



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

## The real effects of earnout contracts in M&As

**Citation for published version:**

Barbopoulos, LG & Danbolt, J 2021, 'The real effects of earnout contracts in M&As', *Journal of Financial Research*. <https://doi.org/10.1111/jfir.12256>

**Digital Object Identifier (DOI):**

[10.1111/jfir.12256](https://doi.org/10.1111/jfir.12256)

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Publisher's PDF, also known as Version of record

**Published In:**

Journal of Financial Research

**General rights**

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

**Take down policy**

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact [openaccess@ed.ac.uk](mailto:openaccess@ed.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.



## ORIGINAL ARTICLE

# The real effects of earnout contracts in M&As

Leonidas G. Barbopoulos  | Jo Danbolt

University of Edinburgh Business School,  
University of Edinburgh, Edinburgh,  
Scotland, UK

**Correspondence**

Leonidas G. Barbopoulos, University of  
Edinburgh Business School, University of  
Edinburgh, 29 Buccleuch Place,  
EH8 9JS Edinburgh, Scotland, UK.  
Email: [leonidas.barbopoulos@ed.ac.uk](mailto:leonidas.barbopoulos@ed.ac.uk)

**Abstract**

Earnouts address merger valuation risk by deferring payment of a large part of deal consideration and making it contingent on targets' future performance. We find acquirers of unlisted targets using earnouts gain more (less) than those making full up-front payments in cash (stock). Larger and older acquirers benefit more from earnout-based deals, as do foreign acquirers and acquirers advised by top-tier or boutique advisors. We address identification through the propensity score matching method and a quasi-natural experiment. Acquirers realize the highest returns from earnouts when the deferred payment is around 30% of deal value. Deferred payments are larger after the SFAS 141(R) reform.

**JEL CLASSIFICATION**

G12, G13, G14, G30, G34

## 1 | INTRODUCTION

Earnout is a contractual payment mechanism in mergers and acquisitions (M&As) where a relatively large part (often around a third) of the deal consideration is deferred and payable to the target's shareholders at multiple stages following the M&A announcement, contingent upon some observable measure(s) of the target firm's future performance within prespecified periods (Barbopoulos, Danbolt, & Alexakis, 2018; Cain et al., 2011).<sup>1</sup> Earnouts

<sup>1</sup>Following an up-front payment in the form of cash, stock, or a mixture of both made at closing, one or more future payment(s)—commonly referred to as the earnout payment(s)—is payable (often over 0.5 to 3 years), conditional on the target firm achieving preagreed (financial or operational) performance-related metrics. Financial metrics are typically revenue- or profit-based, for example, revenues or earnings before interest, taxes, depreciation, and amortization (EBITDA). Operational metrics are usually measured via milestones, for example, related to new product development. In the pharmaceutical sector, earnout payments are often conditional on the regulatory approval of a drug or the granting of a patent.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2021 The Authors. *Journal of Financial Research* published by Wiley Periodicals LLC on behalf of The Southern Finance Association and the Southwestern Finance Association.

are very popular among M&As of unlisted (i.e., private and subsidiary) target firms, particularly those operating in the high-technology, healthcare, and other innovation- and patent-rich sectors, where valuation risk is generally high because of moral hazard and adverse selection (Kohers & Ang, 2000).<sup>2</sup> Prior studies show that earnouts are associated with higher acquirer gains, and higher takeover premia, relative to counterpart M&As that are settled in single up-front payments at closing (Barbopoulos & Adra, 2016; Kohers & Ang, 2000). This is because earnout alleviates merger valuation risk by reducing adverse selection and moral hazard issues.

Earnouts affect thousands of firms and managers, and nowadays are used in sizable investments involving the reallocation of assets worth billions of dollars. They are growing around the world, though the United Kingdom and United States maintain their leading positions in terms of both absolute and relative earnout activities (Viarengo et al., 2018). The effectiveness of earnouts depends on their structure, which can be complex and highly sensitive to the valuation challenges of the target firm, and hence the calculations of the merger's expected payoff (Battaaz et al., 2021; Cain et al., 2011; Lukas et al., 2012). As a result, earnout-design expertise and extensive negotiations are required to reach an agreement between the merging firms. Financial advisors are likely to possess the know-how to design "effective" earnout contracts (Bao & Edmans, 2011) and help the merging firms avoid "convert[ing] today's disagreement over price into tomorrow's litigation over outcome" (Judge Laster, as quoted in Viarengo et al., 2018, p. 438). We are the first to address this important relation. We further study whether resourceful and experienced (larger and older) acquirers are more likely to better negotiate earnout terms and have an advantage in negotiations with relatively (mainly unlisted) small and valuation-challenging targets. Moreover, the US regulatory framework under which earnouts operate (in M&As announced by US-based acquirers) has undergone important reforms, particularly with the introduction of Statement of Financial Accounting Standards No. 141 (revised) in 2009 (hereafter SFAS 141(R)). SFAS 141(R) requires acquirers to recognize the fair value of earnouts in the acquisition price as a liability in the company's accounts at the time of the acquisition and to adjust earnout fair values each quarter (Cadman et al., 2014; in Section 3.3 we offer a detailed discussion of this reform). We offer further evidence on these relations.

Given their growing popularity and the importance of earnouts in shaping the modern corporation, we set out to systematically examine the real effects of earnouts on acquirer returns.<sup>3</sup> Do investors react more favorably to earnout-based M&As of unlisted targets than counterpart deals settled in single up-front payments? If so, when? What deal- and firm-specific characteristics contribute to the success of earnout-based M&As? What role do financial advisors play in the success of earnout-based M&As? Does the most basic aspect of the earnout structure—the size of the deferred part of the deal consideration—matter to returns? To what extent did the US policy reform (SFAS 141(R)) affect the use of earnouts, their structure, and the stock market reaction to such deals? Finally, does the exclusion of listed target M&As (given their limited earnout use) affect the known valuation effects of earnouts on acquirer returns? These are questions of significant practical relevance to corporate managers, to which we provide comprehensive answers.

Arguably, the earnout payment mechanism encourages both ex ante information sharing between the merging firms (thus reducing the risk of adverse selection, similar to stock financing in Hansen's, 1987, model) and retaining motivated and committed key personnel from the target firm during the integration phase of the merger (thus reducing moral hazard).<sup>4</sup> Put simply, target managers are motivated to remain in the firm and maximize its performance (to receive the deferred payments), especially if the managers are also the shareholders, which is often the case in unlisted companies (Barbopoulos & Sudarsanam, 2012). Therefore, earnouts are expected to reduce the underlying valuation gap between the merging firms by explicitly linking the target firm's payment in the acquisition to its future performance. This, in turn, is associated with an increased overall likelihood of merger

---

<sup>2</sup>In recent years, however, earnouts are increasingly used in listed target M&As, yet their frequency remains low (<1% in our sample). Although our analysis is based on unlisted target M&As, in a separate section we examine the valuation effects of earnouts in listed target M&As. We thank an anonymous reviewer for suggesting this analysis.

<sup>3</sup>The business press has also pointed to the growing popularity of earnouts in unlocking COVID-19 valuation gaps (see Latham & Watkins LLP, 2020).

<sup>4</sup>Differences in opinion between buyers and sellers with regard to target value and expected merger synergies, if not managed and controlled effectively, may be detrimental to the merger payoff because of potential deal overpayment and failure to improve the resource allocation between the merging firms (Devos et al., 2009).

success (and higher merger synergies) and, per our findings, higher acquirer gains relative to counterpart M&As without earnouts (consistent with, e.g., Barbopoulos, Danbolt, & Alexakis, 2018; Barbopoulos, Paudyal, & Sudarsanam, 2018; Kohers & Ang, 2000).<sup>5</sup> As a result, acquirers in earnout-based M&As are expected to gain more (less) than those in cash- (stock-) settled M&As without any (with strong and costless) contingent properties (Barbopoulos & Sudarsanam, 2012; Chang, 1998; Hansen, 1987; Kohers & Ang, 2000).

Our analysis is based on 31,214 M&As involving unlisted (i.e., private and subsidiary) target firms, made by either UK or US domiciled acquirers between 1986 and 2016. Our preliminary univariate results show that acquirers in earnout-based M&As enjoy, on average, significant gains of 1.57 percentage points. M&As with earnouts outperform M&As settled fully in cash but underperform deals with stock and mixed single up-front payments. These findings hold regardless of the listing status of the target (i.e., private or subsidiary).<sup>6</sup> This suggests that earnout payments serve as another (in addition to stock) vehicle through which acquirers can reduce merger valuation risk by motivating both information sharing and the realization of high synergies from M&As of unlisted firms (Kohers & Ang, 2000). Our focus on M&As of unlisted target firms only in the study of the pricing effects of earnout versus nonearnout payments provides an ideal setting, as it avoids the negative pricing effects of stock-financed M&As of listed targets in the control group (Fuller et al., 2002; Myers & Majluf, 1984; Travlos, 1987).<sup>7</sup>

We further find that the age and size of the acquirer matters to earnout valuation effects: Larger and more mature (and therefore more resourceful and possibly more experienced) acquirers are found to enjoy higher gains from earnout-based M&As relative to smaller and young acquirers, respectively. In addition, acquirers in smaller earnout-based deals relative to their size enjoy significant gains. Along these lines, we find that more resourceful acquirers, as proxied by their size or cash-to-assets ratio, are more likely to use more prestigious financial advisors. We find that using financial advisors matters to the earnout effect: Top-tier investment banks, as well as boutique financial advisors, on either or both sides of the deal add significant value to acquirers in earnout-based M&As. Prior earnout studies ignore the important effect of advisors when examining the valuation effects of earnouts in M&As.<sup>8</sup> We also find that the global diversification aspect of the deal matters, with acquirers enjoying higher gains from cross-border transactions than domestic M&As based on earnouts. We further find a curvilinear relation between the ratio of earnout value to total deal consideration (i.e., relative earnout value [REAV]) and acquirers' gains. In particular, acquirers on average enjoy maximum benefit from earnout-based M&As when the REAV is roughly 30% of the total deal consideration. Last, we find that the REAV is significantly larger after SFAS 141(R).

Our finding of strong correlations between the use of earnouts and acquirer gains might not reflect a causal relation, as certain firm or deal characteristics might affect both the choice of earnout and acquirer gains. To circumvent this identification problem, we examine the causal effect of earnout choice on acquirer gains by using two identification strategies: the propensity score matching (PSM) method and a quasi-natural experiment. Our finding of a strong positive earnout effect remains robust after controlling for self-selection concerns using the PSM method, the effect of which is examined in the multivariate context after we apply the

<sup>5</sup>We recognize that acquiring firms can use other means through which to provide incentives for target managers to share valuable information and remain with the acquirer in the integration phase of the deal, such as shares (Chang, 1998; Fuller et al., 2002). We do not intend to analyze the relative merits of earnouts versus contractual solutions offered by other means.

