J Econ Finan (2017) 41:311–329
DOI 10.1007/s12197-015-9349-z

Admitting mistakes pays: the long term impact of goodwill impairment write-offs on stock prices

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Published online: 23 December 2015

Abstract Prior studies find a negative stock price reaction after goodwill impairment write-offs both in the short term and in the long term. In 2002 the Financial Accounting Standards Board rules for accounting for goodwill changed. We examine data from after the rule changes and find that investors continue to perceive goodwill write-offs as negative events in the short term, but contrary to previous studies, we find that investors perceive goodwill write-offs as positive news in the long term. We provide evidence suggesting that firms incorporate all foreseeable non-recurring charges into the goodwill impairment. We examine the overall firm performance and find that it improves significantly post event. However, firm operating performance only slightly improves after the write-off. The overall firm performance improvements are due to decreased non-recurring charges in the years subsequent to the write-off.

Keywords Goodwill · Impairments · Write-offs · Earnings management

JEL Classification G1

1 Introduction

In prior literature, goodwill impairment write-offs are shown to have a significant negative short-term announcement impact on stock prices (Hirschey and Richardson 2003; Bens et al. 2011) and this negative effect continues in the long-term after the announcement (Bartov et al. 1998; Hirschey and Richardson 2003). In 2001, however, the accounting standards significantly changed for the treatment of goodwill on the balance sheet with the

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adoption of Rules SFAS 141 and SFAS 142 (Financial Accounting Standards Board, 2001). Goodwill must now be assessed annually to determine if its value on the balance sheet is accurate or if the goodwill has become an impaired asset, and if so it must be written-off. While the short-term announcement impact is logically negative, the benefit from admitting a mis-valuation remains unsubstantiated. In addition, the new accounting rules for goodwill and the subsequent changes in information conveyed by goodwill impairments should logically impact investors' reactions to goodwill impairments. This provided our motivation to re-examine the longer term effects post-2001.

Goodwill is an intangible asset that represents the difference between what an acquiring firm pays for a target company during an acquisition and the book value of the target firm. FASB statement 141 states, "the excess of the cost of an acquired entity over the net of the amounts assigned to assets acquired and liabilities assumed shall be recognized as an asset referred to as goodwill."[1] Simply put, goodwill is the amount a company pays for a firm during an acquisition above the book value of the target firm. This goodwill can be a substantial portion of the acquisition price. The mean goodwill to purchase price ratio is 55 % (Shalev 2009; Lys et al. 2011).With the adoption of rule SFAS 141, a firm that acquires another firm, regardless of whether the target firm is public or private, is required to list this goodwill as an intangible asset on the balance sheet.

Our primary objective is to examine the long-term impact of goodwill impairment write-offs and, using post rule change data, we find that since the adoption of Rules SFAS 141 and SFAS 142 the long-term impact of goodwill impairment write-offs on stock returns is positive and economically significant. We find that this positive reaction continues for as much as one year post the write-off event. Using matching firms to calculate buy and hold abnormal returns, we document a 10.86 % abnormal return over 250 days post announcement and, using a risk-adjusted calendar time regression, we find a 7.92 % abnormal return for twelve months beginning the month after the write-off. This post event abnormal return is greater than the negative abnormal return we find during the two-day window around the event.[2] Since the goodwill impairment write-off is a publicly announced event and the increase in returns is not an immediate effect, the long-term reaction represents a market inefficiency providing an excellent opportunity for investors.

Ideally the acquisition that is the source of the goodwill should create synergies that improve the overall performance of the acquiring firm. If this is true then the positive abnormal returns post write-off are justified by improved firm performance. We examine if this is true or if the positive investor reaction is due to earnings management by the firm. Since the new rules allow for very little discretion on the part of management regarding when and if to take the impairment, the firm is essentially forced to take the write-off. Our hypothesis is that since the firm must take a write-off that will negatively impact earnings, the firms use the opportunity to implement a "big bath" and take all foreseeable write-offs and write-downs at one time. While this causes a more negative impact to earnings in the short term, it eliminates potential negative earnings surprises in the future. Our findings support our "big bath" hypothesis.

[1] See the Financial Accounting Standards Board 2007, Business Combinations.

[2] Write-off announcements frequently occur at earnings releases. The post-announcement abnormal return cannot be a manifestation of post-earnings announcement drift because, with write-offs, the long term response (more than) reverses the initial reaction.

We find that the firm's operating performance improves only slightly after a goodwill impairment write-off. However, we find that the overall firm performance improves significantly. Since the operating performance sees little improvement but the overall firm performance shows substantial improvement, we examine the amount of non-recurring costs post event. Consistent with our "big bath" hypothesis we find that firms with goodwill impairments have an increase in nonrecurring costs (excluding the goodwill impairment) in the year of the impairment. We find that the level of nonrecurring costs significantly decreases in the years subsequent to the goodwill impairment leading to overall improvements in firm earnings in the two years post event.

This study is developed in the following sections. Section 2 provides a review of relevant literature. In Section 3 we describe the data. We discuss the empirical methodology in Section 4. In Section 5 we present the empirical results, and we conclude in Section 6.

2 Literature review

The 2001 adoption of SFAS 141 and 142 can lead to an increase in the amount of goodwill carried on corporate balance sheets for two reasons. Prior to the adoption of SFAS141 there was a great deal of discretion in how acquisitions were recorded. Rule SFAS 141 eliminates this discretion by defining specific purchase accounting rules for all business combinations, with the result that purchased goodwill is now recorded for virtually every acquisition. In addition, prior to the adoption of rule SFAS 142, goodwill was considered a "wasting" asset. This meant that the goodwill was expected to lose its value over time. Firms were required to expense a portion of the goodwill every year, which systematically reduced the amount of goodwill carried on the balance sheet. With the adoption of SFAS 142, goodwill is no longer considered a wasting asset. It can theoretically retain its value over an infinite period of time.

