Is the Goodwill Impairment-Only Model Broken?
An Examination of Post-Acquisition Accounting for Goodwill versus Other Intangibles

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Abstract

Concerns that discretion in post-acquisition accounting leads to inflated goodwill balances led standard setters to consider either modifications to the current impairment-only model or a return to the amortization and impairment model currently used for finite-lived intangibles. We compare goodwill accounting to that of finite-lived intangible assets for the same firm during the same period and examine many important subtleties in the goodwill impairment testing model using previously underexplored disclosures. Our comparison of goodwill and intangible asset balances provides no evidence that impairment-only accounting has led to inflated balances. Our examination of potential sources of discretion in impairment recognition provides marginal evidence of reductions in impairments associated with the use of control premia allowed in the accounting standards but indicates significantly increased impairments associated with adjustments for the shielding effects of off-balance-sheet intangibles and for decreases in the headroom between market and book result in impairments that are not currently required in the accounting standards. Our analyses of goodwill allocation by reporting units provides some support for concerns that reducing requirements to allocate goodwill by reporting units might lead to reduced impairments.

Keywords: Goodwill; Post-acquisition accounting; Intangible assets; Alternative methods.

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1. Introduction

Over the 20 years since changing from an amortization and impairment to an impairment-only post-acquisition accounting model for goodwill and indefinite-lived intangibles, practitioners, regulators, and academics have raised concerns that discretion used to avoid impairments has led to inflated goodwill balances.[1] These criticisms culminated in both the IASB and the FASB proposing to modify the impairment-only approach and reinstate amortization and impairment for all intangible assets. The IASB continues to consider ways to address these concerns, although the FASB has tabled its proposal.[2]

While finite-lived intangible assets are both amortized and impairment tested based on a nondiscounted cash flow trigger, goodwill and indefinite-lived assets are not amortized and are tested for impairment annually or more frequently if circumstances suggest a reduction in fair values. The elimination of goodwill amortization has led to concerns about inflated goodwill balances. In addition, the assessment of goodwill at the reporting unit level, rather than the asset level used for other intangibles, has led to concerns that goodwill impairments will respond less to declining firm performance, due to the headroom created by unrecognized internally generated intangibles and more generally by other sources of market values in excess of book values.[3]

We evaluate these criticisms of the impairment-only model, investigating whether goodwill is inflated and specific factors affecting the association between the incidence of goodwill impairments and firm performance. We expand the literature by comparing goodwill accounting to that of finite-lived intangible assets for the same firm during the same period and by examining

[1] For example, a KPMG (2014) stakeholder survey report concludes that "the degree of subjectivity in goodwill impairment testing limits its effectiveness."
[2] See https://www.ifrs.org/content/dam/ifrs/meetings/2022/may/iasb/ap18-goodwill-and-impairment-cover-paper.pdf and https://players.brightcove.net/2205030511001/default_default/index.html?videoId=6053108542001.
[3] IFRS (2021) discusses the headroom concept, highlighting how headroom from unrecognized intangibles and other assets capitalized in market values allows for post-acquisition market value decreases that do not trigger impairments.

many important subtleties in goodwill impairment testing using previously underexplored disclosures. Our analysis illuminates the extent to which differences in accounting result in goodwill growing over time, relative to other intangibles, and affect the associations between firm performance and goodwill versus other intangible asset impairments. Jointly, these tests are designed to inform standard setters and researchers when evaluating the impairment-only model.

We first explore whether U.S. goodwill balances over the 2011–2020 period grew.[4] Figure 1 highlights trends in goodwill, finite-lived, and indefinite-lived intangible assets scaled by total assets, while Figure 2 highlights trends in the proportion of goodwill to these intangible asset groups for our sample of 15,713 nonfinancial U.S. firms with matching total asset and goodwill balances on Compustat and Calcbench (XBRL).[5] While there is a small increase in the balances in each of these acquired asset types during this period, the growth in impairment-only model assets is not increasing, relative to the amortization and impairment model assets.[6] Consistent with Figures 1 and 2 and in contrast to arguments made by both practitioners and academics, our tests provide no evidence that the impairment-only model results in inflated balances.

We next examine specific concerns related to goodwill impairment testing requirements and the relation of goodwill impairments to firm performance. These tests partition the sample into two groups where i) equity book values exceed market values or ii) market values exceed book values.[7] We compare incidences of goodwill impairments to finite-lived intangible impairments

[4] We focus on the 2011–2020 period due to the availability of complete Calcbench data starting in 2011, and, when we started this project, Compustat data availability ended in 2020.
[5] Our main analyses uses firms with goodwill balances at any point during the period 2011 through 2020. To mitigate the possibility that sample composition changes drive our results, we repeat the analyses for the subsample of firms with goodwill balances throughout the 2011-2020 sample period.
[6] One exception occurs in the goodwill to finite-lived intangibles comparison for single reporting unit firms. While neither goodwill nor finite-lived intangibles are growing, there is a significant positive difference between the two.
[7] Use of book over market excess as a performance measure for impairment likelihood is consistent with accounting standards and prior research (Beatty and Weber, 2006; Ramana and Watts, 2012; Li and Sloan, 2017).

and to goodwill divested when a reporting unit is sold.[8] The differing accounting rules for finite-lived intangibles and divested goodwill allow us to evaluate how accounting rules affect the relationship between performance and loss recognition.

We further partition our data into four groups: (1) single reporting segment and unit, (2) single reporting segment and multiple reporting units, (3) multiple reporting segments with goodwill allocated to all segments, and (4) multiple reporting segments with at least one segment with no goodwill allocation. These partitions allow us to examine competing arguments about the role of reporting units in impairment decisions. Specifically, Ramana and Watts (2012) argue that the ability to allocate goodwill to more units allows more discretion to avoid impairments. Similarly, selectively allocating goodwill to only the best reporting segments will allow firms to avoid impairments. Finally, standard setters have expressed concerns that eliminating the allocation of goodwill to reporting units would reduce the incidence of goodwill impairments when the amount of headroom varies across units.

We find that a positive relationship between equity performance and goodwill impairments across all reporting groups, with the firms having some goodwill allocated to all segments having the most impairments.[9] The evidence that single reporting unit firms have the fewest impairments across all partitions is consistent with concerns expressed by the FASB that eliminating goodwill allocation would reduce the incidence of impairments. These results also provide little support for the concerns raised by Ramana and Watts (2012), other than in the partition where multi-segment firms have goodwill allocated to each segment. The statistically higher incidence of goodwill

[8] A firm planing to sell a reporting unit must impairment test goodwill when the sale of the reporting unit is more likely than not. Once a Held-for-Sale reporting unit is sold, goodwill associated with the reporting unit is divested.
[9] One concern with both the impairment-only and the impairment and amortization models is whether recognition of declines in goodwill is timely and informative. A strong relationship between concurrent impairments and poor performance would suggest timely impairments.

impairments in this group (compared to firms that allocate goodwill to only some segments) could result either from strategic allocation of goodwill to segments with the strongest performance or from a greater likelihood when goodwill is allocated to all reporting units of having a single reporting unit where book exceeds market value. This second possibility is consistent with a higher incidence of goodwill impairments for the partition where each segment is allocated goodwill when consolidated market exceeds book values.

We next analyze finite-lived intangibles. Finite-lived intangibles are subject to amortization and impairment testing, with a different impairment test than goodwill. Thus, this comparison allows us to examine the association of our measure of performance and organizational complexity with impairments under this alternative accounting model. We find that, for seven of the eight partitions, impairment rates are more than 50% lower for finite-lived intangibles than for goodwill. (Each of these differences is statistically significant.) In general, the accounting model for finite-lived intangibles leads to significantly fewer impairments than goodwill, especially for poorly performing firms, where the impairment rates are three times higher for goodwill compared to finite-lived intangibles. Similarly, we find that, for half of our partitions, poor performers are no more likely to take a finite-lived intangible impairment than good performers. Jointly these results are consistent with the views expressed by the CFA Institute (Peters, 2021) that the amortization and impairment model decreases the correlation between impairments and performance and that amortization is an information-free accounting method.

We then examine the rate of firms divesting a reporting unit with goodwill. The trigger for goodwill divestitures is very different than for the annual goodwill impairment tests or the other triggers of impairment testing. We find that firms divesting goodwill have divestiture rates two to three times lower than goodwill impairments and that divestitures are not strongly correlated with

performance. These results highlight that nonperformance-based triggers are likely to reduce the incidence of goodwill reductions and the correlation of these reductions with performance.

Building on these tests, the literature considers goodwill impairments on an annual basis and does not consider impairment timing. (Some impairments occur at the annual assessment date or during the other quarters in the fiscal year.) We isolate the impairments that occur in the fourth quarter (which is the annual assessment period for 85.2% of the firms in our sample) and investigate whether the impairments taken then are affected by firms' decisions to take goodwill impairments in a previous quarter, a finite-lived intangible impairment, or a goodwill divestiture. We document that, first, for firms with a book value greater than their market value, the number of firms taking an impairment in the fourth quarter assessment period is roughly the same as the number of firms making an impairment during other quarters. Similar results hold for firms with market values greater than book values. This result is consistent with the concern that eliminating the annual test and moving to testing only when there is a trigger could significantly reduce the number of goodwill impairments.

Second, the probability of firms taking an impairment in an assessment quarter is statistically and economically larger when they have taken an impairment during the other quarters, especially for firms where market value exceeds book value (where the probability is nearly four times as large). Thus, assessment period impairments do not appear to be independent of non-assessment period impairments. We find even stronger results for the book-exceeds-market group when we compare assessment period impairments with and without a finite-lived intangible impairment during the year. Firms are more than twice as likely to take an impairment charge in their assessment quarter if they have taken a finite-lived intangible asset impairment during the year (three times as likely if market is greater than book). The results are not quite as strong for

goodwill divestitures. Overall, while the impairment decision made during the annual assessment period need not result from a trigger, our analyses suggest that the impairment incidence in the assessment period relates to finite-lived intangible impairments and goodwill divestitures.

We conclude our analyses by examining how potential sources of performance measurement discretion relate to the incidence of goodwill impairment. Specifically, we consider how impairment incidence differs based on i) annual industry level control premia, ii) off-balance-sheet intangibles (headroom), iii) changes in the difference between market and book values (based on the IASB's proposal to address headroom), and iv) the use of analysts forecasted target prices rather than traded prices.

Focusing first on control premiums, the FASB has explicitly indicated that a control premium (CP) adjustment is allowed under ASC 350, where a control premium is added to market value to increase the threshold for an impairment. Thus, we would expect adding a control premium to market values would decrease impairment incidence. We find some evidence of this, as impairment rates are lower due to CP for each reporting group, but the results are only statistically significant for multi-segment firms where goodwill is allocated to all segments.

Unlike control premiums, the FASB does not provide for an adjustment for off-balance-sheet (OBS) intangibles when testing for goodwill impairments. Although no adjustment is required, we find the impairment rate is higher when OBS adjusted book exceeds market for each reporting group and that this increase is greater for multiple reporting unit and segment firms. This suggests that the excess market over book value for these OBS assets is only partially shielding goodwill from impairment.

Similarly, while no adjustment is required for decreases in excess of market over book in accounting standards, when market exceeds book, the goodwill impairment rate is significantly

higher when the market value decreases (versus increases) more than the book value. This increase in impairment rate is significantly higher for multiple reporting unit and segment firms. This suggests that declines in headroom are at least partially reflected in goodwill impairments. We also find that, when we replace market value with analysts' forecasts of one-year-ahead market values, firms that analysts suggest have temporarily depressed market prices take fewer impairments.[10]

We conclude our paper with an exploratory analysis on the effect of the recent change in accounting standards, ASU 2017-04, on the propensity for firms to take impairment charges. We find that, for firms with books values exceeding market values, the goodwill impairment rate increases by roughly 70% and is statistically significant, while, for the opposite firms, there is a small increase in the impairment rates that is insignificant. We find no significant evidence of a change in the propensity to impair finite-lived intangible assets. Thus, the simplification of the rules appears to have led to more goodwill impairments for firms indicated for potential impairment in the first-stage test.

