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Article

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The potential harms of goodwill impairment avoidance: Evidence based on future performance and stock prices

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ABSTRACT

The rapidly increasing volume of goodwill assets in the capital market generates potential risks due to the possibility of an untimely recognition of goodwill impairment. In this paper, we investigate the financial consequences of goodwill impairment avoidance based on firms' future performance and stock prices. Using Chinese A-share listed firms with goodwill balances, we find that avoiding goodwill impairments negatively affects a firm's performance growth and increases its risk of a future stock price crash. These adverse effects continue for the three years following the goodwill impairment avoidance. Our results indicate that goodwill impairment avoidance has detrimental impacts on a firm's future performance and stock price and that these impacts are persistent. Our conclusions are helpful for regulators on how to prevent the risks hidden in goodwill impairment recognition and maintain the stable development of the financial market.

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1. Introduction

After decades of extensive and rapid development, China's economy is currently facing the problems of overcapacity and a supply-demand mismatch, and is in urgent need of adjustments to its economic structure and industrial transformation. Mergers and acquisitions (M&As) are an important way to re-allocate resources in the capital market and have been widely adopted. Recent national policies and the accompanying

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regulations have prompted multiple waves of M&As. Although these M&As have made great contributions to country-level strategies and real economic development, they have also resulted in an increasing volume of goodwill assets, which are a “sword of Damocles” for many listed firms. According to statistics from China Stock Market and Accounting Research (CSMAR), by the end of 2018, there were 2048 Chinese A-share listed firms with goodwill balances and the cumulative value of goodwill assets exceeded 1.3 trillion RMB.

The current accounting standards for the treatment goodwill assets in most countries, including the U.S., Europe and China, have abolished periodical amortization and instead use an impairment test approach to better reflect the underlying economics of goodwill assets. Under the principles-based impairment approach, firms are allowed greater discretion in handling goodwill impairment (Ramanna and Watts, 2012). Studies document that managers exploit the unverifiable discretion inherent to avoid the timely recognition of goodwill impairments for their private incentives related to compensation and reputation (Beatty and Weber, 2006; Ramanna and Watts, 2012; Li and Sloan, 2017; Glaum et al., 2018). Given the rapid increase in the volume of goodwill assets, the potential risk to firms and investors from the untimely reporting of impairments should not be neglected. However, there is limited evidence of the financial consequences of goodwill impairment avoidance.

According to *International Financial News* in 2018,¹ some listed companies, such as Lianjian Optoelectronics (stock number: 300269), have experienced a steep downturn in their earnings performance and stock prices because of their accumulated goodwill impairments being recorded together. Similar events have occurred elsewhere. *Paper News* reported in 2019² that several firms, including Zeus Entertainment (stock number: 002354), had recorded accumulated goodwill impairments, leading to the deterioration of their financial performance and a sharp drop in their stock prices. We examine firms’ future performance and stock prices to reveal the potential harm from avoiding the timely recognition of goodwill impairments.

Although goodwill impairment avoidance can increase a firm’s short-term accounting earnings and stock price (Li and Sloan, 2017), it is myopic behavior that can cause uncertainty about the firm’s future earnings, because when avoiding impairment is no longer possible, the firm’s earnings performance may significantly decline. The literature finds that managers manipulate earnings upward through real and accrual-based activities to support their choice of goodwill impairment avoidance (Filip et al., 2015; Han and Tang, 2019). However, this manipulation damages a firm’s future performance growth because the upward accrual earnings management requires a reversal in future earnings, so the upward real earnings management is conducted at the expense of future earnings. Therefore, we hypothesize that goodwill impairment avoidance negatively impacts a firm’s future performance growth.

We also examine whether goodwill impairment avoidance has an impact on a firm’s risk of a stock price crash. Studies document that corporate information management, such as the timely disclosure of good news and the concealing of bad news, can lead to stock price crashes (Jin and Myers, 2006; Hutton et al., 2009; Kothari et al., 2009; Kim et al., b, 2011a; Kim and Zhang, 2016; Kim et al., 2016). Based on this finding, we argue that avoiding the timely recognition of goodwill impairments leads to inflated accounting earnings and overvalued stock prices in the short term (Li and Sloan, 2017). Postponing the recognition of goodwill impairments allows the negative news associated with the goodwill impairments to accumulate within a firm, increasing the possibility of a concentrated release at a later time and the risk of a sharp decline in the firm’s stock price. Therefore, we hypothesize that goodwill impairment avoidance increases the risk of a stock price crash in the future.

China’s capital market is an appropriate setting to address our research question. Although China has grown tremendously and its information disclosure practices are gradually being standardized, its capital market still features an opaque information environment and weak legal enforcement relative to developed markets, resulting in a high risk of stock price crashes (Piotroski et al., 2015; Wang et al., 2015) and frequent performance fluctuations. We select A-share companies listed on the Shanghai and Shenzhen stock markets as our sample. Our empirical results support the hypothesis that goodwill impairment avoidance has a significantly negative effect on a firm’s future performance growth and a significantly positive effect on a firm’s risk

¹ See <http://stock.eastmoney.com/news/1406,20180515872237425.html>.

² See <https://baijiahao.baidu.com/s?id=1624147940110273126&wfr=spider&for=pc>.

of a stock price crash. These findings demonstrate the detrimental impacts of avoiding the timely recognition of goodwill impairments on a firm's future performance and stock price. We also find that the relationships persist for three years, suggesting that the adverse impacts are long lasting.

Our study makes several contributions to the literature. First, we document the economic consequences of goodwill impairments. Most studies explore the value relevance of goodwill impairments (Li et al., 2011; Bens et al., 2011; Knauer and Wöhrmann, 2016; Li and Sloan, 2017; Qu et al., 2017; Guler, 2018) and the effects of goodwill impairments on future cash flows (Bostwick et al., 2016), management compensation (Darrough et al., 2014), auditor risks (Ayres et al., 2019a), audit fees (Ye et al., 2016), the cost of debt and the debt maturity structure (Xu et al., 2017; Du et al., 2019). We discuss the potential harms of goodwill impairment avoidance on a firm's future performance growth and stock price crash risk and provide new insights into the economic outcomes of avoiding recognizing a goodwill impairment.

Second, our study enriches the literature on the causes of stock price crash risk. The literature on this topic usually assumes that bad news has been concealed. One stream of the literature, represented by Jin and Myers (2006) and Hutton et al. (2009), addresses the quality of accounting information and explores the reasons for managers to hide bad news. The other stream, represented by Kothari et al. (2009) and Kim et al. (2011a, b), Kim and Zhang (2016) and Kim et al. (2016), investigates the effects of managers' incentives (in the form of compensation and reputation) to conceal bad news based on agency conflicts. However, few studies directly discuss the types of bad news hidden by managers that lead to a higher risk of a stock price crash. We examine whether concealing the negative news of impairment losses increases a firm's future stock price crash risk.

Finally, our study has useful practical implications. The Central Economic Work Conference held in Beijing in December 2017 listed “three major battles”³ that should be the focus of the next three years' work; “preventing and resolving major risks” is the primary task. Stock price crashes reduce investors' wealth, weaken the effective operation of the capital market and can endanger national financial stability and real economic development. The deterioration of public firms' financial performance occurs quite frequently and is referred to as “hidden thunder” in the capital market.⁴ We show that goodwill impairment avoidance hurts a firm's future performance growth and increases its crash risk. These adverse impacts are persistent. Our conclusions have implications for investors seeking to improve their prevention awareness and protect their personal interests. Our results can also enlighten regulators on how to detect performance fluctuations and crash risks, prevent major risks from developing in the capital market and maintain the stability of the financial market's development.