Thus, there now should be more goodwill carried on balance sheets than before the rule changes. Prior to the rule change, roughly 30 % of all firms had a positive goodwill balance. We find that since the rule change, the percent of firms with positive goodwill balances has increased. In 2010, 37 % of all firms had a positive goodwill balance. In 2002, when the new rules went into effect goodwill as a percent of total assets increased 68 % from 6.56 % in 2001 to 11.03 % in 2002.[3] With goodwill balances increasing, more firms are exposed to the potential of substantial future goodwill impairment write-offs.

Under the prior rules a goodwill impairment write-off only occurred when there was reason to write-off the goodwill beyond the amount already being amortized. Thus, historically, impairment announcements were received by investors as negative news and had a negative impact on stock prices. With the adoption of SFAS 142, all firms with goodwill on the balance sheet are now required to perform an assessment of the goodwill on an annual basis. If the value of the existing goodwill does not match its book value, it must be deemed impaired and subsequently written off. This has made goodwill impairment write-offs much more common and frequent events.[4]

[3] Firms were required to make the transition to the new accounting rules in 2001. Fiscal year 2002 was completely under the new SFAS 142 guidelines.

[4] Hayn and Hughes (2006) find that not only has the number of write-offs increased, but the size of the write-off has grown as well.

With the new rules, a goodwill impairment is the result of a reduction in the value of the goodwill since the acquisition. If the acquisition was performing as expected, then the current goodwill value would not be less than the goodwill value at acquisition and an impairment need not be taken. Ergo, the goodwill impairment is an implicit public confirmation that the acquisition is not performing as well as expected. The write-off can be quite significant.[5] The goodwill may not be overvalued when initially recorded, but the acquired firm may lose value post acquisition (Churyk 2005) or it may be that the initial overpayment for the target firm causes the subsequent goodwill impairment (Li et al. 2011). Either way, the impairment write-off is an implicit acknowledgement by management that a mistake was made.

Prior literature shows a negative reaction in the short term to these mistake acknowledgements. Hirschey and Richardson (2003) find a negative abnormal return of −2.94 % to −3.52 % in the two-day window around the goodwill impairment announcement using data pre rule change. Bens et al. (2011) find a − 3.3 % abnormal return in the two-day window around the announcement using data from both pre rule change and post rule change. We test if the short-term negative market reaction persists after the rules changes even with the greater frequency of impairment write-offs. We find that impairment write-offs are still considered negative news to shareholders and that the market reaction is significantly negative in the short-term with a − 1.76 % abnormal return in the two-day window around announcement.

Existing literature also shows a negative reaction in the long term to goodwill impairment write-offs. Bartov et al. (1998) document a mean − 12 % cumulative abnormal return in the year following an asset write-down, although it should be noted that their study considers all types of asset write-offs and not just goodwill impairment write-offs. Hirschey and Richardson (2003) examine strictly goodwill impairment write-offs and they find a market adjusted cumulative abnormal return of −11.02 % in the one-year period after the write-off announcement. They show that stock prices start declining prior to the write-off event and continue to decline for approximately 150 days after the event. Both of these studies use pre rule change data.

3 Data

Stock returns, number of shares outstanding, and month-end stock prices are obtained from the Center for Research in Security Prices (CRSP). Value weighted market returns are also obtained from CRSP. All accounting data, including goodwill and goodwill write-off amounts, is obtained from Compustat. The monthly risk free rate and the Fama- French three factors; market (MKT), value (HML) and size (SMB), as well as the Carhart momentum factor (UMD) are obtained from Wharton Research Data

[5] Examples of substantial write-offs include Time Warner's $44.69B write-off in December of 2002 related to the AOL acquisition in 2000; Qwest's $8.48B write-off in December of 2002 related to the U.S. West acquisition in June of 2000; and Macy's Inc. $5.4B write-off in January of 2009 related to the May Department Stores acquisition of 2005.

[0] The address of Kenneth French's website is http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

Services (WRDS). The 49 Fama and French industry codes used in the matching BHAR calculations are obtained from Kenneth French's website.[6]

Our sample is from fiscal year 2002 through fiscal year 2011. We include only U.S. based firms, and only firms listed on the NYSE, AMEX, or NASDAQ. Financial firms (SIC codes 6000–6999) and utilities (SIC codes 4900–4999) are excluded. We obtain our sample by taking all firms listed in Compustat for fiscal years 2002 through 2011 that meet the above requirements and have a negative pre-tax goodwill impairment write-off.[7] This gives us 4508 firm-quarter observations.

We eliminate observations where there are no lagged assets, where no earnings announcement date is available, where the CRSP and Compustat cusips (firm identifiers) do not match, or where the return data necessary for the size, abnormal returns, or momentum calculations are not available. This leaves a final sample of 3209[8] firm-quarter observations.

Summary statistics are shown in Table 1. All values are in millions of dollars, except for the percent of goodwill written off. Goodwill impairment write-offs are measured in the current quarter. Assets, sales, and goodwill are measured at the quarter-end prior to the event. The percent of goodwill written off is the current quarter's impairment amount divided by the previous quarter's goodwill balance. Goodwill can be acquired and written off within the same quarter, thus allowing the write-off amount to be greater than the previous quarter's goodwill balance. If there is no goodwill balance from the previous quarter, the percent written off is set to zero. Size is measured ten days prior to the event and is the product of shares outstanding and price.

