Accounting Discretion and Purchase Price Allocation after Acquisitions[*]

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Abstract

This study investigates acquirers' allocation of purchase price between goodwill and identifiable intangible assets upon the completion of acquisitions. SFAS 142 replaces goodwill amortization with periodic impairment tests based on fair value estimates, while most identifiable intangible assets are still amortized over finite useful lives. As a result of the new differential accounting treatment, we predict and find that managers allocate more purchase price to goodwill post SFAS 142 to reduce amortization expenses when they anticipate greater discretion in future goodwill assessment to avoid reporting impairment. We also find that older CEOs who likely care more about short-term accounting earnings and bonus record more goodwill to avoid amortization expenses. The results are robust to controls for the economic determinants of the allocation. The explanatory power of acquirer/CEO characteristics that capture managers' reporting incentives is greater than that of the economic determinants. In contrast, these variables cannot explain the purchase price allocation prior to SFAS 142. The findings suggest that unverifiable accounting measures likely deviate from the underlying economics as a result of management exploiting their accounting discretion. We also explore the role of external appraisers in the post SFAS 142 period and find mixed results.

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1. Introduction

Researchers and regulators have long debated the accounting for intangible assets. The debate centers on the relevance and reliability of intangible valuation and the existing research produces mixed results. Value-relevance studies examine the association between constructed or recognized value of intangibles and firms' market values to infer the relevance of capitalized intangibles (e.g., Lev and Sougiannis, 1996; and Kallapur and Kwan, 2004). While these studies find significant associations, Kallapur and Kwan (2004) also note that the association varies with contracting considerations, suggesting that the reliability of intangible valuation is affected by managers' reporting incentives. A second line of research investigates the determinants of voluntary recognition of intangible assets to infer the reliability of intangible measurements. While Muller (1999) finds that contracting motives significantly affect the decision to recognize intangible assets, Wyatt (2005) argues that the underlying economics are more important determinants of the decision than contracting motives.

The passage of SFAS 142, *Goodwill and Other Intangible Assets*, further intensifies the debate. Under SFAS 142, acquired goodwill is no longer subject to amortization. Firms are required to allocate goodwill to reporting units based on benefits expected from the acquisitions and then conduct periodic goodwill impairment tests based on estimated fair values of reporting units and identifiable net assets.[1]

Watts (2003) argues that the implementation of SFAS 142 relies on unverifiable fair value estimates that are likely to be manipulated. He also points out that lobbying activities played a role in the formulation of SFAS 142. Ramanna (2006) examines the lobbying process and argues that the lobbying firms supported the fair-value-based goodwill impairment test as a means to seek greater flexibility in accounting. Beatty and Weber (2006) investigate firms' actions upon the adoption of

[1] A reporting unit is an operating segment as defined in SFAS 131, *Disclosures about Segments of an Enterprise and Related Information*, or one level below an operating segment.

SFAS 142 and find that opportunistic reporting incentives affected the decision to record goodwill impairment in the transition period. It is yet to be explored how reliable firms' valuation of goodwill and other intangible assets is in the routine implementation of SFAS 142.

Motivated by the debate on the accounting for intangible assets and that on SFAS 142, this study investigates the allocation of purchase price between goodwill and other intangible assets, the initial valuation of these acquired assets, upon the completion of a merger or an acquisition. While the fair value of the acquired entity is verifiable at this point, the fair values of individual assets are not. Further, the allocation of purchase price among different assets post SFAS 142 directly affects acquirers' subsequent financial reporting, as a result of the new differential treatment of goodwill and identifiable intangible assets with finite lives. In contrast to goodwill that is no longer amortized under SFAS 142, identifiable intangible assets with finite lives such as developed technologies and customer base are still subject to amortization. Recording amortization regularly constrains managers' accounting discretion. Also, managers are reportedly concerned with the amortization of acquired intangibles leading to higher reported expenses and lower earnings after acquisitions (Johnson, 1993). As executive compensation is usually tied to earnings, intangible amortization can reduce CEO bonuses. CEOs are thus motivated to record less intangibles post SFAS 142 to cut amortization expenses. In particular, older CEOs likely have a stronger incentive to avoid amortization expenses and maximize short-term compensation, given their limited horizon and weakened career concerns. We hypothesize that older CEOs allocate more purchase price to goodwill relative to identifiable intangibles than determined by the underlying economics.

However, it can be costly to manipulate the initial valuation of acquired intangible assets by recording more goodwill relative to other intangible assets. Allocating more purchase price to goodwill increases the likelihood of large goodwill impairment write-offs in the future. Pender (2001) argues that goodwill write-offs are considered a manifestation of past acquisition mistakes that can lead to management dismissal. As a result, we predict that managers likely manipulate the

allocation towards goodwill when expecting that they can hide future goodwill impairment by exercising discretion in the tests.[2] We measure managers' capability to avoid future goodwill write-offs with the three acquirer characteristics identified by Ramanna (2006): a high market-to-book ratio, large amount of unverifiable assets, and multiple reporting units.

First, we test our predictions on acquisitions post SFAS 142. As predicted, we find that older CEOs tend to allocate more purchase price to goodwill. Also, an acquirer with more discretion in future goodwill assessment, namely, with a higher market-to-book ratio and less verifiable assets, records more goodwill relative to other intangible assets. While acquirer/CEO characteristics can be correlated with the goodwill-intangible allocation to the extent that they capture acquirers' preference for certain targets and synergies from the combination, our findings are robust to controlling for target characteristics, such as target market-to-book ratio, R&D, and advertising expenditures, and measures of acquisition synergies. We also find that acquirers with multiple segments allocate more purchase price to goodwill relative to intangible assets, but the significance of the result is sensitive to the inclusion of proxies for the underlying economics. Target book-to-market ratio and R&D expenditures, capturing target's economic rents and unrecognized developed technologies, are negatively correlated with the goodwill-intangible ratio.

Our model explains about 32% of the variation of the goodwill-intangible ratio with proxies for the underlying economics and management expected discretion in future goodwill assessment. The acquirer characteristics capturing management expected discretion alone explain 23% of the variation of the goodwill-intangible allocation and their incremental explanatory power is greater than the economic variables. The results suggest that managers' accounting preferences have a substantial impact on reporting reliability when accounting measures are unverifiable. To illustrate

[2] We recognize that under certain circumstances, such as corporate restructuring or management turnovers, managers can include goodwill write-offs as a part of earnings baths. The possibility of hiding goodwill impairment in earnings baths may make goodwill write-offs appear less costly to managers than otherwise. However, anecdotal evidence (e.g., the AOL Time Warner goodwill write-off in 2002) suggests that when impairment occurs, managers are not always able to avoid losses in human capital by taking a 'bath'.

the role that verifiability plays in the allocation process, we also use the same set of variables to explain the allocation of purchase price to tangible assets, the valuation of which presumably involves less discretion.[3] None of the acquirer characteristic variables significantly explains the tangible to total purchase price ratio.

Second, we examine the purchase price allocation of acquisitions prior to SFAS 142 to further mitigate the concern that our variables capturing management's expected discretion in future goodwill tests are related to the economics underlying the allocation. Since our predictions on the variables of interest are based on the new accounting methods prescribed by SFAS 142, we do not expect them to explain the pre-SFAS 142 allocation. Also, in the regression to explain the allocation decision, we expect the coefficients on these variables to differ significantly between the pre and post SFAS 142 regimes. Our findings are largely consistent with these expectations, suggesting that our post SFAS 142 results cannot be solely explained by the economics of goodwill/intangible valuation, but rather related to the implementation of SFAS 142.

Furthermore, we investigate mechanisms that potentially enhance the reliability of the valuation of intangible assets. Dietrich et al. (2001) and Muller and Riedl (2002) find that valuation of investment properties conducted by external independent appraisers is more accurate and associated with less information asymmetry than internal valuation. We explore the role of external appraisers in the allocation of acquisition price, an accounting procedure presumably less verifiable than the valuation of tangible properties. We find that most of the variables capturing management's opportunism are not significantly associated with the allocation between goodwill and other intangibles in the presence of an external appraiser; only CEO tenure, which also proxies for CEO

[3] While intangibles are not always recognized in accounting, tangibles, purchased or internally constructed, are all recorded as assets. Barth et al. (1998) and Wyatt (2005) note that reliability is a major reason why intangibles are not always recorded. These arguments imply that measurement of tangible assets generally involves less discretion and is more reliable.

entrenchment, still affects the allocation. The findings suggest that external appraisers can constrain management' opportunism in intangible valuation to a certain extent but unlikely eliminate it.

Finally, for a sub-sample of multi-segment acquirers, we conduct an additional test examining the correlation between the profitability of a reporting unit and the percentage of goodwill allocated to the unit. If managers prefer greater flexibility in future goodwill assessments and/or impairment decisions, more profitable reporting units are likely to receive more goodwill allocation. Consistent with the prediction, we find a strong positive correlation between the profitability ranking of a reporting unit and the percentage of goodwill allocated to that unit. While we cannot completely rule out that firms expand their profitable product lines through acquisitions, the results are robust to controlling for industry commonality between the target and different reporting units of the acquiring company.

This paper contributes to the literature in several ways. First, this study sheds light on the reliability of intangible valuation by investigating managers' valuation of goodwill and other intangible assets right after acquisitions. We show that managers likely manipulate the allocation between goodwill and other intangibles when the benefit (cost) of manipulation is higher (lower). Moreover, we find that management's opportunism is more important than the economic determinants in explaining the allocation decision, casting doubt on the reliability of intangible and goodwill valuation under SFAS 142. The evidence suggests that the impact of managerial discretion cannot be ignored in interpreting the reported accounting information post SFAS 142.

Second, more generally, our findings have implications for fair-value-based accounting procedures that are built on unverifiable estimates. SFAS 142 is considered an important step towards fair-value-based accounting (Watts, 2003). Our results indicate that the unverifiable fair value estimates can deviate from the underlying economics as a result of management taking advantage of the discretion in measurement. While this study does not explore the net benefits or costs of fair-value-based accounting relative to alternative accounting methods and therefore cannot

generate direct implications for standard setting, the findings are useful as inputs in evaluating fair-value-based accounting procedures.

Third, our results also suggest that external appraisers potentially play an important role in enhancing the reliability of fair value measurements. The findings can help users of financial statements better assess fair value measurements and can also be useful to regulators in assessing fair-value-based accounting procedures and disclosures.

Finally, this study answers the call by Healy and Whalen (1999) for more research on how earnings are managed. Our findings reveal a manipulable accounting procedure that has been largely overlooked in the prior literature and have implications for research on the impairment of acquired assets.

The rest of the paper is organized as follows. Section 2 reviews related provisions in SFAS 142 and previous studies. Development of the hypotheses is explained in Section 3. Section 4 discusses sample selection procedures and empirical results. Section 5 concludes.

2. Background

2.1. Accounting for acquired goodwill and identifiable intangible assets

Acquired goodwill and identifiable intangible assets were both recognized and amortized over their estimated useful lives until SFAS 142 became effective in July 2001. SFAS 142 promulgates new approaches to allocate acquired goodwill within the acquirer upon completion of an acquisition and new accounting procedures for assessing goodwill subsequent to the acquisition.

The first new procedure is related to the allocation of acquisition price. Acquirers need to allocate the purchase price to acquired tangible and identifiable intangible assets, such as patents and developed technologies, based on their fair values with the remainder recorded as goodwill. Next is the allocation of goodwill. Prior to SFAS 142, SFAS 121, *Accounting for the Impairment of Long-lived Assets and for Long-lived Assets to Be Disposed of*, required firms to allocate goodwill to acquired tangible assets or asset groups ratably based on the relative fair values of these assets. In

contrast, SFAS 142 requires acquirers to allocate goodwill to reporting units based on the expected benefits each reporting unit obtains from the acquisition. The estimation of expected benefits, or synergies, involves assessing the fair values of reporting units before and after the acquisition.