The remainder of this paper is organized as follows. Section 2 introduces the policy background. Section 3 discusses the literature and develops our hypotheses. Section 4 describes the research design. Section 5 provides the empirical results. Section 6 offers a further discussion and Section 7 concludes the paper.

2. Policy background

M&A transactions increase in popularity during economic recovery periods. They change the allocation of society's resources and promote economic development. Waves of M&As began in the 1980s in China, and China's M&A experience has progressed from the initial stage through an extensive development stage and gradually into the mature stage over the last 40 years. As a result of these waves of M&As, a tremendous volume of goodwill assets has accumulated in China's capital market. Like the accounting standards in the U.S. and other countries, China's accounting standards on the treatment of goodwill have transitioned from systematic amortization to impairment testing. China's earlier accounting standards considered goodwill as an intangible asset and required amortization over an estimated life not exceeding ten years. The current accounting standards recognize goodwill as a separate long-term asset and require an impairment test at least annually.

As required by the accounting standard CAS No. 8, “Asset Impairment,” which came into effect in January 2007, if there is any indication of impairment on the asset group(s) related to the goodwill, a firm must conduct

³ The three major battles are to prevent and resolve major risks, to carry out targeted poverty alleviation, and to prevent and control pollution.

⁴ Reported by *Securities Times* in 2019; see <http://stock.qq.com/a/20190129/001822.htm>.

an impairment test. As goodwill assets cannot bring future cash flows independently from other assets or asset groups, the impairment test for goodwill is conducted at the level of the asset group(s). The first step in the test is to calculate the recoverable amount of the asset group(s) and compare it with the carrying value excluding the goodwill to confirm the impairment amount. The second step in the test is to compare the carrying value of the asset group(s) including the allocated goodwill with the recoverable amount. If the latter is less, the difference between the two amounts is recorded as the goodwill impairment.

There are three layers of discretion in the implementation of a goodwill impairment test. The first is the identification of the asset group. The recognition of an asset group under CAS No. 8 should be based on whether the main cash inflows generated by the asset group are independent of those generated by other assets or other group assets. The literature shows that the more operating divisions a company has, the more freedom managers have in choosing the asset groups and the lower is the probability of the company recording a goodwill impairment (Laurion et al., 2014). Therefore, the identification of an asset group likely involves subjectivity. The second layer of discretion is the amount of goodwill allocated to each asset group. According to CAS No. 8, the book value of goodwill should be allocated to the related asset group in a reasonable way from the date of purchase. If it is difficult to allocate the goodwill to one group, it should be allocated to the relevant asset groups. The amount of goodwill allocated to each asset group is based on the proportion of each asset group's fair value. When the fair value cannot be reliably estimated, it should be allocated using the proportion of each asset group's book value. Hence, managers can allocate more goodwill to asset groups with higher fair values to avoid recognizing an impairment. The third layer of discretion is the determination of the recoverable amount of the asset group. The standards require that the recoverable amount be the higher of the net fair value of the asset group minus the disposal expenses and the present value of the asset group's expected future cash flows. As it is difficult to obtain an asset group's quoted price in the open market, the fair value of the goodwill assets cannot always be reliably estimated. If the firm chooses the future cash flow discount model, it must clearly identify the asset group's future net cash flows, discount rate and other relevant information. In reality, such information often depends on managers' subjective judgments and is difficult to verify or audit (Ramanna and Watts, 2012).

3. Literature review and hypothesis development

As mentioned in Section 2, firms have great leeway in handling goodwill assets under the current impairment testing approach. The literature confirms that managers exploit this discretion to avoid the recognition of goodwill impairments. Beatty and Weber (2006) provide evidence that managers avoid the timely recording of goodwill impairments out of concerns related to debt covenants, earnings-based bonuses, reputation and exchange delisting risk. Ramanna and Watts (2012) find that compensation and reputation incentivize managers to not record impairments in a timely manner. Similarly, Darrough et al. (2014) show that cash and option-based compensation is significantly decreased when goodwill impairments are reported. Glaum et al. (2018) find that CEO compensation and reputation concerns lead to selective impairment testing.

The literature documents that the board of directors (including the audit committee), external auditors and financial analysts all impose restrictions on managers to prevent the avoidance of goodwill impairments (Bepari and Mollik, 2015; Ferramosca et al., 2017; Ayres et al., 2019b; Gros and Koch, 2020). Majid (2015) shows that increasing the shares held by non-controlling shareholders provides them with more incentives to supervise managers' rent-seeking behavior through goodwill impairments. Using an international dataset from 21 countries, Glaum et al. (2018) find that strong accounting and auditing enforcement tends to lead to a timelier recognition of goodwill impairment and restrains managers from altering impairment decisions out of compensation concerns. Firms in countries with weak enforcement delay the recognition of their impairment losses, and private monitoring through institutional investors can substitute for public enforcement in these regions. Facing these constraints, managers might manipulate their firm's earnings upward to convince others that goodwill is not impaired even when its economic value declines and to protect their private interests from being damaged by an impairment (Filip et al., 2015; Han and Tang, 2019).

The literature suggests that managers have incentives and opportunities to conduct goodwill impairment avoidance. Even when facing internal and external constraints, managers can alter real activities to conceal

the untimely reporting of goodwill impairments. We examine whether goodwill impairment avoidance has an adverse impact on a firm's future performance growth.

Goodwill impairment is considered an operating expense and so directly reduces a firm's current accounting performance. If managers avoid the timely recognition of goodwill impairment, the firm's current performance is inflated relative to the performance of firms that do recognize impairments in a timely fashion. Goodwill impairment avoidance can also increase the uncertainty around future profitability. Impaired goodwill is less capable of creating future profits, and ignoring an impairment in the short term increases the probability of recording an extremely large impairment later, which could significantly harm the firm's performance.

In addition, goodwill impairment avoidance can induce upward earnings management through accruals and real activities. The upward accrual earnings management will reverse later, resulting in a decline in future performance. There are several reasons why real earnings management can damage future performance growth. Although sales manipulation activities such as discount promotion can improve a firm's short-term net income, this improvement comes at the expense of the unit product profit, which harms long-term profitability. Similarly, expanding production can reduce the unit product cost, but it increases future costs such as product maintenance. Cutting discretionary expenditures including research and development (R&D), advertising outlays and selling, general and administrative (SG&A) costs can increase a firm's current earnings, but these cuts undermine the firm's future growth potential (Zang, 2012). Although these real activities enhance a firm's short-term performance, they are conducted at the cost of the firm's future performance. In short, using either upward accrual or real earnings management to avoid goodwill impairment damages a company's future performance growth.

Based on this analysis, we hypothesize that a public firm's goodwill impairment avoidance has a negative impact on its future performance growth, as follows.

H_1 : Goodwill impairment avoidance is negatively associated with a firm's future performance growth.

Next, we explore whether goodwill impairment avoidance increases a firm's stock price crash risk. The literature discusses the determinants of stock price crash risk from two perspectives. The first is based on the quality of accounting information. Studies argue that when a firm produces poor quality accounting information, investors cannot understand the true performance of the firm's business operations. Managers are more likely to hide negative information, resulting in overvalued stock prices. Once the firm can no longer conceal the negative news and the real information is disclosed, its stock price rapidly declines. Jin and Myers (2006) and Hutton et al. (2009) find empirical evidence of a positive association between information opaqueness and stock price crash risk. Kim and Zhang (2016) and Kim et al. (2016) investigate the effect of financial reporting quality on firm-level crash risks and find that financial statement comparability and conditional conservatism can discourage managers from hiding bad news, reducing the risk of future crashes. Chen et al. (2017) show that earnings smoothing exacerbates the risk of a crash. The second perspective is related to agency conflicts. The literature states that managers are incentivized by a variety of factors, such as compensation and career concerns, to withhold bad news and accelerate the disclosure of good news, resulting in a high risk of a future stock price crash (Kothari et al., 2009; Kim et al., b, 2011a; Xu et al., 2014; Piotroski et al., 2015).