In order to accurately attribute investor reaction to goodwill impairment write-off events, we search for any pre-announcements of the write-off. First, we scale the current quarter goodwill impairment write-off value by the previous quarter's total assets. We then search for pre-announcements for our sample firms that have a pre-tax goodwill impairment write-off with a total value of at least 5 % of the previous quarter's total assets. This sample includes 1948 firm-quarter observations. The LexisNexis™ Academic Universe database is used to search for related articles. Specifically, we look for any articles within a three-month window prior to the firm's quarterly earnings announcement date, where the earnings announcement date is for the quarter where the impairment charge was taken and is obtained from Compustat.

If a pre-announcement is found, we use that date as the event date. Otherwise, we use the earnings announcement date as the event date. Barring a pre-announcement, we assume that investors learn about the goodwill impairment write-off at the time of the earnings announcement. These write-offs are typically prominently addressed in the earnings announcement.

To calculate the short-term abnormal return for the firms with impairments we use a two-day window where day 0 is the announcement day, or the first trading day after the announcement if the announcement occurs on a non-trading day, and day 1 is one trading day after day 0. To calculate long-term cumulative and buy-and-hold abnormal

[6] The address of Kenneth French's website is http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[7] The Compustat variable for the quarterly pre-tax goodwill impairment write-off is GDWLIPQ.

[8] All data from Eastman Kodak Company is deleted to avoid any potential confidentiality concerns due to a previous affiliation of one of the authors with Eastman Kodak.

Table 1 Summary statistics

	N	Mean	Median	Standard Deviation	Min	Max
Goodwill impairment Write-off	3209	-$168.79	-$12.57	$1247	-$0.001	-$45,538
Percent of goodwill written-off	3109	7.62 %	2.67 %	12.68 %	0.00 %	326 %
Goodwill	2888	$858.55	$90.73	$3594	$0.00	$81,688
Size	3204	$2495	$231	$9703	$0.00	$208,000
Sales	3114	$831.46	$132.31	$2817	$0.00	$66,022
Assets	3109	$3832.61	$598.62	$13,752	$2.06	$282,913

Accounting data is from Compustat. Size data is from CRSP. This data is for all U.S. firms listed on the NYSE, AMEX, or NASDAQ, excluding financial firms and utilities that have a negative goodwill write-off taken between fiscal years 2002 and 2011. All dollar amounts are in millions. Assets, goodwill, and sales are measured the quarter end prior to the event. Impairment write-offs are for the current quarter. Size is measured ten days prior to the event

returns we use either 125 days or 250 days after the two-day short-term window. Days refer to trading days only, so 125 trading days is approximately 6 months and 250 trading days is approximately 1 year.

4 Methodology

We investigate the long-term returns after the write-off event using three different methodologies: cumulative abnormal returns (CARs), buy-and-hold abnormal returns (BHARs) using matching firms, and risk-adjusted calendar time regressions. For the short term returns we only examine CARs. Hirschey and Richardson (2003) use the CAR methodology and Bartov et al. (1998) use a BHAR based on matching firms, however, they match only on size and industry while we match on size, industry and momentum. We then use two methods to test our hypothesis for why positive returns exist post impairment. First we examine operating performance and overall firm performance in the year of the impairment and in subsequent years, then we examine the amount of one time charges the firm takes concurrent with the goodwill write-off.

4.1 CARs

We start by examining if a goodwill impairment write-off or announcement of an upcoming write-off has an immediate negative impact on the stock price. We only use data from after the implementation of the accounting rules changes. We run an event study and calculate a two-day cumulative abnormal return (CAR) by firm for all firms that have taken a goodwill impairment charge in the quarter. We use a market adjusted model as this model corrects for problems resulting from clustering in calendar time. The abnormal return is the difference between the stock's return and the value weighted market return on the corresponding date. Thus, we do not have an estimation window. The market data is from the same time frame as the event window. We define the event date as the announcement date of the write-off or the earnings announcement date if no pre-announcement is made.

We match our sample data to each individual firm's return data from CRSP based on the date of the event. The CAR is calculated by summing the abnormal returns over the time period of the event. The two-day CAR is the mean of the summed abnormal returns of all firms, as shown in eq. 1.

$$CAR\left(t_1, t_2 = \frac{1}{N}\sum_{i=1}^{N} CAR_{\mathrm{i}}(t_1, t_2)\right) \tag{1}$$

Here, t_1 is the first day of the event study, day zero, and t_2 is the final day of the event study, day one. N is the total number of observations, and $\mathrm{CAR_i}$ is the CAR for firm *i*.

We use the same model for the long-term CAR studies. For example, in the 250 day study, t_1 is day 2 and t_2 is day 251. We examine the time periods both before and after the write-off event with the write-off event being day zero.

4.2 BHARs

For our next test, we calculate a BHAR using matching firms. We match the firms on three criteria; industry, size, and momentum. We then calculate the return on day *t* for both the event firm *i* ($R_{event\ firm\ i,\mathrm{t}}$) and its matching firm ($R_{matchingfirm\ i,\mathrm{t}}$). The BHAR for firm *i* is

$$\mathrm{BHAR}_i = \prod_{t=2}^{T}\left(1 + \mathrm{R_{event\ firm\ i,t}}\right) - \prod_{t=2}^{T}\left(1 + \mathrm{R_{matching\ firm\ i,t}}\right) \tag{2}$$

Here, *t* is the starting day for the calculations. Since this is all after the two-day window around the event, we start with day 2. We calculate BHAR for T = 125 days (approximately 6 months) and T = 250 days (approximately 1 year) after the two-day announcement period.