In conclusion, we contribute to the literature by using the XBRL breakout of intangible assets into indefinite-lived and amortizable finite-lived intangibles to compare how differences in post-acquisition accounting affect both asset balances over time and the association between performance and incidence of impairments of these asset types. Our finding that goodwill is declining as a ratio of the sum of goodwill and finite-lived intangibles provides no support for arguments made by practitioners and academics that the impairment-only model results in inflated goodwill balances.

[10] In an un-tabulated analysis, we seek evidence of whether impairments not indicated by current performance are taken to improve future reported performance (i.e., "big bath" impairments). We focus on the propensity to impair 100% of goodwill by firms whose market values exceed book values. Among firms with market values greater than book values who recorded an impairment we find approximately 8% impair 100% of goodwill balances suggesting a low big bath propensity.

We further contribute to the literature by incorporating goodwill reporting unit disclosures, collected from 10-K filings, to compare the relation between the impairment incidence and equity performance by goodwill allocation reporting group for these asset types. We find that goodwill impairments are associated with performance across all reporting groups while this is not the case for finite-lived intangible assets. These results do not support the argument that replacing the goodwill impairment-only model would result in impairments better aligned with firm performance. In contrast, using XBRL data on goodwill allocation by reporting segment, we find some support for concerns that reducing requirements to allocate goodwill by reporting segments might lead to reduced impairments. We also contribute to the literature by examining alternative performance metrics using control premium data, OBS, and analysts' target price to examine discretion in the incidence of goodwill impairments but find little support for the use of discretion provided by these alternatives to avoid impairments. We find marginal evidence that discretion allowed by the accounting standards related to control premia is associated with less frequent impairments, and we find that available shielding provided by headroom is not being fully utilized.

2. Institutional Details and Literature Review

2.1 Accounting Rules for Goodwill and Other Intangibles

Goodwill is recognized by firms when there is a positive difference between a purchase price and the acquired identifiable net assets in an acquisition. It is then allocated to reporting units, which are elements of operating segments, which are elements of reportable segments (FASB 350-20-35-10). Finite-lived intangibles are amortized and subject to impairment testing rules over their useful life, while indefinite-lived intangibles, including goodwill, are subject to impairment testing only. In addition to impairments, changes in acquired goodwill can arise from (1) post-acquisition

purchase price adjustments, (2) disposals, (3) foreign currency translation adjustments, and (4) new acquisitions.

Goodwill and indefinite-lived intangibles must be evaluated for impairment at least once per year (during the annual assessment quarter) or more frequently if circumstances arise (triggers). One of the key elements of the annual goodwill impairment test is the quantitative fair value measurement of the reporting unit.[11] If book value exceeds fair value, the implied goodwill value is the residual value after allocating the reporting unit fair value to the nongoodwill assets.[12] A goodwill impairment results if the book value exceeds the implied fair value.[13] In contrast, finite-lived intangibles are subject to amortization and need not be tested for an impairment annually and follow the same impairment rules as long-lived assets (like PP&E) (ASC 350-30-35-14). Thus, an impairment test is only required if circumstances arise suggesting that the carrying amount of the asset may not be recoverable, based on a comparison of the carrying amount to undiscounted future cash flows. In an impairment test, if the carrying value exceeds discounted cash flows, the firm must take an impairment charge.

There are several important elements affecting the incidence of goodwill impairments. First, the observability of a reporting unit market price. When there is single reporting unit, the market price of the entity more reliably indicates the reporting unit fair value than when there are multiple reporting units, providing more discretion in impairment assessment. Second, the standards specifically indicate that quoted market prices are insufficient statistics for fair values, even for

[11] ASU 2011-08 provides an optional Step 0 allowing a qualitative assessment of the likelihood that the reporting unit fair value exceeds the carrying value. Relatedly, reporting unit fair value can be measured internally or by an appraiser. Common techniques include using quoted share prices (for single reporting unit firms), adjusting quoted prices for a control premium, using a discounted cash flow analysis, and using market multiples from similar transactions within the industry (FASB 350-20-35-22 through 24).

[12] Compared to goodwill, the main difference for indefinite-lived intangibles is that the impairment is based on an asset class rather than on a reporting unit value.

[13] This two-step process was eliminated for nonsmall reporting SEC filers beginning in 2020.

single reporting unit firms in the presence of a control premium associated with the reporting unit's net asset bundle (ASC 350). Third, unrecognized internally generated intangibles and increases in the values of recognized assets not accounted for at fair value may reduce the effectiveness of the difference between equity market values and book values in goodwill impairment evaluations. Many of the discretionary items should not affect indefinite-lived intangible impairments, given that the quantitative assessment is based on a comparison of the carrying value to the direct calculations of the fair value of the specific indefinite-lived intangibles.

2.2 Issues with Compustat Data Availability for Goodwill and Other Intangible Assets

Prior to the 2001 issuance of FAS 141, obtaining accurate goodwill data was more challenging. While Compustat began reporting goodwill data in 1989, that data appears to be incomplete prior to the reporting changes required by FAS 141. Specifically, the introduction of the requirement to report goodwill separately from other intangible assets on the balance sheet led to an increase in goodwill reported in Compustat, compared to the period prior to FAS 141 when that balance sheet breakout was voluntary. This change in reporting appears to increase the accuracy of the Compustat goodwill balances in the post-2001 period, although other data required by the goodwill reconciliation were not immediately incorporated into the Compustat database. For example, goodwill acquisition data was added in 2011, but other reconciling items, such as goodwill foreign currency translation, are still not separately broken out.

Compustat has additional data limitations on several items prior to 2001.[14] Its goodwill impairments data is first available in 2001, leading studies that include pre-2001 data to impute goodwill impairments using the change in goodwill adjusted for any amortization charges. This

[14] Typically, only aggregated acquisition amounts for each reportable segment are disclosed making external evaluation of specific acquisitions difficult. Determining the number of operating segments and reporting units is also difficult since reportable segments can aggregate operating segments.

results in a misclassification of any of the other factors affecting changes in goodwill as impairments. Post 2001, Compustat also includes indefinite-lived intangible impairment as part of goodwill impairments. While Compustat separately reports the amount of finite-lived amortization expense, the balances of finite- and indefinite-lived intangibles are combined, as are the impairments of finite-lived and other long-lived assets.

2.3 Practitioner, Investor, and Regulatory Literatures

The practitioner literature generally purports that goodwill balances grew in the post-FAS 141 adoption period. The evidence is less clear whether goodwill balances are growing consistently over time and economic conditions or as a percentage of either total intangibles or other assets.[15] These articles also suggest that impairment charges in the post-SFAS 142 world are less timely and levy a host of other criticisms against the existing goodwill accounting model. For example, a KPMG (2020) survey of investors indicates: "There are concerns among users of financial statements that carrying amounts of goodwill may be overstated." This view motivates the discussion of the relative merits of impairment-only versus amortization and impairment models. Peters (2021) summarizing a CFA Institute survey, and Wahal and Repetto (2020), writing on behalf of Avantis Investors, indicate that goodwill balances are growing relative to equity over time with estimates of 32% in 2020 and 40% in 2019 respectively. Ryder (2018) discusses goodwill dollar values, indicating that worldwide goodwill is $8 trillion compared to $14 trillion in physical assets but suggests goodwill impairments are increasing at a similarly fast pace.

FASB (2020) summarizes comments on a recent goodwill accounting change proposal. Over half of the respondents opposed the impairment-only model, indicating "the lack of

[15] EFRAG (2016) shows that goodwill balances grew from 2007 through 2014, but when scaled by net assets or market value of equity, they declined. Ryan (2021) examines a longer period and shows that goodwill as a percentage of equity grew from 9 % to 28% from 1996 through 2019.

informational utility provided by the impairment test" and "that the information provided by the impairment test is limited." Reasons given included "the subjectivity of the impairment test results in lower quality information … and the results of the impairment test may be anomalous because the model is inconsistently applied, and two individuals could get different answers with the same fact pattern." This subjectivity results from control premium assessments, market multiples, and market dislocations. Footnotes Analyst (2018) criticizes the goodwill impairment-only model by highlighting that shielding provided by headroom creates cross-firm variation in goodwill impairment incidences, reducing financial statement comparability and informativeness.

2.4 Academic Research

Several papers compare the post-SFAS 142 impairment-only model to the pre-SFAS 142 amortization and impairment model.[16] Defining goodwill impairments as decreases in intangibles of at least 5% of lagged assets after excluding amortization of intangibles in the pre-period, Bens et al. (2008) find a less significant market reaction to goodwill impairment in the post-period. Li et al. (2011), using a sample of goodwill impairment announcement made during the 1996–2006 period, also find that the impact of the post-SFAS-142 losses, although significantly negative, is lower than that of the pre-SFAS-142 and transition periods. The lower impact may be due to smaller post-SFAS-142 losses that are booked by firms more regularly. They further note: "The collective effect of more frequent impairments in the post-SFAS-142 period may well be as high as that of pre-period impairments. Overall … the announcement of goodwill impairment reveals negative information about the firm to the market."

[16] The academic research on the post-SFAS 142 goodwill accounting has been evaluated in at least four different review papers (Amel-Zadeh et al., 2013; Wen and Moerle, 2016; Boennen and Glaum, 2015; d'Adrcy and Tarca, 2018). Our discussion focuses on previous research on post-acquisition impairments that is most closely related to our study.

Li and Sloan (2017) also find "a greater frequency of small impairments in the 0% to 10% bucket for the post-142 period," but they argue that this difference likely reflects the method that they use to estimate impairments in the pre-142 data, which relies on reductions in goodwill balances that exceed a 5% threshold. They "impose the 5% threshold because goodwill is subject to period amortization in this period" and want to eliminate negative changes in goodwill that "probably reflect amortization." When they focus exclusively on impairments exceeding the 5% threshold, they find a greater frequency of large impairments in the post-142 period compared to their pre-142 impairment estimates and argue that "the higher frequency of firms taking big bath write-offs of their goodwill balances in a single year is consistent with impairments being less timely under SFAS 142," which they argue is consistent with inflated goodwill balances.

Focusing exclusively on the post-SFAS 142 impairment-only model, Ramana and Watts (2012) hypothesize that managers exploit the available discretion to time expense recognition. They focus on the number of Compustat reporting segments and the amount of unverifiable net assets. Managers in firms with more reporting segments, more assets with unverifiable values, or both can inflate their estimates of reporting segment market value. While they discuss issues associated with strategic allocation of goodwill to reporting segments and the effects of headroom, they cannot explore these possibilities and argue that the research provides a lower bound on the goodwill impairment avoidance. Finally, Linsmeier and Wheeler (2021) also use pre- and post-SFAS 142 data to compare the relative size of the income statement charges under the impairment-only versus the impairment and amortization models. Like Li et al. (2011), they find smaller impairment amounts before SFAS 142, but, when combining goodwill impairment and amortization, goodwill is expensed more quickly pre-SFAS 142. Linsmeier and Wheeler (2021) also examine the role of headroom in the impairment model and the IASB's proposal to adjust the

impairment testing model to incorporate headroom.[17] They focus on firms where there is only one acquisition in a given year and construct a measure of pre-acquisition headroom (PAH) based on the market-to-book ratio one year prior to the acquisition. They find that, for their sample of 216 nonserial acquirers, recording goodwill impairments for declines in PAH would have resulted in more impairments in the first year after acquisition.[18]

Data availability is a key issue in these studies. For those considering the pre-SFAS period the lack of Compustat goodwill impairments in the pre-SFAS 142 environment creates a challenge. Some studies manually identify impairments through keyword searches, which leaves the potential for smaller impairments to not be collected. Alternatively, other studies, such as Bens et al. (2008) and Li and Sloan (2017), impute impairments using data on changes in goodwill. This computation is affected by the data issues discussed above. Similar Compustat data limitations arise in studies such as the work of Ramana and Watts (2012) when Compustat reportable segments are used to proxy for goodwill reporting units.

