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The effect of target-firm accounting quality on valuation in acquisitions

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Abstract We examine whether acquisitions are more profitable for acquirers when the firms they target disclose higher-quality accounting information. If accounting information reduces uncertainty in the value of the target firm by facilitating a more precise valuation, we predict that managers of the acquiring firm can bid more effectively and pay less to acquire a target firm that has high-quality accounting information. Using a large sample of acquisitions of public firms from 1990 to 2010, we find evidence consistent with our prediction. Specifically, when target firms have higher-quality accounting information, acquirer returns around the acquisition announcement are higher and target returns are lower—consistent with acquirers capturing a greater portion of acquisition gains by paying less for target firms. These findings, which are robust to a variety of controls and alternative measures of uncertainty and accounting quality, suggest that higher-quality accounting information leads to better bidding decisions in acquisitions.

Keywords Acquisitions · Accounting quality · Valuation

JEL Classification G34 · M41

This study was previously titled "The role of target firms' accounting information in acquisitions".

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1 Introduction

We examine whether acquisitions are more profitable for acquirers when the firms they target disclose higher-quality accounting information.[1] We posit that, when the target firm has higher-quality accounting information, the acquirer can value the target firm with greater precision, bid more effectively, and ultimately pay less for the acquisition.

In an acquisition, the acquirer pays consideration in return for the value of the target plus expected synergies. The acquirer should pay no more than the combined value of the target and synergies, while the target should accept no less than its own value. The amount of consideration to be paid (i.e., the deal price) is determined by negotiations between the two parties. In a simple acquisition model (Hansen 1987), the target sets a reservation price and accepts any bid above that price. Although the market price of a public target is known to potential bidders, there is uncertainty and disagreement as to the intrinsic value of the target firm's net assets. In this setting, as the quality of the target's accounting information increases, the precision in the acquirer's estimate of the target's value increases and the acquirer can bid closer to the target's reservation price. All else equal, better accounting information leads to lower deal prices (relative to the target's reservation price) and thus more profitable acquisitions.

We expect target value uncertainty is negatively related to acquirer stock returns at the acquisition announcement. If uncertainty is greater, bids will be more varied and accepted (winning) bids will be higher. The acquirer's stock return will reflect the higher acquisition price. However, if a target firm discloses accounting information that facilitates a more precise estimate of its value, the acquirer stands to bid more effectively and profit more from the acquisition. Thus we predict acquirer returns are higher for acquisitions of targets with higher accounting quality.

We also examine target stock returns to provide additional evidence on the role of accounting information in facilitating value estimates. Because a higher payment by the acquirer benefits shareholders of the target firm, we predict that target value uncertainty is positively related to target stock returns at the acquisition announcement. If accounting information reduces uncertainty about the target's value, we predict that acquisition-announcement returns are lower for targets with higher accounting quality.

We test our predictions using a sample of 2,427 acquisitions of public firms between 1990 and 2010. Consistent with prior research, we measure accounting quality as the extent a firm's accounting information reduces inherent uncertainty about future cash flows. Although the valuation of the target firm is presumed to be based on assessments of future cash flows, accounting information helps predict future cash flows (Dechow 1994; Barth et al. 2001). We find that acquiring firms experience lower stock returns at the acquisition announcement when the value of the target firm is more uncertain. However, we also find that, controlling for

[1] Although accounting researchers have applied accounting quality to various contexts, we define accounting quality as decision usefulness in the context of equity valuation (Ball and Brown 1968; Beaver 1968; Francis et al. 2008; Dechow et al. 2009).

uncertainty, acquirer returns are higher when the target firm has higher accounting quality—as proxied by the extent accruals relate to past, present, and future cash flows (Dechow and Dichev 2002) or the extent accruals and cash flows predict future cash flows. Our tests also include controls for acquirer characteristics, such as uncertainty and accounting quality, and characteristics of both the target and the acquisition deal. The findings suggest that accounting information helps mitigate information asymmetry between acquirers and target firms.

Target-firm shareholders, however, experience lower returns upon announcement of an acquisition when the target's accounting quality is high. Thus acquirer gains from higher target accounting quality come at the expense of target firm shareholders—target firm shareholders extract less from acquirers who are better informed as a result of higher-quality accounting information. Whereas Francis et al. (2005) and Lambert et al. (2008) show that firms can benefit from higher-quality disclosures (i.e., realize a lower cost of capital), we find that in the specific case of acquisitions, target firms fare worse when their accounting disclosures are of higher quality.

Our results also speak to the value of accounting information in economic decisions generally. A contrary view regarding accounting information is that it is backward looking and arbitrary and therefore not useful in economic decisions such as acquisitions (e.g., Bruner 2004, pp. 248 and 255). In addition, target value uncertainty may arise from general information uncertainty rather than information asymmetry, where the target has private information (e.g., accounting information) it can disclose (e.g., Jiang et al. 2005). Furthermore, uncertainty may be addressed through other means, such as through the use of stock payments (Officer et al. 2009), negotiations (Raman et al. 2013), or earnouts, or accounting information may be supplanted by various other sources of information used in the due diligence process. Despite these possibilities, our results indicate an important role for accounting information in acquisitions—higher quality accounting information allows an acquirer to more precisely value the target firm and determine the bid price.[2]

Our findings also suggest that variation in target value uncertainty and accounting quality explain at least some of the variation in value loss for acquirers. Thus increases in target value uncertainty and decreases in accounting quality during the 1998–2001 merger wave could explain the large value losses documented in prior research (Moeller et al. 2005).

Section 2 presents our hypotheses the basis for our predictions, and our contribution to existing literature. Section 3 presents our research design. Section 4 describes our sample, Sect. 5 discusses our results, and Sect. 6 concludes.

[2] Prior research has examined the use of accounting information by investors (Cohen 2003; Francis et al. 2005; Core et al. 2008) and by lenders (Biddle and Hilary 2006), as well as a firm's use of its own accounting information in compensation (Peng 2007) and capital investment decisions (Biddle et al. 2008; McNichols and Stubben 2008). Our study, in contrast, focuses on one firm's use of another firm's accounting information when making corporate acquisition decisions.

2 Hypotheses and basis for predictions

2.1 The acquisition setting

Broadly speaking, we examine the role of accounting information in business valuation. We study acquisitions because valuing the target firm is an important part of an acquisition, especially given the economic magnitude of many deals and the information asymmetry often involved.[3]

We assume that acquirers choose target firms for strategic business reasons, rather than the quality of targets' accounting information.[4] Furthermore, firms vary in the quality of accounting information. The financial statements of some target firms are more useful than others for the purpose of valuation. We attempt to capture this usefulness with our measures of accounting quality.

When a firm realizes it is a potential target in an imminent acquisition, it may face incentives to manipulate its reported financial information. However, our focus is the more enduring accounting quality that characterizes the target firm. Although accounting information could be affected by discretionary choices in anticipation of an acquisition, Erickson and Wang (1999) fail to find significant evidence of discretionary reporting behavior by target firms and conclude that targets do not have sufficient time to manipulate earnings before the acquisition. For this strategy to work, the target would need ample time to anticipate the acquisition, and the acquirer would have to be fooled by the earnings management (while at the same time presumably understanding the target's reporting incentives).[5]

The acquirer will identify a target with a given intrinsic value and level of accounting quality. If the deal is completed, the acquirer will gain the intrinsic value of the target's net assets plus any synergies in exchange for the deal price, which is negotiated between the acquirer and the target firm. Thus the change in the acquirer's market value can be expressed as follows:

$$\Delta MVA = IVT + Synergies - Price + Signal \tag{1}$$

where ΔMVA is the change in the acquirer's market value of equity around the acquisition; *IVT* is the intrinsic value of the target (not necessarily the market value); *Synergies* represents the expected synergies from the acquisition; *Price* is the acquisition price; and *Signal* represents any signal the acquisition sends to the market. Although intrinsic value and synergies vary across targets and acquirer/target pairs, the target's intrinsic value and synergies are fixed for a given acquirer

[3] See Palepu and Healy (2008, pp. 11–7 to 11–10) for discussion of the importance of valuing target firms to avoid overpayment.

[4] In addition to the intuitive assessment that target accounting quality would at best be a secondary concern to acquirers when selecting among potential targets, we also added our measures of accounting quality to the acquisition prediction model of Palepu (1986). Untabulated results confirm that target accounting quality does not significantly explain the likelihood of a particular firm being acquired.

[5] Consistent with our focus on firms' inherent accounting quality, we employ measures of accounting quality that should be fairly immune to any earnings management that occurs just before the acquisition announcement—firm-specific accounting quality measured over several years and an industry measure of accounting quality, each of which is measured prior to the acquisition announcement date.

and target firm. Thus variation in the return to the acquirer is determined by the acquisition price, after controlling for the signal to the market. This acquisition price in turn depends on the bargaining position of the acquirer, which is affected in part by the acquirer's ability to accurately value the target firm.

2.2 The acquisition model

The acquisition process can be modeled as a two-agent bargaining game under imperfect information (Hansen 1987). In such a transaction, the acquirer will decide that an optimal bargaining strategy is to make a first-and-final offer (Samuelson 1984). Consider a potential target firm that has a standalone value, *IVT*. The combination of the two firms will produce a certain amount of synergies. The acquirer will pay the acquisition price and receive *IVT* + *Synergies* in return.