We start with our sample of 3209 firm-quarter observations. We obtain the SIC code for each firm from CRSP and convert this to the corresponding two-digit Fama and French industry code. We use all firms in CRSP, excluding financial firms and utilities that are listed on NYSE, AMEX, or NASDAQ as our universe of potential matches. We first assign each potential matching firm one of the 49 two-digit Fama and French industry codes based on the firm's SIC information in CRSP. The event firm is matched with all firms having the same two-digit Fama and French industry code which have not had a goodwill impairment write-off within the timeframe we are examining. For the 125 day analysis this would be within six months before or six months after the event date, and for the 250 day analysis, we exclude firms with impairment write-offs within one year before or one year after the event date.

Next we calculate the market capitalization for each of the event firms and each of the potential matches ten days prior to the event. We then reduce the pool of potential matches by requiring that the matching firm's size be within +/− 30 % of the size of the event firm. We then calculate momentum for the sample firm as the cumulated continuously compounded return for days *t*-259 to *t*-10, where *t* is the event date. We calculate momentum returns for each of the potential matches in the same fashion. We then take the firm from the pool of potential matches that has the value for momentum that is closest to the event firm. This is our matching firm.

The buy and hold return is the cumulated continuously compounded return over day 2 through day 126 or from day 2 through day 251. If the event firm does not have a full complement of days post event, then we use what data is available. If the number of days in the matched firm buy-and-hold calculation is less than the number of days in the event firm's buy-and-hold calculation, we take the next best match, (the next closest momentum value with the same two digit industry code and size within +/− 30 %) and use its returns starting from date $d + 1$, where d is the day that the first matched firm's return data ends. We use data from the second matched firm to calculate a total buy and hold return for the two matched firms that uses the same number of days as the event firm. If the second matched firm does not have enough return data we go to the third match and so on until the buy and hold return data for the matching firm has the same number of days as the buy and hold data for the event firm.

We test if size is a factor for abnormal returns by assigning each firm to a size quintile and then calculating the mean and median BHAR for each size quintile. To obtain the size quintiles, we use all firms listed on the NYSE during the time frame October 2001[9] to December 2011. Consistent with our sample data, we limit these firms to U.S. firms only and exclude all financial firms and utilities. The breakpoints for these quintiles are used to determine in which quintile the sample firms reside. We obtain price and share data from CRSP for each of our sample firms at time t-10, or ten days prior to the event. It is at t-10 where the sort across NYSE firms is done, quintile breakpoints are formed, and firms are placed into quintiles. In other words, there is a separate sort for each event firm. This means that there are not an equal number of firms in each quintile.

4.3 Calendar time regressions

The final method we use to determine abnormal returns is a risk-adjusted calendar time regression. This method creates monthly portfolios of all firms that had a goodwill impairment charge in the prior six (or twelve) calendar months. We adjust for risk using MKT, SMB, HML and UMD. We do this for both equal-weighted and value-weighted portfolios, and for both the total pool of firms and by quintiles based on size. The size quintiles are determined in the same manner as described in the BHAR analysis.

We run the calendar time regression on the total pool first and then on each of the quintile pools. We also estimate the regressions over two different time periods, using firms announcing write-offs in the prior six calendar months and, separately, with firms announcing write-offs in the prior twelve months. For both equal-weighted and value-weighted portfolios we estimate the regression.

$$(\text{RET-RF})_{p,t} = \alpha_p + \beta_p \text{MKT}_t + s_p \text{SMB}_t + h_p \text{HML}_t + u_p \text{UMD}_t + \varepsilon_{p,t} \quad (3)$$

where RET is the portfolio return, RF is the risk-free rate, $(\text{RET-RF})_{p,t}$ is the excess return for portfolio p in month t, and the intercept, α_p, is the portfolio abnormal return. We correct for potential heteroskedasticity (Newey and West 1987) using robust standard errors.

[9] The new goodwill accounting rules went into effect beginning with fiscal year 2002. The first date of any firm in our sample is October 2001, which is part of their fiscal year 2002, and thus is under the auspices of the new rules. We therefore use this as our starting date in our size analysis.

4.4 Operating performance

We measure operating performance using both net income and operating income before depreciation.[10] Net income is the income or loss that results after all expenses and losses including extraordinary costs have been subtracted from all revenues. Operating income before depreciation is revenues less operating expenses. Operating expenses are cost of goods sold (COGS) and sales and general administrative (SG&A). If firms do not have data for both net income and operating income they are excluded from our sample.

We scale our net income measure by sales and then we scale by total assets to create two net income based performance measures. We scale operating income by sales and then by total assets to create two operating income based performance measures as well. When using total assets we add goodwill impairments back into the total asset number so that we do not skew the performance measure by using a smaller denominator and making the performance appear to improve simply by removing assets.

We measure the median value for all firms with impairments from the year prior to the impairment to two years post impairment. Industry-adjusted values are calculated by sorting all firms using the Fama and French two digit industry code. The median performance measure for each industry is calculated by year. This is subtracted from the impaired firm median value. If an industry-year has a median value of zero, that industry-year observation is deleted. An industry and performance-adjusted measure is created by using a matched firm, based on the same matching criteria as used for the BHAR calculations. This value is subtracted from the impaired firm performance measure.

The changes in performance across years are calculated using the median change. The statistical significance of the change is measured using a signed rank test.

4.5 Big bath

Our hypothesis is that firms that are required to take a goodwill impairment write-off use the opportunity to take other nonrecurring charges at the same time instead of taking them in subsequent years when they should rightfully occur. If investors do not attach significance to the size of the event, but only to the event itself, it follows that a firm may "pull-forward" any anticipated future charges. This would allow subsequent years to have more positive results than they would otherwise.

We test this "big bath" hypothesis by examining the amount of special items of costs taken by the firms with goodwill impairment write-offs. The category, special items of cost (SPI) represents costs that the firm incurs that are one-time or non-recurring costs. This includes items such as inventory write-downs, write-downs of other assets, restructuring charges, discontinued operation costs, and generally any significant non-recurring item.

