

Goodwill impairment after M&A: acquisition-level evidence

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Current Draft: February, 2023

Abstract

To provide a fuller picture of compliance with ASC 350-20, we hand-collect data to track 893 large acquisitions across time. Our model, which links impairments to post-acquisition accounting and market performance declines as well as acquisition-year attributes, identifies 349 acquisitions as likely to impair. We provide evidence that 65 percent of these at-risk acquisitions impair in the next two years. Our study should be useful to future research as it clarifies the role of hand-collection, market to book ratios, segment level data, and volatility. We also offer descriptive evidence on impairment patterns. Overall, we find high levels of compliance and little opportunism.

Keywords: Goodwill impairment; SFAS 142; conditional conservatism; mergers and acquisitions.

We acknowledge helpful comments from anonymous reviewers, Bill Baber, Sudipta Basu, Henry Jarva, Sarah McVay (Editor), Panos Patatoukas, Karthik Ramanna, Thomas Steffen, and workshop participants at the AAA Annual Meeting, University of Connecticut, Georgetown, University of Massachusetts Lowell and Yale. Prior versions of this paper were circulated under the title “Goodwill impairment after M&A: acquisition-level evidence on compliance with SFAS 142”

I. INTRODUCTION

Statement of Financial Accounting Standards (SFAS) 142 (now ASC 350-20) replaced unconditional amortization of acquisition goodwill with conditional impairment, when estimated fair values fall below booked amounts (FASB 2001). Many expressed reasonable concerns about compliance with the standard because fair value estimates are subjective and hard to verify. Prior research investigating SFAS 142 falls roughly into two groups, each focused on polar opposite null hypotheses (e.g., Watts 2003, Ramanna 2008, and Stein 2019). One group rejects the hypothesis of zero compliance with the standard by showing that impairments are associated with declines in prior, current, and subsequent performance (e.g., Banker, Basu, and Byzalov 2017, Jarva 2009, and Li, Shroff, Venkatarman, and Zhang 2011). The other group rejects full compliance by showing that some firms don't impair when they should (e.g., Li and Sloan 2017, and Ramanna and Watts 2012).

To provide a fuller picture of compliance with SFAS 142, we track 893 large acquisitions for 10 post-acquisition years and use reported impairments to build a comprehensive model that incorporates both acquisition-date and post-acquisition data.¹ We then focus on acquisition-years classified as Should-Impair by our model. Whereas prior research classifies as compliant only those acquisitions that impair in the Should-Impair year, we provide additional measures of compliance by extending the observation window and including as compliant acquisitions that wait a year or two before deciding to impair (not to impair) once they determine that the initial performance decline is permanent (temporary).

¹ The 893 acquisitions are made by 578 unique acquirers. We use a 10-year post-acquisition observation window because the yearly impairment rate has declined substantially by year 10. As we track individual transactions that may or may not be grouped with other transactions for goodwill reporting purposes, it does become difficult to track after an extended period as groupings may change over time. We rely on substantial hand-collection to ensure we are investigating the goodwill attached to a given transaction, but we acknowledge this requires careful reading and in some case judgement.

We propose this broader view of compliance because GAAP relies on managerial judgement and discretion. Managers of acquisitions in Should-Impair years can either impair if they determine the decline is permanent or defer impairment if they are uncertain. As impairments cannot be reversed, impairing early distorts financial reports if prospects improve subsequently. If managers believe there is a reasonable chance the performance decline might reverse, they use the discretion/judgement allowed to estimate fair values and rely on assumptions/methods that effectively assign less weight to the current decline to justify not impairing in the Should-Impair year.²If the next year brings more certainty that the performance decline is permanent (temporary), managers choose to impair (not impair). If, however, the uncertainty remains, managers exercise the discretion/judgement allowed to defer the impairment decision for a second year. Unless performance recovers in the second year, transactions that remain unimpaired are classified as noncompliant.

As described later, this broader view of compliance is confirmed by the content and tone of goodwill-related comment letters issued by the SEC on 10-Q/K reports filed by acquirers as well as acquirer responses to those comment letters. The SEC defers to management even when stock prices fall substantially, recognizing that investors might overreact to bad news and may not have access to private information available to managers (see also Chen, Shroff, and Zhang 2019 and Latham & Watkins 2009).

To implement our approach, we hand-collect details of the acquisition and allocation of goodwill to business segments from the first post-acquisition 10-K report. Subsequent 10-K reports provide information about the first impairment, segment-level performance, and the fraction of

² SFAS 142 makes no mention of permanent and temporary performance declines, but GAAP for impairment of tangible assets requires that the “decline has existed for an extended period of time” (e.g., Paragraph 47 of SAS 92 AICPA 2001 and FASB (2005) Staff Position on FAS 115-1 and 124-1). See also Gordon and Hsu (2018).

goodwill written off. Two aspects of our sample are noteworthy. First, the sample period extends to acquisitions made (impairments taken) as late as 2009 (2019). Most prior studies, which focus on the early 2000's, overemphasize performance declines in the technology sector (crash after the technology bubble) and exclude the deeper and more widespread performance declines of the financial crisis. Second, we limit our sample to acquisitions made after the effective date of SFAS 142, which increases both the odds of impairment and our ability to predict it.³

The dependent variable for our impairment model is an indicator (IMP) that equals one in the year when goodwill associated with an acquisition is impaired for the first time during the ten-year post-acquisition window. We use a logit for this regression. This is effectively a hazard model because we stop tracking after the first impairment.⁴ We consider two sets of explanatory variables shown in prior research to be associated with IMP: post-acquisition performance measures and acquisition-date attributes. The model allows for asymmetry in the IMP/performance relation: IMP increases with bad news, but is unaffected by good news (e.g., Banker, Basu, and Byzalov 2017). Similarly, IMP increases non-linearly as the market to book ratio (MtB) declines, especially as MtB approaches one (e.g., Lawrence, Sloan, and Sun 2013). Also, we use *raw* returns to measure performance, unadjusted for market/industry movements, as it better reflects how fair values of goodwill move relative to booked goodwill (e.g., Jarva 2009).⁵

Coefficient estimates from our prediction model are generally consistent with prior results, especially the asymmetric relation between IMP and performance. IMP increases with declines in

³ There are at least two reasons why we anticipate an increase in goodwill impairments under the new rule. The old rule allowed for the pooling method, which did not lead to any recognized goodwill. By prohibiting the pooling method, the new rules would require all transactions generating goodwill to recognize it. Second, the amortization of goodwill under the old rules reduced the threshold for impairment by reducing the net book value of goodwill. The book value amount remains at purchase amount under the new rules until impaired.

⁴ Our approach resembles that in Hayn and Hughes (2006), who focus on pre-SFAS 142 acquisitions.

⁵ For example, acquirers experiencing negative raw returns could impair, even if adjusted returns are positive because benchmark (industry or market) returns are even more negative that year.

performance indicated by low MtB and negative values of ROA, current and lagged changes in sales, and lagged returns. For acquisition-date variables, IMP increases with the fraction of purchase price allocated to goodwill, pre-acquisition return volatility, and the period between announcement and effective dates (proxy for due diligence undertaken by acquirer).

We use predicted values of IMP (PrIMP) from our model for sample acquisition-years, reflecting the odds of impairment in that year, to group acquisition-years into those that should and should not impair. Based on the methodology in Palepu (1986) we find a cutoff of PrIMP of 0.037. Given the for potential misclassification, we use that figure to form four groups. We consider the group with PrIMP greater than 0.0555 as the Should-Impair observations.⁶ Our sample yields 795 such Should-Impair acquisition-years, which are linked to 349 acquisitions (some acquisitions have more than one Should-Impair year). The remaining 544 acquisitions have no Should-Impair acquisition-years. To estimate compliance, we focus on these 349 acquisitions predicted to impair.

As mentioned earlier, a direct way to infer compliance is to report the fraction of the 349 acquisitions that impair in the first Should-Impair year (year 1). Only 51 acquisitions, representing 15 percent of the 349 acquisitions, impair in the first year they are categorized as should-impair, which suggests a relatively low compliance rate. To implement our broader, alternative view of compliance, we follow the remaining 298 acquisitions that do not impair immediately for two more years to see if they impair (do not impair) if their subsequent performance suggests the year 1 decline is permanent (temporary). By year 3, we find that impairments increase from 51 to 117 (35 percent) and the decision not to impair appears to be justified for an additional 100 acquisitions

⁶ PrIMP equal to 0.0555 represents a predicted probability of impairing of about 51 percent ($= e^{0.0555}/(1+e^{0.0555})$).

(30 percent) as they drop out of the Should-Impair category in years 2 and 3.⁷ Only 49 acquisitions (15 percent) are non-compliant by year 3 as they do not impair despite being classified as Should-Impair for years 1, 2, and 3.⁸ Overall, compliance levels increase dramatically if we allow for a year or two delay while firms assess the duration of the initial performance decline.

As with prior efforts to infer compliance from prediction models estimated on observed behavior, our results describe “average”, not “perfect”, compliance. Consider a hypothetical case where the rules require impairment when PrIMP exceeds 0.010 but all firms delay impairment until PrIMP exceeds 0.0555. Even though no firms comply, we incorrectly conclude 100 percent compliance because firms impair when the model (which reflects average behavior) predicts they should. To assess strict or perfect compliance with SFAS 142, we rely on two external validations. First, we examine a proxy for perfect compliance used earlier: firms should impair if MtB falls below 1.(e.g., Ramanna and Watts 2012). We find that firms begin to impair even before that cutoff is reached: mean (median) MtB in the year of impairment is 1.39 (0.94), and indicators in our prediction model for MtB between 1 and 1.25 and 1.25 and 1.5 are significant at the 1 and 6 percent levels, respectively. Second, we examine the odds of receiving goodwill-related SEC comment letters.⁹ We find that Should-Impair years are more likely to receive a letter, relative to otherwise similar acquisition-years not classified as Should-Impair, and the odds increase further for each additional year the acquisition does not impair even though it is still classified as Should-Impair.

Our sample also offers insights from descriptive analyses. About 25 percent of the sample (222/893) impairs within 10 years of the acquisition, and the impairment often occurs soon after

⁷ As we lose 8 (7) observations in year 2 (3), the year 3 percentages of compliant and non-compliant acquisitions are based on 334 acquisitions (349 – 8 – 7) .

⁸ Compliance is harder to determine for the remaining 68 acquisitions which are classified as Should-Impair in year 2 (3) but not in year 3(2).

⁹ Because goodwill-related comment letters are sent for various reasons (e.g., to request information), receiving a comment letter is consistent with but does not necessarily imply that the SEC views the firm as noncompliant.

the acquisition: 38 percent of impairments within 2 years and 12 percent in the *same* year. Both the relatively high frequency of impairments and the short gap between acquisition and impairment are inconsistent with widespread non-compliance. Firms write off a substantial portion of goodwill (median = 75%) in the year they first impair. We find that about 80 percent of acquisitions are within-industry, and those acquisitions are less likely to impair than across-industry pairs. Impairments peak in 2008 and 2009, during the financial crisis, when profitability and market values decline. The high crisis-era impairment rate is consistent with timely impairments because we find our prediction model fits crisis and non-crisis years similarly. Finally, we find little evidence of opportunism: only a few firms take big baths in the year they impair, and impairments are only weakly related to agency cost proxies.