3. Hypothesis Development

To illuminate whether goodwill balances have swelled in the post-SFAS 142 impairment-only goodwill accounting environment, our first hypothesis focuses on the growth of goodwill relative to separate indefinite-lived intangibles that are impairment tested at the asset level and to finite-lived intangibles that are subject to both amortization and impairment testing at the asset group level. Our first pair of hypotheses is as follows:

H1a *There is no trend in the ratio of goodwill to the sum of goodwill and total intangible assets.*

H1b *There is no trend in the ratio of goodwill to the sum of goodwill and finite-lived intangible assets.*

[17] Specifically, as discussed in IFRS Staff Paper (2021), the IASB is considering adjusting for declines in the excess of market over book values in the evaluation of the need for goodwill impairments.

[18] The timing of the goodwill balance and decline in PAH measurement relative to the acquisition is ambiguous.

The ability to assess the reasonableness of internally generated fair value measurements compared to external fair value indicators for publicly traded entities is relatively easier for single reporting unit firms than for multiple reporting units, especially absent firm disclosures reconciling these values, as recommended in AICPA (2013). The extent of these problems is potentially either alleviated or exacerbated when goodwill is allocated to multiple reporting units. All else equal, for a given entity-wide level of book value relative to market value, the probability of having at least one reporting unit in the tail of the distribution, where book value exceeds market value, increases with the number of reporting units. If goodwill is allocated to each unit, this suggests that eliminating its allocation to reporting units could decrease the likelihood of goodwill impairment recognition. In contrast if goodwill is strategically allocated to reporting units with a low probability of book value exceeding market value (i.e., much headroom), this could suggest that eliminating the allocation of goodwill to reporting units could increase the likelihood of impairment recognition.

In addition, the correspondence between the entity- and reporting-unit-level measurement of book values and market values for single reporting unit firms suggests that, all else equal, the incidence of goodwill impairments when entity *book values exceed market values* for single unit firms would be expected to be higher than for firms with multiple reporting units or reportable segments. On the other hand, variation in the relation between book relative to market values for multi-unit and multi-segment firms suggests that, all else equal, the incidence of goodwill impairment when entity-wide *market values exceed book value* would be expected to be higher for multi-reporting unit or multi-segment firms. We further argue that a comparison of impairment rates, depending on performance across these reporting groups, will reflect the effects of these

concerns with goodwill impairment testing at the reporting unit level controlling for the base-rate impairment differences across the reporting groups. This leads to our second group of hypotheses:

H2a *Goodwill impairment incidence does not differ for single versus multiple reporting unit/segment firms when book value of equity exceeds market value (B>M).*

H2b *Goodwill impairment incidence does not differ for single versus multiple reporting unit/segment firms when market value of equity exceeds book value (M>B).*

H2c *The difference in goodwill impairment incidence when B>M relative to when M>B does not differ for single versus multiple reporting unit/segment firms.*

H2d *Goodwill impairment incidence does not differ when goodwill is allocated to all versus only some reporting segments.*

Since other intangible assets are evaluated on an asset basis rather than a reporting unit basis, the association between entity-level book-to-market equity values and impairments would be expected to be lower for both indefinite- and finite-lived intangible assets than for goodwill, especially for firms with a single reporting unit. Given that impairment assessment for finite-lived intangible assets is only needed when facts or circumstances require it and the assessment relies on undiscounted cash flows, the association between the incidence of finite-lived intangible assets and entity-level book-to-market equity values should be even more tenuous. In addition, in contrast to goodwill impairments that occur in the normal course of business, goodwill divestitures associated with asset disposals are less likely to be associated with entity book-to-market equity. This lead to our third pair of hypotheses:

H3a *The difference in impairments incidence when B>M relative to when M>B does not differ for goodwill versus finite-lived impairments.*

H3b *The difference in impairment/divestitures when B>M relative to when M>B does not differ for goodwill impairments versus goodwill divestitures.*

The requirement that goodwill be impairment tested not only during the annual assessment quarter but also during any quarter when circumstances indicate potential impairment provides a

setting to examine whether goodwill and finite-lived impairment decisions made during the year are independent of the impairment decisions being made for goodwill during the assessment quarter. It is unclear whether impairments of goodwill during the assessment quarter are more or less likely when an impairment of goodwill is made in a non-assessment quarter or a finite-lived intangible impairment or goodwill divestiture is made during the year. This leads to our fourth pair of hypotheses:

H4a *There will be no difference in annual assessment quarter goodwill impairment incidence if there is a goodwill impairment made in a previous non-assessment quarter.*

H4b *There will be no difference in annual assessment quarter goodwill impairment incidence if there is a finite-lived impairment made during the year.*

H4c *There will be no difference in annual assessment quarter goodwill impairment incidence if there is a goodwill divestiture made during the year.*

We also consider how several potential sources of performance measurement discretion relate to the incidence of goodwill impairment. In Appendix B, we provide excerpts from a recent response to a comment letter from the SEC to NRG clarifying how NRG determined the fair value of its subsidiary, NRG Texas. As illustrated in this example, ASC 350 allows a control premium (CP) adjustment that could be used to avoid triggering a goodwill impairment when book value exceeds market value prior to a control premium adjustment.[19] This is inconsistent with the AICPA's best practices approach, suggesting that firms should use more than benchmarks of control premiums of other firms in the industry and instead should reference the enhanced cash flows or reduction of risk associated with control of the entity. In comment 5, NRG indicated that the firm has a 20% control premium, a portion of which was attributable to NRG Texas.

[19] This approach comports with the reliance on a control premium benchmark by the majority of public firms surveyed by the AICPA. See Duff and Phelps (2013), "U.S. Goodwill Impairment Study."

Also in this case, in its response (comment 4 last bullet point), NRG highlights the synergies between its NRG Texas unit and its wholesale unit, which contributes to the headroom in the Texas unit (such as OBS intangibles). Similarly, declines in headroom reflected in the excess of market over book may not trigger a goodwill impairment test when market values continue to exceed book values. Finally, NRG uses analyst target price forecasts as an input into valuations to avoid impairments when these market value estimates exceed book value and book values exceed traded market values, as indicated in comment 5. This leads to our fifth group of hypotheses:

H5a *Goodwill impairment incidence when B>M does not differ when book value is greater than market value adjusted for a control premium (M_{CP}) versus when it is less than M_{CP}.*

H5b *Goodwill impairment incidence when B<M does not differ when book value, adjusted for OBS internally generated intangibles (B_{OBS}), is greater versus lower than the market value.*

H5c *Goodwill impairment incidence when B<M does not differ when changes in the market less book are less than zero versus when those changes are greater than zero.*

H5d *Goodwill impairment incidence when B>M does not differ when book is greater versus less than market values calculated using analyst target price forecasts (M_{AF}).*

4. Research Design and Sample

To test our first pair of hypotheses related to trends in goodwill and in other intangibles, we calculate the means of these measures by year, each as a percentage of total assets, and statistically test for trends using Mann-Kendall trends tests. We also calculate the ratio of goodwill to the sum of goodwill and other intangibles to evaluate the trend of goodwill in comparison with intangibles. We further break out intangible assets into finite- versus indefinite-lived assets and test the growth rate of the ratio of goodwill to the sum of goodwill and finite-lived intangible assets. While goodwill is collected from Compustat reconciled with Calcbench, the intangible breakout is only available on Calcbench. As a sensitivity test, we reperform these tests on a constant subsample of firms with goodwill balances throughout the 2011–2020 sample period. By holding

constant the firms in the sample, we provide some assurance that our results on the trend in goodwill are unaffected by firms entering or exiting the sample.

We test our second through fifth hypotheses using both binomial means tests across performance and reporting groups and tests of differing OLS coefficients across these groups. To test hypotheses H2a–H2d, we analyze whether the goodwill impairment incidence depends on B>M versus B<M across different reporting units. We define reporting units based on Compustat segment data and 10-K and 10-Q key word searches. For single Compustat reporting segment firms, we search for single versus multiple reporting units. For multiple segment firms, we break out the sample into firms where all versus not all segments have goodwill.

To test hypotheses H3a and H3b, we further analyze whether goodwill divestitures and finite-lived intangible impairments collected from Calcbench depend on whether B<M across different reporting units. To test H4a–4c, we restrict our sample to firms that have fourth quarter assessment periods for goodwill impairments and first estimate the goodwill impairment incidence in the assessment quarter. We then investigate whether the incidence of an impairment in the assessment quarter depends on whether a goodwill impairment was taken in a previous non-assessment quarter during the fiscal year, a finite-lived intangible impairment was taken, or a goodwill divestiture was made during the year. We further partition the data based on beginning of the quarter B>M versus B<M for fourth quarter assessment periods.

To test H5a, for firms where B>M, we further partition the sample based on whether $B>M_{\_CP}$, measured as an indicator for whether book value of equity exceeds the control premium adjusted market value. We then analyze whether the incidence of goodwill impairment depends on whether B<M, B>M, and $B>M_{\_CP}$ or B>M and $B<M_{\_CP}$, across different reporting units. Similarly, to test H5b, we partition the B<M observations based on whether book value adjusted

for off-balance-sheet intangibles (collected from Peters and Taylor's database) exceeds market equity value (i.e., $B\_{OBS}>M$ versus $B\_{OBS}<M$) and analyze goodwill impairment varying with these valuation partitions across different reporting unit levels. In addition, to test H5c, we partition the sample where B<M based on whether the changes in the market less book equity value are less than zero (i.e., D(ΔMB<0) versus D(ΔMB>0)) and analyze goodwill impairment varying with these valuation partitions across different reporting unit levels. Finally, to test H5d, we partition the sample where B>M based on whether book value exceeds analyst median target prices multiplied by common shares outstanding measured at the beginning of the year ($B>M\_{AF}$ versus $B<M\_{AF}$). We then analyze goodwill impairment varying with these valuation partitions across different reporting unit levels.

4.2 Sample and Data

We describe our sample selection in Table 1. Our sample is drawn from the intersection of data available on the Compustat and Calcbench databases during the 2011–2020 period.[20] Our final sample consists of 15,713 firm-year observations for 2,562 firms. Table 2 provides descriptive statistics for the sample overall and partitioned based on single reporting segment and multiple reporting segments (RS), with single RS firms further broken down into single and multiple reporting units (RU). Panel A reports means and standard deviations for continuous variables, while Panel B reports the percentage of observations with dichotomous characteristics. Among 15,713 firm-year observations, 2,662 have a single reporting unit and segment, 2,804 have multiple reporting units in a single reporting segment, and 10,247 have multiple reporting units and segments. These groups appear similar along many dimensions, including goodwill (*GDWL*)

[20] We limit our sample to non-financial companies incorporated in the United States with CIK codes and both current and one period lagged data. We further require at least $80 million in assets, 1.25 million shares outstanding a closing share price of $1. and either non-zero beginning or ending goodwill balances that match in the two databases. We also require non-missing reportable segment and reporting unit data.

and finite-lived intangibles (*FLINTAN*) balances, and the proportion of finite-lived impairments (*FLIMP_D*) and indefinite-lived impairments (*ILIMP_D*) for firms with these intangibles.

