top_{i,t} \\ &+ \beta_3 Btm_{i,t} \times OS\_Top_{i,t} + \beta_4 Return_{i,t} \\ &+ \beta_5 ReturnLag_{i,t} + \beta_6 Smooth_{i,t} + \beta_7 Bath_{i,t} \\ &+ \beta_8 Bonus_{i,t} + \beta_9 CoeChange_{i,t} + \beta_{10} Leverage_{i,t} \\ &+ \beta_{11} Segment_{i,t} + \beta_{12} GW/TA_{i,t} + \beta_{13} Size_{i,t} \\ &+ \beta_{14} AnalystFollow_{i,t} + \beta_{15} Roa_{i,t} \\ &+ \sum \beta_t Year + \sum \beta_j Industry_{j,i} + \varepsilon_{i,t} \end{aligned} \tag{1}$$

In this specification, the coefficient β_3 represents the association between large institutional ownership and the firm's likelihood to report an expected impairment of goodwill. An insignificant coefficient would suggest that the presence of large institutional owners do not affect the relationship between an expected impairment and an actual impairment. In contrast, a positive (negative) and significant coefficient would indicate that an increase in the share held by the largest institutional owners leads to a higher (smaller) likelihood of expected impairments.

5.2. Sample selection

The data for the subsequent empirical analysis is gathered from U.S. publicly listed companies. I use firm-level data on goodwill and institutional ownership from a variety of sources. My starting point is the data platform Wharton Research Data Services (WRDS), which contains detailed accounting information for all U.S. publicly listed firms from different sources. Appendix A[6] provides a detailed description of all variables and the respective data source. The sample consists of firms belonging to the S&P 500 index. The S&P 500 index consists of the 505 largest firms by market capitalization listed on stock exchanges in the U.S.. The index is considered to be a good representation of the U.S. stock market and thus, a suitable object for empirical research.

Table 1 presents the sample construction process. Firstly, the top 505 U.S. firms by total market capitalization as listed by the S&P 500 at July 1, 2020 are selected for a time period of eleven years from 2009 through 2019. This results in initial 555 firm-year observations. I exclude 774 firm-year observations belonging to the financial sector.[7] As described by Glaum et al. (2018), the average balance sheet and capital structure of financial firms are significantly different from those of classical nonfinancial firms, which implies that employing the same coefficients on the model could be restrictive and thereby introduce coefficient bias. Further, 657 firm-year observations with book goodwill less than $1 million and 93 firm-year observations with a negative book-to-market ratio are excluded. Finally, I lose 1811 observations due to missing or insufficient data. Taken together, the fi-

[5] Following Yu (2008), I assume that firms not covered by the Thomson Reuters I/B/E/S database have no analyst coverage.

[6] The Appendix can be found on https://jums.academy.

[7] Classified as Financials with GICS Code 40 in Compustat.

Table 1: Sample construction

	Firm-year observations
The 505 S&P 500 firms (as listed on July 1, 2020) for the time period from 2009 through 2019	5555
Firm-year observations belonging to the Financials industry	(774)
Firm-year observations with book goodwill below $1 million	(657)
Firm-year observations with a book-to-market ratio below zero	(93)
Firm-year observations with insufficient/missing data	(1154)
Final sample	2877
Goodwill impairers	302
Material goodwill impairers: >1% of total assets	123
Material goodwill impairers: >$10 million	257
Non goodwill impairers	2575
Observations with book-to-market ratio above one	44
Observations with a return on assets below minus 10%	38

This table shows the construction process for the final sample.

nal sample of firms for which all data items were available consists of 343 firms, resulting in a total of 2877 firm-year observations, of which 302 record an impairment of goodwill.