Using hand-collected data to track goodwill at the acquisition level and performance at the segment level offers considerable detail about relevant factors such as the fraction of purchase price allocated to goodwill, the fraction of goodwill impaired, and the circumstances leading to impairment (when provided). It also allows for a more precise view of the impact of the rule change than relying solely on machine-readable Compustat data, which aggregates information across all acquisitions at the firm level. Relying on Compustat data would overstate substantially the number of impairments, the fraction of goodwill impaired, and how quickly acquisitions were impaired.¹⁰

Additional insights arise from examining alternative specifications of the prediction model. First, focusing on MtB values below one misses a number of impairing firms with MtB between 1 and 1.5. Second, performance measures based on segment-level data do not add significant explanatory power to measures based on firm-level data. Although we are surprised by this finding,

¹⁰ For example, switching from hand-collected to Compustat data doubles the impairment rate from 25 to 49 percent.

future research can be more judicious about hand-collecting these data.¹¹ Finally, pre-acquisition return volatility, but not the market response to acquisition announcements, is positively related to IMP. Consistent with the asymmetric relation in Basu (2001), more volatile firms experience large negative outcomes more often, which increases the odds of impairment.

We contribute to the academic and professional literatures on goodwill accounting under SFAS 142 by analyzing a large sample that covers most large acquirers over a 19-year sample period to provide descriptive evidence, offer significantly improved impairment models, and document relatively high compliance levels and little evidence of opportunism. Given that SFAS 142 is an important application of the conditional conservatism described in Basu (1997), our study also contributes to that literature (e.g., Cedergren, Lev, and Zarowin 2015) by offering a more granular understanding of how firms apply conditional conservatism.

Section 2 reviews relevant prior research. Section 3 describes our sample and descriptive results. Section 4 provides results for our impairment model, Section 5 explores compliance under SFAS 142, and Section 6 concludes.

II. PRIOR LITERATURE AND PREDICTIONS

Relevant Rule Changes

SFAS 142, which replaced the goodwill amortization rules laid out in APB Opinion 17 (AICPA 1970), substantially changed accounting for goodwill. Under APB 17, goodwill is a wasting asset and should therefore be amortized over an estimated life (not to exceed 40 years). Goodwill should be evaluated continuously to determine whether it has been impaired. Subsequently, SFAS 121 (FASB 1995) provided more specific guidelines for impairment:

¹¹ Our findings could be because segment-level data differ from firm-level data for relatively few transactions (about 22 percent). Unique segment-level data are not available when there is only one segment, when the disclosure is unclear and when more than one segment receives a substantial fraction of goodwill.

goodwill should be reassessed when certain events indicate that the carrying amount, based on *undiscounted* future cash flows, is not recoverable.

SFAS 142 eliminated pooling, which increased the number of firms recognizing goodwill after an acquisition, and also determined that goodwill is no longer a wasting asset. Rather than wait for events that suggest impairment has occurred, firms are required to test annually for impairment. Also, goodwill is allocated at acquisition to the “reporting business units”, representing segments (under SFAS 131) or segment components that absorb the target. Previously, goodwill was associated with transactions, not allocated to reporting units. Impairment tests are then conducted separately for each unit. More important, impairment under SFAS 142 is based on fair values, reflecting *discounted* values of future cash flows, not the undiscounted recoverable values defined by SFAS 121.

Under the two-step process required by SFAS 142, each reporting unit first compares fair values to carrying amounts (including goodwill). Fair values, which reflect amounts at which reporting units can be bought or sold between willing parties, are obtained from market prices, discounted future cash flows, or valuations based on industry multiples. The second step, required only if the reporting unit’s carrying amount exceeds its fair value, compares the fair value of goodwill with its carrying value. Goodwill fair value, computed the same way as goodwill at acquisition, equals the difference between reporting unit fair value (computed in step one) and fair values of the reporting unit’s assets less liabilities. Impairments are taken if this implied fair value of reporting unit goodwill falls below its carrying value.

In response to complaints about the costs of annual impairment tests, the FASB issued ASU No. 2011-08, which gave acquirers the option to first assess qualitative factors to determine whether events/circumstances lead to a situation where it is more likely than not that fair values

have dropped below carrying amounts (examples in para. 350-20-35-3C). The two-step impairment test is unnecessary if this qualitative “step 0” suggests that fair value exceeds book value. Although this provision is expected to reduce impairments only after 2011 (Li and Sloan 2017), our preliminary investigation suggests it may not have had a large effect.¹²

Prior Literature

Hayn and Hughes (2006) develop prediction models based on acquisition-date and post-acquisition data to examine deals made between 1988 and 1998 and track impairments through 2004, focusing on pre-SFAS 142 acquisitions. We extend their models by adding variables and relations developed in other research, especially the non-linear relation between impairment and performance predicted by conditional conservatism.

Our methodology is also related to four studies that build models for post-SFAS 142 impairments, all of which document evidence of firms complying with the new rule. Jarva (2009) shows that impairments between 2002 and 2005 are associated with lower future operating cash flows, except when accompanied by other restructuring charges. The former result suggests compliance, whereas the latter suggests opportunism: impairments are linked to big baths. To investigate non-complying firms—those that are predicted to impair but do not—the study builds an impairment prediction model. To allow for a nonlinear relation with performance, the model includes indicator variables for negative performance. The results suggest that IMP increases with the indicators for losses and MtB less than one, levels of goodwill, market capitalization, and more negative current and lagged returns.

Second, Li, Shroff, Venkataraman, and Zhang (2011) investigate variation in investor

¹² An examination of goodwill impairments in our sample and for the universe of Compustat firms did not reveal declines in the magnitude or frequency of impairments around this rule change. The FASB made an additional concession by issuing ASU No. 2017-04 which removed “Step 2”. This ASU is unlikely to be a factor during our sample period because it only affects firms in our sample that early adopted this rule change.

responses to impairment announcements across three regimes: pre-142, transition, and post-142. During their post-142 sample period, which extends to 2006, they find that impairment is associated with more negative returns, downward revisions in analysts' next quarter's earnings per share forecast, and declines in earnings and sales growth over the next two years.¹³ They also find a significant association between the magnitude of impairment and two overpayment proxies: termination fees and unrelated acquisitions (when target's business is unrelated to the acquirer's main business).¹⁴

Third, Banker, Basu, and Byzalov (2017) use multiple measures of post-acquisition performance to predict impairment levels for different assets. In one of their analyses, they study goodwill impairments between 2001 and 2007. Consistent with the conditional conservatism required by SFAS 142, magnitudes of impairment increase as returns, changes in operating cash flow, and changes in sales become more negative. Also, they find that the trigger for impairment is more negative than the zero trigger typically assumed in prior studies on conditional conservatism.

Finally, Wangerin (2019) adds to acquisition-date determinants of goodwill impairment by showing that less due diligence increases the odds of impairment. His sample includes transactions closed between 7/1/2001 and 5/31/2006 and impairments before 5/31/2008. Due diligence is likely lower for acquirers facing competing bidders, short-term reporting incentives, and agency problems. Consistent with prior findings, MtB is negatively related to impairment. Other determinants with significant coefficients include very large write-offs, cash bonuses for CEOs, goodwill as a fraction of total assets, and the presence of a tangible net worth covenant.

¹³ They also find evidence of noncompliance. Like the occasional big baths documented in Jarva (2009), impairments are unrelated to performance declines when accompanied by large restructuring charges.

¹⁴ We consider investor reaction at acquisition announcement, a more direct measure of overpayment.

Turning to evidence of noncompliance, Ramanna and Watts (2012) as well as Watts (2003) argue that SFAS 142 is likely to be ineffective because of managerial discretion. The layers of discretion described in Ramanna and Watts (2012, p. 755) are as follows.

“First, acquired goodwill, which represents rents expected from an acquisition, must be allocated across reporting units. Second, the discounted future value of those reporting units must be estimated; and third; the current value of the units’ net assets (including non goodwill intangibles) must be estimated. The discretion in the first two layers is difficult to audit in that it is *ex post* unverifiable. A similar argument can be made about the discretion in the third layer, particularly with regards to current-value estimates of thinly traded assets and liabilities.”

Ramanna and Watts (2012) provide empirical evidence consistent with managers using discretion allowed by SFAS 142 to avoid impairing goodwill. They follow firms that reported positive goodwill and MtB greater than one, which subsequently reported a decline in MtB over the next two years to levels below one. The second year with $MtB < 1$ are taken from 2003 through 2006. Even though these firms are likely to have goodwill fair values below book values at the end of the second low-MtB year, only about 30 percent of the sample impaired. They find that agency-based factors are associated with firms avoiding impairments.

Li and Sloan (2017) provide additional confirmation that managers use the discretion offered by SFAS 142 to delay impairments. Their sample includes impairments between 1996 and 2000 and between 2004 and 2011. They find that firms with overstated goodwill (estimated from public data) experience more future impairments and lower future returns, which suggests that managers delay impairment and investors are unable to fully identify overstated goodwill. Cross-sectional variation in impairment delays is again linked to agency-based incentives. Overall, prior research documents significant evidence of both compliance and noncompliance with SFAS 142, but the actual level of compliance remains uncertain.

Our impairment model includes the various determinants proposed in prior research. To improve explanatory power, we add two features. First, we include MtB values just above one.

Prior research either assumes a linear negative relation between IMP and MtB or a stepwise relation, where MtB less (greater) than one increases (does not affect) IMP. Given that firm-level market and book value are rough proxies for segment-level fair values and booked goodwill, a cutoff at MtB equal to one might miss some likely-to-impair acquirers that lie just above the cutoff. To include such cases, we add two partitions of MtB: between 1 and 1.25, and between 1.25 and 1.5. Second, we include the variance of pre-acquisition stock returns to incorporate the odds of acquirers facing extreme downturns, sufficient to require impairments. Although more volatile firms are also more likely to face extreme good news, that outcome does not affect IMP.

III. SAMPLE SELECTION AND DESCRIPTIVE RESULTS

Sample Construction

Our sample is based on the population of completed mergers and acquisitions in the SDC Platinum database, with effective dates between July 1, 2001 and December 31, 2009. Focusing on acquisitions after the enactment of SFAS 142 enhances our ability to identify impairments based on hand-collected data.¹⁵ We do not consider acquisitions effective after 2009 to allow a ten-year post-acquisition observation window. To ensure consistent accounting data, we require that acquirers be publicly traded in the United States.

As indicated in Panel A of Table 1, this process yields an initial sample of 14,618 transactions. We eliminate observations if the transaction value is below \$5 million. We also

¹⁵ Eliminating pre-SFAS 142 acquisitions increases the likelihood of observing impairments. Some goodwill has already been amortized pre-SFAS 142, which leaves less unamortized goodwill for possible impairment. Also, given subjectivity involved in reconstructing synergies and allocating it to business units for these older acquisitions (when implementing SFAS 142), managers may over-allocate goodwill to units that have more internally generated (unrecognized) goodwill, thereby reducing the likelihood that fair values fall below book. Even though SFAS 142 applies to years beginning after 12/15/2001, our sample begins on 7/1/2001. We do so because the final rule was announced in July 2001 and thus would have already impacted firm decisions, and it increases sample size by 120 observations. Pre-SFAS 142 amortization should be relatively unimportant for these acquisitions. We confirm that excluding these 120 observations does not materially affect our main results (not tabulated).

require that the acquirer be the majority owner of the target after the transaction and have a stock price higher than \$5. Of the 5,649 transactions that survive these filters, we remove 4,149 transactions in which the acquirer is a REIT or mutual fund based on SIC codes 6200 through 6799, 240 transactions that SDC describes as undisclosed or individual assets, and 204 transactions for which acquiring firms either do not have financial statements available from the SEC's EDGAR database or the financial statements are available but fail to provide sufficient asset allocation detail.¹⁶

We examine 10-K filings for the remaining 1,056 transactions over the ten-year post-acquisition window to collect relevant data related to both the acquisition and impairment, such as the fraction of purchase price allocated to goodwill and the fraction of goodwill impaired. Please note that if a firm has multiple acquisitions in one year, each acquisition is included as its own observation. Multiple material acquisitions by one acquirer in the same year is quite rare in our sample. We exclude 163 transactions because Compustat data are missing or we had difficulty tracking goodwill.¹⁷ The final sample contains 893 transactions, of which 222 impair and 671 do not impair during the ten-year window.

