Overbidding in Mergers and Acquisitions: An Accounting Perspective

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ABSTRACT
Does accounting regime play a role in the well-documented phenomenon of overbidding in M&As? The 2001 regulatory change from a goodwill amortization to a non-amortization regime (SFAS 142) affords us a quasi-experimental setting for testing the consequences of M&A accounting rules for acquirers' bidding decisions. Relying on a novel approach to modeling optimal bidding, our primary finding indicates a significant increase in overbidding in the post-2001 period, suggesting that M&A accounting has real consequences for bidding decisions, and that this result is robust to a battery of sensitivity tests. In addition, supplementary tests show that overbidding is more pronounced in pooling versus purchase transactions, and that the accounting regime's implications for overbidding and acquisition premium are distinct. Overall, our findings shed light on the role accounting plays in shaping managerial decisions—and, ultimately, shareholder wealth—in an important corporate setting. They may thus inform researchers, corporate boards, and standards setters.

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I. INTRODUCTION

The high uncertainty and substantial managerial discretion inherent to the valuation of merger and acquisition (M&A) transactions makes overbidding the subject of broad discussion in the M&A literature.[1] Generally, this body of literature offers three potential reasons for overbidding. First, the economic literature asserts that the presence of agency conflicts may result in empire building (Jensen 1986), which, in turn, leads to overbidding (Berle and Means 1932, 112). Second, the behavioral finance literature maintains that even in the absence of agency motives, overbidding may still occur in M&A transactions due to biased managers, whose assessment of expected synergy is based on their optimism, overconfidence,

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[1] Overbidding is the portion of the purchase price in excess of the optimal bid, derived from an economic model that optimizes the bidding decision (de Bodt, Cousin, and Roll 2018).

or hubris and their urge to beat competing bidders. Third, the accounting literature posits that acquirers' overpriced shares lead them to overbid in stock-for-stock acquisitions, paving the way for subsequent goodwill write-offs and stock price declines. In this paper, we consider a new potential reason for overbidding by investigating the role M&A accounting plays in the bidding decision.

A 2001 regulatory change—from a periodic goodwill amortization regime under the Accounting Principles Board (APB) Opinion No. 17, *Intangible Assets,* to a non-amortization regime under the Statement of Financial Accounting Standards (SFAS) No. 142, *Goodwill and Other Intangible Assets*—affords us a quasi-experimental setting to carry out our investigation. While the effect of other accounting standards on future net income numbers is typically ambiguous (they may either increase or decrease a company's future net income), SFAS 142 unambiguously increases the post-acquisition net income of all acquirers that would not have qualified for the pooling-of-interests method in the pre-SFAS 142 period. This feature makes SFAS 142 a particularly good empirical setting for our tests.

Because the (exogenous) regulatory change from a periodic amortization regime to a non-amortization regime eliminates the drag from goodwill amortization on earnings, *ceteris paribus,* the post-acquisition reported earnings would be higher after SFAS 142 when using the purchase method.[2] Consequently, these higher post-acquisition reported earnings may exacerbate agency conflicts and management's behavioral bias during acquisitions if the managers making bidding decisions are conscious of the acquisition's impact on post-acquisition reported earnings (and, presumably, stock prices). This implies that, *ceteris paribus,* acquiring companies' managers are likely to bid higher to increase the likelihood of securing the (seemingly more appealing) transaction in the post-acquisition period, even if doing so does not optimize shareholders' wealth. Hence, our research question asks: does the goodwill non-amortization approach of SFAS 142 result in a greater level of overbidding by the acquirer's management?

A key challenge underlying our empirical tests lies in the measurement of overbidding. Prior studies employ a variety of proxies for overbidding, including acquisition premium, i.e., the acquirer's offer price relative to target's pre-acquisition stock price and, most notably, acquirer's announcement cumulative abnormal returns (bidder CARs). However, these empirical measures have no counterfactual, so it is hard to ascertain the optimal bidding benchmark against which actual bidding should be contrasted. In addition, these measures fail to take into account the correlation between the bidder's profits from the acquisition and the probability of acquisition success in the bidding process. This may give rise to an endogeneity problem, which may, in turn, cause the overbidding measures to be ambiguous (de Bodt et al. 2018, 1548).

To address these concerns, we use a novel measure of *transaction-level overbidding* derived from the first-order condition of the bidder's expected profit maximization problem (de Bodt et al. 2018). This transaction-level measure explicitly takes into account the correlation between the bidder's profits from the acquisition and the probability of acquisition success and, most important, provides a model-based benchmark for optimal bidding that serves as the basis for computing overbidding. Consequently, ambiguity does not cloud the interpretation of our findings.

In constructing the overbidding measure, we closely follow the procedures outlined in de Bodt et al. (2018), as they have already performed a battery of validity tests to establish the measure's reliability. Following de Bodt et al. (2018), we begin by estimating the probability of acquisition success using a broad sample of both completed and withdrawn transactions, and then obtain our measure of overbidding by estimating the first-order condition of the bidder's expected profit maximization problem using seemingly unrelated regressions (SUR).[3] Armed with our model-based overbidding estimates, we analyze the sample of the completed acquisition transactions using the purchase method and find that the purchase transactions exhibit significantly higher overbidding in the post-SFAS 142 period than in the pre-SFAS 142 period. This result is robust to controlling for acquisition synergy and a host of other variables, including the type of transaction (horizontal or vertical, hostile or friendly), bidder size, time-series trends in market sentiment, and merger waves. The results also hold in a subsample of firms with acquisitions in both the pre- and post-SFAS 142 periods, where each acquirer serves as its own control, as well as when the pre- and post-SFAS 142 periods are shortened significantly, mitigating concerns that an over-time change in our sample composition underlies our findings. Furthermore, a placebo test for changes in the level of overbidding between two post-SFAS 142 periods of equal length, 2002–2007 and 2008–2013, shows little change in overbidding, supporting our explanation that the introduction of SFAS 142, not merely the passage of time, explains the observed increase in overbidding. Next, we find that our results hold even after controlling for the effect of the abolishment of pooling (SFAS 141), which was promulgated simultaneously with SFAS 142, and for a sample of Australian firms that

[2] Indeed, an annual impairment test replaced goodwill amortization. Still, under the new standard, earnings will be higher primarily because amortization reduces earnings even in the absence of an impairment, and because impairment tests are particularly imprecise, allowing substantial managerial discretion in timing impairment losses, if they exist (Roychowdhury and Watts 2007).

[3] The overbidding measure is the *negative* of the first-order condition to reflect the amount that the marginal costs (loss of a bidder's profits) are higher than the marginal benefits (increasing the possibility of acquisition success). The Online Appendix (see Appendix B for the link to the downloadable file) delineates in detail the development and estimation of our overbidding measure, as well as provides summary statistics and estimation results.

switched from an amortization to non-amortization regime. The advantage of using Australian data is that in Australia, the pooling-of-interests method was not available, so a potential endogeneity problem due to the change from pooling to purchase does not apply.

To corroborate our main findings, as well as to examine whether SFAS 142 is also associated with a change in acquisition premium, we perform two supplementary tests. For the first supplementary test, we analyze overbidding in pooling *vis-à-vis* purchase transactions in the pre-SFAS 142 period and expect pooling transactions to exhibit higher overbidding than purchase transactions. This follows because under the pooling method, acquired goodwill is not amortized and the target's book values are not stepped up, which results in lower post-acquisition depreciation. Therefore, *ceteris paribus,* the post-acquisition reported earnings under the pooling method would be higher than those under the purchase method, which, according to our hypothesis, will stimulate more overbidding.[4] Our results confirm this intuition by showing that overbidding is higher for pooling *vis-à-vis* purchase transactions in the pre-SFAS 142 period, thereby corroborating our primary hypothesis and findings that accounting rules contribute to overbidding.

For the second supplementary test, we analyze acquisition premium for purchase transactions in the pre- and post-SFAS 142 periods. To be sure, as de Bodt et al. (2018) suggest, an acquisition premium and overbidding are two distinct measures. To investigate whether acquisition premium also changed in our setting, a second type of supplementary test examines the change in the acquisition premium for purchase transactions in the pre- and post-SFAS 142 periods. Note that the theory in Ayers, Lefanowicz, and Robinson (2002) does not apply to this setting and, thus, in contrast to overbidding, there is a weaker case to be made for a change in the acquisition premium between the two periods—an intuition confirmed by our results.

Our study offers contributions to the M&A accounting literature, to accounting policy makers, and to the economic literature on overbidding. First, as we discuss in detail below, prior accounting research examines a number of research questions associated with SFAS 142, including the role goodwill plays in the purchase price allocation, the determinants of and market reaction to goodwill impairment loss recognition, and the post-acquisition announcement stock price performance. We contribute to the accounting literature on SFAS 142 in particular, and on the economic consequences of accounting standards more generally, by being the first to provide evidence of a real consequence of SFAS 142 for bidding decisions. In addition, from a methodological standpoint, the use of a model-based measure for overbidding, as opposed to using *ad hoc* proxies such as bidder's announcement return or future goodwill write-downs, and a more rigorous estimation method should increase confidence in the inference validity of our study.[5]

Second, our results may have an important policy implication: initially, in 1999, the Financial Accounting Standards Board (FASB) issued an Exposure Draft that proposed shortening the maximum goodwill amortization period under the purchase method from 40 to 20 years. Subsequently, the FASB succumbed to substantial pressure from the business community and went in a different direction, abolishing goodwill amortization entirely (Ramanna 2008). Thus, although the primary goal of SFAS 142 was to provide better information about companies' intangible assets, our findings show that the abolishment of goodwill amortization (inadvertently) increases overbidding in acquisitions, which, in turn, decreases acquirers' shareholder wealth.

Third, we contribute to the literature on overbidding, especially to that which focuses on agency conflicts. Harford and Li (2007) find that executive pay policies in bidding firms exacerbate agency conflicts. Even when a merger leaves the bidding shareholders worse off, the bidding CEO is better off three-quarters of the time. Our results complement these findings by illustrating the role that SFAS 142 plays in fostering agency conflicts. Overall, our findings shed light on the role that accounting rules play in shaping and affecting managerial decisions—and, ultimately, shareholder wealth—in a significant corporate activity setting. Our results may, thus, be informative for researchers, corporate boards, and accounting standards setters.

The rest of the paper is organized as follows. Section II provides an overview of the relevant literature. Section III discusses the accounting background and outlines the research questions. Section IV summarizes the sample construction procedures and develops our overbidding measure. Section V reports summary statistics and outlines the primary tests and results. Section VI reports the results from a multitude of sensitivity and supplementary tests, and Section VII concludes.

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[4] As explained below in detail, this prediction is distinct from the one of Ayers et al. (2002) concerning a differential acquisition premium between pooling and purchase.

[5] Note that neither overbidding nor acquisition premium necessarily imply future goodwill write-downs, and future goodwill write-downs do not necessarily imply overbidding or an acquisition premium. An impairment may simply result from unforeseen adverse events developing after the acquisition or from the overvaluation of goodwill and the undervaluation of other depreciable assets in the purchase price allocation process (Shalev, I. Zhang, and Y. Zhang 2013; Bugeja and Loyeung 2015).

II. LITERATURE REVIEW

Our paper relates to three strands of literature: the literature on goodwill, the literature on purchase *vis-à-vis* pooling of interests, and the literature on overbidding.

Goodwill

According to the Financial Accounting Standards Board (FASB), goodwill represents future economic benefits that arise from assets that cannot be individually identified and separately recognized, such as expected merger synergy. The accounting research on goodwill chiefly focuses on three areas: (1) the role goodwill plays in the purchase price allocation, (2) the determinants of and market reaction to goodwill impairment loss recognition, and (3) the value relevance of goodwill: whether recognized goodwill has predictive value for companies' future earnings and cash flow.