Table 2 displays a breakdown of the final sample by year. All firms were assigned to their respective sector (sector and industry are considered interchangeably) based on the Global Industry Classification Standard (GICS). Appendix C shows a breakdown of the final sample by industry. In order to reduce the effect of possibly spurious outliers in the tails of the sample, I winsorize the independent continuous variables at the top and bottom one percent.[8]

5.3. Descriptive statistics

Table 3 provides the descriptive statistics of all variables. According to the variables of interest, the untabulated statistics for the book-to-market ratio reveals a mean value of 0.334, indicating that the shareholders of these sample firms perceive these firms to be highly profitable. Even firms in the ninetyfifth percentile show a book-to-market ratio of 0.763 and thus below one. However, as shown in Table 1 there are 44 firm-year observations with a book-to-market ratio above one. The proportion of equity shares held by the firm's top one institutional owner vary between 1% and 22.6%, with an average value of 7%. For the firm's top three institutional owners the values vary between 2.9% and 34.5% with an average value of 12.9%, respectively. These values reveal a certain degree of heterogeneity in the ownership structure among the sample firms. Mean of Impair indicates that in 10.5% of the firm-years, the sample firms report an impairment of goodwill.

The mean values of $Return$ and $ReturnLag$ differ notably, which might be partially driven by the fact that $ReturnLag$ includes the returns of the year 2008 and thus the stock market crash caused by the financial crisis as indicated by the increased standard deviation of 32.9%. In 30.3% of the firm-years, firms tend to engage in earnings smoothing ($Smooth$), whereas only 4.5% of the firm-years show evidence of big bath accounting ($Bath$). Regarding the CEO-related control variables, the CEO of the sample firms received a bonus payment in 12.2% of firm-year observations. Furthermore, sample firms report a change in the CEO role in 10.7% of the firm-years. The mean level of leverage reaches 57.6%, indicating that selected firms are largely financed by debt rather than equity. Thus, debt covenants of contracts written on goodwill accounts and the resulting incentives to delay or avoid goodwill impairments might play a role. The sample firms reveal an average number of operating segments of 3.703. The number of operating segments varies between 1 and 11. Furthermore, sample firms report a goodwill-to-assets ratio of 21.2% with a maximum value of 60.3%. The mean sample firm reports a profitable return on assets of 7.2%, whereas at the final ninetyfifth percentile firms report a return on assets of 17.1%. The $Size$ variable, defined as the logarithm of total assets before goodwill impairment, ranges from 6.695 to 12.528. On average, there are 17 analysts following the firm (determined by the exponential of the logarithm value in Table 2, less one).

In Table 4, I perform a mean difference analysis to test for significant differences between firms that impair and those that do not. I find significant evidence that firms with a book-to-market ratio above one are more likely to engage in a goodwill impairment decision indicating that a firm's book-to-market ratio is an adequate measure for market indications of goodwill impairment. Furthermore, impairing firms tend to have a slightly more concentrated ownership structure with respect to the proportion of equity shares held by the top one and the top three institutional owners, respectively. However, for both ownership variables, OS_Top1 and OS_Top3, this difference is not statistically significant.

[8] To test for the sensitivity of the decision whether to winsorize the data, I re-perform the main analysis without winsorization. The inferences remain unchanged.

Table 2: Sample breakdown by year

Year	Number of observations	Impairments	Percentage
2009	235	40	8.17%
2010	238	20	8.27%
2011	241	19	8.38%
2012	242	29	8.41%
2013	252	23	8.76%
2014	278	26	9.66%
2015	273	28	9.48%
2016	280	24	9.73%
2017	287	23	9.98%
2018	283	33	9.84%
2019	268	37	9.32%
Total	2877	302	100%

This table shows a breakdown of the sample by year.