We measure the absolute amount of SPI in the year of the goodwill impairment write-off as well as the two years prior to the impairment write-off and the two years subsequent to the impairment write-off. SPI is tracked in Compustat as a negative amount. Since SPI includes the goodwill impairment write-off, we add back in any goodwill impairment taken in the years we measure.

[10] The Compustat mnemonic for net income is NI, and operating income before depreciation is OIBDP.

We obtain the median SPI value for all firms with goodwill impairment write-offs. We examine the annual changes in the amount of SPI from two years prior to the impairment write-off to two years subsequent to the impairment write-off. We obtain the median difference and use the signed rank test statistic to designate statistical significance. A negative amount indicates that the SPI increased year-on-year, while a positive amount is indicative of a decrease in SPI.

5 Results

5.1 CARs

CARs are presented for the announcement period, and the subsequent 125 and 250 trading days in Table 2. We start by examining if the new accounting rules for goodwill have changed investors' perceptions of a goodwill impairment write-off. We examine short-term CARs for firms that have taken an impairment write-off after the rule change. We find that the mean two-day CAR is −1.76 % and the median is −1.38 %, both of which are significant at the 1 % level. This is consistent with results from studies done prior to the change in accounting rules. Thus, even with the new rules and the subsequent increase in frequency of goodwill impairment write-offs, investors still perceive write-offs as a negative event.

Our main objective is to test the long-term abnormal returns after the rule changes. Accordingly, our next step is to examine the long-term CARs of firms taking a goodwill write-off. We find that the mean (median) 125-day CAR is 18.53 % (9.94 %) and the mean (median) 250- day CAR is 28.6 % (17.31 %), and all are significant at the 1 % level. These long-run results are both statistically and economically significant, and are contrary to results from previous studies prior to the rules changes.

5.2 BHARs

Next we examine the BHARs using matching firms. This is more representative of an investor's experience than the CARs. We perform both a 125 day (approximately six months) and a 250 day (approximately one year) analysis, with results provided in

Table 2 CAR results

CAR period	Total number of days	Number of observations	Mean	t -Stat	Median
0–1	2	3209	−0.0176	−7.70***	−0.0138***
2–126	125	3209	0.1853	17.70***	0.0994***
2–251	250	3209	0.2860	20.19***	0.1731***

This table shows mean and median CAR values for all firms with goodwill impairment write-offs from fiscal year 2002 through fiscal year 2011. The t-statistic is given for the mean. The significance level of the median is from a Wilcoxon signed rank test

***Significant at the 1 % level

**Significant at the 5 % level

*Significant at the 10 % level

Table 3. The mean abnormal return for 125 days post event is 5.88 % and significant at the 1 % level. The mean abnormal return for 250 days post event is 10.86 % and, again, significant at the 1 % level. These results suggest that, since the rule changes, after the initial negative announcement effect investors perceive goodwill impairments as positive news. It takes some time for the market to incorporate this information and for the prices to adjust accordingly. Further, the positive post-event BHARs are several times larger than the negative CARs (Table 2) over the two-day announcement period.

We next test if the size of the firm significantly influences the BHARs. We assign each firm to a size quintile based on size quintile splits of NYSE listed stocks, using the size measured ten days prior to the event date. Table 4 shows the mean and median BHAR by size quintile. For the 125 day analysis, shown in panel A, the smaller firms tend to have the more positive results, but it is not a monotonic relation. However, the smallest quintile has a significantly positive BHAR, and the largest quintile has a significantly negative BHAR, although the smallest quintile's BHAR is significant at the 1 % level, while the largest quintile's BHAR is only significant at the 10 % level. This is true for both the mean and median BHARs. The results for the 250-day study, shown in panel B, exhibit similar characteristics; there is not a monotonic relation, but the smallest quintile has a significantly positive BHAR, significant at the 1 % level, and the largest quintile has a significantly negative BHAR, significant at the 5 % level. This is true for both the mean and median BHARs. While our overall results are contrary to previous studies, it is interesting to note that the results for the largest quintile of firms are consistent with the continued negative performance identified in the previous studies using data prior to the rules changes.

We create an arbitrage portfolio where we go long in the firms in the smallest quintile and short the firms in the largest quintile. For the 125-day study the mean

Table 3 BHAR results

BHAR period	Total number of days	Number of observations	Mean	t -Stat	Median
2–126	125	3074	0.0588	4.18***	0.0174**
2–251	250	3046	0.1086	4.74***	0.0210***

Event firms are matched to firms that did not have an impairment write-off within six months (one year) before or after the event date. Firms are matched by two digit Fama and French industry code, size, and momentum. Size of the matching firm must be +/−30 % of the size of the event firm. After the SIC and size criteria are met, the firm with the closest momentum, measured as returns from day t-259 to day t-10, is used as the matching firm. A buy-and-hold return is calculated for the event firm and for the matching firm from day $t + 2$ to $t + 126$ (251). If the event firm does not have the total complement of returns for the days required, the matching firm's buy-and-hold return is calculated using the same number of days as the event firm. If the matching firm does not have as many days of returns as the event firm, the second closest match is found and returns from it are used from day $d + 1$, where d is the day of the last return for the first matching firm. If the second matching firm does not have returns for the full amount of days required a third matching firm is used and so on until the matching firm's buy-and-hold calculation is comprised of the same number of days as the event firm. The difference between the two is the BHAR. The mean and median returns are reported below. The t-statistic is provided for the mean and the significance value for the median return is from a Wilcoxon signed rank test