<sup>6</sup>Although prior studies investigate the earnout effects on acquirers' gains by including listed target M&As, we offer the first analysis in which only M&As of unlisted targets are included, and we study whether including listed target M&As can distort the analysis of earnout valuation effects.

<sup>7</sup>Recent evidence, however, challenges the traditional view that stock-swap listed target acquisitions are associated with a negative pricing effect on acquirer value. Alexandridis et al. (2017) find that stock-for-stock deals no longer destroy value, and Eckbo et al. (2018) argue that the more the target knows about the bidder, the less likely it is for the target to be paid with overpriced shares. De Bodt et al. (2019) further show that once a series of regulatory incentives are taken away (as they were starting in July 2001), the link between acquirer valuation and the choice to conduct a full stock swap in an M&A deal is broken. Cleary and Hossain (2020) further show that the 3-year mean buy-and-hold abnormal return (BHAR) increased significantly (at least at the 5% level) by approximately 18.07% (1.34%) during the postcrisis period.

<sup>8</sup>We focus on financial advisors, rather than legal advisors, because financial advisors engage in financing and valuation matters during the deal process. Krishnan and Masulis (2013) offer an extensive discussion on the distinctive duties of financial and legal advisors. However, we also investigate the effect of legal advisors on the valuation effects of earnouts in M&As and find an insignificant relation. We thank an anonymous reviewer for suggesting this analysis.

Hainmueller (2012) method and the Stata routine developed by Hainmueller and Xu (2013). Our second approach addresses potential endogeneity concerns by using the SFAS 141(R) reform as a quasi-natural experiment. We find that acquirers enjoy higher gains from earnout-based M&As in response to an exogenous increase in earnout contract monitoring.

Finally, our results are robust to various model specifications and alternative measures of acquirer gains. Our results add to our understanding of the workings and valuation effects of earnouts on acquirer value, and have important implications for managers and firms considering the use of earnout in M&As. Overall, we show that the earnout payment mechanism addresses merger valuation risk and creates value for acquiring companies, but the benefit of using earnouts varies significantly with firm- and deal-specific characteristics, deferred value size, and regulatory reforms, as well as with the type of external financial advisors involved.

## 2 | RATIONALE FOR EARNOUT CONTRACTS IN M&As AND THEIR VALUATION EFFECTS

### 2.1 | The earnout valuation effects

Information asymmetries between companies in merger negotiations often lead to substantial disagreements over a merger's payoffs because of significant merger valuation risk (Eckbo et al., 1990; Hansen, 1987). This is more pronounced in deals involving unlisted (i.e., private or subsidiary) and often young acquired companies that operate in intangible-rich sectors such as high technology and healthcare. For such companies, in addition to the limited availability of firm-specific information (increasing the chance of adverse selection), the extent of intangibility of their assets can cause even larger and harder to estimate merger valuation risk. Moreover, in mergers involving such companies, the value of the combined entity is often highly sensitive to the continued commitment, effort, and creativity of only a few key personnel in the acquired company, whose retention in the combined entity during at least the integration phase of the deal presents an important source of value creation (creating a chance of moral hazard).

Managers of merging companies may have access to superior information about the valuations of the companies they manage, which can give rise to adverse selection (Akerlof, 1970), whereas the (unobserved) efforts of the vendor toward maximizing the merger payoff give rise to moral hazard. As a result, the earnout payment mechanism is regularly employed to "bridge the gap" in expectations between the buyer and the seller with regard to merger outcomes. Moreover, an additional premium is usually offered in earnout-based deals to persuade the target owners to accept deferred payment(s) (Barbopoulos & Adra, 2016; Kohers & Ang, 2000). Therefore, earnouts allow the merging firms to agree to disagree about the value potential of the deal and yet still continue with the deal. Earnouts also help retain key people in the target firm, at least during the integration phase of the deal or the earnout period. Setting stretching performance goals allows the vendor to receive a high deal value if performance targets are met but also protect the acquirer from overpayment should such performance forecasts prove too optimistic.

Prior studies on earnouts in M&A show a positive earnout effect on acquirer value, yet the earnout effect is highly sensitive to several deal- or firm-related characteristics. Kohers and Ang (2000) and Barbopoulos and Sudarsanam (2012) show that earnout-based M&As, especially those exposed to the highest merger valuation risk, yield greater acquirer gains compared to those financed with single up-front payments of cash or stock.<sup>9</sup> Barbopoulos and Sudarsanam (2012) further show that "optimally" classified earnout occurrences, based on a likelihood model that predicts the "correct" earnout choice in a deal, yield even higher acquirer gains. Mantecon

<sup>9</sup>Kohers and Ang (2000), for example, report a 2.20% 2-day cumulative abnormal return (CAR) for earnout acquirers compared to 1.80% for cash and 1.13% for stock acquirers.

(2009) examines alternative methods of valuation uncertainty avoidance in cross-border deals and shows that the use of earnout predominantly benefits acquirers of domestic rather than foreign companies.<sup>10</sup>

However, Barbopoulos, Danbolt, and Alexakis (2018) show that the earnout effect in acquisitions of foreign companies is inversely related to the extent of the acquiring firm's degree of global diversification, with more value added from using earnouts to acquirers with limited or no global diversification before the cross-border M&A announcement. Moreover, Barbopoulos, Paudyal, and Sudarsanam (2018) show that acquirers' gains in earnout-based M&As are sensitive to the choice of payment method (i.e., cash, stock, a combination of the two, or other forms of payment) in the initial and deferred payment stages. Last, Alexakis and Barbopoulos (2020) show that the earnout effect is potentially elusive because of the presence of a significant acquirer information dissemination effect in the majority of earnout-based M&As, predominately involving small acquiring firms. Overall, the positive earnout effect appears to be derived from the ability of earnouts to motivate information sharing between the merging companies, which contributes to the reduction in both adverse selection and moral hazard concerns and, as a result, to the higher likelihood of merger success.

The use of earnout in a merger should therefore by itself be a strong signal regarding the quality of the acquired company's managers (often owners), who are prepared to accept the earnout terms and signal to the market their commitment to maximize the performance of the combined entity during the integration phase of the deal. Our first hypothesis is therefore:

H1: *Earnout-based M&As yield higher acquirer risk-adjusted returns relative to M&As with a single up-front payment (i.e., nonearnout).*

## 2.2 | Firm and deal characteristics, and the earnout valuation effects

Typical earnout-based M&As involve small companies, with vendors that are private or divested subsidiary (unlisted) companies operating in intangible-rich sectors. The merger valuation risk in such deals is high because of the limited information often available, particularly for small, unlisted companies (Barbopoulos et al., 2020, offer a comprehensive discussion of the valuation effects of small deals on acquirer value). In addition, the nature of acquired assets may lead to significant disagreements between the merging companies regarding the value and future prospects of the target firm. Although earnouts are expected to reduce valuation risk in such deals, they come with their own issues. Their structure can be complex and highly sensitive to the challenges involved in the valuation of the acquired company, in addition to bidder default risk and litigation risk, and hence the calculations of the merger's expected payoff (Battauez et al., 2021; Cain et al., 2011; Kohers & Ang, 2000; Lukas et al., 2012). These empirical facts suggest that the efficient risk-sharing properties offered via the earnout can be largely attributed to the effective design of earnout payments, including the size of earnout payments, the interval(s) between them, and the choice of performance metrics. Failure to structure earnouts properly may lead to significant legal disputes and value-destroying M&As. Therefore, intense negotiations and technical expertise on how to structure the earnout contract is essential. We hypothesize that larger and older acquirers, with perhaps more resources and acquisition experience, are better able to negotiate earnout terms and have more of an advantage in negotiations with relatively small targets (i.e., when the relative deal size is low).

REAV (i.e., the fraction of deferred value relative to the full deal value) may also affect the stock price reaction around the announcement date of earnout-based M&As. Although high REAV may signal significant disagreements between the merging partners about the merger payoff, it may also signal the high quality of the vendor, given it is prepared to accept that a larger part of the deal will be deferred and made contingent on future performance.

<sup>10</sup>Datar et al. (2001) show that because of several differences in accounting practices and corporate governance mechanisms worldwide, foreign bidders of US targets are less likely to use earnout than domestic (US) bidders.

The earnout valuation effects are therefore expected to vary with several deal- and firm-specific features, as well as different earnout structures. Our second hypothesis is therefore:

H2: *Earnout-based M&As yield superior acquirer risk-adjusted returns in:*

- (a) *small deals,*
- (b) *deals announced by larger acquirers and hence (in combination with (a)) low relative deal size transactions, and*
- (c) *deals announced by older acquirers,*

*relative to remaining earnout-based M&As and M&As settled with single up-front payments.*

## 2.3 | Financial advisors and acquirer gains from earnout-based M&As

Earnout contracts exhibit several interesting peculiarities pertinent to their structure and whether their terms align with expectations regarding successful M&A completion (Barbopoulos, Paudyal, & Sudarsanam, 2018; Cain et al., 2011). Cain et al. (2011) show that expected earnout payments are strongly related to various proxies for valuation uncertainty, as well as the characteristic properties of earnouts in mitigating valuation uncertainty.

Lukas et al. (2012) further argue that earnouts constitute intricate payments with substantial heterogeneity in contract terms and structures among different deals. Therefore, the effective risk-sharing properties offered via the earnout can be largely attributed to the effective design of earnout payments. Although these terms are endogenously determined, being part of the overall contract negotiations, they may significantly affect outcomes as they affect incentives. Accordingly, the outcome of earnout-based M&As can be expected to be positively related to the technical expertise and negotiation abilities required to structure earnouts well. As a result, external financial advisors (i.e., investment banks and boutique financial advisors), known for their specialization and value-enhancing services, are likely to improve the terms of the earnout contract and increase the likelihood of merger success (for discussions on the impact of financial advisors on merger outcomes, see Bao & Edmans, 2011; Song et al., 2013). Such advisors are likely to be experienced in dealing with earnout contract terms.

The involvement of investment banks in the M&A process has been shown to improve the merger payoff, given the advisor's ability to identify and extract significant synergies from the merger. This literature, however, concentrates on (1) the impact of mainly buy-side financial advisors and (2) M&As that are settled in single up-front payments of cash or stock, whose contractual design avoids contingency considerations about future payments. Several scholars have also investigated the extent to which the advisor's reputation affects the variation in acquirers' risk-adjusted returns through better and more experienced advice (see Hunter & Jagtiani, 2003; Kale et al., 2003). Moreover, the involvement of boutique financial advisors in the M&A process of public target M&As has been shown to be associated with favorable M&A outcomes, such as a decrease in takeover premia (Song et al., 2013). Song et al. (2013) present the skill hypothesis, which posits that boutique financial advisors tend to be hired in complex deals because of their specialization and industry expertise that can help acquirers address the valuation challenges in informationally demanding deals. They also present the scale hypothesis, which predicts that full-service banks focus their efforts on large M&As with substantial resources and advisory fees, which therefore makes boutique financial advisors' services likely to be concentrated in small and low-profile deals.