Table 3: Descriptive statistics of all variables

Variable	Mean	Median	Min.	Max.	St.Dev.	Percentiles	
						10	95
Btm	0.015	0	0	1	0.123	0	0
OS_Top1	0.07	0.065	0.01	0.226	0.036	0.03	0.137
OS_Top3	0.129	0.12	0.029	0.345	0.06	0.059	0.244
$Impair$	0.105	0	0	1	0.307	0	1
$Return$	0.122	0.13	-0.828	1.32	0.269	-0.202	0.543
$ReturnLag$	0.068	0.106	-1.637	1.32	0.329	-0.337	0.538
$Smooth$	0.303	0	0	1	0.46	0	1
$Bath$	0.045	0	0	1	0.208	0	0
$Bonus$	0.122	0	0	1	0.327	0	1
$CeoChange$	0.107	0	0	1	0.309	0	1
$Leverage$	0.576	0.582	0.113	0.986	0.179	0.338	0.869
$Segment$	3.703	4	1	11	2.327	1	8
GW/TA	0.212	0.186	0	0.603	0.153	0.022	0.498
$Size$	9.493	9.45	6.695	12.528	1.217	7.926	11.639
$AnalystFollow$	2.698	2.89	0	3.871	0.784	1.946	3.497
Roa	0.072	0.067	-0.213	0.341	0.062	0.01	0.171
Firm-year observations	2877						

This table reports descriptive statistics of all variables. All continuous variables are winsorized at the first and ninetyninth percentiles. All variables are defined in Appendix A.

With respect to the control variables, impairing firms tend to underperform both contemporaneous and lagged stock market returns versus non-impairing firms. The mean difference analysis also reveals a positive association between the change of the CEO and big bath accounting on the one hand and the goodwill impairment decision on the other hand. Finally, impairing firms appear to be larger, have more operating segments, report a lower return on assets, and display a higher debt-to-assets, as well as a goodwill-to-assets ratio.

5.4. Correlation analysis

In addition to the descriptive statistics, I conduct Bravais-Pearson, and Spearman (rank) correlation analysis to examine the linear relationship between all independent variables. The results are outlined in Table 5, where Bravais-Pearson correlations are shown in the lower left triangle and Spearman (rank) correlations are provided in the upper right triangle.

None of the two independent variables of interest (Btm, OS_Top1, and OS_Top3) show a correlation above the level of 0.4. Following the ranges provided by Evans (1996), I conclude that there is only a very weak to a weak correlation between the two variables on institutional ownership and the remaining control variables.[9] Thus, multicollinearity is not

[9] Evans (1996) defines a correlation as very weak if it ranges between

Table 4: Mean differences

Variable	Impair=0	Impair=1	t-statistics
Btm	0.012	0.040	-3.666***
*OS_Top*1	0.070	0.072	-0.664
*OS_Top*3	0.129	0.134	-1.282
Return	0.129	0.064	3.984***
ReturnLag	0.081	-0.042	6.188***
Smooth	0.308	0.261	1.645
Bath	0.028	0.195	-13.703***
Bonus	0.118	0.152	-1.702
CeoChange	0.101	0.162	-3.284***
Leverage	0.572	0.608	-3.343***
Segment	3.636	4.272	-4.505***
GW/TA	0.209	0.240	-3.378***
Size	9.458	9.789	-4.488***
AnalystFollow	2.701	2.673	0.579
Roa	0.076	0.035	11.050***
Firm-year observations	2575	302	

This table show mean values for non-impairing and impairing firm-years. p-values are two-tailed and indicated as stars according to their significance level as follows: *p<0.05, **p<0.01, ***p<0.001. All continuous variables are winsorized at the first and ninetyninth percentiles. All variables are defined in Appendix A