Some of the main differences in these partitions relate to the observations with a single reporting unit. These observations are less likely to have a book above market value measured using market prices (B>M) before or after an adjustment for a control premium ($B>M_{CP}$) or median analyst target price forecasts ($B>M_{AF}$), while the off-balance-sheet adjusted book above market ($B_{OBS}>M$) is similar for single RU and multi RS observations but higher for those with multi RU. Consistent with the differences in these performance metrics, single RU firms are much less likely to take a goodwill impairment or a goodwill write-off than those with multi-RU/RS.

5. Results

5.1 Examination of Bloated Goodwill Balances—Trends in Goodwill versus Intangibles

Despite widespread concerns that the impairment-only model leads to inflated goodwill balances relative to the finite-lived intangibles amortization and impairment model, we do not find evidence that the percentage of goodwill relative to the percentage of other intangibles assets increases during our sample period. Focusing on Table 3 panel A, over the 10 years from 2011 through 2020 the mean (median) goodwill percentage ranged from 17.2% (12.8%) in 2011 to 18.5% (14.8%) in 2020 compared to 8.1% (4.8%) in 2011 and 10.0% (6.0%) in 2020 for other intangibles. The highest mean (median) value for each of these variables was reached in 2018 with a peak of 19.2% (12.7%) for goodwill and 10.4% (7.0%) for other intangibles. For goodwill the lowest mean (median) value of 16.8% (12.3%) was in 2012, while the lowest values for other intangibles was in 2011. Goodwill as a proportion of intangible assets was at the highest level in 2013 and the lowest level in 2018. A similar pattern is observed when other intangible assets are restricted to only amortizable finite-lived intangibles.

In Panel B, we show that, based on the Mann-Kendall trend analysis using the overall sample, the ratio of goodwill to the sum of goodwill and other intangibles declines through time. The statistically significant estimated slope of the untabulated OLS trend line for the proportion of goodwill to total intangibles is -0.0002, which indicates that goodwill is growing at a slower pace than other intangible assets. Figure 2 shows the downward trend of goodwill relative to other intangibles (including finite- versus indefinite-lived intangibles), which is consistent with Table 3. We also find that there is no significant trend in the ratio of goodwill to total intangible assets for single RU firms and that goodwill is growing more slowly for multi-RU and multi-RS firms. Taken together, these analyses provide no evidence that the impairment-only method for goodwill produces more bloated balances than do the accounting methods used for other intangible assets.

In Table 3 Panels C and D, we replicate the analyses in Panels A and B but focus on a constant sample with goodwill on the balance sheet for each year in the sample period. This limitation provides assurance that our findings are not driven by firms entering or exiting the sample. The firms in this reduced sample have slightly larger goodwill balances, but the results of our analyses and our inferences are the same as those for Panels A and B. There remains no evidence of goodwill growing faster than other intangible assets.

5.2 Annual Incidence of Goodwill Impairments, Goodwill Divestitures, and Finite-Lived Intangible Impairments

Table 4 partitions of the annual incidence of goodwill impairments, finite-lived intangible impairments, and goodwill dispositions by valuation groups and organizational complexity. We create two valuation groups, B>M versus B<M, and four reporting groups, single RU, multi-RU (within single-RS), and multiple segment firms with goodwill allocated only to some versus all segments (*Non_GW_ALL_SEG* versus *GW_ALLSEG*). Panel A rows (1)–(4) indicates that, for each reporting group, the rate of goodwill impairments is significantly higher when B>M versus

when B<M. This is consistent with the importance of this performance measure when evaluating the incidence of goodwill impairments notwithstanding reporting group. For the overall sample, the goodwill impairment rate is also monotonically increasing as organizational complexity increases (more segments and reporting units). We also find that, when goodwill is allocated to all segments, the impairment rates are higher for the overall sample for both B>M and B<M.

Regardless of the valuation group, single-RU firms report lower impairment rates than do multi-RU in single-RS or both of our partitions of multi-segment firms, consistent with the lower overall impairment rate for single-RU firms. However, the difference in impairment rates between the valuation groups is generally insignificantly different when B>M (column 5). The one exception is the partition where multi-segment firms have goodwill allocated to each segment. This, compared to firms that allocate goodwill to only some segments, suggests two possibilities. Firms allocating goodwill to less than all segments could be strategically avoiding allocating goodwill to poorly performing segments when they have the option to do so. Or this could suggest a greater likelihood of having a single reporting unit where book exceeds market when goodwill is allocated to all reporting units. In general, these results provide very limited evidence that impairment rates differ for more complex (or less complex) organizations when B>M. When B<M, which suggests a goodwill impairment would not be needed at the aggregate level, we find the more reporting units a firm has, the more likely it is to take a goodwill impairment.

The FASB has considered eliminating the requirement to allocate goodwill to reporting units (or segments) and tracking the account at the entity level. Opponents have suggested that it would reduce the extent to which goodwill impairments are taken when performance is poor. The results in Panel A (Column 4) are generally inconsistent with this criticism. Specifically, for poor performers, the number of reporting units does not appear to be associated with the propensity to

impair. The results in Column 5 are more consistent with this criticism for firms performing well where impairment is more likely when there are more reporting units. Thus, moving goodwill impairment decisions to the entity level might reduce potential false positives.

Panel B provides a similar analysis for finite-lived intangible impairments. When we compare Panels A and B, in seven of the eight partitions, the impairment rate is larger for goodwill compared to finite-lived intangibles. (All are statistically significant, untabulated.) Thus, moving the accounting rules for goodwill impairments closer to those for finite-lived intangible asset accounting is likely to reduce impairment rates. Panel B also provides little evidence of significant differences in impairment rates across reporting groups in the overall, B>M, or B<M finite-lived samples. There is also no evidence of a difference across performance groups in the impairment rates for single-RU or for multi-RU observations. For the multi-RS group, the impairment rate for B>M is higher than B<M, suggesting a possible association between that metric and the difference between fair values and carrying values of finite-lived intangible assets for multi-RS firms.

Panel C rows (1)–(4) shows the pattern for goodwill divestitures resembles the pattern of goodwill impairments, although the magnitudes are significantly smaller, and overall having a market value less than book value does not explain the divestiture decision. Specifically, we observe a small significantly positive difference between the divestitures when B>M compared to when B<M for single-RU observations but no significant difference across these valuation partitions for multi-RU or multi-segment firms. Overall the analysis in Panel C suggests that firms divesting goodwill have divestiture rates two to three times lower than goodwill impairments and that divestitures are not strongly correlated with performance. These results highlight that nonperformance-based triggers are likely to greatly reduce both the number of goodwill impairments and the link between performance and impairments.

Panel D presents the results for panels A, B, and C in a regression format. The dependent variables are goodwill impairment, goodwill divestitures, and finite-lived intangible asset impairments. The independent variables are indicator variables for our valuation and reporting groups and the interaction of these two variables. The significance of the estimates for each dependent variable in the regression analysis with clustered standard errors by time is consistent with the results in our univariate analyses. The regression analysis allows us to test whether market-to-book has incremental explanatory power for goodwill impairments, compared to goodwill divestitures and finite-lived impairments. The results of these tests (reported at the bottom of the table) indicate that the effect of book-to-market on goodwill impairments (based on single-RU) is significantly higher than goodwill divestitures and finite-lived intangible assets.

Table 5 focuses on the impairment decisions made for a subsample of firms that have fourth quarter annual assessment periods. By focusing on firms with fourth quarter assessment periods (which compromise over 85% of our sample), we can examine whether impairments (for goodwill or finite-lived intangibles) or goodwill divestitures are associated with an increased or decreased impairment rates in the assessment period. The first row of Table 5 focuses on impairments only made in the fourth quarter for firms with a fourth quarter annual assessment period that did not take a prior impairment in a non-assessment quarter. Note that, for the 1,106 of these firms when B>M, there are 243 firms that take an assessment quarter impairment. For the 11,276 of the B<M firms, there are 793 firms taking an impairment in the assessment quarter. Thus, a total of 1,036 firms with no prior impairment in a non-assessment quarter took an assessment quarter impairment.

The second row of Table 5 reports the number of firms with a fourth quarter assessment period that took impairments in one of the prior three quarters and the frequency of an additional impairment in the fourth quarter. In the three non-assessment quarters, there are 270 firms with

previous impairments, and 79 of those took an additional fourth quarter impairment when B>M. And when M>B, there are 734 firms with previous impairments, and 198 of those took an additional fourth quarter impairment. Thus, a total of 1,004 firms took impairments in non-assessment quarters, and more than half of the firms taking impairments did so exclusively in the assessment quarter as opposed to the three non-assessment quarters. Further, more than a quarter of those taking an impairment in a non-assessment quarter take an additional impairment in the assessment quarter. These results are consistent with the concern that eliminating the annual test and moving to testing only when there is a trigger could significantly reduce the number of goodwill impairments. Further, assessment period impairments do not appear to be independent of non-assessment quarters, which is somewhat surprising, as it suggests that the full loss is not being recognized at the time of the trigger.

We find even stronger results when we compare assessment period periods with and without a finite-lived intangible impairment during the year. Firms are more than twice as likely to take an impairment charge in their assessment quarter if they have taken a finite-lived intangible asset impairment during the year (three times as likely if B<M). The results are not quite as strong for goodwill divestitures. Overall our analyses suggest that other impairments and goodwill divestitures influence the likelihood an impairment is taken during the assessment period.

Table 6 reports the incidence of goodwill impairments by reporting group for four alternative book-to-market measures. The Table 4 impairment rate pattern differences across reporting groups for each valuation group are repeated in Table 6 with adjustments to market and book and differences between the two. Panel A adjusts market for a control premium, M_{CP}, while panel B adjusts book for off-balance sheet intangibles, $B_{OBS.}$ Panel C considers how changes in

market less book (headroom) affect impairment rates when B<M, while panel D calculates market using the median analyst price target forecast, M_{AF}, rather than traded prices when B>M.

In Panel A, adding a control premium to the market value captures discretion allowed by the accounting standards to avoid impairment charges. This adjustment results in a substantial reduction in the number of $B>M_{CP}$ observations in each reporting group (column 1) compared to the unadjusted balances (column 4 Table 4). When we compare the observations where both B>M and $B>M_{CP}$ (Column 1) versus those where B>M but $B<M_{CP}$ (column 2), we find consistent results that the impairments are higher when both B>M and $B>M_{CP}$. However, they are only significant for multi-segment firms with goodwill in each reporting segment. These results provide limited evidence that firms avoid goodwill impairments using discretion allowed by the accounting standards to make CP adjustments.

In Panel B, the book value is adjusted for off-balance-sheet internally generated intangibles reflecting potential shielding of goodwill impairments afforded by the headroom provided by these off-balance-sheet intangible assets. This adjustment has no effect when B>M, so the Panel B column 1 results are the same as those in Table 4 when B>M. We find that, across all reporting structures, firms are more likely to impair goodwill when $B_{OBS}>M$ than when $B_{OBS}<M$. This suggests a use of the shield provided by the headroom associated with unrecognized intangible assets, even the standards do not currently require recognition of the headroom.

Panel C examines the IASB's proposal to consider not just the excess of book over market as a trigger but also current period declines in market less book values. Column 2 highlights that firms with B<M and declining market less book take more impairments than those where market less book is increasing. This suggests that the discretion to use available headroom to avoid impairment losses is only partially being used.

