Columbia Business School
Center for Excellence in Accounting
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An Alternative Approach for Mergers and Acquisitions Accounting and It's Use for Predicting Acquirers' Performance*

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ABSTRACT

This study introduces an alternative method for mergers and acquisitions (M&A) accounting and demonstrates its diagnostic properties for predicting acquirers' performance. While current accounting standards view an M&A as buying assets to add to the acquirer's balance sheet, the proposed alternative approach views the purchase as buying the business of a target and the value in that business. Accordingly, the purchase price includes the value in the target's balance sheet plus the added value of the business indicated by the income statement, with the remainder attributed to an alternative goodwill measure. This measure is immediately available to investors on the announcement of the acquisition rather than in subsequent financial reports. The paper shows that this timely alternative goodwill measure is (1) negatively related to the acquirer's long-term returns, (2) positively associated with the future impairments of goodwill reported under current generally accepted accounting principles (GAAP), and (3) incrementally informative over event-date market reactions and acquisition premiums for predicting long-term returns and goodwill impairments.

Keywords: Mergers and acquisitions; Goodwill accounting; Valuation

JEL Classification: G32; G34; M41

Data Availability: The data used in this paper are available from the sources listed in the text.

I. INTRODUCTION

This study introduces an alternative method for mergers and acquisitions (M&A) accounting. It documents that the amount of goodwill estimated with the alternative method is useful in predicting acquirers' stock returns and goodwill impairments under generally accepted accounting principles (GAAP).

Under current GAAP, M&A accounting focuses on buying a target's net assets and adding them to the acquirer's balance sheet: The acquirer estimates the fair value of identifiable, separable net assets acquired and designates the difference between the sum of these estimated fair values and the purchase price as goodwill. However, the acquirer purchases a business rather than individual assets, and the value of a business (acquired) is indicated by both the assets in the balance sheet and the income statement that reports how those assets are earning. Standard residual income models recognize this point by expressing value as balance sheet book value plus added value from the earnings reported in the income statement (e.g., Ohlson 1995). Rather than estimating business value from separable fair values of individual assets on the balance sheet, these models view value as generated from using assets jointly, with that value indicated by the income statement (see Skinner 2008 and Penman 2009). Current GAAP for M&A ignores the income statement information that reveals the value being purchased.

The alternative approach to M&A accounting presented in this paper estimates acquired value in the target by utilizing both balance sheet and income statement information. An alternative goodwill number is then calculated as the difference between the purchase price and the value indicated by these two financial statements. Thus, the approach decomposes purchase price into three components: the book value of the target, the added value indicated by the income statement, and the remainder. Book value is as-reported on a target's balance sheet. The

value indicated by the income statement represents the earnings-creating ability of the net assets in the balance sheet without growth. The sum of the first two components indicates the value in the target as a stand-alone going-concern business. The remainder is the alternative "goodwill" number. Since this alternative goodwill can be calculated immediately when a deal is announced, it is a timely measure. In contrast, the amount of GAAP goodwill is reported in a subsequent financial report published a number of months later.

The paper investigates the diagnostic properties of the timely new accounting measure. It asks the following three questions: (1) As a useful measure indicates over- or under-payment for an acquisition, does the alternative goodwill number predict an acquirer's future stock returns? (2) Does the alternative goodwill measure challenge the allocation to goodwill under GAAP accounting and thus predict future goodwill impairments? (3) Does the alternative goodwill measure answer the previous two questions better than measures commonly used in earlier studies, such as market reactions to deal announcement dates and acquisition premiums? The paper reports, first, that the alternative goodwill is negatively associated with acquirers' long-term returns, even after controlling for risk factors. Second, it is positively related to future goodwill impairments; the higher the purchase price relative to the value in the balance sheet and income statement of the target, the larger the subsequent impairment of GAAP goodwill. Third, the diagnostics perform better in predicting acquirers' future returns and goodwill impairments than market reactions on deal announcement dates and acquisition premiums.

These findings suggest that the alternative goodwill calculation is a useful ex ante method for predicting acquirers' post-acquisition performance. Accordingly, it serves not only as an accounting method more aligned with accounting-based valuation, but also as a tool for investors to evaluate M&A transactions. Indeed, it is also a tool for accountants to question the goodwill

figure they book under current GAAP. Also, potentially, it serves to disciple corporate boards as they evaluate the desirability of an acquisition: Are we paying too much over the value indicated by the target's financial statements?

Aside from its diagnostic properties, the new measure is intrinsically appealing. First, GAAP goodwill is just a plug, with little definition of what the acquirer is actually buying with the purchased goodwill. The alternative measure has a specific interpretation that brings focus for evaluating the purchase price. Second, this lack of definition in the GAAP measure is partially due to recognized assets being booked at their fair value by reference to what they are worth as stand-alone assets in the market. However, assets are used jointly to generate value and it is the value of the business with these assets in joint use that is being acquired. Earnings flow from using assets jointly—indeed, earnings include those from assets not on the acquirer's balance sheet such as research and development (R&D) and brands—so adding the income statement helps identify value-in-use. Third, the GAAP goodwill number is subject to management manipulation by, for example, attributing low fair value estimates to the identifiable assets. The alternative measure is far less affected. Fourth, given these features, the new accounting provides a benchmark for identifying GAAP goodwill most likely to be impaired in the future, in the spirit of Li et al. (2011), who find that the difference between target book value and purchase price predicts goodwill impairments.

A number of prior studies are concerned with managers' opportunistic behavior under current goodwill accounting, but the literature lacks a reliable tool for identifying goodwill that is likely to be impaired. As the alternative goodwill estimate captures the economics of a transaction with minimal room for management discretion, it provides a useful tool for

evaluating M&A pricing and purchased goodwill for investors, accountants, and corporate boards, as well as researchers.

The rest of the paper is organized as follows. Section II lays out the alternative accounting and its potential diagnostic properties. Section III explains the empirical research design to evaluate those properties and Section IV details the variable calculations and sample selection. Section V reports empirical findings. Section VI concludes the paper.

II. THE ALTERNATIVE M&A ACCOUNTING AND ITS POTENTIAL DIAGNOSTIC PROPERTIES

In this section, I explain current goodwill accounting and related issues. I introduce the alternative approach to estimating goodwill and explain its theoretical and practical advantages. Then, testable hypotheses are developed to test its use as a diagnostic tool.

Current goodwill accounting

Statement of Financial Accounting Standards (SFAS) 141 covers the accounting for mergers and acquisitions. Under SFAS 141, an acquirer estimates the fair value of a target's net identifiable assets and records the difference between the purchase price and the sum of the fair values of identifiable net assets as goodwill:

$$Purchase\ Price\left(PP\right) = BV + Fair\ Value\ Adjustment\left(FVadj\right) + GoodWill\left(GW\right)$$

SFAS 142 replaces the amortization of goodwill with periodic impairment tests.

Under this accounting, a manager of the acquiring firm has discretion in estimating the fair value of individual assets and allocating an amount of purchase price to goodwill. When the Financial Accounting Standards Board (FASB) introduced the new standard, it presumed that managers' discretion in M&A accounting would result in more useful and relevant accounting

information. However, subsequent studies raise doubts. Ramanna and Watts (2012) show that the unverifiable fair value estimates are consistent with managers' private incentives predicted by agency theory. Shalev et al. (2013) argue (with evidence) that managers have an incentive to over-allocate to goodwill and under-allocate to other assets, resulting in lower subsequent depreciation and amortization expenses on those other assets. In addition, some studies show that goodwill impairment charges (possibly due to over-allocation of purchase price to goodwill) are not recognized in a timely manner (Hayn and Hughes 2006; Lys et al. 2012; Ramanna and Watts 2012; Li and Sloan 2015).[1]

If goodwill is overstated, a metric is required to identify the overstatement and predict consequent impairment losses. More generally, that metric would identify over-payment for an acquisition and consequently the acquirer's future stock price performance. The present study supplies a measure that can be timely estimated and relies exclusively on publicly available information.

An Alternative Approach to Estimating Goodwill

To evaluate an M&A price, it is important to understand what the acquirer is buying. GAAP attempts to supply that understanding by treating M&A as a purchase of individual assets to be added to acquirers' balance sheet. However, when an acquirer purchases a target company, it buys the business of the target rather than individual assets, and a business creates value by generating earnings from using its assets jointly. For example, the value of Apple Inc. is not a simple sum of the fair values of its inventories and factories; rather, the value resides in Apple's ability to generate earnings by combining these and other assets in a supply chain and

[1] See Ak et al. (2013) for a review of studies with goodwill impairment prediction models.

distrubution system with innovative reseach and development. Those earnings are reported in the income statement; indeed, the income statement includes earnings from "intangible" assets not on the balance sheet (e.g., Apple's brand assets and R&D investments) that GAAP M&A accounting attempts to identify.

The income statement and the value it reveals are not incorporated in GAAP M&A accounting. Thus, the difference between the sum of the fair value of identifiable net assets and the purchase price that is recorded as goodwill under current GAAP is partially explained by this omission. The reported goodwill is not economically interpretable. It is simply a plug to the purchase price.

Standard valuation theory recognizes that value is revealed from both the income statement and the balance sheet, and Penman (2009) shows explicitly how the income statement ameliorates the omissions of intangible assets from the balance sheet. The residual earnings model provides an explicit demonstration (e.g., in Ohlson 1995). In the single-forecast-period version, the market value of a stock can be written as:

$$Market\ Value(MV) = BV_0 + \frac{Earn_1 - (\rho - 1) \cdot BV_0}{\rho - g}$$

where, *BV* is book value, *Earn* is earnings, *Residual earnings (RE)* = $Earn_1$-(ρ-1)BV_0, ρ=*Cost of Capital+1*, and *g= Growth Rate of RE+1*.

