

# **Investor Sentiments, Ill-Advised Acquisitions, and Goodwill Impairment**

By

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## **Abstract**

We hypothesize that the root cause of many goodwill write-offs—managers’ public admission of ill-advised corporate acquisitions—is the overpriced shares of buyers at acquisition. Overpriced shares provide managers with strong incentives to invest, and particularly to acquire businesses, even at excessive prices and doubtful strategic fit, in order to “buy themselves out” of the overpriced share predicament and postpone the inevitable price correction by portraying continued growth. We corroborate our hypothesis by documenting: (1) share overpricing is strongly and positively associated with the intensity of corporate acquisitions, (2) share overpricing is negatively related to the post-acquisition share performance of buyers, beyond the price correction, indicating a negative relation between overpricing and the quality of acquisitions, (3) share overpricing is positively related to the size of goodwill write-offs. We further show that share overpricing predicts both goodwill write-offs and their magnitude, and that acquisition by overpriced companies is a losing proposition for shareholders. Finally, we document some of the serious private and social consequences of the ill-advised acquisitions made by overpriced firms. These findings contribute to the accounting literature on business combinations and goodwill, as well as to the finance/economics research on investor sentiments and corporate investment.

# Investor Sentiments, Ill-Advised Acquisitions and Goodwill Impairment

## I. Introduction

The Figure below presents eBay's cumulative abnormal returns relative to the S&P 500 index over the last five years. In mid-September 2005 (see arrow), eBay acquired the Internet phone company Skype for \$2.6 billion, paid in part by stock. At the time of acquisition, eBay's stock advanced roughly 100% over the S&P 500, and with the benefit of hindsight—eBay's steep stock price decline in 2006—its shares seem to have been substantially *overpriced* on Skype's acquisition. Things soon turned ugly for the online auctioneer, and On October 1, 2007 it announced a massive goodwill impairment charge (write-off) of \$1.43 billion related to the Skype acquisition (55% of original price). Commentators attributed, in part, the soon thereafter (January 2008) retirement of Meg Whitman, eBay's highly respected CEO, to the Skype debacle.

**Figure 1**  
**eBay vs. S&P 500: The Skype Acquisition**



We hypothesize in this study and corroborate empirically that eBay's chain of events, from overpriced shares through large stock-financed but ill-advised acquisitions and ultimately to substantial goodwill write-offs is, in fact, a general phenomenon. We document a strong and monotonically positive relation between share overpricing and the intensity of stock-financed corporate acquisitions, measured by both the value and frequency of acquisitions (though not between overpricing and cash-financed acquisitions), indicating managers' penchant for using overpriced shares to time and finance corporate acquisitions. We then document an equally monotonic and strong but negative relation between share overpricing and the buyers' post-acquisition stock returns, indicating that, on average, acquisitions by companies with overpriced shares are imprudent (the target is overvalued and/or a strategic misfit for the buyer). We further show that the post-acquisition price reversal goes beyond the correction of the initial overpricing, indicating that the acquisitions were, indeed, ill-advised. Finally, we complete documenting the vicious overpricing cycle by showing a strong positive relation between acquisitions financed by overpriced shares and the intensity of goodwill write-offs, a public admission by managers of the ill-advised nature of the acquisitions. We further document that overpriced shares predict both the occurrence of goodwill write-offs and their magnitude.

We then turn to an important issue: When a firm's shares are overpriced, it is beneficial to current shareholders to overpay for a target acquisition, as long as such overpayment is not larger than the buyer's overpricing. In such case, a subsequent goodwill write-off does not necessarily reflect negatively on the acquisition decision. To determine whether overpayment for acquisitions (often leading to goodwill write-offs) are beneficial to the buyers' shareholders, we trace the entire history from overpriced shares, through corporate acquisitions, to goodwill write-offs, and document a decrease, on average, in shareholder value. Thus, shareholders of

overpriced firms do not benefit from managers' attempts to exploit or justify the overpricing of their shares. In this context we also document certain serious social costs of acquisitions with overpriced shares.

The economics underlying this adverse sequence of events, developed in the next section, are essentially as follows. Overpriced shares provide managers with strong incentives to overinvest, and particularly to acquire businesses paid for with the inflated currency (stock). The reasons: First, an acquisition with inflated shares seems a bargain as long as the acquisition price is not equally or more inflated than the buyers' shares. Thus, for example, if the buyer's stock price is twice its intrinsic value, an all-stock, fairly priced acquisition means that the buyer gives up half the value it gets. In this case, it may even be rational to overpay for the target in order to get the deal done. Second, overpriced shares, *by definition*, will drop substantially once investors realize they were overly optimistic (often upon the first earnings or sales disappointment). Managers obviously strive to postpone as far as possible this day of reckoning, hoping for a substantial business improvement down the road that will obviate the price correction. Some managers believe that by acquisitions they will rejuvenate stalling growth, buying their way out of the problem (inflated shares). Others perceive business acquisitions as an effective way of obscuring the overpricing (flagging growth) from investors: The buyer's sales and EPS (though rarely its return-on-equity) increase when the target is combined with the buyer, maintaining the growth façade so treasured by investors. In fact, analysts and consultants often prescribe to slow-growth companies a business acquisition strategy to rejuvenate growth. Third, a business acquisition with overpriced shares transfers wealth from new to current shareholders. Some managers favor such wealth transfers as they feel a stronger loyalty to the latter (and, of course, to themselves, being shareholders too.) Thus, overpriced shares provide managers with strong

incentives to engage in business acquisitions, and sometimes to overpay or even acquire an ill-suited target to maintain the growth facade.<sup>1</sup>

The first link of the vicious cycle—from share overpricing to excessive acquisitions—has been examined before, both conceptually and empirically (see next section), though we focus on a new and important element—that these acquisitions tend to be ill-advised. Our tests, furthermore, are more comprehensive and updated than our predecessors'. The second link of the cycle—from acquisitions financed with inflated shares to goodwill impairment—is to the best of our knowledge examined here comprehensively for the first time, as is the prediction of goodwill write-offs with overpriced shares. This is a particularly important link because it highlights a major cost, both private and social, of overpriced shares—botched acquisitions, as evidenced by the post-acquisitions steep stock price declines and ultimately by managers' admission of large goodwill impairment (recall eBay). Ill-timed and strategically unfit acquisitions are obviously very costly to buyers' shareholders (we show that buyers' shareholders lose throughout the entire cycle from share overpricing to goodwill write-off), and to society as well, in the form of plant closings, laid-off employees and serious diversion of managers' attention to executing acquisitions and desperately attempting to mend imprudent ones. These findings too, are to the best of our knowledge documented first here.

We contribute to the accounting literature on business acquisitions and goodwill by identifying a major root cause of goodwill impairment—the strong incentives of managers of overvalued companies to engage in ill-advised acquisitions (overly paid for and/or strategic misfits). Most studies on goodwill impairment examine: (a) investors' reaction to the impairment announcement—it's generally negative (e.g., Li et al., 2004), (b) the characteristics of target firms related to the write-offs—generally overpaid targets (Li et al., 2004), (c) whether

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<sup>1</sup> We comment in the next section about the illusionary nature of these incentives.

goodwill impairment is timely or delayed by managers—it's delayed (Hayn and Hughes, 2006; Francis et al., 1996), (d) whether the write-offs improve financial information—they do, write-offs predict future cash flows and earnings (Anantharaman, 2007), and (e) managerial incentives affecting the write-offs—goodwill impairment is related to characteristics of debt contracts, managerial bonuses, and exchange delisting regulations (Beatty and Weber, 2006). While these findings are obviously informative, the root causes of goodwill impairment—the circumstances under which ill-advised acquisitions are being made—and the ultimate consequences to investors and society have not been investigated in the literature.

Our findings are also relevant to auditors and regulatory agencies (SEC, for example) in the context of ascertaining goodwill impairment (loss of value). Goodwill (the difference between acquisition price and the fair value of the net assets acquired) has to be tested by managers annually for impairment, but such test is notoriously difficult. Unless the target's shares continue to be publicly traded—a small minority of acquisitions—there is no objective evidence of impairment. We document that overpriced shares at the time of acquisition—we propose below overpricing proxies—predict goodwill write-offs, and thus provide auditors and regulators with information to improve the assessment of goodwill impairment.

Our study also contributes to several strands of economics and finance research dealing with investors' sentiments (optimism) and their effects on corporate investment. In particular, while it has been shown that overpriced shares are related to corporate acquisitions, the important finding that such acquisitions tend to be ill-advised, as evidenced by large goodwill write-offs, is comprehensively documented here for the first time. Furthermore, and unrelated to investors' sentiments, it has been shown that corporate acquisitions detract from the long-term performance of the buyers (i.e., acquisitions have, on average, negative net present value). We

show below that this long-term post-acquisition underperformance can be traced back to acquisitions with overpriced shares. In particular, acquisitions made by fairly-priced buyers do not lead to subsequent underperformance of buyers' shares. The sweeping statement, often heard, that corporate acquisitions are a losing proposition is thus inaccurate.

The order of discussion is as follows: Section II briefly discusses various key issues of investors' sentiments, relating our study to extant literature, and outlines our hypotheses, while Section III presents the data, summary statistics, and our research methodology. Section IV presents our empirical findings concerning the cycle: overpriced shares—ill-advised acquisitions—goodwill write-offs. Section V establishes that share overpricing predicts goodwill write-offs, and Section VI documents that in the final analysis, acquisitions with overpriced shares are a losing proposition. Section VII documents certain private and social costs of ill-advised acquisitions, and Section VIII concludes the study.

## **II. Investors' Sentiments and Ill-Advised Acquisitions**

We discuss here various key issues related to investors' sentiments, overpriced shares and corporate acquisition decisions, as well as the extant research related to ours, ending up with our hypotheses.

### **A. Is share mispricing prevalent?**

How prevalent is share mispricing? Can stock prices in large and active capital markets deviate over sustained periods of time from intrinsic values? No, say ardent believers in capital market efficiency. While individual investors may, of course, over- or under-price securities, such mispricing will be quickly identified and offset by sophisticated arbitrageurs in search of



gains from mispriced securities, thereby reverting prices to intrinsic values. Mispricing, goes the efficient markets argument, is an isolated, temporary phenomenon.

This idyllic view of capital markets governed by rational and sophisticated investors is increasingly challenged by empirical evidence showing that share prices frequently deviate from fundamentals over protracted time periods, sometimes even years (see Baker and Wurgler, 2006, for elaboration). Cases of widespread, long lasting mispricing—overvaluations as well as undervaluations—proliferate. For example, Eberhart et al. (2004) document that the shares of companies with growing R&D (more than 5% annual growth in R&D-to-total assets) yield positive and significant risk-adjusted stock returns for up to five years following the R&D increase. Since R&D data are clearly reported to investors in quarterly income statements, the fact that these R&D-growth companies generate abnormal *future* stock returns—almost 20% in the first two years—implies that investors systematically *undervalue* their shares when the R&D information is reported, and that it takes several years for the undervaluation to be corrected. Moving to overvaluations, starting with Sloan (1996), a large body of research on accounting accruals (items comprising the difference between earnings and cash flows, such as depreciation or the stock option expense) shows that investors get enamored with companies reporting high accruals (their earnings substantially exceed cash flows), despite the fact that in many cases these earnings are of low quality (sustainability), as evidenced by the relatively low cash from operations of these companies. The evidence show that investors systematically bid up the stock prices of such high accruals companies, only to see these prices plummet over the following two-three years.<sup>2</sup> Lev and Nissim (2006) report that this widespread accruals mirage persisted well into the 2000s, a decade after it was first documented, casting serious doubt about the ability and willingness of sophisticated investors to quickly eliminate share overpricing.

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<sup>2</sup> The reverse holds for low accruals companies.