Studying the purchase price allocation in business combinations, several studies document that a considerable portion of the purchase price is allocated to goodwill rather than to other *depreciable* assets, presumably to boost post-acquisition earnings. Shalev et al. (2013) examine a sample of U.S. acquirers and find that the allocation of the acquisition consideration to goodwill increases with the importance of bonuses, and that when acquirers' CFO performance evaluation includes cash flow-based parameters, the association between the amount allocated to goodwill and the importance of bonuses diminishes. Likewise, Bugeja and Loyeung (2015) find that goodwill is positively associated with the use of accounting-based bonus plans to compensate the acquiring firm's CEO, and that goodwill increased after Australia switched in 2005 from Australian generally accepted accounting principles (GAAP), a goodwill amortization regime, to International Financial Reporting Standards (IFRS), a goodwill non-amortization regime. They also find that the amount allocated to goodwill is related to managerial opportunism, not to target firms' economic characteristics. I. Zhang and Y. Zhang (2017) find that the allocation of the purchase price to goodwill relates not only to the goodwill's economic determinants, but also to managerial incentives.

Studying the market reaction to announcements of goodwill impairment loss under the SFAS 121 and SFAS 142 regulatory regimes, Li, Shroff, Venkataraman, and Zhang (2011) find that under both regimes, the market responds negatively to impairment announcements, but more strongly under the SFAS 121 regime. They also find that the magnitude of the goodwill impairment is predictable and conclude that overpayment for acquired targets could be a potential contributing factor to subsequent goodwill impairment. Likewise, Gu and Lev (2011) find that acquirers' overpriced shares relate positively to goodwill write-offs (at the firm, not the transaction, level) because overpriced shares provide strong incentives for managers to overpay the target company in a stock-for-stock acquisition. Clearly, the proposition that overpayment in acquisitions leads to future goodwill impairments may be true, but its converse is clearly false. That is, future goodwill impairments do not necessarily imply overpayment at the time of acquisition; a write-off may simply result from unforeseen adverse events developing afterward.

Beatty and Weber (2006) examine the timing of impairment loss recognition by companies that adopted SFAS 142, because at the time of adoption, companies had a choice between immediate below-the-line and delayed above-the-line impairment loss recognition. The authors find that when debt covenants are affected by below-the-line accounting charges, managers will choose to delay impairment expense recognition. They also find that the probability of taking a write-off is smaller for firms (1) with an earnings-based bonus plan, (2) with CEOs who have a longer tenure, and (3) that are listed on stock exchanges with financial-based listing requirements. In addition, Li and Sloan (2017) find that in the post-SFAS 142 period, (1) impairments are relatively less timely, resulting in relatively inflated goodwill balances, and (2) firms with high goodwill balances and low profitability have both a higher probability of future goodwill impairments and lower future stock returns. Based on these findings, Li and Sloan (2017, 2) conclude, "it appears that investors have failed to fully anticipate the less timely impairments under SFAS 142."

In summary, prior literature employs a variety of settings and methodologies to demonstrate that: (1) companies exploit the difficulty of measuring goodwill's fair value in order to manage its recognized value on the acquisition date; (2) managers exploit the discretion afforded by SFAS 142 to delay goodwill impairments, thus temporarily inflating earnings, the goodwill amount on the balance sheet, and stock prices; (3) goodwill may result from understating depreciable assets on the acquisition date or from overpayment; and (4) acquirers' overvalued stocks may serve as motivation for and an indicator of overpayment in stock-for-stock acquisitions, resulting in post-acquisition goodwill write-offs and stock price declines.

Still, none of these papers directly examine the role M&A accounting plays in overbidding. Our research fills this void in the accounting literature by examining at the *transaction* level (as opposed to the firm level) whether the abolishment of mandatory goodwill amortization under SFAS 142 contributes to *overbidding*. The current paper also makes a methodological contribution by introducing overbidding to acquisition decisions, as opposed to the acquisition premium or bidder CAR, and by directly measuring overbidding using an economic model, as opposed to using future goodwill write-downs—a rather *ad hoc* proxy for acquisition overpayment.

Purchase and Pooling Methods

Ayers et al. (2002), who use a carefully selected sample of 198 stock-for-stock acquisitions of 90 percent or more of the target's stock in the 1990–1996 period, find that the bidding firm's need for target cooperation to consummate a pooling acquisition enables the target to capture a large portion of the acquisition-related benefits, as evidenced by a higher acquisition premium.[6] In other words, the higher acquisition premium paid for pooling *vis-à-vis* purchase transactions in the pre-SFAS 142 period that Ayers et al. (2002) document can be a rational decision that the acquiring firm makes in order to benefit from the pooling method.

Our study differs from Ayers et al. (2002) in two important ways. First, they study the acquisition premium, which is distinct from overbidding. Clearly, the acquisition premium for a pooling transaction may be higher than that for a purchase transaction, but it may still represent an optimal bidding decision. In contrast, overbidding always represents a suboptimal bidding decision. To be sure, many factors unrelated to overbidding affect the acquisition premium; hence, it cannot be used as a measure of overbidding. For example, if the *ex ante* likelihood of acquisition success is low, then the acquirer will pay a higher price in order to secure the acquisition, resulting in a higher acquisition premium. However, this higher acquisition premium does not imply overbidding, as the higher acquisition premium maximizes the bidder's expected profit. Importantly, the distinction between the acquisition premium and overbidding is not merely conceptual; the analysis in a later section demonstrates that it leads to different findings regarding the role of SFAS 142 in shaping the values of the acquisition premium and overbidding.

Second, Ayers et al. (2002) study the choice between the purchase and pooling methods in a pre-SFAS 142 period, whereas we study the purchase method with and without goodwill amortization in the pre- and post-SFAS 142 periods, respectively. Clearly, the pooling and the purchase methods with no goodwill amortization have substantially different balance sheet and income statement implications. In fact, the FASB discontinued the pooling method after criticism that it produces a misleading financial picture of the combined entity because it considers the target as a stand-alone company, and it does not recognize synergies from the acquisition (no mark to market and no recognition of goodwill and other intangibles). Thus, findings indicating that the pooling method is associated with a higher acquisition premium cannot be generalized to purchases with no goodwill amortization, let alone to overbidding.

Aboody, Kasznik, and Williams (2000) study the determinants underlying the choice between the purchase and the pooling-of-interests in stock-for-stock acquisitions. They find that CEOs with earnings-based compensation are more likely to choose pooling and avoid the earnings "penalty" associated with the drag on earnings in acquisitions with large step-ups to targets' net assets. They also find that the likelihood of pooling decreases with debt contracting costs and with the likelihood that the acquiring company will want to repurchase stock or divest the target company's assets, both of which are restricted under the pooling method. Our study differs from Aboody et al.'s (2000) in terms of settings, research questions, and findings. The most material difference is that our research question concerns overbidding, not the choice between pooling and purchase.

Overbidding

Numerous empirical studies on M&A, which suggest that acquisitions destroy value for the acquirer due to overbidding (e.g., Moeller, Schlingemann, and Stulz 2004), generally attribute overbidding to two causes. First, in the presence of agency conflicts, managers may consciously overbid in order to increase the probability of a successful M&A transaction, which will, in turn, increase their pay, visibility, and influence. Indeed, Harford and Li (2007) find that even when a merger leaves the bidder's shareholders worse off, the bidder's CEO is better off three-quarters of the time. They also find that following a merger, a CEO's pay and overall wealth become insensitive to negative stock performance. In addition, the extant literature suggests several potential overbidding determinants related to agency conflicts and governance mechanisms, including past performance (Rau and Vermaelen 1998), CEO variable compensation (Grinstein and Hribar 2004), the G-index (Gompers, Ishii, and Metrick 2003), free cash flow (Jensen 1986), leverage (Jensen and Meckling 1976), CEO age and tenure (Yim 2013), and the CEO pay slice (Bebchuk, Cremers, and Peyer 2011). We introduce a new mechanism that fosters agency conflicts and, thus, drives overbidding—a new accounting rule that increases the *perceived* benefits of overbidding.

A second reason for overbidding in the finance literature concerns a behavioral bias. Roll (1986) introduces the possibility that irrational behavior could lead to poor corporate performance. To take up this issue in M&A, Hayward and Hambrick (1997), Chatterjee and Hambrick (2007), Malmendier and Tate (2008), and Aktas, de Bodt, Bollaert, and Roll (2016), among others, examine the role of narcissism, hubris, and overconfidence. In addition, auction theory extensively analyzes the notion of the winner's curse (e.g., Malmendier and Lee 2011; Krishna 2010). The intuition underlying the winner's curse is straightforward. For simplicity, suppose that a target is worth the same amount to all bidders—the auction is a *common value*

[6] Note that the acquisition premium is one of the several inputs used to compute our measure of overbidding.

auction. Further, suppose that each bidder's estimate for the target is unbiased; in other words, the mean of all bids tends to equal the true economic value of the target. Given the high uncertainty surrounding the target's valuation, the bids will vary substantially. Some will be too high and some too low, which must be the case if the bids are unbiased. Because the highest bid wins, the winner of the auction is likely to be a loser because the winning bid exceeds the true value of the target.[7]

In summary, the overbidding literature considers a variety of reasons for overbidding. Still, the potential effect of M&A accounting on overbidding has not yet been studied—a gap in the literature that the current study attempts to close. In addition, the overbidding measure used in most of these studies has no counterfactual and is subject to endogeneity concerns arising from the correlation between the probability of acquisition success and bidder returns, both of which result from the acquirer's expected profit maximization paradigm. In other words, the bid premium picked by the bidder (the decision variable) underlies both the target shareholders' decision to accept the bid (the probability of success) and the investors' response (bidder's announcement returns). In keeping with de Bodt et al.'s (2018) new approach, we develop a new empirical measure of overbidding. Moreover, in an effort to increase the validity of our results, we follow de Bodt et al. (2018) and take into account the correlation between the probability of acquisition success and bidder returns by employing the SUR procedure.

III. ACCOUNTING BACKGROUND AND THE DEVELOPMENT OF THE RESEARCH QUESTION

Accounting Background

In August 1970, the Accounting Principles Board issued APB 16, *Business Combinations,* and APB 17, *Intangible Assets*. Under APB 16, business combinations were accounted for using either the pooling-of-interests or the purchase method. The use of the former was required whenever 12 criteria were met (most notably, the acquisition had to be more than 90 percent financed by stock); otherwise, the purchase method was to be used. Under the pooling method, the assets and liabilities of the two combining companies, the acquirer and the target, were simply added together, item by item. Any payment in excess of the fair value of the target's net identifiable assets (i.e., goodwill) was not recognized on the consolidated balance sheet as an asset and, consequently, no goodwill amortization expense would be recognized in the post-acquisition period. Conversely, the purchase method requires recognizing goodwill at the time of the acquisition if the purchase price exceeds the fair value of the target's identifiable net assets, and then amortizing that goodwill in future periods. Under APB 17, the period of goodwill amortization should not exceed 40 years.

However, the pooling method was criticized on the grounds that the 12 criteria did not economically distinguish between dissimilar transactions, and that similar business combinations were accounted for using different methods that produced substantially different financial statement results. In 1999, the FASB issued an Exposure Draft proposing two changes: (1) it prohibited the use of the pooling method for business combinations, and (2) it shortened the maximum amortization period for goodwill from 40 to 20 years. However, during 2000 and 2001, substantial pressure from the business community induced the FASB to redeliberate its proposal. In June 2001, the FASB issued SFAS 141, *Business Combinations,* which superseded APB 16, and SFAS 142, *Goodwill and Other Intangible Assets,* which superseded APB 17. These two new pronouncements dramatically changed the accounting for M&A.

