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Acquisitions driven by stock overvaluation: are they good deals?[◇]

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Abstract

Theory and recent evidence suggest that overvalued firms can create value for shareholders if they exploit their overvaluation by using their stock as currency to purchase less overvalued firms. We challenge this idea and show that, in practice, overvalued acquirers significantly overpay for their target firms; these acquisitions do not, in turn, lead to synergy gains. Moreover, these acquisitions seem to be concentrated among acquirers with the largest governance problems. CEO compensation, not shareholder value creation, appears to be the main motive behind acquisitions by overvalued acquirers.

JEL classification: G34, G14

Keywords: Mergers and acquisitions, Stock overvaluation, Operating performance, Agency costs, CEO compensation

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1. Introduction

Shleifer and Vishny (2003) claim that overvalued firms can increase shareholder wealth by using their stock as currency to purchase less overvalued firms.¹ Recent empirical evidence seems to support the proposition that many stock-financed acquisitions are driven by acquirer stock overvaluation. For instance, Rhodes-Kropf, Robinson, and Viswanathan (2005), Dong, Hirshleifer, Richardson, and Teoh (2006), Ang and Cheng (2006) show that stock-swap acquirers are more overvalued than their targets *before* merger announcements (on average) and that the level of equity overvaluation increases a firm's probability of becoming a bidder using stock as the method of payment.

Although using stock-swap acquisitions to exploit mispricing is appealing hypothetically, we challenge the notion that acquirer shareholders benefit in practice. The existence of relative overvaluation between the acquirer and target stocks before the announcement, as documented by previous studies, is a necessary, but not a sufficient condition, for the acquisition to benefit acquirer shareholders. For acquirer shareholders to benefit from using their overvalued stock as currency in an acquisition, the acquirer must be able to lock in its relative stock overvaluation (compared to the target) by negotiating a favorable exchange ratio (i.e., pay a low premium). Furthermore, any synergies associated with the deal (which Shleifer and Vishny *assume* in their model are positive) must not be so negative as to offset any benefit from the overvaluation-induced favorable exchange ratio.

We show that overvalued acquirers often significantly overpay for the targets they purchase, and, more importantly, these acquisitions do not produce the necessary synergy gains. We also compare the long-run operating and stock price performance of these overvalued acquirers against that of similarly overvalued industry peers that are not involved in acquisitions. This comparison suggests that shareholders of overvalued acquirers would actually benefit if their firms had not pursued the acquisitions

¹ Why would the target agree to a stock swap with an overvalued acquirer? Shleifer and Vishny (2003) argue that this could be driven by different investor horizons, extrapolation, or agency problems at target firms. Rhodes-Kropf and Viswanathan (2004) suggest that target managers over-estimate synergies due to incomplete information. We do not specifically address this question, but instead focus on the hypothetical benefits to acquirer shareholders.

in our sample. Combined, our evidence casts doubt on shareholder wealth creation being the main motive behind these acquisitions. Our investigation further reveals that overvalued acquirers have weak corporate governance and that the CEOs of overvalued acquirers experience significant increases in option-based compensation following their acquisitions. Increasing CEO compensation, as opposed to creating shareholder wealth, appears to be the motive behind these acquisitions.

Our paper offers different conclusions from another recent paper in this literature. Savor and Lu (2009) focus on a small sample of announced, but later withdrawn, acquisitions and report that *unsuccessful* stock acquirers earn lower long-run stock returns than *successful* stock acquirers do. They conclude that there is value to success in a stock acquisition, arguing that this supports the hypothesis that “... overvalued firms create value for long-term shareholders by using their equity as currency” (abstract).

However, even if consummating a merger is better than failing to do so (as Savor and Lu claim), this does not necessarily serve the goal of creating value for acquirer shareholders, since there may be a better alternative when stock is substantially overvalued: a seasoned equity offering (SEO). It is not particularly meaningful to compare two inferior choices (completing versus withdrawing an announced acquisition) if managers’ goal is to create value for shareholders. As Shleifer and Vishny (2003) recognize, in the absence of substantial merger synergies, this goal might be better served through an SEO.

What principally drives the differences between their paper and ours is that Savor and Lu (2009) implicitly assume that *all* announced stock acquisitions are motivated by acquirer overvaluation. This is not the case. In our sample, we estimate that approximately one-third of stock deals are *not* motivated by acquirer stock overvaluation: Acquirer stocks are either not overvalued or not more overvalued than the target stocks. We exclude these deals in our examination of deals driven by acquirer stock overvaluation. Savor and Lu’s assumption (that all stock acquirers are overvalued) taints their relatively small sample of failed mergers, and makes it difficult to identify the true effect of acquirer overvaluation. Moreover, the counterfactual we will use (similarly overvalued industry peers not involved in an acquisition) more

directly addresses the issue than theirs (failed acquirers in “exogenously” failed mergers) does because we hold constant a proxy for the empirical measure at the heart of this matter (acquirer overvaluation) while Savor and Lu assume all acquirers are similarly overvalued.

In this paper we study mergers and acquisitions of U.S. firms announced and completed between 1985 and 2006. Unlike previous studies, we identify stock-swap mergers for which the acquirer has the largest relative stock price overvaluation compared to the target before the acquisition announcement. If there are acquisitions by overvalued acquirers that produce the benefits suggested in Shleifer and Vishny (2003), these deals are likely to provide the best examples. In this sub-sample, we find that the acquirer’s overvaluation relative to the target, though substantial before the announcement, quickly dissipates once the deal is announced.

The disappearance of relative overvaluation is driven by both a decrease in the acquirer’s stock price and an increase in the target’s stock price. The decrease in the acquirer’s stock price might be triggered by overpayment and/or lack of synergies, but it could also reflect investors’ correction of acquirer overvaluation at announcement. The latter is unlikely to be detrimental to long-term shareholders if such a correction would occur in time anyway. Because of these potentially confounding effects, however, we do not rely on acquirer announcement returns to assess benefits to acquirer shareholders. In contrast, the target stock price movement conveys more meaningful information about the premium offered (as suggested in Schwert, 1996), and it is net of the market correction of acquirer overvaluation. Compared to the targets in other acquisitions, targets in acquisitions by overvalued acquirers realize significantly higher premiums and secure more favorable exchange ratios compared to the pre-merger acquirer and target relative prices. These higher premiums are not explained by differences in deal, acquirer, or target characteristics, suggesting significant overpayment to targets by overvalued acquirers.

To examine synergies, we evaluate operating performance following acquisitions by overvalued acquirers. We fail to find evidence of positive synergies. Instead, merged firms in these acquisitions suffer

deterioration in operating ROA and asset turnover, while such deterioration is not found, or is substantially less severe, for acquirers in acquisitions not driven by overvaluation. Our evidence therefore demonstrates that overvalued acquirers make poor choices of targets in acquisitions and are unsuccessful in turning their substantial pre-merger relative overvaluation advantage into favorable terms in the consummated deal.

We ask whether shareholders of overvalued acquirers would have been better off had the firms not pursued acquisitions. To answer this counterfactual question, for each overvalued acquirer we identify a contemporaneous control firm that is in the same industry, and has similar size, Tobin's q , stock return in the previous year, and, most importantly, a similar valuation multiple, but does not pursue a merger or an equity offering. We compare the operating and return performance of the overvalued acquirers to the performance of the control firms. Overvalued acquirers incur significantly worse stock returns during the five years following acquisitions than the control firms that did not engage in mergers. Overvalued acquirers also experience significant deterioration in operating performance, which is not observed in the control firms over the same period.

Our results lead us to the question of what motivates overvalued acquirers to buy less-overvalued targets if there is little shareholder wealth creation. Following Harford and Li (2007), we find that acquirer CEOs in overvaluation-driven acquisitions obtain substantial pecuniary benefits following these transactions, specifically large new restricted stock and option grants. These large increases in compensation often outweigh the relatively small decreases in the value of the CEO's equity holding in the acquiring firm. We also find evidence that overvalued acquiring firms have weak governance structures prior to their acquisition attempts. These findings are consistent with Jensen's (2005) hypothesis that equity overvaluation generates substantial agency costs for shareholders (especially if unchecked due to weak structural governance): in this case the pursuit of acquisitions would make CEOs, but not shareholders, better off.

Taken together, our findings cast significant doubt on the effectiveness of acquirers' use of temporarily overvalued stock in stock-swap mergers and acquisitions: such acquisitions do not appear to benefit acquirer shareholders in any tangible way. Furthermore, our evidence suggests that shareholders, but perhaps not the CEO, would be better off if the overvalued firm did *not* pursue such an acquisition.

Our study contributes to several recent strands of the M&A literature. In a small sub-sample of mergers and acquisitions between 1998 and 2001, Moeller, Schlingemann, and Stulz (2005) show that acquirer shareholders, in aggregate, lose \$240 billion during the three-day announcement period, principally in acquisitions by what appear to be overvalued acquirers (high market-to-book). Our paper is different from theirs in that we examine a larger sample of overvalued acquirers over a longer period of time.² Moreover, they focus on announcement returns (and thus wealth implications for short-horizon investors) and do not differentiate between investors' correction of overvaluation and real value destruction.

Several recent papers examine the wealth effects of acquisitions for overvalued acquirers, taking different perspectives that result in conclusions that are broadly consistent with ours. Gu and Lev (2011) find that acquisitions driven by equity overvaluation frequently trigger large goodwill write-offs in the years following the acquisition, concluding that overvalued acquirers make systematically worse acquisition decisions than acquirers that are not overvalued. Akbulut (2012) and Song (2007) use acquirer managers' personal trading decisions to infer overvaluation (instead of the market-/accounting-based metrics we use), examine the relation with long-run abnormal stock returns, and similarly conclude that such deals are unlikely to benefit acquirer shareholders. In contrast to their papers, however, we also investigate the specific mechanisms of value destruction (substantial overpayment and lack of synergies) and, more importantly, *why* these valuing destroying acquisitions are allowed to occur (weak governance).

