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Economic Determinants and Information Environment Effects of Earnouts: New Insights from SFAS 141(R)

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ABSTRACT

Contingent considerations (earnouts) in acquisition agreements provide sellers with future payments conditional on meeting certain conditions. Prior research provides evidence that acquiring firms use earnouts to minimize agency costs associated with acquisitions. Using earnout fair value information, recently mandated by SFAS 141(R), we provide new insights into the economic determinants to include earnout provisions in acquisition agreements, including motivations to resolve moral hazard and adverse selection problems, bridge valuation gaps, and retain target firm managers. We document variations in initial earnout fair value estimates and earnout fair value adjustments that correspond with these underlying motivations. We also provide evidence that target managers stay longer with the firm after the acquisition when earnouts are included primarily to retain target managers. Finally,

we demonstrate that earnout fair value adjustments required by SFAS 141(R) provide valuable information to market participants and are negatively associated with the likelihood of contemporaneous and future goodwill impairments.

1. Introduction

Contingent considerations (hereafter "earnouts") are provisions of acquisition agreements that provide sellers with payments conditional on the occurrence of specified future events or meeting certain conditions. These contracted outcomes, which generally extend up to five years after the acquisition, are often based on financial performance measures, such as revenue and earnings targets, and/or nonfinancial performance hurdles, such as Food and Drug Administration (FDA) approval and clinical trial success. Until recently, acquiring firms did not recognize earnouts at the time of the acquisition. Rather, earnouts were recognized when the corresponding contingencies were resolved and the payments made. Statement of Financial Accounting Standards (SFAS) 141(R) (FASB [2007]) altered the accounting treatment of earnouts. The revised standard requires acquiring firms to estimate and recognize the fair value of earnouts at the acquisition date, include earnout fair values in the acquisition purchase price, and adjust earnout fair values in each reporting period as uncertainty is resolved.[1] We use this recently mandated earnout fair value information to shed new light on the economic determinants of earnout provisions in acquisition agreements and to investigate the information content of earnout fair value adjustments.

Prior work on earnouts primarily examines when acquiring firms are likely to include earnout provisions in acquisition agreements. Kohers and Ang [2000], Datar, Frankel, and Wolfson [2001], and Chatterjee, Erickson, and Weber [2004] suggest that earnouts help acquiring firms hedge risk and reduce acquisition costs when there is greater information asymmetry about target firms. Kohers and Ang [2000] and Chatterjee, Erickson, and Weber [2004] also provide evidence that acquisition premiums are greater when earnouts are included in acquisition agreements. More recently, Cain, Denis, and Denis [2011] find that earnouts are larger when targets operate in industries with high-growth or high-return volatility, consistent with earnouts being structured to minimize the costs of valuation uncertainty. These studies use earnout samples from the pre-SFAS 141(R) period. In our study, we take advantage of the new earnout fair value information required by SFAS 141(R) to provide new insights into the economic determinants of earnout provisions in acquisition agreements.

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[1] Section 2.1 provides a detailed description of the change in the accounting treatment of earnouts, the disclosure and recognition requirements, and the financial reporting implications.

We present and test several economic theories for the determinants of earnouts, including motivations to resolve moral hazard and adverse selection problems, bridge valuation gaps, retain target firm managers, and conserve cash. We use the ratio of the initial earnout fair value to the maximum earnout payment amount (*EOFV/EOMax*) to capture these different economic motivations.

We find that earnout fair values are a smaller percentage of the maximum earnout payment amounts when firms primarily include earnouts to resolve adverse selection problems and bridge valuation gaps between the acquiring and target firms, which is consistent with high uncertainty underlying these earnouts. For these earnouts, we also find earnout fair value adjustments to be large with high standard deviation, consistent with the resolution of uncertainty over time. In contrast, when acquiring firms include earnouts primarily to help retain target firm managers, earnout fair values are closer to the maximum earnout payment amounts. For these earnouts, we provide evidence that target managers stay longer with the firm after the acquisition. Moreover, earnout fair value adjustments are small, with low standard deviation, and more upward adjustments that resemble adjustments for the time value of money. This is consistent with the inclusion of earnout provisions with high probabilities that earnout thresholds will be met when earnouts are used to retain target firm managers. Finally, when acquiring firms include earnouts to provide effort incentives to target managers, earnout fair values approach the midrange of zero and the maximum earnout payment amount, where effort incentives are greatest.

We also investigate the information content of quarterly earnout fair value adjustments required by SFAS 141(R). Earnout fair value adjustments reflect changes in the acquiring firm's assessment of the target's value and the expected benefits of the acquisition. This information is especially valuable in the context of earnouts, where most target firms are private and the market is not well informed. We document that earnout fair value adjustments provide valuable information to the market in their valuation of acquiring firms. We find that the market response to earnout fair value adjustments is significantly positive, after controlling for the direct effect of these adjustments on reported earnings. This suggests that the market responds favorably to the positive news associated with increases in earnout fair values and unfavorably to the negative news of downward adjustments. Furthermore, these findings are driven primarily by earnouts with income-based financial performance measures.

Finally, we examine the link between earnout fair value adjustments and acquisition-related financial reporting outcomes, specifically, goodwill impairments. Prior research on goodwill impairments provides evidence that managers of acquiring firms delay goodwill impairments opportunistically (Beatty and Weber [2006], Hayn and Hughes [2006], Li et al. [2011], Li and Sloan [2012], Ramanna and Watts [2012]). In contrast to these prior studies, in our earnout setting, goodwill impairments are more likely to be

timely and relevant. As predicted, we find that earnout fair value adjustments are negatively associated with the likelihood of contemporaneous and future goodwill impairments.

Our study makes four primary contributions. First, our findings contribute to the literature on earnouts and, more generally, the literature on contract design and incentives. By exploiting the new earnout fair value information required by SFAS 141(R), we provide new insights into previously documented economic determinants of earnout use, while investigating additional unexplored determinants. Specifically, we provide evidence on the relation between earnout characteristics and economic motivations to resolve moral hazard and adverse selection problems, bridge valuation gaps, and retain target firm managers. Second, by examining the information content of earnout fair value adjustments required by SFAS 141(R) and analyzing the impact of these adjustments on market participants' valuation of acquiring firms, we contribute to understanding how mandated accounting information recognized in financial statements improves the information environment in a way that is relevant to market participants. Third, our evidence on the information content of earnout fair value adjustments contributes to the literature on the reliability of fair value measurements. Finally, our study establishes a link between earnout fair value adjustments and the likelihood of contemporaneous and future goodwill impairments, and contributes to the literature on goodwill impairments by identifying leading and timely indicators of goodwill impairments.

2. Earnouts

2.1 ACCOUNTING FOR EARNOUTS

Accounting Principles Board (APB) Opinion 16 (APB [1970]) initially specified the accounting for earnouts. Under APB 16, future payments to be made as part of a business combination agreement were included in the purchase price and recorded at the acquisition date if these payments were made "unconditionally" with amounts determinable at the acquisition date (e.g., amounts placed in escrow for a specific period of time). If payments were contingent on the outcome of future events, as for earnouts, then these contingent payments were disclosed at the time of acquisition, but not recorded as a liability until the contingency was resolved. When the contingency was resolved, the corresponding payments were recognized as an addition to the purchase price and generally recorded as goodwill.

SFAS No. 141 (FASB [2001a]) superseded APB 16 but did not substantially modify the accounting for, or the disclosure of, earnouts. Overall, the earnout-related information disclosed at that time was minimal and earnouts impacted the acquirers' financial statements only when the contingencies were resolved and earnout payments were made (or it was reasonably assured they would be made). On the balance sheet, (short-term) liabilities were recognized after the contingencies were resolved but before

the payments were made. On the income statement, only indirect expenses were recognized (generally related to goodwill impairments) after earnout payments were made.

In 2007, SFAS 141 was revised to include significant changes to the accounting treatment of earnouts.[2] These changes considerably expanded the earnout-related information available and the impact of earnouts on acquirers' financial statements. Specifically, SFAS 141(R) requires acquiring firms to recognize all assets acquired and liabilities assumed, measured at their fair values as of the acquisition date.[3] Accordingly, firms must estimate the fair value of earnouts and include the fair value in the acquisition purchase price as of the acquisition date. In addition, firms must adjust earnout fair values each quarterly reporting period. When earnout payments are in the form of cash payments, transfers of other assets, and/or equity payments settled with a variable number of shares, earnout fair values are recorded as liabilities. Subsequent adjustments to the fair value of the earnout liabilities must be recorded through earnings at each reporting date until the contingencies are resolved. When earnout payments are in the form of equity payments settled with a fixed number of shares, earnout fair values are recorded as equity, and subsequent settlement differences are accounted for within equity as the contingencies are resolved. Approximately 3% of the earnout provisions in our sample are classified as equity. As a result, our discussion focuses on earnouts that are classified as liabilities.[4]

2.2 PRIOR LITERATURE ON EARNOUTS

Prior research on earnouts primarily examines the circumstances where earnout provisions are more likely to be included in acquisition agreements. Kohers and Ang [2000] study a sample of earnout provisions over the period 1984–1996, Datar, Frankel, and Wolfson [2001] analyze acquisitions completed between 1990 and 1997, and Chatterjee, Erickson, and Weber [2004] examine a sample of earnouts in the United Kingdom from 1998 to 2001. All three studies reach similar conclusions: earnouts help acquirers hedge risk and reduce acquisition costs when there is a high degree of information asymmetry about target firms. Overall, they find that firms are more likely to include earnout provisions when targets are small, privately held, or service companies; have a high return on assets or large amounts

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[2] The FASB Staff Position FAS 141(R)-1 (FASB [2009]) issued in April 2009 amends and clarifies SFAS 141(R).

[3] SFAS 141(R) applies to acquisitions completed on or after the beginning of the first annual reporting period beginning on or after December 15, 2008. SFAS 141(R) is now Accounting Standards Codification (ASC) 805 (FASB [2010]). For familiarity reasons, we will refer to SFAS 141(R) throughout this study when referring to the current accounting standard for business combinations, that is, SFAS 141(R) and ASC 805.

[4] See appendix A for an example of the earnout-related information available in corporate filings after the adoption of SFAS 141(R) and appendix B for a simplified hypothetical example of accounting for a liability classified earnout.

of intangible assets from different industries from the acquirers; or operate in high-tech industries with high research and development (R&D), high sales growth, and high market-to-book ratios. Kohers and Ang [2000] and Chatterjee, Erickson, and Weber [2004] also provide evidence that acquisition premiums are greater when earnouts are included in acquisition agreements. More recently, Cain, Denis, and Denis [2011] examine the terms of earnout provisions included in acquisitions completed between 1994 and 2003. Their findings suggest that earnouts are larger when targets operate in industries with high-growth or high-return volatility, consistent with earnouts being structured to minimize the costs of valuation uncertainty.[5]

3. Hypothesis Development

3.1 RATIO *EOFV/EOMAX*

Prior research suggests that earnouts help reduce agency costs in acquisitions. Datar, Frankel, and Wolfson [2001] investigate the occurrence of earnouts, while Cain, Denis, and Denis [2011] study the maximum earnout payment amounts. We take advantage of the newly available earnout fair value information required by SFAS 141(R), specifically the initial earnout fair value (*EOFV*) and the ratio of the initial earnout fair value to the maximum earnout payment amount (*EOFV/EOMax*), to shed additional light on the economic determinants of earnout use in acquisition agreements.