Table 5: Bravais-Pearson and Spearman (rank) correlations of all independent variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1.*Btm*		0.007	0.036	-0.130***	-0.04*	-0.002	0.123***	0.006	0.003	-0.057**	0.005	0.002	0.091***	0.000	-0.130***
2.*OS_Top*1	0.009		0.777***	0.048*	0.008	0.069***	0.054**	-0.041*	-0.006	-0.070***	-0.143***	0.112***	-0.291***	-0.088***	-0.077*
3.*OS_Top*3	0.039*	0.768***		0.038*	0.013	0.073***	0.081***	-0.01	-0.009	-0.079***	-0.150***	0.112***	-0.371***	-0.142***	-0.099***
4.*Return*	-0.136***	0.041*	0.027		-0.108***	0.112***	-0.082***	-0.007	-0.033	-0.026	-0.056**	-0.003	-0.119***	-0.048*	0.061**
5.*ReturnLag*	-0.041*	-0.028	-0.017	-0.163***		0.144***	-0.114***	-0.033	-0.059**	-0.015	-0.034	0.017	-0.069***	0.008	0.166***
6.*Smooth*	-0.002	0.062***	0.072***	0.126***	0.129***		-0.143***	-0.024	-0.037*	-0.014	-0.033	-0.022	-0.020	-0.032	0.127***
7.*Bath*	0.123***	0.060**	0.077***	-0.098***	-0.115***	-0.143***		0.026	0.065***	0.038	0.015	0.004	0.029	0.016	-0.35***
8.*Bonus*	0.005	-0.041*	-0.009	0.000	-0.046*	-0.024	0.026		0.077***	-0.0411*	0.068***	0.032	0.013	-0.065***	-0.024
9.*CeoChange*	0.003	-0.011	-0.011	-0.035	-0.055**	-0.037*	0.065***	0.077***		0.0172	0.002	0.000	0.032	0.016	-0.027
10.*Leverage*	-0.055**	-0.078***	-0.090***	-0.034	-0.013	-0.019	0.037*	-0.046*	0.021		0.112***	-0.068***	0.308***	-0.029	-0.296***
11.*Segment*	0.000	-0.137***	-0.148***	-0.062***	-0.041*	-0.034	0.013	0.080***	0.008	0.116***		0.180***	0.296***	-0.107***	-0.166***
12.*GW/TA*	0.001	0.123***	0.109***	-0.0103	0.019	-0.020	0.003	0.045*	0.000	-0.055**	0.157***		-0.032	-0.085***	-0.079***
13.*Size*	0.081***	-0.281***	-0.354***	-0.119***	-0.049**	0.023	0.023	0.019	0.035	0.316***	0.311***	-0.025		0.350***	-0.260***
14.*AnalystFollow*	-0.006	-0.029	-0.058**	-0.039*	0.023	-0.030	0.018	-0.088***	-0.013	0.013	-0.075***	-0.056**	0.231***		0.113***
15.*Roa*	-0.118***	-0.077***	-0.112***	0.086***	0.165***	0.160***	-0.456***	-0.036	-0.038*	-0.244***	-0.149***	-0.116***	-0.192***	0.049**	

This table shows Bravais-Pearson correlations in the lower left triangle. Spearman (rank) correlations are provided in the upper right triangle. p-values are two-tailed and indicated as stars according to their significance level as follows: *p<0.05, **p<0.01, ***p<0.001. All continuous variables are winsorized at the first and ninetyninth percentiles. All variables are defined in Appendix A.

expected to be a relevant issue for the independent variables of interest.

However, it is worth noting that some of the control variables show significant correlation effects with other independent variables, namely *Roa*, *Size*, *Btm*, *AnalystFollow*, and *Segment*. Again, none of the correlations exceeds the level of 0.4, and thus, multicollinearity is not expected to be a relevant issue either. Furthermore, there are no substantial differences between Bravais-Pearson and Spearman (rank) correlations, which suggests that there are no significant outlier effects in the final sample.

0.00 and 0.19 and as weak if it ranges between 0.20 and 0.39, in absolute terms, respectively.

5.5. Multivariate analysis

This section presents the results of the multivariate linear probability model. Table 6 shows the results of two regression models that estimate the effect of the top one (*OS_Top*1) and the cumulative share of the top three institutional owners (*OS_Top*3) on the goodwill impairment decision when a firm shows market indications of goodwill impairment, respectively. The dependent variable is a dichotomous variable equal to 1 if a firm impaired goodwill in a given firm-year, and 0 otherwise. The adjusted R-squared is reported in the fourth last row, and the sample size is reported in the last row. Both models control for year and industry fixed effects.