These findings indicate that concealing negative news is a direct source of stock price crash risk. Motivated by these findings, we investigate whether avoiding the timely recognition of goodwill impairments increases the risk of a future stock price crash. There are several reasons why goodwill impairment avoidance might lead to stock price crashes. First, recording a goodwill impairment is considered bad news for a firm. An impairment means that the acquired resources from prior M&A transactions failed to achieve the expected synergies (Li and Sloan, 2017). The impairment reduces the company's current accounting performance and sends a signal that the firm's future profitability and cash flows could decline (Li et al., 2011; Bostwick et al., 2016). As a result, investors short the company's shares, leading to a decrease in the firm's stock price (Bens et al., 2011; Knauer and Wöhrmann, 2016; Qu et al., 2017). Therefore, goodwill impairments are often regarded as negative news. Second, managers have incentives and opportunities to avoid the timely recording of goodwill impairments (Beatty and Weber, 2006; Ramanna and Watts, 2012; Glaum et al., 2018). Even when supervised by auditors and financial analysts, managers can achieve impairment avoidance by building a defense mechanism through upward earnings management (Filip et al., 2015; Han and Tang, 2019). Finally, avoiding

impairments inflates a firm's short-term earnings, due to both the unrecorded impairment and the upward earnings management, which causes the firm's stock price to be overvalued in the period after the earnings announcement (Li and Sloan, 2017). However, negative news then accumulates within the firm. When it is no longer possible to conceal the bad news, the accumulated negative news is released to the market at once, leading to a sharp decline in the firm's stock price.

Combining these arguments, we expect companies that avoid goodwill impairments to experience more stock price crashes than those that recognize impairments in a timely fashion. We summarize this conjecture in the following hypothesis.

H_2 : Goodwill impairment avoidance is positively associated with a firm's future stock price crash risk.

4. Research design

4.1. Sample selection and data source

We select firms listed on China's A-share market between 2007 and 2016 as our initial sample. Following the literature (Jarva, 2014; Wang et al., 2015; Kim and Zhang, 2016; Kim et al., 2016; Knauer and Wöhrmann, 2016; Ayres et al., 2019a), we take several steps to filter our sample. (1) We exclude firms in the finance and insurance industries because their accounting systems and asset structures differ significantly from those of other industries. (2) We delete firms without goodwill balances using the footnote information in firms' financial statements. To ensure the effectiveness of the impairment avoidance measurement, we retain only firms with more than 10 million RMB in goodwill assets or with goodwill assets accounting for more than 0.1% of the firm's total assets before impairments in the fiscal year. (3) We remove firm-year observations with fewer than 30 weekly returns to increase the reliability of our measurement of stock price crash risks. (4) Firms with missing values or negative net assets are excluded. To mitigate the effect of outliers, all continuous variables are winsorized at the 1% and 99% levels. Our data are from the CSMAR database, supplemented by the firms' financial statements when necessary.

4.2. Variable measurement

4.2.1. Measuring goodwill impairment avoidance

The research objective of this paper requires us to identify firms that should have recorded impaired goodwill assets in their accounting books but did not. Following the literature, we adopt two methods to compute goodwill impairment avoidance, which we denote as *GWIMPA*.

First, we use the propensity score matching (PSM) method to identify firms that have goodwill assets but did not record impairment charges. We divide the sample into a control group, consisting of firms taking a goodwill impairment, and an experimental group, consisting of firms carrying goodwill but not taking an impairment. Then, we choose the propensity indexes, including the year, industry, market-to-book ratio (M/B) and annual goodwill amounts.⁵ Next, we conduct the matching procedure as a one-to-one match with no replacement. Finally, we delete all unmatched observations. *GWIMPA* is set to one if a firm belongs to the experimental group and zero if it belongs to the control group.

The second method uses M/B as an indicator to identify firms that had potentially impaired goodwill but that did not report an impairment. Other studies argue that goodwill assets are more likely to be impaired

⁵ Enterprises in the same industry-year are likely to be affected by the same current economic situation. If a company takes a goodwill impairment at a given valuation level, competitors with the same valuation and no impairment loss are likely to take a goodwill impairment in the future. Under this assumption, we choose the year and industry as matching indicators. M/B is a relevant proxy for potential goodwill impairment in many empirical studies (Beatty and Weber, 2006; Li et al., 2011; Ramanna and Watts, 2012; Filip et al., 2015; Ayres et al., 2019b). Gu and Lev (2011) and Glaum et al. (2018) find that firms with large volumes of goodwill assets are likely to take impairment losses. Therefore, we increase this matching propensity, which helps to identify the companies that avoid goodwill impairments more accurately.

when M/B falls below one (Ramanna and Watts, 2012; Ayres et al., 2019b). Given that the P/E ratios of Chinese A-share listed firms are generally high, we refer to Francis et al. (1996) and expect firms with M/B below the industry-year median to take goodwill impairments. *GWIMPA* equals one if the firm did not record an impairment and zero otherwise.

As Filip et al. (2015) point out, the second method has a higher probability of generating type II errors because the impairment test's reporting unit is at the asset group level and firms with M/B ratios above one can also have impaired goodwill. Therefore, we rely on the first method to measure goodwill impairment avoidance in our main test and use the second method as a robustness check.

4.2.2. Measuring firm future performance growth

Following the literature (Filip et al., 2015; Chen et al., 2015), we use the change in a firm's return on assets (ΔROA) and the change in its return on equity (ΔROE) to measure the company's future performance growth, *FPERFORM*.

4.2.3. Measuring firm-specific crash risk

Following the literature on stock price crash risks (Hutton et al., 2009; Kim et al., 2011a, 2016; Wang et al., 2015), we use two measures of a firm's stock price crash risk. We first estimate the firm-specific weekly returns for each firm-year, denoted by $W_{i,t}$, as the natural log of one plus the residual returns from the expanded market model regression given by

$$R_{i,t} = \alpha_i + \beta_{1,i}R_{m,t-2} + \beta_{2,i}R_{m,t-1} + \beta_{3,i}R_{m,t} + \beta_{4,i}R_{m,t+1} + \beta_{5,i}R_{m,t+2} + \xi_{i,t} \quad (1)$$

where $R_{i,t}$ represents the return on firm i 's stock in week t and $R_{m,t}$ is the value-weighted A-share market return in week t . We include the lagged and leading market weekly returns to allow for nonsynchronous trading (Kim et al., 2011a). The firm-specific weekly return for firm i in week t is measured as $W_{i,t} = \ln(1 + \xi_{i,t})$, where $\xi_{i,t}$ is the residual from Eq. (1).

The first measure of firm-year's crash risk is the negative skewness, *NCSKEW*, calculated as the negative of the third moment of the firm-specific weekly returns for each sample year divided by the standard deviation of the firm-specific weekly returns raised to the third power. For each firm i in year t , we estimate *NCSKEW* as

$$NCSKEW = - \left[n(n-1)^{3/2} \sum W_{i,t}^3 \right] / \left[(n-1)(n-2) \left(\sum W_{i,t}^2 \right)^{3/2} \right] \quad (2)$$

where n is the number of observations of the firm-specific weekly returns of firm i in year t .