A zone of potential agreement arises from synergies: the value of the target to the acquirer, including synergies, exceeds the standalone value of the target. The acquirer will pay up to the combined value of the target and synergies, while the target will accept bids greater than its own value. How the synergistic gains are divided between the two parties depends on the negotiation of the deal price. Assume only the target firm knows *IVT* with certainty, but the target does not know the expected synergies with certainty. When setting a reservation price, the target considers the following trade-off: by requesting a high reservation price, it attempts to extract more merger rents but risks not selling if the synergies are relatively low. When the acquirer bids below the target's reservation price, no acquisition occurs. Only bids above the target's reservation price are accepted. If the acquirer knows the target's value and reservation price with certainty, it will bid just enough to meet the reservation price. If target uncertainty is greater, bids will be more varied and the accepted (winning) bids will be higher. Thus the acquirer will pay more for a target under uncertainty.

Moving from this general setting to more specific settings, acquiring firms may actually overpay for acquisitions (i.e., the deal price exceeds *IVT* + *Synergies*). Although the optimal response of potential acquirers to target firm uncertainty is to discount bids, empirical evidence suggests they do not always do this (e.g., the negative stock returns to acquiring firms documented by Andrade et al. 2001; Moeller et al. 2005, and others). Prior research has explored several theories explaining acquirer overpayment. Two prominent theories are principal-agent conflicts and the winner's curse (Black 1989; Morck et al. 1990). Although we do not attempt to distinguish these explanations empirically, in each case the prediction is the same. That is, overpayment increases with uncertainty in the value of the target.

2.2.1 Principal-agent conflicts

Managers' incentives can motivate them to make decisions that do not maximize shareholder wealth (Jensen and Meckling 1976). In particular, managers can have incentives to grow their firm beyond the optimal size. As Jensen (1986) notes, growth increases managers' power by increasing the resources they control.

Incentives for growth also stem from the link between growth and managers' compensation (Murphy 1985) and managers' desire for greater prestige and visibility (Black 1989).

Managers also have incentives to diversify their firms. Incentives behind diversification include risk aversion by managers whose human or financial capital is concentrated in a single firm (Black 1989). Furthermore, Grinblatt and Titman (1997, p. 703) posit that managers of firms in declining industries may attempt to protect their jobs by acquiring firms in industries with better long-term prospects.

Managers with such incentives may be willing to complete an acquisition for the private benefits of growth or diversification even if the acquisition is not expected to increase shareholder wealth. Morck et al. (1990) find evidence suggesting managerial objectives do in fact tend to drive acquisitions that reduce bidding firms' values. Shareholders can attempt to limit divergences from shareholder wealth maximization by establishing appropriate incentives for managers and by monitoring managers' activities (Jensen and Meckling 1976). A primary monitoring mechanism employed by shareholders is the board of directors, which represents shareholders by approving significant management activities, including acquisitions. However, a board's ability to effectively monitor management depends on the information available to it. If accounting information reduces uncertainty in the value of the target firm, it is more difficult for management of the acquiring firm to justify a high potential bid to the board by understating risks or overstating potential gains.

Prior research documents the importance of financial accounting information to shareholders and boards in monitoring managers (see Watts and Zimmerman 1986; Bushman and Smith 2001). In the spirit of Holmstrom (1979) and Kanodia and Lee (1998), these studies typically examine the role of a firm's own ex post accounting information in facilitating the monitoring of prior managerial actions (e.g., Hope and Thomas 2008). In contrast, we consider the ex ante use of another firm's accounting information by the acquirer's board to evaluate potential acquisition bids.[6]

2.2.2 *The winner's curse*

The winner's curse is an empirical possibility in competitive bidding situations, where a successful bidder pays too much for an asset with an uncertain value. As explained by Bazerman and Samuelson (1983), the rationale for this overbidding is that (1) while the average bidder may accurately estimate the value of the commodity up for sale in an auction, some bidders will underestimate this value and others will overestimate it, and (2) the bidder who most greatly overestimates the value of the commodity will typically win the auction. Samuelson and Bazerman (1985) extend the analysis of the winner's curse to bilateral negotiations. In either

[6] Hartzell et al. (2004) find evidence suggesting that CEOs of target firms benefit at the expense of shareholders. In this study, however, we focus on the incentives influencing managers of the acquiring firm.

setting, the value of the asset purchased is less than the winning bidder's estimate, possibly so much that the winning bidder loses money on the purchase.[7]

In theory, bidders should take into account their competitors' bidding behavior and discount bids in response to greater uncertainty to counteract the greater likelihood of overbidding—the winner's curse does not occur if all bidders are rational (Cox and Isaac 1984). However, Thaler (1988) describes the difficulty of acting rationally in auctions. It is not enough to determine the expected value of the asset conditional on information available at the time of bidding; the bidder must also determine the expected value conditional on winning the auction, taking into account the fact that winning the auction likely means it overestimated the value of the asset relative to other bidders. In addition, bidders must determine the appropriate magnitude of adjustment to their bid that is necessary to compensate for the presence of other bidders. In addition, as Black (1989) notes, even if some managers do take into account the winner's curse, it is likely that others do not, and these others will be more likely to have a winning bid.[8] These issues are particularly relevant in the context of acquisitions, which are characterized by uncertainty and information asymmetry.

Whether potential acquirers bid appropriately is an empirical question, and surveys of behavioral finance (Thaler 1988; Barberis and Thaler 2003; Baker et al. 2007) conclude that the winner's curse holds in the corporate takeover market.[9] One explanation for this is the hubris hypothesis posed by Roll (1986) in which overconfident managers fall victim to the winner's curse and overbid when acquiring other corporations. Bazerman and Samuelson (1983) discuss two factors that affect the incidence and magnitude of the winner's curse: the degree of uncertainty concerning the value of the item up for bid and the number of competing bidders. The winner's curse occurs when winning bidders fail to adapt their strategies to these factors.

One test of the winner's curse, which is a basis for the predictions in this study, would relate acquirer returns to uncertainty in the value of the target firm. As uncertainty in the target's value increases, so does the variance of bids, leading to higher winning bids. As Bazerman and Samuelson (1983) explain, failure to discount bids (or an insufficient discount) in response to greater uncertainty will increase the likelihood and magnitude of the winner's curse.

[7] Boone and Mulherin (2008) find that 53 % of acquisitions in their sample were negotiations and the other 47 % were auctions. Although the mechanics of these two cases differ, the general predictions are the same: overpayment by the acquirer leads to less profitable acquisitions for its shareholders. Besides, as Black (1989) notes, an auction need not be explicit; other potential bidders could bid if the first bidder's offer is too low.

[8] Experimental evidence suggests acquirers do not bid appropriately, even when they are given significant learning opportunities (Thaler 1988).

[9] In contrast, Boone and Mulherin (2008), using a sample of 308 acquisitions, fails to find evidence for the winner's curse. Their measure of target firm uncertainty is the fraction of the target firm's assets that are not capital assets. Our study, in contrast, uses a larger sample, incorporates more comprehensive measures of target firm value uncertainty, and incorporates the effect of accounting quality on value uncertainty.

2.3 Hypotheses

As explained in Sect. 2.2, we expect the acquirer can successfully bid less for a given target when it can more precisely value the target firm. The lower payment translates to increased returns to shareholders of the acquirer and decreased returns to shareholders of the target. In contrast, when the value of the target is more uncertain, completed acquisitions are likely to be characterized by higher payments and lower returns to the acquirer.

If valuation uncertainty leads to less profitable acquisitions, then to the extent a firm's accounting information aids in valuation we expect it can lead to more profitable acquisitions for acquirers. Prior research has demonstrated that accounting information does aid in explaining equity prices (e.g., Ball and Brown 1968; Beaver 1968; Dechow 1994, and Francis et al. 2005). However, the quality of accounting information varies across firms. When target firms have high-quality accounting information, we predict that the acquirer can better value the target and therefore pays relatively less for the acquisition. We test the following hypothesis:

H1 Acquisitions are more profitable for acquirers when target accounting quality is higher.

Following Roll (1986), we next examine target stock returns to provide additional evidence on the role of accounting information in facilitating value estimates. Because a higher payment by the acquirer benefits shareholders of the target firm, target value uncertainty is positively related to target stock returns at the acquisition announcement. Accordingly, we predict that acquisition-announcement returns are lower for targets with higher accounting quality.[10]

H2 Acquisitions are less profitable for targets when target accounting quality is higher.

2.4 Related research

2.4.1 Target value uncertainty

Much of the literature on uncertainty and information asymmetry focuses on uncertainty relating to the acquirer (e.g., Moeller et al. 2007; Erickson et al. 2012). Our study measures and addresses the general uncertainty of and more importantly the accounting quality of the target firm.

[10] Alternatively, one could argue that targets' returns would be higher when targets' accounting quality is higher if better accounting information helps acquirers to identify combinations with greater synergies. The value of these synergistic gains can be split between the acquirer and the target (as determined in the negotiation or bidding process), allowing both the acquirer and the target to benefit from the target's high-quality accounting information. However, our empirical evidence (i.e., the negative relation between accounting quality and target stock returns at the acquisition announcement) does not support this explanation. Furthermore, as noted in footnote 4, an untabulated analysis reveals that target-firm accounting quality is not a statistically significant predictor of takeover targets when added to the prediction model in Palepu (1986).