***Significant at the 1 % level

**Significant at the 5 % level

*Significant at the 10 % level

Table 4 BHAR results by size quintile

Quintile	Number of observations	Mean BHAR	t- stat	Median BHAR
Panel A: *125 Day BHAR by size quintile*				
1 smallest	1656	0.0926	4.00***	0.0295***
2	530	0.0095	0.32	−0.0264
3	331	0.0626	2.33**	0.0641***
4	275	0.0373	1.56	0.0160
5 - Largest	282	−0.0305	−1.69*	−0.0193*
1–5		0.1231	4.19***	0.0488*
Quintile	Number of observations	Mean BHAR	t- stat	Median BHAR
Panel B: *250 Day BHAR by size quintile*				
1 smallest	1640	0.1738	4.53***	0.0493***
2	528	0.0691	1.60	−0.0185
3	330	0.0705	1.51	0.1052***
4	273	0.0149	0.47	0.0207
5 - Largest	275	−0.0664	−2.21**	−0.0475**
1–5		0.2402	4.93***	0.0969**

Firms are split into size quintiles based on size sorts of all stocks on the NYSE excluding utilities and financial firms. Separate sorts are done for each firm with size measured ten days prior to the event. Mean and median BHARs are calculated for each quintile. T-statistics are provided for the means, and significance values for the medians are from Wilcoxon signed rank tests. An arbitrage portfolio is calculated as the mean abnormal return from the smallest quintile of firms minus the mean abnormal return from the largest quintile of firms. Panel A has results for the 125 day analysis. Panel B has results for the 250 day analysis

***Significant at the 1 % level

**Significant at the 5 % level

*Significant at the 10 % level

(median) return of this arbitrage portfolio is 12.31 % (4.88 %) and is significant at the 1 % (10 %) level. The 250-day arbitrage portfolio yields a mean (median) return of 24.02 % (9.69 %) and is also significant at the 1 % (5 %) level. These returns are also economically significant.

5.3 Calendar time regressions

Next we examine returns post event using risk-adjusted calendar time regressions. This approach corrects for any potential cross-sectional correlations between the event firms. We examine the returns for both equal-weighted portfolios and value-weighted portfolios. We expect the equal-weighted portfolios to have more positive abnormal returns then the value-weighted portfolios since the majority of firms taking impairments are small firms, and our BHAR analyses indicate that the size of the firm is inversely related to the abnormal return. And the results, shown in Table 5, are consistent with both our previous analyses and our expectations. The equal-weighted portfolios, shown in panel A, exhibit positive and significant abnormal returns (alphas) and the value-weighted portfolios, shown in panel B, do not. The equal-weighted portfolios have annualized abnormal returns for the 6 months post event of 8.94 % and 7.92 % for the

Table 5 Calendar time regression results

	Intercept (alpha)	t- stat	Annualized return	Mean monthly raw return	t- stat
Panel A: equal weighted					
6 Months	0.0074	2.04**	8.94 %	0.0152	1.59
12 Months	0.0066	2.06**	7.92 %	0.0206	2.14**
Panel B: value weighted					
6 Months	−0.0007	−0.25	−0.83 %	0.0031	0.45
12 Months	0.0012	0.49	1.44 %	0.0099	1.57

Calendar time portfolios are constructed consisting of 6 months (12 months) of returns. The mean return is calculated for each month. The risk free rate is subtracted from the monthly mean return and regressed on the factors MKT, SMB, HML, and UMD. The intercept (alpha) and its t-statistic are presented in the first two columns. The annualized return is the alpha times 12. The mean monthly raw return is the mean of the monthly returns minus the risk free rate. Panel A shows the results using equal-weighted portfolios. Panel B has the same analysis using value-weighted portfolios. Standard errors are robust to heteroskedasticity

***Significant at the 1 % level

**Significant at the 5 % level

*Significant at the 10 % level

12 month portfolio. The mean monthly raw returns[11] of the equal-weighted portfolios are also positive.

The value-weighted portfolios do not have alphas significantly different from zero. The mean monthly raw returns are positive, but considerably smaller than the corresponding equal-weighted measures.

Similar to the BHAR analysis, we examine the abnormal returns of the calendar time portfolios by size quintiles. Equal-weighted results are shown in Table 6. Consistent with our BHAR results, the smallest quintiles in both the 125-day period, shown in panel A, and the 250-day period, shown in panel B, have the largest alpha. And again consistent with the BHAR results, there is not a monotonic relation among the different size quintiles. However, contrary to our BHAR results, we do not find a negative alpha in the largest quintile. Since the abnormal return for the smallest quintile is greater than for the largest quintile in both time periods, we construct an arbitrage portfolio by going long in the smallest quintile and shorting the largest quintile. This yields annual returns of 8.52 % and 6.2 % for the 125- day and 250- day studies, respectively, but neither of these returns is statistically significant. The mean monthly raw returns are positive and significant for both arbitrage portfolios, but once we adjust for risk, the alphas are not significantly different from zero.

We obtained the results for the same analysis using the value-weighted portfolios. The results for both the 125-day and 250-day analysis, do not exhibit any discernible pattern and there is only one quintile that has even weakly significant results. Since we have seen a relation between firm size and abnormal returns, these results are not unexpected. We do not include them here in the interest of space.

[11] The raw returns are the mean returns of the portfolios minus the risk free rate, but not adjusted for risk using MKT, SMB, HML, and UMD.