The evidence documenting protracted share mispricing is voluminous and growing. It points out that mispricing is particularly prevalent among young and small companies, many of whom are scantily followed by analysts (“orphan stocks”) or shunned by institutional investors, that is, companies with limited and low quality information. Companies with hard to value assets and prospects, such as intangibles-intensive businesses, are also frequently mispriced, as are firms in countries characterized by poor transparency or weak enforcement of securities laws.<sup>3</sup>

## **B. Where are the Arbitrageurs?**

No one, even ardent believers in rational and efficient capital markets, disputes the existence of sentimental investors, optimists or pessimists, or the possibility that otherwise rational investors will occasionally act irrationally, like dumping a stock because its price has fallen sharply without an informed analysis of the reasons for the price decline or the prospects of reversals.<sup>4</sup> But, claim mainstream economists, investors’ sentiments will be *arbitraged away* by sophisticated, gain-motivated contrarians, which will quickly restore prices to fundamentals.<sup>5</sup> So, whence the documented systematic and protracted over- and undervalued share cases? Where are the arbitrageurs? The back-to-fundamentals process will, of course, work only if a sufficient number of arbitrageurs are able to identify mispriced securities and willing to buy, sell, or short them. Such arbitrage, however, is both costly and risky—one never knows how long it will take other investors to realize the mispricing, at which point the arbitrageur makes money. So, there are serious cost and risk hindrances to effective arbitrage.

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<sup>3</sup> Baker and Wurgler (2006) point to the difficulty to value shares as the key driver of share mispricing.

<sup>4</sup> Baker and Wurgler (2007, p. 129) define investor sentiment as “a belief about future cash flows and investment risks that is not justified by the facts at hand.”

<sup>5</sup> A representative view: “in fact, significant deviations from intrinsic value are rare, and markets usually revert rapidly to share prices commensurate with economic fundamentals.” Goedhart et al. (2005, p. 1).

But there is an even more serious limitation to arbitrage of mispriced shares, arising from the attributes of the typically mispriced companies. Consider once more the accruals mispricing. Lev and Nissim (2006) document that indeed some active institutional investors do trade on accruals, but not in sufficient numbers and capital to eliminate the phenomenon. The reason: High accruals companies are typically small, low profits (or loss-making) and no-dividend companies, with volatile stock. But these are the companies that most well-funded institutional investors—the potential arbitrageurs—shy away from, because such companies have low liquidity—that is, trading their shares has a large price impact—an obvious concern to institutions, and their high stock price volatility is an invitation to unpleasant surprises.<sup>6</sup> So here is a serious deterrent to mispricing arbitrage: Companies which are mostly affected by investor sentiments—relatively small, young, low-profitability and high volatility enterprises—are those that most institutional and sophisticated investors shun. Share mispricing of such stocks—over- or underpricing—often persists for lack of effective contrarians.

Finally, an important asymmetry, particularly relevant to our study, should be noted. Investor optimism, leading to share overpricing is more likely to arise and be sustained than pessimism. Suppose investors A and B differ about the prospects of stock X: Investor A is bullish about X whereas B believes it is overpriced. Both investors don't own X (or own small quantities only). What will these investors do to put their expectations to work? Investor A will obviously buy X, while all investor B can do is sell it short. Short sales, however, are for various reasons restricted: most individuals (for whom shorting is relatively costly) and many institutions

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<sup>6</sup> Another reason for institutional reluctance to invest in small, volatile companies is the “prudent-man” law, frequently invoked in lawsuits filed by investors seeking damages from fund managers. Courts often ruled that if the defendant invested “prudently,” generally in large, mature, and profitable companies (Wal-Mart, IBM, and Exxon come to mind), they cannot be held liable for investment losses, short of fraud (see Del Guercio, 1996). Many overpriced companies, such as small high tech and biotech firms, or recent IPOs cannot be considered “prudent” investment, and therefore will not be attractive to fund managers.

(mutual funds in particular) don't engage in short sales. Accordingly, since buying stocks on positive views is unconstrained while selling short is, the perceptions of optimism will be reflected in stock prices more forcefully and persistently than those of pessimistic investors, leading to more pronounced overvaluation of shares even when investors' opinions about the prospects of companies are equally distributed between optimists and pessimists. Chen et al. (2002) provide empirical evidence supporting this scenario.

### **C. Overpricing and corporate acquisitions**

Several studies document a positive relation between share overpricing and corporate investment. Thus, Polk and Sapienza (2004) argue that when a company's shares are overpriced, managers tend to increase capital investment, financed by cash or debt—not just by equity—to convince investors that their elevated growth expectations (optimism) are warranted. In other words, a high investment rate gives the firm an aura of growth. This hyper-investment by overvalued companies is indeed confirmed by Polk and Sapienza's findings, documenting furthermore that these investments are by and large wasteful (negative present value projects), as evidenced by the underperformance of the investing firms' shares subsequent to the investment spree, relative to comparable (similar risk and investment opportunities) firms.<sup>7</sup> Our main issue with this interesting study is that the documented underperformance of the investing companies' shares—the proof that the investments were negative net present value—may be due, partially or fully, to the inevitable price correction experienced by overvalued companies. Polk and Sapienza do control for Tobin's Q and financial slack in their analysis, but these variables may not be sufficient controls for the overpricing correction.

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<sup>7</sup> Stein (1996), and Baker et al. (2003) show that the investment of equity-dependent firms (those with limited internal funds and debt capacity) is more sensitive to share mispricing than that of firms that are not liquidity constrained.

Dong et al. (2006) focus directly on investor misvaluations and corporate acquisitions, a dimension we too examine. The researchers' main argument should, by now, be familiar: Overpriced buyers have an incentive to acquire companies paid by shares, as long as the target is less overvalued than the buyer. Two over-valuation indicators are used by researchers: the price-to-book and the price-to-residual income value (Ohlson, 1995). The sample period is 1978-2000. Dong et al.'s main findings are that, as predicted, buyers have higher valuation ratios than targets (i.e., buyers are more overpriced than targets); higher target valuation (acquisition price) is associated with a higher probability that equity, rather than cash, is the means of payment; and high valuation buyers are more likely to use stock than cash for acquisitions' intensity. These findings are stronger for the 1990s than the 1980s. Overall, the authors conclude, the evidence is consistent with share overpricing driving acquisitions. We note that this study deals with the first link of our "vicious cycle"—the effect of share overpricing on acquisitions' intensity. We extend (and update) these findings to examine the *nature* of the investments—ill-advised acquisitions, and their consequences: large goodwill write-offs—thereby establishing the high costs, both social and private, of overpriced shares.

Our study is tangentially related to the examination of long-term post acquisition returns. Loughran and Vijh (1997) summarize their findings as follows: "During a five-year period following the acquisition, on average, firms that complete stock mergers earn significantly negative excess returns of -25.0% whereas firms that complete cash tender offers earn significantly positive excess returns of 61.7%." (p. 1765). It is an open question whether the negative long-term returns of buyers, documented by Loughran and Vijh and others (e.g., Moeller et al., 2005), are the result of ill-advised acquisitions, and/or the correction of the share

overpricing of many buyers. We address this issue by distinguishing between the two drivers of negative post-acquisition returns—poor acquisitions and overpricing correction.

Our study is also related to recent work on *managers overconfidence* (in contrast with investors' excess optimism). For example, Malmendier and Tate (2005) argue that overconfident CEOs (identified as those that don't reduce their personal exposure to company-specific risk, that is, hold on to stock options until expiration) overestimate the return on investment projects and will therefore invest in negative NPV projects (overinvest).<sup>8</sup> So, can our findings be due to managers' overconfidence rather than to investor's over-optimism? Unlikely, because Malmendier and Tate hypothesize and corroborate that overconfident managers will use *internal funds*, rather than stock, to finance the excessive investment since "...they are reluctant to issue new equity because they perceive the stock of their company to be *undervalued* by the market." (p. 2662, emphasis ours).<sup>9</sup> We, in contrast, focus on acquisition financed by equity. The source of investment funding—cash vs. equity—appears to sharply distinguish between managers' and investors' optimism.

#### **D. Hypotheses**

Fisher and Merton (1984) argue that managers should take advantage of overpriced shares to issue stock and enhance investment, because overpriced shares implies that the firm's effective cost of capital is lower than the intrinsic-value cost of capital (the rational cost of capital), and therefore, at such below-rational cost of capital even certain investments with negative net present value (assessed at the rational cost of capital) should be accepted.

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<sup>8</sup> Ben-David et al. (2007) provide similar evidence.

<sup>9</sup> In a subsequent paper (Malmendier et al., 2007) the authors show that overconfident CEOs are significantly *less likely* to issue equity.

Following such advice, overvalued firms will overinvest, and even acquire negative NPV businesses. Accordingly, we hypothesize:

**H1: The extent of share overpricing will be positively associated with acquisition intensity, reflected in both the value and number of corporate acquisitions.**

We further conjecture that some, perhaps many of the acquisitions made by overpriced companies are ill-advised (overly-paid for and/or strategic misfits) because: (1) Managers of overpriced companies know that it is “rational” to overpay for the target (as long as such overpayment is lower than the overpricing of their own shares). But both own share overpricing and target business valuation are very uncertain, and some buyers may actually overpay more than their shares’ overpricing. (2) Acquisitions by overpriced companies are often made just to keep the “appearance of growth” going. Such acquisitions are often made in haste and under pressure, increasing the likelihood of making mistakes and overpaying for the targets. (3) The overpricing of buyers’ shares gives strong incentives to key target employees to sell the shares they obtain as soon as possible and switch employment to prevent their newly-acquired wealth from evaporating. (Key employees will generally have certain inside information about buyer’s share intrinsic value.) The defection of key target employees will obviously adversely affect the acquisition success. Accordingly we hypothesize:

**H2: The investments made by overvalued companies will include ill-advised (misfit) acquisitions as characterized by: (1) subsequent negative excess returns, and (2) large goodwill write-offs.**

The adverse consequences of acquisitions made by overpriced firms exceed the visible effects of goodwill impairment and the associated negative market reaction. They include massive employee layoffs, plant closings and decrease in innovation investment. Accordingly:

**H3: The ill-advised acquisitions by overvalued firms cause serious private and social harms.**

**III. Data, Methodology, and Summary Statistics**

We obtained our sample from the SDC database on mergers and acquisitions. The initial sample consists of U.S. publicly traded firms that undertook mergers and acquisitions between January 1, 1990 and December 31, 2006. We include U.S. firms engaged in the acquisitions of all types of target firms, regardless of the nationality (both U.S. and foreign) and status (both public and private) of the target firms. We exclude the following observations: (1) the deal was unsuccessful, (2) the value of the transaction is not disclosed, (3) the percentage of shares acquired in the transaction is less than 90%, and (4) the value of the transaction is more than 100% or less than 1% of the acquiring firm's market value. We also require sample firms to have accounting data in COMPUSTAT and stock price and return data in CRSP.

Our measures of the extent of share overpricing—a key element of this study—are based on four firm characteristics: industry-adjusted price-to-earnings (P/E) ratio, the amount of discretionary accruals, stock price momentum, and prior equity issuance. The reason for using four overpricing proxies, and our construction of an index reflecting the incremental information in each proxy with respect to overpricing, is simple: there is no single *ex ante* comprehensive measure of share mispricing.<sup>10</sup> Accordingly, researchers (Baker and Wurgler 2006; Polk and Sapienza 2004) construct indices from several proxies of mispricing, and we follow this approach. Our four proxies are comprised of three measures used by Polk and Sapienza (2004): *discretionary accruals* (Sloan's 1996 evidence suggests the existence of systematic mispricing related to accruals); *net equity issuance/repurchases* (evidence indicates that equity issues

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<sup>10</sup> *Ex post*, overpricing is evident by negative returns, although it's difficult to isolate the effects of the overpricing reversal on subsequent returns from the impact of the firm's contemporaneous operating performance on returns.