Two notable studies on target firm uncertainty are by Officer et al. (2009) and Dionne et al. (2010). Officer et al. (2009) find that acquirer returns are significantly higher in stock acquisitions of hard-to-value targets, suggesting that the use of stock as payment mitigates information asymmetry about the target. However, this study focuses primarily on privately held targets, and results from its analysis of public targets are not always consistent with predictions and are sensitive to the model. In the setting most comparable to ours (where target uncertainty is measured by return volatility and method of payment is an indicator variable as is customary in the literature), their results are contrary to their predictions (Officer et al. 2009, Table 7, column 2, p. 486). Dionne et al. (2010) find that blockholders pay less for acquisitions, consistent with less information asymmetry producing higher returns.

We follow along the lines of Dionne et al. (2010), who suggest that uncertainty about the target (i.e., information asymmetry) affects acquisition profitability. However, by specifically measuring and studying accounting quality, we attempt to test more specifically whether a firm's financial reporting is one mechanism that has a meaningful and measurable effect on acquisition results. In other words, we build on research that documents an effect of uncertainty in general, and we want to test—controlling for uncertainty—whether accounting quality has an incremental effect.

2.4.2 Target accounting quality

Three concurrent studies address the role of the target firm's accounting quality in acquisitions. In this section, we discuss these studies and how ours contributes to this new stream of research.

Raman et al. (2013) examine the effect of a target's accounting quality on takeover decisions. They find that, when the target firm's accounting quality is poor, acquirers (1) prefer negotiated acquisitions, (2) are more likely to offer shares than cash, and (3) pay higher premiums. Raman et al. (2013) do not directly examine the profitability of the acquisition to the acquirer, which is the central focus of our study. Additionally, as we discuss in footnote 15, examining acquirer returns rather than acquisition premiums has the advantage of including expected synergies and excluding valuation discounts.

Furthermore, although some acquirers would prefer and have the ability to enter into negotiations as a response to target uncertainty (as Raman et al. 2013 find), not all do.[11] Thus, although negotiation is a viable mechanism to reduce uncertainty in some acquisitions, it is not used in others. We examine the effect of accounting quality on acquirer returns incremental to any benefits obtained through negotiation (if it is used), because as Raman et al. (2013) note, negotiations may not fully resolve information asymmetries between acquirer and target.

Marquardt and Zur (2010) also examine the role of target firms' accounting quality on the acquisition process. They predict and find that target accounting quality is positively associated with (1) the likelihood the deal will be structured as a

[11] In Raman et al. (2013), the pseudo R-squared of the model explaining negotiated versus nonnegotiated deals with target accounting quality is 0.06, which suggests a substantial number of deals are likely negotiated even though target accounting quality is high, and deals are not negotiated even though target accounting quality is low.

negotiation (similar to Raman et al. 2013), (2) the likelihood the deal will be completed, and (3) how quickly the deal is completed. Marquardt and Zur (2010) do not address the profitability of acquisitions to acquirers.

Martin and Shalev (2009) examine target firm information and stock returns at the acquisition announcement. They study the role of information in pairing acquirers to targets (i.e., maximizing synergies). In contrast, we view the matching process as being determined primarily by factors other than the quality of the target firm's accounting information. Instead, in our study the acquirer relies on the target's accounting information to estimate its value and determine a bid price. In other words, instead of focusing on the total value gain in an acquisition, we examine how that gain is split between the acquirer and target. Furthermore, whereas Martin and Shalev (2009) use stock return nonsynchronicity to measure the information environment of the target firm, we focus on the target's financial reporting and attempt to measure its quality directly.

3 Research design

3.1 Measures of uncertainty

We examine the effect of uncertainty on acquirer and target returns directly, and we control for uncertainty when examining the effect of accounting quality on acquirer and target returns when testing H1 and H2. In the latter case, we control for inherent uncertainty and then estimate the incremental effect of accounting quality. Without the control for target uncertainty, inferences on accounting quality could be affected by an omitted variable bias that results from uncertainty's high correlation with both returns and accounting quality. With the control for target uncertainty included, we examine the effect of accounting quality conditional on uncertainty. That is, the analysis addresses this question: among targets with a particular level of uncertainty, do acquisitions of those with higher accounting quality fare better?[12]

We use three measures for uncertainty of the target firm's value. The primary measure is based on the volatility of the target firm's monthly stock returns, measured over the most recent fiscal year ending before the acquisition announcement (*UNC_RET*). However, to provide confidence in our results and to address potential concerns about circularity (i.e., that a firm's accounting quality affects its return volatility), we examine two additional measures of target uncertainty. *UNC_CFO* is the volatility of annual cash flows from operations divided by total

[12] The distinction between accounting quality and general uncertainty can be illustrated as follows. Take a firm with a variable, uncertain stream of cash flows that reflects the general uncertainty of the environment in which it operates. For example, if sales revenue is volatile, the firm may be hard to value. However, if inventory levels closely covary with future sales, then that information aids in valuation. It is easier to forecast sales revenue knowing that for every $1.00 in inventory on hand $1.20 in cash revenue can be expected the following year. However, if $1.00 in inventory is associated with $1.50 in future revenues in some years and $0.80 in others, then accounting quality is lower, and valuation is more difficult, holding general uncertainty constant. In this example, revenue volatility represents general uncertainty, and the amount of revenue volatility explained by prior-year inventory represents accounting quality.

assets, and *UNC_DTV* is based on the identification of firms that are difficult to value that is described in Baker and Wurgler (2006).

Baker and Wurgler (2006, Table 5) examine ten measures of valuation difficulty. Hard to value firms (1) are small, (2) are young, (3) are high volatility, (4) don't pay dividends, (5) report losses, (6) have more intangible assets, (7) have more R&D spending, (8) have extreme book-to-market ratios, (9) have extreme sales growth, and (10) have extreme changes in external financing. We use these ten measures to construct a single measure using factor analysis.[13]

3.2 Measures of accounting quality

We use two approaches to measure the accounting quality of the target firm, each of which intends to capture general quality of the target firm's accounting information rather than any discretionary reporting behavior that might occur shortly before the acquisition. The first general metric is based on Dechow and Dichev's (2002) model, which posits a relation between current period accounting accruals and operating cash flows in the prior, current, and future periods. As suggested by McNichols (2002), we augment this model with change in sales revenue and gross property, plant, and equipment. According to Francis et al. (2005), in this framework, accruals reflect managerial estimates of cash flows, and the extent to which those accruals do not map into cash flows—due to intentional and unintentional estimation errors—is an inverse measure of the quality of the accruals that are reported. The second metric is based on the ability of the target firm's reported accruals and cash flows to predict future cash flows. The extent to which accruals and cash flows do not explain future cash flows is an inverse measure of the quality of the accruals and cash flows that are reported. The quality of reported accruals, which we use to proxy for overall accounting quality, is measured as $-1\times$ the standard deviation of residuals from the following models:

$$ACC_{t-1} = a + b_1 \Delta SALES_{t-1} + b_2 PPE_{t-1} + b_3 CF_{t-2} + b_4 CF_{t-1} + b_5 CF_t + e \quad (2)$$

$$CF_t = a + b_1 CF_{t-1} + b_2 ACC_{t-1} + e \quad (3)$$

where *ACC* is accounting accruals; *CF* is cash from operations; *SALES* is sales revenue; and *PPE* is gross property, plant, and equipment, each of which is deflated by average total assets in year t.

We use two separate approaches to estimating the models. Ideally, we would estimate a firm-specific measure of accounting quality. However, reliable estimation of a firm-specific measure requires several years of data. Many target firms are young and lack a long history of financial statements, leading to a substantial decrease in the size of the sample and a potential selection bias by systematically excluding acquisitions of younger targets.

An alternative approach is to estimate the models by industry and year and use the industry-level variation in residuals as a proxy for the firm-level accounting quality of firms in the industry that particular year. This overcomes the selection

[13] Untabulated results support our use of a single factor—only one eigenvalue exceeds 1 (2.16; the second largest eigenvalue is only 0.48).

bias, but the tradeoff is that the measure does not capture differences in accounting quality of firms within an industry.

Because of the advantages and disadvantages of the two approaches, we present results using both firm and industry measures of accounting quality. The firm measures of accounting quality, *F_AQ1* and *F_AQ2*, are calculated using the approach in Francis et al. (2005). First, we estimate models (2) and (3) separately for each industry and year. *F_AQ1* is the standard deviation of firm-specific residuals from model (2) over the eight-year period leading up to the acquisition.[14] *F_AQ1* is multiplied by –1 so that higher values represent higher accounting quality. *F_AQ2* is measured similarly using model (3). *F_AQ* is the mean of *F_AQ1* and *F_AQ2*. The industry measures are calculated from the standard deviation of residuals within an industry. *I_AQ1* is the standard deviation of industry residuals from model (2), which is estimated cross-sectionally in the target firm's industry (two-digit SIC code) in the year such that CF_t is the most recent fiscal year ending prior to the acquisition announcement. *I_AQ1* is multiplied by -1 so that higher values represent higher accounting quality. *I_AQ2* is measured similarly using model (3). *I_AQ* is the mean of *I_AQ1* and *I_AQ2*.