Second, SFAS 142 replaces goodwill amortization with periodic impairment tests based on fair value estimates. In conducting the impairment tests, firms first compare the book value and estimated fair value of each reporting unit to identify potential impairment. If the book value of a reporting unit exceeds its fair value, firms should then estimate the fair value of identifiable assets and liabilities and compare it to the unit's fair value. The implied fair value of goodwill is thus the excess of the fair value of the reporting unit over the amounts assigned to its assets and liabilities. If the book value of goodwill exceeds its implied fair value, goodwill impairment should be recognized.

SFAS 142 promulgates different rules for identifiable intangible assets with finite or indefinite lives. Similar to acquired goodwill, an identifiable intangible asset with an indefinite life, such as a trademark, is not amortized. It is assessed for impairment by a comparison of its estimated fair value and the carrying book value. The vast majority of acquired identifiable intangible assets, however, are considered having finite lives (see SFAS 142 Appendix A for examples of intangible assets with an indefinite life and also Section 4 for discussions of descriptive statistics). An acquired intangible asset with a finite life is amortized over its useful life under SFAS 142. An impairment loss should be recognized if the book value of an intangible asset exceeds the undiscounted cash flows that asset is expected to generate.[4]

2.2. Related research

The accounting for goodwill and intangibles has been debated for decades. The debate relates to specific accounting treatments of intangibles but fundamentally centers on the relevance and reliability of intangibles valuation. One line of research focuses on the value relevance of capitalized intangibles by examining the association between constructed or recognized value of intangibles and

[4] See Para. 7, SFAS 144, *Accounting for the Impairment or Disposal of Long-lived Assets.*

firms' market values. For example, Lev and Sougiannis (1996) treat R&D expenses as if they were capitalized and examine the relation between the constructed R&D value and firms' market values. Barth et al. (1998) examine the relation between brand name values estimated by the financial press and firms' market values. Kallapur and Kwan (2004) investigate the association between recognized brand names and firms' market values for a sample of U.K. listed firms. While these studies find the association to be significant and positive, some of them also note problems with the reliability of intangible measurements. Kallapur and Kwan (2004) find that the association is lower when firms have stronger contracting incentives related to listing requirements and debt financing. Furthermore, the approach of inferring value relevance from the documented associations has been challenged (see Holthausen and Watts, 2001).

Another line of research investigates the determinants of a firm's decision in recognizing intangible assets to infer the relevance and reliability of the accounting for intangibles. Muller (1999) finds that contracting incentives such as exchange listing requirements and debt contracting have a significant impact on the decision to capitalize acquired brand names in the U.K. However, Wyatt (2005) argues that the underlying economics such as prevailing technology conditions are more important determinants of the recognition of intangibles than contracting incentives. She examines the intangible recognition decision for a large cross section of Australian listed firms and constructs the technology conditions variables largely at the industry level. However, while her technology condition variables can explain a significant portion of the variation of recognized identifiable intangibles, they do not explain much of the variation in goodwill and capitalized R&D assets.

The passage of the fair-value-based SFAS 142 extended the debate on the accounting for goodwill and other intangibles. Watts (2003) argues that the implementation of SFAS 142 relies on unverifiable fair value estimates that are likely to be manipulated. He also contends that lobbying activities played a role in the formulation of SFAS 142. Ramanna (2006) investigates firms' lobbying positions in the rulemaking period of SFAS 142 and finds that those anticipating greater accounting

flexibility in the goodwill impairment assessment were more likely to support the impairment test proposal. He suggests that firms are likely to use the manipulation potential post SFAS 142. Beatty and Weber (2006) examine the determinants of firms' accounting choices in the initial impairment assessment under SFAS 142. They find that equity market concerns and contracting incentives affected firms' decision to accelerate or delay the impairment recognition. Such findings are consistent with the notion that management incentives affect fair value estimates of goodwill. However, since their study examines an extraordinary one-time charge, the findings may not be generalizable to routine reporting of fair value estimates. Bens and Heltzer (2006) investigate the timeliness and information content of goodwill write-offs around SFAS 142 passage and they do not find any significant changes post SFAS 142. Li et al. (2006) find that investors and financial analysts react negatively to the announcement of an impairment loss in the transition period of SFAS 142 and that the impairment loss is followed by a decline in subsequent performance.

This study extends the research on SFAS 142 as well as that on the reliability of the accounting for intangibles. We present detailed information about the initial fair value assessment of acquired assets, the allocation of purchase price upon the completion of acquisitions. While studies on goodwill impairment focus on poor performing firms, we examine a more general setting since the allocation is performed by every acquirer. Our findings further the understanding of firms' valuation of intangibles and their implementation of SFAS 142 absent extreme economic performance. In addition, we examine not only whether an accounting choice is affected by management incentives, but also the less researched question - how important management incentives are compared to the underlying economics. While Wyatt (2005) examines this question for firms in various industries, we investigate a different accounting choice using a sample of firms with more homogeneous asset structure (to be discussed in detail in Section 4), thereby providing additional insights.

3. Hypotheses

As discussed in Section 2.1, SFAS 142 grants differential treatment for goodwill and identifiable intangible assets, potentially motivating managers to manipulate the allocation of purchase price between the two asset categories. Meanwhile, the allocation process involves unverifiable estimation of fair values of parts of a firm, thereby providing opportunities for manipulation. Whether and to what extent the allocation is manipulated depends on the benefits and costs of such manipulation.

3.1.1. Benefits of manipulating the allocation of purchase price

It has been widely noted in the financial press and among practitioners that management is concerned that the amortization of intangibles increases reported expenses and depresses earnings (e.g., Johnson, 1993; and Moehrle and Moehrle, 2001). This concern may result from managers' belief that investors fixate on reported earnings. It may also arise because managers' bonuses are tied to reported earnings (Healy, 1985). Prior to SFAS 142, acquirers could avoid amortization of acquired intangibles by using the pooling of interest method to account for acquisitions. Lys and Vincent (1995) indicate that acquirers may incur significant additional costs to obtain the more 'favorable' pooling of interest accounting treatment for acquisitions. SFAS 142 bans the pooling of interest accounting and it is alleged that the elimination of goodwill amortization in SFAS 142 is a compromise regulators offer for the restriction (Moehrle and Moehrle, 2001; and Ramanna, 2006). Under SFAS 142, in all circumstances, acquired identifiable intangible assets with finite lives are amortized while goodwill is not.

If managers are concerned with intangible amortization depressing earnings and thereby reducing their bonuses, they will allocate more purchase price to goodwill in order to avoid future amortization expenses. In particular, older CEOs likely have stronger incentives to boost up short-term earnings, given their limited horizon and weakened career concerns. Prior research argues that CEOs close to the end of their tenure focus more on short-term earnings to maximize their compensation rather than long-term performance. For example, Dechow and Sloan (1991) find that

CEOs reduce R&D expenditures to increase reported earnings during the final years in office. CEO career concerns potentially constrain managers' opportunism (Brickley et al., 1999). However, as CEOs age, career concerns become weaker. Older CEOs likely lose less if the misallocation of purchase price is discovered or the misallocation leads to goodwill impairment in the future. Thus, the net benefits of manipulating the allocation between goodwill and other intangibles are greater for older CEOs. We predict,

H1: *Ceteris paribus*, post SFAS 142, older CEOs allocate more purchase price to goodwill relative to identifiable intangible assets than expected.

The benefits of reducing intangible amortization expenses can also vary across firms with firm characteristics. Burgstahler and Dichev (1997) find that firms manage earnings to avoid reporting losses. As a result, acquirers reporting small positive earnings before an acquisition are likely more concerned with amortization depressing earnings. Also, intangible amortization reduces net assets on a regular basis. Recording less identifiable intangibles and reducing amortization expenses can help acquirers maintain a higher net worth. Acquirers with debt covenants based on net worth likely have greater incentives to reduce amortization. However, the descriptive statistics in Section 4.3 show that very few acquirers in our sample report small positive earnings before the acquisitions or have debt covenants based on net worth. Thus, there is no substantial variation in the benefits of avoiding amortization charges in our sample. Our main tests therefore assume constant benefits of manipulating the purchase price allocation towards goodwill and additional analyses of potential variation are discussed in Section 4.5.

3.1.2. Costs of manipulating the allocation of purchase price

Goodwill impairment write-offs

Manipulating the allocation of purchase price can impose costs on acquirers. Allocating more purchase price to goodwill increases the likelihood of large goodwill impairment write-offs in the future. Such write-offs are likely costly to managers and firms. Pender (2001) argues that goodwill

write-offs are considered a manifestation of past acquisition mistakes that can lead to management dismissals.[5] Li et al. (2006) find that investors and analysts revise their expectations of a firm downward upon the announcement of a goodwill impairment loss. Consequently, acquirers anticipating a lower likelihood of future goodwill impairment are more likely to manipulate the allocation of purchase price towards goodwill.

We recognize that under certain circumstances, such as corporate restructuring or management turnovers, managers can include goodwill write-offs as a part of earnings baths. The possibility of hiding goodwill impairment in earnings baths may make goodwill write-offs appear less costly to managers than otherwise. However, anecdotal evidence (e.g., the AOL Time Warner goodwill write-off in 2002) suggests that when impairment occurs, managers are not always able to avoid losses in human capital by taking a 'bath'.

The likelihood of writing off goodwill is determined by the likelihood of incurring economic losses and managers' ability to hide the losses through managing the impairment assessment of goodwill. Li et al. (2006) examine the relation between the indicators of overpayment at the time of acquisition and the likelihood of reporting a goodwill impairment loss. While they find several indicator variables are significantly correlated with reporting impairment, the overall explanatory power of the model (2-4%) suggests that the impairment is not well anticipated at the time of acquisition. As a result, in the main analyses, we assume that the likelihood of economic impairment of acquired goodwill is constant for all acquisitions. In Section 4.5, we conduct additional analyses, relaxing the assumption that economic impairment is equally likely. In our main analyses, we focus on how management's ability to manipulate future impairment assessment and hide potential losses affects the initial valuation of intangible assets. We predict that managers allocate more purchase

[5] An example is AOL Time Warner. Shortly after AOL Time Warner announced a massive goodwill impairment write-off of $54 billion related to the merger with Time Warner in March 2002, its interim chief stepped down and the company as well as several top executives was sued for issuing misleading statements.

price to goodwill when they expect greater flexibility in future goodwill impairment assessment to avoid reporting losses.[6]

Ramanna (2006) identifies three firm characteristics associated with greater manipulation potential in the SFAS 142 goodwill impairment assessment. First, he argues that firms with higher reporting-unit market-to-book ratios obtain greater flexibility under SFAS 142. Firms with higher reporting-unit market-to-book ratios likely have more internally generated economic rents. In the impairment test of acquired goodwill, the book value of acquired goodwill is compared to the fair value of goodwill at the reporting unit level, which includes the value of internally generated rents. Thus, when purchased goodwill is impaired, management is better able to cover the losses using internally generated rents and delay reporting an impairment loss for reporting units with high market-to-book ratios. We expect firms with higher reporting-unit market-to-book ratios to allocate more acquisition price to goodwill relative to identifiable intangible assets.