The model states that the market value of a stock is composed of current book value (*BV*), short-term expected residual earnings (*RE*), and expectations of residual earnings growth (*g*). The latter, the growth rate forecast by the market value, is termed the implied growth rate.

I estimate the value of a target with the unleveraged (enterprise) version of the model:

$$Target\ Value = BV_0 + \frac{CoreEarn_0 - (\rho - 1) \cdot NOA_0}{\rho - 1},$$

where BV_0 is (as above) the common shareholders' equity, which is the net operating assets minus the net debt; NOA_0, is the net operaring assets, and $CoreEarn_0$ is core operating earnings that exclude identified transitory items to yield a forecast of operating earnings one year ahead. The second term focuses on the value of the business operations that are being purchased (see Feltham and Ohlson 1995; Nissim and Penman 2001).

With exclusion of the growth rate, *g*, this valuation is based on accounting data for the target, all of which can be observed. It is a no-growth valuation that excludes speculation about the future (growth), relying only on value that has been recognized by the accounting for the target. Penman (2011) refers to this as an anchoring accounting value to which speculative value (from speculation about growth) can be added. It serves to separate out value revealed by the accounting from that which comes from speculation about the future.

Accordingly, the purchase price in an acquisition can be separated into that indicated by the accounting for the target and the price paid for speculation about added value from the acquisition. This can be further decomposed into three components: the book value of target (*BV*), the value of capitalized current core residual earnings (*CCE*), and the remainder:

$$\begin{aligned} Purchase\ Price\ (PP) &= Target\ Value + the\ Alternative\ Goodwill\ (AGW) \\ &= Book\ Value(BV) + Capitalized\ Core\ Residual\ Earnings\ (CCE) + AGW \end{aligned}$$

This remainder of the purchase price, the *Alternative Goodwill* measure (*AGW*), is that which cannot be justified from the target's accounting information. It includes any value from speculation about growth in the target, but also so-called "synergies" from the acquisition that

add to that growth. Figure 1 depicts the decomposition of the purchase price with the alternative approach compared to that under GAAP.

AGW provides a useful benchmark to evaluate the GAAP goodwill number. It has several advantages over the current GAAP goodwill.

First, *AGW* can be estimated instantly on the announcement of the merger or acquisition (provided published financial statements for the target are available). To report the amount of goodwill under GAAP, managers need to identify legally separable assets and estimate the fair value of each asset separately. Then, they report the remainder as goodwill in the financial statement that is prepared after the deal is completed. Thus, it takes at least several months for investors to find the allocated amount of goodwill under GAAP. With its timeliness feature, the proposed method is similar to Henning et al. (2000), who decompose the reported goodwill into several components based on market values and responses. They demonstrate that going-concern and expected synergy portions of goodwill are positively valued in the market while the excess of goodwill over them is negatively valued. The present study draws a contrast to their findings using the alternative measure.

Second, (in the case of traded companies) *AGW* is based on publicly available information and not subject to managers' discretion.[2] Thus, it is not subject to the issues surrounding GAAP goodwill raised in prior studies such as Ramanna and Watts (2012) and Shalev et al. (2013). Indeed, as will be seen, it can be used to challenge estimates of goodwill under GAAP.

[2] The ability to manipulate earnings in the target qualifies this statement, though that would be by the target firm's management.

Third, the *AGW* measure is defined by the implied growth rate, *g*, in the purchase price, giving it an economic interpretation. That, in turn, brings focus to the evaluation of the purchase price. For manufacturing or retail firms, residual earnings growth is driven by sales growth, profit margins, and asset turnover (with alternative drivers identifiable for financial firms). So, the analyst asks: Can the acquisition deliver the sales, margins, and turnovers to justify the purchase price?

In summary, the alternative approach provides a timely measure, free from management discretion, which relies only on observable accounting inputs to establish a benchmark value of net assets acquired. That benchmark valuation yields an alternative goodwill number with enough definition to be useful in evaluating prices paid in acquisitions. It is an alternative measure to the current GAAP goodwill, one that can potentially be applied to challenge the GAAP goodwill number.

The Diagnostic Properties of the Alternative Goodwill

In this section, I develop tests to examine the diagnostic properties of the *AGW* measure. An acquisition's future performance is typically assessed from long-term returns subsequent goodwill impairments. Therefore, I test whether the alternative goodwill measure predicts these outcomes and whether it performs better than alternative measures that are commonly used to evaluate M&A deals.

The Alternative Goodwill and Acquirers' Future Returns

Prior studies that evaluate post-M&A performance with long-term returns include Oler (2008), Moeller et al. (2005), Shalev (2009), and Sirower (1997). Sirower (1997) proposes the acquisition premium as an indicator of over-payment for the target. That premium depends on

the market price of the target prior to the acquistion which, in itself, may be an over- or under-valuation. The *AGW* measure is assesed relative to the value (not price) of the target and identifies the implied growth purchased, which can be over-valued by an acquirer. I posit the following hypothesis to test the *AGW* diagnostic against alternative measures:

Hypothesis 1: AGW in the purchase price is negatively related to acquirers' long-term returns and provides incremental information to announcement returns and premiums in predicting long-run returns.

The Alternative Goodwill and Future Goodwill Impairments

Goodwill impairment is an important event attributable to unsuccessful M&A deals (Gu and Lev 2011). Studies document that market participants negatively react to goodwill impairments (e.g., Bens et al. 2011; Li et al. 2011). Thus, predicting goodwill impairment is important for investors who want to evaluate M&A deals.

Given the unbiased fair value of indentifed net assets, GAAP goodwill captures overpayment in the pruchase price. Moreover, managers have incentives to over-allocate to goodwill by biasing fair value estimates downward. *AGW* is not subject to management discretion. Therefore, *AGW* can be used to challenge the GAAP goodwill and to forecast its future impairment. This leads to my second hypothesis:

Hypothesis 2: AGW in the purchase price is positively related to future goodwill impairments and provides incremental information to GAAP goodwill in predicting impairments.

III. RESEARCH DESIGN

Test of the Alternative Goodwill and Acquirers' Future Returns

I test Hypothesis 1, first, by examining cumulative raw and size-adjusted returns for 24 months after deal announcements for three portfolios formed on the level of *AGW*. Then, to asses the incremental information in *AGW* relative to announcement returns and premiums, I run the following cross-sectional regressions with cumulative size-adjusted returns over one year and two years after the deal announcement.

$$CAR_{t+i} = b_0 + b_1 AGW + b_2 Prem4wk + b_3 AnnRet + b_4 Beta + b_5 Size + b_6 BTM + b_7 MOM + b_8 Focus + b_9 PctStock + b_{10} OVI + b_{11} PctStock \times OVI + b_{12} RelSize + b_{13} AcqCash + e \quad (1)$$

CAR_{t+i} is size-adjusted cumulative abnormal returns for year *i* after deal announcement; *AGW* is the alternative goodwill measure, the treatment variable of interest; *Prem4wk* is the premium paid by acquirers based on the market price of the target four weeks prior to deal announcement (scaled by purchase price); *AnnRet* is size-adjusted cumulative abnormal returns around deal announcements (three days); *Beta* is estimated from a regression of monthly returns (R- R_f) on market returns (R_m- R_f) using the 36-month prior return period; *Size* is the log market value of the acquirer. *BTM* is acquirers' book-to-market ratio before the deal announcement; *MOM* is the size-adjusted cumulative abnormal returns for the six-month period before the deal announcement; *Focus* is an indicator variable equal to one if the two-digit Standard Industry Classification (SIC) codes of the target and acquirer are the same; *PctStock* is the percentage of payment made with stocks; *OVI* is an overvalued share indicator variable which is equal to one if the acquirer's industry-adjusted price-to-earnings ratio is in the first quintile, zero otherwise;

RelSize is the relative size of a deal over the market value of an acquirer; *AcqCash* is the amount of cash held by an acquirer.

Beta, *Size*, *BTM*, and *MOM* control for four documented (risk) factors that predict stock returns. Control variables related to the performance of acquirers are also included in the model: *Focus* is included to control for the different motivations for M&A deals; the percentage of payment made with stocks (*PctStoc*) and the overvalued stock dummy variable (*OVI*) are included to control for acquirers who use their overvalued stock as a cheap currency in M&As (Gu and Lev 2011); *RelSize* and *AcqCash* are added to control for the relative size and acquirers' cash holding effects (Oler 2008). If *AGW* predicts acquirers' long-term returns incremental to other included variables, the coefficient on *AGW* (b_1) should be negative and significant. A zero coefficient on *AnnRet* and *Prem4wk* suggests that these indicators have no predictive power given *AGW*.

Test of the Alternative Goodwill and Future Goodwill Impairments

I test Hypothesis 2 with the following logistic regression model.

$$\begin{aligned} Logit(GWI) &= b_0 + b_1 GW + b_2 AGW + b_3 GWother \\ &+ b_4 Prem4wk + b_5 AnnRet + b_6 Size + b_7 BTM + b_8 Focus \\ &+ b_9 PctStock + b_{10} OVI + b_{11} PctStock \times OVI + b_{12} RelSize + b_{13} AcqCash + e \end{aligned} \quad (2)$$

where *GWI* is an indicator variable equal to one if goodwill impairment of the identified target is reported in any year after the merger or acquisition; *GW* is the portion of the purchase price allocated to goodwill under GAAP[3]; *AGW* is the alternative goodwill; *GWother* is the difference

[3] Following Shalev et al. (2013), I define goodwill as the sum of the amount of goodwill disclosed in 10-Ks and the indefinite life of intangibles which are not amortized.

between *AGW* and *GW* depicted in Figure 1. Other variables are as defined in equation (1). *GW*, *AGW*, and *GWother* are scaled by purchase price (*PP*).