The two major innovations of SFAS 141 concern the requirements that (1) all business combinations be accounted for by a single method, the purchase method, and (2) the allocation of the purchase price paid for acquired assets (including goodwill) and assumed liabilities be disclosed under major balance sheet captions. The primary change introduced by SFAS 142, which seems to reflect pressure from the business community following issuance of the 1999 Exposure Draft, involves the requirement that goodwill (and other intangible assets with indefinite useful lives) will not be amortized, but rather tested at least annually for impairment. The impairment test compares the fair value of goodwill with its carrying amount; goodwill would have to be written down and expensed against earnings if the impairment test indicates that the carrying amount of goodwill exceeds its (implied) fair value.[8] Still, impairment tests are particularly imprecise. Unless the target's shares are publicly traded after the acquisition—and only a minority of targets' shares are—there is no objective evidence of impairment.

Development of the Research Question

The economic literature offers detailed discussion of the process of assessing a target's value in acquisitions. While in theory, the process is objective and should lead to an unbiased estimate, in practice, acquirers often overbid due to the large

[7] The irrationality of this setting follows from bidders' underestimation of the magnitude of the bid adjustments necessary to compensate for the presence of other bidders.

[8] Since 2013, according to an accounting alternative provided by the FASB's Private Company Council, private companies may elect to amortize goodwill over a period of ten years or less or to use a simpler one-step impairment test.

number of (subjective) assumptions required to justify any particular valuation of the combined entity, which may exacerbate agency motives and behavioral bias.

We examine the possibility that the 2001 regulatory change in M&A accounting has an effect on overbidding. The switch from a periodic amortization regime to a non-amortization regime eliminates the drag from goodwill amortization on earnings. Indeed, goodwill amortization was replaced by an annual impairment test. Still, under the new standard, earnings are higher because amortization reduces earnings even in the absence of an impairment, and because impairment tests are particularly imprecise, allowing substantial managerial discretion in timing impairment losses.[9] This implies that, *ceteris paribus,* for transactions accounted for under the purchase method, post-acquisition reported earnings would be higher in the post-SFAS 142 period than in the pre-SFAS 142 period. Moreover, anecdotal evidence suggests that the higher reported earnings in the post-SFAS 142 period may be associated with higher stock prices and, consequently, higher perceived overbidding benefits. For example, as Jonathan Weil (2001) notes: "Many companies active on the acquisition front will see their earnings boosted when the incremental drag from goodwill amortization goes away. And higher earnings mean higher stock prices, right? That's how some analysts are calling it, anyway. For instance, in a research note last month on electronics conglomerate Tyco International, Merrill Lynch analyst Phua Young wrote that Tyco's earnings for fiscal 2001 could be close to $3 if the FASB proposal went through, compared to $2.70 otherwise. Young claimed that the new rules would make their shares even more attractive."

Furthermore, the FASB's 1999 Exposure Draft, which shortened the maximum goodwill amortization period from 40 to 20 years in harmony with International Accounting Standards (IAS) 22 (as revised in 1993), came under substantial pressure from the business community to repeal it. This reaction indicates that company executives perceive the drag from goodwill amortization on earnings to have a valuation effect. Thus, if, in making bidding decisions, managers are mindful of the impact of the acquisition on their companies' post-acquisition reported earnings and stock prices, then they will be willing to pay more for acquisitions in the post-SFAS 142 period to increase the likelihood of securing the transaction. This managerial behavior may occur either because the higher reported earnings (and stock prices) exacerbate agency conflicts, or because they worsen management's behavioral bias.[10] Hence, our research question asks: does the goodwill non-amortization approach of SFAS 142 result in a greater level of overbidding by the acquirers?

IV. SAMPLE CONSTRUCTION AND THE OVERBIDDING MEASURE

Sample Construction

We construct three primary samples by retrieving data from the following four data sources: (1) stock returns from The University of Chicago's CRSP; (2) accounting data from Standard & Poor's (S&P) Compustat; (3) Thomson Reuters' Securities Data Company (SDC) Platinum for acquisition data, including transaction announcement and completion dates, payment methods, the names and identifiers of acquirers and targets, whether the target firm has a shareholder rights plan (poison pill), whether the transaction is hostile or friendly, the transaction value, information on acquirers' and targets' respective industries, and the number of bidders in the deal process; and (4) the Securities and Exchange Commission's (SEC) EDGAR for certain acquisition characteristics (whether the acquisition was through an auction or initiated by the target).

Table 1 outlines the construction of the three primary samples we use to test our research question.[11] The construction of our first primary sample begins with 2,975 completed transactions with an overbidding estimate in the 23-year period from 1992 to 2014.[12] We drop 638 transactions with missing data to compute control variables, and 603 pooling transactions in the

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[9] Hayn and Hughes (2006) assert that the goodwill impairment test introduces additional managerial discretion by requiring projections of the fair value of the reporting units as a whole and of the units' assets and liabilities excluding goodwill. Roychowdhury and Watts (2007) document that only a small percentage of companies with market indications of goodwill impairment recognize impairment losses.

[10] Agency conflicts may increase because higher reported earnings may result in higher (earnings-based) annual bonuses, and the consequently higher stock price may result in an increase in the value of management's stock and option holdings. Behavioral bias may be intensified either because management, in making its bidding decision, may consider the value of the combined entity by projecting post-acquisition earnings, or because the higher earnings may contribute to increased managerial optimism about potential synergy.

[11] As discussed in the Online Appendix, we use two additional samples to estimate the probability of acquisition success and SUR. In addition, we use a sample consisting of 690 cash-only transactions to test the effect of cash transactions on our findings (Table 6), four subsamples to check the sensitivity of our findings to a possible over-time effect (Table 7), a sample with 1,332 observations to test differential overbidding in the pre-SFAS 142 period across purchase and pooling transactions (Table 11), and a variety of subsamples to test for a possible endogeneity problem (Table 9). For the sake of brevity, these samples are not included in Table 1.

[12] Initially, our sample contains 4,878 transactions—3,736 completed transactions plus 1,142 withdrawn transactions—retrieved from the Thomson Reuters SDC database (see the Online Appendix). We obtain the 2,975 completed transactions with an overbidding estimate by deleting the 1,142 withdrawn transactions and 761 transactions that do not meet one of the following five standard requirements: (1) the percent of shares owned after the acquisition is greater than 50, (2) the percent of shares held by the acquirer six months prior to the M&A announcement is less than 50, (3) the transaction value is greater than $1 million, (4) the target is a public U.S. company, and (5) the target financials are available.

TABLE 1

Sample Selection
The Effects of Sample Requirements on Sample Size

Sample 1: Purchase transactions	2,975
Completed transactions between 1992 and 2014 with overbidding estimate	
Less unavailable relevant acquirer and target financials	638
	2,337
Less pooling transactions (pre-SFAS 142)	603
Sample 1	1,734
Purchase transactions before SFAS 142	729
Purchase transactions after SFAS 142	1005
Sample 2: Purchase excluding "as-if" pooling transactions	
Less "as-if" pooling transactions (post-SFAS 142)	255
Sample 2	1,479
Purchase transactions before SFAS 142	729
Purchase excluding "as-if" pooling transactions after SFAS 142	750
Sample 3: Each acquirer serves as its own control	
Less acquirers not conducting acquisitions both before and after SFAS 142	932
Sample 3	547
Before SFAS 142	200
After SFAS 142	347

Table 1 outlines the sample construction process for our three primary samples.

pre-SFAS 142 period. Thus, our first sample for testing our research question consists of 1,734 purchase transactions, including 729 transactions in the pre- and 1,005 in the post-SFAS 142 periods.

To refine our analysis in Table 1, we construct a second sample by deleting 255 purchase transactions in the post-SFAS 142 period that would have qualified as pooling if APB 16 had still been in effect (hereafter, "as-if" pooling transactions). We determine "as-if" pooling transactions by the percentage of stock acquisitions (more than 90 percent), which is the primary requirement for pooling.[13] This additional selection criterion leaves unchanged at 729 the number of purchase transactions in the pre-SFAS 142 period, whereas the number of post-SFAS 142 purchase transactions declines from 1,005 to 750, yielding a total subsample size of 1,479 transactions.

Finally, in Table 1, we construct the third sample to mitigate a potential omitted variable bias that may arise in settings where an over-time effect is considered. To be included in this subsample, the acquirer must conduct at least one transaction in the pre-SFAS 142 period and one in the post-SFAS 142 period. Under this scheme, which yields 547 transactions, including 200 in the pre- and 347 in the post-SFAS 142 periods, each acquirer serves as its own control, thereby alleviating the concern that omitted firm characteristics confound our findings.[14]

Overbidding Measure

de Bodt et al. (2018) develop a theoretical and empirical measure of overbidding based on the acquirer's expected profit maximization problem and provide ample evidence in support of their new measure's validity. Specifically, they define the bidder's expected profits as the probability of a successful acquisition multiplied by the net profits from the acquisition. As the bid price affects the probability of success in acquisition and the expected profits, de Bodt et al. (2018) use the first-order condition (FOC) with respect to the bid premium paid by the acquirer to develop the optimal bidding strategy.[15] If the bid

[13] We assess the sensitivity of our findings to this research design choice by imposing another criterion on top of the 90 percent stock usage criteria: no stock buybacks in the period two years before to six months after the acquisition. This additional criterion results in a decrease of 35 observations in the as-if pooling sample. As expected, the introduction of this additional criterion has little effect on our findings.

[14] The assumption underlying this approach is that the over-time variation within a firm is smaller than the cross-sectional variation, particularly over a short period.

[15] A bid premium is the acquisition offer price divided by the target's market price eight weeks before the acquisition announcement. Appendix A provides variable definitions.

premium is higher than the optimal bid price, then the acquirer overbids. de Bodt et al. (2018) first adopt various empirical measures for the probability of success and expected profits, then estimate the FOC (i.e., the marginal benefits from the successful acquisition minus the marginal cost of increasing bidding costs). As the optimal bidding decision is at the point where FOC = 0, it follows that a negative (positive) value of FOC reflects over (under) bidding. For ease of interpretation, in the empirical analysis below, we define *Overbidding* as the transaction's negative FOC. This means that a positive value of *Overbidding* indicates overbidding and a negative value indicates underbidding.

We follow the empirical procedures of de Bodt et al. (2018) in developing our measure of overbidding, and find that our estimated overbidding measure is of similar magnitude to theirs.[16] Panels A, B, and C of Table 2 report summary statistics on the prevalence of *Overbidding*, computed as the negative of the sum of: $\alpha_1 \times Pr(Success) + \beta_1 \times Bidder's\ Profits$, where the coefficients α_1 and β_1 are, respectively, −0.038 and 0.031 (see Table IA2.2 in Online Appendix). Panel A reports summary statistics on the prevalence of overbidding in the above three subsamples. Nearly all transactions (over 99 percent) in these three subsamples exhibit overbidding. The results in Panel B demonstrate little variation in *Overbidding* across the 12 Fama-French industries. This shows that the vast majority of acquirers overbid in our sample—a finding consistent with that of de Bodt et al. (2018, 16), who note that "the two FOC tests of bidder's expected profit maximization strongly reject rational bidding." This result is also consistent with the economic literature on the winner's curse and intuition, as targets are expected to reject low bids. Panel C compares *Overbidding* in the high-tech industry versus other industries. The results show that overbidding is significantly greater in the high-tech industry, where the valuation risk is greater, and hence the likelihood of overbidding.

V. PRIMARY TESTS AND RESULTS

Armed with overbidding estimates for each purchase transaction, we begin our empirical analysis by testing the relation between the SFAS 142 adoption and overbidding. Before discussing the test results, however, we review the acquisition frequency in our sample (Table 3), summary statistics for the firm and transaction characteristics (Table 4), and the correlations between variables in our main analysis (Table 5, Panels A and B).