For a firm with a single reporting unit, the reporting unit's market-to-book ratio equals that of the firm. For firms with multiple reporting units, reporting-unit-level market-to-book ratios are unobservable. Since a higher average reporting-unit market-to-book ratio leads to a higher firm-level market-to-book ratio, we use the firm-level market-to-book ratio as a proxy for reporting-unit internally generated rents. We hypothesize,

H2: *Ceteris Paribus,* post SFAS 142, an acquirer with a higher market-to-book ratio prior to the acquisition allocates more purchase price to goodwill relative to identifiable intangible assets than expected.

Second, since the fair value of goodwill in a reporting unit is estimated as the excess of the fair value of the reporting unit over the fair value of its identifiable net assets, Ramanna (2006)

[6] Arguably, when managers expect greater flexibility in future goodwill impairment tests, they may also have incentives to lower valuation of tangible assets and therefore increase the amount of purchase price assigned to goodwill. However, tangible asset values are likely more verifiable and less manipulable. Our tests in Section 4.2 show that managers' discretion in tangible assets valuation is a less important issue in our setting.

argues that the less verifiable the net assets are, the greater discretion firms have in determining the existence and amount of impairment losses. Thus, we expect firms with less verifiable assets to allocate more purchase price to goodwill.

H3: *Ceteris Paribus,* post SFAS 142, an acquirer with less verifiable assets allocates more purchase price to goodwill relative to identifiable intangible assets than expected.

Third, as Watts (2003) points out, synergies from an acquisition are likely joint benefits that cannot be allocated across reporting units in a meaningful manner. Ramanna (2006) thus expects the existence of several large units to allow managers greater accounting flexibility in the sense that they can allocate goodwill across units strategically. However, it seems unnecessary to require multiple *large* units in order for a firm to gain greater discretion in the goodwill allocation. Consider two firms with the same size: one firm has only one reporting unit while the other has two. Managers of the two-reporting-unit firm have the option to allocate goodwill and evaluate for goodwill impairment in the same way as the first firm, namely, allocate goodwill to the two units based on their fair values and then use a firm-level average earnings multiple to estimate reporting unit fair values in subsequent impairment tests. In addition, the two-reporting-unit firm has the option to strategically allocate more goodwill to the more profitable reporting unit and manage the fair value estimates for that unit in subsequent tests.

Moreover, even if a multiple-reporting-unit firm does not allocate goodwill to multiple units, it will still have greater flexibility in future determinations of reporting unit fair values, and consequently, goodwill fair values than a single-reporting-unit firm. The allocation of expected future cash flows across reporting units again involves allocation of joint benefits and costs. Since the fair value of each unit is unverifiable, managers of a multiple-unit firm have greater room to manipulate unit-level fair value estimates than those of a single-unit firm in estimating the firm's fair value. Hence, we hypothesize,

H4: *Ceteris Paribus,* post SFAS 142, an acquirer with multiple reporting units allocates more purchase price to goodwill relative to identifiable intangible assets than expected.

Other costs/constraints with manipulation of purchase price allocation

Dietrich et al. (2001) and Muller and Riedl (2002) argue that external appraisers may serve as monitors in fair value measurements and enhance the credibility of accounting information. They find that valuation of investment properties conducted by external independent appraisers is more accurate and associated with less information asymmetry than internal valuation. If external appraisers constrain managers' manipulation of the initial valuation of goodwill and other intangible assets, we expect,

H5: The association between variables capturing CEO age/management's discretion in future goodwill assessment and the goodwill-intangible allocation is more pronounced when the initial valuation is conducted internally.

In addition, manipulation of accounting numbers is likely constrained by auditors and firms' litigation concerns. Prior research uses the size of an auditor to proxy for audit quality (e.g., Dietrich et al., 2001) and industry classifications to proxy for litigation risks (e.g., Francis et al., 1994). The descriptive statistics reported in the subsequent section show that most of our sample firms are audited by the Big 4 auditors and operate in industries with high litigation risks. As a result, we do not focus on these constraints of manipulation and discuss their impact in Section 4.5.

4. Sample Selection and Empirical Analysis

4.1. Purchase price allocation post SFAS 142

4.1.1. Data

Companies have been required to disclose the allocation of purchase price since SFAS 142 became effective in July 2001. We begin our sample selection with all the acquisitions completed between July 2001 and October 2005 as reported by Thompson Financial's Securities Data Company (SDC) database. We further require that both the acquiring company and the target company be

publicly traded before the acquisition and that the target's primary SIC industry be business services (2-digit SIC code 73). SDC reports 137 deals meeting these requirements.

We focus on the business services industry for several reasons. First, different industries have different industry specific intangible assets, the amount of which is hard to model in the cross-industry setting.[7] By focusing on a single industry, we mitigate the heterogeneity in intangible assets structure and thereby better capture the economic determinants of the allocation decision. As purchase price allocations are likely to be affected by the underlying economics of the target companies, having a relatively homogeneous sample reduces the possibility that our results are driven by alternative explanations such as different operating environments among different industries. Second, M&A activities are very active in the business services industry. In our sample period, acquisitions with the target being a business service firm account for almost 30% of all acquisitions with the target being public. Thus, our sample represents a significant proportion of all acquisitions. Third, companies operating in this industry are likely to generate a significant amount of intangible assets, which makes their accounting decisions about intangibles especially important.

For each deal, we collected the information about purchase price allocation and whether an external appraiser was involved from the acquirer's 10-K filing to the US Securities and Exchange Commission (SEC).[8] Information required to construct measures of acquisition cost allocation is available for 112 deals. Requiring the acquirers' financial information from COMPUSTAT reduced the sample size to 103 deals by 81 unique acquiring companies. Requiring the same for the targets further reduced the sample size to 98 deals by 78 unique acquiring companies. We also obtained other acquisition deal characteristics from the SDC and segment level financial information from COMPUSTAT. CEO data is from Execucomp and supplemented by information collected from

[7] For example, for the publishing industry, publication rights and licensing agreements are significant intangible assets unique to the industry. For pharmaceutical companies, patents on drugs are significant intangibles.
[8] For a small portion of our sample, where the information is not available from the 10-K filings, we also search through relevant 10-Q filings and annual or quarterly reports for the information.

firms' proxy statements and 10-K reports. In addition, we obtained stock return information from CRSP and acquirer debt covenant data from Dealscan. Table 1 summarizes the sample filter information.

4.1.2. Variable Measurement and Research Design

We test our hypotheses empirically through the use of the following variables:

TANGIBLE	=	the net amount allocated to tangible assets and liabilities as a percentage of the total purchase price of the deal,
GOODWILL	=	the amount allocated to goodwill or identifiable intangible assets with an indefinite life as a percentage of the combined amount allocated to all intangible assets, including both goodwill and other intangible assets (also known as identifiable intangible assets),
ACEO_AGE	=	age of the CEO of the acquirer at the time of the acquisition,
ACEO_TENURE	=	the number of years the CEO of the acquirer has been in office,
A_BTM	=	the acquirer's book value of common equity divided by its market value of common equity,
A_VERIF	=	the acquirer's verifiable net assets (Cash + Investment – Debt – Preferred Equity) divided by its total net assets (Assets – Liabilities),
A_SEG	=	a dummy variable equaling one if the acquirer has more than one reporting segment, and zero otherwise
A_SIZE	=	Ln(market value of equity of the acquirer),
A_SP	=	a dummy variable equaling one for acquirers reporting small positive earnings prior to the acquisition (0 < = earnings/total assets < = 0.01), and zero otherwise,
A_NW	=	a dummy variable equaling one if the acquirer has a debt covenant based on net worth, and zero otherwise,
A_LITI	=	a dummy variable equaling one if the acquirer is in one of the four high litigation risk industries identified by Francis et al. (1994): pharmaceuticals/biotechnology (SIC codes 2833-2836, 8731-8734), computers (3570-3577, 7370-7374), electronics (3600-3674), and retail (5200-5961), and zero otherwise,
T_BTM	=	the target's book value of common equity divided by its market value of

common equity,

T_SALES = the target's Ln(Sales) divided by its Ln(Assets),

T_ADV = the target's advertising expense divided by its sales,

T_RD = the target's R&D expense divided by its sales,

WT_CAR = the weighted-average of the acquirer's and the target's abnormal stock return, computed as residuals from a market model, over a 3-day window around the acquisition deal announcement day (abnormal returns are computed as market-model residuals),

COMMON = a dummy variable used to measure the level of commonality between the 4-digit SIC industries in which the target and the acquirer operate; COMMON is assigned a value of one if N_COMMON/N_ACQ is larger than 0.5, or zero otherwise, where N_COMMON is the number of common industries between the target and the acquirer and N_ACQ is the number of industries in which the acquirer operates.

Financial information about the target and the acquirer is measured over the fiscal year prior to the year of acquisition.[9] There are five groups of variables. The first group includes TANGIBLE and GOODWILL, where TANGIBLE measures how purchase price is allocated between tangible assets/liabilities and intangible assets, and GOODWILL measures how purchase price is allocated between goodwill or trademark and other intangible assets, conditional on the total amount of purchase price allocated to intangible assets. We include identifiable intangible assets with an indefinite life as a part of GOODWILL because these assets receive accounting treatment very similar to goodwill in terms of amortization expense and future impairment.[10] TANGIBLE and GOODWILL are the dependent variables of our empirical analysis.

The second group of variables captures characteristics of the CEO of the acquirer. ACEO_AGE equals the age of the CEO as of the acquisition year. ACEO_AGE is likely positively

[9] In some cases, the financial data of the target is unavailable for the year prior to the acquisition year and we then use the financial information two years before the acquisition. This happens mostly when the acquisition occurs at the beginning of the year, before the annual report of the prior year is issued.

[10] In most cases, the identifiable intangible assets with an indefinite life are trademarks, though not all trademarks are considered to have an indefinite life. Only in two cases, other identifiable intangibles are considered to have an indefinite life (developed technology in one case and in the other, agreement).

correlated with the tenure of the CEO. A CEO with a long tenure is more likely entrenched than a CEO who has just taken office. An entrenched CEO can increase his/her compensation directly by influencing the compensation contract and therefore the benefits of avoiding amortization expenses can be minimal. Meanwhile, it is unclear whether an entrenched CEO faces lower costs of manipulating the allocation. Entrenched CEOs may be less likely terminated after reporting goodwill impairment, but once the impairment attracts public attention and leads to management turnover, they have more to lose. It is thus an empirical question how CEO tenure is related to the allocation. We include ACEO_TENURE in subsequent analyses because of its potential correlation with ACEO_AGE and the allocation decision.

The third group of variables, which includes A_BTM, A_VERIF, A_SEG, A_SIZE, A_SP, A_NW, A_LITI, and A_AUDIT, captures acquirer characteristics. These variables are constructed using the financial information of the acquiring companies in the fiscal years prior to the acquisition. Hypotheses two through four predict that A_BTM, A_VERIF, and A_SEG shall affect the acquirers' decision of purchase price allocation.[11] As A_SEG can capture the size of the acquirer, we also include A_SIZE in subsequent regressions to control for this effect. The definition of A_VERIF follows Ramanna (2006).[12] A_SP and A_NW are constructed to capture the benefits of manipulating the purchase price allocation. A_LITI and A_AUDIT are proxies for litigation risks and audit quality. However, as the descriptive statistics reported in Section 4.3 show, these four variables exhibit little variation in our sample.

We predict that acquirer characteristics are correlated with the goodwill-intangible allocation ratio because of cross-sectional variation in the benefits and costs of manipulation. The association between these characteristics and the allocation can also be explained by certain acquirers preferring

[11] We use the number of operating segments to proxy the number of reporting units because firms do not always disclose information on reporting units. However, reporting units can be one level below reporting segments. Noise in this proxy can reduce the power of our tests.