Equation (2) tests the relationship between goodwill impairments (*GWI*) and both the goodwill reported under GAAP (*GW*) and the goodwill estimated with the alternative method (*AGW*). It also examines the components of GAAP goodwill (*AGW* and *GWother*). Prior studies have shown that higher premiums result in goodwill impairments (Hayn and Hughes 2006; Li et al. 2011). Following this line of research, a premium measure (*Prem4wk*) is included in the model. Following Li et al. (2011), *Size*, *BTM*, and *Focus* are added as control variables. Gu and Lev (2011) find that managers with overpriced shares are more likely to pay more for a target, and overpriced shares tend to drive a higher likelihood of future goodwill impairment. I thus control for the method of payment (*PctStock*) and acquirers' overpricing of shares (*OVI*). If payment for overpriced shares is related to goodwill impairment, I expect the coefficient on the interaction between *PctStock* and *OVI* to be positive and significant. *RelSize* and *AcqCash* are included following Oler (2008).

In this model, positive coefficients on goodwill variables indicate that the likelihood of goodwill impairment increases as the goodwill measure increases. My main focus is the coefficient on goodwill under current GAAP (*GW*) and the alternative goodwill (*AGW*). Based on prior research, I expect positive and significant coefficients on *GW* unless it is subsumed by *AGW*. A positive coefficient on *AGW* indicates that the measure provides incremental information about likely impairments over GAAP goodwill and, similarly, in comparison to *Prem4wk* and *AnnRet*.

IV. DATA AND VARIABLE CALCULATIONS

Sample Selection

The initial sample is collected from the Thomson SDC Platinum mergers and acquisitions database. I consider only mergers and acquisitions announced between June 30, 2001, the effective date of SFAS 141, and December 31, 2010. Before SFAS 141, acquirers could choose between the pooling and purchase (when share exchange was involved) methods of business combination accounting. SFAS 141 eliminated the pooling method and required all business combinations to be accounted for by the purchase method. All observations in my sample period accounted for by the purchase method are thus comparable. I also require both acquirers and targets to be traded on major U.S. stock markets (NYSE, Nasdaq, and AMEX) and include only deals worth at least $10 million that involve the acquisition of 100% of a target's shares. If either acquirer or target is in the financial industry (SIC 6000-6999), the observation is excluded from the sample.

From an initial sample of 772 acquisitions that satisfy these requirements, a sample of 409 observations remains after matching with Compustat and I/B/E/S. I require that deal announcements for multiple acquisitions be at least 36 months apart. Purchase price allocation data are hand-collected from 10-K filings found on the Securities and Exchange Commission (SEC) EDGAR website, if available. From the 409 observations, 218 cases with purchase price allocations are found.

For these cases, I recognize goodwill impairment firm years in which companies report pretax impairments of goodwill (GDWLIP). Compustat does not provide detailed information about goodwill impairments, including the specific acquisition that caused the impairment. Thus,

I verify whether a reported goodwill impairment is related to a specific acquisition. To confirm the relationship between price allocation and future goodwill impairment, I manually check, for every case, whether the reported goodwill impairment is related to the acquisition in the sample. Some companies associate specific acquisitions with reported goodwill impairments. In the many cases in which companies do not identify which prior mergers or acquisitions are related to goodwill impairments, I compare the business of the segment reporting goodwill impairment and the business of the target company in the sample. If they are similar, I assume the goodwill impairment is related to the target in the sample. Because I define goodwill as the sum of goodwill disclosed in 10-Ks and indefinite life intangibles, asset write-downs related to the latter are treated as goodwill impairments. The final sample includes 212 observations. Table 1 summarizes the sample selection process.[4]

Variable Calculations

The calculation of variables is explained in the appendix. *AGW* is calculated from the following expression, as earlier:

$$\textit{Purchase Price(PP)= Book Value (BV)+ Capitalized Core Residual Earnings (CCE)+ AGW}$$

Book value (*BV*) is common shareholders' equity and capitalized core residual earnings (*CCE*) is core residual operating income (calculated as in the appendix) capitalized at the cost of capital (ρ). In the main analysis, a non-company-specific cost of capital is used (annualized risk-free rate from Ken French's website[5] together with a 5% risk premium). Alternative future earnings estimates and estimates of the cost of capital are discussed in Section V as robustness tests.

[4] The size of the final sample is slightly smaller than in Shalev et al. (2013), which also requires purchase price allocation data.
[5] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/

To decompose goodwill, purchase price (*PP*) and goodwill (*GW*) are hand-collected from SEC 10-K filings. Because acquirers were required to expense immediately any acquisition costs related to the purchase price before SFAS 141R was introduced, reported acquisition costs are added to purchase prices for deals made after December 15, 2008 (the effective date of SFAS 141R). If expensed acquisition costs are not reported, I add an additional two percent of the purchase price to the purchase price, which is the average of reported acquisition cost over the purchase price in the sample. If *CCE* turns negative and is replaced with zero, *AGW* is calculated by subtracting *BV* and *CCE* from *PP*.

Summary Statistics

Table 2 reports basic descriptive statistics. The average purchase price is about $1,937 million, with companies allocating slightly more than half of the purchase price to goodwill (0.55). About 25 percent of acquirers in the sample report goodwill impairments (*GWI*). Book value (*BV*) of the target counts for about 38 percent of purchase price. The portion of the alternative goodwill (*AGW*) is about 45 percent. The difference (*GWother*) between goodwill (*GW*) and the alternative goodwill (*AGW*) is, on average, about 9 percent of the purchase price. Acquirers experience, on average, negative market reactions (-2 percent) on three-day windows around deal announcements (*AnnRet*). The average premium (*Prem4wk*) of 29 percent is based on target prices four weeks prior to the deal announcement, rescaled by the purchase price. About 68 percent of mergers and acquisitions is made within the same industry (*Focus*) and about 39 percent of purchase prices is paid with the acquirer's stock (*PctStock*). The average deal size over the market value of an acquirer is about 45 percent (*RelSize*). Among acquirer's assets, 18 percent is cash or short-term investments (*AcqCash).* Table 3 summarizes correlations between the analyzed variables. The upper (lower) diagonal reports Pearson (Spearman)

correlations. *AGW* is positively correlated with goodwill impairment (*GWI*) and negatively correlated with one-year and two-year cumulative size-adjusted abnormal returns (CAR_{t+1} and CAR_{t+2}).

V. RESULTS

Empirical Findings

In this section, I report the empirical findings. In the following estimation models, explanatory variables are carefully selected to avoid multicollinearity problems. In untabulated results, the variance inflation factors (VIFs) that test the multicollinearity problem are below 5.5 for all variables in every estimation model in the study.

Results of the Alternative Goodwill and Acquirers' Future Returns

Figure 2 traces the mean cumulative raw returns (Panel A) and size-adjusted cumulative abnormal returns (Panel B) for three portfolios for 24 months after deal announcement.[6] Table 4 reports numerical values. Three portfolios are formed by the alternative goodwill measure, *AGW*. If *AGW* is uninformative or if all implications of *AGW* are immediately reflected in stock prices after deal announcements, there should be no relationship between *AGW* and future returns. Figure 2 shows that the mean cumulative raw returns and size-adjusted cumulative abnormal returns are negatively correlated with *AGW*. The mean cumulative raw returns and size-adjusted cumulative abnormal returns are low for companies with high *AGW* and high for companies with low *AGW*. Although this relationship is weaker for the first nine months, the negative relations between *AGW* and the mean cumulative raw returns and size-adjusted cumulative abnormal

[6] For delisted companies during the 24 months, the CRSP delisting return is applied for the first month and reinvestment at the risk-free rate is assumed. See also Shumway (1997).

returns hold for long-term returns. I interpret these findings as investors not fully understanding the implications of *AGW* at the time of deal announcements. In other words, *AGW* is the accounting diagnostic that is not reflected in pricing.

Figure 3 reports hedge portfolio returns for 24 months after deal announcement, taking a long position in low *AGW* and a short position in high *AGW.* These hedge portfolio returns are compared to similar strategies in *Premium* and *AnnRet.* (For *AnnRet,* a long position is taken for the high portfolio and a short position is taken for the low portfolio.) The figure shows that the hedge portfolio based on *AGW* is higher than the hedge returns based on the other measures. This finding indicates that *AGW* is more useful than the other measures in predicting acquirers' long-term returns.

Table 5 confirms the findings reported in Figure 2 and Table 4. Table 5, Panel A, reports the empirical results from the estimation of equation (1) with size-adjusted cumulative abnormal returns (CAR_{t+1}) for one year since the deal announcement. Robust standard errors are used in the estimation. The negative and significant relationship observed in column (1) between *AGW* and one-year size-adjusted cumulative abnormal returns (CAR_{t+1}) is reported conditional on the market beta (*Beta*), size (*Size*), book-to-market (*BTM*), and momentum measure (*MOM*). The coefficient on *AGW* is -0.132 for column (1). This finding suggests that if an acquirer pays one percent more for uncertainty (*AGW*) in purchase prices, acquirers' long-term returns decrease by about 0.13 percent one year after deal announcements. Prior studies use premiums (*Prem4wk*) and deal announcement date returns (*AnnRet)* to measure the long-term performance of M&A deals. When *Prem4wk* and *AnnRet* are included in the model, in column (2), the coefficient on *AGW* is negative and significant, but *AnnRet* and *Prem4wk* are not significant. This finding suggests that future acquirer performance is better predicted by *AGW* than by *Prem4wk* or

AnnRet. The negative and significant relationship in column (3) between *AGW* and CAR_{t+1} holds even when the control variables (*Focus, PctStock, OVI,* the interaction between acquirers' *PctStock* and *OVI, RelAize,* and *AcqCash*) are included in the model.