Panel A of Table 3 reports the number of acquisitions by sample year and accounting method for a sample of 2,337 transactions consisting of the 1,734 purchase transactions (Sample 1) and the 603 pre-SFAS pooling transactions that were excluded from that sample (see Table 1). For the ten-year period from 1992 through 2001, during which APB 16 was in effect, the purchase method (729 transactions) is more popular than the pooling method (603 transactions). At first glance, this result seems surprising because pooling appears to be managers' preferred method. Still, the difficulty in qualifying for the pooling method may explain the popularity of the purchase method in our sample. Once SFAS 141 became effective (mid-2001), all transactions used the purchase method (1,005 transactions). Consistent with the findings in the literature of a merger wave in the 1990s, the average number of yearly transactions in the 1990s (132.75 acquisitions) considerably exceeds the annual average (only 85 acquisitions) in later years (2000–2014).

Panel B of Table 3 reports the numbers for purchase and pooling (and "as-if" pooling) acquisitions before and after SFAS 142. Recall that "as-if" pooling transactions are those that occurred in the post-SFAS 142 period and, thus, were treated under the purchase method, but would have qualified as pooling under APB 16 (255 transactions). The number of purchase transactions in the pre-SFAS 142 period (729) is comparable to that of the purchase transactions in the post-SFAS 142 period excluding the "as-if" pooling (750). However, the number of "as-if" pooling transactions in the post-SFAS 142 period (255) is substantially smaller than the number of pooling transactions in the pre-SFAS 142 period (603). This statistic is consistent with the conjecture that the 2001 change in accounting for M&A fosters a change in the structure of acquisitions.

Table 4 reports the summary statistics for the firm and transaction characteristics for Sample 1 and for the two subsamples, pre- and post-SFAS 142 (results for Samples 2 and 3, not reported for parsimony, are similar). The primary takeaway is consistent with expectations: both the t-statistic for equality in means (6.065) and the z-statistic for equality in medians (5.283) indicate that *Overbidding* is significantly higher in the post-SFAS 142 period (mean = 0.033; median = 0.033) than in the pre-period (mean = 0.031; median = 0.032). Interestingly, there are other differences between the two samples. *Synergies, Bidder Free Cash Flow, Bidder Market-to-Book*, and *Bidder Leverage* are all significantly smaller in the post-SFAS 142 period, while *Percentage of Stock* and *Bidder Size* are significantly bigger. There is little evidence, however, of a change in *Relative Size* or *Cash* between the two periods. These findings motivate us to control in our analysis for the potential effects these variables may have on *Overbidding*.

[16] The mean of overbidding in de Bodt et al. (2018) is 3.22 (after multiplying by 100). As reported in Panel A of Table 2, our mean of overbidding is 3.306 (Sample 1), 3.191 (Sample 2), and 3.209 (Sample 3). As noted above, the Online Appendix delineates the estimation procedure of our overbidding measure as proposed by de Bodt et al. (2018) and reports descriptive statistics and estimation results.

TABLE 2
Summary Statistics: Overbidding

Panel A: Overbidding by Subsamples

Samples	n	Min.	Max.	Mean	Percent Positive
Sample 1	1,734	−0.145	4.648	3.306	99.88
Sample 2	1,479	−0.145	4.648	3.191	99.86
Sample 3	547	−0.145	4.048	3.209	99.82

Panel B: Overbidding by Fama-French Industries

Industries	n	Min.	Max.	Mean	Percent Positive
All	2,337	−0.145	5.040	3.208	99.91
Non-Durables	76	−0.145	4.048	3.092	98.68
Durables	35	2.676	3.760	3.219	100.00
Manufacturing	203	0.888	3.875	3.192	100.00
Energy	100	0.289	3.766	3.150	100.00
Chemicals	46	1.221	4.334	3.170	100.00
Business Equipment	600	0.518	4.515	3.266	100.00
Telecom	117	−0.107	4.177	3.202	99.15
Utilities	83	2.786	3.845	3.222	100.00
Shops	159	0.319	4.648	3.177	100.00
Health	302	0.319	5.040	3.256	100.00
Money Finance	415	0.596	3.892	3.183	100.00
Other	201	0.228	4.024	3.134	100.00

Panel C: Mean Overbidding in High-Tech versus Non-High-Tech Industries

HT (n = 887)	Non-HT (n = 1,449)	HT minus Non-HT (t-stat.)
3.266	3.173	0.093 (3.47***)

*** Indicates significance at the 1 percent level (two-tailed tests).
Panels A, B, and C of Table 2 report summary statistics on the prevalence of *Overbidding* in various subsamples, computed as follows:

$$Overbidding = -[\alpha_1 \times Pr(Success) + \beta_1 \times Bidder's\,Profits],$$

where coefficients α_1 and β_1 are, respectively, −0.038 and 0.031 (see Table IA2.2 in the Online Appendix). Note that for ease of interpretation, we multiply *Overbidding* by −100. The t-statistic is in parentheses.

Finally, Table 5, Panels A and B report the pairwise Pearson correlations between the variables in our main analysis. There are two salient points to note. First, consistent with our prediction of higher overbidding in the post-SFAS 142 period, the correlation coefficient between *Post-SFAS 142* and *Overbidding* (0.072) is significantly positive. Second, in general, there is little evidence of high correlation among our independent variables, thereby alleviating concerns that multicollinearity may present a serious problem in our sample.

We now turn to Table 6, which presents the primary test results.[17] In all four models, displayed in the four rightmost columns, the dependent variable is *Overbidding,* our model-based measure of overbidding. The higher the measure, the greater the overbidding. Thus, if overbidding, as hypothesized, is greater in the post-SFAS 142 period, then the coefficient on our test variable, *Post-SFAS 142,* should be positive (after controlling for a host of variables, including *Synergies*).

[17] In Tables 6 to 12, a potential bias may arise in computing the standard errors due to within-industry correlated regression errors. Following the standard in the literature, we address this potential problem by clustering standard errors by industry (two-digit SIC codes).

TABLE 3

Pooling versus Purchase Distribution by Year and Accounting Regime

Panel A: Number of Acquisitions by Year and Accounting Method

	Method of Accounting		
Year	**Purchase**	**Pooling**	**Total**
1992	16	15	31
1993	33	16	49
1994	45	47	92
1995	61	71	132
1996	69	74	143
1997	103	79	182
1998	110	132	242
1999	132	76	208
2000	82	63	145
2001	73	52	125
2002	71	0	71
2003	83	0	83
2004	81	0	81
2005	99	0	99
2006	97	0	97
2007	112	0	112
2008	70	0	70
2009	64	0	64
2010	72	0	72
2011	46	0	46
2012	67	0	67
2013	67	0	67
2014	76	0	76
Total	1,734	603	2,337

Panel B: Total Acquisitions by Accounting Method

	Purchase Excluding "As-If" Pooling	**Pooling and "As-If" Pooling**	**Total**
Pre-SFAS 142	729	603	1,332
Post-SFAS 142	750	255	1,005
	1,479	858	2,337

Table 3 reports the decomposition of acquisitions based on the accounting method. Panel A reports the number of acquisitions by year and by accounting method (purchase versus pooling). Panel B reports the total number of acquisitions by accounting method (the purchase method, excluding "as-if" pooling versus pooling and "as-if" pooling). "As-if" pooling acquisitions are those that would have qualified for the use of the pooling method before SFAS 142 was adopted.

Model (1) of Table 6 employs the sample of purchase transactions before and after SFAS 142 (n = 1,734), Model (2) utilizes the subsample of purchase transactions before and after SFAS 142 excluding "as-if" pooling transactions (n = 1,479), Model (3) uses the subsample of pure cash transactions before and after SFAS 142 (n = 690), and Model (4) employs the subsample where each acquirer has completed transactions in both the pre- and post-SFAS 142 periods (n = 547). In all four models, we regress *Overbidding* on the test variable *Post-SFAS 142,* a dummy variable that is equal to 1 if the acquisition was treated under SFAS 142, and 0 if it was treated under APB 17 (periodic amortization of goodwill), and a host of control variables (discussed in the Online Appendix).

Consider, first, the result in the first row, column (1), of Table 6. The coefficient on *Post-SFAS 142* for Model (1) is positive (0.240) and highly significant (t-statistic = 3.91). This result suggests that overbidding is significantly higher in the

TABLE 4

Summary Statistics

	Full Sample (n = 1,734)			Pre-SFAS 142 Period (n = 729)			Post-SFAS 142 Period (n = 1,005)			Comparisons (After − Before)	
Variables	**Mean**	**Std.**	**Median**	**Mean**	**Std.**	**Median**	**Mean**	**Std.**	**Median**	**t-stat. (Mean)**	**z-stat. (Median)**
Overbidding	0.032	0.004	0.033	0.031	0.005	0.032	0.033	0.004	0.033	6.06	5.28
Cash	0.398	0.490	0	0.380	0.486	0	0.412	0.492	0	1.35	1.35
Percent of Stock	32.420	38.890	0	22.800	30.240	0	39.380	42.790	19.910	8.95	7.79
Synergies	0.040	0.171	0.018	0.051	0.240	0.023	0.032	0.094	0.015	−2.21	−1.45
Horizontal	0.639	0.481	1	0.609	0.488	1	0.660	0.474	1	−2.15	−2.15
Hostile	0.016	0.126	0	0.032	0.175	0	0.005	0.070	0	−4.36	−4.34
Bidder Past Performance	0.000	0.001	0	0.000	0.001	0	0.000	0.001	0	−1.72	−1.60
Bidder Free Cash Flow	0.034	0.107	0.041	0.045	0.084	0.044	0.026	0.121	0.036	−3.62	−3.79
Bidder Leverage	0.192	0.174	0.153	0.220	0.175	0.196	0.173	0.172	0.126	−5.54	−6.33
Bidder Market-to-Book	1.911	1.211	1.520	2.010	1.379	1.577	1.840	1.068	1.482	−2.89	−3.10
Bidder Market Value ($mil)	16662.70	41869.40	2341.20	10796.80	33592.20	1849.70	20905.90	46513.60	2967.70	4.99	5.59
Bidder Size	14.760	2.022	14.670	14.410	1.906	14.430	15.010	2.067	14.900	6.09	5.59
Relative Size	−2.306	1.773	−2.044	−2.324	1.766	−2.103	−2.294	1.779	−2.011	0.44	0.33
Tender	0.250	0.433	0	0.370	0.483	0	0.163	0.370	0	−10.08	−9.80

Table 4 reports the summary statistics for firm and transaction characteristics for sample 1, illustrated in Table 1. We also present the test results for comparisons before and after SFAS 142.
Variable definitions are in Appendix A.

post-SFAS 142 period, when the drag from goodwill amortization on earnings is abolished. Indeed, at this point, the result from Model (1) may be subject to multiple interpretations. However, the robustness of the results across the three alternative models, Models (2) through (4) presented in the first row, columns (2)–(4), alleviates this concern. One alternative interpretation may be that the elimination of the pooling method (SFAS 141), not the goodwill amortization, explains our findings in Model (1). However, this alternative explanation cannot explain the positive and highly significant coefficient (0.252; t-statistic = 3.61) on *Post-SFAS 142* in Model (2), where we focus on "pure" purchase transactions by deleting 255 purchase transactions in the post-SFAS 142 period that would have qualified as pooling had APB 16 still been in effect.[18] In other words, the results are not due to transactions that would have qualified as pooling, but are reported as purchase in the post-abolishment of pooling period (Tables 9 and 10 further examine this alternative explanation).