[12] All inferences in subsequent regression tests are not sensitive to replacing A_SEG with A_SEG*Size, which was used by Ramanna (2006) to capture the discretion in goodwill impairment tests.

certain targets. For example, acquirers with more growth options (low A_BTM) may find a target with greater growth potentials to be a good match and record more goodwill to reflect the unrecognized growth options of the target. As a result, we control for target characteristics and synergies generated from the combination.

The fourth group of variables includes T_SALE, T_ADV, T_RD, and T_BTM. We use these target characteristics to control for any difference in operating environment and investment opportunity sets that may be correlated with the underlying economics that affect purchase price allocations. The descriptive statistics (Table 3) show that trademarks, developed technology, and customer relationships are the most important identifiable intangible assets recorded. We thus need to control for target characteristics that are associated with a higher likelihood of recording these assets. First, targets with more sales revenue likely have a larger customer base and more purchase price should be allocated to the acquired customer base. Second, more advertising expenditures are likely associated with greater brand name recognition, so we predict a positive correlation between T_ADV and the purchase price allocated to trademarks. Third, if targets with more R&D expenditures are more likely to have developed useful technologies, more purchase price should be recorded as developed technology.

In addition, internally generated rents, or goodwill, are reflected in the market value of a firm but not in the book value. If a target has more internally generated goodwill and thus a high market-to-book ratio, the acquirer is likely to recognize more goodwill from the acquisition since both the target's internally generated goodwill and the synergy created by the combination are recorded. However, a target with a high market-to-book ratio can also have more unrecognized intangibles that can be recorded after the acquisition. Therefore, we predict a negative correlation between TANGIBLE and T_BTM, but do not have a prediction for the relation between GOODWILL and T_BTM.

The last group of variables, WT_CAR and COMMON, proxies for the amount of synergy potentially arising from the acquisitions and therefore affecting the decisions of purchase price allocation. WT_CAR measures the market's estimate of the change of the combined value of the target and the acquirer at the initial announcement of the acquisition.[13] COMMON measures the extent of overlapping between the industries in which both the target and the acquirer operate. While goodwill recorded after an acquisition includes at least part of the synergies generated by the acquisition, it is unclear how the goodwill-intangible ratio would vary with synergies. For example, acquisitions with the acquirer and the target in the same industry may generate greater synergies, but part of the synergies can be recorded as identifiable intangible assets, such as customer base. Therefore, we make no predictions for the relation between WT_CAR/COMMON and GOODWILL.

We use the following multivariate regression to test the hypotheses:

$$GOODWILL_i = \alpha_0 + \alpha_1 ACEO\_AGE_i + a_2 ACEO\_TENURE_i + a_3 A\_BTM_i + \alpha_4 A\_VERIF_i + \alpha_5 A\_SEG_i + a_6 A\_SIZE_i + \alpha_7 T\_BTM_i + \alpha_8 T\_SALES_i + \alpha_9 T\_ADV_i + \alpha_{10} T\_RD_i + \alpha_{11} WT\_CAR_i + \alpha_{12} COMMON_i + \varepsilon_i \quad (1)$$

As described in Section 3 of the paper, H1, H2, H3, and H4 predict that $\alpha_1 > 0$, $\alpha_3 < 0$, $\alpha_4 < 0$, and $a_5 > 0$, respectively. We also predict that $a_8<0$, $a_9<0$, and $a_{10}<0$. As there is little variation in A_SP, A_NW, A_LITI, and A_AUDIT, we cannot conduct a powerful test of how the allocation varies with the benefits of manipulation or the litigation risks. We discuss regression results including these three variables in sensitivity analyses.

Our hypotheses about purchase price allocation are based on the trade-offs between goodwill, which is non-amortizable under SFAS 141 and SFAS 142, and identifiable intangible assets, which are subject to amortization. Therefore, our predictions should be unique to the allocation of purchase price among different types of intangible assets; we do not have the same trade-offs and therefore the

[13] In untabulated analysis, we find no significant correlation between the acquirer's abnormal announcement period stock return, which may proxy for overpayment by the acquirer, and purchase price allocation.

same predictions with respect to the general allocation of purchase price between tangible assets and intangible assets. One may argue that managers, when expecting greater flexibility in future goodwill impairment tests, may have similar incentives to lower the valuation of tangibles assets in order to increase the amount of purchase price assigned to goodwill. We have two reasons to believe that managers' discretion in tangible assets valuation is a less important issue in our setting. First, tangible assets likely constitute a lesser part of total assets for firms operating in the business service industry that we focus on, which implies any discretion exercised in tangible asset valuation has a lesser economic consequence. Second, the valuation of tangible assets likely involves less uncertainty and therefore any discretion exercised is more likely to be corrected by monitoring parties such as auditors and boards of directors. Therefore, we run the following regression as a benchmark regression with the same independent variables but with the allocation between tangible and intangible assets as the dependent variable.

$$TANGIBLE_i = \alpha_0 + \alpha_1 ACEO\_AGE_i + a_2 ACEO\_TENURE_i + a_3 A\_BTM_i + \alpha_4 A\_VERIF_i + \alpha_5 A\_SEG_i + a_6 A\_SIZE_i + \alpha_7 T\_BTM_i + \alpha_8 T\_SALES_i + \alpha_9 T\_ADV_i + \alpha_{10} T\_RD_i + \alpha_{11} WT\_CAR_i + \alpha_{12} COMMON_i + \varepsilon_i \quad (2)$$

4.1.3. Descriptive Statistics

Table 2 reports the distribution of our sample across industries and over time. By construction, all target firms' primary industries are the Business Services industry (2-digit SIC code 73). Among them, the vast majority (87 out 103) operates primarily in Computer Programming, Data Processing, and Other Computer Related Services (3-digit SIC code 737). The strong industry clustering of the target firms in our sample suggests that we have a relatively homogeneous sample. Likewise, the acquirers are also highly clustered in similar industries: of the 103 deals, 79 have acquiring firms with 73 as the 2-digit primary industry SIC code, while 76 of them have 737 as the 3-digit primary industry SIC code. Our sample period (July 2001 to October 2005) spans over five different calendar years; the sample shows no obvious clustering in time.

Panel A of Table 3 reports the descriptive statistics. SFAS 141 requires that, in a business combination, the acquirer include in the purchase price all costs associated with acquiring the target company's net assets or stock, including the value of the consideration given to the owners of the acquired company as well as other direct costs such as finders' fees and accounting, legal, and appraisal fees. The average purchase price is about $480 million and the median is about $119 million. Consistent with the existing literature (e.g. Andrade et al., 2001), the target companies enjoyed a significant 31% increase in stock prices at the initial announcement of the acquisition. In contrast, the acquiring companies in our sample suffered a significantly negative 2% stock return. The change in the combined value of both the acquirer and the target is a negligible 0.4% and is not significantly different from zero. The dummy variable COMMON has a value of one for 28% for the sample.

For the acquirers, the average market value is about $7,555 million and the median is about $887 million. The average acquirer book-to-market ratio is about 0.46. An average acquirer's verifiable asset constitutes 57% of its total net assets. The average number of operating segments for the acquirers is 2.31, but the median is one, indicating that more than half of the acquirers have only one operating segment. Only three observations of our sample have small positive earnings or net worth covenant. Eighty percent of the acquirers operate primarily in a high litigation risk industry. We also examine both the primary industry and the secondary industries of the acquirer-target combination and find that 90% of the combination operates at least in one of the high litigation risk industries. The vast majority of acquirers (93%) are audited by big auditors.

For the target companies, the average book-to-market ratio is 0.53 and the average sales revenue is $163 million. In the year prior to being acquired, an average target company spends only 1% of its sales revenue on advertising but spends 29% of its sales revenue on R&D activities.

SFAS 141 requires that the acquiring companies allocate the purchase price to individual assets, tangible as well as intangible, and liabilities based on fair value. In our sample, on average,

net tangible assets account for only 8% of the purchase price, but the variation is large, with the 25 percentile and the 75 percentile at -3% and 27%, respectively. The net value allocated to tangibles can be negative when the fair value of tangible liabilities exceeds the fair value of tangible assets. Among the intangibles, goodwill accounts for 72%, on average. Similarly there is also a fair amount of variation in the portion of intangibles classified as goodwill, with the 25 percentile and the 75 percentile at 65% and 86%, respectively.

Panel B reports statistics on categories of identifiable intangible assets reported by acquirers in our sample. There are roughly six categories of identifiable intangible assets in our sample: trademark, developed technology, customer base and customer loyalty, patents, non-competing agreements and contracts, and other agreements and contracts. Among them, developed technology and customer base and customer loyalty are reported most often and account for most of the dollar value. The life of these intangibles, upon which calculation of amortization expenses will be based, varies greatly across different intangible categories and also has a wide range in each individual category. This is consistent with the arguments about the inherent difficulty in assessing the value of intangible assets.

4.1.4. Correlations

Table 4 reports the pair-wise correlations among different variables in our sample. GOODWILL is significantly correlated with three acquirer characteristics ACEO_AGE, A_BTM and A_AVERIF in the directions predicted by H1 – H3. Although the correlation between GOODWILL and A_SEG is positive, consistent with the prediction of H3, the two-tailed probability is only 17%. GOODWILL and ACEO_AGE are also positively correlated. In contrast, none of the acquirer characteristics is significantly correlated with TANGIBLE, which suggests that, unlike the valuation of intangible assets, tangible asset valuation is subject to less discretion resulting from acquirer incentives.

As for target characteristics, T_BTM is negatively correlated with GOODWILL. Smith and Watts (1992) argue that a company's book-to-market ratio is inversely related to its investment opportunity set. The negative correlation between T_BTM and GOODWILL suggests the value of the target companies' investment sets are more likely linked to unidentifiable intangible assets than to identifiable intangible assets. T_RD is also negatively correlated with GOODWILL. Companies that spend more on R&D are more likely to have developed mature technologies and therefore recognize more identifiable intangible assets such as technology or patents, increasing the amount of identifiable intangible assets and correspondingly decreasing the amount of unidentifiable intangible assets (i.e. goodwill) recognized. T_SALES is not significantly correlated with GOODWILL.

Of the proxies for acquisition synergy, COMMON is negatively correlated with GOODWILL. When the acquired company operates in similar industries as the acquiring company, the acquisition may create relatively more synergy through the sharing of resources such as research facilities, research personnel and sales networks, or even better utilization of existing technology, patents and customer base, which may enable the acquiring companies to assign more value to identifiable intangible assets (such as technology, patents or customer base) relative to unidentifiable intangible assets (i.e. goodwill). The correlation between WT_CAR and GOODWILL is also negative but insignificant.

4.1.5. Regression Analysis

Table 5 reports the regressions results. We first estimate the GOODWILL equations with the ordinary least square method (OLS). Since the predictions based on our hypotheses are all one-sided, we will apply one-sided p-values in this discussion. In the regression where only the acquirer characteristics are included as independent variables and GOODWILL is the dependent variable, the five acquirer/CEO characteristics ACEO_AGE, ACEO_TENURE, A_BTM, A_VERIF, and A_SEG

are all significant at 10% level or better, and the adjusted R-square is 23%.[14] The signs of the coefficients on ACEO_AGE, A_BTM, A_VERIF, and A_SEG are as predicted by the hypotheses, suggesting that acquirers strategically allocate purchase price to gain flexibility in future accounting choices.[15] ACEO_TENURE is negatively correlated with GOODWILL, indicating that CEOs with longer tenure allocate less to goodwill. In contrast, when TANGIBLE is the dependent variable, none of the acquirer characteristics are significant. Furthermore, the F-test does not reject the hypothesis that all the four coefficients are zero, and the adjusted R-square is -5%. This is consistent with tangible asset valuation being subject to less management discretion.