However, the literature has so far ignored the role of investment banks and boutique financial advisors on acquirer gains from earnout-based M&As. We set out to fill this void by studying the pricing effects of earnouts in M&As receiving external financial advice on one or both sides of the deal. Our third hypothesis is therefore:

H3: *Earnout-based M&As yield higher acquirer risk-adjusted returns in deals advised by top-tier financial advisors or boutique financial advisors compared to other earnout M&As and M&As settled in single up-front payments.*

### 3 | METHODOLOGY

#### 3.1 | Measurement of acquirer returns

We focus our analysis on the effect of earnout provision on the returns of acquirers around the M&A announcement day. Consistent with numerous studies with similar sample characteristics (e.g., Barbopoulos et al., 2012; Barbopoulos, Danbolt, & Alexakis, 2018; Faccio et al., 2006; Fuller et al., 2002), the announcement-period returns for acquirer  $i$  are estimated using the adjusted market model (AMM), consistent with Brown and Warner (1980, 1985):

$$AR_{it} = R_{it} - R_{mt}, \quad (1)$$

where  $AR_{it}$  is the abnormal return to acquirer  $i$  on day  $t$ ,  $R_{it}$  is the stock return of acquirer  $i$  on day  $t$ , and  $R_{mt}$  is the value-weighted market return index (FTSE All Share or DataStream-US Market index, for the United Kingdom and United States, respectively) on day  $t$ . The announcement-period CAR, our main performance measure, for acquirer  $i$  is the sum of the abnormal returns over a 5-day window ( $t-2$  to  $t+2$ ) surrounding the deal's announcement (day  $t=0$ ), as follows:

$$CAR_i = \sum_{t=-2}^{t+2} AR_{it}. \quad (2)$$

To verify the robustness of our results, we also use other asset pricing techniques (market model, capital asset pricing model [CAPM], three-factor Fama-French model, and four-factor Carhart model) to estimate the acquiring firm's abnormal returns. The choice of model does not affect our results.

#### 3.2 | Multivariate analysis and factors shaping acquirer returns

We use the following regression specification to test our main hypotheses, in addition to controlling for other known factors influencing acquirer abnormal returns:

$$CAR_i = \beta_0 + \sum_{j=1}^k \beta_j X_{ij} + \tilde{\gamma}_t + \tilde{\delta}_c + \varepsilon_i \quad i = 1 \dots N, \quad (3)$$

where  $CAR_i$  is the 5-day ( $t-2$  to  $t+2$ ) CAR for the acquirer, as estimated in Equation (2). The information set  $X_{ij}$  includes variables representing the presence and structure of the earnout in M&As along with several other deal- and firm-specific factors that are known to affect the acquiring firm's value; the impact of each is measured and stacked in the vector  $\beta_j$ . The list of variables in  $X_{ij}$  includes the earnout dummy; the relative size of the deal, measured by the ratio of deal value to acquirer value measured by its market capitalization 20 days before the M&A announcement day; natural logarithm of acquirer value, measured by its market capitalization 20 days before the M&A announcement day; natural logarithm of deal value; acquirer sigma; acquirer market-to-book value 20 days before the M&A announcement day; natural logarithm of acquirer age, measured by the number of days between the M&A announcement date and the date when the firm was first recorded in Datastream; and dummy variables that equal 1 if, respectively, the target is a private firm, if the deal is diversifying, if the target is based in a different country than the acquirer, and if the target is based in an intangible-rich sector, and 0 otherwise. All variables are defined in the Appendix.  $\tilde{\gamma}_t$  and  $\tilde{\delta}_c$  represent year and acquirer nation fixed effects, respectively, and  $\varepsilon_i$  is a white noise error term.

#### 3.3 | Reforms to the earnout regulatory framework: SFAS 141(R)

Traditionally, earnout consideration was recognized in the buyer's financial statements if and when the conditions for the payment of the earnout were satisfied. As recognized by the US Financial Accounting Standards Board



(FASB, 2007), this could result in “the appearance but not the economic substance of a bargain purchase. For example, no liability often was recognized for some contingent payment arrangements (for example, earnouts) at the acquisition date, which could result in the appearance of a bargain purchase by understating the consideration paid” (SFAS 141(R), B379). This changed with the introduction of the revised US accounting standard for Business Combinations: “This Statement, in contrast, requires the measurement and recognition of substantially all liabilities at their fair values on the acquisition date” (SFAS 141(R), B379). Since the introduction of the revised accounting standard in 2009, earnouts are required to be recorded at fair value at the date of the deal closing. The recorded fair value is then subject to periodic adjustments based on the likelihood of payment or actual earnout payments that have occurred. Any such adjustment must be recorded as gain or loss in the buyer's income statement. The result of this rule is to accelerate the recording of contingent liabilities related to the earnout, improve monitoring of earnout payments, increase accountability and transparency, and reduce the likelihood of opportunistic manipulation or setting of overly optimistic performance goals. As this reform is expected to directly affect the demand for earnouts and the earnout contract design, we examine the impact of the policy reform on earnout use and its valuation effects.

Therefore, following the reform of the US accounting standard, we anticipate that merging firms' incentives to employ earnouts, as well as the structure of earnouts, will be different compared to the prereform period.<sup>11</sup> In particular, we anticipate that target managers who may be skeptical about the earnout process will be more prepared to accept the earnout contract terms and, possibly, accept even larger relative earnout fractions (i.e., higher REAV). Higher REAV will also be associated with higher takeover premia.<sup>12</sup> In addition, we expect the requirement for stricter disclosure and the need to be more transparent about the settlement of earnout payments to make them more attractive to acquirers. For acquirers aiming to maximize value from M&As, higher transparency in the settlement phase of earnout payments helps market participants more easily evaluate the value creation potential of the deal. Finally, higher transparency can lead to fewer disputes between the merging firms, and to bidders facing a lower risk of lawsuits in the integration phase of the deal. Therefore, the use of earnout in the postreform period sends a strong signal that the merging firms are highly motivated and committed to maximizing value via earnout-based M&As.

## 4 | SAMPLE AND DESCRIPTIVE STATISTICS

### 4.1 | Sample

The sample consists of M&As announced by UK and US listed companies between January 1, 1986 and December 31, 2016 (inclusive) and recorded by Securities Data Company (SDC) Thomson ONE. To form our final sample, we apply the following criteria: (1) the acquirer is a UK or US firm listed on one of the major stock exchanges in the United Kingdom or United States, with a market value of at least \$1 million, measured 20 days before the M&A announcement; (2) the deal value is at least \$1 million, excluding fees; (3) the acquirer owned less than 10% of the acquired company's shares before the M&A announcement and aimed to control at least 50% of the shares after the deal's completion (to ensure the deal involves a change in control); (4) the acquired company is private or a subsidiary (anywhere in the world); (5) to avoid the confounding effects of multiple deals, all M&As announced within 5 days surrounding another M&A by the same acquirer are excluded from the sample; (6) buy-backs, recapitalizations, spin-offs, exchange offers, and repurchases are excluded from the

<sup>11</sup>Although the relevant UK and International Accounting Standards (applicable in the United Kingdom since 2005) have also evolved over time, with a protracted debate about the appropriate accounting for contingent liabilities arising from acquisitions, there has not been such a clear regulatory change in the accounting for earnouts in the United Kingdom as took place in the United States with the introduction of SFAS 141(R). Although International Financial Reporting Standards No. 53 requires acquirers to recognize contingent liabilities, there is no explicit reference to earnouts in the standard. We therefore restrict our analysis of the impact of regulatory change on the use of earnouts to our sample of US M&As.

<sup>12</sup>Barbopoulos and Adra (2016) show that the premia offered in earnout-based deals increases with REAV.

sample; (7) deals with acquirers having negative book value of equity, in the most recent reporting, are excluded from the sample (as in Lyon et al., 1999); and (8) M&As in which either the acquiring or acquired company is a government organization are excluded from the sample. Finally, we keep only M&As for which the daily stock price and market value of equity of the acquirer are available from Datastream (for the US sample we also confirm our findings based on data collected from the Center for Research in Security Prices [CRSP] and Compustat). Satisfying the preceding criteria leaves us with 31,214 M&As (9577 announced by UK acquirers and 21,637 by US acquirers), 5008 of which (16% of the total sample) include earnouts: 2688 announced by UK and 2320 announced by US domiciled acquirers. However, although the total number of earnout deals is similar in the two countries, the proportion of M&As involving earnouts is much higher in the United Kingdom (28% of all M&As) compared to the United States (11%).

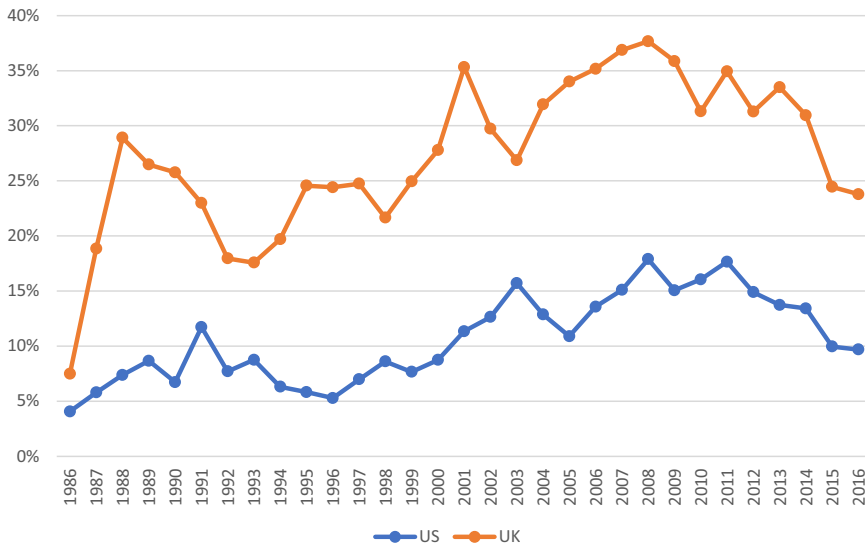
Earnouts are increasingly common in the United Kingdom, United States, and many other countries with strong property rights and legal enforcement of contracts. Our data reveal that more than one in four unlisted target M&As announced by UK domiciled acquirers since 1986, and almost one in three since 2001, involve earnout payments. At their peaks in 2008 (2011), 38% (35%) of all unlisted target M&As announced by UK acquirers involved earnout payments. Similarly, the use of earnout has increased from less than 5% of all unlisted target M&As announced by US acquirers in the late 1980s to more than 10% each year since 2000, with peaks of 18% in both 2008 and 2011. Notably, after 2011, and in particular in 2016, earnout activity dropped for M&As announced by both UK and US acquirers of unlisted targets, to 24% and 10%, respectively. Moreover, the size of earnout-based M&As announced by UK (US) acquirers is substantial, representing at its peak 54% (24%) of the total deal value of all unlisted target M&As (in 2009 and 2003, respectively).<sup>13</sup> Arguably, the increased use of earnouts in M&As announced by both UK and US acquirers since 2000 has been fueled by the record growth of M&As involving hard-to-evaluate target companies operating in the high-technology, healthcare, and other intangible-rich sectors (Barbopoulos, Danbolt, & Alexakis, 2018; Kohers & Kohers, 2001; Officer et al., 2009).<sup>14</sup> Other countries with significant earnout activity include Ireland, Canada, Australia, South Africa, Germany, and the Nordic countries (see also Barbopoulos, Danbolt, & Alexakis, 2018). The UK and US markets for corporate control present excellent laboratories to study earnout-based M&As, given that they are the most earnout-active markets in the world (in terms of both absolute and relative activities).