Panel B of Table 1 provides information on the 578 acquirers associated with the 893 transactions. As many as 405 acquirers have only one transaction in our sample, and 780 of the transactions are covered by acquirers with three or fewer transactions. We collect firm-level stock returns and accounting variables from CRSP and Compustat, respectively, and hand-collect

¹⁶ The 204 acquisitions lost in this step are mainly due to firms bundling allocation amounts across multiple transactions. We suspect details by transaction were not provided because these transactions are not material. They tend to be substantially smaller: median purchase price is less than half the median for our final sample.

¹⁷ Materiality likely also explains why we lose 163 acquisitions because we cannot track many of these transactions after the acquisition. Goodwill as a percentage of transaction value is only two-thirds of that for our final sample. It could also be due to managers obscuring details of the impairment to mitigate negative investor responses. If so, our estimates of compliance are biased downwards because we drop these acquisitions that impaired.

segment-level data from Capital IQ for all firm-years through the first impairment for the 222 acquirers that impair, and for the ten-year window for the remaining acquirers. We also use data from other sources, such as Audit Analytics for goodwill-related SEC comment letters (see appendix).

Descriptive Results.

Table 2, Panel A reports the distribution of impairments for different number of years to impairment, for acquisitions completed in each calendar year between 2001 and 2009. The right-most column totals the acquisitions completed in each year. Most years have around 100 acquisitions, except the last two years (2008 and 2009) contain fewer acquisitions. The second column from the right provides the fraction of those acquisitions impaired for the first time during the ten-year window. The fraction appears to be relatively stable, around 25 to 30 percent, except for 2003 and 2009 (15 and 12 percent, respectively). About 25 percent of acquisitions are impaired for the first time, partially or fully, within our ten-year post-acquisition window.¹⁸ The bottom row in Panel A shows the total number of impairments for the different number of years to impairment between 0 and 10. To our surprise, 27 impairments (12 percent of all impairments) occur in the *same* calendar year as the effective date of the acquisition.¹⁹ The number of impairments peaks during year 3 after acquisition (34 transactions, which represents 15 percent of all impairments), and then declines to zero by year 10.

To investigate clustering associated with the year of impairment, the columns in Panel B of Table 2 describe impairments by the calendar year impaired. There is a clear increase in impairments during 2008 and 2009, with elevated levels in the adjacent years, 2007 and 2010.

¹⁸ This fraction is higher than the 14.1 percent rate for the pre-SFAS 142 sample in Hayn and Hughes (2006).

¹⁹ Examination of these 27 impairments suggest that most occur in 2008 and 2001, during economic downturns, and appear mainly in the Business Equipment industry group.

Impairments are far more likely during stock market downturns.²⁰

Panels C and D of Table 2 describe industry composition for targets and acquirers. We use the Fama/French industry classification to group targets and acquirers into the 12 industry sectors listed in the first column of Panel C.²¹ We then assign each acquisition to the appropriate cell based on acquirer (rows) and target (columns) industry membership. We use boldface for cells along the main diagonal to identify within-industry acquisitions.

The results in Panel C suggest the following findings. First, there is considerable variation in acquirer industry membership (third column from the right), from highs of 240 for Finance and 226 for Business Equipment to lows of 12 for Utilities and Chemicals. Second, a similar distribution is observed for targets (second row from the bottom) because most acquisitions are within-industry. The second column from the right describes the fraction of within-industry deals, conditional on acquirer industry membership. The sample-wide average is 80 percent (reported for the Total row), but it ranges between 31 percent for Durables and 96 percent for Finance. Third, the fraction of deals that are impaired vary across acquirer industry membership (right-most column), from highs of 48 percent for Non-durables and 46 percent for Other to lows of 12 percent for Healthcare and 15 percent for Durables. Similar distributions are observed for target industry membership (bottom row).

Panel D summarizes the Panel C results by compiling the fractions that impair/do not impair for within- versus across-industry acquisitions. The results in Panel D suggest that impairment is considerably less likely for within-industry acquisitions (22.4 percent) relative to acquisitions that span different industries (34.8 percent).

²⁰ A disproportionate fraction of the Finance and Retail impairments occur between 2007 and 2009.

²¹ http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_12_ind_port.html

Our model, which is based on the model in Hayn and Hughes (2006), includes both post-acquisition performance measures and acquisition date characteristics. Table 3, Panel A provides descriptive statistics for post-acquisition performance, separately for the 222 acquisition-years with impairments and the remaining 6,232 non-impairment acquisition-years. We do not report statistical significance for univariate differences in Table 3, but do so when we discuss the multivariate model in Table 4. Results in the first row for %Impair, which measures the fraction of goodwill that is written down, suggest that most of the goodwill is impaired at the first impairment.²² The mean %Impair of 70.1 percent is similar to the 66.2 percent in Hayn and Hughes (2006), and consistent with the inference from other studies (e.g., Li and Sloan 2017) that SFAS 142 did not increase the likelihood of making *partial* impairments.

Segment-level performance is reflected in return on assets (ROA) and change in sales (ChgSales). Prior research offers mixed results regarding the improvement provided by segment-level over firm-level performance: Byzalov and Basu (2016) find that segment-level data improve prediction of impairments, but Hayn and Hughes (2006) do not. Segment-level ROA is lower in both the year of and year prior (LaggedROA) to impairment, relative to non-impairment years. Although change in segment sales (ChgSales) is noticeably lower for impairment years, lagged change in segment sales (LaggedChgSales) is similar across impairment and non-impairment years.

Moving to the firm-level, we find that firm-level ROA (FirmROA) exhibits a similar, though weaker, relation to that observed for segment-level ROA. The results in Table 3 confirm a prominent role for the two MtB-based variables used in prior research: the continuous measure (currMtB) is lower and the indicator for MtB below one (currMtB0to1) is higher in impairment

²² We are not able to ascertain the amount of goodwill impaired for all impaired transactions. In some cases, more than one transaction is impaired that year and the impairment amounts are not separated by transaction.

years compared to non-impairment years.²³ Moving to MtB values just above one, we find the same pattern for MtB between 1 and 1.25 (currMtB1to1.25): 15 percent for the year of impairment but only 6.9 percent for non-impairment years. That pattern is not observed for currMtB between 1.25 and 1.5 (currMtB1.25to1.5), as the year of impairment is associated with lower values. Untabulated results suggest that currMtB above 1.5 is unrelated to IMP. These results are consistent with the MtB/IMP relation being gradually nonlinear, rather than a step function, around 1, likely because firm-level MtB measures with error the ratio of segment-level fair and book values of goodwill.

Turning to stock return-based measures, we find that stock returns compounded over the year (CR) are similar across impairment and non-impairment years, but lagged stock returns (LaggedCR) are substantially lower for impairment years (mean of -11.2 percent) relative to non-impairment years (9.6 percent). Stock markets anticipate performance declines before they are recorded in accounting statements. Finally, we see little difference between impairment and non-impairment years for changes in competition as defined by the Herfindahl Index (ChgCOMP).

Panel B of Table 3 describes acquisition-date characteristics considered in prior research as potentially being related to future goodwill impairment. We do so separately for transactions that subsequently did and did not impair during our 10-year observation window. Contrary to the view that investor responses at acquisition reflect value creation, we find that long and short-window returns around acquisition dates (IndAdjRet and 3dayIndAdjRet) are higher, not lower, for transactions that subsequently impair. In untabulated analyses, we find a robust V-shaped

²³ We combine seven firms with negative book values with the remaining firms (MtB>1.5) because they are unlikely to impair due to a technicality under SFAS 142. Acquirers with zero or negative carrying values claimed they need not impair as they satisfy the first step: fair values cannot be negative and thus must exceed zero/negative carrying values. This practice continued until ASU 2010-28 (FASB 2010) imposed limits on this interpretation. We confirm that results are similar when these seven firms are excluded (not tabulated).

relation between IMP and acquisition-date returns: the likelihood of impairment increases as acquisition-date returns become both more negative and more *positive*. Pre-acquisition return volatility for acquirers (Volatility) is higher for transactions that impair. It appears that more volatile acquirers are more likely to experience extreme swings in future performance, with negative swings increasing the need to impair.²⁴

Acquisitions that subsequently impair have a higher fraction of transaction value assigned to goodwill (GoodwillPct);²⁵ have fewer competing bidders (Bidders); include more stock in the package offered to targets (Stock); and have a larger toehold in the target (PriorOwn). The indicators for relatively low acquisition-date MtB follow the same structure discussed in Panel A for post-acquisition MtB. All three indicators (MtB0to1, MtB1to1.25, and MtB1.25to1.5) at the acquisition date are more likely to equal one when the firm subsequently impairs, as shown by the higher mean numbers in the impairment year compared to non-impairment observations. Acquisitions that subsequently impair are associated with the following acquisition-date characteristics: lower total assets (Size); fewer acquisitions in the prior three years (AcqN); lower industry-adjusted price-earnings ratios (RelativePE); lower net equity issuance (NEQ); more likely to operate in a high-litigation industry; and have a shorter gap between the announcement and effective dates for the acquisition (lnTDD), which suggests less due diligence effort.²⁶

²⁴ The volatility results are robust to using a weighted average of target and acquirer volatility (not tabulated).

²⁵ Consistent with Hayn and Hughes (2006), we view the fraction of the transaction allocated to goodwill as a potential measure of overpayment. As acquired assets should be valued at their market values then the remaining purchase price is allocated to goodwill, it is likely that overpayment will lead to inflated goodwill.

²⁶ We considered abnormal accruals in the acquisition year and premium paid to targets but dropped them because they are similar across the two groups and including them reduces sample size sharply. In untabulated analyses, we also consider a number of other variables. These include whether the merger or acquisition occurs between acquirers in the same industry, whether the acquirer is audited by a Big 4 firm, and CEO characteristics. We find no consistently significant relation with IMP (not tabulated).

IV. RESULTS

Table 4 provides results from different specifications of our model used to predict IMP. As in Table 3, we split the explanatory variables into two groups: performance in each post-acquisition year, referred to as “current year” performance, and acquisition-date characteristics. To incorporate non-linearity in the relation between performance and IMP, we use separate variables for positive and negative values of the different performance measures. In our search for the best specification, we pay particular attention to improvement in explanatory power arising from different ways to incorporate two sets of post-acquisition variables: MtB and segment-level performance, which are reported in Panels A and B, respectively. Improved explanatory power is indicated by a significant change in the area under ROC. Standard errors are double clustered, by acquirer and current year.

The Role of Market to Book (MtB) Ratios

As described earlier, we expect a nonlinear relation between currMtB and IMP: IMP should be higher (lower) for currMtB below one (higher levels of currMtB). If so, including an indicator for currMtB between zero and one should raise explanatory power, relative to the continuous MtB variable. As we expect a gradual, rather than a sharp, reduction in IMP as currMtB exceeds one, the indicator variable currMtB1to1.25, and possibly even currMtB1.25to1.5, should further increase explanatory power. These specifications are described in the first four columns of Table 4, Panel A. Consistent with Panel A of Table 3, Columns (1) and (2) confirm that IMP is negatively (positively) related to currMtB (currMtB0to1). The R^2 is higher in column (2) but the area under ROC is lower, although this is not statistically significant ($\chi^2=2.41$, p-value=0.120).