When only the target characteristics are included as independent variables, the adjusted R-square is at a modest 7% level, and T_BTM and T_RD significantly explain the variation in GOODWILL, which is consistent with pair-wise correlations, indicating that the investment opportunity set is more likely to be associated with unidentifiable intangible assets (goodwill) than with identifiable tangible assets. When the same target characteristics are applied to explaining the variation in TANGIBLE, T_BTM, T_SALES and T_RD are all significantly different from zero, which suggests that the investment opportunity set and production and selling efficiency are more likely to be associated with intangible assets than with tangible assets. In contrast, the target characteristics explain 33% of the allocation of purchase price between tangible vs. intangible assets (measured by TANG).

When both acquirer and target characteristics are included in the regressions, the results remain similar. The variables combine to explain 31% of the variation in GOODWILL and 30% of that in TANGIBLE.

[14] Note A_SIZE is only marginally significant here and therefore does not contribute much to the explanatory power of the model. Even if A_SIZE is removed from the regression, the adjusted R-square remains at 22%.
[15] We also estimate this regression for the sample with data available to compute the target characteristic variables. The coefficient estimates and R^2 are very similar to those reported in Table 5.

Lastly, we add the synergy measures COMMON and WT_CAR into the regressions. The sample size is reduced to 86 because of data restrictions. Most results remain stable except the significance level of A_SEG is reduced, now insignificant at 10% level.

In summary, the regression results are strongly consistent with H1, H2, and H3, and are weakly consistent with H4. As to economic significance, the acquirer characteristics explain more of the variation in goodwill allocation as the target company characteristics. The results suggest that acquirers exercise discretion by allocating more of acquisition cost to goodwill as opposed to other intangible assets when they expect more flexibility in future goodwill impairment decisions.

4.2. Purchase price allocation prior to SFAS 142

Our regression (1) tests H1 – H4 after controlling for the economic determinants of the purchase price allocation between goodwill and identifiable intangible assets. However, due to potential measurement errors with the control variables or potential omitted correlated variables, we cannot completely rule out an alternative interpretation: our variables of interest affect GOODWILL because they are related to the economics underlying the allocation. For example, acquirers with lower A_BTM (higher Tobin's Q) can be good firms and they can carry out better acquisitions that generate more synergies. As a result, they record more goodwill. To mitigate this concern, we examine the purchase price allocation prior to SFAS 142. Since our hypotheses are based on the new accounting procedures promoted by SFAS 142, A_BTM, A_VERIF, and A_SEG should not affect GOODWILL prior to SFAS 142. However, if they capture the economics underlying the allocation, they would affect GOODWILL in both the pre and the post SFAS 142 regimes.

We select a sample of acquisitions completed between 1996 and 2000 following the procedures described in Section 4.1.1. In addition to requiring the target being public and operating in the business service industry, we exclude all pooling of interests deals. There are 131 deals satisfying these requirements and data requirements further reduce the sample to 73 observations

with all the acquirer data and to 70 observations with both the acquirer and the target data. The descriptive statistics of the sample are presented in Table 6 Panel A.

We first estimate regression (1) for the pre-SFAS 142 sample. The results are reported in the first two columns of Table 6 Panel B. The regression in column (1) only includes variables capturing acquirer characteristics. The coefficients on ACEO_AGE, ACEO_TENURE, A_BTM, A_VERIF, and A_SEG are all insignificant. While the coefficients on A_BTM and A_VERIF are negative and significant in the post SFAS 142 regression, they are positive in the pre-SFAS 142 regression, though insignificant. We then add target characteristics variables and COMMON, a control for synergies from the combination, in the regression in column (2). T_BTM loads marginally significant, with the same sign as in the post SFAS 142 regression. The coefficients on A_BTM, A_VERIF, and A_SEG are still insignificant. While the insignificant results prevent us from making strong inferences, the pre-SFAS 142 results are consistent with A_BTM, A_VERIF, or A_SEG reflecting new features of SFAS 142.

Nonetheless, since some of the target characteristics variables capturing economic determinants of the allocation also cease to be significant in the pre-SFAS 142 regression, it is possible that the power of the pre-SFAS 142 tests is low and reduces the significance level of all explanatory variables. To further explore this possibility, we estimate the following regression and its variations using all the observations, both pre and post SFAS 142, and test the difference in coefficients between the two regimes.

$$GOODWILL_i = \alpha_0 + \alpha_1\ ACEO\_AGE_i + a_2\ ACEO\_TENURE_i + a_3\ A\_BTM_i + \alpha_4\ A\_VERIF_i + \alpha_5\ A\_SEG_i + a_6\ A\_SIZE_i + \alpha_7 T\_BTM_i + \alpha_8 T\_SALES_i + \alpha_9 T\_ADV_i + \alpha_{10}\ T\_RD_i + \alpha_{11}\ COMMON_i + \alpha_{12}\ Post142_i + a_{13} Post142_i * ACEO\_AGE_i + a_{14}\ Post142_i * ACEO\_TENURE_i + a_{15} Post142_i * A\_BTM_i + a_{16} Post142_i * A\_VERIF_i + a_{17} Post142_i * A\_SEG_i + a_{18} Post142_i * A\_SIZE_i + a_{19} Post142_i * T\_BTM_i + a_{20} Post142_i * T\_SALES_i + a_{21} Post142_i * T\_ADV_i + \alpha_{22} Post142 * T\_RD_i + \alpha_{23}\ Post142 * COMMON_i + \varepsilon_i \quad (3)$$

Post142 is an indicator variable equaling one for post SFAS 142 observations and zero otherwise. If our results for the pre-SFAS 142 sample are driven by a lack of power and there is no significant difference between the pre and the post SFAS 142 regimes, then we do not expect any of the interactive variables to load significantly.

The results are reported in columns (3) to (5) in Table 6 Panel B. First, acquirer characteristics variables are included in the regression in column (3). The coefficients on Post142*ACEO_AGE, Post142*ACEO_TENURE, Post142*A_BTM and Post142*A_VERIF are significant, suggesting that the determinants of GOODWILL did change across the two periods. However, Post142*A_SEG does not load significantly and the coefficient on A_SEG is significant. It is possible that for multiple-segment acquirers, more business lines benefit from an acquisition and therefore more synergies are generated and recorded as goodwill. In this sense, A_SEG may relate to GOODWILL through its economic connection with synergies from combinations. Column (4) adds target variables and column (5) further adds the interactions of Post142 and target variables in the regression. The inferences on A_BTM, A_VERIF, and A_SEG are the same as in column (3). None of the coefficients on the interactive variables of Post142 and target characteristics are significant. The results suggest that the impact of ACEO_AGE, A_BTM and A_VERIF on GOODWILL is unique post SFAS 142 and that these variables likely reflect the impact of discretion in future goodwill tests rather than economics.

Note that the pre-SFAS 142 observations self-select themselves into the sample by choosing the purchase method and disclosing the purchase price allocation. The allocation of the pre-SFAS 142 sample can be different from that of the post-SFAS 142 sample because of the self-selection. However, if our variables of interest capture economics of the allocation, it is unclear why they do not explain the allocation of disclosing firms, potentially ‘better’ firms than non-disclosing firms. If our variables capture opportunistic reporting incentives existing prior to SFAS 142 and the manipulating firms chose not to disclose, we expect the disclosing and non-disclosing firms to

exhibit systematic differences in these variables. Unreported results show that ACEO_AGE and A_BTM do not differ significantly between the two groups. Thus, self-selection does not appear to explain all our findings.

4.3. Purchase price allocation post SFAS 142 and external appraisers

Independent appraisers are involved in the valuation and allocation process in 43 out of the 103 acquisitions in our sample. If external independent appraisers play a monitoring role in the fair value measurement, as Dietrich et al. (2001) suggest, we expect the impact of A_BTM, A_VERIF, and A_SEG on GOODWILL to be less pronounced when an external appraiser is engaged for the allocation. We estimate the following regression to test this prediction,

$$GOODWILL_i = \alpha_0 + \alpha_1 IV_i + \alpha_2 NON\_IV_i*ACEO\_AGE_i + a_3 NON\_IV_i*ACEO\_TENURE_i + a_4 NON\_IV\_A\_BTM_i + \alpha_5 NON\_IV*A\_VERIF_i + a_6 NON\_IV*A\_SEG_i + \alpha_7 IV_i*ACEO\_AGE_i + a_8 IV_i*ACEO\_TENURE_i + a_9 IV_i*A\_BTM_i + \alpha_{10} IV_i*A\_VERIF_i + \alpha_{11} IV_i*A\_SEG_i + \alpha_{12} A\_SIZE_i + \alpha_{13} T\_BTM_i + \alpha_{14} T\_SALES_i + a_{15} T\_ADV_i + a_{16} T\_RD_i + a_{17} COMMON_i + \varepsilon_i \quad (4)$$

IV (NON_IV) is an indicator variable equaling one (zero) if an acquirer engaged an external appraiser in the purchase allocation and zero (one) otherwise. The estimation results are presented in Table 7.

The first two columns of Table 7 report the OLS estimation results of regression (4). The regression in column (1) only includes acquirer characteristics variables and column (2) includes all variables. Since the decision to engage an external appraiser is endogenous, we also use the Heckman two-stage procedure to correct for self-selection. We model the decision to engage an external appraiser as a function of the size of the acquirer, the size of the target, and other target characteristics included in regression (4). The results after controlling for self-selection are reported in columns (3) and (4) of Table 7. Some of the coefficients on the inverse mills ratio are significant, indicating the existence of self-selection.

After controlling for target characteristics and self-selection, the coefficients on NON_IV*ACEO_AGE, NON_IV*A_BTM and NON_IV*A_VERIF are significant as predicted by H1 – H3. The coefficients on IV*ACEO_AGE, IV*A_BTM and IV*A_VERIF are insignificant. Except for the higher statistical significance for the NON_IV interactive terms than the IV interactive terms, the NON_IV interactive terms also tend to have significantly larger magnitudes. The only exception is IV*ACEO_TENURE. The coefficient on IV*ACEO_TENURE is significantly negative, while that on NON_IV*ACEO_TENURE is not. The results suggest that appraisers can reduce management reporting opportunism to a certain extent but unlikely eliminate it.

4.4. Segment level analysis

As an extension of H2 and H4, we expect an acquirer with multiple reporting units to allocate more goodwill to the units that generate more economic rents as they offer more "protection" from future goodwill impairment. Managers obtain greater flexibility in goodwill impairment tests when reporting units have more internally generated rents and they are thus motivated to allocate more goodwill to these units. Conditional on the amount of purchase price assigned to goodwill, the acquirers with multiple segments will tend to assign more goodwill to those segments with relatively low book-to-market ratios in order to gain flexibility in future impairment decisions. Given the difficulty in estimating book-to-market ratios for individual segments, we operationalize the test by using ranks of segment-level financial performance to proxy for ranks of segment book-to-market ratio. We argue that, within a multiple-segment company, the segments with relatively good financial performance are likely to have relatively low book-to-market ratio. As predicted by H4, within a multiple-segment company, a segment's book-to-market ratio is likely negatively correlated with the amount of goodwill allocated to the segment; therefore, we predict that a segment's rank within an acquiring company based on its financial performance correlates positively with the amount of goodwill allocated in acquisitions.