The annual distribution of the relative earnout activity (i.e., annual ratio of earnout activity to total M&A activity) for M&As made by UK and US acquirers, separately, is shown in Figure 1. As discussed by Maksimovic et al. (2013), Figure 1 shows that the variation in the activity of earnout-based M&As is cyclical, reaching peaks during periods of economic expansion (late 1990s and mid-to-end 2000s) and troughs during periods of economic contraction (early 2000s and the period following the 2008 financial crisis). The lower earnout activity in the postrecession period in the United States may also be due to the regulatory reforms (effective from 2009) that made earnouts potentially more carefully selected.

Table 1, which offers a detailed annual distribution of our sample, shows that the aggregate M&A activity (including earnout-based M&As) follows a pro-cyclical pattern, with significant declines during periods of economic downturn, such as the recession in the early 2000s and the aftermath of the global financial crisis of 2008. About half the deals in our sample are industry diversifying, and one in five with a foreign target. Regarding the payment method in nonearnout settled M&As, we find the largest share of the deals to be settled in cash (38.7%). The remaining deals in our sample are split between transactions settled with stock (15.0%) and mixed payments (30.3%). Almost two-thirds (65.7%) of the deals in our sample involve private target firms, with the remainder being acquisitions of subsidiaries.

<sup>13</sup>These figures are likely to be driven by the nature of the market for corporate control in the United Kingdom and United States, respectively. Faccio and Masulis (2005) show that approximately 90% of UK (and Irish) acquisitions involve unlisted target firms, and Draper and Paudyal (2006) report that approximately 87% of UK acquisitions involve privately held targets. However, Moeller et al. (2007) show that only about 53% of US acquisitions involve unlisted targets.

<sup>14</sup>Increasing media attention has also been devoted to the earnout payment mechanism. In 2017, three articles in the *Wall Street Journal* highlight the importance of earnout growth in the era of high valuation risk (see Gormley, 2017; Gormley & Haggin, 2017; Haggin, 2017).



**FIGURE 1** Annual relative earnout activity in mergers and acquisitions (M&As) announced by US and UK domiciled acquirers. This figure depicts the annual relative earnout activity (ratio of number of earnout-based M&As/total number of M&As) announced by US and UK domiciled acquirers, respectively [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

## 4.2 | Summary statistics

Table 2 reports summary statistics. Earnout-based deals are generally smaller than deals settled in single up-front payments of cash, stock, or mixed payment (\$78 million vs. \$136 million). For the earnout sample, the maximum transaction value is \$9.8 billion (unreported). The average stated earnout value, reflecting the full amount of potential earnout payments, is approximately \$22 million, with a maximum earnout value of \$4 billion and a minimum value of \$130,000 (unreported).

Earnout-based M&As are smaller on average when the target firm is private, compared to earnout-based M&As of subsidiary target firms (\$59 million vs. \$157 million), yet the relative earnout ratio (i.e., ratio of deferred deal value to total deal value) is much larger for M&As of private than subsidiary target M&As (38% vs. 32%). Cain et al. (2011) show that the relative earnout ratio is positively related to the riskiness of the deal, and hence, in deals that are subject to higher merger valuation risk or higher disagreement between the merging firms about the deal's valuation, the relative earnout ratio is much larger than otherwise.

The summary statistics further show that M&As of companies operating in one of the intangible-rich sectors (i.e., media, retail, high-technology, healthcare, or telecommunications sectors, as defined in Barbopoulos, Danbolt, & Alexakis, 2018; Barbopoulos, Paudyal, & Sudarsanam, 2018) have higher maximum stated earnout value, as well as high relative earnout ratio (\$25 million and 39%, respectively), relative to the average earnout-based M&A in the sample. Once again, high values in these figures reflect the higher merger valuation risk embedded in M&As of companies operating in intangible-rich sectors. Further statistics show that, on average, acquiring firms in earnout-based M&As are smaller than their counterparts in nonearnout M&As (\$2208 million vs. \$3709 million).<sup>15</sup> This suggests that smaller acquiring firms, which may be more sensitive to merger valuation risk

<sup>15</sup>Noticeably, the significantly larger size of acquirers (almost double) in nonearnout deals (\$4879 million) compared to earnout deals (\$2442 million) is generally driven by acquirers in cash- (\$7,049 million) or stock- (\$4728 million) settled deals, rather than mixed (\$2590 million) deals. Acquirers in earnout-based, listed target deals are larger than their counterparts in nonearnout M&As, whereas acquirers in earnout-based, private target deals are on average older than their counterparts in nonearnout deals.

**TABLE 1** Annual distribution of sample mergers and acquisitions (M&As) by deal and firm characteristics

Year	All	Domestic	Focused	Cash	Stock	Mixed	Earnout	Private	Deal value (all)	Acquirer MV (all)	Deal value (earnout)	Acquirer MV (earnout)	Relative deal size	CAR	Earnout value	Relative earnout value
1986	163	143	94	43	66	46	8	104	136	1347	123	520	37%	0.876	24.93	38%
1987	260	231	140	91	82	56	31	169	78	941	45	395	47%	1.412	22.42	42%
1988	461	382	202	182	53	119	107	309	55	790	12	439	28%	0.641	5.76	46%
1989	677	545	317	281	103	159	134	388	49	711	25	400	29%	0.259	7.61	45%
1990	483	381	228	221	67	113	82	253	49	910	12	326	33%	0.726	5.02	45%
1991	468	389	247	165	90	140	73	262	40	1080	16	333	27%	2.278	4.22	35%
1992	699	592	375	214	163	247	75	415	40	907	35	1130	40%	1.620	8.23	37%
1993	935	821	484	319	228	282	106	559	43	702	23	235	34%	2.277	6.99	39%
1994	1164	1018	638	393	239	413	119	767	45	811	20	354	52%	1.890	5.90	35%
1995	1166	982	638	387	282	365	132	769	51	763	54	356	54%	1.726	10.84	35%
1996	1448	1224	761	474	368	455	151	1004	63	1187	58	573	31%	2.112	11.99	32%
1997	1888	1585	958	614	398	658	218	1270	96	1513	36	612	28%	1.747	8.56	36%
1998	1891	1560	1006	672	370	620	229	1291	84	1940	44	868	24%	1.754	13.09	34%
1999	1602	1303	898	536	398	460	208	1104	120	4689	46	947	43%	3.911	10.38	37%
2000	1679	1321	936	463	487	478	251	1193	134	7427	83	3388	43%	1.064	17.83	41%
2001	1151	897	612	373	206	345	227	737	156	3766	64	814	53%	3.047	18.83	39%
2002	1090	900	590	476	121	300	193	679	96	2542	50	1226	46%	3.160	14.91	39%
2003	891	743	513	411	94	219	167	559	88	2806	106	2618	45%	2.976	23.85	34%
2004	1210	972	695	554	93	344	219	827	95	4816	64	1849	37%	2.336	21.27	35%
2005	1406	1105	795	645	129	387	245	1002	137	3435	70	2146	81%	3.024	18.19	36%

(Continues)

TABLE 1 (Continued)

Year	All	Domestic	Focused	Cash	Stock	Mixed	Earnout	Private	Deal value (all)	Acquirer MV (all)	Deal value (earnout)	Acquirer MV (earnout)	Relative deal size	CAR	Earnout value	Relative earnout value
2006	1368	1076	738	646	87	359	276	947	129	3648	75	2418	61%	2.004	13.73	35%
2007	1379	1051	783	635	81	352	311	979	160	5614	61	2865	56%	2.195	21.85	35%
2008	946	717	536	434	64	221	227	653	123	3778	87	1465	45%	1.770	25.21	37%
2009	603	462	346	279	62	141	121	366	242	4450	161	3477	49%	2.411	31.05	38%
2010	819	599	440	418	66	166	169	512	237	5709	84	3649	105%	2.555	32.23	40%
2011	852	616	433	417	63	182	190	531	186	4752	99	3349	33%	1.877	31.46	39%
2012	826	620	453	457	42	172	155	502	237	5554	173	3468	28%	2.456	45.00	36%
2013	771	605	424	421	51	153	146	487	218	5819	140	4149	36%	1.672	47.33	36%
2014	975	757	540	510	66	224	175	654	259	6838	147	6416	37%	2.604	38.13	34%
2015	1097	849	532	259	39	650	149	684	270	5455	160	4858	33%	1.872	56.65	33%
2016	846	676	387	97	17	618	114	517	237	5837	257	7717	40%	2.118	86.54	32%
Sum	31,214	25,122	16,739	12,087	4675	9444	5008	20,493	-	-	-	-	-	-	-	-
%	-	80.48	53.63	38.72	14.98	30.26	16.04	65.65	-	-	-	-	-	-	-	-
Average	-	-	-	-	-	-	-	-	127	3468	78	2208	44%	1.721	22.09	37%

Note: This table presents the annual distribution of the main variables in our analysis. See the Appendix for variable definitions.