Table 5, Panel B, shows the relationship between *AGW* and size-adjusted cumulative abnormal returns (CAR_{t+2}) for two years since the deal announcement. *AGW* is negatively and significantly related to two-year size-adjusted cumulative abnormal returns (even when four risk factors, *Beta*, *Size*, *BTM*, and *MOM*, are included in the models). In column (2) and column (3), *Prem4wk* is also negatively and significantly related to CAR_{t+2}, but the coefficient is lower and less significant than *AGW*. These findings suggest that the explanatory power of *AGW* for long-term returns is incremental to the four risk factors and *Prem4wk* and *AnnRet.*

Results of the Alternative Goodwill and Goodwill Impairments

Table 6 reports the empirical results from the estimation of equation (2), a logistic regression model that examines the relation between goodwill impairment and purchase price allocation items with control variables. The first two columns of Table 6 provide estimation results for the relation between goodwill (*GW*) and goodwill impairment (*GWI*). Similar to Hayn and Hughes (2006) and Li and Sloan (2011), the coefficients on *GW* are positive (0.902 and 0.978, respectively) but slightly insignificant (p-value of 0.13 and 0.11, respectively). The interpretation of the positive relation between *GW* and *GWI* is straightforward. If companies record more goodwill, the probability of reporting goodwill impairment increases. However, this relationship is not as strong as reported in prior studies. The negative coefficient on *Size* suggests that the probability of goodwill impairments decreases as acquirers become larger. Following Gu and Lev (2011), who document that companies that use overpriced shares in mergers and acquisitions

are more likely to report goodwill impairments, I add the percentage of the deal amount paid with stock (*PctStock*) and a proxy for overpriced shares of the acquirer (*OVI*). The interaction between *PctStock* and *OVI* is negatively associated with the goodwill impairment, but the relationships are insignificant, and the coefficient on *OVI* is negatively correlated with goodwill impairment. To examine whether market reactions and premiums have implications for goodwill impairment, market reactions on deal announcement dates (*AnnRet*) and premiums (*Prem4wk*) are included in the model (the second column of Table 6). I find neither to be significantly related to goodwill impairment.

The estimation results of equation (3) with decomposed goodwill items are presented in Table 6, columns (3), (4), (5), and (6). In columns (3) and (4), I report the results of tests of *Hypothesis 2*, which concerns whether *AGW* predicts goodwill impairments. As goodwill allocation is not available at the time of deal announcements, *GW* cannot be used by investors to predict goodwill impairment at the time of deal announcements. On the other hand, *AGW* is readily available at the time of deal announcement dates. If *AGW* is related to goodwill impairment, it can be a useful measure for investors who evaluate M&A deals. In column (3), the coefficient on *AGW* is positive and significant. This means that *AGW* is a more practical measure for predicting goodwill impairments than *GW*. The result does not change even when *Prem4wk* and *AnnRet* are included in the model (column (4)). Column (5) reports the result of the components of goodwill. In this model, I replace goodwill with the alternative goodwill (*AGW*), which I expect to be positively related to goodwill impairment and the remainder (*GWother*). The coefficients on *AGW* and *GWother* are positive and significant, but *AGW* is more strongly associated with goodwill impairment. This finding suggests that *AGW* is better in capturing a portion of goodwill that is related to goodwill impairment. In column (6), *Prem4wk* and *AnnRet*

are included in the model. *AGW* is still positive (2.167) and significant after controlling for *Prem4wk* and *AnnRet. GWother* is positive and significant, but less significant than *AGW.*

In summary, the findings in Table 7 show that alternative goodwill (*AGW*) is positively related to goodwill impairment. *AGW* captures the components of goodwill that is more at risk of impairment in the future. These findings suggest that the alternative approach to estimating goodwill introduced in this paper provides a useful tool to identify the portion of goodwill that predicts future impairments.

Additional Tests

Another Method for the Alternative Goodwill Estimation

In the main analysis, the core operating income is capitalized to estimate the value of a target as a business. As a robustness check, I estimate the value of a target with the following two-period residual earnings model.

$$Target\ Value(TV) = Book\ Value_0(BV_0) + \frac{RE_1}{\rho} + \frac{RE_2}{\rho \cdot (\rho - 1)}$$

where RE_t *(Residual Earnings*$_t$*)=* $Earnings_t - (\rho\text{-}1)\ BV_t$ *and* ρ *= Cost of Capital +1*

In this model, residual earnings are forecast up to the second period. This means that earnings growth up to the second period is incorporated in estimating the value of a target. Thus, the value of a target is composed of book value, the discounted first-period residual earnings, and the capitalized second-period residual earnings. Following Frankel and Lee (1998) and Ali et al. (2003), I/B/E/S consensus analysts' forecasts are used as proxies for future earnings. Dividends per share (DVPSP) are used to calculate the dividend payout ratio, which is assumed to be

constant for the second year. The alternative goodwill with the two-period residual earnings model (AGW_{RE}) is defined as the difference between the target value and the purchase price.

Table 7 reports empirical findings with the two-period residual earnings model. Panel A reports the test of the relationship between AGW_{RE} and acquirers' long-term returns. Similar to the main results, AGW_{RE} is negatively related to acquirers' cumulative size-adjusted long-term returns for both one and two years after deal announcements. Goodwill impairment test results are reported in Panel B. AGW_{RE} is positively associated with goodwill impairments. This implies that the AGW_{RE} also predicts future goodwill impairments. Since only I/B/E/S analysts' forecasts that are available before the deal announcements are used in the estimation, the AGW_{RE} can be estimated with publicly available data immediately after deal announcements. These findings suggest that the main findings are not driven by a specific model for estimating the value of a target.

Short-term Reactions

Loughran and Vijh (1997) find that post-acquisition returns are related to the mode of acquisition and the form of payments. In the main analysis, I also show the long-term relationship between the alternative goodwill (*AGW*) and acquirer's performance. However, if implications of *AGW* on acquirers' returns were fully understood by investors and immediately reflected in stock prices, *AGW* would not be related to acquirers' long-term returns. To examine this argument, I look at how investors react to *AGW* around deal announcement dates with the following model.

$$\begin{aligned} AnnRet = {} & b_0 + b_1 AGW + b_2 Prem4wk + b_3 Focus \\ & + b_4 PctStock + b_5 OVI + b_6 PctStock \times OVI + b_7 RelSize + b_8 AcqCash + e \end{aligned} \tag{3}$$

where all variables are as defined in Appendix A.

Table 8 reports the empirical tests of Model 3. That *AGW* is not significantly related to *AnnRet* suggests that investors do not fully understand the implications of *AGW* in purchase prices at the time of deal announcements and that stock prices do not immediately reflect this information. In the second column, both *AGW* and *Prem4wk* are insignificant. Taken together with the findings reported in Table 8, this finding confirms that investors do not immediately understand the implications of *AGW* for M&A deals.

Components of the Alternative Goodwill and Prediction of Acquirers' Future Performance

In this section, I test which components of *AGW* are related to future long-term returns and goodwill impairment. *AGW* can be disaggregated into two components: uncertainties implied in market value[7] of a target (*UMV*) and a premium paid above market value of a target. *UMV* is the difference between the market value of a target and the target value (*TV*)[8]. Thus, *UMV* captures investors' expectations for a target' earnings growth implied in the market value. In other words, *AGW* includes two sources of uncertainty: *UMV* implied in a target's market value and a premium paid by an acquirer. I examine whether the predictive power of *AGW* in long-term returns and goodwill impairments is driven by *UMV* or a premium.

Table 9 reports the empirical results for this question. Panel A shows that the coefficients on *UMV* are negatively and significantly related to one- and two-year size-adjusted cumulative abnormal returns. A premium is significantly associated with two-year size-adjusted cumulative abnormal returns but not with one-year returns. These findings suggest that a portion of the purchase price paid for *UMV* is a predictive measure for both one- and two-year size-adjusted *CAR*s, but the premium is only predictive for longer term returns. In other words, a portion of the

[7] Market value of a target is the price of a target four weeks prior to the deal announcement.
[8] Note that the target value (*TV*) is the sum of book value (*BV*) and capitalized core earnings (*CCE*).

purchase price paid for uncertainty implied in the market value should be considered when an investor evaluates M&A deals. Panel B shows that *UMV* is positively and significantly related to goodwill impairments while the premium is not. This finding also suggests that the goodwill impairment prediction of *AGW* is driven by *UMV* but not by premiums.

Alternative Measures of Cost of Capital

In the main analysis, I use the annualized one-month Treasury bill (T-bill) rate (risk-free rate) plus a risk premium of five percent as a cost of capital measure. As a robustness check, I re-estimate the main results with three alternative measures of cost of capital: 10-year T-bill rate plus five percent risk premium, ten percent of the cost of capital for all firms, and estimates based on the Fama-French three-factor model. Untabulated results show main results consistent with the alternative cost of capital measures. The goodwill impairment tests with the three-factor model cost of capital are quantitatively consistent. These findings confirm that the main findings are robust to alternative measures of cost of capital.

VI. CONCLUSIONS

This study proposes an alternative approach for accounting for mergers and acquisitions that enables investors and managers to evaluate the pricing of an M&A transaction and its consequences. Rather than benchmarking an acquisition as the fair value of identifiable assets on the target's balance sheet, the approach benchmarks the purchase as the value of a target indicated by both the target's balance sheet and income statement, in accordance with accounting-based valuation theory. While goodwill under GAAP has little definition as a plug to the purchase price, the goodwill number under the alternative approach (*AGW*) does. *AGW* enables an interpretation of what is being purchased in M&A deals.