In columns (3) and (4), we sequentially include currMtB1to1.25 and currMtB1.25to1.5. Consistent with IMP increasing for MtB values slightly above one, we find that currMtB1to1.25 and currMtB1.25to1.5 are both significantly positive. Critically, the increase in the area under

ROC, from 0.666 in column (1) to 0.703 when all three indicator variables are included in column (4), is statistically significant ($\chi^2=4.13$, p-value=0.042). Untabulated results reveal insignificant coefficients for indicators for currMtB above 1.5. Overall, these results confirm that impairment is more likely in years when MtB is below or just above one, *ceteris paribus*.

The last four columns of Table 4, Panel A repeat the analyses in the first four columns but include fixed effects and the other determinants of impairment discussed earlier. Fixed effects are based on Fama French 12 industries and the effective year of the acquisition.²⁷ The general tenor of the slopes and magnitudes remain unchanged for the MtB variables. And the area under ROC is again significantly higher ($\chi^2=4.76$, p-value=0.029) when we introduce all three indicator MtB variables in column (8), relative to the continuous MtB in column (5). Regarding current-year performance measures, we find significant coefficients (at the 5 percent level) in all four specifications when performance declines. Specifically, the significant negative values for asset-deflated segment ROA (ROAneg), segment sales declines in the current and prior year (ChgSALESneg and LaggedChgSALEneg), and negative raw returns in the prior year (LaggedCRneg) indicate impairments go up as performance becomes more negative.

Turning to acquisition-date characteristics, we find significant coefficients for pre-acquisition return volatility (Volatility), fraction of purchase price assigned to goodwill (GoodwillPct), and the amount of due diligence undertaken by the acquirer (lnTDD).

Segment-level Versus Firm-level Performance Measures and Additional Analyses

Results reported in Table 4, Panel B examine the increase in explanatory power from segment-level return on assets (ROA) and change in sales (ChgSALES) over corresponding firm-

²⁷ Untabulated results confirm qualitatively similar results without the fixed effects in columns (5) to (8) of Table 4, Panel A, as well as columns (3) and (4) of Panel B.

level numbers. In columns (1) and (2) we focus only on current and lagged values of these two variables—again with separate indicators for positive and negative partitions to accommodate nonlinearity—and suppress all other potential determinants of IMP. The results suggest that segment-level performance does not improve explanatory power.

We consider a number of sensitivity analyses to investigate whether segment-level data provide increased explanatory power over firm-level data for subsamples where segment data might be more relevant. First, we partition based on the “distance” between segment and firm performance for ROA and ChgSALES, expecting more explanatory power for cases with higher distance. Second, we focus on firms that make more acquisitions (serial acquirers are more likely to have multiple segments) and on acquisitions of targets in a different industry (segment performance more likely to deviate from firm performance). In all cases, we find the area under ROC for the specification with segment-level data is not significantly higher than that for the corresponding specification with firm-level data. Overall, even though segment-level data are not as useful as we anticipated, we provide some findings that should be of use to future research considering segment-level data.

To comment on the generalizability of our findings, given that our sample period includes the financial crisis, we investigate whether the prediction results observed for our overall sample are also observed in both the crisis (2008 and 2009) and non-crisis years. Although the high impairment rates in the crisis years are unlikely to be observed in general, the same prediction model could still apply to both subperiods.²⁸ Untabulated results indicate that the main regression results appear similar when the two crisis years are dropped: all significant variables remain

²⁸ We find similar, high impairment rates during the 2001 recession when we expand our sample to include acquisitions completed during 2000 and first half of 2001, prior to the implementation of SFAS 142 (not tabulated).

significant except for currMtB1.25to1.5, for which the p-value increases to levels close to 0.1. The prediction model results in Table 4, Panel C, which we discuss next, also remain similar for the non-crisis year sample. The results are qualitatively similar when we restrict the sample to include just the two crisis years. These findings suggest that the considerations that drive impairments are generalizable, not driven by the crisis years in our sample.

To assist future researchers considering alternative specifications for goodwill impairment models, we perform additional tests (results untabulated) to explore how including three factors—post-acquisition variables, year fixed effects, and an indicator for recession years—impacts the area under the ROC. We find that adding post-acquisition data to acquisition-date variables significantly increases the explanatory power of the model ($\chi^2=35.07$ and p-value<0.0001). Similarly, the addition of year fixed effects significantly improves explanatory power ($\chi^2=16.9$ and p-value <0.0001). Finally, consistent with our results above suggesting the model is relatively unchanged between crisis and non-crisis years, adding an indicator for crisis years (2008 and 2009) results in an insignificant increase in explanatory power ($\chi^2=2.16$ and p-value=0.1417).

V. COMPLIANCE LEVELS AND SUPPLEMENTARY ANALYSES

Identifying Acquisitions that are Likely to Impair (Should-Impair)

To provide a perspective on the extent to which acquirers comply with SFAS 142, we track firm responses for a subset of acquisitions that should impair goodwill based on our prediction model. To separate acquisition-years into those that should and should not impair, we first predict IMP (PrIMP) for our sample based on the specification in column (8) of Table 4, Panel A. Recall that this specification is the most comprehensive (includes all explanatory variables) and has the highest area under the ROC. As we are agnostic about the costs and benefits of classifying and misclassifying acquisitions, we plot the frequency distribution of firms in each decile bin of PrIMP,

separately for firms that impair and do not impair. The point of intersection of the two distributions, representing the optimal cutoff, is 0.037 for our sample (see Palepu 1986 for a discussion). Acquisition-years with PrIMP above (below) 0.037 are (are not) likely to impair.

Given that our prediction model is associated with error, using a cutoff of 0.037 to identify firms that should impair raises the potential of including misclassified firms that should not impair. We create a band on either side of the cutoff that likely includes such misclassified firms. We picked 0.0185 as the width of the band because it is the midpoint between zero and the cutoff. In effect, we form four groups: Should-Not-Impair, Probably-Should-Not-Impair, Probably-Should-Impair, and Should-Impair based on PrIMP values below 0.0185, between 0.0185 and 0.037, between 0.037 and 0.0555 ($=0.037+0.0185$) and above 0.0555 respectively.

We cross these four groups reflecting different predicted impairment levels with the two groups based on actual outcomes: acquisition-years that did and did not impair. The resulting 4x2 classification is provided in Table 4, Panel C.²⁹ The Should-Impair group contains 795 acquisition-years, which are linked to 349 acquisitions (some acquisitions have more than one Should-Impair year). Consistent with the prediction model capturing factors that predict impairment, the fraction impaired declines monotonically from 14.3 to 1.3 percent across the Should-Impair to Should-Not-Impair groups. And finding relatively similar fraction impaired in the Probably Should-Impair and Probably Should Not Impair rows (3.5 versus 2.6 percent) confirms that misclassification is more likely around the prediction model cutoff of 0.037. This supports our decision to raise the cutoff for Should-Impair from 0.037 to 0.0555. We restrict our compliance analyses to these 349 acquisitions with at least one Should-Impair year.

²⁹ Results are confirmed when we use a holdout sample approach. We create two equal, randomly sampled subgroups, estimate the model on one subgroup, and use it to generate predictions on the other subgroup (not tabulated).

Estimating Compliance

As described in the Introduction, we estimate compliance by focusing on the first Should-Impair year (year 1) for the 349 acquisitions predicted to impair. Estimates of compliance in prior research focus on whether firms impair when they initially should, which would indicate a 15% compliance rate for our sample. We offer an alternative measure that include as compliant not only acquisitions that impair in year 1 of should impair, but also those that impair in the next year or the second year following (years 2 and 3) as well as those that do not impair because they fall out of the Should-Impair group in years 2 and 3. For each of the three years we group firms based on two aspects of their track record since year 1: the model's prediction (S=Should-Impair and N=not Should-Impair) and the firm's response (I=impair and D=did not impair).

Figure 1 provides the different permutations of the model prediction/firm response pairs. The label for each box describes the pairs in that permutation for years 1, 2, and 3. The year is denoted by superscripts, and the underscore symbol “_” separates the pairs for each year. The boxes provide the number of observations in each permutation and those that conclude in an impairment are highlighted in green. We lose 8 (7) observations in year 2 (3) as they fall outside the 10-year post-acquisition window during which we collect data. This is because the first Should-Impair year (year 1) occurs in the 10th (9th) year after the acquisition.

In year 1, we find 51 of 349 acquisitions impair (in S¹I¹) whereas 298 acquisitions do not (S¹D¹). Had we followed the narrower compliance perspective used in prior research, we would report a relatively low compliance rate of 15 percent (=51/349). In year 2, we find another 44 acquisitions impair (sum of the 2 highlighted boxes: 29 in S¹D¹_S²I² and 15 in S¹D¹_N²I²), bringing the impairment total up to 95. And another 133 acquisitions (S¹D¹_N²D²) also appear to be compliant as their decision to not impair is justified by them dropping out of the Should-Impair category in year 2. Only 113 acquisitions (S¹D¹_S²D²) appear non-compliant as they do not impair

despite remaining in the Should-Impair category for both years 1 and 2. As of year 2, about two-thirds are compliant ($= (95+133)/(349-8)$) and the remaining third are non-compliant.

By year 3, another 22 acquisitions impair (sum of the 4 highlighted boxes under Year 3) bringing to 117 the number of acquisitions that impair in the first Should-Impair year or the two years following. Another 100 acquisitions are compliant as their decision to not impair is justified by them dropping out of the Should-Impair group for years 2 and 3. The number of noncompliant firms—which did not impair despite being classified as Should-Impair in all three years—declines to 49, and compliance is uncertain for the remaining 68 acquisitions. Stated as percentages, about 65 percent ($= (117+100)/(349-8-7)$) appear to comply, 15 percent ($= 49/(349-8-7)$) are noncompliant, and the remaining 20 percent are not easily classified. Allowing acquirers a year or two to determine if the performance decline that triggered the first Should-Impair prediction is permanent or temporary leads to a substantially higher rate of compliance.

These compliance estimates are conservative for two reasons. First, our model is associated with prediction error which leads to some misclassified Should-Impair acquisitions. Second, as we discuss next in Section 5.3, we find that some of the seemingly non-compliant firms appear to be compliant. Even though our model predicts they remain in the Should-Impair category not just for years 2 and 3, but also for years 4 through 6 (untabulated), and even though they attract goodwill-related comment letters from the SEC, they appear to eventually satisfy the SEC that their decision to not impair is justified.

Average (Relative) Compliance Versus Perfect (Strict) Compliance.

As described in the Introduction, these results describe compliance relative to how other firms comply, not strict compliance with SFAS 142. Consider a case where firms should impair when $PrIMP > 0.010$ but all firms delay impairment until $PrIMP > 0.0555$. Our prediction model—like the models in prior research—describes behavior relative to average compliance, and will

erroneously conclude that all firms comply. We conduct two additional analyses to determine the extent to which the predictions from our model are consistent with strict or perfect compliance.