For the tests, we construct three variables. $PCT\_GW_{i,j}$ is the amount of goodwill allocated to segment *j* as a ratio of the total goodwill assigned in the purchase price allocation of the acquisition deal *i*. $RANK_{i,j}$ is the standardized rank of segment *j* among all segments of the acquiring company in the acquisition deal *i*; the ranking is based on the relative financial performance (measured as pretax income over assets, operating profit over assets, pretax income over sales, or operating profit after depreciation over sales, in that order, depending on the data availability in COMPUSTAT) of all segments in the acquiring company; the ranks are standardized so that the best performing segment receives a rank of 0.5 and the worst performing one receives a rank of -0.5.[16] GWW_RANK_i is the goodwill-weighted rank of all segments for the acquiring company in deal *i*; it is calculated as $\sum_j PCT\_GW_{i,j} * RANK_{i,j}$. If acquiring companies allocate goodwill among their segments independent of their relative financial performance, the goodwill-weighted rank is going to follow a distribution with mean zero; however, if acquiring companies systematically allocate more goodwill to their better performing segments, the goodwill-weighted rank will have a positive value on average. H4 predicts that: 1) the correlation between $PCT\_GW_{i,j}$ and $RANK_{i,j}$ is positive; and 2) GWW_RANK is on average positive.

To control for the commonality between the business operations of the target company and those of different segments of the acquiring company, we also construct two variables with industry membership based on 4-digit SIC codes. P_MATCH is a dummy variable assigned a value of one when a segment's SIC code is the same as the primary SIC code of the acquired company, and zero otherwise. R_MATCH is defined as N1/N2, where N1 is equal to one when the segment's SIC code is the same as any of the multiple SIC codes assigned to the acquired company by SDC, and zero otherwise, while N2 is the total number of different SIC codes assigned to the acquired company by

[16] While different companies may use different definitions in reporting segment level financial performance, each firm should apply the same definition to all its business segments.

SDC. Higher values of P_MATCH and R_MATCH proxy for higher industry commonality between a business segment of the acquiring company and the acquired company.

Panel A of Table 8 reports the descriptive statistics on the variables related to segment-level analysis. The sample size is greatly reduced because not many acquirers disclose information on segments to which they assign the goodwill, and even fewer specify amounts of goodwill allocated to each segment. We have available information to measure $PCT\_GW_{i,j}$ and $RANK_{i,j}$ for 66 segments corresponding to 17 unique acquisition deals. All the segment level variables show considerable variation. PCT_GW has the lowest value of zero and the highest value of one, indicating that the acquirers sometimes assign all goodwill to one segment and nothing to the rest; it also has a median value of zero, indicating that more than half of the segments have not been assigned any goodwill in the acquisitions. By construction, RANK has a mean value of zero, a lowest value of -0.5 and a highest value of 0.5. P_MATCH has a mean value of 0.17, indicating that in approximately one out every six cases, a business segment of the acquiring company has the same 4-digit SIC code as the primary industry of the target company. Note that GWW_RANK has a mean value of 0.27, and that it is significantly different from zero at the 1% level, consistent with our prediction.

Panel B of Table 8 reports the correlations. Consistent with the prediction of H4, the correlation coefficient between PCT_GW and RANK is at 0.45, which is significant at the 1% level, but neither of the segment-level commonality variables is significantly correlated with the allocation of goodwill to different segments. The same pattern is confirmed in the multiple regressions of Panel C, where only the relative performance rank of segments helps explain the allocation of goodwill across different segments of an acquiring company.

In summary, those acquiring companies with multiple segments systematically assign more of the goodwill they acquire to segments with relatively better financial performance. As a caveat, though, we want to point out that the same results are also expected if the acquiring companies systematically choose acquisition targets that operate in similar industries as the ones of the acquiring

companies' relatively profitable segments and therefore the synergy that potentially results from these acquisitions is more likely to be related to these relatively profitable segments. However, while one can argue that acquiring companies may want to expand their more profitable operations, one can also argue that those companies may want to save their relatively under-performing segments through acquisitions. It is unclear which argument will prevail.[17]

4.5. Robustness Checks

Our primary tests in Table 5 assume that the likelihood of incurring economic losses in goodwill is the same across acquirers and thereby focus on how managers' ability to manipulate the impairment assessment affects the allocation decision. While we do not have a good ex ante prediction model for the likelihood of economic losses, we try to relax the above assumption by including two variables capturing the variation in the likelihood: stock return volatility and abnormal returns of the acquirer at the time of announcing the acquisition.

Presumably firms with high stock price volatility are more likely to experience temporary price declines. If goodwill impairment is assessed based on firms' market values, these firms are more likely to have impairment losses. This predicts a negative correlation between GOODWILL and acquirers' stock return volatility. However, SFAS 142 allows valuation methods other than the market-value-based method and firms can take the price volatility into account in their valuation, thereby mitigating the predicted negative correlation. Acquirers' overpayment is also likely positively related to the likelihood of future goodwill impairment. We use the standard deviation of stock returns in the year prior to the acquisition to capture acquirers' stock return volatility and acquirer's abnormal returns at the time of announcing the acquisition to capture overpayment.

Our inferences from Table 5 are not affected by the inclusion of these two variables (untabulated). The coefficient on acquirer stock volatility is negative but insignificant. The

[17] A more powerful test could be to compare the segment allocation of tangible assets or identifiable intangible assets to that of the goodwill. However, we are not able to find disclosure about the segment allocation of any assets other than goodwill.

coefficient on acquirer abnormal returns is positive but also insignificant. The insignificant results can be driven by our tests lacking power. It is also possible that managers have different expectation about the prospect of the acquisition than the market and therefore the abnormal returns cannot capture managers' expectation of the likelihood of goodwill impairment.

As discussed in Section 3, the variables capturing the benefits of manipulation or litigation risks, i.e., A_SP, A_NW, A_LITI, and A_AUDIT, do not exhibit much variation in our sample. Not surprisingly, they do not load significantly in the GOODWILL regression. The coefficients on A_SP and A_NW are positive and that on A_LITI is negative, consistent with predictions. Their inclusion does not affect inferences on other variables. We also examine whether there are other debt covenant ratios affecting the allocation decision. There are 32 firms with covenants or performance pricing schemes based on earnings, but all of them define earnings as EBITDA. The differential treatment of goodwill and other intangibles does not make a difference for EBITDA-based debt contracts.

We recognize that governance mechanisms potentially constrain management accounting choices. Specifically in our setting, they could affect an acquirer's allocation of the purchase price. Existing research suggests that institutional investors are more actively involved in monitoring (Ashbaugh et al., 2003). We obtained institutional holdings data from Spectrum. The percentage of institutional holdings also does not significantly affect *GOODWILL* or *TANG*.

We further conduct the following tests to check the robustness of our results. First, since GOODWILL, the dependent variable in regressions (1), (3), and (4), is a proportion, the OLS regressions in Tables 5, 6, and 7 might be misspecified. We use two alternative methods to estimate the regressions. 1) We normalize GOODWILL by subtracting the mean of GOODWILL from each value and then deflating it by the standard deviation of GOODWILL. All the inferences remain intact when we use the normalized GOODWILL as the dependent variable. 2) We apply a logistic transformation of GOODWILL using the following formula: NEW_GOODWILL = log (GOODWILL/(1 – GOODWILL)). In applying this formula, when GOODWILL equals one, we

replace it by 0.9999. When GOODWILL equals zero, we replace it by 0.0001. Note that this transformation at zero and one is arbitrary and it can be particularly problematic in our setting given that it not rare for GOODWILL to take these values. After the transformation, NEW_GOODWILL is no longer bounded. The inferences in Tables 5 and 7 are unaffected by the transformation. However, the differences in the coefficients on A_BTM and A_VERIF between the pre and post SFAS 142 regimes become insignificant.

Second, in order to ensure that our results are not driven by outliers, we winsorize the variables at the top and bottom 2.5% and re-run the regressions. We obtain qualitatively similar results after the winsorization.

Third, we examine the sensitivity of our results to alternative definitions of variables. We measure the book-to-market ratios alternatively by the book value of equity plus total liabilities over the market value of equity plus the book value of liabilities. We also define the verifiability of acquirer assets as the sum of cash and investments divided by total assets. We replace A_SEG with the logarithm of the number of segments. Finally, we set COMMON equal to one if the value is above the sample median and zero otherwise. Our main results are robust to these alternative variable definitions.

Fourth, we include additional controls for target characteristics, such as target size and performance measured by ROA. These variables do not load significantly in the regressions and their inclusion does not affect our other inferences.

5. Conclusion

This study investigates whether and to what extent management's reporting opportunism rather than the underlying economics affects the valuation of acquired goodwill and identifiable intangibles. Specifically, we examine the factors affecting firms' allocation of purchase price to goodwill and identifiable intangible assets upon the completion of a merger or an acquisition. We conduct the tests on acquisitions with targets operating primarily in the business services industry. By

focusing on a single industry with relatively homogeneous asset structure, we can better capture the economic determinants of the allocation decision. The economic significance of intangibles in this industry further increases the power of the tests.

SFAS 142 affords management greater flexibility in the accounting for goodwill than that for most identifiable intangibles, since goodwill is assessed for impairment based on unverifiable fair value estimates while identifiable intangible assets, except those with an indefinite life, are still amortized. We expect that managers allocate more purchase price to goodwill relative to amortizable intangibles to reduce amortization expenses, when they are able to avoid reporting impairment write-offs in the future or when they benefit more from reducing amortization expenses.

We find that post SFAS 142, acquirers with the three characteristics identified by Ramanna (2006), namely a high market-to-book ratio, unverifiable assets, and multiple reporting units, allocate more purchase price to goodwill. While the relation between the existence of multiple segments and the goodwill-intangible ratio is sensitive to the inclusion of different controls for the underlying economics, the association between the market-to-book ratio (the verifiability of assets) and the allocation ratio is robust to alternative specifications. We also find that older CEOs who likely benefit more from reducing intangible amortization and boosting up short-term earnings allocate more purchase price to goodwill.

We also find that the incremental explanatory power of acquirer/CEO characteristics is greater than the variables capturing the underlying economics of the allocation. This finding suggests that management accounting preferences have a substantial impact on the reliability of financial reporting when accounting measures lack verifiability. In contrast, we do not find a significant association between acquirer characteristics and the allocation of purchase price to tangible assets, the valuation of which presumably involves less subjectivity.

Furthermore, we examine the purchase price allocation of acquisitions prior to SFAS 142 in order to further mitigate the concern that our variables capturing management's expected discretion

in future goodwill tests are related to the economics underlying the allocation. We do not find acquirers' CEO age, market-to-book ratio, and verifiability of assets, constructed based management incentives arguable granted by under SFAS 142, explain the pre-SFAS 142 allocation. Also, in the regression to explain the allocation decision, the coefficients on these variables differ significantly between the pre and post SFAS 142 regimes. Our findings suggest our post SFAS 142 results cannot be solely explained by the economics underlying the goodwill/intangible valuation.

In addition, we investigate mechanisms that potentially enhance the reliability of the valuation of intangible assets. We find that external appraisers can constrain management's reporting opportunism to a certain extent but unlikely eliminate it.

Finally, for a sub-sample of multi-segment acquirers, we find that more goodwill is allocated to the more profitable reporting units, consistent with management intending to obtain greater flexibility in future goodwill assessment and/or avoid reporting impairment. While we cannot rule out the possibility that the results are driven by firms expanding their profitable product lines through acquisitions, the relationship is robust to controls for synergies between the acquiring companies and the acquired companies.