Regression model (1) ((2)) includes an interaction term between the proportion of equity shares held by the firm's top one (three) institutional owners and a dichotomous variable

Table 6: Regression results

Variable	Pred. Sign	(1)		(2)	
		Coefficient	t-statistics	Coefficient	t-statistics
Btm	+	0.05	1.08	0.025	0.54
OS_Top1	+	0	0.08		
OS_Top3	+			0.004	0.44
$Btm \times OS\_Top1$	+	0.0965**	2.33		
$Btm \times OS\_Top3$	+			0.104**	2.17
$Return$	-	-0.019***	-2.99	-0.020***	-3.03
$ReturnLag$	-	-0.022***	-2.83	-0.022***	-2.8
$Smooth$	+	0.030**	2.42	0.030**	2.38
$Bath$	+	0.281***	6.59	0.282***	6.57
$Bonus$	-	0.006	0.29	0.007	0.31
$CeoChange$	+	0.03	1.45	0.031	1.49
$Leverage$	?	0.002	0.3	0.003	0.32
$Segment$	+	0.019**	2.2	0.019**	2.2
GW/TA	?	0.006	0.9	0.006	0.84
$Size$	?	0.011	1.16	0.013	1.29
$AnalystFollow$	+	-0.004	-0.45	-0.004	-0.48
Roa	-	-0.035***	-4.49	-0.034***	-4.34
Adjusted R-squared		0.113		0.113	
Year fixed effects		Yes		Yes	
Industry fixed effects		Yes		Yes	
Firm-year observations		2877		2877	

This table presents the estimation results of a multivariate linear probability model. The table presents regression coefficients and the respective t-statistics. p-values are two-tailed and indicated as stars according to their significance level as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered on the firm-level (Petersen, 2009). All continuous variables are standardized. All continuous variables are winsorized at the first and ninetyninth percentiles. All variables are defined in Appendix A.

whether the firm's book-to-market ratio is above one. The regression results show significantly positive effects on this interaction term for both models, respectively (t-statistics = 2.33 and 2.17).

Consequently, I find statistically significant evidence that firms with larger concentration of ownership are more likely to report goodwill impairment when the firm shows market indications of goodwill impairment. Ceteris paribus, among the firm-years that show market indications of goodwill impairment, one standard deviation point increase in the cumulative proportion of equity shares held by the top one (three) institutional owners (OS_Top1 and OS_Top3) has a significant positive effect of 9.65% (10.4%) on the likelihood for a firm to actually report an impairment of goodwill. The adjusted R-squared for both models is comparable to those documented in prior research.[10] Thus, the results provides evidence that large institutional owners effectively monitor firms towards an impairment when the firm shows market indications of goodwill impairment. To test for multicollinearity issues, I perform a variance inflation factor assessment. Untabulated results suggest that there are no serious multicollinearity issues impacting my results.[11]

With regard to the control variables, my results are broadly in line with the findings of prior research and thus providing further validation for my main results as well as the model itself. For both regression models, both contemporaneous and lagged stock market returns ($Return$ and $ReturnLag$) are significantly negatively related to the goodwill impairment decision. These findings are in line with the findings by Glaum et al. (2018). The coefficients of the two control variables related to earnings management ($Smooth$ and $Bath$) display the expected positive sign. However, only the variable related to the big bath theory of earnings management shows a significant coefficient.

Concerning the CEO-related control variables, $Bonus$ and $CeoChange$, I find coefficients consistent with the predicted sign. However, both variables are not significant.[12] The

[10] The adjusted R-squared in Table 5 for both models is 11.8% similar to the results of other papers on the goodwill impairment decision (e.g., Glaum et al., 2018; Ramanna & Watts, 2012).

[11] Following the recommended maximum values for the variance inflation factor provided by Hair, Black, Babin, and Anderson (1998), I use a maximum tolerance value of ten. All variables of interest are comfortable below this value.