First, we rely on Ramanna and Watts (2012), who propose a simple proxy for the cutoff that describes perfect compliance: firms should impair if MtB falls below one. This cutoff is viewed as a critical value in other prior work, in the SEC comment letters, and in the financial press. We examine if MtB is well below one for most acquisitions at two points in time: when they impair and when they are classified as Should-Impair. Table 3, Panel A indicates that the mean (median) MtB in the year of impairment is 1.385 (0.938). And untabulated results show that mean (median) MtB for Should-Impair years is 1.131 (0.961). Also, as mentioned earlier, the results in column (8) Table 4, Panel A indicate that MtB values just above one also predict impairment. The coefficient for MtB between 1 and 1.25 is very significant, and even the coefficient for MtB between 1.25 and 1.5 is significant at the 6 percent level.³⁰ These MtB comparisons suggest that our Should-Impair classification, based on a cutoff of $PrIMP > 0.0555$, corresponds roughly with perfect compliance.

Second, we examine the likelihood of receiving goodwill-related SEC comment letters regarding 10-K/Q filings. If the receipt of a comment letter is an indication that the SEC might believe an acquisition should impair in that year, finding a higher (lower) incidence of comment letters for years classified as Should-Impair (not Should-Impair) provides comfort that average compliance corresponds roughly with perfect compliance. We search Audit Analytics for goodwill-related SEC comment letters and report in Figure 1 the percent of observations that receive comment letters for each box (in parentheses, next to the number of acquisitions).

³⁰ Analysis of 17 acquisitions that impaired even though $MtB > 3$ reveals either a performance decline that is unique to the product/segment associated with the acquired target or the acquirer adopted a new strategic plan that reduced the value of the target. It is consistent with the view that firms impair when they should.

Before analyzing the relative incidence of comment letters across different boxes in Figure 1, we provide an overview of the content of these letters based on reading samples within each box. First, the receipt of a letter does not necessarily imply that the SEC believes that an acquisition should impair. The letter could be about another transaction, about something other than acquisition goodwill, seeking clarification, and so on. In effect, there is a “base” rate of letters that are unrelated to judgements about impairment. Second, although we expect the odds of receiving a letter to decline once an acquisition impairs, we find that impairments tend to generate additional SEC letters seeking supplementary information about the impairment, often justification for the fraction impaired. Third, as acquirers continue to defer impairment even though performance does not recover, the SEC takes a different tack: it requires firms to make public their methodology and assumptions in 10-Q/K reports. This way investors can directly assess whether an impairment is called for. Finally, we caution that the reliability of our incidence measure is lower for boxes with fewer acquisitions, such as the boxes in year 3 with fewer than 20 observations.

The first comparison we make is whether the odds of receiving a letter are lower if the prediction is not Should-Impair, relative to an otherwise similar acquisition that is in the Should-Impair group. The three such comparisons available all support this view: $S^1D^1_N^2$ versus $S^1D^1_S^2$ (12.84 is less than 16.90 percent); $S^1D^1_S^2D^2_N^3$ versus $S^1D^1_S^2D^2_S^3$ (16.33 is less than 22.95 percent); and $S^1D^1_N^2D^2_N^3$ versus $S^1D^1_N^2D^2_S^3$ (12.62 is less than 15.38 percent). As further confirmation, the 13.47 percent odds of receiving a letter in the first Should-Impair year (S^1) is higher than the 8.27 percent odds of receiving a letter for the 544 acquisitions that had no Should-Impair years (untabulated results).

The second comparison we make is whether the odds of receiving a letter increase when an acquisition defers impairment despite remaining in the Should-Impair category for one more

year. The odds of receiving a letter increases from 13.47 percent in the first Should-Impair year (S^1) to 16.90 percent for the 142 acquisitions classified again as Should-Impair in year 2 ($S^1D^1_S^2$). Repeating the process for another year, the odds of receiving a letter increase to 22.95 percent for the 61 observations classified as Should-Impair for three straight years ($S^1D^1_S^2D^2_S^3$). The results of both comparisons above based on the incidence of SEC comment letters support the inference from our analysis of MtB levels that relative compliance based on our prediction model corresponds roughly with perfect compliance.

As additional analysis, we investigate a sample of 14 acquisitions that did not impair within the 10-year window even though they were classified as Should-Impair in more than 5 years. We find no SEC letters for three acquisitions. Of the remaining 11 acquisitions, nine attempt to justify to the SEC why they need not impair. The SEC pushes to justify the calculations but the acquirers push back and refuse to impair. At some point, the SEC switches to an alternate strategy that requires these firms to publicly disclose the assumptions and methodology they use to justify deferring impairment. We see two takeaways. First, the SEC respects managerial discretion and the right to disagree with other stakeholders. Second, our measure of compliance is understated as we classify these 14 firms as noncompliant when some of them might reasonably be compliant.

Finally, we look for evidence in comment letters to support our broader view of compliance, which requires that managers use the discretion/judgement available under GAAP to defer impairment by providing fair value calculations that effectively underweight the current performance decline. Even though the SEC comment letters question the assumptions and methodology underlying the fair value calculations, and even though those questions become more pointed as impairment is delayed further, the overall sense is that the SEC respects the choices made by managers. The SEC likely recognizes that managers have access to private information

or honestly hold different beliefs about the future. This respect extends to cases where managers disagree with investor beliefs implied by share price declines.³¹ We see managers claim that the negative investor response is due to “volatility”, implying that the price decline is an overreaction that will be corrected in time. This sentiment is also expressed publicly by managers, especially managers of financial institutions during the financial crisis.³² In a few cases managers point to contemporaneous sell-side analyst price targets (forecasts of future prices) as support. The evidence above regarding the 14 acquisitions that did not impair despite a sustained performance decline also suggests that the SEC respects managers’ decisions about impairment.

Additional Analyses

We provide the results of supplementary analyses that extend prior research on the role managerial opportunism and agency costs play in the decision to impair. Impairments might coincide with big baths—large restructuring charges and writedowns—because managers opportunistically impair when they need to take restructuring charges, or they take restructuring charges when they need to impair. We compare the 114 acquisition-years that impair in the Should-Impair row of Table 4, Panel C with the 681 acquisition-years that do not. The first (next) three rows in Panel A of Table 5 describe restructuring charges (writedowns).³³ For reference, we provide numbers for the year the firm was classified as Should-Impair (year t) as well as the prior two years ($t-1$ and $t-2$). The p -values relate to a test of equivalence of means for the two groups.

³¹ Our reading of comment letters suggests that a sharp decline in stock market valuations is an important trigger for the SEC to issue a letter.

³² Both Goldman Sachs and Bank of America undertook actions, including reaching out to Berkshire Hathaway, that were designed to signal that share prices were too low because investors overreacted. See, for example, <https://www.goldmansachs.com/our-firm/history/moments/2008-buffett-investment.html> and Wall Street Journal article from July 26, 2015: “A book BofA and Citi can’t pick up.”

³³ We repeat the analysis using abnormal accruals as defined in both Byzalov and Basu (2016) and Chan, Chan, Jegadeesh, and Lakonishok. (2006) in case firms use negative accruals in general rather than special items to take a big bath. Again, we find no evidence that goodwill impairments are associated with big baths driven by abnormal accruals (not tabulated).

We also provide the number of acquisition-years and fraction of the group with non-zero values.

The results in Panel A suggest the following conclusions. First, there is no indication of firms restructuring when they impair. Not only are mean restructuring charges similar across the two groups in year t , they resemble the levels in the prior two years. Second, there is some evidence that impairing firms take more writedowns in year t : mean of -1.4 percent of revenues is significantly more negative than the -0.5 percent for the Should-Impair But Do Not group. The fraction of firms that take writedowns in the impair subgroup is 35 percent, which is more than the 26 percent that take writedowns in the subgroup that does not impair.³⁴

We then explore whether managerial or firm characteristics loosely related to agency costs and firm complexity explain why some firms should impair but do not. First, we consider if firms with new CEOs are more likely to impair goodwill, as part of a strategy to “clean house” and blame the impairment on the managers they replaced. The NewCEO variable is an indicator equal to one if the CEO is hired within the past 2 years. Our results contradict this view, as firms that impair are less likely to have a new CEO (p -value=0.075 in Table 5, Panel B). However, alternative measures—including CEO tenure and the natural log of CEO tenure—are not significant. Second, we consider whether managers delay or avoid goodwill impairment if their compensation package places greater weight on reported performance. We define Compensation as the fraction of the prior year’s total compensation paid as bonus. Consistent with this view, we find that firms that do not impair place a significantly greater weight on performance-based incentives in their compensation plans (p -value=0.016). Finally, we investigate whether firm complexity explains the impairment decision. We consider two measures: the natural logarithm of total assets (CurrentSize)

³⁴ In an alternative test (untabulated), we repeat the analysis using pre-goodwill impairment ROA. This measure is reduced both in the year of the impairment and the year after. The lack of a quick reversal is inconsistent with big bath behavior. The noticeable performance decline is also inconsistent with smoothing.

and the number of segments (Segments). The results are mixed: although CurrentSize does not play a role (p -value=0.282), the number of segments is higher for firms that do not impair (p =0.056).

Overall, our results suggest limited opportunism. Although there is some evidence that acquirers take big baths when they impair goodwill and some evidence that agency costs reduce the odds of impairment, the magnitudes are relatively small and there is a fair amount of evidence that does not support this view.

IV. CONCLUSIONS

SFAS 142 is an important and controversial rule change that requires acquirers to switch from periodic amortization of goodwill to impairment, when goodwill fair values decline below book. Prior research has rejected the null hypotheses of full and zero compliance with SFAS 142, but leaves open where actual compliance lies between those two extremes. To fill this gap, we build a model that explains observed impairment levels during a ten-year post-acquisition window and use that model to identify and track a subset of firms that should impair.

Whereas prior research includes as compliant only those firms that impair in the year predicted to impair (e.g., Hayn and Hughes 2006), we offer an additional approach to measuring compliance that looks past that year because some compliant firms might delay their decision to impair until they are able to confirm that the performance decline is permanent. We include as compliant both firms that impair soon after that first year of poor health if the decline seems permanent as well as firms that elect not to impair because performance recovers and the decline seems temporary. Our broader view of compliance raises compliance levels for our sample from about 15 percent to about 65 percent.

Because we hand-collect data on acquisitions and subsequent impairments, we are also able to offer new descriptive results, such as variation in impairment patterns over time and across

industries. In addition, we examine evidence of big baths in the year that firms impair. We also investigate firm and manager-level characteristics that might explain why some firms are noncompliant. Overall, we find limited evidence of managers behaving opportunistically.

Our results contribute to the literature on SFAS 142 as well as more generally to the literature on conditional conservatism. Conditional conservatism in most early research is measured as a coefficient estimate from a regression that aggregates conservatism across asset and liability accounts for each firm and then across all firms in samples/subsamples. More recently, research has narrowed its focus on separate accounts, especially goodwill, at the firm level (e.g., Banker, Basu, and Byzalov 2017, Li and Sloan 2017). We extend research on goodwill impairment by offering granular results observed at the acquisition level. Finally, we provide future research with improvements to goodwill impairment prediction models, including alternative ways to incorporate market to book ratios and the benefits of segment-level versus firm-level data.

Some caveats about scope are in order. We limit our attention to managers' responses, not responses of investors or other participants (e.g., Li and Sloan 2017). Our paper does not investigate whether managerial decisions reveal private information (e.g., Ramanna and Watts 2012). Finally, our results only describe the *level* of conditional conservatism post SFAS 142, not the *change* introduced by the standard. Future research will hopefully broaden the scope beyond our analyses to examine these and other related issues that remain unexplored.