TABLE 2 Descriptive statistics

	N	Deal value	Acquirer MV	Relative deal size	Acquirer age	Earnout value (N)	Relative earnout value (N)
All	31,214	127	3468	0.436	12.2	22.09 (5008)	0.368 (5008)
Earnout	5008	78	2208	0.263	12.1	22.09 (5008)	0.368 (5008)
Nonearnout	26,206	136	3709	0.469	12.2	-	-
Cash	12,087	136	5200	0.181	14.8	-	-
Stock	4675	76	3549	1.148	7.9	-	-
Mixed	9444	167	1879	0.502	11.1	-	-
Private target	20,493	70	2879	0.426	11.3	20.10 (4037)	0.379 (4037)
Earnout	4037	59	1800	0.268	11.9	20.10 (4037)	0.379 (4037)
Nonearnout	16,456	72	3144	0.464	11.2	-	-
Subsidiary target	10,721	237	4593	0.455	13.9	30.36 (971)	0.323 (971)
Earnout	971	157	3902	0.240	13.1	30.36 (971)	0.323 (971)
Nonearnout	9750	245	4662	0.477	14.0	-	-
Focused	16,739	148	3000	0.360	11.4	28.02 (2624)	0.367 (2624)
Earnout	2624	94	2743	0.258	11.4	28.02 (2624)	0.367 (2624)
Nonearnout	14,115	158	3048	0.379	11.4	-	-
Diversified	14,475	103	4009	0.523	13.2	15.57 (2384)	0.370 (2384)
Earnout	2384	60	1618	0.267	13.0	15.57 (2384)	0.370 (2384)
Nonearnout	12,091	111	4480	0.574	13.2	-	-
Target in intangible-rich sector	19,411	120	4148	0.434	10.7	25.27 (3595)	0.390 (3595)
Earnout	3595	78	2659	0.234	11.0	25.27 (3595)	0.390 (3595)
Nonearnout	15,816	129	4487	0.479	10.6	-	-

(Continues)

TABLE 2 (Continued)

	N	Deal value	Acquirer MV	Relative deal size	Acquirer age	Earnout value (N)	Relative earnout value (N)
Domestic	25,122	123	2957	0.424	11.4	21.22 (3800)	0.367 (3800)
Earnout	3800	73	2072	0.278	11.3	21.22 (3800)	0.367 (3800)
Nonearnout	21,322	132	3115	0.450	11.4	-	-
Foreign	6092	145	5573	0.484	15.7	24.83 (1208)	0.372 (1208)
Earnout	1208	95	2636	0.214	14.8	24.83 (1208)	0.372 (1208)
Nonearnout	4884	157	6299	0.551	15.9	-	-

Note: This table presents descriptive statistics of the main variables in our analysis. See the Appendix for variable definitions.

or have less access to external finance and are less likely to finance an M&A using their own shares (Bates et al., 2018), are more likely to employ the earnout payment mechanism in valuation-challenging M&As. Finally, the relative deal size shows that earnout-based deals have, on average, smaller relative deal size compared to nonearnout M&As (26% vs. 47%). Overall, the statistics indicate that earnout-based deals exhibit some interesting heterogeneities across different types of deals, which we expect to have different valuation effects on M&A announcements.

## 5 | RESULTS

### 5.1 | Results from univariate tests

Table 3 reports results from our univariate tests. The average acquirer in our sample enjoys a 1.72 percentage point CAR over the 5-day event window. This is consistent with prior studies analyzing the valuation effects of unlisted target M&As, including private (CAR = 1.61 percentage points) and subsidiary (CAR = 1.93 percentage points) target M&As on acquirer returns (Barbopoulos et al., 2020; Chang, 1998; Faccio et al., 2006; Fuller et al., 2002). Acquirers in earnout-based M&As earn, on average, a significant CAR of 1.57 percentage points in the 5-day event window. We further find that although acquirers in earnout and nonearnout M&As enjoy similar CARs (statistically insignificant differential of  $-0.17$ ), some interesting heterogeneity is observed, which is pertinent to the contingent properties in the corresponding nonearnout payment.<sup>16</sup> Specifically, although we find that acquirer returns from earnout-based M&As are 36 basis points higher than acquirer returns in deals settled in up-front cash payments without any contingent properties, they are 97 (45) basis points lower than acquirers' returns in deals settled in up-front stock (mix of cash and stock) payments with (some) contingent properties. Unreported results (available upon request) show that M&As announced by both US and UK domiciled acquirers contribute to these findings. These results offer partial support to the predictions of the earnout hypothesis (H1), that the contingent properties in the earnout payment help acquirers alleviate valuation risk. As a result, earnout-based M&As create more value than deals with cash payments without any contingent payment properties.

Unreported univariate results further show that acquirers in earnout-based M&As enjoy higher gains relative to nonearnout M&As from focused and foreign target deals than from diversified and domestic deals, respectively. Acquirers also enjoy 69 and 22 basis point higher CARs from earnout-based M&As, with a larger component of the deal value being deferred (depending on whether earnout value or REAV is the underlying variable), relative to earnout deals with only a small component of deal value being deferred.

### 5.2 | Results from multivariate tests

In this section, we examine the earnout effect within a multivariate setting where we simultaneously include factors we hypothesize to interact with the earnout effect, along with other factors known from the literature to affect acquirers' gains. We also include nonlinear effects, time fixed effects, and acquirer-nation fixed effects. Table 4 reports the results, based on the estimation of several versions of Equation (3). Model 1 employs 31,214 acquisitions, 5008 of which include earnout payments. The relation between acquirer CAR and earnout in Model 1 is statistically insignificant, consistent with the overall earnout effect also reported in Table 3. Unreported results further show that the insignificant earnout effect is obtained even after we balance our treated and control samples based on the method proposed by Hainmueller (2012) and Hainmueller and Xu (2013).

<sup>16</sup>In a separate analysis (reported in Section 5.7), we show that including listed targets in our analysis makes the earnout valuation effect higher and significant at the 1% level.



**TABLE 3** Univariate analysis of acquirer abnormal returns

		All	Private	Subsidiary
All	Mean	1.72***	1.61***	1.93***
	N	31,214	20,493	10,721
Earnout (1)	Mean	1.57***	1.47***	1.99***
	N	5008	4037	971
Nonearnout (2)	Mean	1.74***	1.64***	1.92***
	N	26,206	16,456	9750
Cash (3)	Mean	1.21***	0.95***	1.48***
	N	12,087	6119	5968
Stock (4)	Mean	2.55***	2.37***	3.54***
	N	4675	3948	727
Mixed (5)	Mean	2.03***	1.85***	2.40***
	N	9444	6389	3055
Differentials				
(1) versus (2)	Mean	-0.17	-0.16	0.07
(1) versus (3)	Mean	0.36***	0.52***	0.51**
(1) versus (4)	Mean	-0.97***	-0.89***	-1.55***
(1) versus (5)	Mean	-0.45***	-0.37**	-0.41

Note: This table presents the mean announcement-period 5-day ( $t-2, t+2$ ) cumulative abnormal returns for all acquisitions split by target listing status (All, Private target, and Subsidiary target) and method of payment (All, Earnout, Nonearnout, Cash, Stock, and Mixed). See the Appendix for variable definitions.

\*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

However, Models 2–4 provide the first evidence of heterogeneity among earnout-based M&As according to several deal and merging firms' characteristics. Specifically, we find that acquirers enjoy significant gains from small earnout-based deals (Model 2), suggesting that the earnout contributes to a reduction in the merger valuation risk associated with small, unlisted, and mostly opaque target firms, consistent with Hypothesis H2(a). We further find that large acquirers enjoy superior gains from earnout-based deals (Model 3), suggesting that larger acquirers are better able to structure earnouts effectively and have the necessary resources to support them, consistent with Hypothesis H2(b). Model 4 confirms this finding, where we examine the role of deal relative size and find that low relative size earnout-based deals add more value, consistent with Hypothesis H2(b). Results in Model 5 suggest that earnouts are more effective in M&As announced by more mature acquirers, indicating that more experienced acquirers, who have been around longer, are more able to support earnouts, consistent with Hypothesis H2(c). We further find that acquirers enjoy higher gains from earnout-based M&As of foreign targets, as shown by the marginally significant coefficient of Foreign  $\times$  Earnout in Model 8. This adds to prior studies indicating that earnouts help acquirers mitigate merger valuation risk in complex deals (Barbopoulos, Danbolt, & Alexakis, 2018; Barbopoulos, Paudyal, & Sudarsanam, 2018; Mantecon, 2009). Overall, these results extend evidence from prior studies showing that earnouts are particularly challenging to structure, and thus, more resourceful acquirers are likely better able to structure earnouts effectively (Cain et al., 2011).<sup>17</sup>

<sup>17</sup>It is noteworthy that our analysis shows no significant gains from earnout-based diversifying M&As, as well as M&As involving targets operating in one of the intangible-rich sectors (defined in the Appendix).

**TABLE 4** Multivariate analysis of acquirer abnormal returns

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Earnout	-0.190	-0.432***	-0.623***	-0.340**	-0.976***	-0.520*	-0.228	-0.581**			
Relative deal size	0.036***	0.012	0.181***		0.203***	0.203***	0.203***	0.203***	0.413**	0.413**	0.416**
Log(Acquirer MV)	-0.539***	-0.685***		-0.496***	-0.855***	-0.539***	-0.539***	-0.857***	-0.578***	-0.578***	-0.576***
Log(Deal value)			0.335***								
Low Deal value		-1.517***									
Low Deal value × Earnout		0.499**									
High Acquirer MV			-1.433***								
High Acquirer MV × Earnout			0.601**								
Low Relative deal size				-0.689***							
Low Relative deal size × Earnout				0.704***							
High Acquirer age					-0.386**						
High Acquirer age × Earnout					1.110***						
Target in intangible-rich sector × Earnout						0.111					
Diversified × Earnout							-0.452				
Foreign × Earnout								0.601*			
REAV									-1.292***	-1.505***	0.385
REAV <sup>2</sup>										0.243***	
(REAV - 0.30) × Dummy iff REAV > 0.30											-2.273**
Sigma	7.462***	9.842***	4.212***	8.609***	7.825***	7.646***	7.600***	7.670***	0.205***	0.222***	0.000***
Acquirer MTBV	-0.129***	-0.096***	-0.395***	-0.119***	-0.441***	-0.445***	-0.445***	-0.445***	-0.181***	-0.181***	-0.183***
Acquirer age	0.101**	0.119***	-0.052	0.114***		-0.110	-0.111	-0.110	0.113	0.113	0.112

(Continues)

TABLE 4 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Private target	-0.703***	-0.640***	-0.326**	-0.674***	-0.412***	-0.409***	-0.410***	-0.413***	-0.527*	-0.526*	-0.551**
Target in intangible-rich sector	-0.223**	-0.191**	-0.352**	-0.201**	-0.397**	-0.422**	-0.407**	-0.408**	0.001	0.001	-0.008
Diversified	-0.111	-0.099	0.428***	-0.085	0.367**	0.373**	0.445**	0.375**	-0.222	-0.223	-0.223
Foreign	0.032	0.042	-0.427**	0.061	-0.517***	-0.501***	-0.505***	-0.615***	-0.129	-0.128	-0.133
Intercept	3.568***	4.745***	-2.264**	3.233***	-0.981	-0.322	-0.353	-0.323	-0.256	-0.231	-0.536
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer nation fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	3.27%	3.78%	2.19%	3.32%	2.08%	2.07%	2.07%	2.07%	1.59%	1.58%	1.62%
F-statistic	87.93***	87.59***	49.80***	82.50***	55.31***	54.97***	55.03***	55.05***	7.32***	6.70***	6.84***
Min VIF	1.01	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.03	1.03	1.03
Max VIF	1.23	1.96	1.59	1.91	2.10	3.66	2.11	1.56	1.24	1.78	5.83
Mean VIF	1.10	1.34	1.25	1.30	1.27	1.53	1.28	1.18	1.10	1.21	1.89
N	31,214	31,214	31,214	31,214	31,214	31,214	31,214	31,214	5008	5008	5008

Note: This table reports results from the multivariate analysis examining the wealth effects of earnout-based deals. The dependent variable consists of the announcement-period market-adjusted 5-day ( $t - 2, t + 2$ ) abnormal returns of acquirers, which are regressed against a set of explanatory variables. Regression outputs are estimated using ordinary least squares, with the coefficients adjusted for possible heteroskedasticity using White (1980) heteroskedasticity-consistent standard errors and covariance. The intercept measures the abnormal returns to acquirers after accounting for the effects of the explanatory variables included in the specification or model. See the Appendix for variable definitions.