In Panel D, the market value is calculated using the median analyst target price forecasts to account for temporary timing differences in market values. For firms with B>M, a majority of the analyst target prices (one year ahead) exceed the current market values, resulting in the forecasted market values exceeding book values. While the difference in impairment rates between those with B>M but B<M_{AF} is insignificantly different for single-RU firms, the rate for those with single-RS/multi-RU and *Non_GW_ALLSEG* is significantly higher than when B<M_{AF}, consistent with firms having market price unlikely to be temporarily low being more likely to impair goodwill.

6. Exploratory Analysis

We conclude our analyses by providing some preliminary evidence on whether the adoption of ASU 2017-04, which simplifies the accounting for goodwill impairments by eliminating step 2 from the goodwill impairment test, impacted firms' propensities to take impairments. Under the previous accounting rules, after determining in Step 1 that the fair market value of the reporting unit was below the book value, the firm would calculate the implied fair value of goodwill in Step 2 by calculating the fair value of all assets (including any unrecognized intangible assets) and liabilities of the reporting unit and subtracting it from the fair value of the reporting unit previously calculated in Step 1. Under the new accounting rules, if "the carrying amount of a reporting unit exceeds its fair value, an impairment loss shall be recognized in an amount equal to that excess, limited to the total amount of goodwill allocated to that reporting unit." Since this change is likely to affect impairment decisions, we examine whether the propensity to record goodwill (and finite-lived intangible assets) impairments differs before and after adoption for a subsample of 522 firms in our sample that disclose adoption of this ASU.

For this subsample, we find that, in the years after adoption, the propensity of goodwill impairments when B>M increases from 28% pre-adoption to 48% post-adoption. (This increase is

statistically significant at the 1% level.) For firms with book value below market value, the propensity of recording a goodwill impairment increases from 13.5% to 24%, but this difference versus when market is greater than book is not statistically significant at conventional levels. We further find that the incidence of goodwill impairments of the entire goodwill balance increases in the post-adoption period when book exceeds market not when book is below market. While the overall incidence of goodwill impairments increases in the post- versus pre-adoption period, we find no evidence of a significant increase in the impairment of indefinite-lived intangible assets.

7. Conclusions

Standard setters, including the IASB and the FASB, have recently initiated projects reconsidering post-acquisition goodwill accounting, with proposals to reinstate amortization, change the level of goodwill impairment testing (reporting unit versus reporting segment), and change the impairment model to adjust for shielding provided by headroom. We provide evidence to illuminate these proposals. Specifically, these projects rely on growing concerns that the current impairment-only model is broken. We build on existing research that has used pre- versus post-SFAS 142 goodwill data by comparing the impairment-only model for goodwill to the alternative of impairment and amortization for finite-lived intangible assets owned by the same firm during a common period of economic growth. Overall the results from these differences in research design produce new and different inferences.

Specifically, our analyses are inconsistent with the concerns that the impairment-only accounting model has led to inflated goodwill balance. While there is a small positive trend in goodwill as a proportion of total assets over the past 10 years, the growth is no faster than the growth in finite-lived intangible assets. As a proportion of intangibles, we find small but statistically significant decline in goodwill relative to finite-lived intangibles for multi-reporting

unit and multi-segment firms. This provides no support for the call to reinstate amortization to eliminate bloated goodwill balances. Our analyses also suggest that the current goodwill impairment incidence at least partially incorporates headroom and reductions in headroom consistent with proposals made by the IASB. We find only limited marginal evidence that firms use a control premium to increase market values to reduce the incidence of goodwill impairments.

Our paper also provides evidence on the role of segments and reporting units in impairment decisions. Although firms with fewer units overall are less likely to take impairment charges, which is consistent with concerns that reducing or eliminating goodwill allocations to reporting units might lead to fewer impairments, for firms with book in excess of market, this is generally not the case. The lower goodwill incidence associated with fewer reporting units is concentrated in firms with market greater than book, where a goodwill impairment would not be required based on current accounting standards. However, we also provide evidence that allocation of goodwill to some but not all segments is associated with a lower incidence of impairments compared to those where goodwill is allocated to all segments. This result is potentially consistent with the possible use of discretion in goodwill allocation to avoid impairments.

Finally, we also provide evidence relevant to proposals suggesting a removal of the annual goodwill impairment test, thereby requiring impairment testing only when triggers arise. Our finding that roughly half of the impairments in our sample occur during the annual assessment quarter, rather than during non-assessment quarters, suggests the possibility of an unintended consequence of this proposal.

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Appendix A

Variable Definitions:

ACQINTAN:	Acquired intangibles (Compustat "acqintan") divided by the average of total assets between the current and the previous year (Compustat "at").
ACQINTAN_D:	Indicator for firms that acquire intangibles in the year (Compustat "acqintan">0).
ACQGW:	Acquired goodwill (Compustat "acqgdwl") divided by the average of total assets between the current and the previous year (Compustat "at").
ACQGW_D:	An indicator for firms that acquire goodwill in the year (Compustat "acqgdwl">0).
AM:	Intangible amortization (Compustat "am") divided by the average of total assets between the current and the previous year (Compustat "at").
BTM:	Lagged book equity (Compustat "ceq")-to-market equity (Compusat "prcc_f"* "csho") ratio.
BTM_{AF}:	BTM using analysts' median target price in 12 months, calculated as lagged ratio of book equity (Compustat "ceq") divided by analysts' median target price measured before the beginning of the fiscal year.
BTM_{CP}:	BTM adjusted for control premium (CP), calculated as lagged ratio of book equity (Compustat "ceq") divided by CP adjusted market equity value (Compustat "prcc_f"* "csho"* (1+CP)). The control premium information is obtained from FactSet Mergerstat/BVR Control Premium Study.
B_{OBS} TM:	BTM adjusted for off-balance sheet intangible assets, calculated as lagged ratio of book equity (Compustat "ceq") plus off-balance intangible assets (obtained from Peters and Taylor's "K_int_offBS" variable) divided by market equity value.
B>M:	Indicator for firms where BTM>1 (see BTM above).
$B>M_{AF}$:	Indicator for firms where BTM_{AF}>1 (see BTM_{AF} above).
$B>M_{CP}$:	Indicator for firms where BTM_{CP}>1 (see BTM_{CP} above).
B_{OBS} >M:	Indicator for firms where B_{OBS} TM >1 (see B_{OBS} TM above).
D(FLINTAN):	Indicator for whether the firm has finite-lived intangible assets, see FLINTAN below.
D(ILINTAN):	Indicator for whether the firm has indefinite-lived intangible assets, see ILINTAN below.
D(∆MB<0):	Indicator equal to one for firms where the market value declines more than the book value of equity from last year. i.e., the change in "market-book difference" measured as market value minus book value of equity (Compustat "prcc_f"* "csho" minus "ceq") is <0.
GDWL:	Goodwill (Compustat "gdwl") divided by total assets (Compustat "at").
GW_ALLSEG:	Indicator for firms where all reporting segments are allocated with goodwill.
GWIMP:	Goodwill impairment (Calcbench "mimpair"/1000000) divided by the average of total assets between the current and the previous year (Compustat "at").
GWIMP_D:	Indicator equal to one for firms that impair goodwill based on the Calcbench dataset.
GWWO:	Goodwill written off (Calcbench "gwoor"/1000000) divided by the average of total assets between the current and the previous year (Compustat "at").
GWWO_D:	Indicator equal to one for firms that write off goodwill based on the Calcbench dataset.
FLINTAN:	Finite-lived intangibles (Calcbench "flintannet"/1000000) divided by total assets (Compustat "at").
FLIMP:	Finite-lived intangible impairment, Calcbench ("flimpair"/1000000) divided by the average of total assets between the current and the previous year (Compustat "at").
FLIMP_D:	Indicator equal to one for firms that impair finite-lived intangibles based on the Calcbench dataset.
ILINTAN:	Indefinite-lived intangibles Calcbench "ilintan"/1000000 divided by total assets (Compustat "at").
ILIMP:	Indefinite-lived intangible impairment, Calcbench "ilimpair"/1000000 divided by the average of total assets between the current and the previous year (Compustat "at").
ILIMP_D:	Indicator equal to one for firms that impair indefinite-lived intangibles based on the Calcbench.
INTAN:	Intangibles (Compustat "intano") divided by total assets (Compustat "at").
MKT-BK:	Lagged difference between market value of equity (Compustat "prcc_f"* "csho") and book equity (Compustat "ceq") divided by total assets.
Multi_RU:	Indicator for firms with one reporting segment but multiple reporting units.
Multi_RS:	Indicator for firms with multiple reporting segments.
R&D_D:	Indicator for firms that have R&D activities (Compustat "xrd">0).

Appendix B

Excerpts from correspondence sent from NRG to the SEC, related to their 10-k filed 2/27/2015 (the correspondence is dated 7/10/2015 and the first three response items are omitted as they are unrelated to goodwill).

4. We note you performed a quantitative assessment for your NRG Texas reporting unit which resulted in this reporting unit failing the first step of the goodwill impairment test but passing the second step of the goodwill impairment test such that you recorded no goodwill impairment. We have the following comments:

With respect to the most recent quantitative assessment you performed, please explain to us all significant assumptions you relied on in more detail than is disclosed in your filing. Your response should include but not be limited to explaining how you reflected in your quantitative assessment the significant drop in natural gas prices and resulting impact this has on setting the price of power.

We utilized a discounted cash flow analysis to determine the fair value of the Texas reporting unit, which was validated through comparisons to a valuation determined by applying a market-based multiple to earnings before interest, income taxes, depreciation and amortization (EBITDA). The primary inputs to the discounted cash flow analysis were as follows:

Gross margin was estimated utilizing market power prices driven by natural gas prices and heat rates for the first five years and NRG's fundamental view of market power prices for the sixth year (considered as "terminal year"). This reflected slightly decreasing near-term market natural gas prices offset by slightly increasing heat rates, which resulted in gradually increasing power and fuel prices over the first five years.

Heat rates remained relatively unchanged in the near-term, however began to rise slightly toward the end of the five-year curve and the terminal year driven primarily by microeconomic factors including the introduction of assumed carbon cost factors in the terminal year.

With respect to natural gas prices, most third party fundamental views agree that prevailing conditions suggest that demand will continue to lag supply, particularly over the next two years, due to the recent surge in shale production causing transformational regional shifts in supply, the proliferation of pipeline construction, and production innovation and efficiency showing no signs of slowing. However, a correction is likely to take place in the 2016-2018 window due to multiple demand side growth factors, including Mercury and Air Toxics Standard (MATS) and other regulatory retirements of coal assets and the resultant substitution of gas-fueled power generation, cumulative industrial demand growth, and increased exports. NRG believes that the above outlook is implicit in its five-year forecast and terminal view for the Texas reporting unit.

Generation economics, primarily driven by the coal facilities, became slightly unfavorable beginning in the terminal year. Due to a proposed EPA carbon rule that, if enacted as proposed, would create a wide range of possible outcomes, NRG framed potential carbon outcomes through a moderate nation-wide carbon price of $10/ton beginning in 2020, the terminal year. This represents the highest probable outcome between a more aggressive nation-wide carbon price of $20/ton including prevailing disruptive technologies and no Federal carbon regulations. NRG's assessment was of both Congressional and EPA activities on GHGs which includes federal carbon prices starting later and having a different shape and impact, specifically looking like tax without free allocations, as well as the Company's previous overall uncertainty surrounding the implementation and timing of carbon legislation on the five-year forecast period.