[12] According to Glaum et al. (2018), it may be the case that $CeoChange$ reflects effects that are similar to Bath and thus subject to multicollinearity.

coefficient of the control variable related to debt-covenant, $Leverage$, is insignificantly slightly positive. This finding is supported by Beatty and Weber (2006), who also find small insignificant coefficients for the firm's debt-to-assets ratio. Finally, my finding on the firm's number of operating segments, $Segments$, reveal a significant positive effect in line with prior research (Glaum et al., 2018; Lapointe-Antunes et al., 2008). To sum up, the results of the multivariate linear probability model provide evidence in line with the monitoring hypothesis. The control variables of the model are generally consistent with the findings by prior research in terms of both significance and magnitude.

6. Robustness analyses

To further validate my results on the influence of large institutional ownership on the decision whether to record necessary impairments of goodwill, I conduct additional robustness analyses to stress the economic relevance and provide further validity. First, I narrow the definition of the dependent variable to those impairments that are material to the firm. Second, the main results are based on a market-related indicator for goodwill impairment. In order to analyze the sensitivity of the definition of the impairment indicator proxy used in the main analysis, I estimate the model using an alternative accounting-based measure for indications of goodwill impairment. Lastly, I follow recent literature and exclude the year 2009, which belongs to the period of the financial crisis, from the sample. All three specifications prove to be robust with regard to my main results. Thus, the subsequent robustness analyses provide further evidence on the role of large institutional owners monitoring firms towards necessary goodwill impairments.

6.1. Dependent variable

The first robustness analysis aims to provide further evidence on the economic relevance of the influence of large institutional owners on necessary goodwill impairments. In order to do so, I narrow the definition of the dependent variable to those impairments that are material to the firm. Thus, I modify equation (1) by specifying the dependent variable, $Impair$, equal to 1 if the reported goodwill impairment is classified as a material impairment, and 0 otherwise. Inspired by Jarva (2009), I define an impairment of goodwill as material if it exceeds $10 million (model (1) and (2)). Alternatively, I define an impairment of goodwill as material if it exceeds 1% of the firm's total assets before the impairment (Model 3 and 4). The final sample reveals 257 (123) impairments with a magnitude exceeding $10 million (1% of total assets) compared to a number of 302 total impairments. All independent variables remain the same as those included in equation (1). Both specifications prove to be significantly positive for both the top one and the top three institutional owners, respectively.

Table 7 shows the results of the specification. The coefficients are largely consistent in magnitude with my main results. Thus, these results provide further evidence on the role of large institutional owners on necessary goodwill impairments. Furthermore, this specification represents impairments with increased economic impact, which are particularly relevant in the tension between the diverging interests of the principal and the agent. Therefore, I argue that these results reinforce monitoring by large institutional owners as a governance device reducing agency costs.

6.2. Independent variable

As the initial measure for impairment expectations is based on market values (Btm), I use an accounting-related measure (Return on assets) to test the robustness of the main results. I use the firm's return on assets (Roa) to proxy for circumstances in which goodwill has potentially lost its economic value and is consequently subject to impairment. This argument is supported by the mean difference analysis (Table 4), where impairing firms reveal a significant lower return on assets. Thus, I define an impairment of goodwill as necessary if the firm reports a return on assets below the value of minus 10%.[13] Accordingly, I create a dichotomous variable, $RoaD$, equal to 1 if the firm's return on assets is below the value of minus 10% in a given firm-year, and 0 otherwise. I adjust equation (1) by replacing the continuous variable Roa with the dichotomous variable $RoaD$. Furthermore, I replace the dichotomous variable Btm with a continuous variable of the firm's book-to-market ratio. All other variables remain the same as those included in equation (1). Table 8 displays the results of the replaced variable as well as for the adjusted interaction term. I continue to document significantly positive results. Considering that an accounting-related measure is somehow different from a market-related measure, I interpret these findings as supporting evidence for my primary inferences.