The second measure of the crash risk is the down-to-up volatility, *DUVOL*, calculated as follows. For each stock i in year t , we separate all weeks with firm-specific weekly returns below the period mean ("down weeks") from weeks with firm-specific weekly returns above the period mean ("up weeks") and compute the standard deviation for each of these subsamples separately. We then take the log of the ratio of the standard deviation of down weeks to the standard deviation of up weeks. This calculation is given by

$$DUVOL = \log \left\{ \left[(n_u - 1) \sum_{Down} W_{i,t}^2 \right] / \left[(n_d - 1) \sum_{Up} W_{i,t}^2 \right] \right\} \quad (3)$$

where n_u and n_d are the numbers of up and down weeks in the period, respectively.

These two measures are both continuous variables and based on the distribution of the firm-specific weekly returns. A higher value of either *NCSKEW* or *DUVOL* indicates that a firm is more prone to stock price crashes. *DUVOL* is less influenced by extreme values than *NCSKEW* is (Francis, Hasan and Li, 2016).

4.2.4. Control variables

As is common in the literature, we control for several determinants of a firm's future performance growth (Chen et al., 2015; Han and Tang, 2017). These control variables include size (*SIZE*), financial leverage (*LEV*), market-to-book ratio (*M/B*), sales growth (*GROWTH*) and the proportion of intangible assets (*INTANG*). Following Hutton et al. (2009), Wang et al. (2015), Kim and Zhang (2016) and Kim et al. (2016), we include several control variables that are predictors of stock price crash risk, including size (*SIZE*), financial leverage

(*LEV*), return on assets (*ROA*), market-to-book ratio (*M/B*), stock return (*RET*), return volatility (*SIGMA*), trading turnover (*DTURN*), information opacity (*ABSDA*), audit quality (*BIG4*), controlling shareholder's holding (*TOPI*), institutional ownership (*INSTIOS*) and lagged crash risk. In addition, we include year and industry fixed effects. The detailed variable definitions are given in Table 1.

4.3. Empirical model

To test whether goodwill impairment avoidance decreases a firm's future performance growth (H_1), we use the following OLS regression model, as is common in the literature (Chen et al., 2015).

$$FPERFORM_{i,t+1} = \lambda_0 + \lambda_1 GWIMPA_{i,t} + \lambda'_2 CONTROL_{i,t} + \eta_1 \quad (4)$$

The dependent variable, *FPERFORM*, is one of our proxies for a firm's future performance growth, ΔROA and ΔROE , measured in year $t + 1$. The independent variable, *GWIMPA*, is the firm's goodwill impairment avoidance measured in year t (see Section 4.2.1) and *CONTROL* is a set of control variables. In model (4), λ_0 is a constant, λ'_2 is the estimated coefficient of *CONTROL* and η_1 is the regression residual. We are interested in the coefficient of the independent variable *GWIMPA*, λ_1 , which is significantly negative if H_1 holds.

To examine H_2 , we use the following OLS regression model, as is common in the literature (Wang et al., 2015; Kim and Zhang, 2016; Kim et al., 2016).

$$CRASHRK_{i,t+1} = \alpha_0 + \alpha_1 GWIMPA_{i,t} + \alpha'_2 CONTROL_{i,t} + \eta_2 \quad (5)$$

The dependent variable, *CRASHRISK*, is one of our two proxies for the firm-specific crash risk, *NCSKEW* and *DUVOL*, measured in year $t + 1$. The independent variable, *GWIMPA*, is the firm's goodwill impairment avoidance measured in year t and *CONTROL* is a set of control variables. In model (5), α_0 is a constant, α'_2 is the estimated coefficient of *CONTROL* and η_2 is the regression residual. We focus on the coefficient α_1 , which is significantly positive if H_2 is true.

Table 1
Variable definitions.

Variables	Definitions
<i>NCSKEW</i>	<i>NCSKEW</i> is the negative coefficient of skewness, calculated as the negative of the third moment of the firm-specific weekly returns for each sample year, divided by the standard deviation of the firm-specific weekly returns raised to the third power. See Eqs. (1) and (2) for details.
<i>DUVOL</i>	<i>DUVOL</i> is the down-to-up volatility, computed as the log of the ratio of the standard deviation of down weeks to the standard deviation of up weeks. See Eqs. (1) and (3) for details.
<i>ΔROA</i>	<i>ΔROA</i> is the change in <i>ROA</i> , calculated as the next year's <i>ROA</i> minus the current year's <i>ROA</i> .
<i>ΔROE</i>	<i>ΔROE</i> is the change in <i>ROE</i> , calculated as the next year's <i>ROE</i> minus the current year's <i>ROE</i> .
<i>GWIMPA</i>	An indicator variable equal to one if the firm avoided reporting goodwill impairment and zero otherwise. See Section 4.2.1 for details.
<i>SIZE</i>	<i>SIZE</i> is the log of the firm's total assets.
<i>LEV</i>	<i>LEV</i> is the book value of the firm's total liabilities divided by the book value of its assets.
<i>ROA</i>	<i>ROA</i> is the firm's income before extraordinary items divided by total assets.
<i>M/B</i>	<i>M/B</i> is the firm's market-to-book ratio.
<i>GROWTH</i>	<i>GROWTH</i> is the growth rate of the firm's sales income.
<i>INTANG</i>	<i>INTANG</i> is the ratio of the firm's intangible assets over its total assets.
<i>RET</i>	<i>RET</i> is the mean of the firm-specific weekly returns over the fiscal year.
<i>SIGMA</i>	<i>SIGMA</i> is the standard deviation of the firm-specific weekly returns over the fiscal year.
<i>DTURN</i>	<i>DTURN</i> , a proxy for investor heterogeneity, is the detrended stock trading volume, calculated as the average monthly share turnover in the current fiscal year minus the average monthly share turnover in the previous fiscal year.
<i>ABSDA</i>	<i>ABSDA</i> is the absolute value of the firm's discretionary accruals estimated by the modified Jones model.
<i>TOPI</i>	<i>TOPI</i> is the proportion of the firm's shares held by the largest shareholder.
<i>BIG4</i>	An indicator variable equal to one if the firm is audited by a Big 4 auditor and zero otherwise.
<i>INSTIOS</i>	<i>INSTIOS</i> is the proportion of the firm's shares held by institutional investors.
<i>YEAR</i>	Dummy variable for year.
<i>INDUSTRY</i>	Dummy variable for industry.

5. Empirical results

5.1. Descriptive statistics

Table 2 displays the descriptive statistics of the main variables. Detailed definitions of all of the variables are provided in Table 1. The mean values of $NCSKEW_{t+1}$ and $DUVOL_{t+1}$ are -0.237 and -0.162 , respectively, and their median values are -0.199 and -0.150 , respectively. These numbers are higher than those reported by Wang et al. (2015), who use a larger sample. One possible explanation for this difference is that our sample only consists of firms with goodwill balances and our sample size is relatively small. The standard deviations of $NCSKEW_{t+1}$ and $DUVOL_{t+1}$ are 0.691 and 0.487 , respectively, indicating that the distribution of stock price crash risks in our study is wide, possibly due to the avoidance of goodwill impairment. The mean, median and standard deviation of ΔROA_{t+1} are -0.002 , 0.000 and 0.039 , respectively, and the mean, median and standard deviation of ΔROE_{t+1} are -0.001 , 0.000 and 0.087 , respectively. The descriptive statistics for the other variables are similar to those found by others (e.g., Wang et al., 2015; Kim and Zhang, 2016; Kim et al., 2016).