Operations and maintenance expenses and capital expenditures were estimated based on NRG's forecasted normal and major maintenance for the facilities for the initial five-year forecast period and normalized maintenance expenses and capital expenditures for the terminal year, representing an amount that can be grown at inflation through the life of the facility and reflects all projected expense.

With its complementary generation portfolio, the Texas reporting unit is a supplier of power to NRG's retail business in Texas, thereby creating a more stable, reliable and competitive business that benefits Texas consumers. By backing the load-serving requirements of the retail business with NRG's generation and risk management practices, the need to sell and buy power from other financial institutions and intermediaries that trade in the ERCOT market is reduced,

resulting in reduced transaction costs and credit exposures. This combination of our generation and retail businesses allows for a reduction in collateral requirements by reducing the need to hedge the retail power supply through third parties. Synergies represent the eliminated collateral requirements of approximately $815 million, with an estimated annual savings of $50 - $90 million. Synergies also include supply cost synergies of approximately $25 million per year. The Company applies the highest and best use concept and combines the Texas business unit with the Texas retail business unit and the synergies associated with combining these businesses is considered to be a market participant view of the fair value of these business units.

The methodology for the terminal year and discount rate are disclosed in the NRG 10-K on page 100.

With respect to your sensitivity scenario, explain to us how you concluded using a hypothetical $0.50 per MMBtu drop in the natural gas market price for the first five year period was reasonable.

A hypothetical $0.50 per MMBtu drop in natural gas market price represents 10% of NRG's terminal view for natural gas prices. The Company believes this drop represents a lowest case because, as discussed in our response to the first sub-question of question 4, most third party fundamental views believe that a 2016-2018 market correction is likely based on the microeconomic factors detailed above. In addition, the hypothetical $0.50 drop in natural gas sensitivity is consistent with those used for the Company's quarterly earnings release sensitivities. Accordingly, we believe $0.50 per MMBtu represents a reasonable sensitivity scenario.

Explain to us in more detail, and tell us how you considered disclosing, the factors that that allowed you to pass step two of the impairment test despite the fact that you failed step one.

The factors that allowed the Texas reporting unit to pass step two of the impairment test include the application of the Gordon Growth Model to the terminal value under the assumption that the cash flows for the Texas reporting unit continue in perpetuity for step one, while the assets within the Texas reporting unit have a finite life and related cash flows under the hypothetical acquisition method accounting that is required to be applied for step two, which results in higher residual goodwill balances. In addition, the synergies associated with the combination of NRG's wholesale generation business and retail business in Texas, as discussed in the first sub-question to question 4 above, also contribute to the Texas reporting unit passing step two. We disclose both of these factors within our disclosures on page 100 of NRG's 10-K.

Also tell us the percentage by which the implied fair value of your goodwill exceeded the carrying amount when you performed step two. Please consider disclosing this information to provide your investors with a greater ability to assess the likelihood of a significant impairment charge.

The implied fair value of the Texas goodwill exceeded its carrying value by 44%, or $756 million. We will consider disclosing this information in future filings.

We also note you reconciled the fair value of your NRG Texas reporting unit determined under the income approach with NRG's market capitalization. Please provide us with the reconciliation of the fair value of this reporting unit to your market capitalization, and explain the underlying reasons for the difference. Please be detailed in your response.

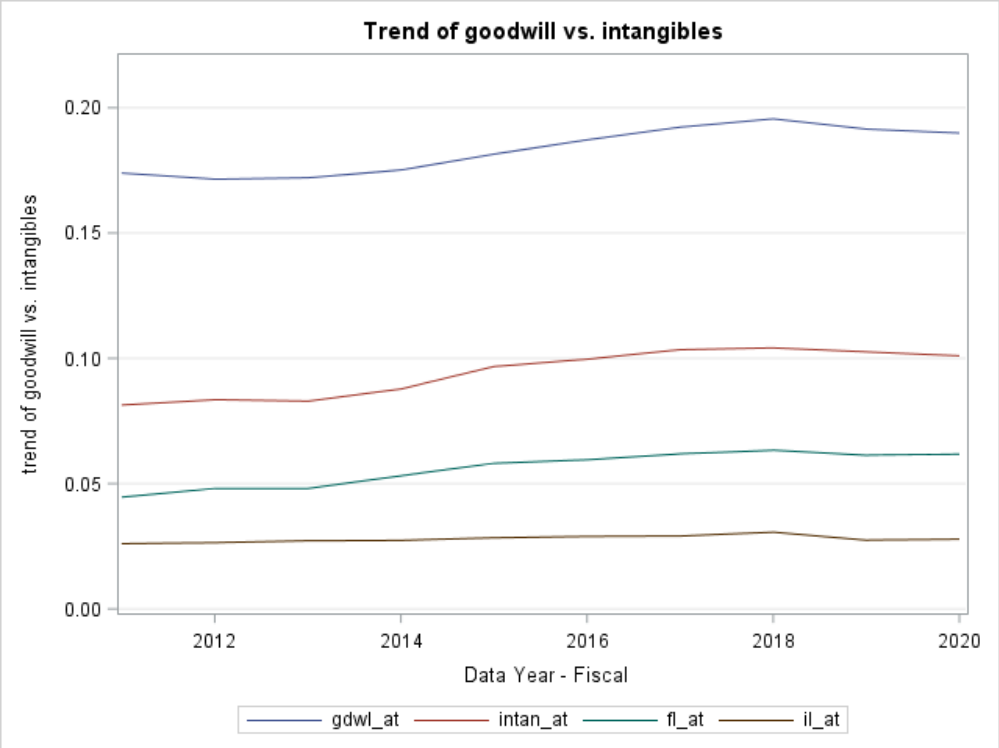
($ in thousands)	As of Valuation Date	Analyst Target Price
Stock price	$ 26.95	$ 34.50
Shares outstanding	338,109,000	338,109,000
Equity value	$ 9,112,028	$ 11,664,748
Preferred stock	$ 249,000	$ 249,000
Debt	$ 20,374,000	$ 20,374,000
Business Enterprise Value	$ 29,735,028	$ 32,287,748
Business Enterprise Value with 20% control premium	$ 31,557,433	$ 34,620,697
Texas Business Enterprise Value	$ 5,235,760	$ 5,235,760
Texas as % of NRG	17.6%	16.2 %

Texas as % of NRG with control premium.	16.6%	15.1 %

Comparison to % of Adjusted EBITDA:		Value	% of NRG
NRG Adjusted EBITDA — 2013 (Actual)	$	2,646,000	
NRG Adjusted EBITDA — 2014 (Actual)	$	3,128,000	
NRG Adjusted EBITDA — 2015 (Mid-point of Guidance)	$	3,300,000	
Texas Adjusted EBITDA — 2013 (Actual)	$	502,139	19.0 %
Texas Adjusted EBITDA - 2014 (Actual)	$	291,577	9.3 %
Texas Adjusted EBITDA - 2015 (Forecast)	$	447,000	13.6 %

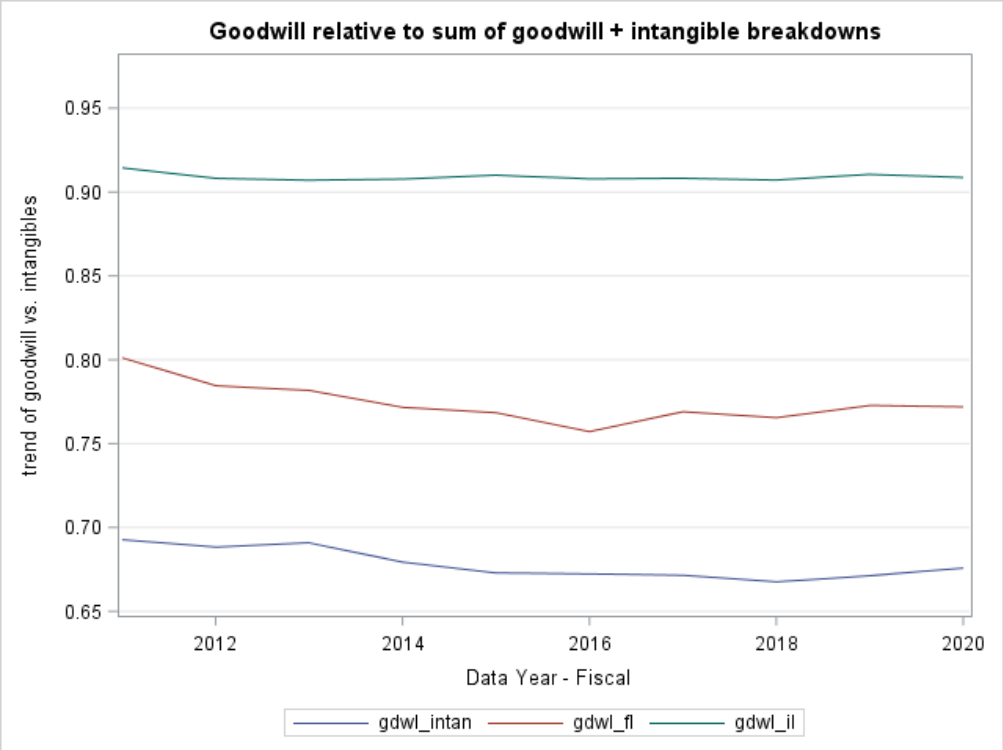
As per the above table, we reconciled the enterprise value of our Texas reporting unit to the total NRG business enterprise value, which was calculated using our market capitalization as of the valuation date and noted it ranged from 16.6% - 17.6% depending on the use of a reasonable control premium. We then compared the Adjusted EBITDA of our Texas reporting unit to the total NRG Adjusted EBITDA for historical periods and our 2015 guidance (which is detailed in the table above) and noted it ranged from 9.3% to 19.0%, which is reasonable. We did not note any significant reconciling differences.

Figure 1 Trends in Goodwill and Total (other than goodwill), Finite-lived, and Indefinite-Lived Intangibles Scaled to Total Assets



gdwl_at=GDWL, intan_at=INTAN, fl_at=FLINTAN, il_at=ILINTAN

Figure 2 Trends in Goodwill Scaled by Goodwill plus Other, Finite-lived, and Indefinite-Lived Intangibles



gdwl_intan = GDWL/INTAN, gdwl_fl=GDWL/FLINTAN, gdwl_il=GDWL/ILINTAN

Table 1: Sample Selection

Steps	Total Firm-year Observations	Total Firm Observations
All COMPUSTAT observations from 2011-2020 with CURCD = USD, FIC=USA, INDFMT=INDL and non-missing CIK	64,057	9,307
Missing lagged observations	51,997	8,311
Requiring beginning PRCC_F>1, CSHO>1.25, AT>80	25,620	4,544
Excluding SIC beginning with 6	22,435	3,687
Requiring GDWL or beginning GDWL > 0	17,331	2,804
Requiring Calcbench asset match	16,929	2,749
Requiring Calcbench goodwill match	16,755	2,732
Requiring Calcbench goodwill impairment information	16,751	2,732
Requiring Reporting Segment information	16,462	2,693
Requiring Reporting Unit Information	15,713	2,562