² We select our sample of interest using measures of the relative overvaluation of the bidder to the target, while Moeller, Schlingemann, and Stulz (2005) select their sample by year; they tend to focus on the notable outliers of value destruction in acquisitions occurring at a particular point in time, while our analysis is concerned with the mean outcome from acquisitions occurring over a long period of time.

2. Data

Our mergers and acquisitions data are obtained from the Securities Data Company's (SDC) U.S. database. We use the following criteria to select the final sample:

- 1) The acquisition is announced and completed between 1985 and 2006.
- 2) Both the acquirer and target are public firms listed on the NYSE, AMEX, or Nasdaq.
- 3) The deal value is at least \$10 million (in 2006 dollars) and at least 1% of the acquirer's market value of equity.
- 4) The acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction.
- 5) The method of payment is either 100% cash or 100% stock.³
- 6) Both the acquirer and target have positive book value of assets (AT) and book value of equity (CEQ) in Compustat as of the end of the fiscal year prior to announcement, and share price and shares outstanding data available in the CRSP (to compute market-to-book (assets) ratios).

The final sample has 1,319 stock-financed and 671 cash-financed mergers or acquisitions. Table 1 reports the number of acquisitions by the calendar year of acquisition announcement. Consistent with extant studies, there are concentrations of deal activity in the late 1980s and, especially, the late 1990s. Cash-financed acquisitions appear relatively more popular in the 1980s, but in the bull-market M&A wave of the late 1990s the number of acquisitions financed by stock vastly outnumbers those financed with cash (although this trend appears to have reversed following the market crash in 2001).

³ Mixed method-of-payment deals are not included in our sample because it is difficult to determine the wealth effects of stock overvaluation when the method of payment is partially (overvalued) stock and partially cash.

3. Identifying acquisitions motivated by stock overvaluation

A necessary condition for a stock-swap acquisition to be motivated by overvaluation is that the stock of the acquirer is more overvalued than the stock of the target. Using various measures of equity overvaluation, previous studies find that, based on the stock prices *before acquisition announcements*, acquirers in stock swaps are more overvalued than their targets on average. However, whether an acquirer can turn this relative, pre-announcement overvaluation into actual gains after the merger for their shareholders depends on the premium paid to the target and the potential synergies from the deal.

We start the empirical analysis by confirming existing findings in the literature: specifically, that overvalued equity appears to motivate stock-swap acquisitions. We employ the measure of misvaluation derived in Rhodes-Kropf, Robinson, and Viswanathan (2005, hereafter RRV). They decompose a firm's log market-to-book equity ratio ($\text{Ln}(M/B)$) into two components:

$$\text{Ln}\left(\frac{M}{B}\right) = \text{Ln}\left(\frac{M}{V}\right) + \text{Ln}\left(\frac{V}{B}\right), \quad (1)$$

where M is the market value of equity, B is the book value of equity, and V stands for the intrinsic value of equity. V is unobservable but can be estimated from a linear function of the firm's book value of equity, net income, and leverage. The first component, $\text{Ln}(M/V)$, proxies for misvaluation. The details of the

decomposition methodology can be found in the Appendix of this paper, or in RRV (2005).⁴ This decomposition has also been adopted in recent studies such as Hertz and Li (2010).⁵

Measuring stock overvaluation based on publicly available information is impossible if markets are perfectly efficient. Shleifer and Vishny (2003) however assume inefficient markets, and overvaluation measures similar to the ones we employ are used by Rhodes-Kropf, Robinson, and Viswanathan (2005) and Ang and Cheng (2006) to provide evidence in support of Shleifer and Vishny's hypothesis that acquisitions by overvalued acquirers benefit shareholders. We do not directly address the issue of market efficiency in this paper. Instead, we show that even if stock overvaluation is measurable, high premiums and negative operating synergies typically make deals driven by acquirer stock overvaluation unattractive for long-term acquirer shareholders.

Table 2 reports the valuation ratios of merging firms at different dates around the transaction, in particular, 42 trading days before the acquisition announcement, one day before the acquisition announcement, and on the day of deal completion. Schwert (1996) suggests that, due to information leakage and market anticipation, stock prices of the merging firms may partially reflect the value implications of the merger in the two months prior to announcement. Therefore our first measure of market value is 42 trading days before the announcement. The book value of equity is the same for all these measures, and is measured as of the end of the fiscal year ending immediately prior to the merger announcement date.

⁴ Our main results are robust to measuring misvaluation in two other ways: (i) the Fama and French (1997) 48-industry-adjusted market-to-book ratio of equity; or (ii) differences between market values and intrinsic values derived using the residual income model in Ohlson (1995) (as in Lee, Myers, and Swaminathan, 1999, and Dong, et al., 2006). The correlation between any pair of these three misvaluation measures is over 0.60, and we find very similar empirical results based on classifying acquirers into groups based on the three measures of overvaluation. For the sake of brevity, therefore, we focus on the results based on the RRV measure (i.e., Eq. (1) above), although results based on the other misvaluation metrics are available from the authors by request.

⁵ The decomposition described in the Appendix results in an ordering of acquirers based on the *sum* of firm-level and industry-level mispricing. However, it might be more meaningful (in terms of testing hypothesis in Shleifer and Vishny, 2003) to order acquirers by firm-level mispricing *only*. When we use firm-level mispricing *only* as our measure of misvaluation we obtain results (available upon request) that are practically identical to those presented in the remainder of this paper. It is perhaps not surprising that our results do not change much since 83% of the acquirers and targets in our sample are in the same Fama-French 12 industry category, implying that *industry-level* mispricing does not drive much of the difference in misvaluation. We thank the referee for this suggestion.

Prior to merger announcements, bidders have significantly higher market-to-book equity ratios than their targets (1.02 vs. 0.71), but the difference seems due to mispricing (0.50 vs. 0.13 at day -42). At 42 trading days prior to bid announcements, stock bidders are overvalued by more than cash bidders (0.58 vs. 0.32). Targets in stock-swap acquisitions are also overvalued before the merger announcements, while targets in cash acquisitions appear to be fairly valued on average. Although both acquirers and targets in stock-financed mergers are overvalued on average before announcement (on both day -42 and day -1), acquirers tend to be more overvalued than their targets (e.g., 0.60 vs. 0.26 one trading day prior to announcement). Overall, our results are consistent with the empirical evidence in Rhodes-Kropf, Robinson, and Viswanathan (2005), Dong, Hirshleifer, Richardson, and Teoh (2006), and Ang and Cheng (2006). The dominant overvaluation of acquirers relative to targets in stock swaps appears consistent with Shleifer and Vishny's (2003) explanation of the motivation for stock-financed acquisitions.⁶

This relative overvaluation diminishes quickly as the merger progresses towards completion, however. In particular, the difference in $\ln(M/V)$ between the acquirer and target in stock-financed mergers drops by 80% from 0.39 at 42 trading days before the announcement to 0.08 on the day of deal completion. This substantial narrowing of the relative overvaluation is reflective of the general fact that acquirers' stock prices fall and target stock prices rise during the bid period. This however does not imply that acquirers fail to capture the benefits of relative overvaluation at announcement. As long as the exchange ratio in the merger is set taking into account pre-announcement acquirer and target stock prices (and the merger does not yield too negative synergies), the acquirer could still, theoretically, take advantage of their overvalued stock to buy cheap(er) target assets. Whether this is the case is an empirical question that we will turn to shortly.

⁶ However, the stock of cash bidders is also more overvalued than the stock of their targets before the merger and the relative overvaluation is of similar magnitude as in stock-swap deals. If *relative* overvaluation is the most important determinant of the bidder's choice of the method of payment, it is puzzling why these cash bidders did not use stock as the method of payment. The fact that these bidders choose to use cash, despite the relative overvaluation of their equity, suggests that there are other factors affecting the choice of payment method.

Although Shleifer and Vishny (2003) suggest that overvaluation may motivate a firm to pursue a stock-financed acquisition, they do not argue that every stock-financed acquisition is motivated by the acquirer's overvaluation relative to the target.⁷ The results in Table 2 suggest the importance of conditioning on relative overvaluation when testing their hypothesis. Relative overvaluation (ROV) is measured as the difference in $\text{Ln}(M/V)$ between the acquirer and target (as in Table 2) 42 trading days prior to the merger announcement. For 404 stock acquisitions (out of 1,319 in Table 1: 31% of our sample), we find that either the acquirer is not more overvalued than its target or the acquirer is not overvalued in absolute terms (i.e., $\text{Ln}(M/V)$ for the acquirer is less than zero). We deem it inappropriate to classify these stock acquisitions as motivated by acquirer overvaluation.

Therefore, we focus in most of the paper on the remaining stock acquisitions in which the acquirers are a) overvalued in absolute terms 42 trading days prior to the merger announcement; and b) are more overvalued than their respective target 42 trading days prior to the merger announcement. Further, in order to sharpen our tests and to mitigate the impact of potential measurement errors, we exclude the bottom half of the distribution (within this subsample) based on the ranking of the relative overvaluation measure (ROV). We are left with a subsample of 425 stock-swap acquisitions satisfying these criteria; in terms of acquisitions *motivated* by stock overvaluation, these acquisitions should fit Shleifer and Vishny's hypothesis the best – acquirers are overvalued in absolute terms and substantially more overvalued than their targets. For the purpose of exposition, we denote these 425 stock acquisitions as “OV acquisitions” (i.e., acquisitions likely driven by stock overvaluation) and the 404 stock acquisitions not seemingly driven by overvaluation (using the criteria above) as “NOV acquisitions”.⁸

⁷ Savor and Lu (2009) do not differentiate between the various motives of stock acquisitions and implicitly assume that all stock-financed mergers are motivated by acquirer stock overvaluation.