Table 2
Descriptive statistics for the full sample.

Variable	N	Mean	SD	Min	p25	p50	p75	Max
$NCSKEW_{t+1}$	4574	-0.237	0.691	-2.251	-0.622	-0.199	0.169	1.738
$DUVOL_{t+1}$	4574	-0.162	0.487	-1.366	-0.494	-0.150	0.163	1.113
ΔROA_{t+1}	4574	-0.002	0.039	-0.141	-0.015	0.000	0.01	0.150
ΔROE_{t+1}	4574	-0.001	0.087	-0.320	-0.0300	0.000	0.020	0.400
$GWIMPA_t$	4574	0.500	0.500	0	0	0.500	1	1
$NCSKEW_t$	4574	-0.273	0.673	-2.322	-0.641	-0.228	0.138	1.472
$DUVOL_t$	4574	-0.192	0.478	-1.382	-0.519	-0.178	0.135	1.000
RET_t	4574	0.006	0.011	-0.017	-0.002	0.004	0.013	0.042
$SIGMA_t$	4574	0.073	0.029	0.032	0.052	0.066	0.087	0.168
$DTURN_t$	4574	-0.045	0.381	-1.104	-0.275	-0.035	0.186	0.923
$SIZE_t$	4574	22.303	1.272	20.024	21.416	22.105	22.952	26.472
LEV_t	4574	0.446	0.201	0.0720	0.285	0.443	0.604	0.863
M/B_t	4574	4.115	2.977	0.803	2.160	3.282	5.079	17.728
ROA_t	4574	0.042	0.047	-0.13	0.020	0.040	0.060	0.180
$GROWTH_t$	4574	0.231	0.504	-0.500	0.000	0.130	0.320	3.350
$INTANG_t$	4574	0.051	0.055	0.000	0.02	0.040	0.060	0.580
$ABSDA_t$	4574	0.058	0.060	0.001	0.018	0.040	0.077	0.329
$BIG4_t$	4574	0.132	0.338	0	0	0	0	1
$TOPI_t$	4574	0.327	0.145	0.074	0.214	0.305	0.425	0.729
$INSTIOS_t$	4574	0.358	0.247	0.000	0.136	0.360	0.558	0.864

Table 3
Univariate test.

Variable	$GWIMPA = 1$ ($N = 2287$)			$GWIMPA = 0$ ($N = 2287$)			Mean t-values (Student's <i>t</i> -test)	Mean z-values (Wilcoxon test)
	Mean	SD	Median	Mean	SD	Median		
ΔROA_{t+1}	-0.003	0.033	0.000	0.0004	0.045	0.000	3.363^{***}	3.170^{***}
ΔROE_{t+1}	-0.005	0.101	0.000	0.004	0.070	0.000	3.536^{***}	2.661^{***}
$NCSKEW_{t+1}$	-0.204	0.696	-0.172	-0.271	0.684	-0.240	-3.265^{***}	-3.728^{***}
$DUVOL_{t+1}$	-0.137	0.489	-0.131	-0.186	0.488	-0.173	-3.410^{***}	-3.354^{***}

Note: $*p < 0.1$, $**p < 0.05$.

$***p < 0.01$.

Table 4
Correlations.

	$GWIMP_{A_t}$	$NCSKEW_{t+1}$	$DUIVOL_{t+1}$	ΔROA_{t+1}	$AROE_{t+1}$	$NCSKEW_t$	$DUIVOL_t$	RET_t	$SIGMA_t$	$DTURN_t$	$SIZE_t$	LEV_t	M/B_t	ROA_t	$GROWTH_t$	$INTANG_t$	$ABSDA_t$	BIG_t	$TOPI_t$	$INSTIOS_t$
$GWIMP_{A_t}$	1																			
$NCSKEW_{t+1}$	0.048***	1																		
$DUIVOL_{t+1}$	0.050***	0.885***	1																	
ARO_{t+1}	-0.050***	-0.056***	-0.075***	1																
$AROE_{t+1}$	-0.052***	-0.032***	-0.030***	0.865***	1															
$NCSKEW_t$	0.033**	0.073***	0.070***	-0.004	0.016	1														
$DUIVOL_t$	0.036**	0.079***	0.076***	0.010	0.027*	0.882***	1													
RET_t	0.088***	0.030***	-0.005	0.036*	0.010	-0.031**	-0.034**	1												
$SIGMA_t$	0.099***	-0.044***	-0.064***	0.065***	0.051***	-0.049***	-0.055***	0.614***	1											
$DTURN_t$	-0.015	-0.087***	-0.097***	0.007	-0.007	-0.014	-0.022	0.543***	0.405***	1										
$SIZE_t$	-0.032**	-0.144***	-0.138***	-0.001	-0.021	-0.181***	-0.195***	-0.155***	-0.196***	-0.000	1									
LEV_t	-0.118**	-0.110***	-0.115***	0.072	0.049***	-0.108***	-0.111***	-0.086***	-0.097***	0.014	0.544***	1								
M/B_t	0.016	0.047***	0.030***	0.025*	0.029*	0.021	0.009	-0.037***	0.043***	-0.072**	-0.067***	-0.035***	1							
ROA_t	0.134***	0.061***	0.056***	-0.390***	-0.380***	0.059***	0.040***	0.063***	-0.088***	-0.027*	-0.054***	-0.364***	0.024	1						
$GROWTH_t$	0.096***	0.044***	0.045***	-0.051***	-0.061***	0.034***	0.022	0.105***	0.106***	-0.046***	0.0800	-0.010	-0.039***	0.190***	1					
$INTANG_t$	-0.035**	0.018	0.017	0.002	0.007	0.006	0.016	-0.003	-0.022	0.016	-0.073***	-0.024*	0.007	-0.048***	-0.042***	1				
$ABSDA_t$	-0.014	0.045***	0.044***	0.049***	0.070***	0.024	0.024	0.043***	0.059***	-0.005	-0.057***	0.098***	0.012	-0.037***	0.231***	-0.087***	1			
BIG_t	-0.056***	-0.011	-0.0120	0.00200	-0.001	-0.093***	-0.112***	-0.173***	-0.124***	-0.143***	0.347***	0.097***	0.024	0.020	0.003	-0.008	-0.043***	1		
$TOPI_t$	0.033	-0.055***	-0.064***	-0.00100	-0.011	-0.047***	-0.051***	-0.0240	-0.062***	-0.028*	0.345***	0.108***	-0.020	0.092***	-0.012	-0.007	-0.035***	0.118***	1	
$INSTIOS_t$	0.023	-0.020	-0.033***	0.026*	0.012	-0.034**	-0.045***	-0.026*	-0.048***	-0.092***	0.319***	0.147***	-0.014	0.091***	-0.015	-0.029**	-0.052***	0.152***	0.311***	1

Note:
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$ (two-tailed).

We perform a *t*-test (Wilcoxon) for each year to determine whether the mean (median) values of future performance growth and crash risk for firms that avoided recognizing goodwill impairment are statistically different from those for firms that recorded an impairment. Table 3 provides the univariate analysis results. We find that the mean and median values of ΔROA_{t+1} are significantly lower for the firms avoiding impairment. We also find that the mean and median of ΔROE_{t+1} are significantly lower for firms avoiding goodwill impairment. These results support the prediction of H_1 . Similarly, we show that the mean and median values of the stock price crash risks as measured by $NCSKEW_{t+1}$ and $DUVOL_{t+1}$ are significantly higher in firms avoiding the impairment charges, supporting H_2 .