Table 2: Annual Data

Panel A: Means and [Standard Deviations] for Continuous Variables

Variables	Overall Sample	Single Reporting Unit	Multi-Reporting Units in Single Segment	Multi Segments
GDWL	0.180 [0.153]	0.187 [0.159]	0.170 [0.156]	0.182 [0.150]
INTAN	0.094 [0.108]	0.091 [0.112]	0.094 [0.121]	0.094 [0.103]
ILINTAN	0.028 [0.083]	0.018 [0.065]	0.034 [0.105]	0.027 [0.080]
FLINTAN	0.056 [0.073]	0.061 [0.089]	0.049 [0.066]	0.056 [0.071]
BTM	0.434 [1.200]	0.336 [0.590]	0.442 [0.640]	0.457 [1.415]
BTM_{CP}	0.312 [0.489]	0.230 [0.401]	0.311 [0.438]	0.335 [0.532]
BTM_{AF}	0.378 [0.440]	0.269 [0.337]	0.379 [0.475]	0.406 [0.449]
B_{OBS} TM	0.859 [1.318]	0.808 [1.287]	0.871 [1.006]	0.867 [1.399]
GWIMP*100	0.785 [3.844]	0.831 [5.466]	0.804 [3.938]	0.768 [3.334]
GWWO*100	0.057 [0.744]	0.036 [0.605]	0.065 [0.774]	0.060 [0.768]
ILIMP*100	0.113 [1.190]	0.141 [1.422]	0.153 [1.600]	0.095 [0.973]
DLIMP*100	0.113 [1.212]	0.165 [1.750]	0.120 [1.566]	0.097 [0.886]
ACQGW	0.023 [0.070]	0.029 [0.087]	0.022 [0.070]	0.022 [0.065]
ACQINTAN	0.019 [0.062]	0.024 [0.081]	0.018 [0.062]	0.018 [0.057]
AM	0.010 [0.013]	0.013 [0.018]	0.010 [0.013]	0.009 [0.011]
N	15,713	2,662	2,804	10,247

Panel B: Percentage of observations with Dichotomous Variables equal to 1

Variables	Overall Sample	Single Reporting Unit	Multi-Reporting Units in Single Segment	Multi-Segments
D(ILINTAN)	41.5%	29.8%	39.8%	45.1%
D(FLINTAN)	81.0%	804%	77.1%	82.2%
B>M	8.0%	5.3%	8.9%	8.4%
$B>M_{CP}$	2.6%	1.2%	3.0%	2.9%
$B>M_{AF}$	4.0%	2.0%	4.5%	4.4%
B_{OBS} >M	27.4%	26.4%	30.3%	26.9%
R&D_D	3.8%	10.2%	4.1%	2.1%
GWIMP_D	15.6%	6.2%	14.5%	18.4%
ILIMP_D	7.4%	5.1%	7.7%	8.0%
FLIMP_D	8.4%	7.8%	8.3%	8.7%
GWWO_D	7.1%	3.1%	5.7%	8.5%
ACQGDWL_D	34.6%	31.3%	32.0%	36.1%
ACQINTAN_D	33.8%	31.2%	31.6%	35.2%
N	15,713	2,662	2,804	10,247

Table 3 Trends in goodwill and intangible asset balances

Panel A: Mean and (median) balance of Goodwill, total intangible assets (per COMPUSTAT), finite-lived intangibles per Calc Bench, indefinite-lived intangibles per CalcBench, and ratios of the percentage of goodwill relative to different measures of total intangible assets by fiscal year from 2011-2020

Fiscal Year	GDWL	INTAN	FLINTAN	ILINTAN	GDWL/ (GW+INTAN)	GDWL/ (GW+FL)	GDWL/ (GW+IL)	MKT-BK	Observations
2011	0.172 (0.128)	0.081 (0.048)	0.044 (0.019)	0.026 (0)	0.686 (0.731)	0.796 (0.859)	0.914 (1)	0.689 (0.398)	1,523
2012	0.168 (0.123)	0.083 (0.051)	0.048 (0.023)	0.026 (0)	0.677 (0.719)	0.775 (0.821)	0.903 (1)	0.737 (0.417)	1,581
2013	0.170 (0.125)	0.082 (0.050)	0.048 (0.025)	0.027 (0)	0.687 (0.715)	0.778 (0.826)	0.907 (1)	1.080 (0.666)	1,587
2014	0.173 (0.132)	0.088 (0.056)	0.053 (0.029)	0.027 (0)	0.674 (0.705)	0.767 (0.809)	0.906 (1)	1.099 (0.706)	1,652
2015	0.178 (0.139)	0.096 (0.060)	0.057 (0.030)	0.028 (0)	0.662 (0.692)	0.759 (0.802)	0.906 (1)	0.961 (0.586)	1,673
2016	0.185 (0.146)	0.099 (0.063)	0.059 (0.032)	0.029 (0)	0.667 (0.698)	0.754 (0.807)	0.907 (1)	1.087 (0.671)	1,631
2017	0.190 (0.151)	0.103 (0.065)	0.062 (0.034)	0.029 (0)	0.666 (0.694)	0.764 (0.801)	0.905 (1)	1.245 (0.726)	1,579
2018	0.192 (0.127)	0.104 (0.070)	0.063 (0.036)	0.031 (0)	0.660 (0.685)	0.759 (0.797)	0.905 (1)	1.097 (0.549)	1,556
2019	0.188 (0.151)	0.102 (0.065)	0.061 (0.032)	0.027 (0)	0.661 (0.693)	0.765 (0.801)	0.905 (1)	1.219 (0.612)	1,551
2020	0.185 (0.148)	0.100 (0.060)	0.062 (0.030)	0.028 (0)	0.664 (0.697)	0.761 (0.800)	0.903 (1)	1.522 (0.678)	1,380

Panel B: Kendall Tau trend test with annual data from 2011-2020 (Prob > |tau| under H0: Tau=0)

	GDWL	INTAN	GDWL/ (GW+INTAN)	FLINTAN	GDWL/ (GW+FL)	ILINTAN	GDWL/ (GW+IL)	Observations
Overall	0.034 (<0.0001)	0.053 (<0.0001)	-0.031 (<0.0001)	0.053 (<0.0001)	-0.035 (<0.0001)	0.014 (0.0279)	-0.011 (0.072)	15,713
Single-unit	-0.002 (0.8645)	0.014 (0.3111)	0.001 (0.9507)	-0.017 (0.2220)	0.028 (0.0418)	0.019 (0.2226)	-0.019 (0.2162)	2,662
Multi-unit	0.002 (0.8598)	0.044 (0.0011)	-0.051 (0.0001)	0.042 (0.0017)	-0.051 (<0.0001)	0.005 (0.7099)	-0.011 (0.4374)	2,804
Multi-segment	0.052 (<0.0001)	0.068 (<0.001)	-0.035 (<0.0001)	0.073 (<0.0001)	-0.046 (<0.0001)	0.020 (0.0088)	-0.014 (0.0580)	10,247

Table 3 Trends in goodwill and intangible asset balances

Panel C: Mean and (median) balance of Goodwill, total intangible assets (per COMPUSTAT), finite-lived intangibles per Calc Bench, indefinite-lived intangibles per CalcBench, and ratios of the percentage of goodwill relative to different measures of total intangible assets by fiscal year from 2011-2020. This table only includes firms that had a goodwill balance throughout the 2011-2020 period.

Fiscal Year	GDWL	INTAN	FLINTAN	ILINTAN	GDWL/ (GW+INTAN)	GDWL/ (GW+FL)	GDWL/ (GW+IL)	MKT-BK	Observations
2011	0.187 (0.146)	0.081 (0.052)	0.044 (0.021)	0.029 (0)	0.712 (0.747)	0.805 (0.856)	0.908 (1)	0.763 (0.462)	712
2012	0.190 (0.149)	0.085 (0.057)	0.048 (0.029)	0.030 (0)	0.707 (0.731)	0.796 (0.824)	0.906 (1)	0.801 (0.500)	712
2013	0.190 (0.153)	0.084 (0.056)	0.048 (0.028)	0.030 (0)	0.710 (0.733)	0.799 (0.836)	0.907 (1)	1.093 (0.736)	712
2014	0.195 (0.161)	0.089 (0.059)	0.052 (0.032)	0.030 (0)	0.703 (0.726)	0.794 (0.822)	0.909 (1)	1.100 (0.772)	712
2015	0.203 (0.171)	0.095 (0.064)	0.057 (0.035)	0.028 (0)	0.703 (0.725)	0.790 (0.815)	0.912 (1)	1.024 (0.652)	712
2016	0.207 (0.174)	0.096 (0.067)	0.059 (0.035)	0.028 (0)	0.704 (0.717)	0.791 (0.817)	0.914 (1)	1.135 (0.738)	712
2017	0.213 (0.187)	0.099 (0.069)	0.061 (0.039)	0.027 (0)	0.702 (0.712)	0.790 (0.810)	0.918 (1)	1.285 (0.822)	712
2018	0.220 (0.194)	0.103 (0.072)	0.065 (0.042)	0.029 (0)	0.700 (0.711)	0.787 (0.807)	0.915 (1)	1.125 (0.626)	712
2019	0.215 (0.194)	0.101 (0.069)	0.066 (0.040)	0.026 (0)	0.703 (0.714)	0.785 (0.799)	0.918 (1)	1.235 (0.712)	712
2020	0.206 (0.183)	0.097 (0.066)	0.061 (0.035)	0.024 (0)	0.692 (0.714)	0.781 (0.811)	0.913 (1)	1.334 (0.703)	712

Panel D: Kendall Tau trend test with a constant sample

	GDWL	INTAN	GDWL/ (GW+INTAN)	FLINTAN	GDWL/ (GW+FL)	ILINTAN	GDWL/ (GW+IL)	Observations
Overall	0.051 (<0.0001)	0.055 (<0.0001)	-0.024 (0.0038)	0.065 (<0.0001)	-0.036 (<0.0001)	-0.003 (0.7270)	0.008 (0.3877)	7,120
Single-unit	0.0302 (0.1621)	0.033 (0.1237)	-0.015 (0.4823)	0.023 (0.2909)	-0.009 (0.6697)	-0.005 (0.8407)	-0.001 (0.9691)	1,048
Multi-unit	0.075 (0.0037)	-0.006 (0.8155)	0.038 (0.1449)	-0.021 (0.4250)	0.036 (0.1690)	-0.017 (0.5581)	0.017 (0.5583)	728
Multi-segment	0.050 (<0.0001)	0.068 (<0.001)	-0.036 (0.0002)	0.082 (<0.0001)	-0.047 (<0.0001)	0.000 (0.9670)	0.006 (0.5388)	5,344

Table 4: Annual Incidence of Goodwill Impairments, Goodwill Divestitures, and Finite-Lived Intangible Asset Impairments Partitioned by Book to Market Equity and Reporting Segment and Unit Groups

Panel A: Incidence of Goodwill Impairments

Reporting Groups	Variable	Overall	B>M	B<M	B>M – B<M	Z-statistic B>M = B<M
(1) Single-Unit	GWImp_D% (N)	6.16% (2,662)	30.71% (140)	4.80% (2,522)	25.92%	12.41***
(2) Multi-Unit/ Single-Segment	GWImp_D% (N)	14.51% (2,804)	32.13% (249)	12.80% (2,555)	19.33%	8.27***
(3) Multi-Segment/ Non_GW_ALLSEG	GWImp_D% (N)	17.66% (5,786)	33.49% (639)	15.70% (5,147)	17.79%	11.12***
(4) Multi-Segment/GW_ALLSEG	GWImp_D% (N)	19.39% (4,461)	39.83% (236)	18.25% (4,225)	21.58%	8.16***
Equality between (1) and (2)	p-value	<0.0001	0.7776	<0.0001	0.0909	
Equality between (1) and (3)	p-value	<0.0001	0.5304	<0.0001	0.0181	
Equality between (1) and (4)	p-value	<0.0001	0.0716	<0.0001	0.2672	
Equality between (3) and (4)	p-value	0.0253	0.0815	0.0010	0.0436	