Abbreviation: VIF, variance inflation factor.

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

In Models 9–11 we employ only the sample of earnout-based deals ( $N = 5008$ ) to examine the relation between acquirers' gains and REAV. The central variable in this model is REAV. We find in Model 9 a negative and significant relation between acquirers' CAR and REAV (coefficient =  $-1.292$ , significant at the 1% level). Although this depicts an inverse relation between acquirers' CAR and REAV, it is contrary to our theoretical predictions on earnout use, suggesting that a more complex and possibly nonlinear relation between acquirers' CAR and REAV is potentially present. We therefore test this possibility by including in the model both REAV and its squared term ( $REAV^2$ ).<sup>18</sup> We find a significant curvilinear relation between acquirers' CAR and REAV. The curve slopes upward until REAV reaches approximately 30% (29.8%) and then slopes downward. Figure 2 depicts this relation. Therefore, firms appear to benefit most from earnout-based deals when about 30% of the deal value is deferred to a future stage. This is consistent with prior discussions in this article and in the literature (Cain et al., 2011). On the one hand, deferring too small a proportion of the deal value may provide insufficient incentive for information sharing and alignment of interests, while still requiring costly negotiations of the earnout contract terms and postacquisition monitoring of target firm performance. On the other hand, deferring too large a proportion of the deal value may highlight the high degree of disagreements between the merging firms regarding the value of the target and hence the riskiness of the deal.

### 5.3 | Impact of financial advisors on acquirer gains from earnout-based M&As

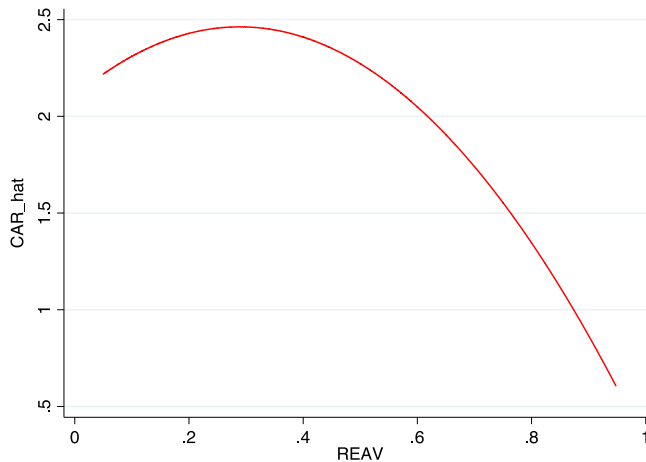
We now examine the effect of financial advisors on acquirer gains from earnout-based M&As. We classify financial advisors into top-tier investment banks and boutique financial advisors. We proceed by performing the following regression:

$$CAR_i = \beta_0 + \beta_1 \times Earnout_i + \beta_2 FA_i + \beta_3 \times (Earnout_i \times FA_i) + \sum_{j=1}^k \varphi_j X_{ij} + \bar{\gamma}_t + \bar{\delta}_c + \varepsilon_i, \quad i = 1 \dots N \quad (4)$$

where  $CAR_i$  is acquirer CAR, as described in Equation (2).  $FA$  represents financial advisors, either top-tier or boutique financial advisors, on either the acquirer or target side, or both, depending on model specification. The information set  $X_{ij}$  accounts for several deal and firm characteristics, such as deal relative size, acquiring firm  $i$ 's size, sigma, market-to-book ratio, and age, and several dummy variables accounting for the presence of a private target firm, the extent of a target firm's sector intangibility of assets, whether the deal is a diversifying deal, and whether the target firm is based in a foreign market. All variables are defined in the Appendix.  $\bar{\gamma}_t$  and  $\bar{\delta}_c$  represent year and acquirer nation fixed effects, respectively, and  $\varepsilon_i$  is a white noise error term. Table 5 reports the results, based on the estimation of several versions of Equation (4).

Results, in general, support the view that external financial advisors, whether top-tier investment banks or boutique advisors, contribute positively to acquirers' gains. Models 1, 3, and 5 extend evidence from the literature that top-tier investment banks add value to acquirers of listed targets M&As (Golubov et al., 2012; Kale et al., 2003). We extend this evidence by studying the impact of advisers in M&As involving unlisted targets. We find that not only do top-tier investment banks add value to acquirers in general, they add significantly more value to acquirer shareholders in earnout-based M&As (Models 2, 4, and 6). We find that such gains are more pronounced

<sup>18</sup>The main advantage of the quadratic regression model is that the turning point is determined empirically. It also assumes that there is only one turning point. Being aware of the limitations of this model regarding the sensitivity of the positioning of the turning point to the model's specification, we apply two sensitivity tests, as in McConnell and Servaes (1990). First, we include additional independent variables in the regression to determine whether our results are sensitive to the inclusion of other factors that have been found to be important determinants of acquirers' CAR. These include financial leverage and the cash-to-assets ratio, among other factors. Our results are consistent with the general prediction of our initial nonlinear relation between REAV and acquirers' CAR. Second, we truncate the distributions of REAV at the 5th and 95th, as well as 10th and 90th, percentiles, and reestimate the regressions. This procedure ensures that a few large outliers do not drive our results. The significant curvilinear relation between REAV and acquirers' CAR is still borne out in the regressions on the truncated samples.



**FIGURE 2** Curvilinear relation between relative earnout value (REAV) and acquirers' cumulative abnormal return (CAR). This figure depicts the estimated mean announcement-period 5-day ( $t-2, t+2$ ) CAR as a function of the proportion of deal value that is deferred (i.e., REAV) [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

when top-tier investment banks are involved on the target firm's side (Model 4; coefficient = 1.311, significant at the 5% level), and even more when top-tier investment banks are used by both sides of the deal (Model 6; coefficient = 1.208, significant at the 5% level). We conjecture that target top-tier investment banks have much more profound incentives to structure earnouts effectively so as to deliver the expected payoffs to their clients (and receive the deferred payments), consistent with the better merger and skilled negotiation hypotheses of Kale et al. (2003) and Golubov et al. (2012), as well as with findings reported by Bao and Edmans (2011). These findings are consistent with Hypothesis H3.

Whereas Models 7, 9, and 11 reveal that acquirers overall break even in deals with boutique advisors, Models 8, 10, and 12 further show that acquirers enjoy significant gains from earnout-based deals with boutique advisors on one or both sides of the deal. Song et al. (2013) show (in a sample of listed acquirers and targets) that boutique financial advisors are more likely to be used in smaller (listed target) M&As, and that deals where acquirers use boutique advisors are associated with lower premia. Our results suggest that acquirers benefit the most from earnouts when they either have boutique financial advisors on their side (Model 8; coefficient = 2.097, significant at the 10% level) or when both merging firms are advised by boutique financial advisors (Model 10; coefficient = 1.254, significant at the 5% level). These findings support Hypothesis H3. Notably, we are the first to study the effect of both top-tier investment banks and boutique financial advisors on unlisted target deals, and where such deals include earnout payments. Finally, unreported results (available upon request) show that acquirers employing top-tier investment banks in earnout-based M&As are potentially more resourceful firms: (1) they are significantly larger firms, (2) they have a significantly higher cash-to-assets ratio in the most recent reporting, and (3) they have a significantly higher return-on-assets ratio in the most recent reporting.

## 5.4 | Control variables

We estimate results in Tables 4 and 5 after controlling for factors that are known to affect the acquirers' gains. Specifically, Asquith et al. (1983) and Fuller et al. (2002) show that acquirer CAR is positively related to the relative size of the deal (i.e., ratio of the deal value to the market value of the acquirer 20 trading days before the M&A

**TABLE 5** Multivariate analysis of acquirer abnormal returns: Impact of financial advisors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Earnout	-1.164*	-1.514**	0.051	-0.192	-0.134	-0.384*	-0.347	-0.518*	-0.452	-0.626	-0.087	-0.234
Top-tier AFA	0.950**	0.713*										
Top-tier AFA × Earnout		1.990**										
Top-tier TFA			0.854**	0.704**								
Top-tier TFA × Earnout				1.311**								
Top-tier AFA and TFA			0.905**	0.760**								
Top-tier AFA and TFA × Earnout				1.208**								
Boutique AFA					0.210			-0.008				
Boutique AFA × Earnout							2.097*					
Boutique TFA									-0.354	-0.516		
Boutique TFA × Earnout										1.561*		
Boutique AFA and TFA											0.009	-0.126
Boutique AFA and TFA × Earnout												1.254**
Relative deal size	0.302***	0.301***	0.027	0.027	0.060**	0.060**	0.099**	0.099**	0.121**	0.121**	0.068*	0.068*
Log (Acquirer MV)	-0.634***	-0.634***	-0.535***	-0.538***	-0.589***	-0.590***	-0.542***	-0.543***	-0.657***	-0.657***	-0.518***	-0.518***
Sigma	95.798*	95.686*	28.186***	28.251***	22.662***	22.674***	37.029***	36.583***	67.393*	67.258*	29.459***	29.233***
MTBV	-0.463*	-0.461*	0.021	0.022	-0.061	-0.059	-0.127*	-0.130*	-0.244*	-0.246*	-0.070	-0.071
Acquirer age	-0.319	-0.322	-0.054	-0.051	0.029	0.029	-0.022	-0.026	-0.376*	-0.376*	0.040	0.039
Private target	-1.219***	-1.211***	-1.082***	-1.085***	-0.999***	-0.999***	-1.167***	-1.158***	-1.266***	-1.260***	-1.096***	-1.088***
Target in intangible-rich sector	-0.509*	-0.504*	-0.621***	-0.632***	-0.523***	-0.528***	-0.593***	-0.581***	-0.783***	-0.775***	-0.572***	-0.563***
Diversified	-0.307	-0.285	-0.199	-0.195	-0.179	-0.170	-0.172	-0.180	-0.420	-0.431	-0.176	-0.185

(Continues)

TABLE 5 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign	-0.743**	-0.746**	-0.103	-0.108	-0.245	-0.249	-0.472**	-0.471**	-0.334	-0.337	-0.281*	-0.281*
Intercept	5.651***	5.661***	4.488***	4.494***	4.724***	4.729***	5.492***	5.528***	6.820***	6.862***	4.521***	4.554***
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer nation fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup>	2.08%	2.09%	3.43%	3.49%	3.31%	3.35%	3.37%	3.42%	1.42%	1.42%	3.14%	3.17%
F-statistic	12.80***	11.97***	24.36***	22.99***	32.98***	31.05***	21.02***	19.80***	9.86***	9.20***	31.19***	29.25***
Min. VIF	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Max. VIF	1.83	1.83	1.60	1.60	1.73	1.73	1.68	1.68	1.55	1.55	1.65	1.65
Mean VIF	1.21	1.25	1.18	1.22	1.19	1.23	1.19	1.20	1.17	1.19	1.18	1.21
N	7848	7848	8925	8925	12,539	12,539	7848	7848	8925	8925	12,539	12,539

Note: This table reports results from the multivariate analysis examining the wealth effects of earnout-based deals. The dependent variable consists of the announcement-period market adjusted 5-day ( $t-2, t+2$ ) abnormal returns of acquirers, which are regressed against a set of explanatory variables. Regression outputs are estimated using ordinary least squares, with the coefficients adjusted for possible heteroskedasticity using White (1980) heteroskedasticity-consistent standard errors and covariance. The intercept measures the abnormal returns to acquirers after accounting for the effects of the explanatory variables included in the specification or model. See the Appendix for variable definitions.