6.3. Excluding 2009

As a further test of robustness, I follow recent literature and perform a sample cut to exclude observations belonging to the year 2009, i.e. the year of the financial crisis. By doing so, I ensure that my results are not driven by observations incurred during this time. Indeed, the sample reveals the largest proportion of goodwill impairments in that year. Thus, it may be the case that there are exceptional conditions related to the financial crisis that impact the goodwill impairment decision. I estimate equation (1) after excluding observations from 2009. Again, the results remain significantly positive for the variables of interest. I do not tabulate these results for brevity.

7. Limitations and future research

Even though the paper provides some evidence that the largest institutional owners effectively monitor firms towards

[13] Ayres et al. (2019) use a similar approach by incorporating the continuous value of the return on assets in their interaction term as the main variable of interest.

Table 7: Robustness tests of dependent variable

Variable	Impairments >$10 million		Impairments >1% of total assets	
	(1)	(2)	(3)	(4)
Btm	0.123***	0.097**	0.061	0.035
	(2.65)	(2.15)	(1.27)	(0.74)
OS_Top1	0.001		0.002	
	(0.24)		(0.25)	
OS_Top3		-0.002		0.002
		(-0.42)		(0.28)
$Btm \times OS\_Top1$	0.106**		0.0931**	
	(2.32)		(2.17)	
$Btm \times OS\_Top3$		0.111**		0.104**
		(2.19)		(2.14)
Adjusted R-squared	0.175	0.1176	0.121	0.122
Control variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Firm-year observations	2877	2877	2877	2877

This table presents the estimation results of a multivariate linear probability model. The table presents regression coefficients and the respective t-statistics in parentheses. p-values are two-tailed and indicated as stars according to their significance level as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered on the firm-level (Petersen, 2009). All continuous variables are standardized. All continuous variables are winsorized at the first and ninetyninth percentiles. All variables are defined in Appendix A.

Table 8: Robustness tests of independent variable

Variable	(1)		(2)	
	Coefficient	t-statistics	Coefficient	t-statistics
$RoaD$	0.176**	2.46	0.122	1.53
OS_Top1	0.002	0.29		
OS_Top3			0.006	0.74
$Road \times OS\_Top1$	0.185***	3.5		
$Road \times OS\_Top3$			0.177***	2.99
Adjusted R-squared	0.114		0.114	
Control variables	Yes		Yes	
Year fixed effects	Yes		Yes	
Industry fixed effects	Yes		Yes	
Firm-year observations	2877		2877	

This table presents the estimation results of a multivariate linear probability model. The table presents regression coefficients and the respective t-statistics. p-values are two-tailed and indicated as stars according to their significance level as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered on the firm-level (Petersen, 2009). All continuous variables are standardized. All continuous variables are winsorized at the first and ninetyninth percentiles. All variables are defined in Appendix A.

necessary goodwill impairments, I acknowledge several limitations related to this paper.

First, my results only provide an association, but not a causal relationship, between the proportions of equity shares held by the firm's top institutional owners and the goodwill impairment decision. In particular, potential endogeneity issues regarding the institutional ownership variables may bias my results. For instance, the results may be subject to a self-selection bias in the sense that institutional owners preferably invest in firms with relatively strong governance mechanisms. Because strong governance mechanisms may promote both the degree of institutional ownership concertation and the goodwill impairment decision, the results may be biased upwards. Thus, it is encouraged that future research inves-

tigates the relationship by making use of different empirical models.[14]

Second, the sample only consists of U.S. publicly listed firms, which limits the generalizability of my results. Because research results on that topic are quite diverse and vary by the country examined, further research should investigate how the results change if the analysis is conducted including multiple countries.[15] Further, because the sample is limited to firms belonging to the S&P 500, the results are only valid for relatively large firms. Therefore, one might expect a somewhat different result for smaller firms.