Panel B: Incidence of Finite-lived Intangible Asset Impairments

Reporting Groups	Variable	Overall	B>M	B<M	B>M – B<M	Z-statistic B>M = B<M
(1) Single-Unit	FLImp_D% (N)	7.69% (2,662)	9.29% (140)	7.69% (2,522)	1.59%	0.69
(2) Multi-Unit/ Single-Segment	FLImp_D% (N)	8.27% (2,804)	8.43% (249)	8.26% (2,555)	0.18%	0.10
(3) Multi-Segment/ Non_GW_ALLSEG	FLImp_D% (N)	8.26% (5,786)	11.74% (639)	7.83% (5,147)	3.91%	3.38***
(4) Multi-Segment/GW_ALLSEG	FLImp_D% (N)	9.35% (4,461)	12.71% (236)	9.16% (4,225)	3.55%	1.82*
Equality between (1) and (2)	p-value	0.5093	0.7967	0.4641	0.6415	
Equality between (1) and (3)	p-value	0.4573	0.4014	0.8373	0.3891	
Equality between (1) and (4)	p-value	0.0213	0.3050	0.0342	0.5212	
Equality between (3) and (4)	p-value	0.0535	0.6941	0.0211	0.6896	

Panel B: Incidence of Goodwill Dispositions

Reporting Groups	Variable	Overall	B>M	B<M	B>M – B<M	Z-statistic B>M = B<M
(1) Single-Unit	GWWO_D% (N)	3.08% (2,662)	5.71% (140)	2.93% (2,522)	2.78%	1.85*
(2) Multi-Unit/ Single-Segment	GWWO_D% (N)	5.71% (2,804)	6.43% (249)	5.64% (2,555)	0.79%	0.51
(3) Multi-Segment/ Non_GW_ALLSEG	GWWO_D% (N)	6.29% (5,786)	5.63% (639)	6.37% (5,147)	-0.74%	-0.73
(4) Multi-Segment/GW_ALLSEG	GWWO_D% (N)	11.50% (4,461)	8.90% (236)	11.64% (4,225)	-2.75%	-1.29
Equality between (1) and (2)	p-value	0.0001	0.7834	0.0002	0.4760	
Equality between (1) and (3)	p-value	<0.0001	0.9719	<0.0001	0.1532	
Equality between (1) and (4)	p-value	<0.0001	0.2233	<0.0001	0.0484	
Equality between (3) and (4)	p-value	<0.0001	0.0826	<0.0001	0.1426	

Table 4: Annual Incidence of Goodwill Impairments, Goodwill Write-offs, and Finite Lived Intangible Asset Impairments by Book to Market Equity and Reporting Segment and Unit Groups

Panel D: Regression coefficients (and standard errors) of an OLS regression of indicator variables for goodwill impairment, goodwill divestitures, and finite-lived intangible impairment.
This table is based on model (1) as follows.

$$GWIMP\_D = \beta_0 + \beta_1 B<M + \beta_2 Multi\_RU + \beta_3 Non\_GW\_ALLSEG + \beta_4 GW\_ALLSEG + \beta_5 B<M * Multi\_RU + \beta_6 B<M * Non\_GW\_ALLSEG + \beta_7 B<M * GW\_ALLSEG + \varepsilon. \quad (1)$$

GWIMP_D equals one for firms impairing goodwill during the year and zero otherwise. *B<M* equals one for firms with beginning of the year equity book value (Compustat "ceq") exceeding market value (Compustat "csho" * "prcc_f") and zero otherwise. *Multi_RU* equals one for firms with multiple reporting units within a single reporting segment and zero otherwise. *GW_ALLSEG* (*Non_GW_ALLSEG*) equals one for firms with multiple segments and goodwill (not) being reported in each segment. In model (1), β_0 captures the impairment incidence for single reporting unit firms when B>M, and β_1 captures the incremental impairment likelihood for these firms when B<M relative to when B>M. β_2 through β_4 capture the incremental impairment likelihood when B>M relative to firms with single reporting units for *Multi_RU*, *GW_ALLSEG*, and *Non_GW_ALLSEG* firms, respectively. $\beta_2+\beta_5$, $\beta_3+\beta_6$, and $\beta_4+\beta_7$ capture the incremental impairment likelihood relative to single reporting unit firms when B<M for *Multi_RU*, *GW_ALLSEG*, and *Non_GW_ALLSEG*, respectively. In columns (2) and (3), we replace the dependent variable in model (1) by *GWWO_D* (an indicator for goodwill divestiture) and *FLIMP_D* (a finite-lived intangible impairment indicator), respectively.

VARIABLES	Goodwill Impairment	Goodwill Divestiture	Finite-lived Intangible Impairment
Constant	0.307*** (0.042)	0.057*** (0.021)	0.093*** (0.027)
Multi_RU	0.014 (0.053)	0.007 (0.026)	-0.009 (0.032)
Non_GW_ALLSEG	0.028 (0.047)	-0.001 (0.024)	0.025 (0.031)
GW_ALLSEG	0.091* (0.053)	0.032 (0.028)	0.034 (0.036)
B<M	-0.259*** (0.042)	-0.028 (0.021)	-0.016 (0.028)
B<M*Multi_RU	0.066 (0.053)	-0.019 (0.027)	0.014 (0.033)
B<M*Non_GW_ALLSEG	0.081* (0.048)	0.035 (0.024)	-0.023 (0.031)
B<M*GW_ALLSEG	0.043 (0.053)	0.055* (0.029)	-0.020 (0.037)
Test of equality of Single-unit for sample of B>M from Goodwill Impairment		p-value<0.0001	p-value<0.0001
Equality of coefficient on B<M (for Single-unit)		p-value<0.0001	p-value<0.0001
Observations	15,713	15,713	15,713
R-squared	0.038	0.014	0.001

***, **, and * represent the 1%, 5% and 10% significance level, respectively. The standard errors are clustered by firm in the regression. See the appendix for detailed variable definitions.

Table 5: Quarterly Goodwill Impairment (only sample with 4th quarter as their annual assessment quarter)

	B>M (1)	B<M (2)	Diff (1) & (2)
	#(GWimp_D) %(GWImp_D) (N)	#(GWImp_D) %(GWImp_D) (N)	Δ%(GWImp_D) (Z-stat)
A) Without prior impairment	243 21.97% (1,106)	793 7.03% (11,276)	14.94% (17.12)***
B) With prior impairment	79 29.26% (270)	198 26.98% (734)	3.18% (0.72)
C) Finite-Lived Intangible Impairment (No prior goodwill impairment)	31 50.47% (107)	176 21.86% (805)	28.60% (6.40)***
D) Goodwill Divestiture (No prior goodwill sample)	18 33.33% (54)	99 12.58% (787)	20.75% (4.26)***
E) Goodwill Divestiture at t+1 (No prior goodwill impairment)	12 22.64% (53)	86 11.56% (744)	11.08% (2.37)**
Difference: A) vs B) (with & without prior impairments)	p-value 0.0112	p-value <0.0001	
Difference: A) vs C) FL Impairment & no Imp (No prior goodwill impairment)	p-value <0.0001	p-value <0.0001	
Difference: A) vs D) Divestitures & no Divestitures (No prior goodwill impairment)	p-value =0.0387	p-value <0.0001	
Difference: A) vs E) Divestitures & no Divestitures at t+1 (No prior goodwill impairment)	p-value =0.4191	p-value <0.0001	

Table 6 Goodwill Impairment Incidence across Alternative Valuation Metrics by Reporting Group

Panel A: Market equity calculated using traded share price adjusted for industry-year control Premium

Reporting Groups	B>M B>M$_{CP}$ (1)	B>M B<M$_{CP}$ (2)	B<M (3)	Difference (1) & (2)	Difference (2) & (3)
	%(GWImp_D) (N)	%(GWImp_D) (N)	%(GWImp_D) (N)	Δ%(GWImp_D) (Z-statistic)	Δ%(GWImp_D) (Z-statistic)
Single-Unit	35.48% (31)	27.78% (90)	4.67% (2,413)	7.71% (0.81)	23.14% (9.47)***
Multi-Unit/ Single-Segment	33.77% (77)	32.39% (142)	12.98% (2,380)	1.37% (0.21)	19.41% (6.46)***
Multi-Segment/ Non_GW_ALLSEG	34.43% (212)	33.07% (375)	15.95% (4,477)	1.37% (1.01)	17.12% (8.42)***
Multi-Segment/ GW_ALLSEG	48.33% (60)	35.90% (156)	17.63% (3,970)	12.44% (1.67)*	18.27% (5.78)***

Panel B: Book value calculated with an adjustment for off-balance sheet intangible assets

Reporting Groups	B>M (1)	B<M B$_{OBS}$ >M (2)	B<M B$_{OBS}$ <M (3)	Difference (1) & (2)	Difference (2) & (3)
	%(GWImp_D) (N)	%(GWImp_D) (N)	%(GWImp_D) (N)	Δ%(GWImp_D) (Z-statistic)	Δ%(GWImp_D) (Z-statistic)
Single-Unit	30.71% (140)	9.93% (564)	3.27% (1,957)	20.79% (6.33)***	6.66% (6.54)***
Multi-Unit/ Single-Segment	32.13% (249)	21.33% (600)	10.18% (1,955)	10.80% (3.33)***	11.15% (7.15)***
Multi-Segment/ Non_GW_ALLSEG	33.49% (639)	21.97% (1,170)	13.85% (3,977)	11.52% (5.34)***	8.11% (6.70)***
Multi-Segment/ GW_ALLSEG	39.83% (235)	26.99% (715)	16.44% (3,509)	12.84% (3.73)***	10.55% (6.66)***

Panel C: Change in market to book ratio

Reporting Groups	B>M (1)	B<M D(ΔMB<0) (2)	B<M D(ΔMB>0) (3)	Difference (1) & (2)	Difference (2) & (3)
	%(GWImp_D) (N)	%(GWImp_D) (N)	%(GWImp_D) (N)	Δ%(GWImp_D) (Z-statistic)	Δ%(GWImp_D) (Z-statistic)
Single-Unit	30.71% (140)	7.29% (1,043)	3.04% (1,479)	23.43% (8.65)***	4.24% (4.91)***
Multi-Unit/ Single-Segment	32.13% (249)	16.50% (1,103)	9.99% (1,452)	15.63% (5.63)***	6.51% (4.88)***
Multi-Segment/ Non_GW_ALLSEG	33.49% (639)	18.81% (2,275)	13.23% (2,872)	14.68% (7.91)***	5.58% (5.47)***
Multi-Segment/ GW_ALLSEG	39.83% (236)	22.53% (1,629)	15.56% (2,596)	17.30% (5,76)***	6.97% (5.71)***

Panel D: Market equity calculated using analysts' median target price forecasts

Reporting Groups	B>M B>M$_{AF}$ (1)	B>M B<M$_{AF}$ (2)	B<M (3)	Difference (1) & (2)	Difference (2) & (3)
	%(GWImp_D) (N)	%(GWImp_D) (N)	%(GWImp_D) (N)	Δ%(GWImp_D) (Z-statistic)	Δ%(GWImp_D) (Z-statistic)
Single-Unit	32.43% (37)	28.40% (81)	4.61% (2,384)	4.04% (0.45)	23.78% (9.31)***
Multi-Unit/ Single-Segment	46.27% (67)	30.28% (109)	12.80% (2,383)	15.99% (2.14)**	17.48% (5.21)***
Multi-Segment/ Non_GW_ALLSEG	38.61% (202)	30.72% (293)	15.36% (4,779)	7.90% (1.82)*	15.36% (6.92)***
Multi-Segment/ GW_ALLSEG	44.30% (79)	35.48% (124)	17.98% (4,100)	8.82% (1.25)	17.51% (4.95)***