5.2. Correlations

Table 4 presents the Pearson correlation matrix for our main variables. The correlation coefficient between ΔROA_{t+1} and ΔROE_{t+1} is 0.865 and significant at the 1% level, indicating that the two measures of future performance growth are highly correlated. More importantly, both measures of future performance growth are negatively correlated with our measure of goodwill impairment avoidance, $GWIMPA_t$, supporting our prediction that firms that avoid goodwill impairment have worse performance growth. We also find that the two crash risk measures, $NCSKEW_{t+1}$ and $DUVOL_{t+1}$, are highly correlated (0.885). Consistent with H_2 , both measures of the future stock price crash risk are positively correlated with our measure of goodwill impairment avoidance, $GWIMPA_t$.

The correlation analysis only provides preliminary evidence for the underlying associations; due to the lack of control variables, more stringent multiple regressions are needed to fully support our hypotheses. Table 4 shows that the correlation between the two variables used in our models is relatively small, indicating that there is no multicollinearity problem.

Table 5
The effect of goodwill impairment avoidance on a firm's future performance growth.

Variable	(1) ΔROA_{t+1}	(2) ΔROA_{t+1}	(3) ΔROE_{t+1}	(4) ΔROE_{t+1}
$GWIMPA_t$	−0.004*** (−3.26)	−0.003*** (−2.64)	−0.008*** (−3.15)	−0.007*** (−2.68)
$SIZE_t$		−0.002** (−2.56)		−0.003** (−2.21)
LEV_t		0.020*** (5.13)		0.034*** (3.90)
M/B_t		0.000 (0.98)		0.001*** (2.62)
$GROWTH_t$		−0.004*** (−3.14)		−0.010*** (−3.92)
$INTANG_t$		−0.009 (−0.81)		−0.014 (−0.57)
_cons	−0.004 (−0.84)	0.026* (1.74)	−0.007 (−0.66)	0.050 (1.50)
INDUSTRY	Yes	yes	yes	yes
YEAR	Yes	yes	yes	yes
N	4574	4574	4574	4574
AR ²	0.017	0.025	0.017	0.026
F	3.704	4.370	3.683	4.455

Notes: t-statistics in parentheses.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

5.3. Multivariate analyses

5.3.1. Goodwill impairment avoidance and future performance growth

To test H_1 , we estimate regression model (4). The results are presented in Table 5.

In columns 1 and 2 of Table 5, we use ΔROA_{t+1} as the dependent variable. In columns 3 and 4, ΔROE_{t+1} is the dependent variable. In columns 1 and 3, we only include the independent variable $GWIMPA_t$ and the controls for the year and industry effects. In columns 2 and 4, we include the other control variables into the regressions. The estimated coefficients of $GWIMPA_t$ in columns 1 and 3 are -0.004 and -0.008 , respectively, and both are significant at the 1% level. These results indicate that goodwill impairment avoidance has a significantly negative impact on a company's future performance growth after controlling for year and industry effects. In columns 2 and 4, the estimated coefficients of $GWIMPA_t$ are -0.003 and -0.007 , respectively, and

Table 6
The effect of goodwill impairment avoidance on the future stock price crash risk.

Variable	(1) $NCSKEW_{t+1}$	(2) $NCSKEW_{t+1}$	(3) $DUVOL_{t+1}$	(4) $DUVOL_{t+1}$
$GWIMPA_t$	0.059*** (2.80)	0.048** (2.29)	0.044*** (2.95)	0.039*** (2.65)
$NCSKEW_t$		0.047*** (3.11)		
$DUVOL_t$				0.043*** (2.84)
RET_t		2.673 (1.62)		0.036 (0.03)
$SIGMA_t$		-2.232*** (-3.16)		-1.730*** (-3.48)
$DTURN_t$		-0.196*** (-5.75)		-0.118*** (-4.94)
$SIZE_t$		-0.040*** (-3.04)		-0.047*** (-5.05)
LEV_t		-0.094 (-1.25)		-0.014 (-0.27)
M/B_t		0.017*** (3.62)		0.008** (2.33)
ROA_t		0.123 (0.49)		0.132 (0.74)
$ABSDA_t$		0.398** (2.28)		0.303** (2.47)
$BIG4_t$		0.048 (1.47)		0.033 (1.44)
$TOPI_t$		-0.125 (-1.62)		-0.103* (-1.90)
$INSTIOS_t$		0.050 (0.93)		0.046 (1.20)
_cons	-0.233 (-0.77)	0.804* (1.94)	-0.292 (-1.36)	0.880*** (3.01)
INDUSTRY	yes	yes	yes	yes
YEAR	yes	yes	yes	yes
N	4574	4574	4574	4574
AR2	0.031	0.062	0.030	0.066
F	5.983***	8.355***	5.908***	8.929***

Notes: t-statistics in parentheses.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

both are significant at the 1% level, providing strong evidence that avoiding goodwill impairment is detrimental for a firm's future growth. In short, H_1 is supported.

5.3.2. Goodwill impairment avoidance and future stock price crash risk

To test H_2 , we run regression model (5). The results are seen in Table 6.

In columns 1 and 2 of Table 6, we use $NCSKEW_{t+1}$ as the dependent variable. In columns 3 and 4, we use $DUVOL_{t+1}$ as the dependent variable. In columns 1 and 3, we only include the independent variable $GWIMPA_t$ and the controls for year and industry effects. Columns 2 and 4 include the other control variables. In columns 1 and 3, we find that the estimated coefficients of $GWIMPA_t$ are 0.059 and 0.044, respectively, and both are significant at the 1% level. Thus, goodwill impairment avoidance has a significantly positive effect on

Table 7

Robustness test: Deleting the observations from the year in which CAS No. 8 came into effect.

Variable	(1) ΔROA_{t+1}	(2) ΔROE_{t+1}	(3) $NCSKEW_{t+1}$	(4) $DUVOL_{t+1}$
$GWIMPA_t$	-0.003*** (-2.64)	-0.007*** (-2.68)	0.048** (2.29)	0.039*** (2.65)
$NCSKEW_t$			0.047*** (3.11)	
$DUVOL_t$				0.043*** (2.84)
RET_t			2.673 (1.62)	0.036 (0.03)
$SIGMA_t$			-2.232*** (-3.16)	-1.730*** (-3.48)
$DTURN_t$			-0.196*** (-5.75)	-0.118*** (-4.94)
$SIZE_t$	-0.002** (-2.56)	-0.003** (-2.21)	-0.040*** (-3.04)	-0.047*** (-5.05)
LEV_t	0.020*** (5.13)	0.034*** (3.90)	-0.094 (-1.25)	-0.014 (-0.27)
M/B_t	0.000 (0.98)	0.001*** (2.62)	0.017*** (3.62)	0.008** (2.33)
ROA_t			0.123 (0.49)	0.132 (0.74)
$ABSDA_t$			0.398** (2.28)	0.303** (2.47)
$BIG4_t$			0.048 (1.47)	0.033 (1.44)
$TOPI_t$			-0.125 (-1.62)	-0.103* (-1.90)
$INSTIOS_t$			0.050 (0.93)	0.046 (1.20)
$GROWTH_t$	-0.004*** (-3.14)	-0.010*** (-3.92)		
$INTANG_t$	-0.009 (-0.81)	-0.014 (-0.57)		
_cons	0.026* (1.74)	0.050 (1.50)	0.804* (1.94)	0.880*** (3.01)
INDUSTRY	Yes	yes	yes	yes
YEAR	Yes	yes	yes	yes
N	4574	4574	4574	4574
AR2	0.025	0.026	0.062	0.066
F	4.370***	4.455***	8.355***	8.929***

Notes: t-statistics in parentheses

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

a company's risk of a future stock price crash. In columns 2 and 4, the estimated coefficients of $GWIMPA_t$ are -0.003 and -0.007 , respectively, and statistically significant at the 5% and 1% levels, respectively. In short, after factoring in the effects of control variables and year and industry effects, goodwill impairment avoidance significantly increases a firm's risk of a future stock price crash, supporting H_2 .