3.3 Models of acquirer and target stock returns

Recall from Sect. 2.2 that, in an acquisition, the acquirer will pay an acquisition price and receive in return the intrinsic value of the target plus any synergies generated from the combination. We use acquirer stock returns to measure the market's assessment of this value exchange.[15]

According to Andrade et al. (2001), the most statistically reliable evidence on the value created by acquisitions comes from short-window event studies that use the abnormal stock price reaction at acquisition announcement as a gauge of value creation or destruction.[16] In an efficient capital market, stock prices quickly adjust following an acquisition announcement, incorporating any expected value changes.[17] Following Moeller et al. (2004), we use the three-day market-adjusted stock return of the acquiring firm, centered on the date of the acquisition

[14] We require nonmissing data for at least five of the 8 years.

[15] An alternative measure to assess acquisition profitability is the acquisition premium—the acquisition price relative to the target's market value. However, the target's market value directly reflects any valuation discount due to poor accounting quality, which confounds the acquisition premium measure in this setting. The acquirer's return, instead, should reflect the net value of the acquisition to the acquirer. For example, suppose a target has an intrinsic value of \$100 but trades at \$93 due to a valuation discount. If an acquirer pays \$110 for the deal, which is expected to produce synergies of \$15, then the change in the acquirer's value is \$5 (\$100 + \$15 − \$110). The acquisition premium (\$110/[\$100 − \$7]), is affected by the \$7 valuation discount, which should be irrelevant, and also ignores expected synergies of \$15.

[16] In addition, in our setting, long-window returns pose potential measurement issues to the extent expected returns are related to accounting quality (Francis et al. 2005).

[17] Consistent with this idea, Baker et al. (2007) cite the result of Malmendier and Tate (2008)—that investors are more skeptical about bid announcements made by optimistic CEOs—as being consistent with irrational managers operating in efficient markets.

announcement (*ACQ_RET*), to measure the economic benefit of the acquisition to acquiring firm shareholders.

A large literature examines the returns to acquiring firms' shareholders upon announcement of an acquisition and generally finds slightly negative average stock returns for the shareholders of the acquiring firm.[18] Although the literature has not converged on a single model for acquirer returns, several factors are commonly used, including characteristics of the acquisition deal (e.g., the method of payment or whether it is a tender offer) and of the acquirer (e.g., acquirer size). For example, Travlos (1987) finds that public firm acquisitions paid for with equity have lower returns than public firm acquisitions paid for with cash.

Prior research has also considered the target firm's industry, specifically, whether the acquisition involves a target in a different industry. Morck et al. (1990) hypothesize that diversifying acquisitions might result from self-serving managers pursuing acquisitions that provide private benefits. In addition, Moeller et al. (2004) include the relative size of the target and an industry liquidity index. Officer et al. (2009) include indicators for whether the acquirer and target are ".com" companies, and Dionne et al. (2010) include the target's past growth.

We use the following model to estimate the effect of accounting quality on the profitability of the acquisition to acquiring firm shareholders:

$$\begin{aligned} ACQ\_RET = {} & b0 + b1\,AQ + b2\,UNC + b3\,ACQ\_SIZE + b4\,ACQ\_DOTCOM \\ & + b5\,REL\_SIZE + b6\,TARG\_GROWTH + b7\,TARG\_DOTCOM \\ & + b8\,IND\_LIQUID + b9\,SAME\_IND + b10\,STOCK + b11\,TENDER \\ & + b12\,NEGOTIATED + b13\,COMPETING + b14\,EARNOUT \\ & + b15\,POISONPILL + e \end{aligned} \tag{4}$$

where *UNC* is either *UNC_RET, UNC_CFO*, or *UNC_DTV*. *AQ* is either *I_AQ* using the full sample or *F_AQ* using the subsample of firms for which enough data is available to measure *F_AQ*.

We include characteristics of the acquirer, target, and the deal applied in prior research to explain acquirer returns. *ACQ_SIZE* is the natural log of the acquirer's market value of equity, and *ACQ_DOTCOM* is an indicator for whether the acquirer is a dot-com company (i.e., has ".com" in its company name). *REL_SIZE* is the ratio of the target's market value of equity to the acquirer's market value of equity.[19] *TARG_GROWTH* is the target's annual revenue growth prior to the acquisition, and *TARG_DOTCOM* is an indicator for whether the target is a dot-com company. *IND_LIQ* (industry liquidity or deal intensity) is the sum of acquisition deal prices for a particular industry divided by the aggregate assets across firms in the same industry, measured on an annual basis. *SAME_IND* is an indicator variable that equals one if the acquirer and target firm have the same two-digit SIC code.

STOCK is an indicator variable that equals one if at least 90 percent of the acquisition price was paid with equity. *TENDER* is an indicator variable that equals

[18] See Andrade et al (2001) for a review.

[19] Our inferences are unchanged if we replace *REL_SIZE* with the natural log of the target's market value in our tests or if we include both *REL_SIZE* and target size simultaneously.

one if the acquisition was a tender offer. *NEGOTIATED* indicates whether the deal was negotiated (i.e., friendly) between the acquirer and target, as defined in Raman et al. (2013). Finally, *COMPETING* indicates whether there were competing bids; *EARNOUT* indicates whether the deal included an earnout; and *POISONPILL* indicates whether the target had a poison pill in place.

We also estimate a second version of Eq. (4) that includes measures of acquirer uncertainty and accounting quality. Erickson and Wang (1999) and Louis (2004) find evidence of earnings management by acquirers prior to acquisitions. This addresses the possibility that acquirer accounting quality is associated with acquirer returns in a manner that also relates to the accounting quality of the target firm.

The literature generally uses similar models for target and acquirer returns. We use the following model to examine target returns:

$$\begin{aligned} TARG\_RET = {} & b0 + b1\,AQ + b2\,UNC + b3\,ACQ\_SIZE + b4\,ACQ\_DOTCOM \\ & + b5\,REL\_SIZE + b6\,TARG\_GROWTH + b7\,TARG\_DOTCOM \\ & + b8\,IND\_LIQUID + b9\,SAME\_IND + b10\,STOCK + b11\,TENDER \\ & + b12\,NEGOTIATED + b13\,COMPETING + b14\,EARNOUT \\ & + b15\,POISONPILL + e \end{aligned} \tag{5}$$

where *TARG_RET* is the three-day market-adjusted stock return of the target firm, centered on the date of the acquisition announcement.[20] The remaining variables are as defined previously.

4 Sample and descriptive statistics

4.1 Sample criteria

We draw the sample of acquisitions from the Securities Data Company's U.S. Mergers and Acquisitions Database. We select the sample of domestic mergers and acquisitions with announcement dates between 1990 and 2010. Starting the sample period in 1990 allows us to use data from the statement of cash flows to construct measures of accounting quality (Hribar and Collins 2002). We follow the sample criteria of Moeller et al. (2004), except that we include only acquisitions of public targets. Specifically, we consider only acquisitions of firms by public acquirers where acquiring firms control less than 50 % of the shares of the public target firms before the acquisition announcement and end up with all the shares of the acquired firm. We further require that the transaction be completed within 1,000 days and

[20] Target accounting quality may be negatively associated with target returns for a different reason. If low accounting quality leads to a depressed stock price (i.e., through a valuation discount) and the acquirer's bid is based on intrinsic value rather than the depressed stock price, then the lower stock price would experience a relatively larger increase upon announcement of the acquisition. Valuation discounts, however, would not confound the interpretation of the results based on acquirer returns.

that the deal value be >$1 million.[21] Finally, we impose additional requirements for deal characteristics, accounting data needed to calculate accounting quality, and acquirer and target stock returns around the acquisition announcement.

4.2 Descriptive statistics

Our data requirements yield a sample of 2,427 acquisitions. Table 1, Panel A, provides summary statistics. The average three-day market-adjusted stock return to acquirers centered on the acquisition announcement (*ACQ_RET*) is negative (−0.01) and corresponds to a mean dollar change in acquirer market value of −$128 million, consistent with prior research.[22] The average three-day market-adjusted stock return to target firms (*TARG_RET*) is positive (23 %), also consistent with prior research. The negative acquirer returns and positive target returns are also consistent with overpayment resulting from the winner's curse or principal-agent conflicts.

Panel B of Table 1 shows sample descriptive statistics by year. Unsurprisingly, the number of acquisitions increases into the late 1990s, followed by a decline in the early 2000s, and then an increase up to the 2008 financial crisis. Mean acquirer returns are negative or zero in each year, and mean target returns are positive each year. Target value uncertainty (*UNC_RET*, the volatility of target stock returns) increases during the 1998–2001 merger wave before peaking in 2002, which corresponds to the peak in target returns. Similar results are evident for two other measures of target value uncertainty (*UNC_CFO* and *UNC_DTV*); each peaks in 2002, although *UNC_CFO* doesn't decline in later years—likely due to the lagged nature of the measure. The quality of accounting information (*F_AQ*, measured at the firm level), which is also measured with a lag, begins to decline around 2000 and remains low throughout the second half of the sample period. The industry measure of accounting quality (*I_AQ*) exhibits a similar trend around 2000 and increases during the final years of the sample period.

Table 1, Panel C, presents correlations. The Pearson correlations above the diagonal indicate that acquirer returns are positively correlated with target returns (0.10) and industry-level accounting quality (0.07). The correlation between acquirer returns and firm-level accounting quality is positive but not statistically significant (0.02). Acquirer returns are significantly higher for tender offers (0.13) and lower for stock-financed acquisitions (−0.13), acquisitions of targets with higher growth (−0.07), and acquisitions of targets in industries with more acquisition activity (−0.05). However, we base our inferences on the multivariate tests presented in the next section.