This study makes several contributions to the literature. First, our findings help evaluate the consequences of SFAS 142 and the reliability of intangible valuation. Our finding that management opportunistic reporting incentives are more important than the economic determinants of the initial valuation of acquired intangibles casts doubt on the reliability of intangible valuation under SFAS 142. The evidence suggests that the impact of management discretion cannot be overlooked in assessing intangible valuation. Second, our findings have implications for fair-value-based accounting procedures that are built on unverifiable estimates in general. SFAS 142 is considered an important step towards fair-value-based accounting (Watts, 2003). Our findings suggest that the unverifiable fair value estimates can be biased as a result of management taking advantage of the discretion in measurement. Third, we find that external appraiser may help improve the reliability of

fair value measurements. Finally, in response to Healy and Wahlen's (1999) call for more research on the manipulation of specific accruals, this study also contributes to the earnings management literature by documenting the manipulation of a specific accounting procedure that has not yet been explored.

We analyze one of the accounting choices under SFAS 142. The analysis can be extended to other choices that involve unverifiable estimation. Particularly, it would be a natural extension to examine how management's flexibility in the goodwill impairment tests affects their decision to report an impairment loss subsequent to the acquisition.

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Appendix 1 – Variable definitions

TANGIBLE	=	the net amount allocated to tangible assets and liabilities as a percentage of the total purchase price of the deal,
GOODWILL	=	the amount allocated to goodwill or identifiable intangible assets with an indefinite life as a percentage of the combined amount allocated to all intangible assets, including both goodwill and other intangible assets (also known as identifiable intangible assets),
ACEO_AGE	=	age of the CEO of the acquirer at the time of the acquisition,
ACEO_TENURE	=	the number of years the CEO of the acquirer has been in office,
A_BTM	=	the acquirer's book value of common equity divided by its market value of common equity,
A_VERIF	=	the acquirer's verifiable net assets (Cash + Investment – Debt – Preferred Equity) divided by its total net assets (Assets – Liabilities),
A_SEG	=	a dummy variable equaling one if the acquirer has more than one reporting segment, and zero otherwise
A_SIZE	=	Ln(market value of equity of the acquirer),
A_SP	=	a dummy variable equaling one for acquirers reporting small positive earnings prior to the acquisition (0 < = earnings/total assets < = 0.01), and zero otherwise,
A_NW	=	a dummy variable equaling one if the acquirer has a debt covenant based on net worth, and zero otherwise,
A_LITI	=	a dummy variable equaling one if the acquirer is in one of the four high litigation risk industries identified by Francis et al. (1994): pharmaceuticals/biotechnology (SIC codes 2833-2836, 8731-8734), computers (3570-3577, 7370-7374), electronics (3600-3674), and retail (5200-5961), and zero otherwise,
T_BTM	=	the target's book value of common equity divided by its market value of common equity,
T_SALES	=	the target's Ln(Sales) divided by its Ln(Assets),

T_ADV	=	the target's advertising expense divided by its sales,
T_RD	=	the target's R&D expense divided by its sales,
WT_CAR	=	the weighted-average of the acquirer's and the target's abnormal stock return, computed as residuals from a market model, over a 3-day window around the acquisition deal announcement day (abnormal returns are computed as market-model residuals),
COMMON	=	A dummy variable used to measure the level of commonality between the 4-digit SIC industries in which the target and the acquirer operate; COMMON is assigned a value of one if N_COMMON/N_ACQ is larger than 0.5, or zero otherwise, where N_COMMON is the number of common industries between the target and the acquirer and N_ACQ is the number of industries in which the acquirer operates.

Table 1 – Post SFAS 142 Sample Selection

			Number of Acquisitions
Acquisitions on SDC between July 2001 and October 2005, where the acquired companies have primary SIC code of 73 (Business Service industry) and are publicly traded before being acquired			137
Less	Missing purchase price allocation information	25	
Acquisitions remaining			112
Less	Missing acquiring companies' financial information from Compustat	9	
Acquisitions remaining			103
Less	Missing acquired companies' financial information from Compustat	5	
Acquisitions remaining			98

Table 2 - Sample Distribution
The sample includes acquisitions completed between July 2001 and October 2005, where both acquiring companies and acquired companies are publicly traded and acquired companies' primary industry is Business Service (SIC code 73).

Panel A – Sample distribution by industry membership of the acquired companies

3-digit SIC code	Number of obs	Percent
731	3	3%
732	1	1%
735	1	1%
736	4	4%
737	87	84%
738	7	7%
All	103	100%

Panel B – Sample distribution by industry membership of the acquiring companies

3-digit SIC code	Number of obs	Percent
271	1	1%
273	1	1%
283	1	1%
357	5	5%
366	2	2%
382	1	1%
386	1	1%
481	1	1%
483	1	1%
596	1	1%
731	1	1%
735	1	1%
736	1	1%
737	76	74%
829	1	1%
873	2	2%
874	6	6%
All	103	100%

Panel C – Sample distribution by completion time of the acquisitions

Time period	Number of obs	Percent
July ~ December 2001	10	10%
2002	24	23%
2003	30	29%
2004	26	25%
January ~ October 2005	13	13%
All	103	100%

Table 3 - Descriptive Statistics

The sample includes acquisitions completed between July 2001 and October 2005, where both acquiring companies and acquired companies are publicly traded and acquired companies' primary industry is Business Service (SIC code 73). Variables definitions are in Appendix 1.

Panel A – Descriptive Statistics of Main Variables

	Mean	Standard deviation	Lower Quartile	Median	Higher Quartile	# of Obs
Deal Characteristics						
Total Purchase Price ($ million)	479.9	1420.4	43.3	119.0	329.7	103
Acquirer Announcement Return (%)	-2.0	7.7	-7.4	-2.1	1.9	94
Target Announcement Return (%)	31.2	42.3	6.1	20.5	51.5	87
WT_CAR	0.4	6.7	-3.7	1.0	4.1	87
COMMON	0.28	0.45	0	0	1	103
Acquirer Characteristics						
Market Value	7,554.7	24,518.1	344.2	887.3	3,750.3	103
A_BTM	0.46	0.37	0.21	0.34	0.62	103
A_VERIF	0.57	2.13	0.09	0.41	0.73	103
Number of Business Segments	2.31	1.90	1	1	3	103
A_SEG	0.43	0.50	0	0	1	103
ACEO_AGE	52.7	7.2	48	52	57	103
ACEO_TENURE	6.3	6.1	2	4	8	103
A_SP	0.03	0.17	0	0	0	103
A_NW	0.03	0.17	0	0	0	103
A_LITI	0.80	0.40	1	1	1	103
A_AUDIT	0.93	0.25	1	1	1	103
Target Characteristics						
T_BTM	0.53	0.80	0.30	0.42	0.80	98
Sales ($ million)	162.9	326.0	34.9	61.5	138.4	100
T_SALES	0.95	0.18	0.85	0.94	1.06	100
T_ADV	0.01	0.06	0.00	0.00	0.00	103
T_RD	0.29	2.10	0.00	0.00	0.00	103
Purchase Price Allocation Information						
TANGIBLE	8.2	42.1	-3.0	12.5	26.5	103
GOODWILL	71.8	20.4	65.1	76.4	85.8	103

Table 3 Cont'd
Descriptive Statistics

Panel B – Descriptive Information on Identifiable Intangible Assets Recognized in Purchase Price Allocation

Name of Intangible Assets	Number of Acquisitions	Percentage of Acquisitions	Mean Percentage of Total Purchase Price	Mean Percentage of Total Amount of Intangible Assets Recognized	Mean Percentage of the Amount of Purchase Price Assigned to Intangible Assets Other than Goodwill and IPRD	Range of Life	Number of Acquisitions with Indefinite Life Assigned
Trademark	42	41%	3%	4%	16%	0.5-indefinite	13
Developed Technology	69	67%	11%	15%	51%	1.5-10, one case indefinite	1
Customer Base & Customer Royalty	65	62%	11%	12%	50%	1.5-20	
Patent	10	10%	3%	3%	13%	3-10	
Non-competing Agreements & contracts	16	16%	1%	1%	4%	1-5	
Other Agreements & Contracts	21	20%	7%	8%	42%	1-11, one case indefinite	1

Table 4 – Correlations

The sample includes acquisitions completed between July 2001 and October 2005, where both acquiring companies and acquired companies are publicly traded and acquired companies' primary industry is Business Service (SIC code 73). This table reports pair-wise Pearson correlations between the main variables. Correlation coefficients in **bold** are significant at 10% level, two sided. Variables definitions are in Appendix 1.

	GOOD_ WILL	TANG	A_BTM	A_VERIF	A_SEG	ACEO_ AGE	ACEO_ TENURE	A_SIZE	T_BTM	T_SALES	T_ADV	T_RD	COMMON
TANG	-0.07												
A_BTM	**-0.20**	0.01											
A_VERIF	**-0.37**	-0.03	-0.15										
A_SEG	0.14	0.01	-0.06	0.03									
ACEO_AGE	**0.23**	0.01	-0.12	-0.02	**0.36**								
ACEO_TENURE	-0.02	-0.07	0.00	-0.09	**0.29**	**0.29**							
A_SIZE	0.07	-0.03	**-0.38**	-0.03	**0.20**	**0.30**	-0.05						
T_BTM	**-0.17**	**0.47**	**0.18**	-0.10	**-0.19**	-0.11	-0.04	-0.15					
T_SALES	0.16	**-0.48**	0.08	-0.07	0.06	0.05	**0.18**	**-0.21**	**-0.38**				
T_ADV	0.01	0.01	-0.10	0.11	-0.05	**0.17**	-0.10	0.12	-0.04	-0.06			
T_RD	**-0.30**	0.05	-0.11	0.02	-0.11	-0.07	-0.06	0.12	0.15	**-0.45**	-0.01		
COMMON	**-0.20**	-0.12	0.10	-0.01	**-0.24**	**-0.24**	-0.10	-0.09	-0.06	-0.04	-0.10	0.12	
WT_CAR	-0.15	0.13	0.06	**0.22**	-0.13	0.07	-0.03	-0.05	**0.23**	-0.11	0.10	0.07	0.12

Table 5 – Purchase price allocation post SFAS 142 - Regressions

This table reports estimations of equations (1) and (2). Variables definitions are in Appendix 1. ** and * indicate coefficient significance at the one-tail 5% and 10* level, respectively. † indicates F-test significance at 5% level.