Table 6 Equal weighted calendar time regression estimations by size quintile

	Intercept (alpha)	t- stat	Annualized return	Mean monthly raw return	t- stat
Panel A: *6 month equal weighted by size quintile*					
Smallest −1	0.0103	1.90*	12.39 %	0.0188	1.73*
2	0.0014	0.25	1.64 %	0.0102	0.92
3	0.0089	1.96*	10.67 %	0.0154	1.70*
4	0.0025	0.32	3.00 %	0.0094	0.94
Largest −5	0.0027	0.86	3.18 %	0.0074	1.10
1–5	0.0071	1.30	8.52 %	0.0130	1.82*
	Intercept (alpha)	t- stat	Annualized Return	Mean Monthly Raw Return	t- stat
Panel B: *12 month equal weighted by size quintile*					
Smallest −1	0.0085	1.80*	10.25 %	0.0237	2.19**
2	0.0014	0.34	1.73 %	0.0177	1.57
3	0.0065	1.66*	7.75 %	0.0202	2.13**
4	0.0069	1.43	8.29 %	0.0179	1.98**
Largest −5	0.0034	1.25	4.06 %	0.0117	1.86*
1–5	0.0052	1.00	6.20 %	0.0120	1.78*

The calendar time portfolios are split by size quintile based on the quintile splits of NYSE listed firms exclusive of utilities and financial firms. Calendar time portfolios are constructed consisting of 6 months (12 months) of returns. The mean return is calculated for each month. The risk free rate is subtracted from the monthly mean return and regressed on the factors MKT, SMB, HML, and UMD. The intercept (alpha) and its t-statistic are presented in the first two columns. The annualized return is the alpha times 12. The mean monthly raw return is the mean of the monthly returns minus the risk free rate. Panel A shows the results using equal-weighted portfolios. In the 125-day period, the smallest quintile and largest quintile do not have the same number of observations. There are two months in the largest quintile portfolio where there were no firms with impairments. Therefore, in estimating the regression for the difference portfolio, the two months with no data were removed from the smallest quintile. Thus, the alpha for the arbitrage portfolio is not equivalent to the difference between the alpha for the smallest quintile and the alpha for the largest quintile Panel B has the same analysis using value-weighted portfolios. Standard errors are robust to heteroskedasticity

***Significant at the 1 % level

**Significant at the 5 % level

*Significant at the 10 % level

5.4 Operating performance

Having shown that there is positive stock price reaction for firms taking impairment write-offs, we next examine if the increase in stock price is justified by an increase in the firm's performance.

We examine the median change in net income scaled by sales between years, shown in Table 7. The significance of the change is determined by a signed rank test and is denoted by stars. Three stars indicate that the change is significantly different from zero at the 1 % level, two stars indicate significance at the 5 % level, and one star indicates significance at the 10 % level. In both the unadjusted and industry adjusted results we see an improvement in results from the year of the impairment to the subsequent year and from year zero to two years post impairment. These improvements are both economically and statistically significant.

Table 7 Median net income scaled by sales

		Median change				
		−1 to 0	−1 to + 1	−1 to + 2	0 to + 1	0 to + 2
All firms with impairments						
Observations	1381					
Unadjusted		−0.044***	−0.003***	0.004***	0.037***	0.047***
Industry adjusted		−0.041***	−0.008***	−0.003	0.034***	0.041***
Industry/performance adjusted		0.003***	0.001	−0.003	−0.003***	−0.007***

This shows the median change between years of the annual net income scaled by sales. This data is from 2002 to 2011 and excludes financial firms and utilities. The data is shown for the year of the goodwill impairment, one year prior, and one and two years subsequent to the event. Unadjusted is the data for all firms with a good will impairment write-off. Industry adjusted shows the difference between the median for all firms with impairments and the median value for all other firms in that industry. Industry and performance adjusted is the difference between the impaired firm and a matched firm using the same criteria for matching that was used in the BHAR analysis. The significance is from a signed rank test with

***Indicating significance at the 1 % level

**Indicating significance at the 5 % level

*Indicating significance at the 10 % level

However, when we examine the performance compared to a matched firm (industry and performance adjusted) we find that the performance erodes from the year of the impairment to the subsequent year and continues to erode in year two.

We see the same patterns when we measure performance by scaling the net median income by assets instead of sales. We add any goodwill impairment back into the total assets in order to ensure we are not seeing improved performance by simply reducing the value of the denominator in the impairment year. Again we see improved performance for both year one and year two post write-off for the unadjusted and industry adjusted measures. We see erosion in performance when using the industry and performance adjusted measure.

Since net income includes nonrecurring items of cost, we next examine the firm performance using operating income before depreciation. Using operating income before depreciation provides a measure that examines the performance based on ordinary operating costs (COGS and SG&A) and eliminates any improvements due to changes in the amount of nonrecurring costs. If the acquisition created improvement in the firm's day to day business, we should see it reflected in improved operating income.

Table 8 shows median operating income scaled by sales. Similar to the previous measure, performance improves from year zero to year one and from year zero to year two for the unadjusted measure however the increase in performance is much smaller. The industry and performance adjusted results show that performance erodes in the two years subsequent to the impairment write-off. The industry adjusted measure shows a minor improvement from year zero to year two but no improvement from year zero to year one. The industry and performance adjusted measure shows that performance declined from year zero to year one and from year zero to year two.

Table 8 Median operating income scaled by total sales

		Median change				
		−1 to 0	−1 to + 1	−1 to + 2	0 to + 1	0 to + 2
All firms with impairments						
Observations	1381					
Unadjusted		−0.010***	−0.006***	−0.002	0.003***	0.006***
Industry adjusted		−0.011***	−0.011***	−0.009***	−0.001	0.001***
Industry/performance adjusted		0.004***	0.002**	−0.001	−0.002**	−0.006***

This is the median change between years of operating income before depreciation (OIBDP) scaled by total sales. OIBDP is defined as revenue less cost of goods sold and SG&A. This data is from 2002 to 2011 and excludes financial firms and utilities. Unadjusted is the data for all firms with a good will impairment write-off. Industry adjusted shows the difference between the median for all firms with impairments and the median value for all other firms in that industry. Industry and performance adjusted is the difference between the impaired firm and a matched firm using the same criteria for matching that was used in the BHAR analysis. The significance is from a signed rank test with

***Indicating significance at the 1 % level

**Indicating significance at the 5 % level

*Indicating significance at the 10 % level

Using operating income scaled by assets, produces similar results. Years one and two post impairment show modest performance improvements for the unadjusted and industry adjusted categories. Using the industry and performance adjusted measure; we see erosion in the performance in the years subsequent to the write-off. Overall, any improvements in performance post write-off are much smaller using operating income versus using net income.