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Appendix: Variables

Variable Name	Definition	Source
Impair (IMP)	Indicator equal to 1 if goodwill is impaired in that year for the first time within 10 years of the effective year of an acquisition, 0 otherwise	Hand-collected
Pr(IMP)	Predicted value of IMP.	Table 4, Panel C, Column (8)
%Impair	Percent of acquired goodwill written down at first impairment.	Hand-collected
currMtB	Market value of equity at the end of the current fiscal year divided by book value of equity (adding back any goodwill impairment), used for currMtB0to1, currMtB1to1.25 and currMtB1.25to1.5.	Compustat
currMtB0to1	Equal to 1 if acquirer MtB is less than 1 but greater than 0 for the current year, 0 otherwise	Compustat
currMtB1to1.25	Equal to 1 if acquirer MtB is less than 1.25 but greater than 1 for the current year, 0 otherwise	Compustat
currMtB1.25to1.5	Equal to 1 if acquirer MtB is less than 1.5 but greater than 1.25 for the current year, 0 otherwise	Compustat
ROA	Operating income divided by total assets for the segment that goodwill is primarily allocated to.	Hand-collected/ Compustat†
LaggedROA	Prior year's segment ROA	Hand-collected/ Compustat†
ChgSales	Change in segment sales from prior year scaled by prior year sales	Hand-collected/ Compustat†
LaggedChgSales	Change in segment sales between prior year and two years before, scaled by sales from two years before	Hand-collected/ Compustat†
CR	Raw returns for acquirer compounded over the current fiscal year	CRSP
LaggedCR	Raw returns for acquirer compounded over the prior fiscal year	CRSP
ChgCOMP	Change in Herfindahl Index for segment industry	Compustat
Firm ROA	Total operating income divided by total assets, acquirer	Compustat
IndAdjRet	Industry-adjusted acquirer returns from twenty days before the announcement date to the day before the effective date of the transaction	CRSP
IndAdjRetPos	Equal to IndAdjRet if greater than 0, 0 otherwise	CRSP
IndAdjRetNeg	Equal to IndAdjRet if less than 0, 0 otherwise	CRSP
3DayIndAdjRet	Industry-adjusted acquirer returns for narrow announcement windows [-1, +1], where day 0 is announcement day.	CRSP
3DayRet	Raw acquirer returns for narrow announcement windows [-1, +1], where day 0 is announcement day.	CRSP
Volatility	Standard deviation of the raw returns of acquirer for the one year ending twenty days prior to the announcement	CRSP
GoodwillPct	Percent of purchase price allocated to goodwill	Hand-collected

Bidders	Number of bidders for target	SDC
Stock	Equal to 1 if a majority of the consideration is in the form of the acquirer's equity, 0 otherwise	Hand-collected
PriorOwn	Equal to 1 if acquirer owned any portion of the target prior to the transaction, 0 otherwise	SDC
MtB	Market value of equity at the end of the fiscal year divided by book value of equity (adding back any goodwill impairment), used for MtB0to1 and MtB1to2.	Compustat
MtB0to1	Equal to 1 if the acquiring firm's value for MtB is less than 1 but greater than 0, 0 otherwise	Compustat
MtB1to1.25	Equal to 1 if the acquiring firm's value for MtB is less than 1.25 but greater than 1, 0 otherwise	Compustat
MtB1.25to1.5	Equal to 1 if the acquiring firm's value for MtB is less than 1.5 but greater than 1.25, 0 otherwise	Compustat
Size	Natural log of assets of acquirer prior to transaction	Compustat
AcqN	Number of acquisitions made by the acquirer during the prior three years	SDC
RelativePE	Acquirer's market value of equity divided by income before extraordinary items prior to acquisition relative to its industry as defined by Fama-French 12 industry grouping.	Compustat & CRSP
NEQ	Net equity issuance defined as the difference between the natural log of ratio of market value at the time of acquisition to the market value of equity 5 years earlier and the natural log of market returns over the same period.	CRSP
HighLitigation	Equal to 1 if the acquiring firm is in a high litigation industry, 0 otherwise. High litigation industries include Biotech, Computers, Electronics, and Retail as defined by Francis, Philbrick, and Schipper (1994)	SDC
lnTDD	The natural log of days between the announcement and effective date, (Wangerin 2019)	SDC
NewCEO	Equal to 1 if CEO started within past 2 years, 0 otherwise	ExecuComp
Compensation	Percentage of total compensation in the form of bonus for the prior year	ExecuComp
CurrentSize	Natural log of assets of acquirer for current year	Compustat
Segments	Number of segments of acquirer for current year	Compustat
SECLetter	Equal to 1 if the firm received an SEC comment letter about intangible assets for that year's financial statements, 0 otherwise	Audit Analytics

† For multi-segment acquirers, segment-level variables are hand-collected from Capital IQ. For single-segment acquirers, segment-level variables equal their corresponding firm-level values, which are obtained from Compustat.

The suffixes “neg” and “pos” refer to transformations of the underlying variable that capture the separate effects of negative and positive values, obtained by setting positive and negative values to zero, respectively.

Figure 1: Tracking acquisitions after first year predicted to impair

Of the 893 acquisitions in our sample, 349 are classified as “Should-Impair” in at least one year (Table 4, Panel C). To estimate compliance with SFAS 142, we track those acquisitions for 2 years after the first Should-Impair year. The first row in each box indicates our model’s prediction (S = Should-Impair, N= not Should-Impair) and the firm’s response (I = impair, D = did not impair) for that first year and the two years after (superscripts 1, 2, and 3). The prediction/response pairs for each year are separated by “_”. The second row provides the number of acquisitions (in bold) and the fraction that received an SEC comment letter (% in parentheses). We lose observations if the first Should-Impair year is 9 or 10 years after acquisition as tracking ceases 10 years after acquisition. Shaded boxes indicate impairments.

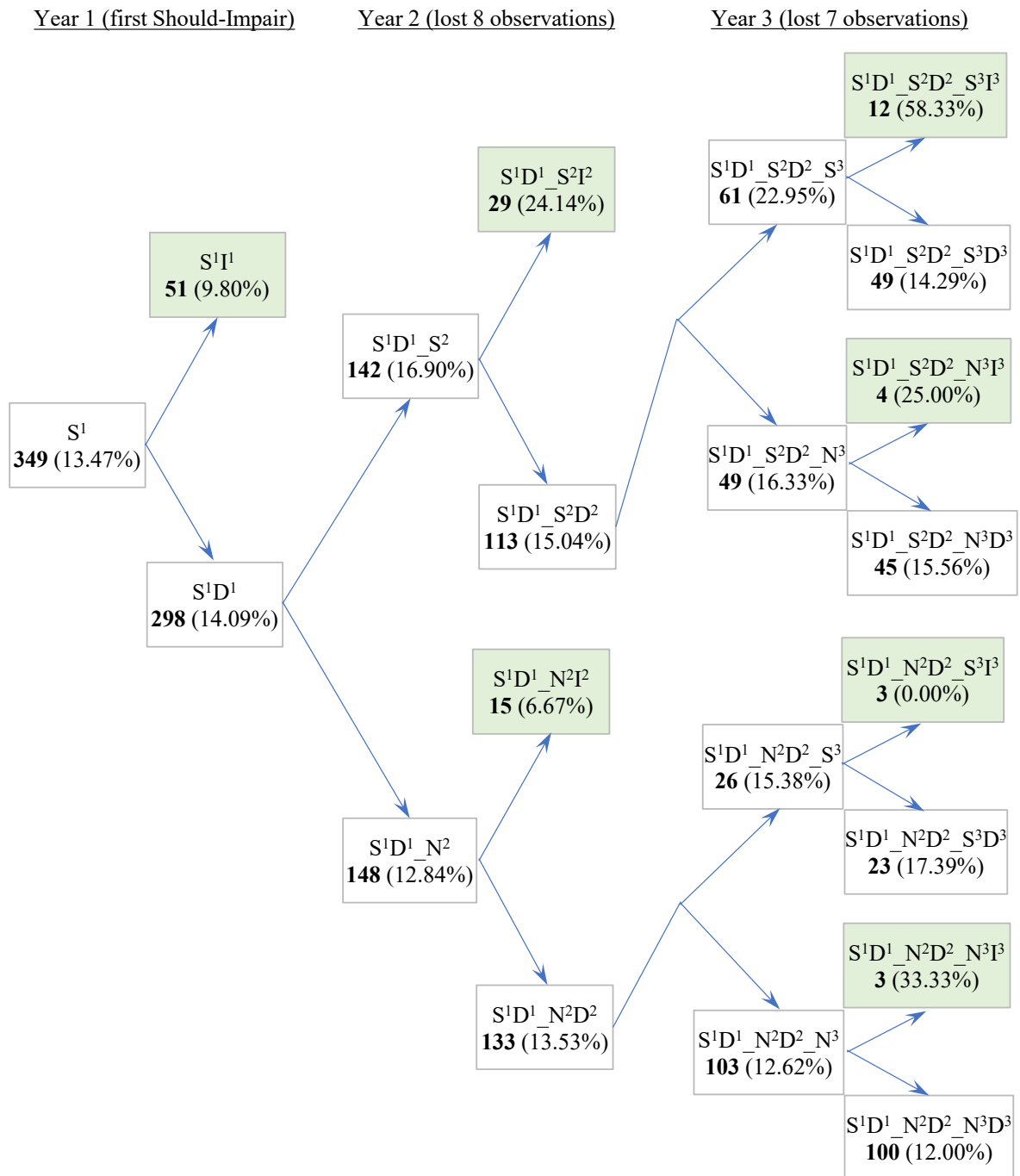


Table 1: Sample selection**Panel A: Sample Restrictions**

Source	Observations
All M&A transaction from SDC with US Acquirers, 2001-2009	14,618
Less: transaction values less than \$5 million, the acquirer is not the majority owner post-acquisition, or stock price of acquirer is below \$5	(8,968)
All material M&A transactions	5,649
Less: observations that SDC describes as undisclosed or individual assets	(240)
Less: observations with a mutual fund or REIT acquirer	(4,149)
All relevant M&A transactions	1,260
Less: no financial statement on EDGAR or no disclosure of allocation	(204)
All M&A transactions with sufficient disclosure	1,056
Less: unclear if impairment related to acquisition/data no longer available	(163)
Final Sample of transactions studied	893
Acquisitions that first impair within ten years	222

Panel B: Distribution of the Number of Acquisition per Acquirer

Acquisitions per Acquirers	Number of Unique Acquirers
One	405
Two	109
Three	35
Four	13
Five	5
Six	3
Seven	3
Eight	2
Nine	0
Ten	2
Eleven	0
Twelve	0
Thirteen	1
Total Unique Acquirers	578

Table 2: Distribution of impairment subsample across years and industries

This table describes how the 222 acquisitions that subsequently impaired some goodwill within a ten-year window are distributed across calendar years, number of years to impairment, broad industry sectors, and whether or not targets are in the same industry sector as the acquirer.

Panel A: Year of acquisition and years to impair (cells report number of impairments)

The rows represent the effective year of the transaction and the columns represent the number of years between the effective year and impairment year for the 222 acquisitions that impair. The last two columns describe the total number of acquisitions in each effective year and the fraction of those totals that impair.