EOFV reflects the acquirer's expectations that earnout thresholds will be achieved and future earnout payments will be made, while *EOMax* represents the maximum payout. Hence, *EOFV/EOMax* reflects the acquirer's expected earnout payments relative to the maximum payment amount. This ratio captures the following key elements that allow us to provide new insights into the economic motivations of earnouts. First, *EOFV/EOMax* reflects the acquirer's estimated probabilities that earnout thresholds will be met and future earnout payments will be made. Second, *EOFV/EOMax* reveals the effort incentives to target managers underlying the earnout provisions. The ratio provides insights into the potential for target managers to receive larger earnout payments through additional effort to the extent that that effort increases the probability of achieving earnout thresholds.[6] Finally, *EOFV/EOMax* provides an approximation of the difference between the target firm's and acquiring firm's expectations. *EOFV* reflects the acquirer's expected value of the earnout, while the target's expected value of the earnout, although unobservable, likely exceeds the acquirer's expected

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[5] In a contemporaneous study, Allee and Wangerin [2013] investigate how auditing affects the design of earnout provisions in acquisition agreements after the adoption of SFAS 141(R). They find that firms are less likely to include earnouts after the adoption of SFAS 141(R), but that this effect is moderated in the presence of a high-quality auditor.

[6] Greater opportunities for larger payouts are similar in spirit to increased sensitivity of managers' wealth to firm performance, which is a common metric in prior literature on bonus payouts (Lambert and Larcker [1987]) and equity holdings (Hall and Liebman [1998]).

value, but cannot be greater than *EOMax*. Therefore, *EOFV/EOMax* provides insights into the valuation gap between the parties, where valuation gaps increase with smaller ratios.

The following sections outline how we employ the ratio *EOFV/EOMax* in our predictions of the economic determinants of earnout provisions in acquisition agreements.[7] Although a combination of these motivations likely drives earnout contract design, we present hypotheses for each economic determinant holding the other motivations constant.

3.2 EARNOUTS TO RESOLVE MORAL HAZARD PROBLEMS

Earnouts help resolve moral hazard problems by linking payouts with measurable outcomes that occur after an acquisition. Effort incentives vary with the probability of meeting earnout thresholds. As an illustration, consider a common earnout contract that pays zero until reaching a threshold performance target P^*. For any performance P greater than or equal to P^*, the payout is *EOMax*. Assuming stochastic dominance in effort, where greater effort in time t increases the probability that $P_{t+1} > P^*$, it follows that the incentives decrease as $|E_t(P_{t+1}) - P^*|$ increases. Thus, the incentives are greatest when $E_t(P_{t+1}) = P^*$.

If we also assume that the target firm and the acquiring firm agree on the distribution of P_{t+1}, the relation between earnout incentives and the initial earnout fair value estimate, *EOFV*, is as follows:

$$EOFV = EOMax^{\times} \left(\Pr\left(P_{t+1} > P^* \right) \right). \tag{1}$$

Following equation (1), and considering the relation between earnout incentives and $E_t(P_{t+1})$, the incentives provided by the earnout decline as *EOFV* approaches *EOMax*. Similarly, as *EOFV* approaches zero, the incentives are also weaker. Thus, the incentives are greatest when *EOFV* approaches the midrange of possible earnout payouts (i.e., amounts between zero and *EOMax*). The general relation between earnout incentives, fair values, and contract structure outlined here also applies to other commonly observed earnout contracts.[8] In summary, regardless of the specific earnout contract structure and assumptions about the distribution of

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[7] In our discussion, and throughout our study, we assume that managers of private target firms have significant ownership positions in the firms they manage and thus reap the greatest economic benefits from earnouts, similar to Cain, Denis, and Denis [2011] (see footnotes 10 and 17 in Cain, Denis, and Denis [2011]). This assumption is consistent with the evidence in Ang, Cole and Lin [2000] that, out of 1,708 small private firms, 73% are managed by owners. To provide evidence on this issue in our sample, we gather information on top-level executives for 76% of the target firms in our earnout sample. In this subset, 56% of the top-level target executives are founders of the target firms. Unfortunately, we are not able to find ownership information, as most target firms are private. However, founding executives likely hold considerable ownership stakes in their firms. Furthermore, top-level executives of private target firms likely hold large ownership stakes in the firms they manage, even if they are not founders.

[8] To further illustrate, consider another common earnout contract that pays zero until reaching a minimum threshold performance target $\underline{P}$, at which the payout is *EOMin*. The earnout payout then increases linearly in performance until reaching a maximum

$E_t(P_{t+1})$, earnout incentives are greatest when *EOFV* lies in the midrange of payouts and decline as *EOFV* moves toward *EOMax* or the minimum payout.[9] This leads to our first hypothesis:

H1: Ceteris paribus, earnout fair values converge toward the midrange of possible earnout amounts when acquiring firms include earnout provisions in acquisition agreements to resolve moral hazard problems.

Based on the discussion above, we use the ratio *EOFV/EOMax* to test H1. As *EOFV/EOMax* approaches one, the target manager's upside potential and returns to effort decline. Similarly, at the other extreme, as *EOFV/EOMax* approaches zero, the probability of meeting earnout thresholds decreases, which also reduces returns to effort. In contrast, when *EOFV/EOMax* approaches the midrange of zero and one, the returns to effort are greatest. Thus, the ratio *EOFV/EOMax* captures the effort incentives earnouts provide to target managers, where the incentives are strongest when *EOFV/EOMax* approaches the midrange of possible values (i.e., between zero and one), and decrease as *EOFV/EOMax* moves away from the midrange.

3.3 EARNOUTS TO RESOLVE ADVERSE SELECTION PROBLEMS AND BRIDGE VALUATION GAPS

Earnouts also help resolve agency problems that result from information asymmetry between acquiring and target firms, where greater information asymmetry leads to greater adverse selection problems and greater valuation gaps. Earnouts help resolve adverse selection problems and bridge valuation gaps by offering payment schedules that are acceptable to both parties, despite their divergent valuations of the target firm (Bruner [2001], Cain, Denis, and Denis [2011]). The target firm will accept the terms of a proposed acquisition when the sum of the initial fixed consideration and the target firm's expected value of the earnout payments are greater than, or equal to, its perceived value of the target. At the same time, the acquiring firm will accept the terms of the transaction when the sum of the initial fixed consideration and the acquirer's expected value of the earnout

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threshold performance target $\overline{P}$, where the maximum earnout payment *EOMax* is achieved. When $P > \overline{P}$, there is no incremental earnout payout. If we continue to assume stochastic dominance in effort, where greater effort in time t increases $E_t(P_{t+1})$, it follows that the incentives are greatest when $\underline{P} < E_t(P_{t+1}) < \overline{P}$. The incentives decrease as $E_t(P_{t+1}) - \overline{P}$ increases and $E_t(P_{t+1}) > \overline{P}$. Similarly, the incentives decrease as $\underline{P} - E_t(P_{t+1})$ increases and $E_t(P_{t+1}) < \underline{P}$. As a result, the incentives provided by the earnout are greatest when *EOFV* is in the region where $\underline{P} < E_t(P_{t+1}) < \overline{P}$.

[9] The premise of incentives declining toward the tails of a probability distribution closely resembles Healy's [1985] discussion of bonus contracts, where the incentives decline as the probability of obtaining the bonus becomes either very unlikely or almost certain. Similar incentives are also presented in Murphy [2001], where, under a typical bonus plan, no bonus is paid until a specified performance threshold is met. The bonus then increases with performance until reaching a "cap." Murphy [2001] describes the range between the performance threshold and the cap as the "incentive zone."

payments is smaller than, or equal to, its perceived value of the target. Because of divergence in the parties' expected values of the future earnout payments, earnouts help resolve adverse selection problems and bridge valuation gaps in acquisitions.

As discussed in section 3.1, the ratio *EOFV/EOMax* provides an approximation of the valuation gap between the acquirer and the target, where a small ratio reflects a large valuation gap and a large ratio reflects a small valuation gap. It follows that earnouts designed to resolve adverse selection problems and bridge valuation gaps are more likely to have small values of *EOFV/EOMax*. This leads to our second hypothesis:

H2: Ceteris paribus, earnout fair values are a smaller percentage of maximum earnout payment amounts when acquiring firms include earnout provisions in acquisition agreements to resolve adverse selection problems and bridge valuation gaps.

3.4 EARNOUTS TO RETAIN TARGET MANAGERS AND CONSERVE CASH

In addition to mitigating moral hazard and adverse selection problems, earnouts help acquiring firms retain certain target managers with unique skills, who bring value to the firm and are costly to replace. One way to retain select target managers at a low cost is to include earnouts with greater probabilities of meeting earnout thresholds. Even though earnout provisions do not include specific retention clauses, the implied assumption is that the probability of achieving earnout thresholds declines if the select target manager leaves the firm and the cost of replacing that manager is high. In this case, the fair value of the earnout approaches the maximum earnout payment amount, and the ratio of *EOFV/EOMax* approaches one. This leads to our next hypothesis:

H3a: Ceteris paribus, earnout fair values approach maximum earnout payment amounts when acquiring firms include earnout provisions in acquisition agreements to retain target firm managers.

Acquiring firms with considerable cash constraints may also include earnouts to delay payments and conserve cash in the near term. In this case, to reduce the contracting costs of imposing risk on target managers, acquiring firms include earnout provisions with high probabilities of meeting earnout thresholds. Similar to H3a, large *EOFV/EOMax* ratios are likely when acquiring firms use earnouts primarily to delay payments and conserve cash. This leads to the following hypothesis:

H3b: Ceteris paribus, earnout fair values approach maximum earnout payment amounts when acquiring firms include earnout provisions in acquisition agreements to conserve cash in the near term.

Both the desire to retain target managers, who are costly to replace, and to conserve cash provide economic explanations for earnout provisions with high probabilities that earnout thresholds will be met, and

corresponding initial earnout fair values that approach maximum earnout payment amounts.

To provide further evidence on H1 through H3b, we investigate characteristics (e.g., magnitude, standard deviation, and direction) of earnout fair value adjustments, and predict that these characteristics vary with the economic motivations of earnout use presented in these hypotheses. Furthermore, to shed additional insights regarding H3a and the motivation to include earnouts to retain target firm managers, we investigate the length of time top-level executives of target firms stay with the firm after the acquisition.

3.5 INFORMATION CONTENT OF EARNOUT FAIR VALUE ADJUSTMENTS

For liability classified earnouts, in addition to reporting initial earnout fair values at the time of the acquisition, SFAS 141(R) requires firms to remeasure earnout fair values and record appropriate adjustments each quarterly reporting period. These earnout fair value adjustments provide information to market participants about the acquiring firms' revised expectations of the target firms' future performance and the likelihood that earnout thresholds will be achieved and corresponding earnout payments made. Specifically, an increase in the earnout fair value (i.e., liability) indicates that the likelihood of achieving earnout thresholds is greater than previously anticipated by the acquirer, while a decrease indicates a decline in the expected likelihood of achieving earnout thresholds.

These earnout fair value adjustments also have a direct effect on earnings where an increase (decrease) in the earnout liability results in a decrease (increase) in earnings. Because an increase (decrease) in the liability has a negative (positive) effect on earnings, but reveals a positive (negative) signal about the likelihood of the target achieving earnout thresholds, the effect on earnings contradicts the information revealed.[10] This contrast introduces a tension in how market participants view the information provided by earnout fair value adjustments. We predict that market participants value the information provided by earnout fair value adjustments beyond their direct effect on earnings.

In summary, earnout fair value adjustments reflect changes in the acquiring firms' assessments of the value of the target firms and the expected benefits of the acquisitions. This information is valuable to market participants, especially in the context of earnouts where most target firms are private, for which the market is not well informed. Moreover, because SFAS 141(R) requires firms to recognize earnout fair value adjustments directly through reported earnings, this information is prominent and easily accessible to financial statement users. Therefore, after controlling for the direct effect of earnout fair value adjustments on reported earnings, we predict that these

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[10] These contradictory income effects are similar to the fair values of liabilities examined in Barth, Hodder, and Stubben [2008].

adjustments provide valuable information to market participants about the benefits of the acquisitions and/or the acquired targets' worth, and thus the value of acquiring firms. This leads to our fourth hypothesis:

H4: The market valuation of acquiring firms is associated with the acquisition performance information provided by earnout fair value adjustments.