⁸ By definition, the sample of NOV acquisitions includes deal in which the *target* is more overvalued than the acquirer. Acquisitions in this subset of NOV deals are especially punitive for acquirer shareholders: for example, in untabulated analysis we find that the average cumulative abnormal announcement return for acquirers is significantly *positive* if deals in which the target is more overvalued than the acquirer are excluded (compared to zero if they are not). To avoid data snooping, however, we retain the full set of NOV acquisitions in the remainder of this paper, but note that none of our results are qualitatively affected by the exclusion of these deals from our

Table 3 presents some key characteristics of the merging firms in the fiscal year prior to the acquisition announcement, divided into these three groups (OV stock acquisitions, NOV stock acquisitions, and cash acquisitions). Bidders in NOV stock acquisitions are smaller than bidders in either of the other deal-type categories, measured using total assets or market value of equity, although the targets are generally not significantly different in size. Somewhat mechanically bidders in OV acquisitions have significantly higher median valuation (P/E) ratios and pre-deal stock returns (market-adjusted 12-month return) than bidders in NOV and cash-financed deals. Interestingly, however, such high valuations and returns of OV bidders appear to be unrelated to accounting fundamentals, as OV bidders do not have higher operating ROA, leverage, or asset turnover (but do have significantly higher sales growth) than NOV stock bidders and cash bidders. Consistent with findings in the literature, cash acquisitions tend to be more hostile, more likely to involve competing bidders, involve tender offers, have bidders with toehold, and be diversifying deals. There is also some evidence in the table that cash acquisitions are less likely to occur in waves.

One concern with the time-series of OV acquisitions is that it might consist of primarily acquisitions in the market bubble period of the late 1990s, as that is when there are a large number of stock-financed acquisitions by overvalued acquirers (e.g., Moeller, Schlingemann, and Stulz (2005)). The results in this paper would be less meaningful if the OV group of acquisitions contained mostly acquisitions from that unusual time period. We therefore examine the distribution of these three groups of acquisitions over time. While there is some concentration in OV acquisitions during the 1997 – 2000 period (216 (51%) out of 425 OV acquisitions), this four year period is one in which there is a concentration of stock-financed acquisitions in general (585 (44%) out of the 1,319 stock-financed acquisition in the sample described in Table 1). Furthermore, of the 752 acquisitions in Table 1 between 1997 and 2000, 29% are in the OV

sample. We thank the referee for suggesting this analysis to us, and leave a thorough analysis of deals in which the target is more overvalued than the acquirer to future research.

group, 19% in the NOV group, and 22% are cash financed.⁹ Therefore, this suggests that OV acquisitions are not overly concentrated in the market bubble period of the late 1990s relative to the general concentration of stock-financed acquisitions in this period (and the general correlation of acquisition activity with periods of economic prosperity). Moreover, acquisitions in this unusual period (the late 1990s) are not overrepresented by acquisitions in the OV group.

As a further test, in untabulated results (available from the authors by request) we regress the measure of relative overvaluation (ROV) on year indicator variables. The results suggest that acquirers are more overvalued than their targets on average for most of the period 1997 – 2000, but are also significantly relatively overvalued in non-bubble years such as 2002 and 1985. We interpret the results from this analysis as supporting the conclusions offered above: in the market bubble period of the late 1990s acquirers were relatively more overvalued than their targets, but by no means are acquirers more overvalued than their targets *only* during that period.

4. Do overvalued acquirers overpay?

As long as the acquirer's stock is more overvalued than the target's stock, a stock-swap acquisition could benefit acquirer shareholders. As an ex-ante motivation for stock acquisitions, however, this justification overlooks one important fact: acquirers often pay a significant premium to take over their targets. As a result, price movements in the acquirer (down sharply) and target (up sharply) shares may shrink, or even eliminate, the relative overvaluation that initially motivates the acquisition. If the terms of acquisition, specifically the exchange ratio at which target stock is converted into acquirer stock, are determined based on the relative valuation *before* announcement, the acquiring firm may be able to lock in the transactional gains from acquiring hard (target) assets using (more) overvalued paper. However,

⁹ These percentages do not add up to 100% because we have excluded some stock acquisitions with low, positive relative overvaluation (i.e., those that did not make it into either the OV or NOV groups described above) and not all the acquisitions in Table 1 have enough information to compute relative overvaluation measures.

whether overvalued acquirers can do so depends critically on whether the acquirer overpays the target with too high of a premium.

To address this question we estimate two different measures of the acquisition premium (AP) paid by the acquirer. The first measure is based on the stock returns of the *target* during the bid period, as in Schwert (1996). One advantage of this measure is that the increase in the target's stock price will, in an efficient market, reflect the true premium offered by the acquirer net of any correction of acquirer stock mispricing. Following Schwert (1996) we compute this measure of acquisition premium as the target cumulative abnormal returns (CAR) from 42 trading days before the announcement to the day of deal completion (i.e., the bid period),

$$AP_1 = \sum_{t=-42}^T (R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt})), \quad (3)$$

where $t=0$ for the day of announcement and $t=T$ for the date of deal completion. This measure of acquisition premium is also used in Bargeron, Schlingemann, Stulz, and Zutter (2008). For completeness, we also report the three-day announcement CARs for targets (another popular measure of value creation in the M&A literature) and the bid-period CAR for acquirers.¹⁰

Our second measure of acquisition premium is the exchange ratio divided by the relative price of the target and acquirer stock before announcement. In particular,

$$AP_2 = \left(\frac{\text{Exchange Ratio}}{(P_{\text{Target}, AD-42} / P_{\text{Acquirer}, AD-42})} - 1 \right) * 100. \quad (4)$$

Exchange ratio is defined as the number of acquirer shares exchanged for each share of target stock. The denominator is the relative price of the target and acquirer shares 42 trading days prior to the

¹⁰ We follow the standard event study methodology to compute cumulative abnormal return (CAR). Specifically, we use the CRSP value-weighted index as the market portfolio, estimate the parameters of the market model using returns from trading day -253 to trading day -42, and use the estimated parameters to compute the expected return during the event window. The daily pricing errors (the differences between realized returns and estimated expected returns) are cumulated over the event window to compute CARs. The three-day event window is counted from day -1 to day +1 relative to the announcement day.

announcement day (AD). This measure is calculated only for stock-swap acquisitions, and exchange ratio data is from SDC and hand-checked for every stock-swap in our sample.

As reported in Table 4, both measures of acquisition premium yield consistent results. The average premium paid by OV stock acquirers to their target is significantly higher than the premium paid by NOV stock acquirers. The difference is as large as 15% using the AP_1 premium measure (based on target stock returns), and is even larger if the second measure (AP_2) is used. The premiums paid by OV acquirers appear to be comparable to those paid by cash acquirers. Cash acquirers are known to offer significantly higher premiums than stock acquirers for their targets (Jensen and Ruback, 1983), potentially explained by the incidence of hostile acquisitions (which often involve cash payments) and the fact that cash offers trigger an immediate tax liability for target shareholders (and hence require a compensating premium). The three-day announcement returns for target shareholders suggest the same conclusion: higher premiums paid by overvalued acquirers using their own stock as a method of payment.

Consistent with the acquisition premium results, in Table 4 we find that OV stock-swap acquirers incur very negative abnormal returns during the bid period (-17% at the mean and -11% at the median). In contrast, NOV stock acquirers and cash acquirers do not realize negative cumulative abnormal returns on average during the bid period.

Another interesting comparison is between acquisitions by the same acquirers that are classified as OV acquirers at some point in time in our sample period and as NOV acquirers at other times. In other words, we examine subsamples of our OV and NOV data where each OV acquirer has at least one other deal where they are classified as a NOV acquirer (with a minimum of 6 months between deals by the same acquirer with different valuation classification). In these subsamples with common acquirers we have 77 OV deals and 63 NOV deals. The deals in these subsamples have significantly different premiums: for example, using AP_1 acquirers pay premiums of 37.8% on average when they are overvalued (OV) compared to 20.7% premiums on average when they are not. Acquirers also incur

significantly more negative announcement abnormal returns at times when they are overvalued (OV) relative to when they appear in the NOV subsample. Our results are consistent with those for the unconstrained samples presented in Table 4: acquirers pay *more* in acquisitions when they are overvalued relative to the premiums paid when they are not.¹¹

Next we use regression analysis to examine if the variation in acquisition premiums can be explained by the differences in target, acquirer, and deal characteristics (reported in Table 3). The dependent variable in our regressions is the acquisition premium (AP_1 or AP_2 above). In some of the specifications we include an indicator variable (OV) as the variable of interest. This variable is equal to one if the deal is an OV acquisition (as in Table 4), and zero otherwise. In other specifications we directly include the relative overvaluation measure (ROV) described in Section 3.¹² We use similar control variables as in Bargaron, Schlingemann, Stulz, and Zutter (2008). The regression samples contain only stock-swap acquisitions because AP_2 (Eq. (4) above) is not defined for cash deals, but our regressions with AP_1 as the dependent variable are qualitatively unaffected if we use a sample containing both stock and cash mergers.