(repurchases) predict subsequent low (high) stock returns, namely mispricing, Daniel and Titman, 2001); and *price momentum* (evidence indicates that yearly excess returns exhibit positive serial correlation, that is momentum is a mispricing phenomenon, Jegadeesh and Titman, 1993). Concerning these three mispricing proxies, Polk and Sapienza (2004, pp. 21-22) note: “One problem with the previous two proxies of mispricing [accruals and equity issues] is that managers affect discretionary accruals, equity issuance, and investment [the focus of study]. Our results indicate that there is correlation between investment and both discretionary accruals and equity issuance, but they can hardly say anything about the direction of the causality. While high discretionary accruals may cause sub-optimal investment decisions managers may decide to manipulate accruals to be able to invest more... Our next measure of mispricing [price momentum] suffers less from the reverse causality problem because it is not directly chosen by the manager, and more generally reflects investors’ sentiments.”

To these three overpricing proxies we add the price-to-earnings (P/E) ratio, the most widespread mispricing proxy used by investors. Dong et al. (2006) in their study of overpricing and corporate acquisitions, use a highly correlated, but somewhat less frequently used measure—the price-to-book ratio. The industry-adjusted P/E ratio we use is the difference between the firm’s P/E and the industry median P/E ratio for all firms in the sample firm’s 4-digit SIC industry. To assure that the industry median P/E ratio is properly computed, we excluded in its computation firms with negative P/E ratios and those with P/E ratios greater than 100. We also exclude in our final sample firms with negative P/E ratios. Our approach to measuring the discretionary component of accounting accruals follows Chan et al. (2001), where discretionary accruals are defined as the difference between the firm’s total accruals and “normal accruals,” deflated by average total assets. Total accruals are measured as the difference between earnings

before extraordinary items and cash from operations, and normal accruals are a constant proportion of the firm's sales, based on the ratio of the sum of total accruals to the sum of sales over the prior five years (year  $t-5$  to year  $t-1$ ). Price momentum is the firm's market-adjusted returns for the 11-month period that ends one month before the firm's fiscal year-end. We measure equity issuance as the total amount of equities issued by the firm over the most recent three years (year  $t-2$  to year  $t$ ), deflated by lagged total assets.

We perform a principal component analysis to aggregate and summarize the incremental information on firm valuation contained in the four overpricing proxies. To discern from our data the relation among these overpricing proxies to the fullest extent, we include in this principal component analysis all available firms, not just buyers, with the required accounting and stock return data. To enhance our estimation of share overpricing we use in the analysis the first two principal components, which together account for 53.3% of the total variability. In our subsequent tests and regression analyses, we use these two principal components as the firm-specific composite indicators of share overpricing (*OVE1* and *OVE2*, respectively).

We measure the intensity of corporate acquisition activities for each firm-year by the total *number* of transactions undertaken by the firm in the current year (*NUM*), as well as in the next one, and next three years, and similarly by the combined *value* of all transactions in the current year (and subsequent years), deflated by the acquiring firm's market value at the beginning of the year (*VALUE*). For firm-years with no mergers and acquisition activities on the SDC database, the value of these two variables is set to zero. We also compute these two acquisition intensity measures for the subsamples of transactions that are financed fully by stock or by cash. For each firm-year, we also compute across all transactions the average percentage of the transaction value that is paid for by stock (*STOCK%*).

Table 1 provides summary statistics on the firms we study. Panel A refers to *all* firms with available data, whereas Panel B focuses on acquiring companies. The data indicate that acquirers are larger than non-acquirers (the formers' median market value is twice the latter's), and have a substantially higher industry-adjusted P/E ratio. As to the four components of the overpricing index, acquirers have large discretionary accruals, higher price momentum, more equity issued, and a higher relative P/E ratio than non-acquirers. This is the first indication that the shares of acquiring firms, as a group, are more overpriced than those of non-acquiring firms. The correlations matrix (Table 2) indicates that our two overvaluation indicators, *OVE1* and *OVE2*, are only marginally negatively correlated ( $-0.063$ ), supporting our use of both indicators in the subsequent analysis.<sup>11</sup>

#### **IV. Empirical Tests**

We essentially employ two methodologies to examine the various hypothesized relationships. The first, a simultaneous classification of the observations by quintiles of the two overpricing indicators (principal components) and the second—what else—a regression analysis.

##### **A. Share overpricing and acquisition intensity**

In Table 3, we report our evidence on the association between share overpricing and firms' acquisition over the three years subsequent to overpricing. Panel A of Table 3 presents the mean acquisition value and frequency for the main diagonal of the sample firms classified by quintiles of the two overpricing principal component indicators (*OVE1* and *OVE2*). Thus, for example, the left cell (titled Lowest-lowest) includes firms that were classified by *each indicator* among the 20% least overpriced. The data in each cell indicate mean acquisition intensity—

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<sup>11</sup> The two indicators are, of course, uncorrelated in the sample of all firms from which they are estimated. In the subsample of buyers the two overvaluation indicators are slightly negatively correlated.

value and number—in the next three years. Moving along the diagonal (from left to right across each row), the data in Panel A show a strong and monotonic increase in both mean acquisition value (divided by market value) and the number of acquisitions (in parentheses). Thus, for all sample firms (first row in Table 3), as one moves from the least to the most overpriced buyers, acquisition value (number) increases from 0.067 (0.234) to 0.191 (0.833), namely three-fold. The same monotonic increase in acquisition intensity holds for the subsample of acquiring companies (second row).

The next four rows of Table 3 present the quintile data for stock-only and cash-only acquisitions, from the least (left) to the most (right) overpriced buyers. It is clear that the increasing trend of acquisition-intensity exists for acquisitions-by-stock only. For cash-financed acquisitions, the acquisition value is roughly flat along the overpricing scale, whereas the number of subsequent acquisitions increases monotonically.

Examining sub-periods (bottom half of Panel A), the tendency of acquisition intensity to increase with overpricing is strong in the first two sub-periods, 1990-1995 and 1996-2000, but weakens somewhat for acquisition value (though not frequency) in the recent sub-period, 2001-05. The reason, perhaps, is that the first couple of years of this sub-period, 2001 and 2002, for which we have full subsequent three-year data, were recession years with a lagging capital market performance, which generally adversely affect the acquisition activities of firms, including that of overpriced companies.<sup>12</sup>

Panel B of Table 3 presents estimates of a logistic regression analysis where the dependent variable is having (denoted by 1) or not having (denoted by 0) acquisitions in the following three years. In addition to our two composite (principal component) indicators of

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<sup>12</sup> The data in Panel A refer to the aggregate acquisition activity in the subsequent (to overpricing) three years. Performing this analysis on acquisitions in the next year only, yields very similar results.

overpricing (*OVE1* and *OVE2*), we include among the independent variables the common control variables for corporate acquisitions: firm size ( $\text{Log}(MV)$ ), availability of cash, measured by cash flows from operating activities (*CFO*), the capital market activity indicator (S&P 500 return, *SP500*)—acquisition intensity is positively correlated with the market—and industry dummies. The logistic regression estimates indicate that for all acquisitions, the two overpricing indicators—our focus of analysis—are positive and statistically significant, for each of the three periods examined. Same applies to stock-financed acquisitions. For cash-only acquisitions, the overpricing indicators are positive and significant, though the magnitude of the coefficients is substantially smaller than those of the stock-financed acquisitions. The pseudo  $R^2$ s are also larger for the stock acquisitions than cash acquisitions.

Panel C of Table 3 presents OLS regression estimates for the dependent variable—acquisition value (scaled by total assets). These regressions are obviously run only on firms with acquisitions in the subsequent (to overpricing) three years.<sup>13</sup> We note that for all firms with acquisitions and for stock-financed acquisitions, the coefficients of the two overpricing indicators are positive and significant (except for *OVE2* in the next year of stock-financed acquisitions). However, for cash-based acquisitions, practically all the overpricing coefficients are insignificant. Thus, share overpricing is positively related to acquisition value for “all acquisitions” and stock-financed acquisitions.

Summarizing, our tests strongly confirm the hypothesis that acquisition-intensity (value, as well as the number of acquisitions) is positively related to the overpricing of the buyers’

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<sup>13</sup> The standard errors and t-statistics in this regression are obtained by following the clustering approach prescribed by Peterson (2006). This approach mitigates the effect of cross-sectional correlation in the regression residuals that may lead to biased standard errors of coefficient estimates in OLS regression. It produces unbiased estimates of standard errors and hence generates robust inferences about the statistical significance of coefficient estimates.

shares. This relationship is strong for acquisitions financed by shares, and weaker, though still present, in cash-financed acquisitions.<sup>14</sup>

## **B. Post-Acquisition Stock Returns**

Previous research (e.g., Loughran and Vjih, 1997) indicates that the long-term performance of acquiring companies lags the benchmarks. But this negative performance can be due to ill-advised or overpaid acquisitions—the common conclusion of this research—and/or to the return reversal of overpriced companies which, as the evidence shows, are particularly active in acquisitions. In this section we distinguish between these factors.

Table 4 presents the future abnormal returns subsequent to acquisitions made in the years following the overpricing measurement. These returns are computed using the Fama-French 4-factor model that takes into account the commonly used return-generating factors (market return, firm size, book-to-market effect, and momentum). The results in Panel A confirm extant evidence that acquiring firms tend to have below-benchmark returns in the three future years, with stock-financed acquisitions performing the worst. Panel B (main diagonal of the two overpricing indicators) shows that for quintiles 1 (lowest overpricing) through 3, the post-acquisition returns are in fact *positive*, and monotonically decreasing. Quintile 1's acquisitions are evidently positive net present value (NPV), on average (coefficient 0.0047, t-value 1.94). Things are drastically different for quintile 4 and 5 (medium-high and high-high)—the 40% most overpriced firms—where the five-year post-acquisition returns are increasingly negative and statistically significant. This result is very pronounced for stock-financed acquisitions, but not for cash-financed acquisitions. Furthermore, these results also hold for acquisitions made in years  $t+2$  and  $t+3$  relative to the overpricing measurement (lower part of Panel B).

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<sup>14</sup> Polk and Sapienza (2004) argue that overpriced companies will overinvest, using cash or debt, not just stock, in order to convince investors that the high price multiples are justified by corporate growth.

We conclude from this analysis that while, on average, the long-term post acquisition performance of buyers is negative, consistent with prior findings, this negative performance is driven by overpriced companies. The acquisitions made by fairly-priced companies are positive NPV, on average. This still leaves open the important question whether the negative post-acquisition returns of the overpriced buyers reflect ill-advised acquisitions and/or the overvaluation price reversals. This question is addressed in Table 5, where we compare the returns of *non-acquiring* firms, classified by degree of overpricing, with the post-acquisition returns of similarly classified *acquiring* firms. This comparison, thus, holds constant the degree of overpricing and the subsequent reversal of stock prices due to overpricing, thereby focusing on the negative returns due to ill-advised acquisitions.

The data in Table 5, Panel A show that for quintiles 1-3, the fairly or moderately overpriced companies, the 5-year stock performance of *non-acquiring* companies (top row) is quite similar to that of *acquiring* firms (rows 2 to 3). However, for quintiles 4-5 (right-side two columns), the 40% most overpriced companies, the five-year stock performance of acquiring companies is significantly *more negative* than that of non-acquiring companies. Thus, for example, the post-acquisition returns of the 20% most overpriced firms with two or more acquisitions in the current (overpricing measurement) year is  $-0.0144$  vs.  $-0.0095$  for the most overpriced firms with no-acquisitions. The difference between these returns is statistically significant at the 0.01 level.<sup>15</sup> This negative return differential apparently reflects the fact that the acquisitions by overpriced buyers were indeed ill-advised—overpaid for and/or strategic

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<sup>15</sup> As the data in Table 5 show, the *extent* of overpricing is similar for corresponding quintiles of acquiring and non-acquiring firms. In panel A, both the *t*-test and Wilcoxon *z*-test fail to reject the null hypothesis of equality of mean and median values of *OVE1* and *OVE2* between the corresponding quintiles of acquiring and non-acquiring firms. In panel B, the *t*-test and *z*-test indicate that the acquiring firms in the highest-highest quintile have significantly *lower* mean and median values of *OVE1* and *OVE2* than non-acquiring firms in the corresponding quintile (e.g., mean (median) of 0.86 (0.50) for *OVE1* and mean (median) of 0.18 (0.17) for *OVE2* of acquiring firms vs. mean (median) of 1.16 (0.73) for *OVE1* and mean (median) of 0.42 (0.26) for *OVE2* of non-acquiring firms in the highest-highest quintile).

misfits. This evidence, focusing on the quality of acquisitions by overpriced firms, distinct from the overpricing reversal, extends the extant evidence that overpricing leads to excessive acquisitions (Dong et al., 2004), as well as clarifies that the documented underperformance of acquiring companies (Loughran and Vijh, 1997) is partially due to ill-advised acquisitions made by excessively overpriced firms, rather than a consequence of acquisition per se.