Panel C also indicates that industry-level accounting quality is positively correlated with acquirer returns (0.07) but negatively correlated with target returns (−0.11). Firm-level accounting quality is also positively (but not significantly at the

[21] We include all acquisitions of at least $1 million when analyzing target returns, but following Moeller et al. (2003), we require acquisitions of at least 10 % of the acquirer's pre-acquisition market value when analyzing acquirer returns. This cutoff helps ensure the acquisition is material enough to be reflected in the acquirer returns.

[22] To protect against the influence of outliers, all continuous variables are winsorized at the extreme one percentiles.

Table 1 Descriptive statistics

Panel A: Summary statistics

	N	Mean	Std. Dev.	Q1	Median	Q3
ACQ_RET	2,427	−0.01	0.07	−0.05	−0.01	0.02
TARG_RET	2,427	0.23	0.25	0.06	0.18	0.33
UNC_RET	2,427	0.04	0.02	0.02	0.03	0.05
UNC_CFO	1,118	0.08	0.06	0.04	0.06	0.10
UNC_DTV	2,171	0.09	0.79	−0.46	0.01	0.53
F_AQ	1,118	−0.08	0.05	−0.10	−0.06	−0.04
I_AQ	2,427	−0.13	0.07	−0.16	−0.12	−0.07
ACQ_UNC_RET	2,328	0.03	0.02	0.02	0.02	0.04
ACQ_F_AQ	1,364	−0.06	0.04	−0.07	−0.04	−0.03
ACQ_I_AQ	2,420	−0.18	0.13	−0.22	−0.15	−0.09
ACQ_SIZE	2,427	7.48	2.07	6.03	7.45	8.91
ACQ_DOTCOM	2,427	0.00	0.05	0.00	0.00	0.00
REL_SIZE	2,427	0.34	0.50	0.04	0.16	0.43
TARG_GROWTH	2,427	0.20	0.45	0.00	0.11	0.31
TARG_DOTCOM	2,427	0.01	0.08	0.00	0.00	0.00
IND_LIQUID	2,427	0.03	0.04	0.00	0.02	0.03
SAME_IND	2,427	0.64	0.48	0.00	1.00	1.00
STOCK	2,427	0.40	0.49	0.00	0.00	1.00
TENDER	2,427	0.19	0.39	0.00	0.00	0.00
NEGOTIATED	2,427	0.98	0.13	1.00	1.00	1.00
COMPETING	2,427	0.05	0.22	0.00	0.00	0.00
EARNOUT	2,427	0.00	0.07	0.00	0.00	0.00
POISONPILL	2,427	0.01	0.08	0.00	0.00	0.00

Table 1 continued

Panel B: Select variable means by year

Year	*# Deals*	*ACQ_RET*	*TARG_RET*	*UNC_RET*	*UNC_CFO*	*UNC_DTV*	*F_AQ*	*I_AQ*
1990	41	−0.02	0.28	0.03		0.04		−0.10
1991	46	−0.01	0.22	0.04		0.37		−0.11
1992	36	0.00	0.17	0.04		0.08		−0.10
1993	59	0.01	0.24	0.04		0.21		−0.09
1994	102	0.00	0.22	0.04		0.18		−0.10
1995	146	−0.01	0.20	0.04	0.06	0.03	−0.05	−0.10
1996	152	0.00	0.19	0.03	0.06	−0.08	−0.06	−0.09
1997	204	−0.01	0.14	0.03	0.06	0.00	−0.06	−0.10
1998	246	−0.02	0.22	0.04	0.06	0.04	−0.06	−0.10
1999	238	−0.02	0.21	0.04	0.06	0.02	−0.06	−0.11
2000	173	−0.04	0.25	0.05	0.07	0.14	−0.06	−0.13
2001	150	−0.02	0.25	0.06	0.09	0.60	−0.09	−0.15
2002	86	−0.02	0.30	0.05	0.11	0.66	−0.09	−0.20
2003	96	−0.02	0.22	0.05	0.11	0.44	−0.09	−0.21
2004	99	−0.03	0.20	0.04	0.09	0.02	−0.08	−0.20
2005	99	−0.01	0.19	0.03	0.11	−0.15	−0.10	−0.18
2006	124	−0.01	0.20	0.02	0.10	−0.34	−0.10	−0.12
2007	125	−0.01	0.25	0.02	0.09	−0.39	−0.09	−0.11
2008	77	−0.03	0.32	0.03	0.11	−0.04	−0.11	−0.13
2009	71	−0.01	0.32	0.05	0.11	0.29	−0.10	−0.14
2010	57	0.01	0.37	0.05	0.09	0.14	−0.09	−0.17
Total	2,427	−0.01	0.23	0.04	0.08	0.09	−0.08	−0.13

Table 1 continued

Panel C: Correlations among regression variables

		1	2	3	4	5	6	7	8	9	10	11	12
1	*ACQ_RET*		**0.10**	0.00	0.00	0.00	0.02	**0.07**	**−0.09**	**0.13**	**0.06**	−0.02	−0.01
2	*TARG_RET*	**0.10**		**0.11**	**0.11**	**0.12**	**−0.11**	**−0.11**	−0.01	**0.06**	**−0.10**	**0.12**	−0.02
3	*UNC_RET*	−0.02	**0.10**		**0.46**	**0.86**	**−0.46**	**−0.37**	**0.65**	**−0.29**	**−0.23**	**−0.24**	**0.07**
4	*UNC_CFO*	−0.01	**0.09**	**0.55**		**0.57**	**−0.84**	**−0.42**	**0.27**	**−0.28**	**−0.37**	**−0.08**	0.00
5	*UNC_DTV*	−0.02	**0.09**	**0.88**	**0.64**		**−0.58**	**−0.38**	**0.59**	**−0.33**	**−0.24**	**−0.30**	**0.08**
6	*F_AQ*	0.01	**−0.12**	**−0.54**	**−0.87**	**−0.65**		**0.47**	**−0.27**	**0.32**	**0.40**	**0.08**	0.01
7	*I_AQ*	**0.08**	**−0.12**	**−0.45**	**−0.50**	**−0.41**	**0.56**		**−0.30**	**0.33**	**0.74**	**−0.06**	**−0.06**
8	*ACQ_UNC_RET*	**−0.09**	0.00	**0.67**	**0.33**	**0.58**	**−0.32**	**−0.34**		**−0.43**	**−0.21**	**−0.40**	**0.10**
9	*ACQ_F_AQ*	**0.09**	0.02	**−0.34**	**−0.41**	**−0.38**	**0.44**	**0.41**	**−0.43**		**0.36**	**0.35**	−0.03
10	*ACQ_I_AQ*	**0.06**	**−0.08**	**−0.33**	**−0.47**	**−0.32**	**0.51**	**0.77**	**−0.27**	**0.44**		**−0.09**	**−0.05**
11	*ACQ_SIZE*	0.02	**0.13**	**−0.22**	**−0.09**	**−0.30**	**0.09**	**−0.06**	**−0.39**	**0.32**	**−0.07**		**−0.07**
12	*ACQ_DOTCOM*	−0.02	−0.01	**0.06**	0.01	**0.07**	0.00	**−0.06**	**0.06**	−0.04	−0.03	**−0.07**	
13	*REL_SIZE*	**−0.15**	**−0.32**	**−0.24**	**−0.30**	**−0.27**	**0.30**	**0.16**	**0.11**	**−0.09**	**0.11**	**−0.53**	0.04
14	*TARG_GROWTH*	**−0.07**	**−0.07**	−0.01	0.05	**0.05**	−0.01	0.01	−0.02	0.01	0.02	**0.10**	0.02
15	*TARG_DOTCOM*	0.02	0.02	**0.11**	**0.07**	**0.12**	**−0.06**	**−0.09**	**0.09**	−0.03	−0.03	**−0.06**	**0.30**
16	*IND_LIQUID*	**−0.08**	**−0.07**	**0.13**	−0.01	**0.12**	−0.03	**−0.23**	**0.09**	−0.02	**−0.19**	**0.09**	0.04
17	*SAME_IND*	**−0.05**	−0.03	**−0.05**	**−0.06**	0.00	**0.09**	**0.04**	**0.05**	−0.02	−0.03	**−0.08**	0.01
18	*STOCK*	**−0.14**	**−0.16**	**0.15**	0.01	**0.18**	0.00	−0.01	**0.23**	**−0.07**	**0.05**	**−0.14**	0.02
19	*TENDER*	**0.14**	**0.23**	0.03	0.06	−0.01	**−0.08**	**−0.07**	**−0.05**	**0.06**	−0.01	**0.06**	−0.03
20	*NEGOTIATED*	0.00	**−0.06**	**0.05**	**0.07**	**0.09**	**−0.07**	0.00	0.04	−0.03	−0.02	−0.03	0.01
21	*COMPETING*	0.00	−0.04	**−0.06**	−0.04	**−0.09**	**0.06**	0.04	−0.02	0.03	0.02	−0.02	−0.01
22	*EARNOUT*	0.00	−0.01	**0.06**	**0.08**	**0.06**	−0.04	**−0.04**	**0.05**	−0.03	**−0.06**	**−0.05**	0.00
23	*POISONPILL*	−0.02	0.02	−0.03	0.01	**−0.05**	−0.01	−0.01	−0.01	−0.04	0.00	0.01	0.00