To provide further evidence on the information content of earnout fair value information, we investigate the relation between earnout fair value adjustments and the likelihood of goodwill impairments.[11] Prior studies on goodwill impairments provide evidence that managers of acquiring firms exploit the discretion in SFAS 142 (FASB [2001b]) to opportunistically delay goodwill impairments (Li et al. [2011], Li and Sloan [2012], Ramanna and Watts [2012]).[12] These studies, however, identify the need for goodwill impairments at the firm level, generally using market indications of such impairments (e.g., firm-level book-to-market ratio). We contribute to this literature by examining a novel and rich setting. Contrary to acquisitions with no earnout, for acquisitions with earnouts, SFAS 141(R) requires acquiring firms to reestimate every quarter a portion of the acquisition purchase price (i.e., earnout fair values). Adjustments resulting from this reestimation (i.e., earnout fair value adjustments) are prominently disclosed in financial statements, affect reported earnings, and are linked to future verifiable outcomes (i.e., earnout payments). Given that part of the goodwill recorded in an acquisition is likely related to the initial earnout fair value, downward earnout fair value adjustments should coincide with impairments of the related goodwill. As a result, managers of acquiring firms have incentives to record goodwill impairments in a timely manner after adjusting earnout fair values down to maintain their credibility and reputation with market participants. Consequently, in our earnout setting, goodwill impairments are likely to be timely and relevant.

We expect earnout fair value adjustments to be negatively associated with the likelihood of goodwill impairments. Downward earnout fair value adjustments reflect downward revisions of the acquiring firm's expectations about the target firm's future performance. Therefore, we predict downward earnout fair value adjustments to be associated with greater likelihood of goodwill impairments. In contrast, we expect upward earnout fair value adjustments to be related to decreases in the likelihood of goodwill impairments. This leads to our fifth hypothesis:

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[11] We note that, regardless of whether earnouts are classified as equity or liability, earnout fair value adjustments are not mechanically related to past, concurrent, or future goodwill impairments (as illustrated in appendix B). Goodwill impairments are recorded separately from earnout fair value adjustments, at the discretion of acquiring firms.

[12] Prior work documents similar findings in the pre-SFAS 142 period (Hayn and Hughes [2006], Li and Sloan [2012]) and the SFAS 142 transition period (Beatty and Weber [2006]).

H5: Earnout fair value adjustments are negatively associated with the like-lihood of goodwill impairments.

Together, H4 and H5 shed light on the information conveyed by earnout fair value adjustments, recently mandated by SFAS 141(R), by examining the effect of the information content of these adjustments on the market's valuation of acquiring firms and on acquisition-related financial reporting outcomes.

4. Data and Sample Selection

4.1 COMPREHENSIVE SAMPLE OF ACQUISITIONS

We obtain data from the Thomson Reuters Securities Data Company (SDC) Platinum Mergers and Acquisitions database, the Compustat annual and quarterly databases, the CRSP daily returns database, and the I/B/E/S database. To compile a comprehensive sample of acquisitions with earnout information, we identify acquisitions by U.S. public acquiring firms using the SDC database, which records the maximum amount of earnout payments (if any). We require strictly positive total assets for acquiring firms in the quarterly Compustat database, and sufficient data to construct explanatory variables. We gather additional information by hand-collecting data on acquisitions that are covered by the SDC database but marked as having missing deal values and/or missing maximum earnout payment amounts. For these acquisitions, we search corporate filings in the Securities Exchange Commission's EDGAR database for any earnout-related information.

We compile a comprehensive sample of 10,816 acquisitions over the period from July 1, 2006 to June 30, 2011. Out of these 10,816 acquisitions, 6,734 (4,082) are completed pre- (post-) SFAS 141(R).[13] Furthermore, 994 of these acquisitions contain earnout provisions: 618 in the pre- and 376 in the post-SFAS 141(R) period. Approximately 9% of the acquisitions in our comprehensive sample include earnouts, and this fraction remains constant before and after the adoption of SFAS 141(R).

Using a subset of this comprehensive sample, we examine the relation between the adoption of SFAS 141(R) and earnout provisions.[14] Specifically, we estimate a probit model of earnout use to test whether the probability of including earnouts in acquisition agreements varies with the adoption of SFAS 141(R), while controlling for acquirer, target, and deal characteristics expected to impact decisions to use earnouts. In unreported tests, and in line with prior research, we find significant positive relations between the probability of earnouts and the following target characteristics: the growth

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[13] SFAS 141(R) applies to acquisitions completed on or after the beginning of the first annual reporting period beginning on or after December 15, 2008.

[14] Due to data requirements for these tests, we use a subset of 5,391 acquisitions where 3,422 (1,969) are completed pre- (post-) SFAS 141(R) and 803 contain earnout provisions (507 pre- and 296 post-SFAS 141(R)).

opportunities, R&D intensity, and stock return volatility of the target's industry as well as the likelihood of the target firm being private. We also find significant negative relations between the probability of earnouts and the acquiring firm's leverage as well as the likelihood of the target firm operating in a different industry from the acquiring firm. Finally, we do not find a significant relation between the probability of earnouts and the adoption of SFAS 141(R).[15] Overall, our findings indicate that the additional requirements introduced by SFAS 141(R) did not alter acquiring firms' propensity to include earnouts in acquisition agreements considerably.

4.2 SAMPLE OF POST-SFAS 141(R) EARNOUTS

We compile a sample of acquisitions with earnout provisions completed after the adoption of SFAS 141(R) covering the sample period from January 1, 2009 to June 30, 2011. This process yields a total sample of 329 acquisitions with earnouts, which consists of 321 liability classified earnouts, 4 equity classified earnouts, and 4 earnouts with a portion classified as liability and a portion classified as equity.

To gather additional detailed information on this sample, we hand-collect initial earnout fair value estimates, subsequent earnout fair value adjustments, and earnout design details (such as starting date, length of the earnout measurement period, performance measures, payment structure, etc.) from corporate filings in the EDGAR database (forms 8-K, 10-Q, and 10-K). See appendix A for an example of the earnout-related information available in corporate filings. Finally, using LexisNexis as well as several professional networking sites (e.g., LinkedIn), we hand-collect information on top-level executives of the target firms in our sample (such as founder/ownership information, role in target firm, arrival and departure dates, etc.).

From this sample of post-SFAS 141(R) earnouts, we select specific sub-samples based on the focus of the tests and related data requirements. We introduce and define these subsamples as they are employed in our analyses.

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[15] We further examine whether the relation between the propensity to include earnouts and acquirer, target, and deal characteristics changed after the adoption of SFAS 141(R) by including interaction variables of a post-SFAS 141(R) indicator variable with these characteristics. After including these interactions, we continue to find no evidence of a significant relation between the use of earnouts and the adoption of SFAS 141(R). In addition, none of the interaction variables are significant, except for a positive and significant marginal effect for the interaction of the post-SFAS 141(R) indicator variable with the target industry ratio of employees to total assets, and a significantly negative marginal effect for the interaction with the natural logarithm of the number of previous acquisitions made by the acquiring firm in the target industry. This suggests that, in the post-SFAS 141(R) period, earnouts are more likely to be included when targets are service companies and less likely to be included when acquiring firms acquired similar target firms in the past.

5. *Economic Determinants of Earnouts*

5.1 MODELS AND VARIABLE DEFINITIONS

5.1.1. EOFV/EOMax Values. Following our development of H1 through H3b, we classify observations into three groups based on values of *EOFV/EOMax*. As discussed in section 3.1, *EOFV/EOMax* captures key elements that shed new light on the economic determinants of earnouts. Specifically, we conjecture that the ratio reflects different economic motivations across its range of values. Small values of *EOFV/EOMax* consist of earnout observations for which we predict that the economic motivations to use earnouts to resolve adverse selection problems and bridge valuation gaps are strong, whereas the motivations to address moral hazard problems are weak. Large values of *EOFV/EOMax* include earnouts for which we predict that the motivations to include earnouts to resolve adverse selection problems, address moral hazard problems, or bridge valuation gaps are weak, whereas the motivations to retain target managers and conserve cash are strong. Finally, we predict that earnouts with *EOFV/EOMax* values around the midrange of zero and one reflect instances where effort incentives to address moral hazard concerns are strong. In our tests, we define a "Low," "Middle," and "High" group, where the Low (High) group corresponds to values of *EOFV/EOMax* in the bottom (top) 25%, and the Middle group corresponds to *EOFV/EOMax* values between 25% and 75%.[16]

5.1.2. EOFV/EOMax and Economic Determinants of Earnouts. To test our first set of hypotheses on the economic determinants of earnouts, we investigate the relation between *EOFV/EOMax* and measures of the hypothesized determinants. We estimate the following model for earnout i:

$$EOFV/EOMax_i = \beta_0 + \beta_1 IndTobinQ_j + \beta_2 IndRND_i + \beta_3 IndRetVol_i$$
$$+ \beta_4 TargetSize_i + \beta_5 TargetNonPrivate_i$$
$$+ \beta_6 CrossInd_i + \beta_7 IndHomogeneity_i$$
$$+ \beta_8 AcqCFO_i + \varepsilon_i, \tag{2}$$

where:

EOFV/EOMax = Initial earnout fair value estimate scaled by the maximum earnout payment amount.

IndTobinQ = Median Tobin's Q (Tobin [1969]) of the target's three-digit SIC industry in the fiscal year prior to the acquisition announcement.

IndRND = Median R&D-to-sales ratio of the target's three-digit SIC industry in the fiscal year prior to the acquisition announcement.

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[16] For sensitivity purposes, we replicate our tests using (1) the bottom (top) 15% and (2) the bottom (top) 30% to define the Low (High) *EOFV/EOMax* groups. The findings remain qualitatively similar.

$IndRetVol =$ Annualized volatility of the value-weighted return of the target's three-digit SIC industry, measured over the last 100 days prior to the acquisition announcement.

$TargetSize =$ Natural logarithm of the sum of the initial fixed payment for the acquisition and the initial earnout fair value estimate, as a measure of the fair value of the target firm at the time of the acquisition.

$TargetNonPrivate =$ Indicator variable equal to one if the target is not a private company (e.g., a public company, a subsidiary, etc.), zero otherwise.

$CrossInd =$ Indicator variable equal to one if the acquirer's three-digit SIC industry (primary or secondary SIC) and the target's primary three-digit SIC are different, zero otherwise.

$IndHomogeneity =$ Average partial correlation coefficient on the industry return index of the target's three-digit SIC industry, using a two-factor regression model of each firm's stock return on an equal-weighted industry return index and an equal-weighted market index over the five years 2004–2008 (Parrino [1997]).

$AcqCFO =$ Acquirer's cash flow from operations scaled by total assets in the fiscal year prior to the acquisition announcement.

Consistent with prior research (e.g., Datar, Frankel, and Wolfson [2001], Cain, Denis, and Denis [2011]), we include the following target industry characteristics: growth opportunities (*IndTobinQ*), R&D intensity (*IndRND*), and return volatility (*IndRetVol*). We also include the size of the target (*TargetSize*). Information asymmetry between the target and the acquirer is increasing in *IndTobinQ, IndRND,* and *IndRetVol,* and decreasing in *TargetSize.* We conjecture that adverse selection problems and valuation gaps are more severe in acquisitions of firms that are small and from industries with high growth opportunities, R&D, and return volatility. Therefore, we rely on these four proxies of information asymmetry to test H2, which predicts that *EOFV/EOMax* is small when *IndTobinQ, IndRND,* and *IndRetVol* are large and *TargetSize* is small.