### **C. Acquisitions and Goodwill Write-offs**

The final link of the hypothesized vicious cycle—from share overpricing to the consequences of ill-advised acquisitions—deals with managers’ admission of the ill-advised nature of acquisitions—the decrease (write-down) of goodwill values on buyers’ balance sheets, required by generally accepted accounting principles (GAAP). Table 6 provides the main diagonal results, as well as regression analyses relating overpricing during 1991-2000 to goodwill write-offs (scaled by buyers’ total assets) during 2001-2006. For each firm, we measure share overpricing by the average value of the two indicators of overpricing (*OVE1* and *OVE2*) over 1991-2000. Goodwill write-offs are based on the total amount of write-offs during 2001-2006.

Considering the main diagonal (top row of Panel A), the average goodwill write-off increases monotonically with the buyers’ share overpricing: From 0.0033 (goodwill write-off scaled by total assets) for the 20% firms with the lowest overvaluation to 0.0206 (six fold) for the 20% firms with the highest share overpricing. The second row shows even more dramatic results for the subgroup of firms, all having write-offs in 2001-2206: The average write-off increases from 0.0284 (lowest mispricing) to 0.1012 (highest mispricing). For firms with acquisitions during 1991-2000 *and* goodwill write-offs in 2001-2006 (fourth row), the diagonal average



write-offs increase from 0.0225 to 0.1367. Thus, the goodwill write-offs of the 20% most overpriced buyers amounted to a startling 13.7% of their total assets.

Panel B of Table 6 reports regression estimates (Tobit and OLS) of the amount of goodwill write-off (scaled by total assets) regressed on the two indicators (principal components) of share overpricing (*OVE1* and *OVE2*), as well as on the percent of acquisition price paid in shares (*STOCK%*), the buyers' size (*Log(MV)*), and industry dummies. In all the regressions, the two overpricing indicators are positive and highly significant (except for *OVE2* in the Tobit analysis), whereas the stock payment percentage variable is not significant. This analysis confirms the last link of our cycle: Buyers' overpriced shares are closely associated with the write-off (impairment loss) of the goodwill related to their acquisitions, just as in the eBay example that leads this study.

## **V. Overpricing Predicts Write-offs**

We report in this section on the ability of the overpricing of the shares of buyers *to predict* the subsequent goodwill impairment; both its occurrence and magnitude. Predicting goodwill impairment, that is providing an early warning signal of this adverse event, is of obvious interest to investors and auditors, among others.

We consider each firm-year with acquisitions an observation, and for firms with multiple acquisitions in a given year we aggregate their individual firm-year observations into one, recording both the number of acquisitions and their value. We measure the share overpricing of buyers, using our two principal component indicators, in the year of acquisition. We then run both a Logit and Tobit analysis; the former with the dependent variable: goodwill impairment in future years (1), and no impairment in future years (0); and the latter (Tobit) with the size of impairment in future years (relative to total assets) as the dependent variable.

The independent variables are our two overpricing indicators (*OVE1* and *OVE2*), along with (for the first time in our analyses) a variable distinguishing between domestic and foreign acquisitions (*FOREIGN%*), which is defined as the percentage of foreign targets (in terms of number of acquisitions) in the firm's total acquisitions in a given year. Foreign acquisitions differ from domestic ones along institutional, economic, and accounting dimensions, calling for a separate analysis. The remaining independent variables—amount of goodwill, buyer's size, acquisition value, percentage of acquisition price paid in stock, and industry dummies—serve as controls.

Table 7 reports the Logit and Tobit estimates. It is evident that in both, the two overpricing indicators are positive and highly significant. The right columns of the Logit and Tobit tables indicate that the marginal predictive contribution of the overpricing indicators is highest among the independent variable (except for the size of goodwill). We conclude, therefore, that buyers' share overpricing has a significant predictive ability with respect to subsequent goodwill impairment.

## **VI. Was It All Worth It?**

A question not comprehensively researched in the literature is: What are the implications of goodwill write-offs? Do they signal imprudent acquisition decisions, or perhaps goodwill impairment is a benign byproduct of successful *market-timing motivated* acquisitions? Indeed, managers of goodwill-impaired firms often try to assuage directors and shareholders by claiming that in order to get the deal done, they had to overpay for the target (leading to the write-off), but that the payment was made with shares which were overvalued more than the target overpayment. In the final analysis, goes the argument, shareholders benefit from the acquisition,

even considering the excessive price paid. According to this scenario, the goodwill write-off is a non-event.

Consider the following comments made by Anthony Muller, the CFO of JDS Uniphase, in a 2001 conference call after the firm announced a \$44.8 billion goodwill write-off from various acquisitions made during the tech bubble of the late 1990s: “This goodwill resulted from our acquiring good companies when valuations were high. But keep in mind that while we purchased highly valued shares, we were also in effect selling highly valued shares at the same time as none of the transactions resulting in large goodwill amounts were done for cash. Had these transactions been done at different times when valuations were lower with exactly the same share exchange ratios, the goodwill amounts would have been considerably smaller.” (Pender, 2001). So, is goodwill impairment a byproduct of good investment decisions or a consequence of poor ones?

We examine this important question by tracing the fortunes of goodwill-impaired firms from acquisition through the goodwill write-off. We focus on two performance measures: stock market performance and both the return-on-assets (before impairment losses). Table 8 provides the results for both the year-by-year performance around acquisition and write-off, and the entire period from acquisition through the write-off. First thing to note is that of the 504 firms for which we have complete data on acquisitions and goodwill write-offs, 100 firms (20%) didn't survive three years after write-off (they were bankrupt or acquired). Data for the 404 firms that made it through the third year after write-off (top panel of Table 8) indicate that both the mean and median returns of the full trip (from acquisition through write-off) were decidedly negative:  $-0.32$  and  $-0.43$ , respectively. Thus, on the whole, investors didn't benefit from acquisitions paid for by overpriced shares. The oft-made prescription to enhance acquisitions when share

prices are inflated is misguided on both ethical and practical grounds. The increasingly negative mean and median return-on-asset measures in Table 8 corroborate this conclusion.

## **VII. The Private and Social Costs of Ill-Advised Acquisitions**

We focus in this section on certain preliminary indicators of private and social costs of ill-advised acquisitions made by overvalued companies. First, we document a positive and significant association between the size of goodwill write-off and investors' losses on the public announcement of write-offs (this was documented earlier by, e.g., Li et al., 2004). We also document a negative association between goodwill write-offs and the subsequent revisions in analysts' forecasts of earnings, leading to further investor losses (investors generally react to revisions in analysts' forecasts). More importantly, we then track various indicators of economic activity by the write-off companies, before and after the write-off, to suggest social costs.<sup>16</sup> Specifically, we consider the following activity indicators: sales growth, employment growth, physical capital (property, plant & equipment) growth, and R&D growth. We also consider the change in the number of business segments (industries) the goodwill-impaired firm operates in. Closing of businesses and plants and the consequent costs to employees and communities will generally be indicated by a decrease in the segment number.

In Table 9 we report investor and analyst reaction to the news of goodwill write-offs. In the examination of investor reaction (Models 1 and 2), we regress the firm's market-adjusted returns over a five-day window, event day -2 to event day +2, relative to the date of quarterly earnings and impairment announcement, on unexpected earnings (*UXE*) and the reported amount of goodwill write-offs (*WOF*). Unexpected earnings are defined as the difference between actual earnings and analyst consensus forecast immediately before the earnings announcement. *UXE*

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<sup>16</sup> Kedia and Philippon (2006) apply a similar methodology to assess social costs of earnings manipulations.

and *WOF* are deflated by the firm's market value on the date of analyst forecast. Following Petersen (2006), we run the regressions with year dummies and report the significance level of coefficient estimate obtained from firm level clustering. As expected, the regression results of Models 1 and 2 indicate a positive and statistically significant coefficient on *UXE*. The coefficient on *WOF* in Model 2 is  $-0.094$  (significant at the 0.001 level), indicating a negative investor reaction to the news of goodwill write-offs. The significance of goodwill write-offs is also indicated by the improvement in the regression  $R^2$  (from 2.35% in Model 1 to 3.95% in Model 2). In Models 3–8, we regress the revision of analyst earnings forecast made after the write-off announcement on *UXE* and *WOF*. Consistent with the negative investor reaction to goodwill write-offs, analysts also react negatively to goodwill write-offs by revising downward the earnings forecast for impairment firms. The relevance of goodwill write-offs for analyst forecast revisions is indicated by the significantly negative coefficient on *WOF* and the considerable increase in the adjusted  $R^2$  of the regression when *WOF* is included. Thus investors' losses are obviously associated with the size of goodwill write-off.

In Figure 2 we present the changes in the economic activity indicators before and after goodwill write-offs: year-to-year sales growth, employment growth, growth in property, plant, and equipment (PP&E), growth in capital expenditure, and growth in R&D expenditures. To avoid the undue influence of outliers, we focus on the median percentage growth rate across impairment firms. We further adjust the various growth rates to the median growth rates in the firm's 3-digit SIC industry in the same year. Figure 2 (lower panel) indicates that the write-off firms had above-industry growth rates in all the indicators examined up to two years before the write-offs. From then on, the growth rates collapse to below-industry median, with all the costs

and dislocations (employee layoffs, plant closing, harm to communities) involved.<sup>17</sup> The various economic indicators tracked increase one year after the write-off, but still lag both the industry and the pre-write-off level even three years after the recognition of acquisition losses.

Figure 3 depicts the mean year-to-year change in the number of business segment for the impairment firms, adjusted (lower panel) for the average change in the number of segments across all Compustat firms.<sup>18</sup> Here too, the write-off companies had above-average segment growth prior to the write-off, followed by a sharp decrease in segment growth starting two years prior to the write-off. No recovery after write-off is observed here.

## **VIII. Concluding Comments**

We hypothesize and empirically corroborate that a major root cause of goodwill write-offs is the overpriced shares of buyers at time of acquisition. Share overpricing provides managers with strong but distorted incentives to acquire companies—sometimes strategically misfit and overpaid for businesses—in order to obscure the overpricing from investors and postpone, perhaps even prevent, the day of reckoning (the overpricing reversal). We document that indeed overvalued companies tend to engage in ill-advised acquisitions, culminating in goodwill write-offs. We further show that share overpricing predicts both the occurrence of goodwill write-offs and their magnitude. Regarding the consequences of acquisitions with overpriced shares, we show that by and large they are a losing proposition for shareholders, and lead to considerable social costs.

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<sup>17</sup> The fact that the various economic activity indicators turn sharply “south” two years prior to write-off, suggests that managers delay the recognition of the loss on acquisitions. Similar conclusion about write-off delays is reported by Hayn and Hughes, 2006.

<sup>18</sup> We also perform this analysis by adjusting for the average change in the number of segments across all firms that are from the impairment firm’s three-digit SIC industry and from the same size quintile. The results of this analysis lead to identical conclusion.