		Years to Impair											Fraction Impaired	Total Acquisitions
		0	1	2	3	4	5	6	7	8	9	10		
Effective Year	2001	5	3	5	0	0	0	3	11	2	1	0	25%	120
	2002	3	0	1	3	2	2	6	4	1	1	0	25%	93
	2003	2	0	1	2	3	2	4	1	0	0	0	15%	103
	2004	0	3	1	2	7	12	4	0	1	0	0	27%	111
	2005	0	3	2	11	9	4	0	3	1	0	0	28%	120
	2006	0	2	11	7	4	4	2	0	0	0	0	29%	103
	2007	1	11	7	7	0	3	2	1	0	0	0	27%	117
	2008	14	2	3	1	1	0	0	0	0	2	0	30%	76
	2009	2	1	1	1	0	1	0	0	0	0	0	12%	50
	Total	27	25	32	34	26	28	21	20	5	4	0	25%	893

Panel B: Year of acquisition and year of impairment cells report number of impairments)

The rows represent the effective year of the transaction and the columns represent the impairment year for the 222 acquisitions that impair.

		Year Impaired																		Total	
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		2019
Effective Year	2001	5	3	5	0	0	0	3	11	2	1	0								30	
	2002		3	0	1	3	2	2	6	4	1	1	0								23
	2003			2	0	1	2	3	2	4	1	0	0	0							15
	2004				0	3	1	2	7	12	4	0	1	0	0						30
	2005					0	3	2	11	9	4	0	3	1	0	0					33
	2006						0	2	11	7	4	4	2	0	0	0	0				30
	2007							1	11	7	7	0	3	2	1	0	0	0			32
	2008								14	2	3	1	1	0	0	0	0	2	0		23
	2009									2	1	1	1	0	1	0	0	0	0	0	6
	Total	5	6	7	1	7	8	15	73	49	26	7	11	3	2	0	0	2	0	0	222

Table 2: (continued)

Panel C: Industry distribution (cells report number of acquisitions)

The rows and columns represent the industry sector (Fama/French 12-industry classification) for acquirers and targets, respectively, for our sample of 893 acquisitions. The last two columns describe the fraction of acquisitions with acquirer and target in the same industry and the fraction that impair for each acquirer sector. The bottom row provides the fraction that impair for each target sector.

		Target Industry														
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	Total	% Within Industry	% Impair
Acquirer Industry	(1) Non-Durables	20	0	2	0	0	4	0	0	1	0	0	0	27	74%	48%
	(2) Durables	0	4	1	0	0	3	0	0	1	0	0	4	13	31%	15%
	(3) Manufacture	1	4	24	0	2	13	0	0	3	2	0	4	53	45%	40%
	(4) Energy	0	0	0	37	0	0	0	2	1	0	0	0	40	93%	25%
	(5) Chemicals	1	0	2	2	4	0	0	0	0	3	0	0	12	33%	25%
	(6) Bus. Equipment	0	1	3	0	0	192	1	1	2	6	2	18	226	85%	23%
	(7) Telecom	0	0	0	0	0	7	21	0	1	0	0	3	32	66%	28%
	(8) Utilities	0	0	0	3	0	0	0	9	0	0	0	0	12	75%	17%
	(9) Retail	3	0	1	0	2	3	0	0	25	6	1	7	48	52%	29%
	(10) Healthcare	0	0	1	0	0	4	0	0	2	105	0	7	119	88%	12%
	(11) Finance	0	0	0	0	0	6	1	0	0	0	230	3	240	96%	20%
	(12) Other	0	0	1	0	0	19	3	0	2	2	0	44	71	62%	46%
Total		25	9	35	42	8	251	26	12	38	124	233	90	893	80%	
% Impair		40%	22%	43%	29%	25%	25%	31%	17%	26%	14%	19%	39%			

Panel D: Impairments for acquisitions that are within and across industry

The columns group acquisitions based on whether the target and acquirer are from the same or different industry (Fama/French 12-industry classification) and the rows group acquisitions based on whether or not they impaired during the 10 year observation window.

		Acquirer industry vs. target industry		Total
		Same	Different	
Future Impairment	Impair	22.4%	34.8%	222
	Do Not Impair	77.6%	65.2%	671
Total		715	178	893

Table 3: Description of Variables

This table contains descriptive statistics for acquirer performance in post-acquisition years and acquisition-year characteristics in Panels A and B, respectively. Acquisitions are dropped after the earlier of the first impairment or ten years after the acquisition. In Panel A post-acquisition years are split into 2 subsamples: firms-years without an impairment and impairment years. In Panel B, acquisitions are split into those that subsequently did not and did impair. Details of variables are provided in the Appendix

Panel A: Post-acquisition years

	Non-Impairment Years				Impairment Year			
	Mean	P25	Med.	P75	Mean	P25	Med.	P75
%Impair*	-	-	-	-	0.701	0.283	0.752	1
currMtB	2.449	0.898	1.791	3.199	1.385	0.430	0.938	1.552
currMtB0to1	0.098	0	0	0	0.486	0	0	1
currMtB1to1.25	0.069	0	0	0	0.150	0	0	0
currMtB1.25to1.5	0.069	0	0	0	0.063	0	0	0
ROA	0.074	0.015	0.056	0.124	0.010	-0.026	0.011	0.079
LaggedROA	0.077	0.015	0.058	0.129	0.036	-0.014	0.031	0.106
ChgSales	0.116	-0.011	0.076	0.182	0.016	-0.118	-0.014	0.090
LaggedChgSales	0.132	-0.005	0.083	0.197	0.131	-0.057	0.052	0.187
Firm ROA	0.059	0.014	0.054	0.115	0.015	-0.020	0.012	0.063
CR	0.095	-0.096	0.064	0.252	0.090	-0.384	0.067	0.376
LaggedCR	0.096	-0.092	0.059	0.247	-0.112	-0.575	-0.166	0.198
ChgCOMP	0.003	0.000	0.000	0.001	0.005	0.000	0.000	0.001
# of Acquisition-years	6,232				222			

* We obtained %Impair for 131 of the 222 firms that impaired goodwill. For the remaining firms, the exact dollar amount of impairment was not disclosed (e.g., disclosed dollar value was combined across goodwill impairments for multiple acquisitions).

Table 3 (continued)

Panel B: Acquisition Year

	Transactions that do not impair				Transactions that impair			
	Mean	P25	Med.	P75	Mean	P25	Med.	P75
IndAdjRet	0.076	-0.043	0.049	0.156	0.100	-0.084	0.020	0.167
3DayIndAdjRet	0.004	-0.013	0.002	0.020	0.005	-0.018	0.005	0.027
Volatility	0.025	0.016	0.020	0.029	0.029	0.018	0.024	0.036
GoodwillPct	0.524	0.337	0.545	0.706	0.607	0.439	0.598	0.799
Bidders	1.042	1	1	1	1.029	1	1	1
Stock	0.470	0	0	1	0.498	0	0.5	1
PriorOwn	0.028	0	0	0	0.034	0	0	0
MtB	3.117	1.624	2.301	3.749	2.133	1.139	1.822	2.556
MtB0to1	0.056	0	0	0	0.169	0	0	0
MtB1to1.25	0.067	0	0	0	0.130	0	0	0
MtB1.25to1.5	0.061	0	0	0	0.097	0	0	0
Size	8.330	7.269	8.246	9.547	8.016	6.764	7.877	9.541
AcqN	1.880	1	1	2	1.623	1	1	2
RelativePE	25.103	0	2.076	30.937	24.687	0	0.910	30.183
NEQ	0.651	0	0.298	1.171	0.616	0	0.070	1.213
HighLitigation	0.336	0	0	1	0.304	0	0	1
lnTDD	4.711	4.248	4.654	5.037	4.590	4.220	4.635	5.017
# of Acquisition-years	671				222			

Table 4: Predicting impairment using acquisition date and post-acquisition variables

Panels A and B provide coefficient estimates and associated p-values for hazard model specifications that explain impairments (IMP=1). Firms are followed for ten years after acquisition or through the year of first impairment. The variables included under the Current Year subheading refer to the current post-acquisition year, and the variables included under the Acquisition subheading refer to the year of acquisition. Panel A considers different ways to represent Market to Book ratios (MtB) and Panel B examines the benefits of segment-level over firm-level data. Panel C compares predictions (PrIMP) from the model in column (8) with actual impairments. Fixed effects refer to acquirer industry (Fama/French 12-industry) and acquisition year. Standard errors are double clustered, by acquirer and current year. Details of variables are provided in the Appendix.

Panel A: Alternative measures of MtB

	Pred. sign	Dependent Variable: Impairment (IMP)							
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Current Year									
currMtB	-	-0.286 <i>0.000</i>				-0.405 <i>0.013</i>			
currMtB0to1	+		1.718 <i>0.000</i>	1.932 <i>0.000</i>	2.000 <i>0.000</i>		1.679 <i>0.000</i>	2.047 <i>0.000</i>	2.143 <i>0.000</i>
currMtB1to1.25	+			1.421 <i>0.000</i>	1.489 <i>0.000</i>			1.310 <i>0.000</i>	1.404 <i>0.000</i>
currMtB1.25to1.5	+				0.611 <i>0.010</i>				0.522 <i>0.058</i>
ROApos						-0.950 <i>0.624</i>	-1.247 <i>0.573</i>	-0.726 <i>0.699</i>	-0.610 <i>0.744</i>
ROAneg						-3.666 <i>0.000</i>	-3.611 <i>0.000</i>	-3.980 <i>0.001</i>	-4.025 <i>0.001</i>
LaggedROApos						-0.471 <i>0.741</i>	-0.699 <i>0.696</i>	-0.613 <i>0.685</i>	-0.553 <i>0.710</i>
LaggedROAneg						1.662 <i>0.430</i>	2.053 <i>0.319</i>	1.984 <i>0.307</i>	1.897 <i>0.329</i>
ChgSALESpos						-1.038 <i>0.068</i>	-1.006 <i>0.072</i>	-0.955 <i>0.069</i>	-0.941 <i>0.073</i>
ChgSALESneg						-1.947 <i>0.006</i>	-1.774 <i>0.030</i>	-1.706 <i>0.037</i>	-1.691 <i>0.032</i>
LaggedChgSALESpos						0.207 <i>0.534</i>	0.222 <i>0.506</i>	0.128 <i>0.695</i>	0.128 <i>0.690</i>
LaggedChgSALESneg						-1.767 <i>0.021</i>	-1.727 <i>0.024</i>	-1.508 <i>0.056</i>	-1.511 <i>0.055</i>
CRpos						-0.000 <i>0.635</i>	-0.000 <i>0.518</i>	-0.000 <i>0.604</i>	-0.000 <i>0.541</i>
CRneg						-0.000 <i>0.128</i>	-0.000 <i>0.143</i>	-0.000 <i>0.171</i>	-0.000 <i>0.170</i>
LaggedCRpos						-0.000 <i>0.363</i>	-0.000 <i>0.601</i>	-0.000 <i>0.847</i>	-0.000 <i>0.881</i>
LaggedCRneg						-0.000 <i>0.003</i>	-0.000 <i>0.003</i>	-0.000 <i>0.004</i>	-0.000 <i>0.002</i>
ChgCOMP						5.195 <i>0.406</i>	7.017 <i>0.267</i>	5.761 <i>0.346</i>	5.649 <i>0.381</i>
FirmROA						0.483 <i>0.751</i>	0.247 <i>0.859</i>	0.441 <i>0.750</i>	0.517 <i>0.707</i>

Panel A (continued)