Abbreviation: VIF, variance inflation factor.

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

announcement). Across all models in which the relative size of the deal is employed as a control factor, we find a strong positive relation between acquirer CAR and the relative size of the deal to the size of the acquirer. Moeller et al. (2004) demonstrate that acquirer CAR is negatively related to acquirer size, measured by the natural logarithm of the acquirer's market capitalization 20 days before the M&A announcement day. Our results, which are in line with the literature, show that shareholders of small acquirers experience, on average, significantly higher CAR than large acquirers. Prior studies show that the size of the deal affects acquirer CAR (Barbopoulos, Paudyal, & Sudarsanam, 2018; Stulz et al., 1990). To control for this effect in our multivariate tests, we employ the natural logarithm of the deal value. Our results show that acquirers of larger deals enjoy significant gains in the short run (Model 3 of Table 4).

Moeller et al. (2007) demonstrate the importance of information asymmetry on acquirer CAR. Following their approach, we proxy for the extent of the acquiring firm's information asymmetry in our multivariate tests, using acquirer sigma, measured by the standard deviation of the residuals in the CAPM model over  $t-256$  and  $t-6$ , where  $t=0$  is the M&A announcement day. Across all models that employ acquirer sigma, we find a positive relation between acquirer CAR and acquirer sigma, consistent with prior studies (Alexakis & Barbopoulos, 2020). Previous research has also shown that an acquiring firm's valuation affects its CAR in the short run (Chemmanur et al., 2009; Moeller & Schlingemann, 2005). Along these lines, Rau and Vermaelen (1998) show that acquirer CAR is sensitive to its market-to-book valuation (MTBV). Across all models in which acquirer MTBV is employed, we find a negative relation between acquirer CAR and acquirer MTBV.

Zhang (2006) shows that investors tend to have more information on firms with a longer trading history, and such firms tend to have lower information asymmetry. Therefore, we employ in our analysis the age of the acquirer, measured by the log of the number of days between the date of the M&A announcement and the date when the company was first recorded in Datastream. The listing status of the target firm has also been shown to affect acquirer CAR (Chang, 1998; Draper & Paudyal, 2006; Faccio et al., 2006). Chang (1998) argues that private target acquisitions are more profitable investments for acquirers compared to public target acquisitions, because of limited information and competition for private target firms, as well as the more effective monitoring of targets' managers in the combined entity during the merger integration period. Although our analysis is restricted to unlisted targets, our sample includes acquisitions of both private targets and subsidiaries. We include a dummy variable that equals 1 when the target is private, and 0 otherwise. We find that acquirers of private targets experience, on average, significantly lower short-run abnormal returns than acquirers of subsidiary targets, as in Fuller et al. (2002).

Both the target's valuation risk and the overall deal's postacquisition integration challenges increase with the target's level of intangible assets. To account for this effect in our analysis, we employ an intangible-rich sector dummy that equals 1 if the target is operating within media, retail, high-technology, healthcare, or telecommunications sectors, and 0 otherwise. We find that acquirers of targets operating in an intangible-rich sector, in general, experience negative and significant announcement-period abnormal returns. If both the target and the acquirer belong to the same industrial sector, their integration may be easier, and the synergy gains are likely to be higher (Barbopoulos & Sudarsanam, 2012). Firms acquiring targets that operate in an unrelated sector may also gain from diversification, thereby resulting in a reduction in the volatility of the combined firm's cash flows and the cost of capital. However, Morck et al. (1990) find that returns to acquirer shareholders are lower when their firm diversifies. Therefore, to control for the potentially influential effect of corporate diversification, we employ a dummy variable that equals 1 for diversifying deals (i.e., where the target and acquirer do not share the same two-digit Standard Industrial Classification [SIC] code), and 0 otherwise. Our results show, in general, mixed evidence regarding the industrial diversification effect on acquirer CAR. Finally, if the target firm is operating in a foreign country, its valuation risk, as well as the overall deal's postacquisition integration challenges, are likely to be higher. To account for the impact of foreign acquisitions on acquirer CAR, we employ a dummy variable that equals 1 if the target is foreign, and 0 if the deal is domestic. Once again, our results show a mixed international diversification effect on acquirer CAR.



## 5.5 | Addressing self-selection concerns in univariate and multivariate tests

Our finding of strong correlations between the use of earnout and acquirer gains might not reflect a causal relation because certain characteristics might affect both the choice of using earnout and acquirer's gains. To address identification problems in our analysis, we examine the causal effect of earnout choice on acquirer gains by using two identification strategies: the PSM method and a quasi-natural experiment.

### 5.5.1 | Propensity score matching

We first address self-selection bias concerns based on the PSM method (Rosenbaum, 2002; Rosenbaum & Rubin, 1985), where results are confirmed based on a multivariate reweighting method described in Hainmueller (2012). We use six matching ratios (1-to-1, 2-to-1, 3-to-1, 4-to-1, 5-to-1, and 10-to-1), with close propensity scores, in which we allow replacement, except in the 1-to-1 matching ratio, where we perform analyses with and without replacement. Table 6 reports the results.

Panel A of Table 6 reports results from our univariate analysis of acquirer CAR based on the PSM approach. Our 1-to-1 matching ratio, with or without replacement, shows that acquirers earn 67 and 56 basis point higher CAR from earnout than nonearnout deals. These differences are statistically significant at the 5% level. Similar conclusions are obtained with the remaining matching ratios. Therefore, our results are robust to controlling for self-selection bias concerns using the PSM method.

To address self-selection bias concerns in a multivariate framework, we estimate the earnout effect in the matched sample that is composed of earnout and nonearnout M&As sharing similar characteristics. The sample is constructed based on the PSM method. Panel B of Table 6 reports ordinary least squares (OLS) regression estimates on the impact of earnout on acquirer gains without applying the multivariate reweighting method before estimating each regression. Panel C reports OLS regression estimates on the impact of earnout on acquirer gains after applying the multivariate reweighting method (Hainmueller & Xu, 2013). As in our univariate tests, we use six matching ratios (1-to-1, 2-to-1, 3-to-1, 4-to-1, 5-to-1, and 10-to-1), with close propensity scores, in which we allow replacement except in the 1-to-1 matching ratio, where we perform analyses both with and without replacement. The results show that acquirers enjoy significant gains from earnout-based M&As, irrespective of the matching ratio that we use. Specifically, the coefficients for the earnout dummy variable range from 0.54 and 0.64 in Panel B, all significant at least at the 5% level. Coefficients estimated after we apply the entropy balancing (Hainmueller & Xu, 2013) range from 0.48 to 0.60 in Panel C, again all significant at least at the 5% level. Overall, the results reported in Table 6, which are less likely to be affected by self-selection bias concerns, offer further support to our earnout hypotheses (H1) predicting the positive earnout effect of earnout-based M&As.

### 5.5.2 | SFAS 141(R) as a quasi-natural experiment

In this section we aim to test whether the reform of the US regulatory framework under which earnouts operate (SFAS 141(R), effective from 2009) affected the valuation effects of earnouts to acquirer shareholders. The reforms were expected to improve the monitoring, accountability, and transparency of the earnout payment process, while also reducing the likelihood of opportunistic manipulation or setting of overly optimistic performance goals, or even unintentional errors affecting accounting-based benchmarks. Therefore, firms employing earnouts in the postreform period send a signal about their quality regarding their efforts in maximizing synergies from the deal. In examining the impact of the reform on the valuation effects of earnouts, we estimate the following difference-in-difference specification:

**TABLE 6** Addressing self-selection bias concerns using the PSM method

		Without replacement		With replacement				
		1-to-1	1-to-1	2-to-1	3-to-1	4-to-1	5-to-1	10-to-1
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Panel A: Univariate analysis on the matched sample</i>								
All matched	Mean	1.88***	1.98***	1.87***	1.80***	1.78***	1.77***	1.81***
	N	7163	7047	10,221	12,179	13,507	14,503	17,076
Earnout (1)	Mean	2.13***	2.25***	2.12***	2.07***	2.05***	2.04***	2.07***
	N	4502	3593	4439	4737	4870	4934	4999
Nonearnout (2)	Mean	1.46***	1.69***	1.69***	1.63***	1.63***	1.64***	1.70***
	N	2661	3454	5782	7442	8637	9569	12,077
Diff: (1) versus (2)	Mean	0.67**	0.56**	0.43**	0.44**	0.42**	0.40**	0.37**
<i>Panel B: Multivariate analysis on the matched sample (without entropy balancing)</i>								
Earnout		0.54**	0.62**	0.57***	0.62***	0.64***	0.62***	0.61***
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer nation fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup> (%)		1.74	1.87	1.62	1.64	1.64	1.59	1.57
F-statistic		4.32***	4.51***	4.68***	6.01***	6.33***	6.38***	7.76***
N		7163	7047	10,221	12,179	13,507	14,503	17,076
<i>Panel C: Multivariate analysis on the matched sample (with entropy balancing)</i>								
Earnout		0.60**	0.58**	0.48**	0.51***	0.52***	0.49***	0.48**
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer nation fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup> (%)		1.84	1.91	1.63	1.65	1.66	1.62	1.63
F-statistic		3.75***	4.58***	4.06***	4.73***	4.83***	4.73***	5.15***
N		7163	7047	10,221	12,179	13,507	14,503	17,076

Note: This table reports results from the propensity score matching (PSM) analysis examining the wealth effects of earnout-based deals in the univariate analysis (Panel A), multivariate analysis (in the matched sample) without balancing the covariates in the matched sample (Panel B), and multivariate analysis (in the matched sample) with balancing the covariates in the matched sample based on the method developed by Hainmueller (2012) and the Stata routine developed by Hainmueller and Xu (2013; Panel C). The dependent variable in Panels B and C consists of the announcement-period market-adjusted 5-day (t-2, t+2) abnormal returns of acquirers, which are regressed against a set of explanatory variables. Regression outputs are estimated using ordinary least squares, with the coefficients adjusted for possible heteroskedasticity using White (1980) heteroskedasticity-consistent standard errors and covariance. The intercept measures the abnormal returns to acquirers after accounting for the effects of the explanatory variables included in the specification or model. See the Appendix for variable definitions.