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**Table 1**  
**Descriptive Statistics on Sample Firms**

<b>Panel A. Distribution statistics of key firm characteristics for all available firms</b>						
	<i>N</i>	Mean	Standard deviation	25%	Median	75%
Market value ( <i>MV</i> ) (\$ million)	62,992	2974.69	13745	61.53	265.66	1201.29
Relative P/E	62,992	16.228	115.88	-3.059	0.082	6.913
Discretionary accruals	62,992	0.013	0.364	-0.026	0.001	0.033
Price momentum	62,992	0.120	0.721	-0.214	0.009	0.276
Equity issuance	62,992	0.123	0.517	0.000	0.014	0.089
Indicator #1 of overpricing ( <i>OVE1</i> )	62,992	0.017	1.091	-0.387	-0.191	0.109
Indicator #2 of overpricing ( <i>OVE2</i> )	62,992	0.001	0.739	-0.037	0.038	0.092
Cash flows from operation ( <i>CFO</i> )	54,218	0.110	0.307	0.052	0.099	0.161

<b>Panel B. Distribution statistics of key firm characteristics for firms with acquisition activities</b>						
	<i>N</i>	Mean	Standard deviation	25%	Median	75%
Market value ( <i>MV</i> ) (\$ million)	9,725	3420.07	14058	149.62	535.00	1793.58
Relative P/E	9,725	21.447	144.69	-2.061	0.964	8.793
Discretionary accruals	9,725	0.018	0.256	-0.019	0.002	0.032
Price momentum	9,725	0.124	0.748	-0.205	0.020	0.277
Equity issuance	9,725	0.185	0.433	0.002	0.036	0.203
Indicator #1 of overpricing ( <i>OVE1</i> )	9,725	0.124	1.176	-0.348	-0.134	0.217
Indicator #2 of overpricing ( <i>OVE2</i> )	9,725	-0.015	0.692	-0.035	0.036	0.083
Cash flows from operation ( <i>CFO</i> )	8,260	0.116	0.135	0.059	0.108	0.169
Number of acquisitions ( <i>NUM</i> )	9,725	1.399	0.966	1.000	1.000	2.000
Value of acquisitions ( <i>VALUE</i> )	9,725	0.334	0.916	0.053	0.138	0.349
Percentage of stock offered ( <i>STOCK%</i> )	9,725	0.275	0.397	0.000	0.000	0.528

Variable definitions are as follows. Market value (*MV*) (in \$ millions) is the firm's capital market valuation of common equity at the fiscal year-end. Relative P/E is the difference between the firm's P/E ratio and the 4-digit SIC industry median P/E ratio for all firms in the sample firm's 4-digit SIC industry. In the computation of 4-digit industry median P/E ratio, we exclude firms with negative P/E ratios and firms with P/E ratios greater than 100. Firms with negative P/E ratios are excluded in the sample. Discretionary accruals are the difference between the firm's total accruals and "normal accruals," deflated by average total assets. Total accruals are measured as the difference between earnings before extraordinary items and cash from operation, and normal accruals are a constant proportion of the firm's current year sales, based on the ratio of the sum of total accruals to the sum of sales over the prior five years (year  $t-5$  to year  $t-1$ ) (Chan et al., 2001). Price momentum is the firm's market-adjusted returns for the 11-month period that ends one month before the firm's fiscal year-end. Equity issuance is the total amount of equities issued by the firm over the most recent three years (year  $t-2$  to year  $t$ ), deflated by lagged total assets. Indicator #1 of overpricing (*OVE1*) and indicator #2 of overpricing (*OVE2*) are, respectively, the first and second principal component of the firm's relative P/E, discretionary accruals, price momentum, and equity issuance. Cash flows from operation (*CFO*) is the amount of net cash flows from the firm's operating activities, deflated by lagged total assets. The number of acquisitions (*NUM*) is the total number of acquisition transactions undertaken by the firm in the current year. The value of acquisitions (*VALUE*) is the combined value of all acquisition transactions in the current year, deflated by the acquiring firm's market value at the beginning of the year. The percentage of stock offered (*STOCK%*) is the average percentage of the transaction value paid for by stock across all transactions in the year.

**Table 2**  
**Pearson (Upper Diagonal) and Spearman (Lower Diagonal) Correlation Coefficient Among Key Variables**  
**for Firms with Acquisition Activities (*p*-value for two-sided significance test in parenthesis)**

	<i>Log(MV)</i>	<i>OVE1</i>	<i>OVE2</i>	<i>CFO</i>	<i>NUM</i>	<i>VALUE</i>	<i>STOCK%</i>
Logarithm of market value ( <i>Log(MV)</i> )	1.000	−0.005 (0.590)	−0.052 (0.001)	0.163 (0.001)	0.075 (0.001)	−0.122 (0.001)	0.069 (0.001)
Indicator #1 of overpricing ( <i>OVE1</i> )	−0.020 (0.044)	1.000	−0.182 (0.001)	0.061 (0.001)	0.087 (0.001)	0.152 (0.001)	0.064 (0.001)
Indicator #2 of overpricing ( <i>OVE2</i> )	−0.045 (0.001)	−0.063 (0.001)	1.000	−0.072 (0.001)	−0.035 (0.001)	0.015 (0.136)	−0.018 (0.078)
Cash flows from operation ( <i>CFO</i> )	0.188 (0.001)	0.054 (0.001)	−0.216 (0.001)	1.000	−0.008 (0.477)	0.111 (0.001)	0.035 (0.001)
Number of acquisitions ( <i>NUM</i> )	0.101 (0.001)	0.096 (0.001)	−0.033 (0.001)	−0.011 (0.332)	1.000	0.126 (0.001)	0.009 (0.369)
Value of acquisitions ( <i>VALUE</i> )	−0.263 (0.001)	0.120 (0.001)	0.018 (0.068)	−0.052 (0.001)	0.267 (0.001)	1.000	0.060 (0.001)
Percentage of stock offered ( <i>STOCK%</i> )	0.040 (0.001)	0.028 (0.005)	−0.017 (0.100)	0.019 (0.090)	0.093 (0.001)	0.164 (0.001)	1.000

This table gives the Pearson (in the upper diagonal) and Spearman (in the lower diagonal) correlation coefficients among key variables for firms with acquisition activities. Variable definitions are given in the footnote to Table 1.

**Table 3**  
**The Relation between Share Overpricing and Subsequent Acquisition Activities**

<b>Panel A. Mean value (frequency) of acquisitions over the subsequent three years</b>						
<b>Main diagonal of sample firms classified by quintiles of <i>OVE1</i> and <i>OVE2</i></b>						
<b>Sample</b>	<b>Form of payment</b>	<b>Lowest-lowest</b>	<b>Low-medium</b>	<b>Medium-medium</b>	<b>Medium-high</b>	<b>Highest-highest</b>
All firms	All	0.067 (0.234)	0.082 (0.364)	0.110 (0.565)	0.133 (0.777)	0.191 (0.833)
Acquirers	All	0.316 (1.549)	0.318 (1.611)	0.324 (1.834)	0.363 (2.116)	0.574 (2.508)
All firms	Stock	0.010 (0.021)	0.017 (0.059)	0.031 (0.157)	0.047 (0.244)	0.057 (0.223)
Acquirers	Stock	0.342 (1.167)	0.366 (1.283)	0.374 (1.545)	0.395 (1.804)	0.542 (2.129)
All firms	Cash	0.015 (0.082)	0.02 (0.123)	0.023 (0.166)	0.020 (0.183)	0.023 (0.189)
Acquirers	Cash	0.238 (1.279)	0.215 (1.324)	0.174 (1.272)	0.158 (1.421)	0.183 (1.519)
1990-1995	All	0.097 (0.338)	0.101 (0.440)	0.111 (0.636)	0.193 (1.043)	0.259 (0.908)
1996-2000	All	0.061 (0.227)	0.104 (0.415)	0.122 (0.639)	0.149 (0.867)	0.241 (1.081)
2001-2005	All	0.049 (0.161)	0.044 (0.248)	0.068 (0.423)	0.069 (0.466)	0.081 (0.523)
1990-1995	Stock	0.009 (0.025)	0.031 (0.106)	0.052 (0.273)	0.092 (0.479)	0.094 (0.283)
1996-2000	Stock	0.01 (0.030)	0.016 (0.055)	0.037 (0.182)	0.046 (0.251)	0.073 (0.360)
2001-2005	Stock	0.010 (0.011)	0.005 (0.021)	0.003 (0.017)	0.011 (0.039)	0.008 (0.036)
1990-1995	Cash	0.023 (0.098)	0.031 (0.145)	0.021 (0.161)	0.019 (0.217)	0.031 (0.221)
1996-2000	Cash	0.007 (0.054)	0.019 (0.123)	0.028 (0.169)	0.029 (0.199)	0.022 (0.188)
2001-2005	Cash	0.015 (0.090)	0.011 (0.104)	0.019 (0.167)	0.012 (0.139)	0.017 (0.161)

**Table 3 (Continued)**  
**The Relation between Share Overpricing and Subsequent Acquisition Activities**

<b>Panel B. Results from logistic regression of acquisitions over the subsequent three years on indicators of overpricing and control variables</b>												
<b>Variable</b>	<b>All acquisitions</b>				<b>Stock-only acquisitions</b>				<b>Cash-only acquisitions</b>			
	<b>All years</b>	<b>1990-1995</b>	<b>1996-2000</b>	<b>2001-2005</b>	<b>All years</b>	<b>1990-1995</b>	<b>1996-2000</b>	<b>2001-2005</b>	<b>All years</b>	<b>1990-1995</b>	<b>1996-2000</b>	<b>2001-2005</b>
Intercept	-1.928	-2.107	-2.109	-2.061	-4.427	-3.979	-5.382	-5.312	-3.334	-3.813	-3.249	-3.295
[ <i>p</i> -value]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]
<i>OVE1</i>	0.252	0.194	0.229	0.224	0.513	0.403	0.423	0.399	0.158	0.121	0.117	0.149
	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]
<i>OVE2</i>	0.124	0.101	0.194	0.254	0.138	0.172	0.240	0.126	0.101	0.052	0.115	0.245
	[< 0.001]	[0.035]	[< 0.001]	[< 0.001]	[0.001]	[0.022]	[0.005]	[0.198]	[0.002]	[0.276]	[0.063]	[0.066]
<i>Log(MV)</i>	0.120	0.171	0.174	0.091	0.146	0.185	0.282	0.115	0.171	0.240	0.175	0.139
	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[0.002]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]
<i>CFO</i>	1.175	1.254	1.076	1.289	1.635	2.076	1.859	-0.027	1.362	1.108	1.102	1.795
	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[0.486]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]
<i>SP500</i>	0.436	0.455	0.633	-1.535	1.968	0.171	2.592	-2.442	0.015	0.684	0.315	-1.500
	[< 0.001]	[0.002]	[< 0.001]	[< 0.001]	[< 0.001]	[0.271]	[< 0.001]	[< 0.001]	[0.442]	[< 0.001]	[0.066]	[< 0.001]
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Pseudo <i>R</i> <sup>2</sup>	6.05%	6.40%	6.82%	4.21%	7.89%	6.91%	11.78%	4.54%	6.43%	7.73%	5.39%	4.44%
Likelihood Ratio	1135.66	602.59	646.83	386.03	747.55	364.09	576.91	177.06	897.82	495.35	374.25	307.57
	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]	[< 0.001]
<i>N</i>	40,513	13,407	13,069	14,037	40,513	13,407	13,069	14,037	40,513	13,407	13,069	14,037

**Table 3 (Continued)**  
**The Relation between Share Overpricing and Subsequent Acquisition Activities**

<b>Panel C. Results from OLS regression of total acquisition value over the subsequent three years on indicators of overpricing and control variables</b>			
<b>Variable</b>	<b>All acquisitions</b>	<b>Stock-only acquisitions</b>	<b>Cash-only acquisitions</b>
Intercept ( <i>t</i> -statistics) [ <i>p</i> -value]	0.625 (26.46) [< 0.001]	0.595 (9.59) [< 0.001]	0.556 (13.29) [< 0.001]
<i>OVE1</i>	0.034 (4.59) [< 0.001]	0.030 (1.91) [0.028]	-0.007 (-0.91) [0.181]
<i>OVE2</i>	0.043 (3.33) [< 0.001]	0.057 (2.18) [0.015]	-0.028 (-1.31) [0.101]
<i>Log(MV)</i>	-0.045 (-13.83) [< 0.001]	-0.037 (-4.30) [< 0.001]	-0.052 (-10.11) [< 0.001]
<i>CFO</i>	-0.172 (-3.12) [0.001]	-0.173 (-1.51) [0.066]	-0.165 (-2.28) [< 0.001]
<i>SP500</i>	0.123 (5.07) [< 0.001]	-0.114 (-1.46) [0.072]	0.055 (2.10) [0.018]
Industry dummies	Included	Included	Included
Adjusted <i>R</i> <sup>2</sup>	8.11%	9.66%	11.27%
<i>F</i> -statistics [ <i>p</i> -value]	18.26 [< 0.001]	5.52 [< 0.001]	5.91 [< 0.001]
<i>N</i>	10,548	1,853	4,351

In panel A, the main diagonal of sample firms classified by quintiles of *OVE1* and *OVE2* are formed by assigning firms in each year into quintile portfolios ranked by the values of *OVE1* and *OVE2*, respectively, and then retaining firms in the intersection of the two portfolios. For example, the portfolio labeled “Highest-highest” (“Lowest-lowest”) consists of firms that are in the top (bottom) quintiles ranked by both *OVE1* and *OVE2*. “All firms” include all firms with data on *OVE1* and *OVE2*, and “Acquirers” include only those with acquisition activities. “Stock” includes firms with acquisitions that are completely paid with the shares of the acquiring firm, and “Cash” includes firms with acquisitions that are fully paid with cash. The definitions of *OVE1*, *OVE2*, *MV*, and *CFO* are as given in the footnote to Table 1. The logistic regressions in panel B include the decision of acquisition (1 for acquiring firms and 0 for non-acquiring firms) as the dependent variable. The standard error estimates in the OLS regressions of panel C are obtained by following the firm-level clustering procedure of Peterson (2006).