Another concern in Table 6 may be that the mixed form of payment between stock and cash has changed between our two sample subperiods. Prior research asserts that stock-for-stock acquisitions should exhibit more overbidding, and the findings for Model (1) of a significantly negative coefficient on the *Cash* variable (−0.053; t-statistic = −2.68) and a significantly positive coefficient on the *Percent of Stock* variable (0.001; t-statistic = 3.39) are consistent with this assertion. Thus, Model (3) considers this possibility by keeping only pure cash acquisitions in the sample. Notwithstanding the substantial reduction in sample size, the results of Model (1) still hold, i.e., the coefficient on *Post-SFAS 142* is still significant (0.298; t-statistic = 2.26). Finally, the composition of acquirers and, thus, firms' characteristics in our sample might have changed between the two subperiods, which, in turn, may explain our findings. However, the results for Model (4), where only acquirers with acquisitions in both the pre- and post-SFAS 142 periods are included, are inconsistent with this explanation. In other words, the introduction of SFAS 142 is the only effect that explains the totality of the evidence presented in Table 6, and therefore it emerges as the most likely interpretation for our findings (we further investigate this issue below).

[18] The coefficient of 0.252 (actually 0.00252, as we multiplied by 100) represents the reduction in the bidder's expected profit per unit of bid premium post-SFAS 142. The FOC from an optimality model is conditioned on the level of the bid premium. Since the bid premium has not changed between the two periods (see Table 12), this 0.00252 can straightforwardly represent the reduction in the bidder's expected profit post-SFAS 142. Recall that the bidder's expected profit is measured as the bidder's CAR, and the reduction in bidder's CAR is 0.00252. Based on the average bidder's market value of $16,662.73 million (see Table 4), bidder's shareholders lost approximately an additional $41.990 million in stock value due to overbidding associated with adoption of SFAS 142. Thus, our results are not only statistically significant, they are also economically important.

TABLE 5
Correlation Matrix

Panel A: (1)—(7)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) *Overbidding*	1.000						
(2) *Post-SFAS 142*	0.072***	1.000					
(3) *Cash*	−0.035	0.222***	1.000				
(4) *Percent of Stock*	0.095***	−0.241***	−0.738***	1.000			
(5) *Synergies*	−0.490***	0.027	0.049***	−0.140***	1.000		
(6) *Horizontal*	0.061***	−0.010	−0.140***	0.134***	−0.022	1.000	
(7) *Hostile*	−0.508***	−0.048***	0.024	−0.063***	0.302***	−0.033	1.000
(8) *Bidder Past Performance*	0.131***	−0.079***	−0.087***	0.105***	−0.055***	0.016	0.003
(9) *Bidder Free Cash Flow*	0.047**	−0.026	0.162***	−0.187***	−0.031	−0.053***	0.023
(10) *Bidder Leverage*	−0.104***	0.028	−0.033	−0.116***	0.107***	−0.002	0.032
(11) *Bidder Market-to-Book*	0.060***	−0.107***	0.014	0.068***	−0.102***	−0.060***	0.007
(12) *Bidder Size*	0.074***	0.148***	0.193***	−0.166***	−0.126***	−0.111***	0.021
(13) *Relative Size*	−0.031	−0.019	−0.312***	0.243***	0.145***	0.124***	0.046**
(14) *Tender*	0.157***	−0.012	0.396***	−0.457***	0.096***	−0.113***	0.170***

Panel B: (8)—(14), continued from Panel A

	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) *Overbidding*							
(2) *Post-SFAS 142*							
(3) *Cash*							
(4) *Percent of Stock*							
(5) *Synergies*							
(6) *Horizontal*							
(7) *Hostile*							
(8) *Bidder Past Performance*	1.000						
(9) *Bidder Free Cash Flow*	−0.008	1.000					
(10) *Bidder Leverage*	0.041**	−0.007	1.000				
(11) *Bidder Market-to-Book*	0.212***	0.109***	−0.137***	1.000			
(12) *Bidder Size*	−0.006	0.358***	−0.012	0.210***	1.000		
(13) *Relative Size*	0.085***	−0.217***	0.172***	−0.155***	−0.543***	1.000	
(14) *Tender*	−0.045**	0.114***	0.017	0.059***	0.107***	−0.135***	1.000

***, ** Indicate significance at the 1 percent and 5 percent levels, respectively.
Table 5 displays the pairwise Pearson correlation coefficients between all variables in our main analysis. Variable definitions are in Appendix A.

As for the control variables, *Cash* is significantly negative (except in Table 6, column (4)) and *Percent of Stock* is significantly positive, suggesting, consistent with the assertion in prior literature (e.g., Li et al. 2011), that the form of payment (cash or stock) relates to overbidding: cash (stock) transactions are associated with less (more) overbidding. *Synergies* is negatively associated with overbidding; *ceteris paribus,* more synergies imply lower overbidding. *Bidder Past Performance* is positively associated with overbidding. Rau and Vermaelen (1998) show that good past performers (glamour firms) underperform in the long run; hence, better past performance leads to greater overbidding. *Bidder Free Cash Flow* is also positively associated with overbidding, consistent with Jensen's (1986) assertion that agency conflicts partially drive overbidding. As expected, *Hostile* decreases overbidding, while *Relative Size* and *Tender* increase it. In summary, the results for our test variable displayed in Table 6 are robust across the four subsamples, and the results for the control variables are generally consistent with those in the extant literature. This internal and external validation of our findings increases confidence in their reliability.

TABLE 6

The Real Effect of Accounting on Overbidding
The Basic Model

Variables	Exp. Sign	(1)	(2)	(3)	(4)
Post-SFAS 142	+	0.240***	0.252***	0.298**	0.243***
		(3.91)	(3.61)	(2.26)	(3.08)
Cash		−0.053***	−0.038**	—	−0.007
		(−2.68)	(−1.97)	—	(−0.24)
Percent of Stock		0.001***	0.001***	—	0.001**
		(3.39)	(3.05)	—	(2.12)
Synergies	−	−0.009***	−0.008***	−0.011***	−0.005***
		(−4.29)	(−4.47)	(−3.66)	(−3.42)
Horizontal		0.015	0.029	0.033	—
		(1.02)	(1.95)	(1.55)	—
Hostile	−	−0.017***	−0.017***	−0.018***	−0.022***
		(−17.63)	(−19.30)	(−7.76)	(−13.08)
Bidder Past Performance	+	0.207***	0.246***	0.161	0.096
		(3.78)	(4.07)	(1.56)	(0.67)
Bidder Free Cash Flow		0.134**	0.078	0.013	0.205
		(2.01)	(0.67)	(0.09)	(1.24)
Bidder Leverage		−0.041	−0.016	−0.017	0.027
		(−0.78)	(−0.34)	(−0.25)	(0.34)
Bidder Market-to-Book		−0.002	−0.004	0.000	−0.001
		(−0.15)	(−0.47)	(0.02)	(−0.08)
Bidder Size		0.003	0.009	0.003	0.005
		(0.44)	(1.74)	(0.36)	(0.65)
Relative Size		0.009	0.014**	0.000	0.019**
		(1.02)	(2.07)	(0.02)	(2.06)
Tender		0.447***	0.445***	0.422***	0.464***
		(20.02)	(20.69)	(19.40)	(24.29)
Industry FE and Year FE		Yes	Yes	Yes	Yes
Intercept		0.026***	0.026***	0.030***	0.034***
		(18.70)	(17.60)	(13.12)	(17.08)
No. Obs.		1,734	1,479	690	547
Adjusted R^2		0.585	0.648	0.684	0.739

***, ** Indicate significance at the 1 percent and 5 percent levels (two-tailed tests), respectively.
Table 6 reports estimations of overbidding before and after SFAS 142. In all models, the dependent variable, *Overbidding,* the negative of the first-order condition, is estimated from the bidder's profits and probability of acquisition success SUR procedures described in the Online Appendix. The test variable, *Post-SFAS 142,* is a dummy variable set to 1 if the transaction closes in the fiscal year that starts after June 30, 2001, and 0 otherwise. Model (1) reports the analyses of a sample of purchase transactions before and after SFAS 142. Model (2) reports the analyses of a sample of purchase transactions before and after SFAS 142, excluding "as-if" pooling transactions (i.e., the percent of stock in the purchase price is less than 90). Model (3) reports the analysis on a subsample of pure cash transactions before and after SFAS 142. Model (4) reports on a subsample of transactions where: (1) the acquirer has completed transactions both before and after SFAS 142, and (2) the transactions are purchase method transactions that exclude "as-if" pooling transactions. All models control for industry and year fixed effects. For ease of presentation, the coefficients on all variables are multiplied by 100, except the following: *Synergies, Bidder Past Performance,* and *Hostile*. t-statistics are in parentheses.
Variable definitions are in Appendix A.

VI. VALIDITY CHECKS AND SUPPLEMENTARY TESTS

Validity Checks

In an effort to further assess the validity of our results, we perform four types of sensitivity tests, reported in Table 7 (changing market conditions), Table 8 (length of sample period), Table 9 (endogeneity), and Table 10 (Australian data). First, we consider the possible effect on our findings of over-time variation in market conditions by augmenting our model with two control variables that capture over-time market upturns and downturns—*Merger Wave* and *High Sentiment*. Following Harford

TABLE 7

The Real Effect of Accounting Regime on Overbidding Controlling for Merger Waves and Market Sentiment

Variables	Exp. Sign	(1)	(2)	(3)	(4)
Post-SFAS 142	+	0.253***	0.248***	0.249***	0.356***
		(3.60)	(2.96)	(2.97)	(3.09)
Merger Wave		−0.018	—	−0.018	−0.043
		(−0.53)		(−0.52)	(−0.86)
Post-SFAS 142 × Merger Wave		−0.100	—	−0.187	−4.685
		(−0.02)		(−0.04)	(−0.70)
High Sentiment		—	−0.003	−0.003	0.099
			(−0.04)	(−0.04)	(0.95)
Post-SFAS 142 × High Sentiment		—	1.653	1.727	−18.950
			(0.23)	(0.24)	(−1.88)
Controls		Yes	Yes	Yes	Yes
Industry FE and Year FE		Yes	Yes	Yes	Yes
Intercept		0.026***	0.026***	0.026***	0.033***
		(16.59)	(17.60)	(16.64)	(14.03)
No. Obs.		1,479	1,479	1,479	547
Adjusted R^2		0.648	0.648	0.648	0.741

***, ** Indicate significance at the 1 percent and 5 percent levels (two-tailed tests), respectively.

Table 7 reports analyses of overbidding pre- and post-SFAS 142 after controlling for two additional effects: merger waves and market sentiment. The dependent variable in all models, *Overbidding,* the negative of the first-order condition (multiplied by 100 for each of presentation), is estimated from the bidder's profits and probability of acquisition success SUR procedures. The test variable, *Post-SFAS 142,* is a dummy variable set to 1 if the transaction closes in the fiscal year that starts after June 30, 2001, and 0 otherwise. Models (1)–(3) use a subsample of purchase transactions, excluding "as-if" pooling transactions (i.e., the percent of stock in the purchase price is less than 90). Model (1) reports the overbidding estimation after controlling for merger wave periods. Merger wave periods are estimated for U.S. acquisitions following the methodology in Harford (2005). Model (2) reports the overbidding estimation after controlling for the market sentiment as per Baker and Wurgler (2006). Model (3) controls for merger wave periods and market sentiment simultaneously. Model (4) controls for merger wave periods and market sentiment simultaneously, but it uses a subsample of acquirers that (1) have completed transactions both before and after SFAS 142, and (2) whose transactions are purchase excluding "as-if" pooling transactions. All models control for industry and year fixed effects. Control variables are the same as in Table 6. t-statistics are in parentheses.

Variable definitions are in Appendix A.