Table 5 presents the regression results. In Columns 1 and 4 the principal explanatory variable of interest is the OV indicator, and controlling for acquirer, target, and deal characteristics, OV stock acquirers tend to pay an average premium of around 10 percentage points higher than other bidders do. These coefficients are statistically significantly different from zero, and relatively stable regardless of whether AP_1 or AP_2 is used as the dependent variable. In Columns 2 and 5 in the table we replace the OV indicator with the continuous measure of relative overvaluation, ROV, and also add year fixed effects to the regressions. The coefficients on the ROV variable are positive and highly statistically significant in both the AP_1 and AP_2 regressions, suggesting again that acquisition premiums are increasing in acquirer overvaluation relative to the target. In terms of economic magnitude, using the point estimate in Column 2 (with AP_1 as the dependent variable, which is net of the correction of acquirer misvaluation at the

¹¹ We thank the referee for suggesting these tests. Unfortunately the small sample sizes (and resulting loss of power) prevent us from obtaining significant results for the other metrics in Table 4 (AP_2 and target three-day CARs).

¹² We thank the referee for suggesting this approach.

announcement) a one standard deviation increase in acquirer relative overvaluation (ROV) is associated with a 10.0 percentage point increase in premiums. Given that the unconditional average premium (calculated as in AP_1) for stock-swap acquisitions is 27.4%, this represents an economically substantial increase in premiums associated with a one standard deviation increase in acquirer overvaluation.

In Columns 3 and 6 we add acquirer fixed effects to the regressions. The effect of this addition is to allow us to make within-firm comparisons for acquirers that appear multiple times in the data, and estimate how their relative overvaluation (ROV) at different points in time affect their tendency to overpay. Similar to the univariate evidence discussed above, we find evidence consistent with the notion that the *same acquirer* pays significantly higher premiums in acquisitions undertaken when they are more overvalued.

The coefficients on the control variables are largely consistent with prior literature, with higher premiums being paid by large acquirers, to small targets, by acquirers with low leverage (and hence more financial flexibility), and in hostile deals. We also observe a markup-pricing effect (Schwert, 1996) in our sample: the coefficients on the prior 12-month return to the target stock are significantly negative but far smaller than -1.

In summary, our results suggest that the characteristics of the merging firms and the deal terms that they agree on are unable to explain the significantly higher premiums paid by overvalued bidders. In other words, overvalued stock acquirers substantially overpay their targets, and this overpayment is net of investors' correction of acquirer stock overvaluation. However, it is possible that the overpayment we document is justified by significant merger synergies. In the next section we examine post-acquisition operating performance to assess acquisition synergies directly.

5. Do acquisitions driven by stock overvaluation generate synergies?

The evidence above is consistent with the notion that overvalued acquirers pay especially high premiums in acquisitions and earn very negative bid-period returns. One alternative strategy for a firm to take advantage of its temporary overvaluation would be to conduct a seasoned equity offering (Loughran and Ritter, 1995). Why don't overvalued acquirers conduct an equity offering instead of undertaking a stock-swap acquisition? Shleifer and Vishny (2003) answer this question by suggesting high synergies possibly generated from mergers but not from equity offerings (p. 302-303). Significant enough synergies could also justify the high premiums paid to targets by overvalued acquirers (Section 4). To directly address the question of whether acquisitions driven by stock overvaluation generate larger and positive synergies than other acquisitions, we examine operating performance following the merger. An examination of post-completion operating performance sheds light on the source of economic gains or losses associated with the mergers, and allows us to evaluate whether the merger creates real value for acquiring-firm shareholders.

We employ two different methods to examine abnormal changes in operating performance after mergers. The first method follows Healy, Palepu, and Ruback (1992). Our primary measure of operating performance is earnings before interest, taxes, depreciation and amortization (EBITDA, also called operating income before depreciation) divided by the market value of the assets at the beginning of the fiscal year.¹³ Market value of assets is the market value of common equity plus the book values of preferred stock and long- and short-term debt net of cash. We call this measure operating ROA. Operating ROA can be decomposed into asset turnover, calculated as sales divided by the market value of assets at the beginning of the fiscal year, and operating profit margin, calculated as EBITDA divided by Sales. Asset turnover measures the productivity of existing assets.

¹³ Healy, Palepu, and Ruback (1992) argue that the rationale for using the market value of the assets rather than the book value to deflate operating income is that market value represents the opportunity cost of the assets and therefore facilitates inter-temporal and cross-sectional comparisons. Furthermore, using the market value of assets mitigates any effects arising from the choice of the accounting method for mergers (pooling vs. purchase). Our results are also robust to the use of book value of assets as the denominator.

$$Operating\ ROA = \frac{EBITDA}{Assets} = \frac{EBITDA}{Sales} \times \frac{Sales}{Assets} \quad (5)$$

Operating Margin *Asset Turnover*

We calculate operating performance for the merged firm for nine fiscal years (years -3 to +5) surrounding the merger completion year (year 0). In the pre-merger years, operating performance is calculated as the weighted average of the performance of the acquirer and target (weighted by the market values of assets for the two firms at the beginning of each fiscal year). We then find the industry median operating performance for the merged firm for the same fiscal years, which in the pre-completion years is the weighted average of the industry median operating performance for the acquirer and target (weighted by the market values of assets for the two merging firms at the beginning of each fiscal year and using the 48 industry categories defined as in Fama and French (1997)). Abnormal operating performance is calculated as the difference between operating performance for the merged firm and the industry median operating performance. We then run cross-sectional OLS regressions to compute abnormal changes in performance due to the mergers,

$$PERFORMANCE_{post,i} = \alpha + \beta PERFORMANCE_{pre,i} + \varepsilon_i. \quad (6)$$

The explanatory variable, $PERFORMANCE_{pre,i}$, is the abnormal operating performance (operating ROA, asset turnover, or operating margin) for the merging firms in acquisition i , calculated as the median in the pre-merger years (years -3 to -1). The dependent variable, $PERFORMANCE_{post,i}$, is the abnormal operating performance during the post-merger years, calculated as the median in years +1 to +5. The slope coefficient β captures the correlation in abnormal performance between the pre-and post-merger years (i.e., persistence in operating performance for a given firm). The intercept α measures the average change in the industry-adjusted abnormal performance that is due to the merger, and is our main coefficient of interest. This method, proposed by Healy, Palepu, and Ruback (1992), has been adopted by many studies to examine changes in operating performance after mergers (Mitchell and Mulherin, 1996), as well as after other corporate events such as CEO turnover (Denis and Denis, 1995), asset sales (John

and Ofek, 1995), share repurchases (Nohel and Tarhan, 1998), seasoned equity offerings (Fu, 2010), privatization (Boubakri and Cosset, 1998), and bankruptcy (Hotchkiss, 1995).

The top panel of Table 6 contains estimates of intercept from Eq. (6) for the various categories of bidders (OV, NOV, and cash) analyzed in this paper. The point estimates suggest significant deterioration in operating performance (both operating ROA and asset turnover) following acquisitions by overvalued bidders, while the same is not true for NOV stock-swap bidders (no significant change in performance) or cash bidders (significant improvement in performance). For example, the point estimates suggest that mergers by overvalued acquirers are followed by an abnormal reduction of 0.93% in operating ROA, after controlling for industry peer performance and any time-series performance persistence of merging firms. Acquirers driven by stock overvaluation seemingly experience significantly abnormal declines in operating performance after mergers, largely attributable to a significant drop in the productivity of assets, while other types of bidders do not.

The last column in Table 6 addresses the issue of whether overvalued firms generally underperform around the dates of mergers in this sample (even if they didn't pursue a merger) or whether the decline in operating performance is attributable to the transaction itself. In other words, we try to answer the question: what would have happened if these overvalued acquirers had not pursued the acquisition. We match each OV acquiring firm in the sample to a non-merging overvalued firm that: a) exists for at least seven fiscal years centered on the merger completion year; b) does not conduct an SEO or acquisition in that seven-year window¹⁴; c) is in the same industry as the acquirer; d) has total assets of 50%-150% of the acquirer; e) has Tobin's Q of 50%-150% of the acquirer; f) has a buy-and-hold return in the year before merger announcement of 50%-150% of the acquirer; and g) has the closest Ln(M/V) measure (Table 2) to the acquirer (but not more than 50% larger or smaller) in the year prior to merger announcement. This procedure yields 326 matched control firms for the 425 OV acquirers. For these

¹⁴ Our results and conclusions in all the following tables do not change if we instead define this window to be a three-year window centered on the merger completion year.

similarly-overvalued, but non-merging, control firms we compute abnormal operating performance over the same fiscal years as we do for the event (acquiring) firms.

As can be seen in the final column of Table 6, matched similarly-overvalued firms that do not participate in acquisitions on average do not incur a decline in performance around the time of the mergers in our sample. This contrasts starkly with the significant declines in performance observed for the overvalued acquirers documented in the first column of the table. These results suggest that overvalued acquirers suffer significant declines in operating ROA, at least partly caused by declines in the efficiency of asset usage, while other types of acquirers *and* similarly-overvalued non-acquiring firms do not. The comparison with non-acquiring overvalued firms suggests that the overvalued acquirers in our sample may have been better off had they not pursued their acquisitions.

Barber and Lyon (1996) emphasize the importance of matching firm size and pre-event operating performance in estimating firms' abnormal performance following corporate events (such as mergers). Therefore, our second method adopts this approach. For every bidder and target firm, we find a control firm in the same industry that (a) has total assets of 50%-150% of the merging firm, and (b) has the closest operating ROA to the merging firm in the fiscal year before the merger. As a result, we have a pair of control firms for each pair of merging firms. Control firms are required to exist for at least three years and not conduct seasoned equity offerings or be involved in acquisitions in the following five years. The weighted-average operating performance of the control firm pair is calculated each year as the benchmark performance for the merged firm. The weights are the market values of assets of the two merging firms at the beginning of the merger completion year. Abnormal operating performance is the difference in operating performance of the merged firm and its benchmark. We compute the median abnormal operating performance over the five post-merger years to make statistical inferences. The results are presented in the bottom panel of Table 6.