This study introduces an alternative accounting for M&A that not only accords with valuation theory but also provides a diagnostic to evaluate these deals. The paper documents two properties of *AGW* as a diagnostic. First, the measure predicts an acquirer's long-term returns, a measure of success of the acquisition. *AGW* is negatively related to these returns. The information in *AGW* is incremental to that in other measures commonly used to evaluate M&A deals, namely market reactions on deal announcement dates and acquisition premiums. Second, *AGW* predicts impairments of GAAP goodwill subsequent to the acquisition. With these properties, the new approach provides an effective tool for evaluating M&A deals that is useful to researchers, practitioners, analysts, corporates boards, and standard setters.

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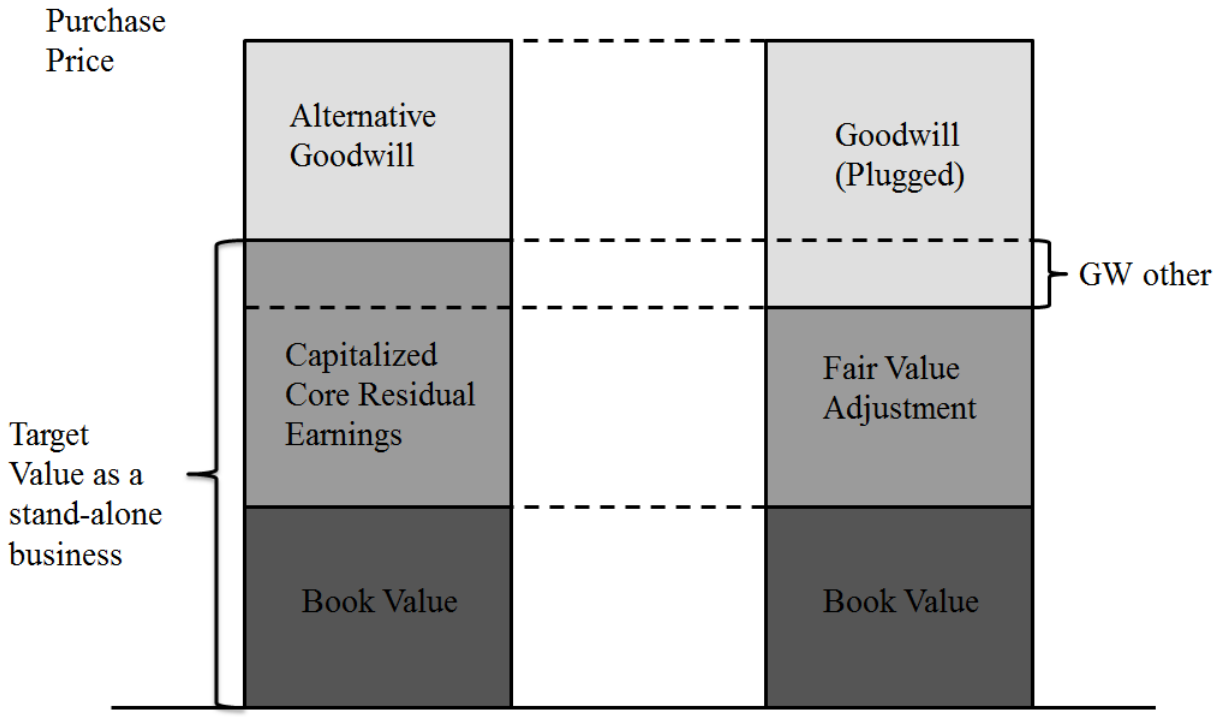
Appendix: Variable Definitions

Variable	Definition	Description
PP	Purchase price (in $ millions)	The purchase price as reported in the acquiring company's 10-K. Reported acquisition costs are added to purchase prices for deals made after December 15, 2008 (effective date of SFAS 141R). If expensed acquisition cost is not reported, 2.7 percent of the purchase price (average reported acquisition cost over the purchase price in the sample) is added to the purchase price.
BV	Book Value (scaled by PP)	Common shareholders' equity (CSE)/ Common shares outstanding (CSHO) CSE is defined following the appendix in Nissim and Penman (2001): CSE=Common equity (CEQ)+Preferred treasury stock (TSTKP)-Preferred dividends in arrears (DVPA). If CSHO is missing, Common shares used to calculate basic earnings per share (CSHPRI) replaces CSHO.
CCE	Capitalized core residual earnings (scaled by PP)	The capitalized residual operating earnings with no growth assumption. If negative, *CCE* is replaced with zero.
AGW	Goodwill estimated with the alternative method (scaled by *PP*)	Purchase price (*PP*)-Book value (*BV*)- Capitalized core residual earnings (*CCE*).
FVadj	Fair value adjustment (scaled by *PP*)	The fair value of identifiable net assets (*FVadj*) =Purchase price (*PP*)-Goodwill (*GW*)-Book value (*BV*).
GW	Goodwill (scaled by *PP*)	The amount of purchase price allocated to goodwill as reported in the acquiring company's10-K and the amount of indefinite life intangibles.
GWother	Goodwill other than the value from long-term growth (scaled by *PP*)	The difference between the value from the alternative goodwill (*AGW*) and goodwill (*GW*).
GWI	Goodwill impairment	Indicator variable equal to 1 if a company reported goodwill impairment related to the target with purchase price allocation data in any year after the merger or acquisition and 0 otherwise. When a company does not explicitly disclose the acquisition related to the impairment, the relationship between the target and the impairment is checked manually. If the business of the segment reporting goodwill impairment is similar to the business of the target

		before the combination, the impairment is assumed to be related to the target. *GWI* also includes write-downs of indefinite life intangibles.
CAR_{t+1}	One-year cumulative size-adjusted abnormal returns of acquirers	CAR_{t+1} is the cumulative size-adjusted abnormal return of acquirers over a period of one year after deal announcement.
CAR_{t+2}	Two-year cumulative size-adjusted abnormal returns of acquirers	CAR_{t+2} is the cumulative size-adjusted abnormal return of acquirers over a period of two years after deal announcement.
Prem4wk	Acquisition premium	*Prem4wk* is the amount of premium based on the price of a target four weeks before deal announcement.
AnnRet *(Acquirer)*	Announcement date returns of acquirers	*AnnRet* is the value-adjusted cumulative abnormal returns (three days) around deal announcements. The following trading day is taken as the announcement date for deals announced on a non-trading day.
Size	Size of acquirer	The logarithm of the market value of the acquirer (MKVALT).
Focus	M&A focus	Indicator variable equal to 1 if two-digit SIC codes of target and acquirer are the same and 0 otherwise.
PctStock	Percentage of stock payment	Percentage of payment in merger and acquisition deals made with stock.
OV	Overpriced share	Similar to Gu and Lev (2011), *OV* is the price (PRCC) to earnings (EPSPX) ratio adjusted for the industry average. Industry means that companies have the same four-digit SIC code. An *OV* less than 0 is replaced with 0, and an *OV* greater than 100 is replaced with 100.
RelSize	Relative deal size over the size of acquirer	*RelSize* is the relative size of a deal over the market value of an acquirer (*PP/MKVALT*).
AcqCash	Acquirer Cash	*AcqCash* is cash and cash equivalents (CHEs) of an acquirer scaled by total assets (AT).
Beta	Beta of acquirer	*Beta* is estimated from a regression of monthly returns ($R - R_f$) on market returns ($R_m - R_f$) using the 36-month return period.
BTM	Book-to-market ratio of acquirer	*BTM* is acquirers' book-to-market ratio (CSE/Mkvalt) before deal announcements.
MOM	Momentum measure of acquirer	*MOM* is the size-adjusted cumulative abnormal returns for the six-month period before deal announcements.

Figure 1: Purchase Price Allocation Based on the Alternative Approach and GAAP



This figure compares the decomposition of purchase prices based on the alternative method introduced in the paper (left column) with current GAAP accounting (right column). The left column shows the target value as a stand-alone business, which is the sum of book value and capitalized core residual earnings. The capitalized core residual earnings indicates the value of the target's operation. The right column shows goodwill to be a plugged number after the fair value of identifiable net assets is estimated. The dotted line between goodwill and alternative indicates that goodwill can be decomposed into the alternative goodwill (*AGW*) and the remainder (*GWother*).