Dependent Variable	GOODWILL	TANGIBLE	GOODWILL	TANGIBLE	GOODWILL	TANGIBLE	GOODWILL	TANGIBLE
INTERCEPT	60.02 ***	8.82	76.91 ***	104.05 ***	70.06 ***	113.03 ***	78.56 ***	124.25 ***
	(15.25)	(36.89)	(13.96)	(24.35)	(20.57)	(42.64)	(22.35)	(45.52)
ACEO_AGE	0.67 ***	0.22			0.66 **	0.24	0.46 *	0.44
	(0.28)	(0.68)			(0.28)	(0.59)	(0.31)	(0.64)
ACEO_TENURE	-0.58 **	-0.65			-0.57 **	-0.26	-0.54 *	-0.46
	(0.32)	(0.77)			(0.32)	(0.66)	(0.35)	(0.71)
A_BTM	-15.97 ***	-0.68			-17.75 ***	-7.19	-17.51 ***	-11.79
	(5.32)	(12.86)			(5.43)	(11.25)	(6.02)	(12.26)
A_VERIF	-4.10 ***	-0.90			-4.18 ***	-0.88	-4.09 ***	-1.04
	(0.85)	(2.05)			(0.83)	(1.73)	(0.88)	(1.80)
A_SEG	5.11 *	3.08			3.38	7.57	1.87	6.09
	(3.96)	(9.57)			(4.06)	(8.42)	(4.54)	(9.24)
A_SIZE	-1.72 *	-1.23			-1.91 *	-2.42	-1.38	-2.33
	(1.14)	(2.77)			(1.23)	(2.56)	(1.31)	(2.68)
T_BTM			-3.58 *	17.22 ***	-3.14	17.57 ***	-2.12	21.66 ***
			(2.77)	(4.84)	(2.54)	(5.27)	(3.17)	(6.46)
T_SALES			-2.83	-109.78 ***	-4.55	-112.22 ***	-4.29	-134.63 ***
			(13.79)	(24.06)	(12.47)	(25.85)	(13.41)	(27.30)
T_ADV			-0.41	-3.20	-6.18	0.02	-10.15	-10.28
			(35.37)	(61.71)	(31.62)	(65.54)	(32.34)	(65.87)
T_RD			-2.80 ***	-4.05 **	-2.79 ***	-3.84 **	-2.73 ***	-4.73 ***
			(1.07)	(1.86)	(0.93)	(1.93)	(0.97)	(1.98)
COMMON							-8.93 **	-5.96
							(4.95)	(10.09)
WT_CAR							0.03	0.15
							(0.31)	(0.63)
F-test	6.18 †	0.16	2.76 †	13.18 †	5.32 †	5.22 †	4.31 †	4.61 †
Adj-R^2	0.23	-0.05	0.07	0.33	0.31	0.30	0.32	0.34
Number of Obs	103	103	98	98	98	98	86	86

Table 6 – Purchase price allocation prior to SFAS 142
This table reports the analyses of acquisitions prior to SFAS 142. The pre-SFAS 142 sample includes acquisitions completed between January 1996 and December 2000, where both acquiring companies and acquired companies are publicly traded and acquired companies' primary industry is Business Service (SIC code 73). All pooling of interests deals are excluded. Variables are defined as described in Appendix 1.

Panel A – Descriptive statistics of pre-SFAS 142 acquisitions

	Mean	Std. Dev.	Lower Quartile	Median	Higher Quartile	# of Obs
GOODWILL	81.51	29.20	75.48	96.36	100.00	75
ACEO_AGE	49.73	8.39	44.00	48.00	57.00	75
ACEO_TENURE	6.17	5.86	2.00	5.00	9.00	75
A_BTM	0.22	0.18	0.12	0.18	0.32	71
A_VERIF	0.43	2.34	-0.13	0.32	0.65	74
A_SEG	0.35	0.48	0.00	0.00	1.00	75
A_SIZE	7.68	2.25	6.59	8.11	9.18	71
T_BTM	0.11	1.51	0.06	0.20	0.41	73
T_SALES	0.73	1.68	0.80	0.94	1.08	73
T_ADV	0.005	0.021	0.000	0.000	0.000	75
T_RD	0.033	0.144	0.000	0.000	0.000	75
COMMON	0.16	0.37	0.00	0.00	0.00	75

Panel B – Purchase price allocation pre and post SFAS 142

This panel reports estimations of equations (1) and (3). ** and * indicate coefficient significance at the one-tail 5% and 10* level, respectively. † indicates F-test significance at 5% level.

	Pre-SFAS 142		Pre-SFAS 142		Pre vs. Post 142		Pre vs. Post 142		Pre vs. Post 142	
INTERCEPT	78.64	***	72.90	***	86.64	***	88.51	***	72.90	***
	(24.36)		(29.18)		(18.39)		(19.87)		(22.13)	
ACEO_AGE	**-0.33**		**-0.29**		**-0.24**		**-0.31**		**-0.29**	
	(0.46)		(0.56)		(0.36)		(0.38)		(0.43)	
ACEO_TENURE	**0.31**		**0.36**		**0.44**		**0.54**		**0.36**	
	(0.65)		(0.73)		(0.50)		(0.52)		(0.55)	
A_BTM	**0.02**		**0.03**		**0.01**		**0.02**		**0.03**	
	(0.03)		(0.03)		(0.02)		(0.02)		(0.02)	
A_VERIF	**0.23**		**-0.57**		**0.03**		**-0.28**		**-0.57**	
	(2.94)		(3.22)		(2.30)		(2.35)		(2.44)	
A_SEG	**10.21**	*	**8.54**		**11.10**	**	**10.03**	*	**8.54**	
	(7.85)		(8.95)		(6.13)		(6.46)		(6.79)	
A_SIZE	1.64		2.11		-0.07		0.26		2.11	
	(1.97)		(2.30)		(1.08)		(1.18)		(1.74)	
T_BTM			-3.62	*			-3.11	**	-3.62	**
			(2.61)				(1.66)		(1.98)	
T_SALES			-0.79				-1.26		-0.79	
			(2.34)				(1.72)		(1.77)	
T_ADV			79.68				0.28		79.68	
			(202.70)				(41.49)		(153.73)	
T_RD			1.71				-2.76	***	1.71	
			(30.95)				(1.15)		(23.47)	
COMMON			0.09				-3.00		0.09	
			(13.17)				(4.81)		(9.99)	
Post142					-34.57	*	-28.49		3.73	
					(25.86)		(26.76)		(36.53)	
Post142*ACEO_AGE					**0.81**	*	**0.79**	*	**0.88**	*
					(0.50)		(0.52)		(0.58)	
Post142*ACEO_TENURE					**-0.94**	*	**-1.00**	*	**-0.93**	*
					(0.66)		(0.68)		(0.70)	
Post142*A_BTM					**-13.12**	**	**-13.52**	**	**-17.02**	**
					(6.81)		(7.14)		(7.53)	
Post142*A_VERIF					**-4.00**	*	**-3.73**	*	**-3.62**	*
					(2.56)		(2.59)		(2.70)	
Post142*A_SEG					**-6.84**		**-8.31**		**-6.30**	
					(8.01)		(8.46)		(8.87)	
Post142*A_SIZE									-4.00	*
									(2.44)	
Post142*T_BTM									-0.17	
									(4.08)	
Post142*T_SALES									-5.07	
									(17.34)	
Post142*T_ADV									-89.37	
									(159.83)	
Post142*T_RD									-4.39	
									(23.51)	

Post142*COMMON					-6.13
					(11.54)
F-test	0.69	0.52	2.61 †	2.37 †	1.92 †
Obs	71	68	174	166	166
Adj. R-sq	-0.03	-0.09	0.10	0.12	0.11

Table 7 – Purchase price allocation post SFAS 142 and external appraisers
This table reports estimations of regression (5). ** and * indicate coefficient significance at the one-tail 5% and 10* level, respectively. † indicates F-test significance at 10% level.

	OLS	OLS	Heckman	Heckman
INTERCEPT	42.31 **	63.55 ***	18.40	-13.68
	(20.09)	(25.25)	(25.85)	(35.83)
IV	18.83	7.93	24.79	35.00
	(32.11)	(32.28)	(36.02)	(40.73)
NON_IV*ACEO_AGE	**0.90 *** **	**0.81 ** **	**0.85 ** **	**0.79 ** **
	(0.37)	(0.38)	(0.42)	(0.45)
NON_IV*ACEO_TENURE	**-0.29**	**-0.36**	**-0.51 ***	**-0.54 ***
	(0.41)	(0.41)	(0.37)	(0.37)
NON_IV*A_BTM	**-16.54 *** **	**-19.99 *** **	**-23.58 ** **	**-22.76 *** **
	(6.40)	(6.59)	(10.24)	(9.09)
NON_IV*A_VERIF	**-4.30 *** **	**-4.47 *** **	**-6.51 ***	**-6.33 ***
	(0.89)	(0.87)	(4.25)	(4.26)
NON_IV*A_SEG	**7.11 ***	**4.25**	**4.40**	**2.59**
	(5.23)	(5.55)	(7.01)	(7.03)
IV*ACEO_AGE	**0.65**	**0.65 ***	**0.60 ***	**0.47**
	(0.50)	(0.50)	(0.36)	(0.37)
IV*ACEO_TENURE	**-0.89 ***	**-0.80 ***	**-1.14 *** **	**-1.09 *** **
	(0.55)	(0.54)	(0.45)	(0.42)
IV*A_BTM	**-11.39**	**-9.51**	**-7.22**	**-4.73**
	(9.34)	(9.47)	(8.02)	(8.10)
IV*A_VERIF	**-1.16**	**-1.21**	**-2.36**	**-1.57**
	(4.26)	(4.20)	(3.81)	(3.41)
IV*A_SEG	**0.31**	**-1.94**	**-1.71**	**-1.30**
	(6.14)	(6.27)	(4.45)	(4.41)
A_SIZE	-1.36	-1.81 *	-0.36	0.36
	(1.19)	(1.29)	(1.38)	(1.71)
T_BTM		-3.22		-1.02
		(2.69)		(2.76)
T_SALES		-5.05		26.59 *
		(12.72)		(16.68)
T_ADV		-9.97		5887.19 *
		(32.70)		(3840.91)
T_RD		-2.66 ***		-469.98 *
		(0.94)		(293.16)
COMMON		-5.46		-3.29
		(4.29)		(4.60)
IV_Lam			14.42	12.03
			(17.11)	(21.04)
NON_IV_Lam			-38.84 **	-47.82 **
			(21.03)	(22.92)
Adj-R^2	0.23	0.30	0.22	0.25
Number of Obs	103	98	84	82

Table 8 - Empirical Analysis of Goodwill Allocation in Multi-segment Acquirers
This sub-sample includes acquisitions where the acquiring companies have more than one business segment and also disclose how they allocate the goodwill acquired in the acquisitions among different segments. PCT_GW is the amount of goodwill allocated to a segment as a ratio of the total goodwill assigned in the purchase price allocation of an acquisition. RANK is the standardized profitability rank of segment j among all segments of the acquiring company in an acquisition deal; the ranking is based on the relative financial performance (measured as pretax income over assets, operating profit over assets, pretax income over sales, or operating profit after depreciation over sales, in that order, depending on the data availability in COMPUSTAT) of all segments in the acquiring company; the ranks are standardized so that the best performing segment receives a rank of 0.5 and the worst performing one receives a rank of -0.5. P_MATCH is a dummy variable assigned a value of one when a segment's SIC code is the same as the primary SIC code of the acquired company, and zero otherwise. R_MATCH is defined as N1/N2, where N1 is equal to one when the segment's SIC code is equal to any of the SIC codes assigned to the acquired company by SDC, and zero otherwise, while N2 is the total number of different SIC codes assigned to the acquired company by SDC. GWW_RANK is the goodwill-weighted rank of all segments for the acquiring company.

Panel A – Descriptive Statistics

	# of Obs	Mean	Standard Deviation	Max	Higher Quartile	Median	Lower Quartile	Min
PCT_GW	66	0.26	0.41	1.00	0.51	0.00	0.00	0.00
RANK	66	0.00	0.38	0.50	0.50	0.00	-0.50	-0.50
P_MATCH	66	0.17	0.38	1.00	0.00	0.00	0.00	0.00
R_MATCH	66	0.11	0.17	0.50	0.25	0.00	0.00	0.00
GWW_RANK	17	0.27	0.31	0.50	0.50	0.50	0.01	-0.50

Panel B – Correlations

	PCT_GW	RANK	R_MATCH
RANK	**0.45**		
P_MATCH	0.02	-0.09	
R_MATCH	-0.05	-0.03	**0.79**

Panel C – Regressions with PCT_GW as Dependent Variable

	Coefficient	T-Stat	Coefficient	T-Stat	Coefficient	T-Stat
INTERCEPT	0.25	4.89	0.27	4.83	0.28	4.96
RANK	0.49	3.99	0.48	3.95	0.50	4.09
P_MATCH	0.06	0.50			0.26	1.27
R_MATCH			-0.10	-0.36	-0.55	-1.22