5.4. Robustness tests

To validate our main findings, we conduct a series of robustness tests. First, CAS No. 8 has been in effect since 2007. CAS No. 8 involves a change in accounting principles on whether goodwill impairments can be classified as below-the-line items. Managers' incentives during the first year of the implementation of CAS

Table 8

Robustness test: Truncating the goodwill impairment amount at the 1st and 99th percentiles.

Variable	(1) ΔROA_{t+1}	(2) ΔROE_{t+1}	(3) $NCSKEW_{t+1}$	(4) $DUVOL_{t+1}$
$GWIMPA_t$	-0.003^{**} (-2.57)	-0.007^{***} (-2.61)	0.051^{**} (2.37)	0.042^{***} (2.76)
$NCSKEW_t$			0.048^{**} (3.07)	
$DUVOL_t$				0.043^{***} (2.76)
RET_t			3.175^* (1.89)	0.112 (0.09)
$SIGMA_t$			-2.368^{***} (-3.30)	-1.731^{***} (-3.43)
$DTURN_t$			-0.199^{***} (-5.76)	-0.122^{***} (-5.02)
$SIZE_t$	-0.002^{**} (-2.48)	-0.003^{**} (-1.99)	-0.041^{***} (-3.03)	-0.047^{***} (-4.94)
LEV_t	0.020^{***} (5.05)	0.032^{***} (3.70)	-0.115 (-1.50)	-0.024 (-0.44)
M/B_t	0.000 (0.57)	0.001^{**} (2.39)	0.017^{***} (3.45)	0.008^{**} (2.27)
ROA_t			0.039 (0.15)	0.112 (0.62)
$ABSDA_t$			0.385^{**} (2.19)	0.296^{**} (2.39)
$BIG4_t$			0.050 (1.50)	0.032 (1.39)
$TOPI_t$			-0.113 (-1.46)	-0.101^* (-1.84)
$INSTIOS_t$			0.048 (0.88)	0.043 (1.12)
$GROWTH_t$	-0.003^{***} (-2.83)	-0.009^{***} (-3.71)		
$INTANG_t$	-0.008 (-0.77)	-0.014 (-0.56)		
_cons	0.026^* (1.71)	0.045 (1.33)	0.721^{**} (2.29)	0.922^{***} (4.15)
INDUSTRY	Yes	yes	yes	yes
YEAR	Yes	yes	yes	yes
N	4488	4488	4488	4488
AR2	0.024	0.024	0.062	0.066
F	4.139 ^{***}	4.211 ^{***}	8.208 ^{***}	8.773 ^{***}

Notes: t-statistics in parentheses.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

No. 8 may be different than those after 2007, because there is a trade-off between taking a write-off below the line in 2007 and facing potential future impairments (Filip et al., 2015; Xu et al., 2017). To account for this change, we delete the observations from 2007 and use the remaining sample to re-run the regressions. The test results are reported in Table 7, and we find that our main conclusions do not change substantially.

Second, studies find that some firms record relatively small amounts of goodwill impairment many times when the firms are profitable and then take a “big bath” of impairment when their performance is extremely bad (Giner and Pardo, 2015). These strategies can lead to a noisy sample in the control group. Therefore, we keep the control group sample with goodwill impairments truncated at the 1st and 99th percentiles and match the experimental group with the remaining control group sample and re-run our regressions. The test results are shown in Table 8. They are statistically indistinguishable from those of the main tests.

Table 9

Robustness test: Alternative measure of $GWIMPA_t$ discussed in Section 4.2.

Variable	(1) ΔROA_{t+1}	(2) ΔROE_{t+1}	(3) $NCSKEW_{t+1}$	(4) $DUVOL_{t+1}$
$GWIMPA_t$	−0.004*** (−2.88)	−0.010*** (−3.14)	0.045* (1.66)	0.041** (2.14)
$NCSKEW_t$			0.031 (1.59)	
$DUVOL_t$				0.033* (1.65)
RET_t			−0.329 (−0.12)	−2.217 (−1.11)
$SIGMA_t$			−2.118** (−2.11)	−1.302* (−1.84)
$DTURN_t$			−0.147*** (−2.85)	−0.093** (−2.54)
$SIZE_t$	−0.002** (−2.01)	−0.004** (−2.34)	−0.051*** (−3.40)	−0.036*** (−2.93)
LEV_t	0.017*** (3.24)	0.034*** (3.16)	0.052 (0.52)	−0.134* (−1.83)
M/B_t	0.002*** (2.99)	0.005*** (3.31)	0.051*** (3.43)	0.032*** (3.03)
ROA_t			0.014 (0.04)	−0.403 (−1.53)
$ABSDA_t$			0.282 (0.99)	0.351* (1.76)
$BIG4_t$			0.032 (0.78)	0.012 (0.42)
$TOPI_t$			−0.203** (−1.98)	−0.147** (−2.03)
$INSTIOS_t$			−0.017 (−0.23)	0.021 (0.41)
$GROWTH_t$	−0.005** (−2.25)	−0.008* (−1.67)		
$INTANG_t$	0.002 (0.15)	0.020 (0.63)		
_cons	0.031 (1.60)	0.077* (1.92)	1.027* (1.75)	0.618 (1.44)
INDUSTRY	yes	yes	yes	yes
YEAR	yes	yes	yes	yes
N	2640	2640	2640	2640
AR2	0.042	0.048	0.063	0.068
F	4.284***	4.794***	5.316***	5.728***

Notes: t-statistics in parentheses.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

Next, we adopt the second method discussed in Section 4.2 to identify firms with impaired goodwill but that did not record any impairment losses. Table 9 reports the test results. We find that the main conclusions continue to hold, but with weaker statistical significance.

Finally, to address the impact of autocorrelation and other statistical concerns about the regression models and to obtain more robust results, we correct the standard errors by clustering at the firm level. The adjusted test results are presented in Table 10. The results are consistent with our primary findings.

6. Further analyses and results

In our main tests, we investigate the impact of goodwill impairment avoidance on a firm's performance growth and stock price crash risk in the next year. However, it is likely that managers conceal the negative

Table 10

Robustness test: Standard errors clustered at the firm level.