Our conclusions using this empirical method are similar to those reported above. Specifically, overvalued acquirers appear to substantially and significantly underperform the weighted-average benchmark of matched firms that had similar size and ROA as the bidder in the pre-merger years. Using the Barber and Lyon method, it appears that NOV stock-swap bidders, cash bidders, and the similarly-overvalued but non-merging control firms also experience significant declines in both operating ROA and asset turnover in the following years, but their declines in performance are substantially lower in magnitude than those experienced by overvalued (OV) bidders, largely because these firms experience (offsetting) improvements in operating margins that OV acquirers do not.

To summarize, the post-acquisition operating performance evidence in Table 6 suggests that overvalued acquirers significantly underperform in the years after their acquisitions, both in industry- and pre-event adjusted terms (the Healy, Palepu, and Ruback (1992) technique) and relative to firms matched on size and pre-event performance (the Barber and Lyon (1996) technique). Interestingly, this is not true (or much lower in magnitude) for NOV stock-swap bidders or cash bidders, nor is it true for industry peers that are similarly overvalued at around the same time as the acquisition takes place. Combined, this evidence suggests that overvalued acquirers do not seem to reap operating synergies from acquisitions. “Synergies” in deals consummated by overvalued acquirers are very likely negative, or at best much lower than synergies in deals by acquirers not using overvalued stock as a method of payment.

6. What if overvalued acquirers had not pursued stock acquisitions?

Thus far, our evidence suggests that acquirers in OV acquisitions overpay for their targets and that these acquisitions generate little (or, worse, negative) long-run operating synergies. Both these factors challenge the notion that acquisitions by overvalued acquirers create value for acquirer shareholders. However, one might still argue that if an overvalued acquirer does *not* pursue an acquisition, stockholders might incur even larger losses in value in the long run. Savor and Lu (2009) find that stock bidders that

fail to complete their deals (i.e., failed bidders) realize worse long-run abnormal stock returns than do stock bidders that consummate their deals, and argue that completed stock acquisitions create value for acquirer shareholders.¹⁵

We address the same issue from a different perspective – comparing the long-run abnormal returns of successful OV acquirers with those of control firms that are in the same industry, similarly overvalued at the same time, have similar size, Tobin’s Q and prior returns, but have not pursued an acquisition or equity offering (the similarly-overvalued, non-merging peers identified in Table 6).¹⁶ In part, this evidence complements the findings in Table 6 and addresses a missing piece of the value creation puzzle. In addition, these results also help compare and contrast our paper, and our OV-acquirer sample selection process specifically, with the existing literature (especially Savor and Lu (2009), which compares successful and unsuccessful bidders without conditioning on overvaluation).

We compute long-run abnormal returns using three different approaches. The first is market-adjusted buy-and-hold returns, defined as follows:

$$BHR_i[0, T] = \left(\prod_{t=0}^T (1 + R_{i,t}) - 1 \right) - \left(\prod_{t=0}^T (1 + R_{m,t}) - 1 \right), \quad (7)$$

where $t=0$ is the month of acquisition announcement. $R_{i,t}$ is the monthly return for stock i in month t , $R_{m,t}$ is the monthly return for the CRSP value-weighted index in month t , T is the holding period, respectively 24, 36, and 60 months.

¹⁵ However, Savor and Lu (2009) show in their Table IX (p.1084) that acquirer shareholders react positively to announcements of bid termination, suggesting shareholders do not think that completing the deal creates value.

¹⁶ In a similar spirit, DeAngelo, DeAngelo, and Stulz (2010) examine the popular view of market timing as a primary motivation for SEOs. They find that although SEO firms have high M/B ratios and high recent stock returns prior to the announcement, the vast majority of firms with high M/B ratios and high recent stock returns do not issue stock. They therefore conclude that “The problem for the market-timing explanation is that, paraphrasing Sherlock Holmes, many ‘dogs don’t bark’ at times when, according to theory, they should be barking.” (p.276). One way to think about our tests is that we investigate if “dogs that should bark but didn’t bark” are penalized by poor long-run returns, and in particular whether their long-run returns are worse than those for similar firms that *did* undertake an acquisition.

Our second method is the calendar-time portfolio approach proposed by Mitchell and Stafford (2000). Specifically, in each month during our sample period we form a portfolio consisting of OV acquirers that have announced an eventually-completed acquisition within the previous 24, 36, or 60 months. The portfolio is rebalanced monthly to add the OV acquirers that have just announced an acquisition and drop the firms that reach the end of the holding period. We form another portfolio consisting of the non-merging OV peers, and the timing of their inclusion into (and exclusion from) the non-merging portfolio is the same as for their matched OV acquirer. We calculate the monthly equal-weighted excess returns of the event and control portfolios and run time-series regressions of the portfolio excess returns on the Fama and French three factors,

$$R_{p,t} - r_{f,t} = a_p + b_p(R_{m,t} - r_{f,t}) + s_pSMB_t + h_pHML_t + e_{p,t}. \quad (8)$$

The regression intercepts a_p measure the average monthly abnormal return for portfolio p over the holding period.

Our third approach is Ibbotson's (1975) returns across time and securities (IRATS) method combined with the Fama-French three-factor model. We run the following regression in each event month j :

$$R_{i,t} - r_{f,t} = a_j + b_j(R_{m,t} - r_{f,t}) + s_jSMB_t + h_jHML_t + \varepsilon_{i,t}, \quad (9)$$

where $R_{i,t}$ is the monthly return on stock i in the calendar month t that corresponds to the event month j . $j = 0$ is the month of the merger announcement. The abnormal returns during the holding period are sums of the intercepts of cross-sectional regressions over the relevant event-time periods.

Table 7 reports median long-run stock returns, contrasting OV acquirers with non-merging, but similarly overvalued, peers in the same industry. The columns labeled “Difference” report the median returns for a long-short portfolio that is long OV acquirers and short non-merging OV peers. In general, we find that OV acquirers realize significantly worse returns than their matched peers in the two to five years after acquisitions, with the differences appearing especially strong in market-adjusted buy-and-hold returns and using the IRATS method. Of particular interest, the market-adjusted buy-and-hold returns are negative for both OV acquirers and non-merging overvalued peers (reflecting the correction of overvaluation), but substantially more negative for overvalued firms that actually complete an acquisition compared to their similarly overvalued peers.

This long-run stock return evidence, coupled with the operating performance results in Table 6, succinctly summarizes the *net* effect of acquisitions by overvalued acquirers: the net effect of overpayment, negative deal synergies, and the correction of ex-ante overvaluation is clearly detrimental for acquirer shareholders. Furthermore, it suggests that shareholders of overvalued firms would be better off if managers of their firms did not pursue the acquisitions.

7. Why do value-destroying acquisitions by overvalued acquirers happen?

Why would overvalued acquirers pay such high premiums to their targets while the post-completion performance is so poor? One possibility is that agency problems drive acquisition activity by overvalued acquirers, especially if unchecked by strong internal and external corporate governance. Jensen (2005) suggests that equity overvaluation generates substantial agency costs, and as an example he suggests that ill-conceived acquisitions, driven by stock overvaluation, reflect these agency costs. Overvaluation, by definition, implies that the firm will be unable to deliver the operating performance priced into its pre-acquisition stock price. Managers under pressure to meet such unachievable expectations potentially take risky actions (asset substitutions) that harm shareholder value, such as poorly-conceived acquisitions.

Jensen points out that the prevalence of equity-based managerial compensation in the past two decades, such as incentive bonuses based on stock price appreciation and stock option grants, exacerbates this problem.

Extant studies of CEO compensation and incentives suggest this is highly plausible. For instance, Fich, Starks, and Yore (2008) argue that executive compensation schemes often motivate CEOs to engage in deal-making activity. They find that total CEO compensation increases upon the completion of many large corporate transactions, such as mergers and acquisitions, even when the deals are not expected to improve firm value. Grinstein and Hribar (2004) show that CEOs having more power to influence board decisions receive significantly larger M&A bonuses, but these bonuses are not related to deal performance. Based on 1,508 acquisitions between 1993 and 2000, Harford and Li (2007) find that acquirer CEOs are significantly better off due to new stock and option grants following acquisitions. The addition of large new grants offset the wealth reduction of the CEO's existing portfolio even for poorly performing firms. Moreover, CEO's pay and wealth become insensitive to poor performance, but remain sensitive to good performance, after acquisitions. Combined, these studies suggest that it is possible that the results in this paper can be explained from an agency cost perspective.

We examine whether acquisitions by overvalued acquirers are motivated by CEO enrichment rather than stockholder wealth creation (which seems unlikely given our results so far), and whether weak governance encourages such a pattern. In Panel A of Table 8, we follow the empirical approach in Harford and Li (2007) and decompose CEO compensation into two components: cash payments (including annual salary and bonus compensation) and new grants of restricted stock and stock options. We calculate the medians of these two variables in the fiscal year before merger announcement with their values in the fiscal year following merger completion, and compare the increases for OV acquirers with increases for CEOs of their similarly-overvalued, non-merging peers (as described in Table 6).