(2005), we compute our *Merger Wave* variable by first splitting our sample into two subsamples, one of which contains transactions that occurred during the 144-month period from 1992 to 2003, and the other those that occurred during the 132-month period from 2004 to 2014. Next, for each two-digit SIC industry, we calculate the highest 24-month concentration of merger bids involving firms in that industry in each subsample. This 24-month period is identified as a potential wave. Taking the total number of bids over the entire subsample period for a given industry, we simulate 1,000 distributions of the number of occurrences of industry member involvement in a bid premium over a 144-month (132-month) period by randomly assigning each occurrence to a month where the probability of assignment is 1/144 (1/132) for each month. We then calculate the highest 24-month concentration of activity from each of the 1,000 draws and compare the actual activity concentration from a potential wave to the empirical distribution of 1,000 peak 24-month concentrations. If the actual peak concentration exceeds the 95th percentile from that empirical distribution, then we code that period as a wave. This procedure yields 147 industry merger waves for 82 industries. To compute our *High Sentiment* variable, we use the monthly sentiment index from Baker and Wurgler (2006).

Table 7 presents the results from this validity check, using four augmented models that control for the possible effects of over-time variation in merger waves and market sentiment. Both effects appear in the regressions as stand-alone variables. To allow for possible differential effect between the pre- and post-SFAS 142 periods, we also interact each variable with our *Post-SFAS 142* variable. Models (1), (2), and (3) analyze the sample of purchase transactions before and after SFAS 142 while excluding the "as-if" pooling method (n = 1,479). The sample employed for estimating Model (4) consists only of acquirers with acquisitions in both the pre- and post-SFAS 142 periods (n = 547), where each acquirer serves as its own control. If over-time variation in market conditions confounds our findings, then the significant coefficient on *Post-SFAS 142* reported in Table 6 will turn insignificant. The results in the first row of Table 7 show that the coefficients on *Post-SFAS 142* are positive and

TABLE 8

The Real Effect of Accounting on Overbidding
Sample Period Sensitivity Tests

Variables	(1)	(2)	(3)	(4)
Post-SFAS 142 Shorter	0.189***	0.167***	—	—
	(3.88)	(3.65)		
Post-SFAS 142 Alt	—	—	0.079	0.050
			(1.01)	(1.05)
Controls	Yes	Yes	Yes	Yes
Industry FE and Year FE	Yes	Yes	Yes	Yes
Intercept	0.026***	0.025***	0.037***	0.036***
	(17.79)	(18.98)	(22.38)	(18.41)
No. Obs.	764	664	929	698
Adjusted R^2	0.576	0.667	0.426	0.533

***, ** Indicate significance at the 1 percent and 5 percent levels (two-tailed tests), respectively.
Table 8 reports estimations of overbidding before and after SFAS 142, with shorter pre- and post-SFAS 142 periods. In all four models, the dependent variable, *Overbidding,* the negative of the first-order condition (multiplied by 100 for each of presentation), is estimated from the bidder's profits and probability of acquisition success SUR procedures described in the Online Appendix. In Models (1) and (2), *Post-SFAS 142 Shorter* is a dummy variable set to 1 if the transaction closes between 2002 and 2005, and 0 if the transaction closes between 1997 and 2000. In Models (3) and (4), *Post-SFAS 142 Alt* is a dummy variable set to 1 if the transaction closes between 2008 and 2013, and 0 if the transaction closes between 2002 and 2007. Models (1) and (3) report the analyses of a sample of purchase transactions before and after SFAS 142. Models (2) and (4) report the analyses of a sample of all purchase excluding "as-if" pooling transactions in the pre-SFAS 142 period (i.e., the payment in stock is less than 90 percent of the total purchase price). All models control for industry and year fixed effects. Control variables are the same as in Table 6. t-statistics are in parentheses.
Variable definitions are in Appendix A.

highly significant for all four specifications. Moreover, both the coefficients and significance levels are very similar to those reported in Table 6. While the two new control variables, *Merger Wave* and *High Sentiment,* are insignificant, many of the other control variables—*Cash, Percent of Stock, Synergies, Hostile, Bidder Past Performance, Relative Size,* and *Tender*—continue to be significant with similar signs. Overall, the results in Table 7 alleviate concerns that over-time variation in market conditions confound our findings.

The second type of validity check assesses the robustness of our findings to the length of our sample period. It is arguable that during our rather long sample period spanning 23 years, changes other than the introduction of SFAS 142 not fully controlled for in our analysis, underlie our findings. To mitigate concerns that other over-time changes underlie our findings, we perform two tests: one in which the sample period is considerably shortened, and another in which a placebo test is conducted using two subperiods after the introduction of SFAS 142.

First, we shorten significantly our sample period from 23 to eight years, that is, from 1997 to 2000 for the pre-SFAS 142 period and 2002 to 2005 for the post-SFAS 142 period. If some unidentified over-time changes, not the introduction of SFAS 142, underlie our findings, the documented SFAS 142 effect on overbidding should disappear (or diminish substantially) as the length of the sample period around the introduction of SFAS 142 is shortened and other possible changes become less likely. Columns (1) and (2) of Table 8 report the results from this analysis. In column (1), all purchase transactions in the pre- and post-periods are included in the sample, and in column (2), all purchase transactions in the pre-period and all post-period purchase transactions, excluding the "as-if" pooling transactions, are included.[19] The findings in the first row, columns (1) and (2) of Table 8, show that our results are not sensitive to the length of the sample period. In both columns, the coefficients on our test variable, *Post-SFAS 142 Shorter,* are, as before, positive and highly significant (t-statistics $>$ 3.60). These results alleviate the concern that unidentified over-time changes, other than those we specifically control for, underlie our findings.

In the second row, columns (3) and (4) of Table 8, we perform placebo tests using the post-SFAS 142 period from 2002 to 2013. In column (3), all purchase transactions in the pre- and post-periods are included in the sample, and in column (4), the sample includes all purchase transactions in the pre-period and all purchase transactions, excluding the "as-if" pooling transactions, in the post-period. For the placebo tests, we set our test variable, *Post-SFAS 142 Alt,* to 1 if the acquisition is completed between 2008 and 2013, and to 0 if the acquisition is completed between 2002 and 2007. Because both subperiods come after the introduction of SFAS 142, a significant coefficient on the *Post-SFAS 142 Alt* variable would indicate that

[19] Other samples are not analyzed due to sample size concerns arising from the shorter sample period.

changes other than the introduction of SFAS 142 underlie our findings. Conversely, an insignificant coefficient on *Post-SFAS 142 Alt* would increase our confidence that the effect we document is not due to confounding effects that we failed to control for. The results in columns (3) and (4) show that in both samples, the coefficient on the *Post-SFAS 142 Alt* variable is statistically insignificant.

Our third and fourth validity checks revisit the question of whether the choice between pooling and purchase accounting afforded by APB 16 leads to an endogeneity problem that may confound our findings. We previously examined this possibility by performing our tests on two subsamples, where the endogeneity problem is less likely to play a role. One sample excludes the "as-if" pooling transactions, and the other excludes all non-cash transactions. Still, we perform the two additional tests: one concerns an endogeneity test that closely relates to the one performed by Ayers et al. (2002), and the other entails the use of Australian data.

Table 9 reports the results from the endogeneity test that builds on Ayers et al.'s (2002) methodology. Panel A uses the pre-SFAS 142 subsample and a two-stage estimation procedure to generate an expected overbidding variable in the pre-SFAS 142 period. In the first stage, Model (1) estimates an accounting choice probit model of the choice between the pooling and purchase methods in the pre-SFAS period, where the dependent variable is *Pooling,* a dummy variable that equals 1 when the accounting method is pooling, and 0 otherwise. Along the lines of Ayers et al. (2002), we then compute, on the basis of Model (1), the *Predicted Pooling* variable, i.e., the predicted probability of choosing the pooling method at the transaction level. In the second stage, Model (2), presented in the rightmost column of Panel A, estimates the predicted overbidding in the pre-SFAS 142 period. The dependent variable is *Overbidding,* and we include as an explanatory variable *Predicted Pooling,* which we generate in the first stage from Model (1). We then compute predicted overbidding from Model (2), which corrects our overbidding estimate in the pre-SFAS 142 period for a possible endogeneity bias. The primary takeaway from the results displayed in Panel A of Table 9 is that in Model (2), *Predicted Pooling* is insignificant (0.001; t-statistic = 0.87). This is in contrast to Ayers et al.'s (2002) finding that this variable (which they label PACT) is significant. Thus, while their evidence suggests that the choice between pooling and purchase in the pre-SFAS 142 period is endogenous to the acquisition premium, our results indicate that this accounting choice may be exogenous to overbidding.

Panel B of Table 9 replicates our primary test after replacing the pre-SFAS 142 overbidding variable with the predicted overbidding generated from Model (2) in Panel A. For the post-SFAS 142 period, we use our original overbidding measure as, in that period, there was no accounting choice to be made and all transactions must be accounted for using the purchase method. As before, the test variable, *Post-SFAS 142,* is a dummy variable set to 1 if the transaction closes in the fiscal year that starts after June 30, 2001, and 0 otherwise. Model (1) reports the analyses of a sample of purchase transactions before and after SFAS 142. Model (2) reports the analyses of a sample of purchase transactions before and after SFAS 142, excluding "as-if" pooling transactions. Model (3) reports the analysis on a subsample of pure cash transactions before and after SFAS 142. Model (4) reports results from a subsample of transactions where: (1) the acquirer has completed transactions both before and after SFAS 142, and (2) the transactions exclude the "as-if" pooling transactions. The primary finding is that the coefficients on our test variable, *Post-SFAS 142,* are positive and statistically significant in all four models, suggesting that the choice between the pooling and purchase methods in the pre-SFAS 142 period does not confound our findings.

Our fourth validity check examines whether our primary results for the effect of the abolishment of goodwill amortization on overbidding hold in an Australian sample of acquisitions around the switch from Australian GAAP (a goodwill amortization regime) to IFRS (a non-amortization regime) at the end of 2005. The advantage of using Australian acquisitions is that in Australia, the pooling-of-interests method was not available, so the potential endogeneity problem due to the change from pooling to purchase discussed above does not apply. The sample period commences in 1992 and ends in 2018, the last year for which the data are available on SDC, the data source for our initial sample of 799 completed acquisition transactions and 324 withdrawn transactions.[20,21] Using this sample of 648 transactions, we first estimate the probability of success. Then, to obtain our measure of overbidding, we further require that control variables for the SUR regressions be available. This addition data requirement reduced the 443 completed transactions sample by 204, resulting in 239 completed transactions. We then use this sample of 239 completed transactions to estimate the first-order condition of the bidder's expected profit maximization problem using SUR regressions, and to compute *Overbidding*.

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[20] The sample period commences in 1992 because we want the periods before and after the accounting change to be of equal length.

[21] We first retrieve 799 completed acquisition transactions using the following five criteria: (1) the country of domicile for both the acquirer and the target is Australia; (2) the percent of the target's shares held by the acquirer six months prior to the acquisition announcement is less than 50 percent; (3) the percent of shares owned by the acquirer after the acquisition is 100 percent; (4) the transaction is completed; and (5) the transaction was announced between 1992 and 2018. We then retrieve 324 withdrawn transactions, using the following five criteria: (1) The country of domicile for both the acquirer and the target is Australia; (2) the percent of the target's shares held by the acquirer six months prior to the acquisition announcement is less than 50 percent; (3) the acquirer seeks to own 100 percent of the target's shares; (4) the transaction is withdrawn; and (5) transactions are announced between 1992 and 2018. After requiring the control variables for estimating the probability of success to be available for both completed and withdrawn transactions, we are left with 648 transactions: 443 are completed and 205 are withdrawn.