**Table 4**  
**Future Five-Year Stock Performance (Post-Acquisition) of Firms with Acquisition Activities**

<b>Panel A. Estimate of future abnormal returns for all acquisitions, stock-only acquisitions, and cash-only acquisitions</b>				
<b>Acquisition type</b>	<b>Acquisition year</b>	<b>Estimate</b>	<b><i>t</i>-statistic</b>	<b><i>p</i>-value</b>
All acquisitions	$t + 1$	-0.0024	-2.35	0.010
Stock-only acquisitions	$t + 1$	-0.0045	-2.41	0.008
Cash-only acquisitions	$t + 1$	0.0005	0.24	0.406
All acquisitions	$t + 2$	-0.0028	-2.78	0.003
Stock-only acquisitions	$t + 2$	-0.0036	-2.76	0.003
Cash-only acquisitions	$t + 2$	-0.0028	-1.87	0.032
All acquisitions	$t + 3$	-0.0021	-1.91	0.029
Stock-only acquisitions	$t + 3$	-0.0032	-2.37	0.009
Cash-only acquisitions	$t + 3$	-0.0013	-0.79	0.214

<b>Panel B. Estimate of future abnormal returns for sub-sample partitioned by quintiles of overpricing (<i>OVE1</i> and <i>OVE2</i>)</b>					
<b>Acquisition type (year)</b>	<b>Main diagonal of sample firms classified by quintiles of <i>OVE1</i> and <i>OVE2</i></b>				
	<b>Lowest-lowest</b>	<b>Low-medium</b>	<b>Medium-medium</b>	<b>Medium-high</b>	<b>Highest-highest</b>
All acquisitions ( $t+1$ )	0.0047	0.0003	0.0001	-0.0052	-0.0103
( <i>t</i> -statistics)	(1.94)	(0.18)	(0.04)	(-2.34)	(-5.31)
[ <i>p</i> -value]	[0.027]	[0.430]	[0.484]	[0.010]	[< 0.001]
Stock-only acquisitions ( $t+1$ )	0.0027	0.0002	0.0002	-0.0054	-0.0127
	(0.70)	(0.08)	(0.07)	(-1.58)	(-4.15)
	[0.242]	[0.467]	[0.474]	[0.058]	[< 0.001]
Cash-only acquisitions ( $t+1$ )	0.0007	0.0009	-0.0003	-0.0004	-0.0047
	(0.19)	(0.59)	(-0.11)	(-0.19)	(-1.72)
	[0.424]	[0.276]	[0.455]	[0.426]	[0.044]



**Table 4 (Continued)**  
**Future Five-Year Stock Performance (Post-Acquisition) of Firms with Acquisition Activities**

<b>Panel B. Estimate of future abnormal returns for sub-sample partitioned by quintiles of overpricing (cont.)</b>					
<b>Main diagonal of sample firms classified by quintiles of <i>OVE1</i> and <i>OVE2</i></b>					
<b>Acquisition type (year)</b>	<b>Lowest- lowest</b>	<b>Low- medium</b>	<b>Medium- medium</b>	<b>Medium- high</b>	<b>Highest- highest</b>
All Acquisitions ( $t+2$ )	0.0044	0.0012	0.0011	-0.0050	-0.0081
( $t$ -statistics)	(2.39)	(0.44)	(0.63)	(-2.22)	(-4.03)
[ $p$ -value]	[0.009]	[0.329]	[0.263]	[0.014]	[< 0.001]
Stock-only acquisitions ( $t+2$ )	0.0043	0.0004	-0.0010	-0.0064	-0.0122
	(1.05)	(0.12)	(-0.46)	(-2.17)	(-3.22)
	[0.148]	[0.453]	[0.324]	[0.016]	[0.001]
Cash-only acquisitions ( $t+2$ )	0.0028	0.0026	0.0008	-0.0034	-0.0069
	(1.37)	(1.29)	[0.33]	(-0.88)	(-2.18)
	[0.087]	[0.100]	[0.370]	[0.190]	[0.015]
All Acquisitions ( $t+3$ )	0.0064	0.0017	-0.0007	-0.0039	-0.0071
	(2.31)	(0.58)	(-0.33)	(-1.52)	(-3.81)
	[0.011]	[0.282]	[0.369]	[0.066]	[< 0.001]
Stock-only acquisitions ( $t+3$ )	0.0011	0.0005	-0.0015	-0.0029	-0.0052
	(0.21)	(0.20)	(-0.61)	(-1.05)	(-1.71)
	[0.417]	[0.420]	[0.271]	[0.148]	[0.045]
Cash-only acquisitions ( $t+3$ )	0.0064	0.0004	-0.0025	0.0040	-0.0072
	(1.54)	(0.19)	(-1.14)	(-0.97)	(-2.24)
	[0.063]	[0.425]	[0.128]	[0.166]	[0.013]

Future abnormal returns reported in this table (panels A and B) are the intercept of the monthly Fama-French four-factor model that accounts for the effect of market return, firm size, book-to-market, and return momentum. This model is estimated on portfolios consisting of firms with acquisition activities one year ( $t+1$ ), two years ( $t+2$ ), and three years ( $t+3$ ) after the measurement of share over-pricing (i.e., the measurement date of *OVE1* and *OVE2*), respectively. Firms are included into the portfolio from the month after the acquisition and remain in the portfolio for 60 months (5 years). The procedure for assigning firms into the main diagonal portfolios classified by the quintiles of *OVE1* and *OVE2* is given in the footnote to Table 3.

**Table 5**  
**The Relation between Acquisition Activities and Future Five-Year Stock Performance**

Sample	Main diagonal of sample firms classified by quintiles of <i>OVE1</i> and <i>OVE2</i>				
	Lowest-lowest	Low-medium	Medium-medium	Medium-high	Highest-highest
<b>Panel A. Classification based on acquisitions in current year (year <i>t</i>)</b>					
(A1) Firms with NO acquisitions in year <i>t</i>					
Average monthly abnormal return over 5-year period	0.0068	0.0026	0.0016	-0.0039	-0.0095
( <i>t</i> -statistics)	(4.51)	(2.24)	(1.37)	(-3.22)	(-6.78)
[ <i>p</i> -value]	[< 0.001]	[0.013]	[0.086]	[0.001]	[< 0.001]
Mean <i>OVE1</i> , mean <i>OVE2</i>	-0.60, -0.26	-0.34, -0.02	-0.20, 0.03	0.03, 0.08	1.16, 0.42
[Median <i>OVE1</i> , median <i>OVE2</i> ]	[-0.56, -0.14]	[-0.34, -0.01]	[-0.19, 0.04]	[0.02, 0.08]	[0.73, 0.25]
(A2) Firms with <i>one or more</i> acquisitions in year <i>t</i>					
Average monthly abnormal return over 5-year period	0.0069	0.0021	0.0004	-0.0047	-0.0129
( <i>t</i> -statistics)	(3.56)	(0.99)	(0.27)	(-2.23)	(-5.67)
[ <i>p</i> -value]	[< 0.001]	[0.163]	[0.393]	[0.014]	[< 0.001]
Mean <i>OVE1</i> , mean <i>OVE2</i>	-0.58, -0.20	-0.35, -0.01	-0.21, 0.04	0.03, 0.08	1.24, 0.50
[Median <i>OVE1</i> , median <i>OVE2</i> ]	[-0.56, -0.13]	[-0.34, -0.01]	[-0.21, 0.04]	[0.02, 0.08]	[0.74, 0.24]
(A3) Firms with <i>two or more</i> acquisitions in year <i>t</i>					
Average monthly abnormal return over 5-year period	0.0041	0.0023	0.0007	-0.0059	-0.0144
( <i>t</i> -statistics)	(1.50)	(1.14)	(0.37)	(-1.74)	(-3.76)
[ <i>p</i> -value]	[0.068]	[0.127]	[0.378]	[0.042]	[< 0.001]
Mean <i>OVE1</i> , mean <i>OVE2</i>	-0.60, -0.16	-0.37, -0.01	-0.22, 0.04	0.02, 0.08	1.26, 0.51
[Median <i>OVE1</i> , median <i>OVE2</i> ]	[-0.61, -0.13]	[-0.35, -0.01]	[-0.22, 0.04]	[0.01, 0.07]	[0.76, 0.24]
Difference between firms in (A3) and firms in (A1)					
Difference in average monthly abnormal return	-0.0027	-0.0003	-0.0009	-0.0020	-0.0049
( <i>t</i> -statistics)	(-1.41)	(-0.46)	(-1.09)	(-1.45)	(-2.53)
[ <i>p</i> -value]	[0.081]	[0.341]	[0.139]	[0.075]	[0.006]
Difference in mean <i>OVE1</i> , difference in mean <i>OVE2</i>	0.00, 0.10	-0.03, 0.01	-0.02, 0.01	-0.01, 0.00	0.10, 0.09
[Difference in median <i>OVE1</i> , difference in median <i>OVE2</i> ]	[-0.05, 0.01]	[-0.01, 0.00]	[-0.03, 0.00]	[-0.01, -0.01]	[0.03, -0.01]