We also identify whether the target is nonprivate (*TargetNonPrivate*) and operates in a different industry from the acquirer (*CrossInd*), where information asymmetry between the target and the acquirer is decreasing in *TargetNonPrivate* and increasing in *CrossInd.* In line with Cain, Denis, and Denis [2011], we conjecture that the importance of the target managers' efforts is increasing in cross-industry acquisitions. Also, prior research provides evidence that majority ownership by owner–managers is very common in private firms, but rare in public firms, especially subsidiaries of public firms (Holderness, Kroszner, and Sheehan [1999], Coates [2010],

Cain, Denis, and Denis [2011]). Thus, we predict that managers of private target firms will be more responsive to earnout incentives than managers of nonprivate target firms. Therefore, *TargetNonPrivate* and *CrossInd* are proxy variables to test H1. Empirically, H1 predicts that *EOFV/EOMax* falls in the midrange of zero and one when acquiring firms use earnouts to address moral hazard issues, as reflected by *TargetNonPrivate* equal to zero and *CrossInd* equal to one.

In some instances, the cost of replacing target managers is sufficiently high such that retaining these managers outweighs the need to offer effort incentives to them. To provide evidence on the use of earnouts to help retain target managers, and avoid the high cost of replacing them, we use a measure of the homogeneity of the target industry that is based on the correlation of returns in the target industry, *IndHomogeneity*, as in Parrino [1997]. Brickley [2003] suggests that industry homogeneity reflects a deeper pool of potential replacements for existing managers. Thus, less homogeneity in the target industry indicates that the pool of potential managers is small and the cost of replacing target managers is high. Consequently, H3a predicts that *EOFV/EOMax* is large when *IndHomogeneity* is low, and acquirers include earnout provisions to help retain target managers. Finally, we consider acquiring firms' cash flow from operations (*AcqCFO*) as an additional economic determinant of earnout use. To the extent that acquirers include earnouts to conserve cash, H3b predicts that *EOFV/EOMax* is large when *AcqCFO* is low.

5.1.3. EOFV/EOMax and Target Manager Retention. To provide additional insights regarding H3a and the motivation to include earnouts to retain target firm managers, we examine the relation between *EOFV/EOMax* and the length of time target managers stay with the firm after the acquisition. We estimate the following model for earnout i:[17]

$$
\begin{aligned}
TargetExec\_Variable_i = {} & \beta_0 + \beta_1 EOFV/EOMax\_Middle_i \\
& + \beta_2 EOFV/EOMax\_High_i \\
& + \beta_3 AcqRet\_LengthStay_i \\
& + \beta_4 IndRet\_LengthStay_i + \varepsilon_i,
\end{aligned} \tag{3}
$$

where:

$EOFV/EOMax\_Middle =$ Indicator variable equal to one if the earnout is in the Middle *EOFV/EOMax* group, zero otherwise.

$EOFV/EOMax\_High =$ Indicator variable equal to one if the earnout is in the High *EOFV/EOMax* group, zero otherwise.

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[17] Observations in equation (3) are at the earnout level. When more than one top-level target executive is identified for an earnout, we select the executive with the longest length of stay in the firm for our test.

$AcqRet\_LengthStay =$ Buy-and-hold stock return of the acquirer over the length of stay of the target manager (i.e., between the acquisition completion date and the earliest of (1) the target manager leave date and (2) June 28, 2013).

$IndRet\_LengthStay =$ Buy-and-hold value-weighted stock return of the target's three-digit SIC industry over the length of stay of the target manager (i.e., between the acquisition completion date and the earliest of (1) the target manager leave date and (2) June 28, 2013).

The dependent variable, *TargetExec_Variable*, represents the following two measures capturing the target manager's length of stay: *TargetExec_LengthStayPct* is the number of days the target manager stays with the firm after the acquisition divided by the total number of days between the acquisition completion date and June 28, 2013; and *TargetExec_LengthUntilLeave* is the number of years the target manager stays with the firm after the acquisition. We focus on the variables *EOFV/EOMax_Middle* and *EOFV/EOMax_High* to examine differences in the length of stay of target managers across the groups of *EOFV/EOMax*. H3a predicts that *EOFV* approaches *EOMax* when acquiring firms use earnouts to retain target managers. Consequently, we expect target managers to stay longer with the firm when *EOFV/EOMax* is large. Finally, we include two additional independent variables to control for factors that potentially impact a target manager's decision to stay or leave the firm: the performance of the acquiring firm (*AcqRet_LengthStay*) and of the target industry (*IndRet_LengthStay*) in the period after the acquisition during which the target manager is still with the firm.

5.1.4. Earnout Fair Value Adjustments and Economic Determinants of Earnouts. To provide additional evidence on H1 through H3b, we investigate characteristics of earnout fair value adjustments required by SFAS 141(R), including magnitude, standard deviation, and direction. Using the fair value adjustments from earnouts designed to help resolve moral hazard problems (where the ratio *EOFV/EOMax* lies in the midrange of zero and one) as a benchmark, we predict that earnout fair value adjustments reflect the resolution of high uncertainty when firms include earnouts to address adverse selection and valuation gap issues. Specifically, we expect earnout fair value adjustments to be larger, with higher standard deviations, and in different directions (upward or downward) for earnouts with low *EOFV/EOMax*. In contrast, when firms employ earnouts to retain target managers or delay cash payments, earnout fair value adjustments are more likely to correspond to systematic adjustments for the time value of money. Thus, for earnouts with high *EOFV/EOMax*, we predict that fair value adjustments exhibit smaller magnitudes and lower standard deviations and are more often upward than downward.

To test these predictions, we estimate the following model for earnout i:

$$EOFVAdj\_Variable_i = \beta_0 + \beta_1 EOFV/EOMax\_Low_i + \beta_2 EOFV/EOMax\_High_i$$
$$+ \beta_3 IndRetVol\_EO_i + \beta_4 IndRet\_EO_i + \beta_5 NbQtrs_i$$
$$+ \beta_6 EOMax/AcqMVE_i + \varepsilon_i, \tag{4}$$

where:

$EOFV/EOMax\_Low =$ Indicator variable equal to one if the earnout is in the Low *EOFV/EOMax* group, zero otherwise.

$EOFV/EOMax\_High =$ Indicator variable equal to one if the earnout is in the High *EOFV/EOMax* group, zero otherwise.

$IndRetVol\_EO =$ Annualized volatility of the value-weighted stock return of the target's three-digit SIC industry, averaged over all quarters of the observed earnout period.

$IndRet\_EO =$ Buy-and-hold value-weighted stock return of the target's three-digit SIC industry over the observed earnout period.

$NbQtrs =$ Number of quarters in the observed earnout period.

$EOMax/AcqMVE =$ Maximum earnout payment amount scaled by the acquirer's market value of equity prior to the acquisition completion date.

The dependent variable, *EOFVAdj_Variable*, represents the following three characteristics of earnout fair value adjustments: *EOFV_StdDev* is the standard deviation of the underlying earnout fair value divided by the mean earnout fair value over the observed earnout period, *EOFVAdj_Max* is the absolute value of the maximum earnout fair value adjustment divided by the mean earnout fair value over the observed earnout period, and *EOFVAdj_UpDownPct* is the difference between the number of quarters with upward earnout fair value adjustments and the number of quarters with downward earnout fair value adjustments, divided by the total number of quarters in the observed earnout period, multiplied by 100. The variables of interest *EOFV/EOMax_Low* and *EOFV/EOMax_High* are used to examine any differences in earnout fair value adjustment characteristics across the groups of *EOFV/EOMax*. The other independent variables control for factors that potentially impact the magnitude, standard deviation, and direction of earnout fair value adjustments. These control variables capture the underlying volatility (*IndRetVol_EO*) and performance (*IndRet_EO*) of the target industry during the observed earnout period, the number of quarters in the observed earnout period (*NbQtrs*), and the size of the earnout relative to the size of the acquiring firm (*EOMax/AcqMVE*).

5.2 SUBSAMPLES AND UNIVARIATE STATISTICS

From the sample of acquisitions with earnouts in the post-SFAS 141(R) period described in section 4.2, we select two subsamples to test hypotheses
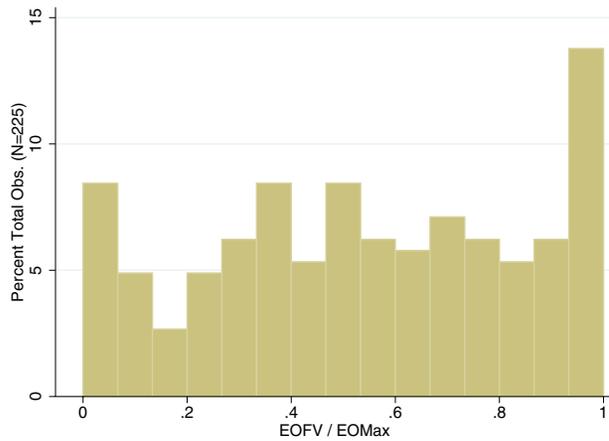
FIG. 1.—Histogram of *EOFV/EOMax* variable definition.

H1 through H3b. First, the "initial earnout fair value subsample" consists of acquisition observations with nonmissing initial earnout fair value estimates and nonmissing maximum earnout payment amounts. This subsample consists of 225 earnout observations and is used to estimate equation (2). Figure 1 plots the histogram of all *EOFV/EOMax* values for this subsample. To estimate equation (3), we focus on a subset (162 earnout observations) of this subsample for which we have relevant information on top-level target executives and available data for the related control variables.

Second, the "earnout fair value adjustment subsample" consists of acquisition observations with liability classified earnouts, nonmissing initial earnout fair value estimates, nonmissing maximum earnout payment amounts, and at least three quarters of earnout fair value adjustments. This subsample consists of 215 earnout observations and is employed to estimate equation (4).[18]

Table 1 provides univariate statistics of the variables in equations (2) and (3) for the initial earnout fair value subsample as a whole and across the three groups of *EOFV/EOMax*. Table 1 also reports the statistical significance from *t*-tests for differences in means for all variables (chi-square tests for differences in distributions for the indicator variables, *TargetNonPrivate* and *CrossInd*). For the subsample as a whole, the mean and median *EOFV/EOMax* ratio is 0.54, close to the midrange of zero and one, where we conjecture that firms include earnouts primarily to address moral hazard concerns. Looking across the *EOFV/EOMax* groups, consistent with our predictions, earnouts in the High group, where earnouts are not primarily included to resolve adverse selection problems, are related to target

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[18] There are 189 earnout observations overlapping the initial earnout fair value subsample and the earnout fair value adjustment subsample.

TABLE 1
Summary Statistics, Initial Earnout Fair Value Subsample

Variable	All (N = 225)		Low (N = 47) EOFV/ EOMax ≤ 0.25		Middle (N = 108) 0.25 < EOFV/ EOMax < 0.75		High (N = 70) EOFV/ EOMax ≥ 0.75	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
EOFV/EOMax	0.54	0.54						
IndTobinQ	1.54	1.45	1.51	1.47	1.56	1.47	1.51	1.40
IndRND	0.06	0.06	0.07*	0.06	0.07*	0.06	0.05	0.06
IndRetVol	0.24	0.21	0.26	0.22	0.23	0.19	0.23	0.21
TargetSize (in $M)	88.64	29.93	65.82	31.00	101.61	31.35	83.95	24.64
TargetSize (Log)	3.39	3.40	3.30	3.43	3.46	3.44	3.34	3.20
TargetNonPrivate	0.21	0.00	0.32*,**	0.00	0.19	0.00	0.17	0.00
CrossInd	0.42	0.00	0.32	0.00	0.44	0.00	0.46	0.00
IndHomogeneity	0.11	0.08	0.12	0.11	0.11	0.08	0.11	0.08
AcqCFO	0.08	0.09	0.05*,**	0.06	0.09	0.10	0.08	0.09
TargetExec_ LengthStayPct	0.73	1.00	0.63*	0.84	0.73	1.00	0.80	1.00
TargetExec_ LengthUntilLeave (in years)	2.33	2.74	2.01*	2.18	2.28	2.57	2.59	2.99
AcqRet_LengthStay	0.42	0.17	0.27	0.11	0.48	0.28	0.41	0.03
IndRet_LengthStay	0.41	0.34	0.38	0.26	0.42	0.35	0.42	0.34

Summary statistics for the initial earnout fair value subsample as a whole and for the Low, Middle, and High *EOFV/EOMax* groups, along with statistical significance from *t*-tests for differences in means (chi-square tests for differences in distributions for *TargetNonPrivate* and *CrossInd*) across the Low, Middle, and High *EOFV/EOMax* groups. The Low (High) group corresponds to values of *EOFV/EOMax* in the bottom (top) 25%, and the Middle group corresponds to *EOFV/EOMax* values between 25% and 75%. The variables *TargetExec_LengthStayPct*, *TargetExec_LengthUntilLeave*, *AcqRet_LengthStay*, and *IndRet_LengthStay* relate to a subset (162 earnout observations) of the initial earnout fair value subsample with data to estimate equation (3) (31, 77, and 54 earnout observations in the Low, Middle, and High *EOFV/EOMax* groups, respectively, in this subset).