TABLE 9

The Effect of SFAS 142 on Overbidding
Endogeneity Tests

Panel A: The Effect of Choosing Pooling on Overbidding Before SFAS 142

Variables	Exp. Sign	Model (1) Pooling	Exp. Sign	Model (2) Overbidding
Predicted Pooling		−		0.001
				(0.87)
Target Step-up Value	+	0.006***		−
		(5.21)		
Target Earnings	+	1.288		−
		(1.69)		
Bidder Book Size	?	−0.026		−
		(−1.46)		
Target Leverage	−	−174.155***	?	−0.069
		(−9.89)		(−0.73)
Bidder Repurchase	+	−11.237	+	0.000
		(−1.60)		(0.01)
Target Hi-tech Industry	?	−3.301	?	−0.025
		(−0.39)		(−1.02)
Toehold		−17.612	−	−0.645***
		(−1.22)		(−6.97)
Competing Bidder		−45.556***	+	−0.004
		(−2.94)		(−0.05)
Relative Size		1.271	−	0.075
		(0.18)		(1.74)
Target Liquidity		17.457**	?	−0.009
		(2.11)		(−0.40)
Target Market-to-Book		4.043***	−	0.003
		(3.98)		(0.85)
Synergies		−2.720***	−	−0.021***
		(−7.36)		(−9.13)
Intercept		0.539***		0.032***
		(3.48)		(47.97)
No. Obs.		1,908		1,908
Adjusted R^2		0.098		0.337

Panel B: The Effect of SFAS 142 on Overbidding

Variables	Exp. Sign	(1)	(2)	(3)	(4)
Post-SFAS 142	+	0.192***	0.215***	0.316***	0.258***
		(4.63)	(5.59)	(3.90)	(2.91)
Target Leverage	?	−0.016***	−0.014***	−0.082*	−0.022**
		(−4.40)	(−3.02)	(−1.92)	(−2.04)
Bidder Repurchase	+	−0.015	−0.014	−0.010	0.013
		(−1.07)	(−1.23)	(−0.71)	(0.36)
Target Hi-tech Industry	?	−0.016	−0.006	0.005	0.028
		(−0.77)	(−0.27)	(0.17)	(0.69)
Toehold	−	−0.561***	−0.563***	−0.562***	−0.512***
		(−23.33)	(−22.16)	(−16.13)	(−9.37)
Competing Bidder	+	0.008	0.004	0.072	−0.004
		(0.41)	(0.22)	(1.66)	(−0.12)
Relative Size	−	−0.006	0.047**	0.016	0.093
		(−0.17)	(2.39)	(0.28)	(1.96)

(continued on next page)

TABLE 9 (continued)

Variables	Exp. Sign	(1)	(2)	(3)	(4)
Target Liquidity	?	−0.085***	−0.065***	−0.063**	−0.072**
		(−2.83)	(−3.19)	(−2.45)	(−2.19)
Target Market-to-Book	−	0.004***	0.004**	0.004	0.006**
		(2.99)	(2.35)	(1.61)	(2.05)
Synergies	−	−0.022***	−0.021***	−0.022***	−0.017***
		(−22.48)	(−24.18)	(−9.60)	(−7.75)
Cash		−0.044***	−0.029	−	−0.012
		(−2.85)	(−1.78)		(−0.47)
Percent of Stock		0.001***	0.001**	−	0.001
		(2.80)	(2.58)		(1.33)
Horizontal		0.000	0.000	0.000	0.000
		(1.25)	(1.90)	(1.77)	(0.28)
Hostile	−	−0.004**	−0.004**	−0.005	−0.009**
		(−2.16)	(−2.38)	(−1.63)	(−2.25)
Bidder Past Performance	+	0.143***	0.122***	0.123***	−0.017
		(4.06)	(3.02)	(2.82)	(−0.29)
Bidder Free Cash Flow		−0.048	−0.155	−0.190**	−0.218
		(−0.46)	(−1.22)	(−2.45)	(−0.57)
Bidder Leverage		−0.011	−0.016	−0.057	−0.004
		(−0.27)	(−0.36)	(−1.15)	(−0.04)
Bidder Market-to-Book		−0.004	−0.001	0.005	−0.006
		(−1.13)	(−0.28)	(1.52)	(−1.44)
Bidder Size		−0.012*	−0.006	−0.008	0.003
		(−1.74)	(−1.25)	(−1.03)	(0.34)
Tender		0.168***	0.165***	0.189***	0.189***
		(9.42)	(9.70)	(8.52)	(8.26)
Industry FE and Year FE		Yes	Yes	Yes	Yes
Intercept		0.033***	0.032***	0.031***	0.036***
		(21.02)	(21.76)	(17.25)	(9.84)
No. Obs.		1,678	1,451	672	534
Adjusted R^2		0.599	0.630	0.599	0.562

***, ** Indicate significance at the 1 percent and 5 percent levels (two-tailed tests), respectively.

Table 9 reports endogeneity tests of our main result, which controls for the choice of pooling method before SFAS 142. Panel A uses the pre-SFAS 142 subsample and tests for the relation between overbidding and the pooling-purchase choice in the pre-SFAS 142 period. Similar to Equation (3) in Ayers et al. (2002), in the first stage, Model (1) estimates an accounting choice probit model of the choice between the pooling and purchase methods in the pre-SFAS period, where the dependent variable is *Pooling,* a dummy variable that equals 1 when the accounting method is pooling, and 0 otherwise. We then compute, on the basis of Model (1), the *Predicted Pooling* variable, i.e., the predicted probability of choosing the pooling method at the transaction level. In the second stage, Model (2) estimates the predicted overbidding in the pre-SFAS 142 period. The dependent variable is *Overbidding,* and we include as an explanatory variable *Predicted Pooling,* which we generate in the first stage from Model (1). Panel B reports estimations of overbidding before and after SFAS 142. We replace pre-SFAS 142 *Overbidding* with the predicted overbidding generated from Model (2) of Panel A. *Overbidding* after SFAS 142 is estimated from the bidder's profits and probability of acquisition success SUR procedures described in the Online Appendix. The test variable, *Post-SFAS 142,* is a dummy variable set to 1 if the transaction closes in the fiscal year that starts after June 30, 2001, and 0 otherwise. See Table 6 for descriptions of Model (1)–Model (4). All models control for industry and year fixed effects. For ease of presentation, the coefficients on all variables are multiplied by 100, except the following: *Target Step-up Value, Target Earnings, Bidder Book Size, Predicted Pooling, Synergies, Bidder Past Performance,* and *Hostile*. t-statistics are in parentheses.

Variable definitions are in Appendix A.

Finally, to analyze the effect of the switch from Australian GAAP to IFRS on overbidding, we require the control variables in the overbidding determinants estimation to be available, which further reduces the sample size to 184 transactions. Table 10 reports the results from this analysis for three alternative models. The primary variable of interest is *Post-IFRS,* a dummy variable set to 1 if the acquisition transaction closes after the switch to IFRS, and to 0 otherwise. Model (1) is the primary model, and Models (2) and (3) contain additional controls (*High Sentiment* and *Merger Wave*) for over-time changes in the market conditions. In Models (4) and (5), we include the interaction terms *Post-IFRS* × *High Sentiment* and *Post-IFRS* × *Merger Wave*.

TABLE 10

The Effect of Goodwill-Amortization Abolishment on Overbidding
Australian Data

Variables	Exp. Sign	(1)	(2)	(3)	(4)	(5)
Post-IFRS	+	0.132***	0.353***	0.351***	0.228*	0.473***
		(2.89)	(3.79)	(4.17)	(1.87)	(2.89)
High Sentiment			−0.002		−0.180	
			(−0.01)		(−0.87)	
Merger Wave				−0.069		0.202
				(−0.61)		(0.92)
Post-IFRS × High Sentiment					0.265	
					(1.45)	
Post-IFRS × Merger Wave						−0.428
						(−1.10)
Controls		Yes	Yes	Yes	Yes	Yes
Intercept		2.538***	4.354***	4.325***	4.471***	4.316***
		(7.13)	(6.77)	(6.23)	(6.73)	(5.71)
No. Obs.		184	184	184	184	184
Adjusted R^2		0.448	0.462	0.463	0.462	0.465

***, **, * Indicate significance at the 1 percent, 5 percent, and 10 percent levels (two-tailed tests), respectively.
Table 10 reports estimations of overbidding before and after the adoption of IFRS in Australia. In all models, the dependent variable, *Overbidding,* the negative of the first-order condition (multiplied by 100 for each of presentation), is estimated from the bidder's profits and probability of acquisition success SUR procedures described in the Online Appendix. The test variable, *Post-IFRS,* is a dummy variable set to 1 if the transaction closes after December 31, 2005, and 0 otherwise. Model (1) reports the overbidding estimation. Model (2) reports the overbidding estimation after controlling for the market sentiment proxied by the annual return of the S&P ASX 200 Index. Model (3) controls for merger wave periods, defined as years where the number of public firm acquisitions are in the top 20 percent of the sample. Models (4) and (5) control for the interaction terms *Post-IFRS × High Sentiment* and *Post-IFRS × Merger Wave,* respectively. Other control variables are the same as in Table 6. t-statistics are in parentheses.
Variable definitions are in Appendix A.

The results for Model (1) in Table 10 show that the coefficient on *Post-IFRS* is positive, 0.132, and significant (t-statistic = 2.89). Thus, notwithstanding the substantially reduced sample of only 184 Australian acquisitions *vis-à-vis* the 1,734 U.S. acquisitions used in our primary test (Model (1) in Table 6), the results for the two samples with respect to the effect of the switch from a goodwill amortization to a non-amortization regime are fairly similar. That is, parallel to the results for the U.S. data (reported in Table 6), the switch from an amortization to a non-amortization regime in Australia is also associated with higher overbidding. This result further increases our confidence that a potential endogeneity problem should not be overemphasized.

Models (2) and (3) in Table 10 consider the possible effect that over-time variation in market sentiment and mergers' frequency may have on our primary finding. The results show that adding controls for these two potentially confounding effects does not affect our primary finding, as the *Post-IFRS* variable remains significantly positive. Overall, the results from the analysis of the Australian sample further support our conclusion that the switch to a goodwill non-amortization regime under SFAS 142 contributes to overbidding.

Supplementary Tests—Overbidding and the Acquisition Premium

In this section, we examine whether the pooling method contributes to overbidding (Table 11), and whether the introduction of SFAS 142 is associated with an increase in acquisition premium (Table 12). First, using a subsample of pre-SFAS 142 transactions, Table 11 reports the results from testing whether the pooling method contributes to overbidding. Following the intuition underlying our research question, the drag from goodwill amortization on earnings associated with the purchase method, as well as other differences between the purchase and pooling methods, should foster acquirers' incentives to overbid when the pooling-of-interests method is used in the acquisition. Hence, in the pre-SFAS 142 period, we would expect transactions accounted for under the pooling method to be associated with higher overbidding than transactions accounted for under the purchase method. The first row of Table 11 reports the coefficient on *Pooling,* a dummy variable that is equal to 1 if the transaction is under the pooling method, and 0 if it is under the purchase method. As expected, the coefficient is positive

TABLE 11

The Effect of Accounting Regime on Overbidding Pooling versus Purchase Transactions in the Pre-SFAS 142 Period

Variables	Exp. Sign	(1)
Pooling	+	0.131***
		(5.47)
Synergies	−	−0.008***
		(−3.88)
Horizontal		0.030
		(1.57)
Hostile		−0.017***
		(−12.99)
Bidder Past Performance		0.343***
		(7.08)
Bidder Free Cash Flow		0.253***
		(3.84)
Bidder Leverage		0.024
		(0.44)
Bidder Market-to-Book		−0.004
		(−0.56)
Bidder Size		0.021***
		(3.85)
Relative Size		0.038***
		(4.01)
Tender		0.418***
		(16.57)
Industry FE and Year FE		Yes
Intercept		0.026***
		(22.69)
No. Obs.		1,332
Adjusted R^2		0.595

***, ** Indicate significance at the 1 percent and 5 percent levels (two-tailed tests), respectively.
Table 11 reports analyses of overbidding prior to SFAS 142 for transactions that are accounted for under the pooling-of-interests *vis-à-vis* purchase methods. The dependent variable, *Overbidding,* the negative of the first-order condition, is estimated from the bidder's profits and probability of acquisition success SUR procedures. The test variable, *Pooling,* is a dummy variable that equals 1 when the transaction is accounted for under the pooling method, and 0 otherwise. Model (1) reports the overbidding estimation before SFAS 142 using similar control variables as in Table 6. The model controls for industry and year fixed effects. For ease of presentation, the coefficients on all variables are multiplied by 100, except the following: *Synergies, Bidder Past Performance,* and *Hostile*. t-statistics are in parentheses.
Variable definitions are in Appendix A.