**Table 5 (Continued)**  
**The Relation between Acquisition Activities and Future Five-Year Stock Performance**

Sample	Main diagonal of sample firms classified by quintiles of <i>OVE1</i> and <i>OVE2</i>				
	Lowest-lowest	Low-medium	Medium-medium	Medium-high	Highest-highest
<b>Panel B. Classification based on acquisitions in prior years (<math>t-4</math> to <math>t-1</math>), current year (<math>t</math>), and future years (<math>t+1</math> to <math>t+3</math>)</b>					
(B1) Firms with NO acquisition in years $t-4$ , $t-3$ , $t-2$ , $t-1$ , and $t$ (5-year span)					
Average monthly abnormal return over 5-year period	0.0072	0.0029	0.0017	-0.0040	-0.0099
( $t$ -statistics)	(4.60)	(2.56)	(1.50)	(-3.24)	(-6.96)
[ $p$ -value]	[< 0.001]	[0.006]	[0.067]	[0.001]	[< 0.001]
Mean <i>OVE1</i> , mean <i>OVE2</i>	-0.61, -0.29	-0.35, -0.02	-0.20, 0.03	0.03, 0.08	1.16, 0.42
[Median <i>OVE1</i> , median <i>OVE2</i> ]	[-0.57, -0.15]	[-0.34, -0.01]	[-0.20, 0.04]	[0.02, 0.08]	[0.73, 0.26]
(B2) Firms with NO acquisition in years $t-3$ , $t-2$ , $t-1$ , $t$ , $t+1$ , $t+2$ and $t+3$ (7-year span)					
Average monthly abnormal return over 5-year period	0.0073	0.0030	0.0017	-0.0040	-0.0106
( $t$ -statistics)	(4.69)	(2.54)	(1.50)	(-3.10)	(-7.61)
[ $p$ -value]	[< 0.001]	[0.006]	[0.067]	[0.001]	[< 0.001]
Mean <i>OVE1</i> , mean <i>OVE2</i>	-0.61, -0.30	-0.35, -0.02	-0.20, 0.03	0.03, 0.08	1.15, 0.42
[Median <i>OVE1</i> , median <i>OVE2</i> ]	[-0.56, -0.15]	[-0.34, -0.01]	[-0.20, 0.04]	[0.02, 0.08]	[0.71, 0.26]
(B3) Firms with acquisitions every year in years $t-2$ , $t-1$ , $t$ , $t+1$ , and $t+2$ (5-year span)					
Average monthly abnormal return over 5-year period	0.0055	0.0039	0.0011	-0.0128	-0.0158
( $t$ -statistics)	(1.07)	(1.40)	(0.46)	(-2.21)	(-2.90)
[ $p$ -value]	[0.144]	(0.081)	[0.323]	[0.015]	[0.002]
Mean <i>OVE1</i> , mean <i>OVE2</i>	-0.52, -0.09	-0.29, -0.01	-0.20, 0.04	0.02, 0.07	0.86, 0.18
[Median <i>OVE1</i> , median <i>OVE2</i> ]	[-0.51, -0.09]	[-0.28, -0.02]	[-0.19, 0.05]	[0.04, 0.07]	[0.50, 0.17]
Difference between firms in (B3) and firms in (B1)					
Difference in average monthly abnormal return	-0.0017	-0.0010	-0.0006	-0.0088	-0.0059
( $t$ -statistics)	(-0.90)	(-0.94)	(-0.87)	(-1.96)	(-1.93)
[ $p$ -value]	[0.185]	[0.174]	[0.193]	[0.026]	[0.028]
Difference in mean <i>OVE1</i> , difference in mean <i>OVE2</i>	0.09, 0.29	0.06, 0.01	0.00, 0.01	-0.01, -0.01	-0.30, -0.24
[Difference in median <i>OVE1</i> , difference in median <i>OVE2</i> ]	[0.06, 0.06]	[0.06, -0.01]	[0.01, 0.01]	[0.02, -0.01]	[-0.23, -0.09]

Future abnormal returns reported in this table (panels A and B) are the intercept of the monthly Fama-French four-factor model that accounts for the effect of market return, firm size, book-to-market, and return momentum. This model is estimated on portfolios consisting of firms with acquisition activities in the current year (year  $t$ ), the year for which share overpricing is measured (i.e., the measurement year of *OVE1* and *OVE2*), as well as years before and after the acquisition. Firms are included into the portfolio from the month after the acquisition and remain in the portfolio for 60 months (5 years). The procedure for assigning firms into the main diagonal portfolios classified by the quintiles of *OVE1* and *OVE2* is given in the footnote to Table 3.

**Table 6**  
**The Relation between Share Overpricing/Acquisition and Goodwill Impairment Write-off in Subsequent Years**

<b>Panel A. Mean amount of goodwill impairment write-offs in 2001-2006 for portfolios formed by indicators of overpricing</b>					
<b>Sample</b>	<b>Main diagonal of sample firms classified by quintiles of <i>OVE1</i> and <i>OVE2</i></b>				
	<b>Lowest-lowest</b>	<b>Low-medium</b>	<b>Medium-medium</b>	<b>Medium-high</b>	<b>Highest-highest</b>
1) All firms with data on over-valuation errors	0.0033	0.0051	0.0060	0.0118	0.0206
2) Firms with non-zero impairment over 2001-2006	0.0284	0.0289	0.0424	0.0757	0.1012
3) Firms with acquisitions activities over 1991-2000	0.0032	0.0060	0.0111	0.0212	0.0338
4) Firms with acquisitions activities over 1991-2000 and non-zero impairment over 2001-2006	0.0225	0.0270	0.0603	0.1046	0.1367

**Table 6 (Continued)**  
**The Relation between Share Overpricing/Acquisition and Goodwill Impairment**  
**Write-off in Subsequent Years**

<b>Panel B. Regression of future goodwill impairment write-off on indicators of overpricing, acquisition means, and control variables</b>				
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<b>Sample (regression type)</b>	All firms (Tobit)	Firms with impairment (OLS)	Firms with acquisition (Tobit)	Firms with acquisition and impairment (OLS)
Intercept ( <i>t</i> -statistics) [ <i>p</i> -value]	-0.2581 (-20.34) [< 0.001]	0.0778 (7.89) [< 0.001]	-0.2146 (-12.61) [< 0.001]	0.0652 (4.39) [< 0.001]
<i>OVE1</i>	0.0080 (2.39) [0.009]	0.0309 (7.00) [< 0.001]	0.0173 (4.53) [< 0.001]	0.0264 (6.69) [< 0.001]
<i>OVE2</i>	0.0046 (0.67) [0.251]	0.0336 (4.08) [< 0.001]	0.0177 (2.31) [0.011]	0.0257 (3.45) [< 0.001]
<i>STOCK%</i>	————	————	0.0045 (0.34) [0.367]	0.0035 (0.24) [0.404]
<i>Log(MV)</i>	0.0132 (8.32) [< 0.001]	-0.0041 (-2.68) [0.004]	0.0102 (4.58) [< 0.001]	-0.0024 (-1.11) [0.134]
3-digit SIC Industry Dummies	Included	Included	Included	Included
<i>F</i> -statistics [ <i>p</i> -value]	————	16.29 [< 0.0001]	————	10.92 [< 0.0001]
Log likelihood Chi-square [ <i>p</i> -value]	-886.09 175.19 [< 0.0001]	————	-371.21 115.39 [< 0.0001]	————
Pseudo <i>R</i> <sup>2</sup> [Adjusted <i>R</i> <sup>2</sup> ]	9.00%	[15.06%]	13.45%	[19.26%]
<i>N</i>	4,849	777	2,136	417

For each firm, we measure share overpricing by the average value of the two indicators of overpricing (*OVE1* and *OVE2*) over 1990-2000. Goodwill write-offs are based on the total amount of write-offs during 2001-2006. The procedure for assigning firms into the main diagonal portfolios classified by the quintiles of average *OVE1* and *OVE2* is similar to the one given in the footnote to Table 3, with the definitions of *OVE1* and *OVE2* for a firm-year given in the footnote to Table 1. *STOCK%* is the average percentage of acquisition paid with stock across all acquisitions over 1990-2000. The sample for “All firms” in Model 1 includes all available firms with data on *OVE1* and *OVE2*. The sample for “Firms with impairment” in Model 2 includes firms that report goodwill impairment during 2001-2006 and have data on *OVE1* and *OVE2* over prior years. The sample for “Firms with acquisition” includes firms with acquisitions over 1990-2000 and with data on *OVE1* and *OVE2*. The sample for “Firms with acquisition and impairment” in Model 4 includes all firms in the regressions of Model 3 and Model 4 (i.e., firms that have acquisitions over 1990-2000 and report impairment over 2001-2006).



**Table 7**  
**The Usefulness of Share Overpricing/Acquisition in Predicting**  
**Goodwill Impairment in Future Years**

<b>Panel A. Logistic regression predicting impairment vs. no-impairment</b>				
<b>Independent variable</b>	<b>Coefficient estimate</b>	<b>z-statistics</b>	<b>p-value</b>	<b>Effect on probability</b>
Intercept	-0.769	-11.58	< 0.001	————
<i>OVE1</i>	0.778	8.81	< 0.001	19.33%
<i>OVE2</i>	0.587	3.10	0.001	14.97%
<i>STOCK%</i>	0.013	11.47	< 0.001	0.32%
<i>Log(NUM)</i>	0.205	2.08	0.019	5.12%
<i>VALUE</i>	-0.141	-1.92	0.028	-3.53%
<i>FOREIGN%</i>	0.167	1.58	0.058	4.18%
<i>GOODWILL</i>	1.642	9.20	< 0.001	41.01%
<i>Log(MV)</i>	-0.032	-1.61	0.054	-0.80%
3-digit SIC Industry Dummies	Included			
Model $\chi^2$ (Model p-value)		552.36 (< 0.001)		
Pseudo $R^2$		11.14%		
% correctly classified (% no-impairment in sample)		66.11% (55.79%)		
Actual impairment (actual no-impairment) predicted to be true		52.16% (77.17%)		
Type I (type II) error		22.83% (47.84%)		
<b>Panel B. Tobit regression predicting the amount of impairment vs. no-impairment</b>				
<b>Independent variable</b>	<b>Coefficient estimate</b>	<b>t-statistics</b>	<b>p-value</b>	<b>Effect on probability</b>
Intercept	-0.118	-5.49	< 0.001	————
<i>OVE1</i>	0.119	16.81	< 0.001	16.03%
<i>OVE2</i>	0.051	3.85	< 0.001	6.82%
<i>STOCK%</i>	0.001	8.84	< 0.001	0.18%
<i>Log(NUM)</i>	0.029	2.02	0.022	3.87%
<i>VALUE</i>	-0.017	-1.85	0.032	-2.35%
<i>FOREIGN%</i>	0.036	2.29	0.011	4.91%
<i>GOODWILL</i>	0.046	9.92	< 0.001	6.19%
<i>Log(MV)</i>	-0.007	-2.52	0.006	-0.99%
3-digit SIC Industry Dummies	Included			
Model $\chi^2$ (Model p-value)		774.16 (< 0.001)		
Pseudo $R^2$		25.08%		

The definitions of *OVE1*, *OVE2*, *STOCK%*, *NUM*, *VALUE*, and *MV* are as given in the footnote to Table 1. *FOREIGN%* is the percentage of foreign acquisitions made by the firm in a given year and ranges between 0 and 100%. *GOODWILL* is the amount of goodwill relative to the firm's total assets. The dependent variable in the logistic regression of Panel A takes the value of 1 for firms reporting impairment in the subsequent year and 0 otherwise. The dependent variable in the tobit regression of Panel B takes the value of the actual amount of goodwill impairment relative to the firm's total assets for firms with goodwill impairment in subsequent years and 0 for no-impairment firms. The sample for both regressions consists of firms with acquisition activities in the year of measuring share overpricing.