Variable Definitions: *EOFV/EOMax* is the initial earnout fair value estimate scaled by the maximum earnout payment amount. *IndTobinQ* is the median Tobin's Q of the target's three-digit SIC industry in the fiscal year prior to the acquisition announcement. *IndRND* is the median R&D to sales ratio of the target's three-digit SIC industry in the fiscal year prior to the acquisition announcement. *IndRetVol* is the annualized volatility of the value-weighted return of the target's three-digit SIC industry, measured over the last 100 days prior to the acquisition announcement. *TargetSize* in $M (Log) is (the natural logarithm of) the sum of the initial fixed payment for the acquisition and the initial earnout fair value estimate, as a measure of the fair value of the target firm at the time of the acquisition, in $M. *TargetNonPrivate* is an indicator variable equal to one if the target is not a private company (e.g., a public company, a subsidiary, etc.), zero otherwise. *CrossInd* is an indicator variable equal to one if the acquirer's three-digit SIC industry (primary or secondary SIC) and the target's primary three-digit SIC are different, zero otherwise. *IndHomogeneity* is the average partial correlation coefficient on the industry return index of the target's three-digit SIC industry, using a two-factor regression model of each firm's stock return on an equal-weighted industry return index and an equal-weighted market index over the five years 2004–2008 (Parrino [1997]). *AcqCFO* is the acquirer's cash flow from operations scaled by total assets in the fiscal year prior to the acquisition announcement. *TargetExec_LengthStayPct* is the number of days the target manager stays with the firm after the acquisition divided by the total number of days between the acquisition completion date and June 28, 2013. *TargetExec_LengthUntilLeave* is the number of years the target manager stays with the firm after the acquisition. *AcqRet_LengthStay* is the buy-and-hold stock return of the acquirer over the length of stay of the target manager (i.e., between the acquisition completion date and the earliest of (1) the target manager leave date and (2) June 28, 2013). *IndRet_LengthStay* is the buy-and-hold value-weighted stock return of the target's three-digit SIC industry over the length of stay of the target manager (i.e., between the acquisition completion date and the earliest of (1) the target manager leave date and (2) June 28, 2013). All continuous variables are winsorized at the 1st and 99th percentiles. *Statistically different from the High group $p <$ 0.10. **Statistically different from the Middle group $p < 0.10$.

TABLE 2
Summary Statistics, Earnout Fair Value Adjustment Subsample

Variable	All ($N=215$)		Low ($N=39$) EOFV/ EOMax ≤ 0.25		Middle ($N=108$) $0.25 <$ EOFV/ EOMax < 0.75		High ($N=68$) EOFV/ EOMax ≥ 0.75	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
EOFV/EOMax	0.56	0.56						
EOFV_StdDev	0.30	0.16	0.51*,**	0.32	0.32*	0.20	0.14	0.05
EOFVAdj_Max	49.24	20.24	84.08*,**	58.21	51.53*	29.80	25.61	6.38
EOFVAdj_ UpDownPct	12.73	0.00	−1.65*	−12.50	10.92*	10.56	23.84	5.56
IndRetVol_EO	0.23	0.22	0.23	0.24	0.23	0.22	0.23	0.22
IndRet_EO	0.22	0.17	0.25	0.23	0.22	0.16	0.20	0.17
NbQtrs	6.08	6.00	6.26	6.00	6.04	6.00	6.04	5.50
EOMax/AcqMVE	0.04	0.02	0.07*,**	0.04	0.04*	0.02	0.02	0.01

Summary statistics for the earnout fair value adjustment subsample as a whole and for the Low, Middle, and High *EOFV/EOMax* groups, along with statistical significance from *t*-tests for differences in means across the Low, Middle, and High *EOFV/EOMax* groups. The Low (High) group corresponds to values of *EOFV/EOMax* in the bottom (top) 25%, and the Middle group corresponds to *EOFV/EOMax* values between 25% and 75%.

Variable Definitions: *EOFV/EOMax* is the initial earnout fair value estimate scaled by the maximum earnout payment amount. *EOFV_StdDev* is the standard deviation of the underlying earnout fair value divided by the mean earnout fair value over the observed earnout period. *EOFVAdj_Max* is the absolute value of the maximum earnout fair value adjustment divided by the mean earnout fair value over the observed earnout period. *EOFVAdj_UpDownPct* is the difference between the number of quarters with upward earnout fair value adjustments and the number of quarters with downward earnout fair value adjustments, divided by the total number of quarters in the observed earnout period, multiplied by 100. *IndRetVol_EO* is the annualized volatility of the value-weighted stock return of the target's three-digit SIC industry, averaged over all quarters of the observed earnout period. *IndRet_EO* is the buy-and-hold value-weighted stock return of the target's three-digit SIC industry over the observed earnout period. *NbQtrs* is the number of quarters in the observed earnout period. *EOMax/AcqMVE* is the maximum earnout payment amount scaled by the acquirer's market value of equity prior to the acquisition completion date. All continuous variables are winsorized at the 1st and 99th percentiles. *Statistically different from the High group $p < 0.10$. **Statistically different from the Middle group $p < 0.10$.

firms that operate in industries where the R&D intensity is significantly lower than in the Low or Middle groups. Also as expected, target firms in the Low group are more likely to be nonprivate firms compared to the Middle group or the High group. Next, contrary to our prediction, the acquiring firms in the Low group have lower cash flow from operations than acquiring firms in the Middle or High groups. Finally, for the variables used in equation (3), target managers' length of stay with the firm after the acquisition is significantly longer for earnouts in the High group, included primarily to retain target managers, than for earnouts in the Low group, as expected.

Similar to table 1, table 2 provides univariate statistics of the variables in equation (4) for the earnout fair value adjustment subsample. The mean and median *EOFV/EOMax* ratio for this subsample is 0.56, again close to the midrange of zero and one. Moreover, the mean and median lengths of observed earnout periods are six quarters.[19] Turning to the results across

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[19] For each earnout, the "observed earnout period" refers to the number of quarters, after the acquisition and within the earnout measurement period, for which we observe earnout fair values.

the *EOFV/EOMax* groups, when moving from the High group to the Middle group, and from the Middle group to the Low group, *EOFV_StdDev* and *EOFVAdj_Max* both increase significantly. That is, earnout fair value adjustments are larger in magnitude with greater standard deviations when earnouts are more likely to be used to address adverse selection problems and bridge valuation gaps, which supports our conjectures on the determinants of earnouts. We also find that earnouts in the High group have more upward earnout fair value adjustments than earnouts in the Middle and Low groups, also consistent with our predictions.

5.3 RESULTS

Table 3 presents parameter estimates of equation (2). Standard errors are clustered by target industry because we measure several variables at the target industry level. Column (1) presents estimates of an ordinary least squares estimation, whereas columns (2) and (3) present estimates of a multinomial probit estimation. Starting with the results in column (1), we find that *EOFV/EOMax* is significantly negatively related to *IndRND*. This negative relation is consistent with H2, which predicts that earnouts are implemented, in part, to resolve adverse selection problems and bridge valuation gaps. We also find a significantly negative (yet, relatively weak) relation between *EOFV/EOMax* and *IndHomogeneity* (*t*-statistic $= -1.74$). This result supports H3a, and is consistent with acquiring firms including earnout provisions to help retain target firm managers.

Columns (2) and (3) of table 3 present results from the estimation of a multinomial probit model used to predict the likelihood of *EOFV/EOMax* categorical outcomes given a set of explanatory variables. In our context, the three categorical outcomes are earnouts in the Low, Middle, and High groups, and the covariates are those included in equation (2) and defined in section 5.1.2. Column (2) presents results of the likelihood that an earnout is in the Low group compared to the Middle group, and column (3) the likelihood that an earnout is in the High group compared to the Middle group. We find that earnouts with target firms operating in high R&D intensity industries are significantly less likely to be in the High group compared to the Middle group, that is, less likely to have large values of *EOFV/EOMax*. This result is consistent with H2 and provides evidence that retaining target managers and conserving cash are not determinants of earnout provisions when target firms operate in high R&D industries.

We find that earnouts with nonprivate target firms are more likely to be in the Low group compared to the Middle group, and target firms operating in different industries from acquiring firms are less likely to be in the Low group compared to the Middle group. These findings are consistent with the prediction in H1 that private targets and target firms operating in different industries from acquiring firms are more likely to be in the Middle group, where the effort incentives to resolve moral hazard concerns are the greatest.

TABLE 3

Determinants of Initial Earnout Fair Value to Maximum Earnout Payment Ratio

$$EOFV/EOMax_i = \beta_0 + \beta_1 IndTobinQ_i + \beta_2 IndRND_i + \beta_3 IndRetVol_i$$
$$+ \beta_4 TargetSize_i + \beta_5 TargetNonPrivate_i + \beta_6 CrossInd_i$$
$$+ \beta_7 IndHomogeneity_i + \beta_8 AcqCFO_i + \varepsilon_i$$

Variable	OLS (1)	Multinomial Probit Low vs. Middle (2)	High vs. Middle (3)
IndTobinQ	0.010	−0.433	−0.125
	(0.134)	(−0.819)	(−0.322)
IndRND	−0.673**	0.437	−4.929***
	(−2.438)	(0.312)	(−2.719)
IndRetVol	−0.110	1.043	−0.226
	(−0.559)	(0.781)	(−0.180)
TargetSize	0.007	−0.013	0.033
	(0.530)	(−0.134)	(0.358)
TargetNonPrivate	−0.067	0.587**	0.018
	(−1.561)	(2.068)	(0.056)
CrossInd	0.062	−0.447*	−0.056
	(1.175)	(−1.928)	(−0.157)
IndHomogeneity	−0.701*	−0.773	−4.561**
	(−1.735)	(−0.224)	(−2.013)
AcqCFO	0.403	−3.456**	−0.781
	(1.169)	(−2.458)	(−0.421)
Constant	0.607***	0.153	0.657
	(3.659)	(0.161)	(0.862)
Observations	225	225	225
Adjusted R^2	0.030		
Chi-square		60.39	60.39
p-value		<0.01	<0.01

Standard errors are clustered at the three-digit SIC target industry level. Column (1) presents estimates of an ordinary least squares (OLS) estimation. Columns (2) and (3) present estimates of a multinomial probit estimation. Column (2) (column 3) presents results of the likelihood that an earnout is in the Low (High) group compared to the Middle group. The Low (High) group corresponds to values of *EOFV/EOMax* in the bottom (top) 25%, and the Middle group corresponds to *EOFV/EOMax* values between 25% and 75%.