Our sample consists of 166 OV acquirers and 90 similarly-overvalued, non-merging peers with available compensation data in Compustat's ExecuComp database. We find that acquirer CEOs enjoy a considerable increase in their wealth after completing acquisitions. Of the two groups in Table 8, CEOs of overvalued firms that engage in acquisitions (OV column) experience the largest increase in wealth despite having poor acquisition performance (high premiums, low or negative synergies). Compared to the year prior to announcement, the median CEO of an overvalued acquirer obtains an increase in grants of options and/or restricted stock following completion of \$1.28 million versus \$0.72 million for CEOs of similarly-overvalued, non-merging peers. The median value of cumulative grants from the year prior to announcement to the year after completion is \$9.6 million for the CEOs of overvalued acquirers, compared to \$4.9 million for CEOs of similarly-overvalued, non-merging peers, and this difference is statistically significant at better than the 5% level. Compared to CEOs of similarly-overvalued firms that do not engage in acquisition activity, therefore, CEOs of overvalued acquirers experience considerable increases in wealth (while their shareholders do not).

Why does the firm's governance structure allow this to occur? In Panel B of Table 8 we present governance metrics for the samples of overvalued firms (measured in the fiscal year immediately prior to the acquisition/match year). Following prior literature, firms are considered to have *weak* governance if the board size is larger (Jensen, 1993; Yermack, 1996), the board is weak (proxied by the tenure of the CEO greater than the median: Hermalin and Weisbach, 1998; Harford and Li, 2007), the BCF index is high (managers are entrenched by anti-takeover provisions: Bebchuk, Cohen, and Ferrell, 2009), or blockholders or executives have low ownership stakes in the firm (Jensen and Meckling, 1976). As can be seen in Panel B of Table 8, these governance metrics suggest that overvalued firms that engage in acquisitions have significantly weaker governance than similarly-overvalued peers that do not make acquisitions. Specifically, OV acquirers have significantly larger boards, higher BCF index (indicative of greater entrenchment), and weaker external monitoring (indicated by lower ownership by blockholders).

In summary, we find that CEOs of overvalued firms are richly rewarded for acquisition activity that does not benefit their shareholders, and that the governance structure of these firms appears to exacerbate the agency problems that lead to this outcome. This is consistent with the contention in Jensen (2005) that equity overvaluation generates substantial agency costs potentially leading to ill-conceived acquisitions that destroy shareholder wealth.

8. Conclusion

Stock-swap acquisitions by overvalued acquirers could benefit acquirer shareholders, but only if the premium paid to the target is not too high and/or if the acquisition generates substantial synergies. The evidence in this paper suggests that neither of these conditions appears to be satisfied. Overvalued acquirers pay high premiums to their targets and generate negative synergies in the post-acquisition years (leading to substantial declines in operating performance). This results in substantial declines in the value of the acquirer's stock over the bid period and negative long-run abnormal stock returns that appear larger in magnitude than necessary to correct ex-ante overvaluation. We also show that acquirer CEOs extract considerable rewards for themselves despite the poor performance for their shareholders, highlighting an agency concern that is potentially exacerbated by weak corporate governance.

Our findings cast substantial doubt on the effectiveness of acquirers' use of temporarily overvalued stock in stock-swap mergers and acquisitions. Significant overpayment for the target and negative long-run synergies appear to erode most of the gains that would otherwise accrue to the shareholders of an overvalued acquirer buying a less-overvalued target. Perhaps most importantly, our evidence suggests that shareholders would be better off if an overvalued firm did not pursue an acquisition in the first place, even accounting for the correction of overvaluation. Overall, our findings cast doubt on the notion that stock-swap acquisitions by overvalued acquirers benefit acquirer shareholders in any measurable way.

Appendix

A firm's log market-to-book equity ratio (M/B) can be decomposed into two items,

$$\text{Ln} \left(\frac{M}{V} \right) = \text{Ln} \left(\frac{M}{B} \right) - \text{Ln} \left(\frac{V}{B} \right), \quad (\text{A1})$$

where M is the observed market value of equity and B is the book value of equity. V stands for the intrinsic value of equity, which is unobservable. Previous studies, for example Lee, Myers, and Swaminathan (1999), Ang and Cheng (2006), and Dong, et al. (2006), use a residual income model to estimate V . However the residual income model relies on a number of fairly restrictive assumptions, and, more importantly, the use of analyst forecasts (to compute residual income) would bias our tests toward large M&A transactions.

RRV (2005) relax the residual income model and assume that a firm's intrinsic value is a linear function of its book value of equity, net income (i.e., the growth of book value of equity), and leverage. The parameters of the linear function are allowed to vary over time and across industries to reflect the variation in investment opportunities across times and industries. The parameters also capture differences in discount rates amongst firms. Specifically,

$$\ln(M_{it}) = \alpha_{0jt} + \alpha_{1jt} \ln(B_{it}) + \alpha_{2jt} \ln(|NI_{it}|) + \alpha_{3jt} I_{(<0)} \ln(|NI_{it}|) + \alpha_{4jt} LEV_{it} + \varepsilon_{it}. \quad (\text{A2})$$

$|NI_{it}|$ stands for the absolute value of net income of firm i at time t . $I_{(<0)}$ is an indicator variable which equals one for firm-years with negative net income, and zero otherwise. LEV is the market leverage ratio. The subscript j stands for industry. ε_{it} captures the deviation of intrinsic value from the observed market value of equity and, therefore, is a natural proxy for misvaluation.

We run cross-sectional regressions of Eq. (A2) for each industry and each year to estimate the parameters α_{jt} . We use the industry classification scheme developed by Fama and French (1997) to

classify firms into 12 industries, and find similar results to RRV (2005). These three variables, i.e., book value of equity, net income, and leverage ratio, are able to explain the within-industry cross-sectional variations of market value of equity well, with regression R^2 's over 80% for almost all industries.

The residual from Eq. (A2) (ε_{it}) can be interpreted as the firm-level mispricing at a point of time. Previous studies suggest, however, that there is an important industry-specific component of misvaluation, and the magnitude of industry-level misvaluation also varies over time. So the effective mispricing for a firm is the sum of firm-level and industry-level mispricing. Following RRV (2005), we take the time-series average of $\hat{\alpha}_{jt}$, the estimated α_{jt} from Eq. (A2), to compute the long-run parameters

$\bar{\alpha}_j = \frac{1}{T} \sum_t \hat{\alpha}_{jt}$. The final measure of RRV mispricing is:

$$\ln(M_{it}/V_{it}) = \ln(M_{it}) - [\bar{\alpha}_{0j} + \bar{\alpha}_{1j} \ln(B_{it}) + \bar{\alpha}_{2j} \ln(|NI_{it}|) + \bar{\alpha}_{3j} I_{(<0)} \ln(|NI_{it}|) + \bar{\alpha}_{4j} LEV_{it}]. \quad (A3)$$

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Table 1

The sample of mergers and acquisitions from 1985-2006.

The sample consists of 1,319 stock-financed and 671 cash-financed mergers and acquisitions that are announced and completed during 1985 - 2006 in the U.S. The table presents the sample distribution by the calendar year of acquisition announcement. The following criteria are used to select the sample from the SDC Domestic M&A database: (1) Both the acquirer and target are public firms listed on the NYSE, AMEX, or Nasdaq; (2) The deal value is at least \$10 million (in 2006 dollars) and at least 1% of the acquirer's market value of equity as of the month end before merger announcement; (3) The acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction; (4) The method of payment is either 100% cash or 100% stock; (5) Both the acquirer and the target have positive book value of assets (AT) and book value of equity (CEQ) in Compustat as of the end of the fiscal year prior to announcement, and share price and shares outstanding data available in the CRSP as of the end of the month prior to announcement.

Year	Stock	Cash
1985	27	33
1986	16	48
1987	24	33
1988	16	38
1989	17	20
1990	15	11
1991	26	4
1992	26	7
1993	25	18
1994	92	36
1995	121	36
1996	105	29
1997	167	37
1998	174	43
1999	134	48
2000	110	39
2001	79	23
2002	23	21
2003	39	30
2004	40	36
2005	22	34
2006	21	47
Total	1,319	671

Table 2
Overvaluation of merging firms.

This table presents averages of a measure of overvaluation for bidders and target in the sample described in Table 1. Overvaluation is measured as proposed by Rhodes-Kropf, Robinson, and Viswanathan (2005) and described in the Appendix. Overvaluation is measured at three points in the life of each deal: 42 trading days before announcement (AD_{-42}), one day before announcement (AD_{-1}), and on the day of deal completion (CD). For all three measures, the book value of equity (from Compustat) is measured as of the end of the fiscal year immediately preceding deal announcement. The market-to-book equity ratio is decomposed into two components: misvaluation and long-run investment opportunities, $\ln(M/B) = \ln(M/V) + \ln(V/B)$. The last three rows of the table describe the measure of misvaluation ($\ln(M/V)$). The last three columns report the differences in valuation ratios. Statistical significance is examined with t -tests: *, **, or *** indicates that the difference is significantly different from zero at the 10%, 5%, or 1% level, respectively.

Valuation ratios	Bidders	Targets	Stock bidders	Targets of stock bidders	Cash bidders	Targets of cash bidders	Stock bidders – Cash bidders	Stock bidders – Stock targets	Cash bidders – Cash targets
$\ln(M/B)_{AD_{-42}}$	1.02	0.71	1.14	0.79	0.78	0.54	0.36***	0.35***	0.24***
$\ln(V/B)_{AD_{-42}}$	0.52	0.58	0.56	0.60	0.46	0.54	0.10***	-0.04**	-0.08**
$\ln(M/V)_{AD_{-42}}$	0.50	0.13	0.58	0.19	0.32	0.01	0.26***	0.39***	0.31***
$\ln(M/V)_{AD_{-1}}$	0.51	0.21	0.60	0.26	0.33	0.10	0.27***	0.33***	0.22***
$\ln(M/V)_{CD}$	0.43	0.39	0.49	0.41	0.33	0.36	0.16***	0.08***	-0.03

Table 3

Acquirer, target, and deal characteristics.