Figure 2: Mean Post-deal Announcement Returns

Figure 2 A: Mean cumulative raw returns for three portfolios based on the portion of alternative goodwill (*AGW*) in the purchase prices (*PP*)

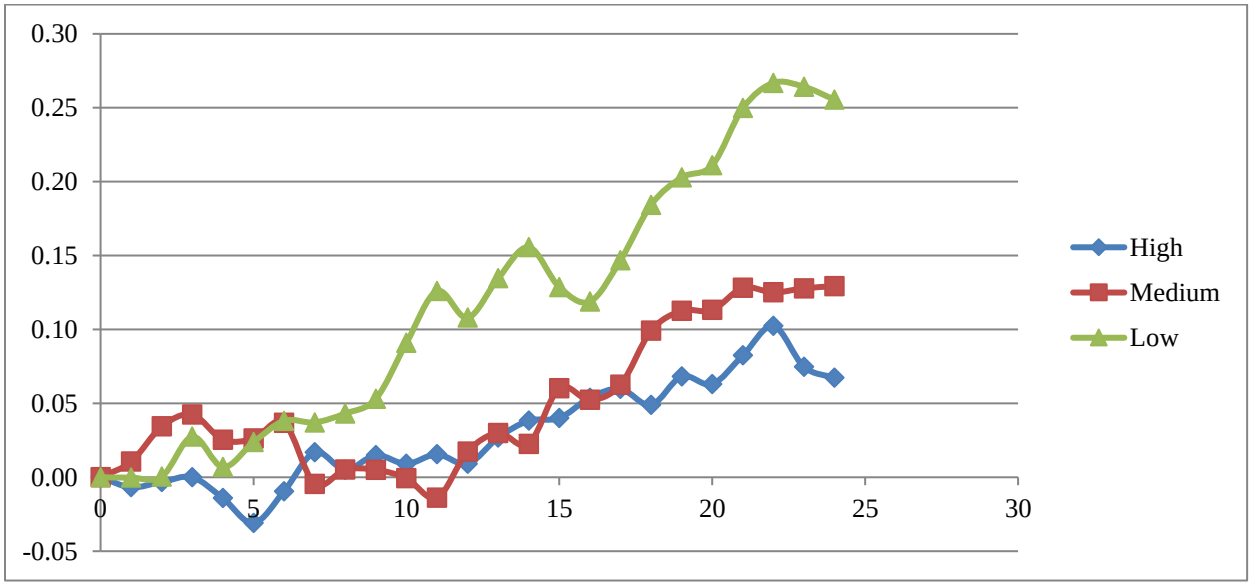
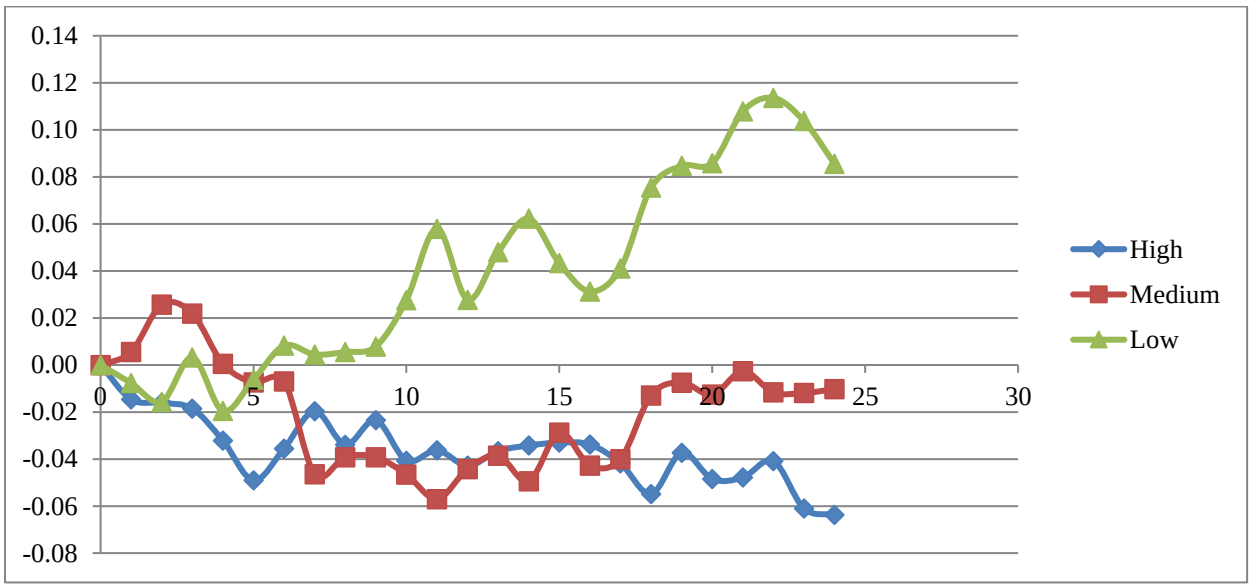
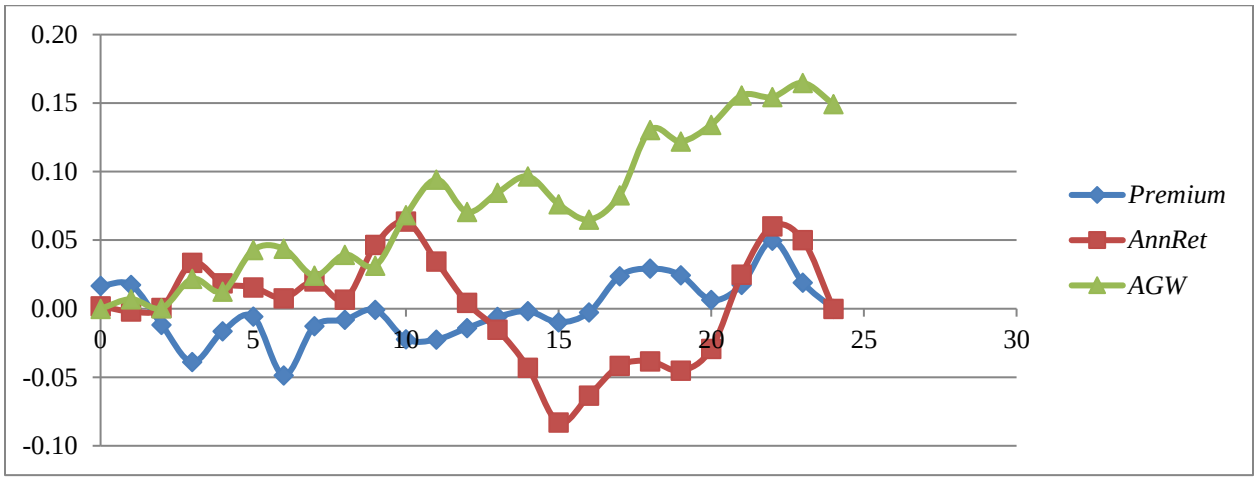


Figure 2 B: Mean size-adjusted cumulative abnormal returns for three portfolios based on the portion of the alternative goodwill (*AGW*) in the purchase prices (*PP*)



These figures illustrate the main findings of the study. The portfolios are formed on deal announcement dates based on the portion of the alternative goodwill (*AGW*) in the purchase prices (*PP*). High (low) portfolio indicates that acquirers paid relatively more (less) than other acquirers for *AGW*. In both Figures 2 A and 2 B, the mean cumulative raw (abnormal) returns of high (low) portfolios are lower (higher) than the mean cumulative raw (abnormal) returns s of other portfolios. If a stock is delisted during the 24-month period after the deal announcement, I apply CRSP delisting returns for the first month and assume reinvestment at the risk-free rate.

Figure 3: Post-deal Announcement Hedge Portfolio Returns



This figure compares the predictability of three measures (*Premium*, *AnnRet*, and *AGW*) on hedge portfolio returns. After forming three portfolios based on *Premium*, *AnnRet*, and *AGW*, a long (short) position is taken for the low *Premium* and *AGW* (*AnnRet*) and a short (long) position is taken for the high *Premium* and *AGW* (*AnnRet*).

Table 1: Sample Selection Process

Thomson SDC Platinum mergers and acquisitions Deal announcements made between June 30, 2001 (SFAS 141 effective), and December 31, 2010 Deal value at least $10 million Both acquirer and target are in NYSE, Nasdaq, or AMEX Acquisition of 100% shares of target Non-financial acquirer and target	**772**
(-) observations cannot be linked to Compustat, and I/B/E/S	(363)
Remaining observations	409
(-) observations without purchase price allocation in 10-K filing in SEC EDGAR	(191)
Remaining observations	218
(-) observations with missing control variables	(6)
Remaining observations	**212**

Table 2: Descriptive Statistics

Variables	N	Mean	Std Dev	5th Pctl	Median	95th Pctl
PP(in $ millions)	212	1937.39	4396.93	39.78	624.35	7198.60
BV	212	0.38	0.35	0.07	0.29	1.06
CCE	212	0.17	0.35	0.00	0.00	0.75
AGW	212	0.45	0.52	-0.50	0.58	0.91
FVadj	212	0.07	0.45	-0.60	0.11	0.58
GW	212	0.55	0.29	0.05	0.57	0.95
GWother	212	0.09	0.64	-0.58	0.02	0.89
GWI	212	0.25	0.44	0.00	0.00	1.00
CAR_{t+1}	212	-0.02	0.38	-0.66	-0.01	0.54
CAR_{t+2}	212	0.00	0.44	-0.69	0.03	0.68
Prem4wk	212	0.29	0.58	-0.01	0.22	0.50
AnnRet(Acquirer)	212	-0.02	0.08	-0.16	-0.02	0.10
Size	212	7.91	1.70	5.36	7.91	10.75
Focus	212	0.68	0.47	0.00	1.00	1.00
PctStock	212	38.96	41.32	0.00	30.11	100.00
OV	212	13.92	25.54	0.00	2.63	55.10
RelSize	212	0.45	0.53	0.01	0.22	1.43
AcqCash	212	0.18	0.17	0.01	0.12	0.53

This table reports descriptive statistics for M&A deals, purchase price allocations based on GAAP accounting, and components of the purchase price based on the new method introduced in the study. *PP* (in $ millions) is purchase price as reported in 10-K. *BV* is the book value of the target. *CCE* is the capitalized core residual earnings. *AGW* is the goodwill measured with the alternative method. *FVadj* is the fair value adjustment of identifiable net assets. *GW* is the portion of the purchase price allocated to goodwill. *GWother* is the difference between the alternative goodwill (*AGW*) and goodwill (*GW*) under current GAAP. *GWI* is an indicator variable equal to 1 if goodwill impairment to identified target is reported in any year after the merger or acquisition and 0 otherwise. CAR_{t+1} is returns of acquirers over a period of one year after deal announcement. CAR_{t+2} is returns of acquirers over a period of two years after deal announcement. *Prem4w*k is the amount of premium based on the price at four weeks before the deal announcement. *AnnRet* is announcement date (three-day) returns of acquirers around deal announcements. *Size* is the log market value of the acquirer. *Focus* is an indicator variable equal to one if the two-digit SIC codes of target and acquirer are the same. *PctSto*ck is the percentage of payment made with stock. *OV* is acquirers' industry-adjusted price-to-earnings ratio. *RelSize* is the relative size of a deal over the market value of an acquirer. *AcqCash* is the acquirer's cash and cash equivalents scaled by total assets. *BV*, *CCE*, *AGW*, *FVadj*, *GW*, and *GWother* are scaled by the purchase price (*PP*).