Variable Definitions: *IndTobinQ* is the median Tobin's Q of the target three-digit SIC industry in the fiscal year prior to the acquisition announcement. *IndRND* is the median R&D to sales ratio of the target three-digit SIC industry in the fiscal year prior to the acquisition announcement. *IndRetVol* is the annualized volatility of the value-weighted return of the target three-digit SIC industry, measured over the last 100 days prior to the acquisition announcement. *TargetSize* is the natural logarithm of the sum of the initial fixed payment for the acquisition and the initial earnout fair value estimate, as a measure of the fair value of the target firm at the time of the acquisition. *TargetNonPrivate* is an indicator variable equal to one if the target is not a private company (e.g., a public company, a subsidiary, etc.), zero otherwise. *CrossInd* is an indicator variable equal to one if the acquirer three-digit SIC industry (primary or secondary SIC) and the target primary three-digit SIC are different, zero otherwise. *IndHomogeneity* is the average partial correlation coefficient on the industry return index of the target three-digit SIC industry, using a two-factor regression model of each firm stock return on an equal-weighted industry return index and an equal-weighted market index over the five years 2004–2008 (Parrino [1997]). *AcqCFO* is the acquirer cash flow from operations scaled by total assets in the fiscal year prior to the acquisition announcement. All continuous independent variables are winsorized at the 1st and 99th percentiles. *t*-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

TABLE 4

Target Manager Retention

$$TargetExec\_Variable_i = \beta_0 + \beta_1 EOFV/EOMax\_Middle_i + \beta_2 EOFV/EOMax\_High_i$$
$$+ \beta_3 AcqRet\_LengthStay_i + \beta_4 IndRet\_LengthStay_i + \varepsilon_i$$

Variable	OLS TargetExec_LengthStayPct (1)	Hazard Model TargetExec_LengthUntilLeave (2)
EOFV/EOMax_Middle	0.071	0.574**
	(1.324)	(−2.176)
EOFV/EOMax_High	0.144*	0.453***
	(1.879)	(−2.614)
AcqRet_LengthStay	0.027	1.173
	(0.706)	(0.745)
IndRet_LengthStay	0.546***	0.046***
	(4.498)	(−3.615)
Constant	0.414***	
	(5.190)	
Observations	162	139
Adjusted R^2	0.325	
LogL		−169.5

Standard errors are clustered at the three-digit SIC target industry level. Column (1) presents estimates of an ordinary least squares (OLS) estimation. Column (2) presents estimates of a duration analysis using a Cox proportional hazard model with single-record, single-failure data, where the failure is the latest departure date of all target executives in our model. Column (2) reports hazard ratios and z-statistics of the estimated coefficients. The estimation of this model requires that a target manager stays at least one day with the firm after the acquisition.

Variable Definitions: *TargetExec_LengthStayPct* is the number of days the target manager stays with the firm after the acquisition divided by the total number of days between the acquisition completion date and June 28, 2013. *TargetExec_LengthUntilLeave* is the number of years the target manager stays with the firm after the acquisition. *EOFV/EOMax_Middle* is an indicator variable equal to one if the earnout is in the Middle *EOFV/EOMax* group, zero otherwise. *EOFV/EOMax_High* is an indicator variable equal to one if the earnout is in the High *EOFV/EOMax* group, zero otherwise. *AcqRet_LengthStay* is the buy-and-hold stock return of the acquirer over the length of stay of the target manager (i.e., between the acquisition completion date and the earliest of (1) the target manager leave date and (2) June 28, 2013). *IndRet_LengthStay* is the buy-and-hold value-weighted stock return of the target's three-digit SIC industry over the length of stay of the target manager (i.e., between the acquisition completion date and the earliest of (1) the target manager leave date and (2) June 28, 2013). *AcqRet_LengthStay* and *IndRet_LengthStay* are winsorized at the 1st and 99th percentiles. t-/z-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Finally, we document that earnouts with targets in less homogeneous industries are more likely to be in the High group compared to the Middle group. This result supports H3a by providing evidence that *EOFV/EOMax* is large when target industry homogeneity is low and acquiring firms have greater incentives to retain target firm managers. We also find that earnouts are less likely to be in the Low group compared to the Middle group when acquiring firms have high levels of cash flow from operations (and therefore are less cash constrained). This result is not consistent with the prediction in H3b that *EOFV/EOMax* is large when acquiring firms have low levels of cash flow from operations (and are more cash constrained). Overall, we do not find evidence in support of H3b.

Table 4 presents parameter estimates of equation (3). Standard errors are clustered by target industry. Column (1) presents estimates of an ordinary least squares estimation using *TargetExec_LengthStayPct* as the

dependent variable to capture the target manager's length of stay with the firm after the acquisition. The results in column (1) indicate that a target manager's length of stay with the firm is longer for earnouts where *EOFV/EOMax* is in the High group compared to the Low group. This is consistent with H3a and suggests that, when *EOFV* is close to *EOMax*, and earnouts are included primarily to retain target managers, target managers stay with the firm longer after the acquisition.

Column (2) presents estimates of a duration analysis using a Cox proportional hazard model with single-record, single-failure data, where the failure is the latest departure date of all target executives in our model. Column (2) reports hazard ratios and *z*-statistics of the estimated coefficients. The dependent variable *TargetExec_LengthUntilLeave* captures the amount of time the target manager stays with the firm after the acquisition. The estimation of this model requires that a target manager stays at least one day with the firm after the acquisition.

As presented in column (2), the hazard ratio is 0.45 for target managers when earnouts are in the High *EOFV/EOMax* group and 0.57 when earnouts are in the Middle group. In an untabulated test, we do not find a statistical difference between the hazard ratios in these two groups. Overall, the results in this column indicate that, when earnouts are in the High *EOFV/EOMax* group, target managers stay with the firm after the acquisition longer than when earnouts are in the Low group. Similar to the findings in column (1), this result supports H3a and is consistent with target managers staying longer with the firm when earnouts are included to retain target managers. Finally, columns (1) and (2) provide evidence that target managers stay significantly longer with the firm after the acquisition if the performance of the target industry is better, which increases the likelihood that earnout payments will be made.

Table 5 presents parameter estimates of an ordinary least squares estimation of equation (4) using *EOFV_StdDev* (column 1), *EOFVAdj_Max* (column 2), and *EOFVAdj_UpDownPct* (column 3) as dependent variables to capture earnout fair value adjustment characteristics. For all columns, standard errors are clustered by target industry. We first examine the Low *EOFV/EOMax* group. In this Low group, we find that the variation of earnout fair values is significantly greater, the maximum fair value adjustment is significantly larger, and the proportion of quarters with upward adjustments is significantly smaller, than in the Middle and High groups. These findings are consistent with earnout fair value adjustments that reflect the resolution of high uncertainty over time when earnouts are designed to help address adverse selection problems and bridge valuation gaps.

We next turn to the High *EOFV/EOMax* group. In this group, we find a significantly smaller variation in earnout fair values, significantly smaller maximum absolute fair value adjustments, and significantly larger proportions of upward adjustments than downward adjustments, compared to

TABLE 5

Characteristics of Earnout Fair Value Adjustments

$$EOFVADJ\_Variable_i = \beta_0 + \beta_1 EOFV/EOMax\_Low_i + \beta_2 EOFV/EOMax\_High_i$$
$$+ \beta_3 IndRetVol\_EO_i + \beta_4 IndRet\_EO_i + \beta_5 NbQtrs_i$$
$$+ \beta_6 EOMax/AcqMVE_i + \varepsilon_i$$

Variable	EOFV_StdDev (1)	EOFVAdj_Max (2)	EOFVAdj_UpDownPct (3)
EOFV/EOMax_Low	0.175**	31.929*	−15.689**
	(2.144)	(1.948)	(−2.064)
EOFV/EOMax_High	−0.179***	−26.596***	14.077*
	(−3.088)	(−2.831)	(1.963)
IndRetVol_EO	0.559	95.804	
	(1.356)	(1.328)	
IndRet_EO			−19.367
			(−1.383)
NbQtrs	0.022**	4.245**	0.902
	(2.044)	(2.014)	(0.467)
EOMax/AcqMVE	0.121	−13.879	102.190**
	(0.335)	(−0.236)	(2.259)
Constant	0.056	4.370	5.827
	(0.457)	(0.180)	(0.538)
EOFV/EOMax_High vs. Low	−0.354***	−58.525***	29.766***
	(−3.793)	(−3.250)	(3.486)
Observations	215	215	215
Adjusted R^2	0.117	0.107	0.036

Ordinary least squares estimations of earnout fair value adjustment characteristics on *EOFV/EOMax* groups, where *EOFV/EOMax* is the initial earnout fair value estimate scaled by the maximum earnout payment amount, and control variables. Standard errors are clustered at the three-digit SIC target industry level.

Variable Definitions: *EOFV_StdDev* is the standard deviation of the underlying earnout fair value divided by the mean earnout fair value over the observed earnout period. *EOFVAdj_Max* is the absolute value of the maximum earnout fair value adjustment divided by the mean earnout fair value over the observed earnout period. *EOFVAdj_UpDownPct* is the difference between the number of quarters with upward earnout fair value adjustments and the number of quarters with downward earnout fair value adjustments, divided by the total number of quarters in the observed earnout period, multiplied by 100. *EOFV/EOMax_Low* is an indicator variable equal to one if the earnout is in the Low *EOFV/EOMax* group, zero otherwise. *EOFV/EOMax_High* is an indicator variable equal to one if the earnout is in the High *EOFV/EOMax* group, zero otherwise. The Low (High) group corresponds to values of *EOFV/EOMax* in the bottom (top) 25%. *IndRetVol_EO* is the annualized return volatility of the value-weighted stock return of the target's three-digit SIC industry, averaged over all quarters of the observed earnout period. *IndRet_EO* is the buy-and-hold value-weighted stock return of the target's three-digit SIC industry over the observed earnout period. *NbQtrs* is the number of quarters in the observed earnout period. *EOMax/AcqMVE* is the maximum earnout payment amount scaled by the acquirer's market value of equity prior to the acquisition completion date. *IndRetVol_EO, IndRet_EO*, and *EOMax/AcqMVE* are winsorized at the 1st and 99th percentiles. *t*-statistics in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$.

the other two groups (Low and Middle). These results are consistent with earnout fair value adjustments that resemble systematic adjustments for the time value of money, and correspond to earnouts used to retain target managers.[20]

Overall, the findings in tables 1 through 5 provide evidence that initial earnout fair value estimates and earnout fair value adjustments vary

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[20] We also find a significantly greater likelihood that the last observed earnout fair value is greater than, or equal to, the initial earnout fair value for earnouts in the High *EOFV/EOMax* group than for earnouts in the Low *EOFV/EOMax* group (not tabulated).

in a predictable manner that is consistent with the underlying economic motivations to use earnouts: to provide effort incentives to target managers, resolve adverse selection problems, bridge valuation gaps between acquiring and target firms, and retain target managers.

6. Information Content of Earnout Fair Value Adjustments

6.1 MARKET VALUATION OF EARNOUT FAIR VALUE ADJUSTMENTS

To provide evidence on the market valuation of earnout fair value adjustments, we examine the relation between abnormal returns and quarterly earnout fair value adjustments recognized by acquiring firms. H4 predicts that earnout fair value adjustments resolve uncertainty and provide valuable information that market participants incorporate into their valuation of acquiring firms. That is, we conjecture that earnout fair value adjustments reveal changes in the acquiring firm's assessment of the target's value and the expected benefits of the acquisition (e.g., expected synergies). To test this hypothesis, we measure buy-and-hold abnormal returns around the release of earnout fair value adjustments that SFAS 141(R) requires acquiring firms to record quarterly. Specifically, we focus on the three-day window centered on the 10-Q/-K filing date. We investigate the information content of earnout fair value adjustments after controlling for the direct effect of these adjustments on reported earnings. We estimate the following model for the pooled sample of acquiring firms j and quarters q:[21]

$$BHAR_{10-Q/-K,j,q} = \beta_0 + \beta_1 EarnSurp_{j,q} + \beta_2 EOFVAdj_{j,q} + \beta_3 Accrual_{j,q} + \varepsilon_{j,q},$$
(5)

where:

$BHAR_{10\text{-}Q/\text{-}K}$ = Acquirer's buy-and-hold abnormal returns over the three trading days centered on the 10-Q/-K filing date. Buy-and-hold abnormal returns are measured using raw stock returns minus returns on matched size and book-to-market reference portfolios.