(0.131) and significant (t-statistic = 5.47), indicating that, *ceteris paribus,* overbidding is significantly higher for pooling than for purchase transactions. These results, which are distinct from those of Ayers et al. (2002) that hypothesize and find a higher acquisition premium for pooling transactions in the pre-SFAS 142 period, corroborate our primary hypothesis and findings that accounting rules contribute to overbidding. As before, most of the control variables are significant with the expected signs, including *Synergies* (−0.008, with a t-statistic of −3.88), *Hostile* (−0.017, with a t-statistic of −12.99), *Bidder Size* (0.021, with a t-statistic of 3.85), *Relative Size* (0.038, with a t-statistic of 4.01), and *Tender* (0.418, with a t-statistic of 16.57).[22]

[22] We also consider a possible effect of the bidder's financial advisor on overbidding by adding financial advisor fixed effects, and find the results (not tabulated) to be robust, albeit somewhat weaker. We also examine the possible effects of bidders' leverage and horizontal mergers, because leverage may serve as an external control mechanism to resolve agency conflicts (Jensen and Meckling 1976), and because acquirers in horizontal deals (i.e., both the acquirer and target operate in the same space) have less information asymmetry, and hence overbid less. The results (not tabulated) show that while that bidders' leverage and horizontal mergers attenuate overbidding, the impact of SFAS 142 on overbidding remains significant.

TABLE 12

The Effect of SFAS 142 on the Acquisition Premium

Variables	Exp. Sign	(1)	(2)	(3)	(4)
Post-SFAS 142	+	4.204	5.690	27.840	69.980
		(0.35)	(0.50)	(1.03)	(1.83)
Controls		Yes	Yes	Yes	Yes
Industry FE and Year FE		Yes	Yes	Yes	Yes
Intercept		1.993***	1.850***	1.113***	1.906***
		(6.29)	(6.64)	(3.09)	(6.67)
No. Obs.		1,734	1,479	690	547
Adjusted R^2		0.064	0.087	0.036	0.125

***, ** Indicate significance at the 1 percent and 5 percent levels (two-tailed tests), respectively.
Table 12 reports estimations of the acquisition premium before and after SFAS 142. In all models, the dependent variable is *Bid Premium,* i.e., the offer price divided by the market price of the target eight weeks before the announcement. The test variable, *Post-SFAS 142,* is a dummy variable set to 1 if the transaction closes in the fiscal year that starts after June 30, 2001, and 0 otherwise. See Table 6 for descriptions of Model (1)–Model (4). All models control for industry and year fixed effects. Control variables are the same as in Table 6. t-statistics are in parentheses.
Variable definitions are in Appendix A.

Overall, the results in Tables 6, 7, 8, 9, 10, and 11 show that the choice of a goodwill non-amortization regime *vis-à-vis* an amortization regime—whether examined cross-sectionally in the pre-SFAS 142 period (pooling versus purchase) or on an over-time basis (pre- and post-SFAS 142)—has an important real economic consequence: it leads to higher overbidding and lower acquirers' shareholder wealth. An interesting question arises: does SFAS 142 also affect the acquisition premium? At first glance, the pooling method's similar impact on overbidding and the acquisition premium may lead to the conclusion that SFAS 142 may also have a similar effect on these two variables. However, as discussed above, overbidding and the acquisition premium are conceptually distinct, which makes it unclear whether the change in the accounting regime would affect them in a similar fashion.

To shed light on the possible effect the change in the accounting regime may have on the acquisition premium, we examine the change in the acquisition premium for purchase transactions in the pre- and post-SFAS 142 periods. Table 12 presents the results. The tests replicate the analysis in Table 6 with the dependent variable being *Bid Premium,* the offer price divided by the market price of the target eight weeks before the acquisition announcement. In contrast to the findings in Table 6, the coefficients on *Post-SFAS 142* are insignificant in all four specifications. Thus, the introduction of SFAS 142 has little effect on the acquisition premium. This result is not surprising because overbidding and acquisition premium are conceptually different; hence, they exhibit different sensitivities to changes in accounting regimes.

VII. CONCLUSION

M&A accounting underwent a significant regulatory change in 2001, switching from a goodwill amortization (APB 17) to a non-amortization (SFAS 142) regime. Exploiting this exogenous shock and using a novel, model-based approach to estimating overbidding, we examine the role M&A accounting plays in acquirers' bidding decisions. Specifically, our research question asks: Does the goodwill non-amortization approach of SFAS 142 result in a greater level of overbidding by the acquirers?

In response to that question, we find a significant increase in overbidding in the post-SFAS 142 period. This result is robust to inclusion of a host of controlling variables, different subsamples, and various endogeneity tests. A placebo test also shows that it is the introduction of SFAS 142 that explains the increase in overbidding. We also replicate our primary analysis using a sample of Australian acquisitions around the switch from Australian GAAP (a goodwill amortization regime) to IFRS (a goodwill non-amortization regime) and our results remain.

Our study offers contributions to the M&A accounting literature, to accounting policy makers, and to the economic literature on overbidding. First, we contribute to the accounting literature on SFAS 142 in particular, and on the economic consequences of accounting standards more generally, by being the first to provide evidence of a real consequence of SFAS 142 for bidding decisions. In addition, from a methodological standpoint, the use of a model-based measure for overbidding and a more rigorous estimation method should increase confidence in the inference validity of our study. Second, our results may have an important policy implication. Our findings show that the abolishment of goodwill amortization (inadvertently)

increases overbidding in acquisitions, which, in turn, decreases acquirers' shareholder wealth. Third, we contribute to the literature on overbidding, especially to that which focuses on agency conflicts, as our results illustrate the role SFAS 142 plays in fostering agency conflicts.

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APPENDIX A

Variable Definitions

Variable	Definition
Bid Premium	Acquisition offer price divided by the market price of the target eight weeks before the acquisition announcement (computed by SDC).
Bidder Book Size	Natural logarithm of the bidder's book value of assets.
Bidder CAR	The abnormal returns of the bidder in the [−1, +1] window around the M&A announcement.
Bidder Free Cash Flow	Income before extraordinary items (Compustat item IBC) divided by total assets (Compustat item AT).
Bidder Leverage	Long-term debt (Compustat item DLTT) divided by total assets (Compustat item AT).
Bidder Market Value	Bidder stock price times the number of shares, calculated at 42 days before the deal announcement.
Bidder Market-to-Book	Total assets minus common equity (Compustat item CEQ) plus the market value of equity (Compustat items CSHO ∗ PRCC_F) divided by total assets (Compustat item AT).
Bidder Past Performance	Bidder abnormal return (alpha) obtained from the estimation of the market model estimated during the period from 250 to 20 days before the announcement.
Bidder Repurchase	1 if the bidder rescinded a stock repurchase program, and 0 otherwise.
Bidder's Profits	Bidder CAR scaled by the probability of acquisition success.
Bidder Size	Bidder's market value in US$ millions 42 days before the announcement (logarithm is used in the regression).
Cash	Dummy variable equals 1 if the consideration is cash only, and 0 otherwise.
Competing Bidder	1 if there was a competing bidder for the target, and 0 otherwise.
High Sentiment	Dummy variable equals 1 if the sentiment index (U.S. market) is above the median, and 0 otherwise. Sentiment index is defined as per Baker and Wurgler (2006).
Horizontal	Dummy variable equals 1 if the bidder and target have the same four-digit SIC code, and 0 otherwise.
Hostile	Dummy variable equals 1 if the SDC classifies the transaction as hostile, and 0 otherwise.
Liquidity Index	Schlingemann, Stulz, and Walkling (2002) liquidity index. Ratio of the value of M&A transactions in a year to the total assets (Compustat item AT) of firms in the bidder's two-digit SIC code industry for that year.
Merger Wave	For U.S. acquisitions in Table 7, it is a dummy variable equal to 1 if the transaction is announced during one of the merger-wave periods, estimated using the methodology per Harford (2005), and 0 otherwise. For Australian acquisitions, it is a dummy variable equal to 1 for years where the number of public firm acquisitions are in the top 20 percent of the sample, and 0 otherwise.
Overbidding	Transaction's negative first-order condition (FOC).
Percent of Stock	Percent of shares used to finance the transaction.
Pooling	Dummy variable equals 1 if the transaction was accounted for under the pooling-of-interests method, and 0 otherwise.
Post-IFRS	Dummy variable set to 1 if the acquisition transaction closes after the switch to IFRS, and to 0 otherwise.

(continued on next page)

APPENDIX A (continued)

Variable	Definition
Post-SFAS 142	Dummy variable equals 1 if the transaction closes in the fiscal year that starts after June 30, 2001, and 0 otherwise.
Post-SFAS 142 Alt	Dummy variable equals 1 if the transaction closes between 2008 and 2013, and 0 if the transaction closes between 2002 and 2007.
Post-SFAS 142 Shorter	Dummy variable equals 1 if the transaction closes between 2002 and 2005, and 0 if the transaction closes between 1997 and 2000.
Predicted Pooling	Predicted likelihood of using the pooling method.
Probability of Acquisition Success	Estimated using Model (1) from Panel B of Table IA2.1 in the Online Appendix.
Relative Size	Ratio of the target's market value computed 42 days before the announcement to the bidder's market value computed on the same day.
Synergies	Transaction CAR divided by probability of acquisition success.
Target CAR	Target CAR over the three-day event windows centered on the announcement date, estimated with a market model and with an estimation window from 250 to ten days before the announcement.
Target Earnings	Target earnings in the year of acquisition prior to the effective date of the acquisition, deflated by the bidder's number of shares outstanding 40 days prior to the acquisition announcement.
Target Hi-tech Industry	1 if the target firm is a member of an intensive research and development industry, and 0 otherwise.
Target Leverage	Ratio of the target's long-term debt to its market value 40 days prior to the acquisition announcement.
Target Liquidity	Ratio of the target's cash, short-term investments, and accounts receivable to its market value 40 days prior to the acquisition announcement.
Target Market-to-Book	Total assets minus common equity (Compustat item CEQ) plus the market value of equity (Compustat item CSHO $*$ PRCC_F) divided by total assets (Compustat item AT).
Target Run-up	Target's stock performance during the period between 42 and six days before the announcement.
Target Size	Target's market value in US$ millions 42 days before the announcement (logarithm is used in regression).
Target Step-up Value	Step-up in the target's book value, calculated as the target's market value 40 days prior to the acquisition announcement less the target's book value of equity, deflated by the target's market value 40 days prior to the acquisition announcement.
Tender	Dummy variable equals 1 if the SDC classifies the transaction as a tender offer, and 0 otherwise.
Toehold	Dummy variable equals 1 if the bidder holds a non-zero percentage of the target's shares before the announcement, and 0 otherwise.
Transaction CAR	Weighted average of Bidder CAR and Target CAR by market values computed 42 days before the announcement.
Transaction FOC	Bidder's FOC, estimated using Equations (4) and (5) and coefficients from the SUR estimations.

APPENDIX B

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