The sample consists of 425 OV mergers, 404 NOV mergers, and 671 cash mergers out of the sample described in Table 1. The classification of stock-swap acquisitions into OV and NOV groups is based on the relative overvaluation measures proposed by Rhodes-Kropf, Robinson, and Viswanathan (2005) (and described in the Appendix) measured 42 trading days prior to the merger announcement. NOV stock mergers are defined as those for which the acquirer is either a) not overvalued in absolute terms; or b) not more overvalued than its target. For the remaining stock-swap acquisitions, we divide the sample into halves using the median of the difference in overvaluation between the acquirer and target, and stock-swap acquisitions with the greatest difference in overvaluation are labeled OV stock mergers. This table reports medians of the following firm characteristics and performance variables as of (unless otherwise noted) the fiscal year ending immediately prior to the merger announcement: assets, MVE (market value of equity 42 trading days before announcement), price-to-earnings (P/E) ratio, leverage (debt/market value of assets), Tobin's Q (market value of assets divided by the book value of assets), operating ROA (operating income/market value of assets at the beginning of fiscal year), asset turnover (sales/market value of assets at the beginning of fiscal year), sales growth (from fiscal year t-2 to fiscal year t-1), the acquirer's market-adjusted 12-month stock return (buy-and-hold return during the 12 months prior to the announcement divided by the contemporaneous CRSP value-weighted market return), and the standard deviation of the acquirer's stock returns (over the period from trading day -253 to -42 relative to the announcement date). Total assets and market value of equity are expressed in real terms (2006 dollars). Hostile, Compete, Tender, Tarterm, Bidlock, and Toehold are indicator variables of deal characteristics that equal one if the deal is hostile, has more than one acquirer bidding for the target, is a tender offer, includes target termination fees, includes bidder lockup provisions, or involves a bidder that holds 0.5% or more of the target stock prior to the announcement, respectively (and zero otherwise). Means are reported for all indicator variables. % of horizontal is the percentage of acquisitions that are horizontal mergers, defined as mergers in which both the acquirer and the target are in the same Fama-French 48 industry. % in waves is the percentage of acquisitions that occur during merger waves, where merger waves are identified as in Harford (2005). Wilcoxon sign rank tests are used to test the difference in medians and Fisher's Exact tests are used to test the difference in means of all indicator variables. *, **, or *** indicates that the value in the NOV or Cash acquisitions column is significantly different from the corresponding value in the OV acquisitions column at the 10%, 5%, or 1% level, respectively.

	Stock Acquisitions				Cash acquisitions	
	OV		NOV		Bidder	Target
	Bidder	Target	Bidder	Target		
Assets (\$ millions)	1,435	208	1,050**	269	2,233***	189
MVE (\$ millions)	1,974	178	783***	171	1,912	134**
P/E ratio	17.4	13.1	12.5***	11.1**	14.4***	11.6
Leverage	0.16	0.07	0.13	0.19***	0.19**	0.16***
Tobin's Q	1.45	1.19	1.05	0.98**	1.04**	0.97***
Operating ROA	0.11	0.11	0.12	0.11	0.14***	0.12
Asset turnover	0.58	0.62	0.50*	0.63	0.88***	1.06***
Sales growth	0.25	0.13	0.15***	0.13	0.10***	0.08***
Acquirer market-adjusted 12-month stock return	17.13	-11.66	-0.76***	-4.33*	-0.82***	-2.90***
Standard deviation of the acquirer's stock returns	2.68	3.57	2.52	3.37	2.02***	2.99***
Hostile		0.01		0.01		0.05***
Compete		0.03		0.03		0.08***
Tender		0.02		0.01		0.53***
Tarterm		0.61		0.59		0.50***
Bidlock		0.28		0.25		0.16***
Teohold		0.01		0.06***		0.11***
% of horizontal		0.67		0.73*		0.56***
% in waves		0.46		0.39**		0.32***

Table 4
Acquisition premiums.

This table presents descriptive statistics for acquisition premiums paid by acquirers to targets and for acquirer bid-period cumulative abnormal returns (CAR). Acquisition premiums are measured in two different ways. The first measure (AP_1) is the cumulative abnormal return to the target during the bid period, i.e., from 42 trading days before merger announcement to the date of deal completion (Schwert, 1996). Cumulative abnormal returns are estimated using the market model with the CRSP value-weighted index as the market portfolio. The parameters of the market model are estimated based on daily stock returns from trading days -253 to -45. The second measure of acquisition premium (AP_2) is estimated for stock-swap acquisitions only, and is the exchange ratio divided by the relative stock price of the target and bidder 42 trading day before the announcement. The classification of stock acquisitions into OV and NOV groups is described in Table 3. The last two columns report the differences in means and medians. Statistical significance is examined with *t*-tests (means) and Wilcoxon-Mann-Whitney tests (medians): *, **, or *** indicates that the difference is significantly different from zero at the 10%, 5%, or 1% level, respectively.

	OV	NOV	Cash	Diff (OV – NOV)	Diff (OV – Cash)
<i>$AP_1 = \text{Target bid-period CAR} [-42, \text{completion}]$</i>					
Mean	39.09***	23.24***	39.71***	15.85***	-0.62
Median	35.16***	21.78***	34.24***	13.38***	0.92
<i>$AP_2 = \left(\frac{\text{Exchange Ratio}}{P_{\text{Target}, AD-42} / P_{\text{Acquirer}, AD-42}} - 1 \right) * 100$</i>					
Mean	68.51***	37.15***	-	31.36***	-
Median	44.97***	24.62***	-	20.35***	-
<i>Three-day target abnormal announcement returns [-1, +1]</i>					
Mean	19.70***	14.24***	28.40***	5.46***	-8.70***
Median	16.56***	10.93***	21.68***	5.63***	-5.12***
<i>Acquirer bid-period CAR [-42, completion]</i>					
Mean	-17.45***	0.12	1.72	-17.57***	-19.17***
Median	-10.88***	-1.27	-0.09	-9.61***	-10.79***

Table 5

Can acquirer, target, or deal characteristics explain the higher premiums paid by overvalued acquirers?

The table reports the results from ordinary least squares regressions of acquisition premiums on merging firm and deal characteristics. The samples only include stock-swap acquisitions. In Columns 1-3 the dependent variable is the target's cumulative abnormal returns from 42 trading days prior to announcement to merger completion (AP₁ from Table 4). In Columns 4-6 the dependent variable is the exchange ratio divided by the relative stock prices of the target and acquirer 42 trading days before announcement (AP₂ from Table 4). OV is an indicator variable that equals one if the deal is an OV stock-swap merger (defined in Table 3), and zero otherwise. ROV is the difference in Ln(M/V) between the acquirer and target (as in Table 2) 42 trading days prior to the merger announcement, winsorized at the 1%/99% level. RET_12 indicates market-adjusted 12-month stock returns (buy-and-hold returns during the 12 months prior to the announcement divided by the contemporaneous CRSP value-weighted market return), and STDEV indicates the standard deviation of returns over the period from trading day -253 to -42 relative to the announcement date. All other variables are defined in prior tables. All regressions contain intercepts whose coefficients are not reported. *, **, or *** indicates that the regression coefficient is significantly different from zero at the 10%, 5%, or 1% level using *t*-tests based on standard errors that are robust to heteroskedasticity.

Acquisition Premium:	AP ₁			AP ₂		
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
OV	11.17***			9.74**		
ROV		13.87***	14.55**		7.21**	5.50
Log(MVE) (acquirer)	5.80***	3.49***	-0.71	11.21***	10.09***	7.98
Log(MVE) (target)	-8.79***	-7.32***	-6.87***	-8.67***	-8.22***	-6.35**
Tobin's Q (acquirer)	0.07	-0.19	1.21	0.02	-0.19	-0.63
Tobin's Q (target)	-0.14	0.29	0.73	0.20	0.31	0.40
Leverage (acquirer)	-18.11**	-25.01***	0.91	-29.33***	-33.48***	-41.59
Leverage (target)	14.49**	16.40**	11.49	13.55*	14.24*	3.97
Operating ROA (acquirer)	-8.70	-15.58	-67.38	-3.69	-8.07	-52.48
Operating ROA (target)	18.95*	16.98	2.77	13.30	11.17	-27.25
RET_12 (acquirer)	-0.01	-0.01	-0.11*	0.06*	0.06*	0.06
RET_12 (target)	-0.21***	-0.20***	-0.21***	-0.06**	-0.06**	-0.12*
STDEV (acquirer)	2.15	-1.10	-2.11	-0.65	-3.09	-17.12**
STDEV (target)	-0.40	-0.62	-2.76	4.62***	4.55***	6.20**
Hostile	38.38***	39.05***	23.12	32.36*	34.49**	65.08***
Compete	3.31	0.75	-0.92	0.44	-3.54	-17.03
Tender	-5.31	-14.07	-3.77	-15.05	-23.39**	-58.07
Tarterm	5.00*	7.71***	-6.14	0.53	5.03	-2.41
Bidlock	-0.35	-1.97	-0.11	10.04***	8.50**	10.08
Toehold	-6.36	-0.55	7.94	-4.78	-3.73	4.13
Year fixed effects	No	Yes	Yes	No	Yes	Yes
Acquirer fixed effects	No	No	Yes	No	No	Yes
Number of observations	1,198	1,198	1,198	1,198	1,198	1,198
Adjusted R ²	0.189	0.224	0.324	0.126	0.137	0.178

Table 6

Abnormal changes in operating performance after mergers.