$EarnSurp$ = Difference between actual I/B/E/S earnings per share and the average of the most recent individual analyst earnings per share forecasts, scaled by price at the end of the quarter.

$EOFVAdj$ = Earnout fair value adjustment scaled by market value of equity at the end of the quarter.

$Accrual$ = Difference between (1) income before extraordinary items and discontinued operations and (2)

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[21] In equations (5) and (6), observations are at the firm-quarter level. When there are multiple earnout fair value adjustments in the same firm-quarter, we sum all of these adjustments together.

cash flow from operations, scaled by market value
of equity at the end of the quarter.[22]

When estimating equation (5), the coefficient on *EOFVAdj* captures the
market response to earnout fair value adjustments after controlling for the
market response to earnings surprises. Since reported earnings include
earnout fair value adjustments, the coefficient on *EOFVAdj* reflects the mar-
ket valuation of the information revealed in earnout fair value adjustments
beyond the direct effect of these adjustments on earnings.[23]

We gather a sample of 1,114 quarterly earnout fair value adjustments de-
rived from a sample of 262 acquisitions with liability classified earnouts, a
subsample of the initial sample of 329 acquisitions with earnouts described
in section 4.2 after applying all data requirements to estimate equation
(5). Our sample of 1,114 firm-quarter observations consists of 696 nonzero
earnout fair value adjustments, with 416 upward adjustments and 280 down-
ward adjustments. The average increase in earnout fair value is $2.6 million,
and the average decrease is $4.7 million, corresponding to 3.2 and –5.8
cents per share outstanding, respectively. We further divide our sample of
quarterly earnout fair value adjustments into two subsamples based on the
underlying performance measures used for earnout thresholds. One sub-
sample of 356 observations contains earnouts with income-based financial
performance measures (e.g., net income, earnings per share, earnings be-
fore interest and taxes, etc.). The other subsample of 758 observations in-
cludes earnouts with performance measures other than income based (e.g.,
sales, R&D phases, product development, FDA approval, etc.).[24]

Table 6 presents parameter estimates of equation (5). Standard errors
are clustered at both acquiring firm and quarter level. Column (1) in-
cludes all quarterly earnout fair value adjustments. In line with prior find-
ings on earnings surprises, we find a positive and significant coefficient on
EarnSurp. Furthermore, we find a positive and significant coefficient on
EOFVAdj, consistent with a market response that is positively associated with
the news in the fair value adjustment after controlling for the effect of the
adjustment on earnings. This supports H4 and suggests that the market
responds to the information revealed by earnout fair value adjustments be-
yond their direct effect on reported earnings.

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[22] We include *Accrual* in line with prior work that estimates a related model (e.g., Feldman
et al. [2010]). Also, prior studies generally scale accruals by average total assets. Our results
remain unchanged if we use this alternative scalor. However, we decided to be consistent and
use the same scalor as that used for the other variables in equation (5).

[23] We acknowledge that the market may form ex ante expectations about earnout fair value
adjustments. Consequently, the earnout "news" would be the difference between the reported
and the expected adjustments. Unfortunately, the latter cannot be measured. Therefore, we
use the reported earnout fair value adjustments as the earnout "news" to the market.

[24] Earnouts may be designed using more than one performance measure and, occasionally,
using a combination of income-based and non-income-based performance measures. We note
that the subsample of 758 observations also includes 112 observations for which the perfor-
mance measures were not identified.

TABLE 6

Abnormal Returns Around 10-Q/-K Filings, Earnings Surprises and Earnout Fair Value Adjustments

$$BHAR_{10-Q/-K,j,q} = \beta_0 + \beta_1 EarnSurp_{j,q} + \beta_2 EOFVAdj_{j,q} + \beta_3 Accrual_{j,q} + \varepsilon_{j,q}$$

| | | Performance Measures | |
| | All | Income-Based | Other |
Variable	(1)	(2)	(3)
EarnSurp	1.231***	1.903***	0.893***
	(4.583)	(3.439)	(4.062)
EOFVAdj	1.101*	1.785*	0.802
	(1.871)	(1.840)	(0.790)
Accrual	−0.025	−0.105	0.023
	(−0.489)	(−1.175)	(0.339)
Constant	−0.000	−0.001	0.000
	(−0.120)	(−0.164)	(0.236)
Observations	1,114	356	758
Adjusted R^2	0.034	0.060	0.021

Ordinary least squares estimations of acquirer's buy-and-hold abnormal returns on earnings surprises, earnout fair value adjustments, and accruals. Standard errors are clustered at both acquiring firm and quarter level. Column (1) includes all quarterly earnout fair value adjustments. Column (2) includes observations related to earnouts with income-based financial performance measures. Column (3) includes observations related to earnouts with nonincome-based performance measures, as well as 112 observations for which the performance measures were not identified.

Variable Definitions: $BHAR_{10-Q/-K}$ is the acquirer's buy-and-hold abnormal returns over the three trading days centered on the 10-Q/-K filing date. Buy-and-hold abnormal returns are measured using raw stock returns minus returns on matched size and book-to-market reference portfolios. *EarnSurp* is the difference between actual I/B/E/S earnings per share and the average of the most recent individual analyst earnings per share forecasts, scaled by price at the end of the quarter. *EOFVAdj* is the earnout fair value adjustment, scaled by market value of equity at the end of the quarter. *Accrual* is the difference between (1) income before extraordinary items and discontinued operations and (2) cash flow from operations, scaled by market value of equity at the end of the quarter. All independent variables are winsorized at the 1st and 99th percentiles. *t*-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

To further examine how earnout fair value adjustments impact market participants' valuation of acquiring firms, columns (2) and (3) report results of equation (5) estimated using the subsample of earnouts with income-based financial performance measures and the subsample of earnouts with other performance measures, respectively. We expect earnout fair value adjustments to be more informative to market participants when the underlying performance measures are based on income, since this type of information is generally easier to translate into market values than nonincome or even nonfinancial information. The coefficient on *EOFVAdj* is positive and significant in column (2) for earnouts with income-based financial performance measures, whereas it is insignificant in column (3) for earnouts with non-income-based performance measures. These results suggest that the findings in column (1) are driven primarily by earnouts with income-based financial performance measures, consistent with our prediction.

The prior literature on fair value information generally documents that market participants find fair value measurements sufficiently reliable to be reflected in their valuation of firms (Landsman [2007], Kolev [2009], Song, Thomas, and Yi [2010]). However, the reliability of fair value measurements

greatly depends on the extent of measurement error, whether inputs are observable, and the managerial discretion over the measurements (Maines and Wahlen [2006], Penman [2007]). In our setting, earnout fair value estimates and adjustments are prepared by acquiring firm managers using unobservable inputs and considerable discretion. However, earnout fair values are linked to future verifiable outcomes (i.e., earnout payments). Consequently, and consistent with our findings in table 6, acquiring firm managers have incentives to report accurate earnout fair values that market participants consider in their valuation of acquiring firms.

6.2 EARNOUT FAIR VALUE ADJUSTMENTS AND GOODWILL IMPAIRMENTS

To provide further evidence on the information content of earnout fair value adjustments, we examine the relation between fair value adjustments and the likelihood of goodwill impairments, as predicted in H5. Specifically, we investigate whether earnout fair value adjustments are negatively associated with the likelihood of contemporaneous and future goodwill impairments.[25] Because SFAS 141(R) was adopted recently and we do not have a long time series of earnout adjustments, we focus on the probability of goodwill impairments as a function of earnout fair value adjustments up to three quarters preceding a quarterly report. We estimate the following probit model for the pooled sample of acquiring firms j and quarters q:

$$\Pr\left(GWImp_{j,q} = 1\right) = \Phi(\beta_0 + \beta_1 EOAdj_{j,q} + \beta_2 \sum_{t=1}^{3} EOAdj_{j,q-t} + \beta_3 AcqOneSeg_{j,q}$$
$$+ \beta_4 ExpectedImp_{j,q} + \beta_5 AcqTobinQ_{j,q-1} + \beta_6 AcqRetVol_{j,q-1}$$
$$+ \beta_7 AcqSize_{j,q-1} + \beta_8 AcqLev_{j,q-1} + \beta_9 Quarter4_{j,q}), \qquad (6)$$

where:

$GWImp_q$ = Indicator variable equal to one if a goodwill impairment is recorded in quarter q, zero otherwise.

$EOAdj_q$ = Earnout fair value adjustment in quarter q scaled by total assets at the beginning of quarter q.

$\sum_{t=1}^{3} EOAdj_{q-t}$ = Sum of the earnout fair value adjustments in the three quarters prior to quarter q scaled by total assets at the beginning of quarter q.

$AcqOneSeg_q$ = Indicator variable equal to one if the firm has a single reporting segment in quarter q, zero otherwise.

$ExpectedImp_q$ = Indicator variable equal to one if the ratio of the market value to book value of equity is less than one at the beginning of quarter q, zero otherwise.

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[25] As mentioned in footnote 11, earnout fair value adjustments are not mechanically related to past, concurrent, or future goodwill impairments as each transaction is recorded independently from the other.

$$AcqTobinQ_{q-1} = \text{Ratio of market value to book value of total assets at the beginning of quarter } q.$$

$$AcqRetVol_{q-1} = \text{Annualized stock return volatility, measured using the standard deviation of daily returns from quarter } q-1.$$

$$AcqSize_{q-1} = \text{Natural logarithm of the market value of equity at the beginning of quarter } q.$$

$$AcqLev_{q-1} = \text{Ratio of total liabilities to total assets at the beginning of quarter } q.$$

$$Quarter4_q = \text{Indicator variable equal to one if quarter } q \text{ is the fourth quarter of a fiscal year, zero otherwise.}$$

The variables of interest are $EOAdj_q$ and $\sum_{t=1}^{3} EOAdj_{q-t}$.[26] The other independent variables control for acquiring firm characteristics that prior studies find are related to goodwill impairments in the post-SFAS 142 period (e.g., Beatty and Weber [2006], Li and Sloan [2012], Ramanna and Watts [2012]). Standard errors are clustered at the acquiring firm level.

Table 7 reports mean marginal effects from the estimation of equation (6). Columns (1) and (2) include earnout fair value adjustments in quarter q. We find a significantly negative relation between earnout fair value adjustments in a given quarter q and the probability of goodwill impairments in the contemporaneous quarter q.[27] When we allow the coefficients to vary for upward ($EOAdjUp_q$) and downward ($EOAdjDown_q$) earnout fair value adjustments in quarter q, we find that downward earnout fair value adjustments are significantly related to the probability of contemporaneous goodwill impairments, while there is no significant relation with upward earnout fair value adjustments. The findings in columns (1) and (2) provide evidence that earnout fair value adjustments are negatively associated with the likelihood of concurrent goodwill impairments, consistent with H5.

Columns (3) and (4) include earnout fair value adjustments in quarter q and the sum of earnout fair value adjustments in the three quarters preceding quarter q. We continue to find a significantly negative relation between earnout fair value adjustments and the probability of contemporaneous goodwill impairments, driven by downward fair value adjustments. We also find a significantly negative relation between the cumulative earnout fair value adjustments in quarters $q-1$ to $q-3$ and the probability of goodwill impairments in quarter q.

To shed light on the economic magnitude of the results in table 7, the mean marginal effects in columns (1) and (3) indicate that a one standard

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[26] Earnout fair value adjustments in quarter q are not significantly correlated to the sum of earnout fair value adjustments in the three quarters prior to quarter q.