Table 1 continued

		13	14	15	16	17	18	19	20	21	22	23
1	*ACQ_RET*	−0.03	**−0.07**	0.04	**−0.05**	**−0.05**	**−0.13**	**0.13**	0.00	−0.01	−0.01	−0.02
2	*TARG_RET*	**−0.22**	**−0.08**	0.02	**−0.06**	−0.02	**−0.16**	**0.21**	**−0.04**	−0.04	−0.01	0.01
3	*UNC_RET*	**−0.16**	**0.06**	**0.15**	**0.09**	−0.03	**0.16**	0.01	**0.05**	**−0.05**	**0.07**	−0.03
4	*UNC_CFO*	**−0.19**	0.04	**0.11**	−0.03	−0.02	0.01	0.04	**0.06**	−0.04	**0.08**	0.00
5	*UNC_DTV*	**−0.21**	**0.12**	**0.15**	**0.09**	0.00	**0.17**	−0.01	**0.08**	**−0.09**	**0.07**	**−0.04**
6	*F_AQ*	**0.19**	−0.04	**−0.07**	0.04	0.06	0.01	**−0.06**	−0.06	0.06	−0.03	0.01
7	*I_AQ*	**0.09**	0.00	**−0.09**	**−0.08**	0.03	0.04	**−0.07**	−0.01	0.03	**−0.04**	−0.01
8	*ACQ_UNC_RET*	**0.06**	0.02	**0.12**	**0.06**	**0.04**	**0.23**	**−0.06**	**0.04**	−0.02	**0.06**	0.00
9	*ACQ_F_AQ*	**−0.06**	0.00	−0.02	0.01	−0.01	**−0.07**	**0.07**	−0.04	0.02	−0.05	−0.01
10	*ACQ_I_AQ*	**0.08**	0.03	−0.01	−0.02	−0.04	**0.11**	−0.02	−0.02	0.01	**−0.06**	−0.01
11	*ACQ_SIZE*	**−0.39**	**0.06**	**−0.06**	0.02	**−0.08**	**−0.14**	**0.07**	−0.03	−0.02	**−0.05**	0.01
12	*ACQ_DOTCOM*	0.01	0.01	**0.30**	**0.04**	0.01	0.02	−0.03	0.01	−0.01	0.00	0.00
13	*REL_SIZE*		0.00	0.01	0.03	**0.06**	**0.06**	**−0.05**	−0.03	**0.07**	−0.02	**0.04**
14	*TARG_GROWTH*	0.03		**0.05**	**0.09**	0.00	**0.13**	−0.04	0.01	−0.02	−0.02	−0.01
15	*TARG_DOTCOM*	0.01	0.02		**0.04**	0.00	0.03	−0.01	−0.03	0.01	−0.01	−0.01
16	*IND_LIQUID*	**−0.04**	**0.12**	**0.04**		0.01	**0.05**	−0.01	0.03	0.01	0.00	−0.01
17	*SAME_IND*	**0.11**	−0.01	0.00	0.03		**0.04**	**−0.10**	0.00	0.02	−0.01	0.00
18	*STOCK*	**0.13**	**0.10**	0.03	**0.04**	**0.04**		**−0.36**	**0.07**	**−0.08**	−0.02	−0.04
19	*TENDER*	**−0.14**	−0.03	−0.01	−0.02	**−0.10**	**−0.36**		**−0.17**	**0.11**	−0.03	**0.12**
20	*NEGOTIATED*	**−0.04**	0.02	−0.03	0.02	0.00	**0.07**	**−0.17**		**−0.16**	0.01	**−0.33**
21	*COMPETING*	**0.08**	−0.03	0.01	−0.02	0.02	**−0.08**	**0.11**	**−0.16**		0.01	0.03
22	*EARNOUT*	−0.02	−0.01	−0.01	−0.01	−0.01	−0.02	−0.03	0.01	0.01		−0.01
23	*POISONPILL*	**0.05**	−0.01	−0.01	−0.02	0.00	−0.04	**0.12**	**−0.33**	0.03	−0.01	

Table 1 presents descriptive statistics for 2,427 acquisitions from 1990 to 2010. Panel A presents summary statistics. Panel B presents means by year. Panel C presents Pearson (above diagonal) and Spearman (below diagonal) correlation coefficients among regression variables. Correlations in bold are significantly different from zero at the 0.05 level. Variable definitions are provided in Appendix 1

0.05 level) correlated with acquirer returns (0.02) and negatively correlated with target returns (−0.11). Finally, the correlation between firm-level accounting quality and industry-level accounting quality is significantly positive (0.47). This correlation supports our use of industry-level accounting quality measures, which appears to capture a significant portion of the firm-level measure but allows us to use a larger sample and more timely measure of accounting quality.

5 Results

Table 2 presents results relating to the determinants of acquirers' acquisition announcement period stock returns. In Panel A, column (1) describes estimates from the base model, which includes a measure of uncertainty but not accounting quality. Consistent with expectations, returns to the acquiring firm's shareholders for acquisitions of targets with uncertain values are lower (t = −3.15). The column also indicates that, on average, the announcement-period stock return for stock acquisitions is less than that of cash acquisitions (t = −3.49), and the return for tender offers and acquisition of dot-com targets are on average higher (t = 5.05 and 2.54, respectively). In addition, acquisitions by larger acquirers are less profitable (t = −5.07), and acquisitions are less profitable for acquirers when there is more acquisition activity in the industry (t = −2.23) or when the target has had higher growth (t = −1.66). The coefficients on other control variables are not statistically significant.

Turning to column (2) of Panel A, consistent with H1, returns to acquiring firm shareholders are significantly higher when the target has higher-quality accounting information (t = 3.51). Although column (3) of Panel A indicates that controlling for uncertainty attenuates the effect of accounting quality, the effect remains significantly positive (t = 2.30).[23] An untabulated analysis of decile-ranked accounting quality reveals that three-day returns to acquisitions of target firms in the top decile of accounting quality are 200 basis points higher than those of target firms in the bottom decile of accounting quality, after controlling for target uncertainty. Furthermore, an untabulated regression of the dollar change in acquirer market value indicates that acquirers gain $132 million more from acquisitions of target firms in the top decile of accounting quality compared to acquisitions of target firms in the bottom decile.

Panel A, column (4), replaces the firm-level measure of accounting quality with an industry-level measure. These results are not directly comparable to the previous results using firm-level measures because the sample size is substantially larger. Nevertheless, a similar finding emerges—the coefficient on the target's accounting quality is 0.15 and significantly positive (t = 5.46), indicating that returns to acquiring firm shareholders are higher when the target has higher-quality accounting

[23] The relatively high correlations between target uncertainty and accounting quality (−0.46 and −0.37 for *F_AQ* and *I_AQ*) raise the possiblity that multicollinearity could affect the stability of the regressions. However, untabulated variance inflation factors are at or below 1.56 and 1.66 for the two regressions, which suggests the effect of multicollinearity is not substantial.

Table 2 Determinants of acquiring firms' acquisition announcement period returns

Panel A: Primary regressions

ACQ_RET = b0 + b1 AQ + b2 UNC_RET + controls + e

	(1)		(2)		(3)		(4)		(5)	
	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat
F_AQ			0.20	3.51	0.14	2.30				
I_AQ							0.15	5.46	0.14	4.58
UNC_RET	−0.36	−3.15			−0.62	−3.02			−0.14	−1.12
ACQ_SIZE	−0.01	−5.07	0.00	−2.71	−0.01	−3.68	0.00	−4.40	−0.01	−4.42
ACQ_DOTCOM	−0.02	−0.55	−0.07	−0.96	−0.07	−1.01	−0.01	−0.21	−0.01	−0.24
REL_SIZE	0.00	−0.43	0.00	−0.38	−0.01	−1.19	0.00	0.17	0.00	−0.15
TARG_GROWTH	−0.01	−1.66	0.00	−0.02	0.00	0.07	−0.01	−2.14	−0.01	−1.97
TARG_DOTCOM	0.07	2.54	−0.03	−0.64	−0.02	−0.30	0.07	2.47	0.07	2.57
IND_LIQUID	−0.11	−2.23	−0.06	−0.79	−0.05	−0.60	−0.10	−2.19	−0.10	−2.10
SAME_IND	0.00	−0.91	−0.01	−1.50	−0.01	−1.50	0.00	−0.90	0.00	−0.92
STOCK	−0.02	−3.49	−0.02	−3.37	−0.02	−2.92	−0.02	−3.93	−0.02	−3.64
TENDER	0.03	5.05	0.03	3.94	0.03	3.99	0.03	5.17	0.03	5.22
NEGOTIATED	0.00	0.28	0.00	−0.01	0.00	−0.07	0.00	0.24	0.00	0.26
COMPETING	−0.01	−0.94	−0.02	−1.70	−0.02	−1.79	−0.01	−1.12	−0.01	−1.11
EARNOUT	−0.01	−0.25	0.08	1.45	0.07	1.40	−0.01	−0.21	0.00	−0.14
POISONPILL	−0.03	−1.34	−0.04	−1.32	−0.04	−1.23	−0.03	−1.24	−0.03	−1.24
Intercept	0.04	2.11	0.04	1.48	0.07	2.54	0.04	2.01	0.04	2.27
R-squared	6.0 %		6.2 %		7.2 %		7.1 %		7.1 %	
N	1,645		754		754		1,645		1,645	