Table 3: Correlation Matrix

N=212	*BV*	*CCE*	*AGW*	*FVadj*	*GW*	*GWother*	*GWI*	CAR_{t+1}	CAR_{t+2}	*Prem4wk*	*AnnRet*
BV	1	0.09	-0.74	-0.76	-0.03	0.59	-0.05	0.11	0.17	0.20	0.02
CCE	-0.20	1	-0.74	-0.25	0.27	0.72	-0.03	0.13	0.17	-0.08	-0.04
AGW	-0.69	-0.46	1	0.68	-0.16	-0.89	0.05	-0.17	-0.23	-0.08	0.01
FVadj	-0.53	0.11	0.42	1	-0.63	-0.85	-0.02	-0.10	-0.19	-0.22	0.00
GW	-0.20	0.11	0.11	-0.61	1	0.59	0.09	0.02	0.09	0.10	-0.02
GWother	0.40	0.45	-0.73	-0.75	0.50	1	0.00	0.14	0.23	0.11	-0.02
GWI	-0.03	0.05	0.01	-0.08	0.12	0.07	1	-0.15	-0.15	-0.10	-0.06
CAR_{t+1}	0.10	0.07	-0.14	-0.10	0.02	0.12	-0.13	1	0.57	-0.06	0.02
CAR_{t+2}	0.15	0.08	-0.19	-0.17	0.06	0.18	-0.11	0.65	1	-0.09	-0.01
Prem4wk	-0.01	-0.16	0.05	0.01	-0.03	-0.04	-0.13	-0.03	-0.03	1	0.08
AnnRet	0.07	-0.04	-0.02	-0.04	-0.05	-0.02	-0.08	0.02	-0.02	-0.04	1

Table 3 presents the correlation matrix of variables used in the paper. The upper diagonal reports Pearson, the lower diagonal Spearman, correlations. All variables are defined in Table 2.

Table 4: Long-term Returns of Acquirers after Deal Announcements

	Mean cumulative raw returns				Mean size-adjusted CARs		
	High	Medium	Low		High	Medium	Low
0 m	0.00	0.00	0.00	0 m	0.00	0.00	0.00
1 m	-0.01	0.01	0.00	1 m	-0.01	0.01	-0.01
2 m	0.00	0.03	0.00	2 m	-0.02	0.03	-0.02
3 m	0.00	0.04	0.03	3 m	-0.02	0.02	0.00
4 m	-0.01	0.03	0.01	4 m	-0.03	0.00	-0.02
5 m	-0.03	0.03	0.02	5 m	-0.05	-0.01	-0.01
6 m	-0.01	0.04	0.04	6 m	-0.04	-0.01	0.01
7 m	0.02	0.00	0.04	7 m	-0.02	-0.05	0.00
8 m	0.01	0.01	0.04	8 m	-0.03	-0.04	0.01
9 m	0.01	0.01	0.05	9 m	-0.02	-0.04	0.01
10 m	0.01	0.00	0.09	10 m	-0.04	-0.05	0.03
11 m	0.02	-0.01	0.13	11 m	-0.04	-0.06	0.06
12 m	0.01	0.02	0.11	12 m	-0.04	-0.04	0.03
13 m	0.03	0.03	0.13	13 m	-0.04	-0.04	0.05
14 m	0.04	0.02	0.16	14 m	-0.03	-0.05	0.06
15 m	0.04	0.06	0.13	15 m	-0.03	-0.03	0.04
16 m	0.05	0.05	0.12	16 m	-0.03	-0.04	0.03
17 m	0.06	0.06	0.15	17 m	-0.04	-0.04	0.04
18 m	0.05	0.10	0.18	18 m	-0.05	-0.01	0.08
19 m	0.07	0.11	0.20	19 m	-0.04	-0.01	0.08
20 m	0.06	0.11	0.21	20 m	-0.05	-0.01	0.09
21 m	0.08	0.13	0.25	21 m	-0.05	0.00	0.11
22 m	0.10	0.13	0.27	22 m	-0.04	-0.01	0.11
23 m	0.07	0.13	0.26	23 m	-0.06	-0.01	0.10
24 m	0.07	0.13	0.26	24 m	-0.06	-0.01	0.09

This table reports mean cumulative raw returns and size-adjusted cumulative abnormal returns (*CAR*s) for 24 months after M&A deal announcement dates (Figure 2 is a graphical illustration of this table). Three portfolios (high, medium, and low) are based on *AGW*.

Table 5: Long-term Returns from Cross-sectional Regressions and Value from Expected Earnings Growth

Panel A: $year_{t+1}$

CAR_{t+1}	(1)		(2)		(3)	
Intercept	-0.00412	(-0.02)	0.0297	(0.14)	-0.00332	(-0.01)
AGW	-0.132**	(-2.36)	-0.138**	(-2.44)	-0.141**	(-2.50)
Prem4wk			-0.0504	(-0.95)	-0.06	(-1.04)
AnnRet			0.0396	(0.09)	0.03	(0.07)
Beta	-0.0393	(-0.95)	-0.0392	(-0.94)	-0.04	(-0.83)
Size	0.0139	(0.80)	0.01	(0.70)	0.01	(0.67)
BTM	-0.0127	(-0.11)	-0.02	(-0.16)	-0.02	(-0.13)
MOM	-0.0378	(-0.34)	-0.04	(-0.40)	-0.03	(-0.25)
Focus					0.03	(0.56)
PctStock					0.00	(-0.67)
OVI					0.03	(0.41)
$PctStock \times OVI$					0.00137	(1.06)
RelSize					0.0203	(0.27)
AcqCash					0.0391	(0.21)
N	212		212		212	
$Adj\ R^2$	0.02		0.02		0.00	

This table reports the estimation results of equation (1) with CAR_{t+1} on the left-hand side: CAR_{t+1} is size-adjusted cumulative abnormal returns for one year after deal announcement. VEG_{PP} is the value from expected earnings growth. *Prem4wk* is the amount of premium based on the price at four weeks before the deal announcement. *AnnRet* is announcement date (three-day) returns of acquirers around deal announcements. *Beta* is estimated from a regression of monthly returns ($R - R_f$) on market returns ($R_m - R_f$) using the 36-month return period. *Size* is the log market value of the acquirer. *BTM* is acquirers' book-to-market ratio before the deal announcement. *MOM* is the size-adjusted cumulative abnormal returns for the six-month period before the deal announcement. *Focus* is an indicator variable equal to one if the two-digit SIC codes of target and acquirer are the same. *PctStock* is the percentage of payment made with stock. *OVI* is an overvalued share indicator variable that is equal to one if the acquirer's industry-adjusted price-to-earnings ratio is in the first quintile, zero otherwise. *RelSize* is the relative size of a deal over the market value of an acquirer. *AcqCash* is the acquirer's cash and cash equivalents scaled by total assets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. t-value is reported in parentheses.

Table 5 (Continued)

Panel B: $year_{t+2}$

CAR_{t+2}	(1)		(2)		(3)	
Intercept	-0.269	(-1.37)	-0.219	(-1.10)	-0.214	(-0.94)
AGW	-0.176***	(-2.97)	-0.183***	(-3.05)	-0.182***	(-2.82)
Prem4wk			-0.0725*	(-1.79)	-0.0961**	(-2.27)
AnnRet			0.0176	(0.04)	0.151	(0.33)
Beta	0.00422	(0.09)	0.00330	(0.07)	-0.00515	(-0.10)
Size	0.0351*	(1.96)	0.0328*	(1.82)	0.0282	(1.46)
BTM	0.148*	(1.92)	0.137*	(1.79)	0.191**	(2.10)
MOM	0.0143	(0.05)	-0.0237	(-0.09)	0.0283	(0.10)
Focus					0.00971	(0.14)
PctStock					0.000995	(1.04)
OVI					0.0653	(0.78)
$PctStock \times OVI$					0.000302	(0.20)
RelSize					-0.115	(-1.28)
AcqCash					0.0928	(0.51)
N	212		212		212	
$Adj\ R^2$	0.05		0.05		0.06	

This table reports the estimation results of equation (1) with CAR_{t+2} on the left-hand side: CAR_{t+2} is size-adjusted cumulative abnormal returns for two years after the deal announcement. VEG_{PP} is the value from long-term growth. *Prem4wk* is the amount of premium based on the price at four weeks before the deal announcement. *AnnRet* is announcement date (three-day) returns of acquirers around deal announcements. *Beta* is estimated from a regression of monthly returns ($R - R_f$) on market returns ($R_m - R_f$) using the 36-month return period. *Size* is the log market value of the acquirer. *BTM* is acquirers' book-to-market ratio before the deal announcement. *MOM* is the size-adjusted cumulative abnormal returns for the six-month period before the deal announcement. *Focus* is an indicator variable equal to one if the two-digit SIC codes of target and acquirer are the same. *PctStock* is the percentage of payment made with stock. *OVI* is an overvalued share indicator variable that is equal to one if the acquirer's industry-adjusted price-to-earnings ratio is in the first quintile and zero otherwise. *RelSize* is the relative size of a deal over the market value of an acquirer. *AcqCash* is the acquirer's cash and cash equivalents scaled by total assets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. t-value is reported in parentheses.