	Pred. sign	Dependent Variable: Impairment (IMP)							
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>Acquisition year</u>									
IndAdjRetPos						-0.000 <i>0.692</i>	-0.000 <i>0.770</i>	-0.000 <i>0.859</i>	-0.000 <i>0.857</i>
IndAdjRetNeg						0.000 <i>0.736</i>	0.000 <i>0.829</i>	0.000 <i>0.802</i>	0.000 <i>0.796</i>
Volatility						25.962 <i>0.003</i>	26.208 <i>0.001</i>	25.531 <i>0.003</i>	24.784 <i>0.004</i>
GoodwillPct						1.301 <i>0.021</i>	1.411 <i>0.007</i>	1.390 <i>0.010</i>	1.381 <i>0.013</i>
Bidders						-0.549 <i>0.086</i>	-0.515 <i>0.064</i>	-0.532 <i>0.067</i>	-0.555 <i>0.054</i>
Stock						-0.058 <i>0.658</i>	0.016 <i>0.916</i>	-0.020 <i>0.899</i>	-0.039 <i>0.788</i>
PriorOwn						0.174 <i>0.623</i>	0.264 <i>0.420</i>	0.312 <i>0.384</i>	0.303 <i>0.428</i>
MtB						0.006 <i>0.957</i>			
MtB0to1							-0.226 <i>0.226</i>	-0.230 <i>0.382</i>	-0.210 <i>0.358</i>
MtB1to1.25								0.148 <i>0.560</i>	0.161 <i>0.502</i>
MtB1.25to1.5									0.181 <i>0.545</i>
Size						0.064 <i>0.263</i>	0.072 <i>0.176</i>	0.097 <i>0.140</i>	0.094 <i>0.124</i>
AcqN						-0.011 <i>0.927</i>	-0.013 <i>0.912</i>	-0.038 <i>0.752</i>	-0.031 <i>0.798</i>
RelativePE						0.002 <i>0.220</i>	0.002 <i>0.248</i>	0.002 <i>0.398</i>	0.001 <i>0.535</i>
NEQ						-0.091 <i>0.605</i>	-0.083 <i>0.622</i>	-0.090 <i>0.581</i>	-0.104 <i>0.551</i>
HighLitigation						0.036 <i>0.870</i>	-0.062 <i>0.800</i>	-0.016 <i>0.947</i>	0.006 <i>0.980</i>
lnTDD						0.233 <i>0.000</i>	0.214 <i>0.000</i>	0.212 <i>0.000</i>	0.203 <i>0.000</i>
Constant		-2.924 <i>0.000</i>	-3.835 <i>0.000</i>	-4.049 <i>0.000</i>	-4.116 <i>0.000</i>	-5.006 <i>0.000</i>	-6.297 <i>0.000</i>	-6.775 <i>0.000</i>	-6.775 <i>0.000</i>
Fixed Effects		No	No	No	No	Yes	Yes	Yes	Yes
R-Squared		2.68%	5.87%	7.86%	8.06%	16.62%	18.38%	18.58%	18.86%
Area under ROC		0.666	0.6387	0.701	0.703	0.802	0.811	0.824	0.827
From Equality of Area Under ROC Test:		Compared to (1)				Compared to (5)			
Chi-Squared (p-value)			2.41 <i>(0.120)</i>	3.86 <i>(0.049)</i>	4.13 <i>(0.042)</i>		0.48 <i>(0.487)</i>	3.74 <i>(0.053)</i>	4.76 <i>(0.029)</i>
# of Obs.		6,454	6,454	6,454	6,454	6,454	6,454	6,454	6,454

Panel B: Segment-level versus firm-level data

	Pred. sign	Dependent Variable: Impairment (IMP)			
		(1)	(2)	(3)	(4)
		Firm-Level ROA and Sales	Segment-Level ROA and Sales	Firm-Level ROA and Sales	Segment-Level ROA and Sales
<u>Current Year</u>					
ROApos		-8.939 <i>0.036</i>	-4.172 <i>0.063</i>	-4.040 <i>0.166</i>	-0.420 <i>0.798</i>
ROAneg		2.596 <i>0.203</i>	-2.688 <i>0.153</i>	0.644 <i>0.704</i>	-3.776 <i>0.007</i>
LaggedROApos		1.128 <i>0.759</i>	0.417 <i>0.829</i>	-0.565 <i>0.825</i>	-0.572 <i>0.700</i>
LaggedROAneg		-1.379 <i>0.461</i>	2.145 <i>0.322</i>	0.066 <i>0.969</i>	2.037 <i>0.262</i>
ChgSALESpos		-1.558 <i>0.003</i>	-1.193 <i>0.061</i>	-1.182 <i>0.009</i>	-0.935 <i>0.073</i>
ChgSALESneg		-2.779 <i>0.002</i>	-2.033 <i>0.028</i>	-2.362 <i>0.003</i>	-1.660 <i>0.028</i>
LaggedChgSALESpos		0.401 <i>0.198</i>	0.495 <i>0.028</i>	0.034 <i>0.935</i>	0.129 <i>0.688</i>
LaggedChgSALESneg		-1.836 <i>0.001</i>	-1.805 <i>0.002</i>	-1.080 <i>0.131</i>	-1.495 <i>0.058</i>
CRpos				-0.000 <i>0.313</i>	-0.000 <i>0.543</i>
CRneg				-0.000 <i>0.134</i>	-0.000 <i>0.173</i>
LaggedCRpos				-0.000 <i>0.767</i>	-0.000 <i>0.893</i>
LaggedCRneg				-0.000 <i>0.000</i>	-0.000 <i>0.003</i>
ChgCOMP				6.214 <i>0.308</i>	5.643 <i>0.381</i>
currMtB0to1				1.962 <i>0.000</i>	2.136 <i>0.000</i>
currMtB1to1.25				1.253 <i>0.000</i>	1.400 <i>0.000</i>
currMtB1.25to1.5				0.456 <i>0.082</i>	0.517 <i>0.061</i>

Panel B (continued)

	Pred. sign	Dependent Variable: Impairment (IMP)			
		(1)	(2)	(3)	(4)
Acquisition year					
IndAdjRetPos				-0.000 <i>0.604</i>	-0.000 <i>0.852</i>
IndAdjRetNeg				0.000 <i>0.553</i>	0.000 <i>0.788</i>
Volatility				25.957 <i>0.001</i>	24.194 <i>0.002</i>
GoodwillPct				1.324 <i>0.017</i>	1.392 <i>0.010</i>
Bidders				-0.582 <i>0.034</i>	-0.553 <i>0.056</i>
Stock				-0.049 <i>0.752</i>	-0.044 <i>0.771</i>
PriorOwn				0.111 <i>0.788</i>	0.292 <i>0.446</i>
MtB0to1				-0.245 <i>0.275</i>	-0.213 <i>0.352</i>
MtB1to1.25				0.084 <i>0.724</i>	0.155 <i>0.516</i>
MtB1.25to1.5				0.161 <i>0.585</i>	0.181 <i>0.541</i>
Size				0.071 <i>0.197</i>	0.094 <i>0.123</i>
AcqN				-0.015 <i>0.892</i>	-0.031 <i>0.797</i>
RelativePE				0.001 <i>0.495</i>	0.001 <i>0.529</i>
NEQ				-0.067 <i>0.706</i>	-0.101 <i>0.567</i>
HighLitigation				0.011 <i>0.965</i>	0.006 <i>0.980</i>
lnTDD				0.194 <i>0.001</i>	0.201 <i>0.000</i>
Constant		-3.129 <i>0.000</i>	-3.345 <i>0.000</i>	-6.105 <i>0.000</i>	-6.742 <i>0.000</i>
Fixed Effects		No	No	Yes	Yes
R-Squared		5.57%	5.45%	18.56%	18.57%
Area under ROC		0.693	0.683	0.829	0.826
From Equality of Area Under ROC Test:		Compared to (1)		Compared to (3)	
Chi-Squared (p-value)		0.30 <i>(0.584)</i>		0.21 <i>(0.650)</i>	
# of Obs.		6,454	6,454	6,454	6,454

Panel C: Predictive success of model.

Based on the specification in column (8) of Table 4 Panel A, we estimate Pr(IMP) or predicted values for IMP for the 6,454 acquisition-years in our sample. We use the approach in Palepu (1986) to estimate a cutoff value of 0.037. Observations with $\text{Pr}(\text{IMP}) > 0.037$ are more likely to impair ($\text{IMP}=1$). Given the likelihood of misclassification being greater around this cutoff, we create a band of width equal to 0.0185 on either side of the cutoff to create four groups: Should-Not-Impair, Probably-Should-Not-Impair, Probably-Should-Impair, and Should-Impair based on PrIMP values below 0.0185, between 0.0185 and 0.037, between 0.037 and 0.0555 and above 0.0555 respectively. We report the number of observations in each group as well as the subsets that impair and don't impair during the 10-year post-acquisition window.

Moving from the acquisition-year level to the acquisition level, the 795 years in the Should-Impair row are linked to 349 acquisitions. The remaining 544 acquisitions had no Should-Impair years.

	Predicted Value	Impair	Do Not Impair	Percent impaired	Total
Should-Impair	>0.0555	114	681	14.3%	795
Probably-Should-Impair	0.037 to 0.0555	15	413	3.5%	428
Probably-Should-Not-Impair	0.0185 to 0.037	25	921	2.6%	946
Should-Not-Impair	<0.0185	68	4,217	1.3%	4,285
Total		222	6,232	3.4%	6,454

Table 5: Supplementary analyses on the role of managerial opportunism and agency costs in the decision to impair

We examine whether the decision to impair is associated with earnings management and manager/firm characteristics that reflect agency costs. Panel A compares evidence of big baths— restructuring charges and write-downs, scaled by lagged revenue for that year and two prior years— between two subsets of firms that Should-Impair described in the first row of Table 4, Panel C: those that impair and those that do not. Panel B compares managerial and firm characteristics across the two subsets. Details of variables are provided in the Appendix.

Panel A: Evidence of big baths in impairment years.

Variable	Should-Impair & Do (114 acquisition-years)						Should-Impair But Do Not (681 acquisition-years)						Diff in Means test p-value
	Mean	p25	p50	p75	Non-zero obs.		Mean	p25	p50	p75	Non-zero obs.		
					#	%					#	%	
Restruct _{t-2}	-0.007	-0.004	0.000	0.000	52	40.3%	-0.007	-0.005	0.000	0.000	281	41.3%	0.821
Restruct _{t-1}	-0.011	-0.007	0.000	0.000	56	43.4%	-0.008	-0.007	0.000	0.000	310	45.5%	0.297
Restruct _t	-0.011	-0.012	-0.004	0.000	71	55.0%	-0.011	-0.011	-0.001	0.000	367	53.9%	0.999
Writedown _{t-2}	-0.004	0.000	0.000	0.000	25	19.4%	-0.003	0.000	0.000	0.000	118	17.3%	0.821
Writedown _{t-1}	-0.007	-0.002	0.000	0.000	40	31.0%	-0.004	0.000	0.000	0.000	143	21.0%	0.173
Writedown _t	-0.014	-0.007	0.000	0.000	45	34.9%	-0.005	-0.001	0.000	0.000	176	25.8%	0.003

Panel B: Comparing characteristics of Should Impair Firms that Do and Do Not ImpairC.

Variable	Should-Impair & Do (114 acquisition-years)				Should-Impair But Do Not (681 acquisition-years)				Diff in Means test p-value
	Mean	p25	p50	p 75	Mean	p25	p50	p 75	
NewCEO	0.132	0.000	0.000	0.000	0.194	0.000	0.000	0.000	0.075
Compensation	0.163	0.000	0.128	0.228	0.230	0.065	0.193	0.342	0.016
CurrentSize	8.104	6.891	7.961	9.493	7.983	6.840	87.953	9.380	0.282
Segments	1.675	1	1	1	2.395	1	1	2	0.056