Table 2 continued

Panel B: Regressions using alternative measures of target uncertainty

ACQ_RET = b0 + b1 AQ + b2 UNCERTAINTY + controls + e

	(1)		(2)		(3)		(4)		(5)		(6)	
UNCERTAINTY:	*UNC_CFO*		*UNC_CFO*		*UNC_CFO*		*UNC_DTV*		*UNC_DTV*		*UNC_DTV*	
	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat
F_AQ			0.28	2.92					0.12			
I_AQ					0.12	2.89				1.82	0.13	3.80
UNCERT	−0.11	−2.19	0.08	1.02	−0.04	−0.76	−0.01	−3.67	−0.01	−2.25	−0.01	−1.72
ACQ_SIZE	0.00	−2.32	0.00	−2.59	0.00	−2.23	−0.01	−5.58	−0.01	−3.34	−0.01	−4.57
ACQ_DOTCOM	−0.07	−0.92	−0.07	−0.97	−0.07	−0.98	−0.02	−0.48	−0.07	−0.95	−0.01	−0.24
REL_SIZE	0.00	−0.14	0.00	−0.28	0.00	−0.18	−0.01	−1.22	−0.01	−1.07	0.00	−0.77
TARG_GROWTH	0.00	−0.10	0.00	−0.06	0.00	−0.06	−0.01	−1.06	0.00	0.09	−0.01	−1.51
TARG_DOTCOM	−0.04	−0.68	−0.04	−0.72	−0.04	−0.83	0.07	2.56	−0.03	−0.49	0.07	2.57
IND_LIQUID	−0.05	−0.71	−0.06	−0.81	−0.05	−0.69	−0.09	−1.76	−0.05	−0.65	−0.09	−1.74
SAME_IND	−0.01	−1.41	−0.01	−1.54	−0.01	−1.38	0.00	−0.85	−0.01	−1.21	0.00	−0.81
STOCK	−0.02	−3.44	−0.02	−3.39	−0.02	−3.34	−0.02	−3.42	−0.02	−2.71	−0.02	−3.62
TENDER	0.03	3.78	0.03	3.97	0.03	3.88	0.03	5.22	0.04	4.55	0.03	5.25
NEGOTIATED	0.00	−0.06	0.00	−0.04	0.00	−0.17	0.01	0.53	0.01	0.49	0.01	0.53
COMPETING	−0.02	−1.62	−0.02	−1.75	−0.02	−1.66	−0.02	−1.71	−0.02	−2.19	−0.02	−1.83
EARNOUT	0.07	1.36	0.08	1.45	0.06	1.19	0.00	−0.09	0.08	1.48	0.00	−0.07
POISONPILL	−0.04	−1.35	−0.04	−1.36	−0.04	−1.25	−0.03	−1.21	−0.03	−1.10	−0.02	−1.11
Intercept	0.03	1.10	0.04	1.44	0.04	1.50	0.04	1.87	0.03	1.18	0.04	2.21
R−squared	5.3 %		6.2 %		6.2 %		7.1 %		7.2 %		7.9 %	

Table 2 continued

Panel B: Regressions using alternative measures of target uncertainty

$ACQ\_RET = b0 + b1\ AQ + b2\ UNCERTAINTY + controls + e$

	(1)		(2)		(3)		(4)		(5)		(6)	
UNCERTAINTY:	*UNC_CFO*		*UNC_CFO*		*UNC_CFO*		*UNC_DTV*		*UNC_DTV*		*UNC_DTV*	
	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat
N	754		754		754		1,463		719		1,463	

Table 2 presents coefficient estimates and t-statistics of determinants of acquiring firms' acquisition announcement period returns (*ACQ_RET*). The first column of panel A displays results for the base model, while the second and third columns and fourth and fifth columns include measures of firm-level (*F_AQ*) and industry-level (*I_AQ*) accounting quality, respectively. Panel B reports regression results obtained by replacing *UNC_RET* with alternative measures of target value uncertainty (*UNC_CFO* and *UNC_DTV*) as indicated in the column headings. Acquisitions with deal values <10 % of the acquirer's equity market value are excluded. Variable definitions are provided in Appendix 1

information. The final column of Panel A indicates this effect of accounting quality holds after controlling for target value uncertainty (t = 4.58).[24,25]

Table 2, Panel B, presents results using two alternative measures of uncertainty in the target firm's value. The regressions in the first three columns use uncertainty measured as the volatility of cash flows from operations. The next three columns measure uncertainty in terms of valuation difficulty, as defined in Baker and Wurgler (2006). As predicted, the coefficient on accounting quality is significantly positive in each of four applicable specifications, with t-statistics ranging from 1.82 to 3.80.[26]

Table 3 extends the analysis in Table 2 to include measures of acquirer uncertainty and accounting quality. The first column presents results using a firm-level measure of accounting quality. Acquirer returns are negatively associated with acquirer uncertainty (t = −2.09), consistent with Moeller et al. (2004). However, acquirer returns are not significantly associated with acquirer accounting quality (t = 1.23). A similar finding emerges in column (2), which uses an industry-level of accounting quality. Acquirer returns are negatively associated with acquirer uncertainty (t = −2.77) but not associated with acquirer accounting quality (t = 0.02). Notably, both firm-level and industry-level target accounting quality remain significantly positive after controlling for acquirer uncertainty and accounting quality (t = 1.83 and 2.53). These results support the idea that acquirers' bidding behavior is associated with target accounting quality but not acquirer accounting quality. That is, high-quality information about the target helps the acquirer value the target, but the acquirer's own accounting information would not necessarily help it value another firm.

Table 4 presents results relating to the determinants of returns to target firm shareholders upon announcement of an acquisition. The results from the base model presented in column (1) of Panel A indicate that target shareholders experience higher returns on average for tender offers (t = 7.33), offers with earnouts (t = 4.11), and for acquisitions by larger acquirers (t = 2.90), and lower returns for stock deals (t = −4.80), deals with competing offers (t = −2.64), deals in industries with more acquisition activity (t = −2.51), and deals involving larger target firms (t = –7.41) or target firms with high growth (t = −3.65). In line with expectations, target firms with more uncertain values experience higher returns on average (t = 5.84).

The column (2) of Panel A, indicates that, consistent with H2, target firms with high-quality accounting information experience lower returns (t = −2.21). The

[24] Untabulated analyses reveal similar inferences obtain when using estimates from either model (2) or model (3) individually. The coefficient on accounting quality is significantly positive as predicted in each case.

[25] Untabulated analyses indicate that the effect of target accounting quality on acquirer returns increases with target uncertainty (t = 1.65) when target accounting quality is measured at the industry level. The interaction is not statistically significant when target accounting quality is measured at the firm level.

[26] Although Table 2 presents the different measures of uncertainty in separate regressions, inferences are unchanged when all three uncertainty measures are included simultaneously. The coefficient on target accounting quality is significantly positive when measured at the firm level (t = 2.54) and at the industry level (t = 1.79).

Table 3 Determinants of acquiring firms' acquisition announcement period returns, controlling for acquirer accounting quality

$ACQ\_RET = b0 + b1\,AQ + b2\,UNC\_RET + b3\,ACQ\_AQ + b4\,ACQ\_UNC\_RET + controls + e$

	(1)		(2)	
	Est.	t-stat	Est.	t-stat
F_AQ	0.12	1.83		
I_AQ			0.11	2.53
UNC_RET	−0.32	−1.12	0.13	0.80
ACQ_F_AQ	0.09	1.23		
ACQ_I_AQ			0.00	0.02
ACQ_UNC_RET	−0.71	−2.09	−0.52	−2.77
ACQ_SIZE	−0.01	−4.22	−0.01	−4.72
ACQ_DOTCOM	0.00	0.00	0.02	0.51
REL_SIZE	−0.01	−1.50	0.00	0.20
TARG_GROWTH	0.00	−0.12	−0.01	−2.11
TARG_DOTCOM	0.02	0.28	0.07	2.65
IND_LIQUID	0.02	0.27	−0.11	−2.20
SAME_IND	−0.02	−2.53	0.00	−1.08
STOCK	−0.02	−2.31	−0.01	−3.09
TENDER	0.02	3.09	0.03	4.57
NEGOTIATED	−0.01	−0.42	0.00	0.24
COMPETING	−0.02	−1.89	−0.01	−0.86
EARNOUT	0.03	0.46	0.00	−0.15
POISONPILL	−0.04	−1.28	−0.02	−1.16
Intercept	0.11	3.72	0.05	2.58
R-squared	9.9 %		7.0 %	
N	551		1,561	

Table 3 presents coefficient estimates and t-statistics of determinants of acquiring firms' acquisition announcement period returns (*ACQ_RET*). The first and second column of panel A display results for measures of firm-level (*F_AQ*) and industry-level (*I_AQ*) accounting quality, respectively. Acquisitions with deal values <10 % of the acquirer's equity market value are excluded. Variable definitions are provided in Appendix 1

effect is attenuated after controlling for value uncertainty (t = −0.69). The fourth column in Table 4, Panel A, shows stronger results using the industry-level measure of accounting quality. Target firms with high accounting quality experience lower announcement period returns both before (t = −4.15) and after controlling for uncertainty (t = −2.04). An untabulated analysis of decile-ranked accounting quality reveals that returns to target firms in the top decile of accounting quality are 600 basis points lower than those of target firms in the bottom decile of accounting quality, after controlling for target uncertainty.