Variable	(1) ΔROA_{t+1}	(2) ΔROE_{t+1}	(3) $NCSKEW_{t+1}$	(4) $DUVOL_{t+1}$
$GWIMPA_t$	−0.003*** (−2.93)	−0.007*** (−3.17)	0.048** (2.26)	0.039** (2.57)
$NCSKEW_t$			0.047*** (3.05)	
$DUVOL_t$				0.043*** (2.70)
RET_t			2.673* (1.66)	0.036 (0.03)
$SIGMA_t$			−2.232*** (−3.18)	−1.730*** (−3.48)
$DTURN_t$			−0.196*** (−6.01)	−0.118*** (−4.97)
$SIZE_t$	−0.002*** (−3.13)	−0.003*** (−2.58)	−0.040*** (−3.06)	−0.047*** (−5.15)
LEV_t	0.020*** (5.33)	0.034*** (3.83)	−0.094 (−1.25)	−0.014 (−0.26)
MB_t	0.000 (0.81)	0.001** (1.96)	0.017*** (3.64)	0.008** (2.22)
ROA_t			0.123 (0.45)	0.132 (0.68)
$ABSDA_t$			0.398** (2.23)	0.303** (2.45)
$BIG4_t$			0.048 (1.49)	0.033 (1.49)
$TOPI_t$			−0.125 (−1.54)	−0.103* (−1.83)
$INSTIOS_t$			0.050 (0.89)	0.046 (1.18)
$GROWTH_t$	−0.004** (−2.57)	−0.010*** (−2.89)		
$INTANG_t$	−0.009 (−0.94)	−0.014 (−0.68)		
_cons	0.026** (2.19)	0.050* (1.78)	0.804*** (2.83)	0.880*** (4.53)
INDUSTRY	yes	yes	yes	yes
YEAR	yes	yes	yes	yes
N	4574	4574	4574	4574
AR2	0.025	0.026	0.062	0.066
F	5.871***	3.990***	10.223***	14.479***

Notes: t-statistics in parentheses.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

news associated with goodwill impairment for extended periods, so the impact of the avoidance is likely to exhibit persistence. Motivated by this consideration, we expand the testing period to a three-year window and examine the persistence of the impact of goodwill impairment avoidance on a firm's performance growth and stock price crash risk. The results are shown in Table 11.

In columns 1 to 4 of Table 11, the dependent variable is a firm's performance growth as measured by ΔROA and ΔROE in the second ($t+2$) and third ($t+3$) year. In columns 5 to 8, the dependent variable is the firm's stock price crash risk as measured by $NCSKEW$ and $DUVOL$ in years $t+2$ and $t+3$. The independent variable in all of the columns is $GWIMPA_t$. As seen in columns 1 to 4, we still find a significant negative association between goodwill impairment avoidance and a firm's performance growth in the second and third year after excluding the influence of the control variables and industry and year effects. The results in columns 5 to

Table 11

The persistence of the effect of goodwill impairment avoidance on a firm's future performance and stock price crash risk.

Variable	(1) ΔROA_{t+2}	(2) ΔROA_{t+3}	(3) ΔROE_{t+2}	(4) ΔROE_{t+3}	(5) $NCSKEW_{t+2}$	(6) $NCSKEW_{t+3}$	(7) $DUVOL_{t+2}$	(8) $DUVOL_{t+3}$
$GWIMPA_t$	-0.009*** (-4.33)	-0.014*** (-5.28)	-0.016*** (-3.09)	-0.031*** (-4.45)	0.056** (2.33)	0.059** (1.97)	0.034** (2.12)	0.049** (2.47)
$NCSKEW_{t+1/t+2}$					0.073*** (4.41)	0.060*** (3.08)		
$DUVOL_{t+1/t+2}$							0.046*** (2.82)	0.038** (2.04)
$RET_{t+1/t+2}$					2.487* (1.65)	0.014 (0.01)	2.078** (2.05)	-0.781 (-0.61)
$SIGMA_{t+1/t+2}$					0.157 (0.42)	0.780* (1.76)	0.011 (0.04)	0.419 (1.42)
$DTURN_{t+1/t+2}$					-0.036 (-1.15)	-0.028 (-0.67)	-0.020 (-0.96)	-0.001 (-0.04)
$SIZE_{t+1/t+2}$	-0.004*** (-3.06)	-0.007*** (-4.92)	-0.001 (-0.26)	-0.007** (-1.99)	-0.013 (-0.81)	-0.041** (-2.17)	-0.019* (-1.80)	-0.043*** (-3.42)
$LEV_{t+1/t+2}$	0.040*** (5.83)	0.044*** (5.24)	-0.011 (-0.64)	0.007 (0.34)	0.034 (0.39)	0.285*** (2.76)	0.021 (0.36)	0.230*** (3.35)
$M/B_{t+1/t+2}$	-0.000 (-0.97)	-0.003*** (-6.54)	0.001 (0.96)	-0.004*** (-2.91)	0.002 (0.30)	-0.011* (-1.70)	-0.001 (-0.24)	-0.010** (-2.32)
$ROA_{t+1/t+2}$					0.423 (1.47)	1.456*** (4.34)	0.305 (1.57)	1.056*** (4.74)
$ABSDA_{t+1/t+2}$					0.496*** (2.59)	-0.195 (-0.84)	0.321** (2.49)	-0.183 (-1.18)
$BIG4_{t+1/t+2}$					0.023 (0.45)	0.124** (2.01)	0.015 (0.42)	0.069* (1.68)
$TOPI_{t+1/t+2}$					-0.129 (-1.51)	-0.078 (-0.78)	-0.090 (-1.55)	-0.046 (-0.69)
$INSTIOS_{t+1/t+2}$					0.092 (1.54)	0.003 (0.04)	0.040 (1.00)	0.002 (0.03)
$GROWTH_{t+1/t+2}$	-0.034*** (-7.22)	-0.050*** (-8.57)	-0.072*** (-6.22)	-0.119*** (-7.92)				
$INTANG_{t+1/t+2}$	0.007 (0.38)	-0.033 (-1.42)	0.080* (1.71)	-0.001 (-0.01)				
_cons	0.047* (1.75)	0.125*** (3.87)	-0.063 (-0.97)	0.157* (1.90)	0.380 (1.01)	0.581 (1.26)	0.476* (1.87)	0.682** (2.22)
INDUSTRY	Yes	yes	yes	yes				
YEAR	Yes	yes	yes	yes				
N	4490	3256	4483	3248	4470	3215	4470	3215
AR2	0.054	0.101	0.033	0.063	0.047	0.043	0.058	0.058
F	9.220	12.772	5.962	8.043	6.802	4.841	8.299	6.242

Notes: t-statistics in parentheses.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

8 show a significantly positive relationship between *GWIMPA* and the risk of a stock price crash in years 2 and 3. Overall, we confirm that goodwill impairment avoidance has an adverse impact on a firm's performance growth and stock price crash risk and that these effects persist for at least three years.

7. Conclusion

The rapid increase in the volume of goodwill assets in China's capital market has strengthened the importance of the timely recognition of goodwill impairments under the current impairment testing approach. The literature documents that managers exploit their discretion in asset valuation to avoid reporting impairment losses due to concerns about the managers' compensation and reputation (Beatty and Weber, 2006; Ramanna and Watts, 2012; Glaum et al., 2018). Even when facing monitoring pressure, managers can conduct upward earnings management to avoid recording impairments and protect their personal interests (Filip et al., 2015; Han and Tang, 2019). We investigate the financial consequences of goodwill impairment avoidance from the perspectives of a firm's future performance and stock price crash risk.

Using data on firms listed on China's A-share market as our sample, we find that goodwill impairment avoidance is negatively associated with a firm's future performance growth and positively associated with its stock price crash risk. These detrimental effects persist for at least three years. Our results enrich the literature on the consequences of goodwill impairment and the determinants of stock price crash risk and provide a new perspective for explaining the performance changes observed in listed companies. Our results also have practical implications. For regulators, the primary task of the current "three major battles" paradigm is to prevent major risks. We find that avoiding the recognition of goodwill impairment worsens a company's future performance and increases its risk of a stock price crash. Therefore, regulators should pay attention to firms' goodwill avoidance behavior and its potential harms and enhance their monitoring intensity to prevent the occurrence of major risks. External investors should stay alert when interpreting a firm's impairment information and be aware of potential avoidance when making investment decisions.

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