**Table 8**  
**Mean and Median Firm Performance around Acquisition and Goodwill Write-off**

Variable	Years relative to acquisition			Years relative to impairment					From acquisition through write-off
	-1	0	+1	-1	0	+1	+2	+3	
<b>Panel A. Firms that survived up to three years after impairment (404 firms)</b>									
Excess stock return	0.0400	0.1211	-0.1197	0.0294	-0.2590	-0.0260	0.0772	-0.0388	-0.3164
	-0.1249	0.0608	-0.1575	-0.0280	-0.3745	-0.0723	-0.0147	-0.0710	-0.4275
Return on assets	-0.0797	-0.0642	-0.0808	-0.0713	-0.1214	-0.1259	-0.0967	-0.1021	
	0.0041	0.0003	-0.0020	-0.0077	-0.0304	-0.0220	-0.0229	-0.0168	—
<b>Panel B. Firms that survived up to only two years after impairment (18 firms)</b>									
Excess stock return	0.4634	2.3665	-0.4839	-0.4412	0.1979	0.4263	-0.3107		-1.0457
	0.2362	-0.1932	-0.5010	-0.5808	0.0151	0.1132	-0.4215	—	-0.8942
Return on assets	-0.0401	-0.0636	-0.1348	-0.0555	-0.1352	-0.0928	-0.1336		
	0.0102	-0.0113	-0.0595	-0.0458	-0.0881	-0.0472	-0.0813	—	—
<b>Panel C. Firms that survived up to only one year after impairment (37 firms)</b>									
Excess stock return	-0.0911	-0.0666	-0.0363	-0.0317	-0.1411	-0.1293			-1.8873
	-0.0741	0.0729	-0.1475	-0.0095	-0.1319	-0.1227	—	—	-2.1263
Return on assets	-0.1047	-0.1000	-0.1829	-0.1809	-0.4252	-0.4638			
	-0.0033	-0.0173	-0.0352	-0.0600	-0.1786	-0.1613	—	—	—
<b>Panel D. Firms that did not survive after impairment (45 firms)</b>									
Excess stock return	-0.1245	-0.0327	-0.4565	-0.3764	-0.3651				-1.0049
	-0.1178	-0.1722	-0.5325	-0.4857	-0.4430	—	—	—	-0.9954
Return on assets	-2.0452	-0.1493	-0.1664	-0.1850	-0.2789				
	-0.0062	-0.0298	-0.0626	-0.0871	-0.1806	—	—	—	—

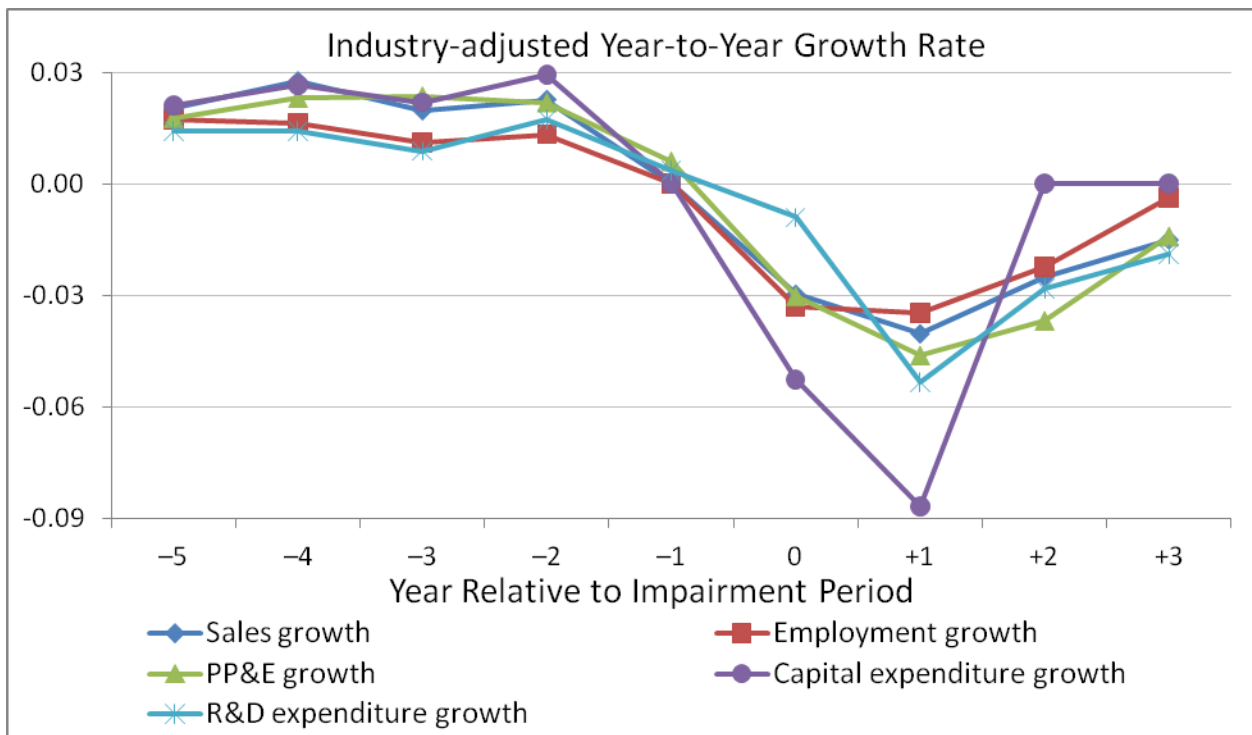
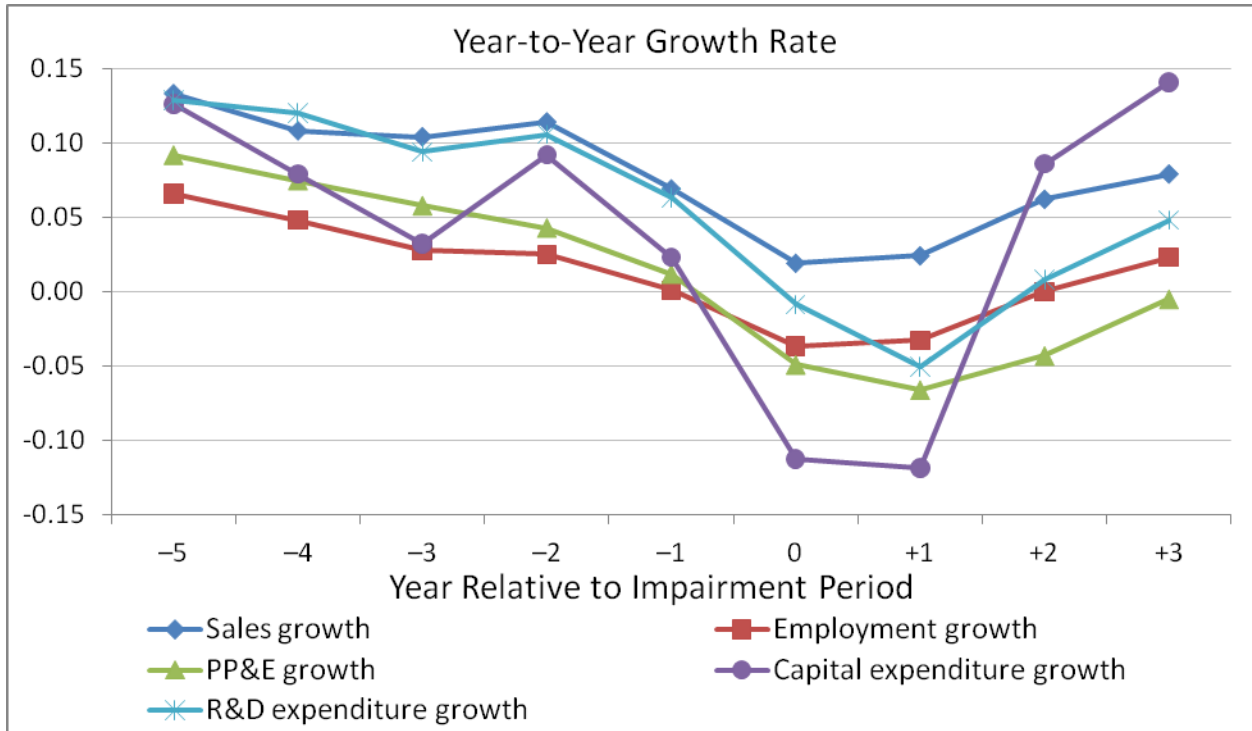
The first (second) row for each variable reports the mean (median) value of that variable. Sample firms included in this table have acquisition activities identified in the SDC database and report goodwill impairment over 2001-2006. The sample in panel A consists of 404 firms that report goodwill impairment over 2001-2003 and have the required Compustat data available for up to three years after the impairment. The sample in panel B consists of 18 firms that report goodwill impairment over 2001-2003 but no longer have the required Compustat data available in two years after the impairment. The sample in panel C consists of 37 firms that report goodwill impairment over 2001-2004 but no longer have the required Compustat data available in one year after the impairment. The sample in panel D consists of 45 firms that report goodwill impairment over 2001-2005 but no longer have the required Compustat data available after the impairment year.

**Table 9**  
**Summary Statistics from the Regression of Market Reaction to Goodwill Write-offs in Quarterly Earnings Announcement on Unexpected Earnings and the Reported Amount of Goodwill Write-off**

Variable	Stock price reaction to quarterly earnings news		Analyst forecast revision					
	Model 1	Model 2	One-quarter ahead		Two-quarter ahead		Three-quarter ahead	
			Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	-0.006	0.005	-0.004	-0.002	-0.004	-0.003	-0.003	-0.002
( <i>t</i> -statistics)	(-0.64)	(0.60)	(-3.74)	(-2.58)	(-4.09)	(-2.85)	(-2.94)	(-1.76)
[ <i>p</i> -value]	[0.260]	[0.275]	[< 0.001]	[0.005]	[< 0.001]	[0.003]	[0.002]	[0.040]
<i>UXE</i>	0.214	0.170	0.036	0.028	0.049	0.042	0.048	0.041
	(3.04)	(2.34)	(3.70)	(2.79)	(3.60)	(3.00)	(2.92)	(2.52)
	[0.001]	[0.009]	[< 0.001]	[0.002]	[< 0.001]	[0.001]	[0.002]	[0.006]
<i>WOF</i>	————	-0.094	————	-0.008	————	-0.007	————	-0.006
		(-3.15)		(-3.14)		(-2.63)		(-2.39)
		[0.001]		[0.001]		[0.004]		[0.009]
<i>YR02</i>	-0.009	-0.007	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(-0.85)	(-0.61)	(-1.08)	(-0.89)	(-0.81)	(-0.62)	(-0.54)	(-0.39)
	[0.197]	[0.273]	[0.141]	[0.187]	[0.208]	[0.266]	[0.294]	[0.350]
<i>YR03</i>	-0.004	-0.008	0.001	0.001	0.002	0.001	0.001	0.001
	(-0.34)	(-0.79)	(0.83)	(0.15)	(1.88)	(1.24)	(1.01)	(0.47)
	[0.366]	[0.215]	[0.203]	[0.441]	[0.030]	[0.109]	[0.155]	[0.319]
<i>YR04</i>	-0.005	-0.011	0.002	0.001	0.002	0.001	0.001	0.001
	(-0.48)	(-1.08)	(1.47)	(0.72)	(1.86)	(1.23)	(1.18)	(0.66)
	[0.317]	[0.140]	[0.072]	[0.237]	[0.032]	[0.109]	[0.119]	[0.255]
<i>YR05</i>	-0.006	-0.009	0.002	0.001	0.003	0.002	0.002	0.001
	(-0.57)	(-0.99)	(1.73)	(1.21)	(2.42)	(1.86)	(1.77)	(1.27)
	[0.283]	[0.161]	[0.042]	[0.113]	[0.008]	[0.031]	[0.039]	[0.102]
Adj. <i>R</i> <sup>2</sup>	2.35%	3.95%	5.92%	8.55%	9.36%	11.68%	7.72%	9.40%
<i>F</i> -statistics	6.22	8.43	14.97	18.30	20.99	22.35	16.46	16.98
[ <i>p</i> -value]	[< 0.0001]	[< 0.0001]	[< 0.0001]	[< 0.0001]	[< 0.0001]	[< 0.0001]	[< 0.0001]	[< 0.0001]
<i>N</i>	1,085	1,085	1,112	1,112	969	969	925	925

In Models 1 and 2, we regress the firm's market-adjusted returns over a five-day window, event day  $-2$  to event day  $+2$ , defined in relation to the date of quarterly earnings and impairment announcement, on unexpected earnings (*UXE*) and the reported absolute amount of goodwill write-offs (*WOF*). Unexpected earnings are defined as the difference between actual earnings and analyst consensus forecast immediately before the earnings announcement. *UXE* and *WOF* are deflated by the firm's market value on the date of analyst forecast. In Models 3–8, we regress the revision of analyst earnings forecast made after the write-off announcement on *UXE* and *WOF*. Following Petersen (2006), we run all regressions with year dummies included and report the significance level of coefficient estimate obtained from firm level clustering.

**Figure 2**  
**Changes in Economic Activities Around Goodwill Impairment Write-off**



**Figure 3**  
**Changes in Business Segment Around Goodwill Impairment Write-off**