This table reports abnormal changes in operating performance after mergers for acquirers and overvalued non-acquirers. There are two metrics used to assess post-merger abnormal changes in operating performance. The first is based on Healy, Palepu, and Ruback (1992). For the first three columns, we calculate operating performance for the merged firm for nine fiscal years surrounding the merger completion year (years -3 to +5 relative to the merger completion year (0)). In the pre-merger years, this is calculated as the weighted average of the performance of the acquirer and target (with weights relative to the market values of assets for the two firms at the beginning of each fiscal year). We then find the industry median operating performance for the merged firm for the same fiscal years, which in pre-merger years is the weighted average of the industry median operating performance for the acquirer and target (with weights relative to the market values of assets for the two merging firms at the beginning of each fiscal year and 48 industry categories defined as in Fama and French (1997)). Abnormal operating performance is calculated as the difference between operating performance for the merged firm and the industry median operating performance. We then run a cross-sectional regression of the median post-merger abnormal performance (years +1 to +5 relative to the merger completion year (0)) on the median pre-merger abnormal performance (years -3 to -1 relative to the merger completion year). The regression intercept is interpreted as the change in abnormal performance due to the merger, and is displayed in the table. In the final column we replicate this procedure for non-merging firms that are approximately as overvalued as the acquirer in the year prior to merger announcement. Specifically, for each OV acquiring firm in the sample we identify a non-merging OV firm that: a) exists for at least seven fiscal years centered the merger completion year; b) does not conduct an SEO or acquisition in that seven-year window; c) is in the same industry as the acquirer; d) has total assets of 50%-150% of the acquirer; e) has Tobin's Q of 50%-150% of the acquirer; f) has a buy-and-hold return in the year before merger announcement of 50%-150% of the acquirer; g) has the closest Ln(M/V) measure (Table 2) to the acquirer (but not more than 50% larger or smaller) in the year prior to merger announcement. For this non-merging OV firm we replicate the procedure described above to compute abnormal operating performance over the same fiscal years as we did for the event (acquiring) firms. The second metric is the size and pre-merger performance match suggested by Barber and Lyon (1996). For the first three columns, for every acquirer and target firm we find a control firm that (a) has total assets of 50%-150% of the merging firm in the fiscal year before the merger, and (b) has the closest operating ROA to the merging firm in the fiscal year before the merger. As a result, we have a pair of control firms for each pair of merging firms. Control firms are required to exist for at least three years and not to conduct seasoned equity offerings or be involved in acquisitions in the following five years. The weighted-average operating performance of the control firm pair is calculated each year as the benchmark performance for the merged firm (with weights relative to the market values of assets for the two firms in the year before merger completion year (0)). Abnormal operating performance is the difference in the operating performance of the merged firm and this weighted-average benchmark, and the median abnormal operating performance over the first five post-merger years is displayed in the table. In the final column we replicate this procedure for non-merging firms that are approximately as overvalued as the acquirer in the merger announcement year (the non-merging OV firms are selected as described above). For the non-merging OV firms we replicate the procedure of finding control firms based on total assets and ROA and reporting median abnormal operating performance over the following five fiscal years. *p*-values for tests of significance are in parentheses.

	OV	NOV	Cash	Non-merging OV
<i>Healy, Palepu, and Ruback (1992)</i>				
Operating ROA	-0.93 (0.005)	-0.15 (0.767)	1.37 (<0.001)	-0.22 (0.631)
Asset Turnover	-12.81 (<0.001)	2.94 (0.448)	3.71 (0.267)	0.60 (0.841)
Operating Margin	0.69 (0.463)	1.04 (0.442)	1.24 (0.006)	0.59 (0.648)
<i>Barber and Lyon (1996)</i>				
Operating ROA	-1.82 (<0.001)	-1.78 (0.002)	-0.63 (0.041)	-0.76 (0.033)
Asset Turnover	-8.67 (<0.001)	-3.49 (0.002)	-4.82 (0.004)	-4.63 (<0.001)
Operating Margin	-0.27 (0.920)	1.57 (0.075)	0.97 (0.056)	1.18 (0.400)

Table 7

Long-run stock returns.

This table presents median long-run stock returns of OV acquirers and their matched control firms. The non-merging OV control firms are in the same industry, similarly overvalued, have similar size and Tobin's Q as the OV acquirers, but have not pursued an acquisition or SEO (as described in Table 6). We compute long-run abnormal returns using three different approaches: (1) Market-adjusted buy-and-hold returns: $BHR_i[0, T] = (\prod_{t=0}^T (1 + R_{i,t}) - 1) - (\prod_{t=0}^T (1 + R_{m,t}) - 1)$, where $t=0$ is the month of acquisition announcement. $R_{i,t}$ is the monthly return for stock i in month t , $R_{m,t}$ is the monthly return for the CRSP value-weight index in month t , T is the holding period (24, 36, or 60 months). (2) The calendar-time portfolio approach proposed by Mitchell and Stafford (2000). Specifically, in each month during our sample period we form two portfolios, one consisting of OV acquirers that have announced an eventually-completed acquisition within the previous 24, 36, or 60 months and the other consisting of corresponding control firms. The portfolios are rebalanced monthly to add the OV acquirers that have just announced an acquisition and drop the firms that reach the end of the holding period. We calculate the monthly equal-weighted excess returns of the OV acquirer and control portfolios and run time-series regressions of the portfolio excess returns on the Fama and French three factors, $R_{p,t} - r_{f,t} = a_p + b_p(R_{m,t} - r_{f,t}) + s_pSMB_t + h_pHML_t + e_{p,t}$. The regression intercepts a_p measure the average monthly abnormal return for portfolio p over the holding period, and are reported in the table. (3) Ibbotson's (1975) returns across time and securities (IRATS) method combined with the Fama-French three-factor model. We run the following cross-sectional regression in each event month j : $R_{i,t} - r_{f,t} = a_j + b_j(R_{m,t} - r_{f,t}) + s_jSMB_t + h_jHML_t + \varepsilon_{i,t}$, where $R_{i,t}$ is the monthly return on stock i in the calendar month t that corresponds to the event month j ($j = 0$ is the month of the merger announcement). The reported abnormal returns during the holding period are sums of the intercepts from the cross-sectional regressions over the relevant event-time periods. p -values for tests of significance are in parentheses.

Holding Period	Market-adjusted buy-and-hold returns			Calendar-time approach			Ibbotson's IRATS		
	OV Acquirers	Non-merging OV	Difference	OV Acquirers	Non-merging OV	Difference	OV Acquirers	Non-merging OV	Difference
[0, 24]	-19.80 (<0.001)	-12.40 (0.015)	-9.51 (0.002)	-0.22 (0.343)	0.02 (0.925)	-0.24 (0.417)	-9.95 (0.012)	6.95 (0.129)	-17.90 (0.002)
[0, 36]	-28.90 (<0.001)	-15.10 (0.003)	-13.01 (0.009)	-0.38 (0.042)	0.01 (0.943)	-0.40 (0.080)	-16.0 (0.002)	5.66 (0.332)	-17.97 (0.019)
[0, 60]	-21.40 (<0.001)	-3.40 (0.617)	-15.17 (0.004)	-0.20 (0.197)	0.08 (0.640)	-0.28 (0.140)	-12.99 (0.050)	7.61 (0.342)	-18.75 (0.077)

Table 8

Changes in CEO compensation and wealth after acquisitions and pre-acquisition governance.

Panel A reports medians of CEO compensation data from Compustat's ExecuComp database. The OV and Non-merging OV samples are described in Table 6. We require that CEOs be the same between the fiscal year before the acquisition announcement (ayr-1) and the fiscal year after the merger completion (cyr+1). Cash payment is the annual salary and bonus compensation. Grants are the total value of all restricted stock and options granted during the fiscal year. Cumulative grants are the value of grants from the announcement year (ayr) to year cyr+1. Dollar values are in thousands and adjusted to 2006 dollars. Panel B reports means of various governance characteristics for the year prior to the acquisition (or match) year. Board data is from the RiskMetrics (formerly IRRC) database. Board size is the number of directors on a board, and Strong board is an indicator variable that equals one for firms whose CEOs have served below the ExecuComp median years of CEO tenure, and zero otherwise. BCF index is from Bebchuk, Cohen and Ferrell (2009), and the data is from Lucian Bebchuk's website. Blockholders are investors who own more than 5% of a firm's outstanding shares, and outside ownership data is from the Thomson Reuters 13f database. Executive ownership is from Execucomp. The number of observations is in brackets. A *t*-test is used to test the differences in Board size and the BCF index, and Chi-square tests are used to test the difference in other variables. In both panels, *, **, or *** indicates that the difference is significantly different from zero at the 10%, 5%, or 1% level using a *t*-test, respectively.

Panel A: Changes in CEO compensation			
	OV	Non-merging OV	Difference (OV - Non-merging OV)
<i>Year: ayr-1</i>			
Cash payment	1,342	1,339	123
Grants	2,219	1,538	1,257***
<i>Year: cyr+1</i>			
Cash payment	1,615	1,489	-3
Grants	4,247	1,879	2,010***
<i>Change from year ayr-1 to cyr+1</i>			
Cash payment	210	220	-137
Grants	1,281	715	902
Cumulative grants	9,585	4,875	1,906**
Number of observations	166	90	53
Panel B: Pre-acquisition governance			
	OV	Non-merging OV	Difference (OV - Non-merging OV)
Board size	12.4 [94]	11.0 [58]	1.4*
% Strong board	48.3 [211]	53.6 [138]	-5.3
BCF index	2.6 [163]	2.2 [135]	0.4***
% of shares owned by blockholders	6.5 [372]	7.6 [266]	-1.1*
% of shares owned by executives	4.1 [253]	4.2 [159]	-0.1