Third, this paper is limited to the role of institutional owners in monitoring fair value estimates of goodwill subsequent to business combinations (i.e. ex-post monitoring). One potential concern is that institutional owners may intervene prior to an acquisition takes place and thus prevent unprofitable or overpriced business combinations ex-ante (i.e. ex-ante monitoring). Based on the finding by Gu and Lev (2011) that the overvaluation of the firm's share causes managers to undertake value-destroying acquisitions, I encourage future research to shed light on the ex-ante influence of large institutional owners on business combinations and the resulting goodwill impairment charges in later years.

8. Conclusion

This paper examines the role of large institutional owners on the goodwill impairment decision when a firm shows market indications of goodwill impairment. The data used consists of 343 U.S. publicly listed firms during the period 2009 to 2019, resulting in 2877 firm-year observations. I test whether ownership concentration indicated by the share of equities held by the firm's largest institutional owners is associated with an increase of the likelihood for a firm to report a necessary impairment of goodwill. Following prior research, I define the firm's book-to-market ratio as a suitable proxy for market indications of goodwill impairment (Beatty & Weber, 2006; Francis et al., 1996; Ramanna & Watts, 2012). Hence, firms with positive goodwill on their balance sheet and a book-to-market ratio above one are expected to record a goodwill impairment.

Estimating a multivariate linear probability model, I find evidence that the largest institutional owners effectively help in diminishing the available managerial discretion in the annual goodwill impairment test through their monitoring activities in order to protect their significant investments. I am, to the best of my knowledge, the first empirically arguing that large institutional owners effectively monitor firms towards a necessary impairment decision. Therefore, there is no prior research with which I can directly compare my results.

The results for both the top one institutional owner and the cumulative share of equity held by the top three institutional owners are consistent as they provide evidence for effective monitoring towards necessary goodwill impairments. In the broadest sense, these results expand the literature on the influence of institutional ownership on financial reporting outcomes and, in particular, on the goodwill impairment decision. My results are in line with the active monitoring hypothesis and the associated theory of an increased incentive of larger shareholders to monitor the firm (Huddart, 1993; Maug, 1998; Shleifer & Vishny, 1986). Thus, large institutional owners effectively reduce agency costs by diminishing the available managerial discretion of the impairment-only approach towards the interest of shareholders. In this connection, my results provide further evidence on the finding by Callen and Fang (2013) that institutional owners prevent management from hoarding bad news. Furthermore, my results are in accordance with findings reported by Li and Sloan (2017). Their cross-sectional regression results suggest that institutional ownership leads to more timely impairment decisions. A somewhat related paper on the firm's information environment by Ayres et al. (2019) concludes that higher analyst coverage increases the likelihood of an impairment. In that vein, my results offer further evidence on the positive influence of the firm's information environment on the impairment decision, i.e. the monitoring by large institutional owners.

A common point of criticism of the impairment-only approach versus the systematic amortization approach is the lack to provide more value-relevant information with respect to the true economic value of goodwill due to managerial discretion prevalent in the annual impairment test. Against this background, my results show that monitoring by institutional owners can help to substitute the lack of the SFAS 142 regime to enforce transparency regarding the true economic value of goodwill.

Overall, this paper adds to extant academic research in two ways. In a more general context, I look at the effect of institutional ownership on firms' financial reporting behavior and find that they monitor firms towards more timely goodwill impairments. In the context of goodwill, I show that ownership concentration indicated by the share of equity held by the firm's largest institutional owner is a further determinant of the manager's goodwill impairment decision.

[14] For instance, prior studies on institutional ownership use a propensity score model in order to control for potential endogeneity issues of institutional ownership, e.g. Lindemanis, Loze, and Pajuste (2019). Alternatively, other papers use an instrumental variable two-stage least squares approach to deal with potential endogeneity issues, e.g. Callen and Fang (2013).

[15] Glaum et al. (2018) find that the strength of a country's enforcement regime affects both the timeliness and the managerial incentives related to the goodwill impairment decision.

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