Table 6: Goodwill Impairments and Value from Expected Earnings Growth

GWI	(1)		(2)		(3)		(4)		(5)		(6)	
Intercept	-0.658	(0.26)	-0.265	(0.04)	-1.062	(0.64)	-0.659	(0.23)	-1.576	(1.30)	-1.259	(0.78)
GW	0.941	(2.28)	1.043	(2.56)								
AGW					0.796*	(3.38)	0.783*	(3.18)	2.040**	(6.35)	2.167**	(6.59)
GWother									1.215*	(3.37)	1.342*	(3.78)
Prem4wk			-1.580	(2.40)			-1.567	(2.24)			-1.621	(2.36)
AnnRet			-0.510	(0.05)			-0.703	(0.09)			-0.112	(0.00)
Size	-0.206	(2.46)	-0.224*	(2.78)	-0.172	(1.78)	-0.182	(1.94)	-0.202	(2.29)	-0.214	(2.48)
BTM	0.119	(0.06)	0.140	(0.08)	0.706	(1.53)	0.767	(1.75)	0.561	(0.97)	0.596	(1.04)
Focus	0.116	(0.09)	0.166	(0.18)	0.0439	(0.01)	0.0792	(0.04)	0.184	(0.22)	0.241	(0.37)
PctStock	-0.0009	(0.04)	-0.0014	(0.09)	-0.0001	(0.00)	-0.0007	(0.02)	-0.0005	(0.01)	-0.0008	(0.03)
OVI	-1.714*	(3.81)	-1.421	(2.69)	-1.541*	(3.21)	-1.338	(2.40)	-1.805**	(3.97)	-1.557*	(2.98)
PctStock ×OVI	-0.0232	(0.72)	-0.0279	(1.00)	-0.0255	(0.89)	-0.0284	(1.07)	-0.0235	(0.74)	-0.0277	(1.00)
RelSize	0.995***	(7.72)	0.917**	(6.26)	1.055***	(8.32)	0.965***	(6.75)	1.044***	(8.11)	0.982***	(6.87)
AcqCash	1.582	(1.81)	1.830	(2.21)	1.536	(1.71)	1.644	(1.86)	1.919	(2.50)	2.193*	(2.99)
N	212		212		212		212		212		212	
Pseudo R^2	0.24		0.26		0.25		0.27		0.27		0.29	

Table 7 reports the estimation results of equation (3): *GWI* is an indicator variable equal to 1 if goodwill impairment to the identified target is reported in any year after the merger or acquisition and 0 otherwise. *GW* is the portion of the purchase price allocated to goodwill. *AGW* is the alternative goodwill estimated with the alternative method. *GWother* is the difference between the alternative goodwill (*AGW*) and goodwill (*GW*). *Prem4wk* is the amount of premium based on the price at four weeks before the deal announcement. *AnnRet* is announcement date (three-day) returns of acquirers around deal announcements. *Size* is the log market value of the acquirer. *BTM* is acquirers' book-to-market ratio before the deal announcement. *Focus* is an indicator variable equal to one if the two-digit SIC codes of target and acquirer are the same. *PctStock* is the percentage of payment made with stock. *OVI* is an overvalued share indicator variable that is equal to one if the acquirer's industry-adjusted price-to-earnings ratio is in the first quintile, and zero otherwise. *RelSize* is the relative size of a deal over the market value of an acquirer. *AcqCash* is the acquirer's cash and cash equivalents scaled by total assets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The chi-squared statistic is reported in parentheses.

Table 7: The alternative estimation method

Panel A:

CAR_{t+i}	CAR_{t+1}		CAR_{t+2}	
Intercept	-0.0418	(-0.19)	-0.262	(-1.18)
AGW_{RE}	-0.139*	(-1.67)	-0.185**	(-2.41)
Prem4wk	-0.0610	(-1.09)	-0.0994**	(-2.36)
AnnRet	0.0693	(0.15)	0.210	(0.43)
Beta	-0.0385	(-0.91)	-0.0102	(-0.21)
Size	0.0143	(0.79)	0.0313	(1.63)
BTM	0.0116	(0.10)	0.224**	(2.58)
MOM	-0.0494	(-0.42)	-0.0254	(-0.09)
Focus	0.0338	(0.60)	0.0133	(0.20)
PctStock	-0.000498	(-0.57)	0.00108	(1.12)
OVI	0.0236	(0.38)	0.0638	(0.76)
PctStock × *OVI*	0.00133	(1.00)	0.000253	(0.16)
RelSize	0.00939	(0.12)	-0.128	(-1.40)
AcqCash	0.0650	(0.35)	0.125	(0.68)
N	212		212	
Adj R^2	-0.01		0.04	

Panel B:

GWI	(1)		(2)	
Intercept	-0.680	(0.25)	-1.044	(0.57)
AGW_{RE}	1.043**	(5.13)	2.274***	(7.07)
GWother			1.176*	(3.09)
Prem4wk	-1.424	(1.81)	-1.412	(1.76)
AnnRet	-1.035	(0.19)	-0.585	(0.06)
Size	-0.187	(2.07)	-0.229*	(2.80)
BTM	0.748	(1.81)	0.483	(0.74)
Focus	0.0808	(0.04)	0.201	(0.26)
PctStock	-0.000693	(0.02)	-0.00128	(0.07)
OVI	-1.339	(2.41)	-1.528*	(2.93)
PctStock × *OVI*	-0.0289	(1.08)	-0.0275	(0.96)
RelSize	1.052***	(7.72)	1.077***	(7.94)
AcqCash	1.453	(1.45)	1.933	(2.34)
N	212		212	
Pseudo R^2	0.2759		0.2936	

AGW_{RE} is the alternative goodwill estimated with the two-period residual earnings model. All other variables are defined in previous tables. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. t-value is reported in parentheses for Panel A, and the chi-squared statistic is reported in parentheses for Panel B.

Table 8: Short-term Market Reactions and Value from Expected Earnings Growth

AnnRet	(1)		(2)	
Intercept	0.0196	(1.59)	0.0188	(1.54)
AGW	-0.00346	(-0.35)	-0.00272	(-0.27)
Prem4wk			0.00820	(1.17)
Focus	-0.0188*	(-1.74)	-0.0193*	(-1.77)
PctStock	-0.000582***	(-3.39)	-0.000579***	(-3.36)
OVI	0.0101	(0.81)	0.00696	(0.55)
$PctStock \times OVI$	-0.00000626	(-0.02)	0.0000418	(0.13)
RelSize	-0.00396	(-0.28)	-0.00386	(-0.27)
AcqCash	-0.0249	(-0.59)	-0.0322	(-0.73)
N	212		212	
$Adj\ R^2$	0.10		0.09	

This table represents the estimation result of equation (2): *AnnRet* is the announcement date (three-day) returns of acquirers around deal announcements. *AGW* is the alternative goodwill estimated with the alternative method. *Prem4wk* is the amount of premium based on the price at four weeks before the deal announcement. *Focus* is an indicator variable equal to one if the two-digit SIC codes of target and acquirer are the same. *PctStock* is the percentage of payment made with stock. *OVI* is an overvalued share indicator variable that is equal to one if the acquirer's industry-adjusted price-to-earnings ratio is in the first quintile, and zero otherwise. *RelSize* is the relative size of a deal over the market value of an acquirer. *AcqCash* is the acquirer's cash and cash equivalents scaled by total assets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. t-value is reported in parentheses.

Table 9: Acquirer's Long-term Performance and Components of Value from Expected Earnings Growth

Panel A:

CAR_{t+i}	CAR_{t+1}		CAR_{t+2}	
Intercept	-0.135	(-0.66)	-0.364*	(-1.67)
UMV	-2.239***	(-3.48)	-1.835**	(-2.05)
Prem4wk	-0.0594	(-1.16)	-0.0928**	(-2.27)
AnnRet	0.0245	(0.05)	0.139	(0.29)
Beta	-0.0352	(-0.83)	-0.00879	(-0.17)
Size	0.0192	(1.08)	0.0341*	(1.76)
BTM	0.00927	(0.09)	0.231**	(2.58)
MOM	-0.0349	(-0.31)	-0.0840	(-0.29)
Focus	0.0272	(0.48)	0.00922	(0.13)
PctStock	-0.000670	(-0.76)	0.000992	(1.01)
OVI	0.0166	(0.27)	0.0542	(0.63)
$PctStock \times OVI$	0.00134	(1.03)	0.000174	(0.11)
RelSize	0.0374	(0.50)	-0.0982	(-1.08)
	0.0816	(0.45)	0.142	(0.77)
N				
$Adj\ R^2$	212		212	

Panel B:

GWI		
Intercept	-0.651	(0.23)
UMV	30.07**	(5.98)
Prem4wk	-0.560	(0.44)
AnnRet	-0.322	(0.02)
1yrRet	-0.204	(2.34)
Size	0.671	(1.58)
Focus	0.209	(0.28)
PctStock	0.00084	(0.03)
OVI	-1.269	(2.14)
PctStock ×OVI	-0.0304	(1.21)
RelSize	1.023***	(7.32)
	1.732	(1.96)
N		
Pseudo R^2	212	

UMV is *MV-TV* where *MV* is the market value of a target four weeks before a deal announcement; *TV* is the value of a target, which is the sum of *BV* and *CCE*. Note that the sum of *UMV* and *Prem4wk* is equal to *AGW*. All other variables are defined in previous tables. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. t-value is reported in parentheses for Panel A, and the chi-squared statistic is reported in parentheses for Panel B.