Taken as a whole, the findings indicate that acquirer returns are greater for acquisitions of targets with higher accounting quality. In addition, consistent with gains from acquisitions being shared between acquirer and target, target returns are lower when target accounting quality is higher. These findings are consistent with

Table 4 Determinants of target firms' acquisition announcement period returns
TARG_RET = b0 + b1 AQ + b2 UNC_RET + controls + e

	(1)		(2)		(3)		(4)		(5)	
	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat	Est.	t-stat
F_AQ			−0.29	−2.21	−0.10	−0.69				
I_AQ							−0.27	−4.15	−0.15	−2.04
UNC_RET	1.52	5.84			1.49	3.24			1.30	4.58
ACQ_SIZE	0.01	2.90	0.00	0.37	0.00	1.26	0.00	0.95	0.01	2.52
ACQ_DOTCOM	−0.08	−0.85	−0.07	−0.32	−0.07	−0.29	−0.09	−1.01	−0.09	−0.94
REL_SIZE	−0.08	−7.41	−0.08	−5.79	−0.07	−4.79	−0.10	−9.16	−0.08	−7.51
TARG_GROWTH	−0.04	−3.65	−0.01	−0.50	−0.01	−0.39	−0.03	−3.28	−0.04	−3.58
TARG_DOTCOM	0.07	0.99	−0.02	−0.17	−0.05	−0.40	0.10	1.45	0.06	0.93
IND_LIQUID	−0.30	−2.51	−0.03	−0.16	−0.07	−0.35	−0.27	−2.23	−0.31	−2.59
SAME_IND	0.01	0.99	0.02	1.12	0.02	1.16	0.01	0.80	0.01	0.99
STOCK	−0.05	−4.80	−0.05	−3.46	−0.06	−3.94	−0.04	−3.93	−0.05	−4.64
TENDER	0.10	7.33	0.10	5.52	0.10	5.47	0.10	7.57	0.10	7.27
NEGOTIATED	−0.05	−1.26	−0.06	−1.04	−0.06	−1.06	−0.05	−1.14	−0.05	−1.27
COMPETING	−0.06	−2.64	−0.09	−3.03	−0.08	−2.89	−0.06	−2.69	−0.06	−2.60
EARNOUT	0.20	4.11	0.27	4.13	0.21	3.03	0.26	5.51	0.20	4.06
POISONPILL	−0.06	−0.88	−0.17	−1.73	−0.20	−1.98	−0.05	−0.72	−0.06	−0.93
Intercept	−0.03	−0.48	−0.08	−1.04	−0.09	−1.06	−0.03	−0.54	−0.03	−0.51
R-squared	11.3 %		10.0 %		10.8 %		10.7 %		11.4 %	
N	2,427		1,118		1,118		2,427		2,427	

Table 4 presents coefficient estimates and t-statistics of determinants of target firms' acquisition announcement period returns (*TARG_RET*). The first column displays results for the base model, while the second and third columns and fourth and fifth columns include measures of firm-level (*F_AQ*) and industry-level (*I_AQ*) accounting quality, respectively. Variable definitions are provided in Appendix 1

our prediction that higher-quality accounting information permits more precise valuations in acquisitions.

6 Conclusion

We examine whether higher-quality accounting information of target firms leads to more profitable acquisitions for acquirers in a large sample of acquisitions of public firms. Using a sample of 2,427 acquisitions during the period of 1990–2010, we find that acquiring firms experience lower stock returns at the acquisition announcement when the value of the target firm is uncertain. However, we also find that, controlling for uncertainty, acquirer returns are higher when the target firm has higher accounting quality—results indicate that acquirer returns are 200 basis points higher and acquirer value changes are $138 million higher on average for acquisitions of targets with high versus low accounting quality. Thus high-quality accounting information may successfully mitigate information asymmetry between acquirers and target firms, leading to more profitable acquisitions.

Target firm shareholders, however, experience lower returns upon announcement of an acquisition when the target's accounting quality is high. Thus acquirer gains from higher target accounting quality seem to come at the expense of target firm shareholders—target firm shareholders extract less from acquirers as a result of their higher-quality accounting information. Taken together, these findings suggest that high-quality accounting information, by allowing a more precise valuation of the target firm, allows acquirers to bid more effectively and pay less for a given acquisition.

Our study sheds light on the negative returns realized, on average, by acquirers at the acquisition announcement. Increases in target value uncertainty and decreases in accounting quality explain at least some of the variation in value loss for acquirers and could explain the larger value losses that occurred during the 1998–2001 merger wave (Moeller et al. 2005).

Our results also speak to the value of accounting information in economic decisions generally. A contrary view regarding accounting information is that it is backward looking, arbitrary, likely supplanted by various other sources of information, and therefore not useful in economic decisions. In this light, researchers have sought to understand whether better accounting quality improves outcomes for investors. For example, a sizable literature seeks to assess whether investors reward the equity of firms with high-quality accounting information with a lower cost of capital (e.g., Cohen 2003; Aboody et al. 2005; Francis et al. 2005; Core et al. 2008). However, there is considerable controversy over how to estimate cost of capital and the extent to which factors applied in the empirical literature control for risk or capture mispricing. By focusing on returns at acquisition announcements, our study identifies an alternative measure to assess the effect of accounting quality on investment decisions. Our results indicate that accounting information plays an important role in acquisitions by facilitating better bidding decisions by acquiring firms.

Finally, the study raises some intriguing questions for future research about the role of accounting information in acquisition decisions. For example, why do firms acquire targets with uncertain value and low accounting quality, especially considering that

these acquisitions tend to be less profitable? Did lower accounting quality play an important role in acquisitions with the greatest dollar value losses (Moeller et al. 2005)? Can acquirers time their acquisitions to minimize their informational disadvantage, in the spirit of the Korajczyk et al. (1992) study of seasoned equity offerings? Finally, if target firms have some influence over the quality of their accounting information, how do they trade off the ongoing benefits of more information disclosures (e.g., a lower cost of capital, Easley and O'Hara 2004; Lambert et al. 2008) against potentially lower one-time gains from a possible future acquisition?

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Appendix 1: Variable definitions

ACQ_RET	Three-day market-adjusted stock return of acquiring firm, centered on the date of the acquisition announcement.
TARG_RET	Three-day market-adjusted stock return of target firm, centered on the date of the acquisition announcement.
UNC_RET	Volatility of the target firm's monthly stock returns over the most recent two fiscal years prior to the acquisition announcement.
UNC_CFO	Volatility of the target firm's annual cash flows from operations divided by total assets, measured over the 8 years leading up to the acquisition announcement.
UNC_DTV	Primary factor obtained through factor analysis of target's size, age, volatility, dividends, sign of earnings, intangible assets, R&D spending, and deviations from sample mean of book-to-market ratio, sales growth, and change in external financing.
F_AQ	Firm-level accounting quality (see Appendix 2).
I_AQ	Industry-level accounting quality (see Appendix 2).
ACQ_SIZE	Natural log of the acquirer's market value, measured 2 days prior to the acquisition announcement.
ACQ_DOTCOM	Indicator, =1 if the acquirer's name includes ".com."
REL_SIZE	Ratio of the target's market value of equity to the acquirer's market value of equity, each measured 2 days prior to the acquisition announcement.
TARG_GROWTH	Target's annual revenue, divided by revenue of the prior year.
TARG_DOTCOM	Indicator, =1 if the target's name includes ".com."
IND_LIQUID	Sum of acquisition deal prices for each industry divided by the aggregate assets across firms in the same industry, measured on an annual basis.
SAME_IND	Indicator, =1 if the acquirer and target firm have the same two-digit SIC code.
STOCK	Indicator, =1 if at least 90 percent of the acquisition price was paid with equity.
TENDER	Indicator, =1 if the acquisition is a tender offer.
NEGOTIATED	Indicator, =1 if deal is negotiated.
COMPETING	Indicator, =1 if there are additional (i.e., competing) bids for the target.
EARNOUT	Indicator, =1 if deal includes an earnout.
POISONPILL	Indicator, =1 if target has a poison pill.

Appendix 2: Description of accounting quality measures

Models:

$$ACC_{t-1} = a + b_1 \Delta SALES_{t-1} + b_2 PPE_{t-1} + b_3 CF_{t-2} + b_4 CF_{t-1} + b_5 CF_t + e \quad (2)$$

$$CF_t = a + b_1 CF_{t-1} + b_2 ACC_{t-1} + e \quad (3)$$

CF = cash from operations
ACC = accruals = net income before extraordinary items – CF
$SALES$ = sales revenue
PPE = gross property, plant, and equipment

Firm-level measures

Models (2) and (3) are estimated cross-sectionally by industry (two-digit SIC code) and year.

F_AQ1 = –1 × the standard deviation of a firm's residuals from model (2) calculated over the eight years leading up to the acquisition
F_AQ2 = –1 × the standard deviation of a firm's residuals from model (3) calculated over the eight years leading up to the acquisition
F_AQ = mean of F_AQ1 and F_AQ2

We require nonmissing data for at least five of the eight years.

Industry-level measures

Models (2) and (3) are estimated cross-sectionally in the target firm's industry (two-digit SIC code) in the year such that CF_t is the most recent fiscal year ending prior to the acquisition announcement.

I_AQ1 = –1 × the standard deviation of an industry's residuals from model (2)
I_AQ2 = –1 × the standard deviation of an industry's residuals from model (3)
I_AQ = mean of I_AQ1 and I_AQ2

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