[27] Note that, unfortunately, when measuring goodwill impairments, we cannot identify the specific acquisition related to the goodwill being impaired.

TABLE 7

Earnout Fair Value Adjustments and Goodwill Impairments

$$\Pr\left(GWImp_{j,q} = 1\right) = \Phi(\beta_0 + \beta_1 EOAdj_{j,q} + \beta_2 \sum_{t=1}^{3} EOAdj_{j,q-t} + \beta_3 AcqOneSeg_{j,q}$$

$$+ \beta_4 ExpectedImp_{j,q} + \beta_5 AcqTobinQ_{j,q-1} + \beta_6 AcqRetVol_{j,q-1}$$

$$+ \beta_7 AcqSize_{j,q-1} + \beta_8 AcqLev_{j,q-1} + \beta_9 Quarter4_{j,q})$$

Variable	(1)	(2)	(3)	(4)
$EOAdj_q$	−3.116***		−3.751***	
	(−3.134)		(−2.770)	
$EOAdjUp_q$		−2.437		−7.997
		(−0.602)		(−0.975)
$EOAdjDown_q$		−3.171***		−3.755**
		(−2.971)		(−2.423)
$EOAdj_{q-1,\,q-3}$			−0.922**	
			(−2.009)	
$EOAdjUp_{q-1,\,q-3}$				−2.186
				(−1.226)
$EOAdjDown_{q-1,\,q-3}$				−0.691
				(−1.317)
$AcqOneSeg$	−0.018	−0.018	−0.024	−0.024
	(−1.593)	(−1.595)	(−1.500)	(−1.455)
$ExpectedImp$	0.030	0.030	0.035	0.033
	(1.401)	(1.408)	(1.157)	(1.093)
$AcqTobinQ$	−0.035*	−0.035*	−0.031	−0.030
	(−1.944)	(−1.937)	(−1.278)	(−1.255)
$AcqRetVol$	0.006	0.006	0.005	0.004
	(0.178)	(0.185)	(0.115)	(0.089)
$AcqSize$	0.001	0.002	−0.001	−0.002
	(0.366)	(0.394)	(−0.208)	(−0.345)
$AcqLev$	−0.026	−0.026	−0.022	−0.024
	(−1.040)	(−1.011)	(−0.580)	(−0.635)
$Quarter4$	0.062***	0.062***	0.064***	0.064***
	(4.282)	(4.292)	(3.195)	(3.185)
Observations	1,266	1,266	667	667
$LogL$	−161.9	−161.9	−98.31	−98.05

Estimations of a probit model of goodwill impairments on earnout fair value adjustments. Mean marginal effects are reported. Standard errors are clustered at the acquiring firm level.

Variable Definitions: *GWImp* is an indicator variable equal to one if a goodwill impairment is recorded in quarter q, zero otherwise. *EOAd j_q* is the earnout fair value adjustment in quarter q scaled by total assets at the beginning of quarter q. *EOAd jUp_q* (*EOAd $jDown_q$*) is equal to *EOAd j_q* when *EOAd j_q* is upward (downward), zero otherwise. $\sum_{t=1}^{3} EOAd j_{q-t}$ is the sum of the earnout fair value adjustments in the three quarters prior to quarter q scaled by total assets at the beginning of quarter q. $\sum_{t=1}^{3} EOAd jUp_{q-t}$ ($\sum_{t=1}^{3} EOAd jDown_{q-t}$) is equal to $\sum_{t=1}^{3} EOAd j_{q-t}$ when $\sum_{t=1}^{3} EOAd j_{q-t}$ is upward (downward), zero otherwise. *AcqOneSeg* is an indicator variable equal to one if the firm has a single-reporting segment in quarter q, zero otherwise. *ExpectedImp* is an indicator variable equal to one if the ratio of the market value to book value of equity is less than one at the beginning of quarter q, zero otherwise. *AcqTobinQ* is the ratio of market value to book value of total assets at the beginning of quarter q. *AcqRetVol* is the annualized stock return volatility, measured using the standard deviation of daily returns from quarter $q-1$. *AcqSize* is the natural logarithm of the market value of equity at the beginning of quarter q. *AcqLev* is the ratio of total liabilities to total assets at the beginning of quarter q. *Quarter4* is an indicator variable equal to one if quarter q is the fourth quarter of a fiscal year, zero otherwise. All continuous independent variables are winsorized at the 1st and 99th percentiles. z-statistics in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$.

deviation decrease in contemporaneous earnout fair value adjustments increases the probability of goodwill impairments by 1.1% and 1.4%, respectively. These increases in the likelihood of goodwill impairments are economically meaningful given that the unconditional probabilities of goodwill impairments for the samples tested in columns (1) and (3) are 3.63% and 4.35%, respectively.

Together, the results in table 7 are consistent with the prediction in H5 that earnout fair value adjustments are negatively associated with the likelihood of contemporaneous and future goodwill impairments. These findings contribute to the literature on goodwill impairments by identifying leading indicators and predictors of goodwill impairments. These findings also provide evidence of the information content of earnout fair value adjustments as they relate to acquisition-related financial reporting outcomes (i.e., goodwill impairments).

7. Conclusion

SFAS 141(R) requires firms to estimate and recognize the fair value of earnouts at the time of the acquisition, and adjust this earnout fair value over time. This revised accounting standard alters the information environment surrounding earnout provisions and offers an opportunity to provide new insights into the economic motivations to include earnout provisions in acquisition agreements. It also allows us to investigate the information content of earnout fair value adjustments by examining how they impact market participants' valuation of acquiring firms and their association with acquisition-related financial reporting outcomes, specifically, goodwill impairments.

We provide evidence that firms include earnout provisions in acquisition agreements to help resolve moral hazard and adverse selection problems, bridge valuation gaps between acquiring and target firms, and retain target managers. We document that earnout fair value adjustment characteristics vary predictably with the economic motivations driving the use of earnouts. We also find that earnout fair value adjustments provide valuable information that market participants incorporate into their valuation of acquiring firms. Finally, we show that earnout fair value adjustments are negatively associated with the likelihood of contemporaneous and future goodwill impairments.

Our study contributes to the literature on earnouts, and more generally the literature on contract design and incentives, by providing new insights into the economic motivations driving the use of earnouts, as well as the incentives underlying these contract provisions. Our study also provides evidence on how mandated accounting information recognized in financial statements improves the information environment in a way that is relevant to market participants. Finally, our study contributes to the literature on goodwill impairments by identifying leading and timely indicators of goodwill impairments.

<center>APPENDIX A</center>

In this appendix, we provide an example representative of the earnout fair value information available in corporate filings after the adoption of SFAS 141(R).

McAfee, Inc., SEC Filing 10-Q for Quarter ended September 30, 2009, filed November 6, 2009, pages 12–14.

<center>**MCAFEE, INC. AND SUBSIDIARIES**
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS</center>

4. Business Combinations

2009 Acquisitions

On September 1, 2009, we acquired 100% of the outstanding shares of MX Logic, Inc. (MX Logic), a Software-as-a-Service provider of on-demand email, Web security, and archiving solutions for $138.5 million. The MX Logic purchase agreement provides for earnout payments totaling up to $30.0 million contingent upon the achievement of certain MX Logic revenue targets. The $24.6 million fair value of the earnout payments has been accrued for a total purchase price of $163.1 million.

The MX Logic contingent consideration arrangement requires payments up to $30.0 million that will be due and payable if certain criteria in relation to revenue recognized on the sale of MX Logic products are met during the three-year period subsequent to the close of the acquisition. The fair value of the contingent consideration arrangement of $24.6 million was determined using the income approach with significant inputs that are not observable in the market. Key assumptions include discount rates consistent with the level of risk of achievement and probability-adjusted revenue amounts. The expected outcomes were recorded at net present value. Subsequent changes in the fair value of the liability will be recorded in earnings. As of September 30, 2009, the range of outcomes and the assumptions used to develop the estimates had not changed significantly, and the amount accrued in the financial statements increased by $1.0 million. The increase in fair value was due to expected achievement of the earnout payments at an earlier date than originally assumed and an increase in the net present value of the liability due to the passage of time.

On June 1, 2009, we acquired 100% of the outstanding shares of Solidcore Systems, Inc. (Solidcore), a provider of whitelisting technology that controls and protects the applications installed on a computer, for $32.1 million. The Solidcore purchase agreement provides for earnout payments totaling up to $14.0 million contingent upon the achievement of certain Solidcore financial and product delivery targets. The $8.4 million fair value of the earnout payments has been accrued for a total purchase price of $40.5 million.

The Solidcore contingent consideration arrangement requires payments up to $14.0 million that will be due and payable if certain criteria in relation to amounts billed to customers for Solidcore products are met during the three-year period subsequent to the close of the acquisition and if certain criteria in relation to product development and integration are met within 18 months of the acquisition. The fair value of the contingent consideration arrangement of $8.4 million was determined using the same approach described above for the MX Logic earnout. As of September 30, 2009, the range of outcomes and the assumptions used to develop the estimates had not changed, and the amount accrued in the financial statements increased by $0.4 million. The increase in fair value was due to an increase in the net present value of the liability due to the passage of time.

[. . .] In January 2009, we acquired 100% of the outstanding shares of Endeavor Security, Inc. (Endeavor), an intrusion prevention and detection company, for $2.5 million. The Endeavor purchase agreement provides for an earnout payment totaling $1.0 million contingent upon the achievement of certain Endeavor financial targets during the two-year period subsequent to the close of the acquisition. The fair value of the earnout of $0.7 million at acquisition was accrued, for a total purchase price of $3.2 million. As of September 30, 2009, the range of outcomes and the assumptions used to develop the estimates had not changed, and the amount recognized in the financial statements increased by $0.1 million. The increase in fair value was due to an increase in the net present value of the liability due to the passage of time. We recorded $1.4 million of goodwill, which is not deductible for tax purposes. We did not provide the purchase price allocation for Endeavor in the table above because the effect of this acquisition was not material to our condensed consolidated balance sheets.

The results of operations for these acquisitions have been included in our results of operations since their respective acquisition dates. The financial impact of these results is not material to our condensed consolidated statements of income and comprehensive income. In connection with the MX Logic acquisition, we recognized $1.0 million of acquisition-related costs that were expensed in the current period and are included in general and administrative expenses in our condensed consolidated statements of income and other comprehensive income for the period ended September 30, 2009.

APPENDIX B

In this appendix, we provide a simplified hypothetical example of the accounting for a liability classified earnout (i.e., recognition of the initial earnout fair value, earnout fair value adjustments, and payment).

Assume the following:

Year 1

Company P acquires Company T with cash consideration of $40M and earnout payments in cash of up to $10M payable three years following the acquisition based on the net sales and EBITDA of Co. T.

Fair value of the identifiable net assets of Co. T is $37M.

Fair value of the earnout at the time of the acquisition is $7M.

No change in the earnout fair value at the end of year 1.

Year 2

Fair value of the earnout at the end of year 2 is $9M.

Year 3

Payment of earnout is $6M (assume earnout payment is not related to any identifiable asset).

Accounting Transactions Pre-SFAS 141(R)

	Assets			=	Liab	+	SE
Year 1	Cash −40	Co. T +37	Goodwill +3				
Year 2							
Year 3	Cash −6		Goodwill +6				

Accounting Transactions Post-SFAS 141(R)

	Assets			=	Liab	+	SE
Year 1	Cash −40	Co. T +37	Goodwill +10		EO Liab +7		
Year 2					EO Liab +2		Loss −2
Year 3	Cash −6				EO Liab −9		Gain +3

Note that, in this hypothetical example, we do not recognize any goodwill impairment as goodwill impairments are not mechanically related to earnout fair value adjustments and are recorded separately from earnout fair value adjustments, at the discretion of acquiring firms.

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