This evidence is consistent with our hypothesis that managers pull forward all foreseeable future potential write-offs in order to take one “big bath” as opposed to spreading out a number of smaller write-offs across subsequent years.

5.5 Big bath

We further test our “big bath” hypothesis by examining the special items of costs (SPI) charges for the two years prior to the impairment year, the impairment year, and the two years after the impairment year for all firms with goodwill impairment charges. Special items of cost include the majority of unusual or nonrecurring charges a company incurs. SPI may include: applicable prior year adjustments (excluding recurring tax adjustments), any nonrecurring items that are significant, results from discontinued operations, natural disaster losses, interest on tax settlements, inventory write-downs, nonrecurring profit or loss from the sale of an asset or investment, gains or losses from the repurchase of debentures, research and development that is purchased, moving expenses, reserves for litigation expenses, restructuring costs, severance pay, construction allowances, transfers from previous reserves, write-downs (or write-offs) of intangibles or receivables, write-offs of capitalized software, and year 2000 (Y2K) costs, in addition to the goodwill impairment charges.

This is shown across all firms with impairments in Table 9. The table shows the median difference in SPI charges between years listed. We add the goodwill impairment charges back into SPI totals for year zero so that we are comparing SPI charges exclusive of the goodwill, with SPI charges in subsequent years. SPI is represented as a negative number since it is a cost. The median difference between years is negative if the amount of SPI increases and it is positive if the amount of SPI decreases. A signed rank test is used to determine if the amount of the change is significantly different from zero. The stars represent the significance of the change, with three stars representing significance at the 1 % level, two stars indicating significance at the 5 % level, and one star indicating significance at the 10 % level.

Overall we see that there is an economically and statistically significant reduction in the magnitude of the SPI charges in both the first year and the second year subsequent to the goodwill impairment year. SPI charges, exclusive of the goodwill impairment charge are greatest in the year of the goodwill impairment charge. This is consistent with our big bath hypothesis. Managers may elect to take every charge they can foresee in the year of the goodwill impairment charge so that the firm experiences only one negative event. Then the subsequent years have less SPI and therefore improved overall firm performance which is consistent with the positive abnormal returns after a goodwill impairment.

We also analyze SPI scaled by sales and find the same patterns and draw the same conclusions as when we examine absolute SPI data. Therefore, these results are not included.

6 Conclusion

This paper examines the impact of goodwill impairment write-offs on stock returns after the changes to the accounting rules that reclassified goodwill from a wasting asset to a perpetual asset. Prior to this rule change, studies found a negative stock price reaction to goodwill write-offs both in the short term and in the long term.

Our analysis confirms the previous findings of a short-term negative price reaction. Even with the rule changes and the subsequent increase in frequency of impairment

Table 9 Special items of cost

	Year-on-year changes in SPI			
	−2 to − 1	−1 to 0	0 to + 1	+1 to + 2
Median change in SPI value	−0.350***	0.000	0.597***	0.342***

This table shows the median differences in the annual amount of special items of cost (SPI) charges the firms with goodwill impairments took between the two years prior to the year of the event, the year of the goodwill impairment event, and the two subsequent years. The Impairment charge is added back into the number in year 0. The significance is from a signed rank test with

***Indicating significance at the 1 % level

**Indicating significance at the 5 % level

*Indicating significance at the 10 % level. This data is for the timeframe 2002–2011 and excludes financial firms and utilities write-offs, investors continue to perceive the goodwill write-off as negative news in the short term.

However, our primary findings from examining the long-term impact of the goodwill impairment write-offs using only data post rule change are contradictory to previous studies. We show that these write-offs have an economically significant positive effect on stock prices in the long term. These results suggest that investors have changed their perceptions about goodwill impairment write-offs after the implementation of the new rules. They now perceive an impairment write-off of the goodwill from a previous acquisition as a positive event in the long term.

We also show that the perceived improved firm performance post event is due to earnings management. Our evidence suggests that firms being required to write off some or all of the goodwill also write off additional non-goodwill items at the same time. In other words the requirement for the goodwill impairment write-off may be a catalyst for the firm to take a "big bath". The forced goodwill impairment indicates that the firm will have negative news. The firm takes all potentially negative news and incorporates it into the goodwill impairment announcement or as in many cases the earnings announcement that contains the write-off announcement. Investors may perceive this "big bath" as indicative that the subsequent performance of the firm will be positive since all foreseeable nonrecurring costs have already been absorbed.

Since goodwill write-offs are publicly announced events, there is ample opportunity for investors to react to this management signal. Rational investors can anticipate the increase in stock prices post event and trade on the goodwill impairment announcement.

Further research on this topic could be to examine the difference between the goodwill impairment amount required to be written off by a fair-value assessment and the actual write-off that the firms take. In addition, the amount of exposure a firm's goodwill write-off receives may also impact investors' perceptions of the write-off. Since smaller firms often have less analyst coverage this could help explain the relation of size to abnormal returns. Thus it would be interesting to track the amount of analyst coverage for the firms with write-offs. It would also be interesting to examine how many firms that are required to take a goodwill impairment write-off do not survive.

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