\*\*p < 0.05; \*\*\*p < 0.01.

$$CAR_i = \beta_0 + \beta_1 \times \text{Earnout}_i + \beta_2 \times \text{Post SFAS}(R)_t + \beta_3(\text{Earnout}_i \times \text{Post SFAS}(R)_t) + \sum_{j=4}^k \beta_j X_{ij} + \tilde{\gamma}_t + \varepsilon_i \quad i = 1 \dots N, \quad (5)$$

$CAR_i$  represents acquirer CAR (estimated in Equation (2)). Earnout is a dummy variable that equals 1 if a deal includes earnout payments (treatment group), and 0 if the deal is fully settled with an up-front payment (control group).  $\text{Post SFAS}(R)_t$  is a dummy variable that equals 1 after the regulatory reform (the treatment), effective from 2009, and 0 otherwise.  $\sum_{j=4}^k \beta_j X_{ij}$  represents the effects of a diverse set of control variables, and  $\varepsilon_i$  is a white noise error term. In Equation (6),  $\beta_0$  captures the baseline average,  $\beta_1$  captures the treatment group specific effect (to account for average permanent differences between treatment and control),  $\beta_2$  captures the time trend common to control and treatment groups, and  $\beta_3$  represents the differences in change over time or the true effect of the treatment. Table 7 reports the results (Models 1–5).

Our results on the impact of the policy reform on acquirer CAR reveal that acquirer returns are in general (irrespective of payment method) significantly lower after the introduction of SFAS 141(R) than they were before ( $\beta_2 = -1.007$ ). However, the results further reveal a positive and significant increase in the earnout effect ( $\beta_3 = 1.088$ ). To examine the estimated mean difference in acquirer CAR between the treatment (earnout) and control (nonearnout payment) groups after the regulatory reform, we test whether  $\beta_1 + \beta_3 = 0$ . The hypothesis of  $\beta_1 + \beta_3 = 0$  is rejected in most models, suggesting a significant treatment effect following the implementation of the SFAS 141(R) reform.

## 5.6 | Tests of the impact of policy reform (SFAS 141(R)) on earnout structure (REAV)

As discussed in Sections 1 and 3.3, we next test whether the reform of the US regulatory framework under which earnouts operate (SFAS 141(R), effective from 2009) affected the earnout structure. The reforms were expected to improve the monitoring, accountability, and transparency of the earnout payment process, while reducing the likelihood of opportunistic manipulation or setting of overly optimistic performance goals, or even unintentional errors affecting accounting-based benchmarks.

In examining the impact of the reform on the earnout structure and the valuation effects of earnouts, we estimate the following difference-in-difference specification:

$$REAV_i = \beta_0 + \beta_1 \times \text{Earnout}_i + \beta_2 \times \text{Post SFAS}(R)_t + \beta_3(\text{Earnout}_i \times \text{Post SFAS}(R)_t) + \sum_{j=4}^k \beta_j X_{ij} + \tilde{\gamma}_t + \varepsilon_i \quad i = 1 \dots N, \quad (6)$$

$REAV_i$  represents the relative earnout value. Earnout is a dummy variable that equals 1 if a deal includes (additional) payments (treatment group), and 0 if the deal is fully settled with an up-front payment (control group).  $\text{Post SFAS}(R)_t$  is a dummy variable that equals 1 after the regulatory reform (the treatment) effective from 2009, and 0 otherwise.  $\sum_{j=4}^k \beta_j X_{ij}$  represents the effects of a diverse set of control variables, and  $\varepsilon_i$  is a white noise error term. In Equation (6),  $\beta_0$  captures the baseline average,  $\beta_1$  captures the treatment group specific effect (to account for average permanent differences between treatment and control),  $\beta_2$  captures the time trend common to control and treatment groups, and  $\beta_3$  represents the differences in change over time, or the true effect of the treatment. Table 7 reports the results (Models 6–10).

Our results on the impact of the policy reform (SFAS 141(R)) on REAV (Model 1) suggest that REAV is significantly larger ( $\beta_3 = 0.019$ , significant at the 5% level) in the postintervention period (effective in 2009), relative to the preintervention period. Ceteris paribus, the proportion of deal value deferred in earnout deals increased from approximately 32% to 34% following the regulatory change.

TABLE 7 Market reaction to M&A announcements and the earnout fraction (REAV) due to change in SFAS 141(R)

	Post 2009 CAR (1)	Post 2008 CAR (2)	Post 2007 CAR (3)	Post 2006 CAR (4)	Post 2005 CAR (5)	Post 2009 REAV (6)	Post 2008 REAV (7)	Post 2007 REAV (8)	Post 2006 REAV (9)	Post 2005 REAV (10)
Earnout	-1.295***	-1.237***	-1.118***	-1.136***	-1.136***	0.324***	0.323***	0.321***	0.322***	0.324***
Post SFAS 141(R)	-1.007**	-1.108**	-1.193***	-1.124***	-1.373***	0.004***	0.004**	0.005**	0.005**	0.003**
Earnout × Post SFAS 141(R)	1.088**	0.790	0.366	0.389	0.370	0.019**	0.015	0.014	0.015	0.007
Intercept	5.771***	5.701***	5.451***	5.453***	5.170***	-0.004	-0.003	-0.002	-0.003	-0.005
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup> (%)	4.94	4.94	4.95	4.95	4.97	65.92	65.94	65.97	65.94	65.90
F-statistic	93.70***	93.67***	93.90***	93.80***	94.17***	3,486***	3,488***	3,492***	3,488***	3,483***
Min. VIF	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Max. VIF	2.54	2.95	2.95	3.23	3.49	2.54	2.95	2.95	3.23	3.49
Mean VIF	1.50	1.59	1.59	1.67	1.74	1.50	1.59	1.59	1.67	1.74
N	21,637	21,637	21,637	21,637	21,637	21,637	21,637	21,637	21,637	21,637

Note: This table records estimates from difference-in-difference tests based on the sample of US mergers and acquisitions (M&As). The dependent variable is the announcement-period market-adjusted 5-day (t-2, t+2) cumulative abnormal returns (CARs) of acquirers (as in Equation (2)) in Models 1-5 and REAV (ratio of earnout value to total deal consideration) in Models 6-10. Regression outputs are estimated using ordinary least squares, with the coefficients adjusted for possible heteroskedasticity using White (1980) heteroskedasticity-consistent standard errors and covariance. The intercept measures: in Models 1-5, average REAV after accounting for the effects of the explanatory variables included in the specification or model; in Models 6-10, average REAV after accounting for the effects of the explanatory variables included in the specification or model, effectively the REAV in the control sample or the single up-front paid M&As. Earnout is a dummy variable that equals 1 for earnout-based M&As, and 0 otherwise (single up-front paid M&As), and Post SFAS 141(R) is a dummy variable that equals 1 for deals announced after the cutoff year, and 0 otherwise. Control variables include: Relative deal size, Sigma, MTBV, Acquirer age, Private target, Target in intangible-rich sector, Diversified, and Foreign. See the Appendix for variable definitions.

Abbreviation: VIF, variance inflation factor.

\*\*p < 0.05; \*\*\*p < 0.01.

## 5.7 | Acquirer gains from listed target earnout-based M&As

In addition to our main analysis based only on private and subsidiary target M&As, we investigate the valuation effects of earnout payments in listed target M&As. Earnout payments in listed target M&As in our sample are used in only 63 deals (less than 1% of the sample). For the full sample (both United Kingdom and United States) we find that acquirers earn 1.76 percentage point higher gains from earnout-based M&As of listed companies relative to counterpart deals settled with single up-front payments. For the US sample, this differential is 2.16 percentage points.<sup>19</sup> When differentials are calculated between the earnout and stock or mixed portfolios, we find the earnout gains are economically significant, averaging between 2.50 and 3.00 percentage point higher CARs for earnouts than for stock or mixed, respectively.

Moreover, our univariate analysis shows that when listed target acquisitions are included in the analysis, the overall earnout effect on acquirer gains is 0.36 percentage points, significant at the 1% level. The multivariate analysis further confirms this (coefficient of earnout dummy = 0.230). Therefore, including listed target M&As in the analysis has a negative effect on the performance of the control portfolio composed of single up-front payments in cash, stock, or mixed, ultimately distorting the earnout effect in deals where it is mostly used. (To conserve space, these results are unreported but available upon request.)

## 5.8 | Practical implications for corporate managers

Our results have important implications for corporate managers who are considering participation in earnout-based M&As, for equity investors, and for the investment management community more generally. We recognize that although these three groups of managers maximize different objectives, a common objective to them all is their desire to participate in investments that deliver higher value and, hence, higher returns.

First, corporate managers of acquiring firms may like to reflect on our findings when negotiating the acquisition of targets that are difficult to value and tend to operate in intangible-rich or valuation-opaque sectors, and they may consider the use of an earnout payment mechanism in the deal. The value of the target firm in such deals often depends on the flair, creativity, and skill of only a few key personnel, whose retention in the integration period of the deal plays a critical role for the successful integration and completion of the deal. Earnouts can motivate such retention and, depending on their structures, can enhance commitment and the successful creation of merger synergies. Corporate managers of target firms may also like to reflect on our findings when negotiating their participation in an earnout-based M&A. In particular, in maximizing the merger payoff, and the odds of receiving the maximum amount of earnout payment, the acquired company's managers may like to embed the suggestions derived from our findings in their carefully designed earnout agreements.

Second, equity investors who are considering committing funds to a project or a firm may reflect on our findings and invest in firms that carefully design earnouts and, hence, participate in earnout-based M&As of companies operating in intangible-rich sectors. Earnout-based M&As are more likely to deliver higher returns relative to M&As that are settled in single up-front payments of cash, as shown by our univariate and multivariate tests. Investing in projects whose valuation is carefully executed, and where incentives to achieve their future potential are aligned via earnout contracts, is more likely to further investors' primary objectives of maximizing returns while minimizing merger valuation risk.

---

<sup>19</sup>A long-standing result in the M&A literature is that stock-settled listed target M&As are associated with significant acquirer losses because of information asymmetry over the acquiring firm and the signaling that its equity is overvalued (Hansen, 1987; Myers & Majluf, 1984; Travlos, 1987). We show that acquirers can benefit from earnouts that reduce merger valuation risk due to information asymmetry over the acquired company, while avoiding most of the well-established stock-financing mispricing discount.

Third, portfolio managers may want to reflect on our findings when constructing equity portfolios. Specifically, they may want to consider our findings when investing in the equity of firms that are participating in earnout-based M&As. Considering the various factors that interact with the earnout effect in M&As, portfolio managers may want to consider our results when designing equity portfolios that satisfy their return maximization principle.

## 6 | CONCLUSIONS

Over the past 3 decades, there has been a surge of M&As that include earnouts as part of the merger agreement. Earnout-based M&As are in general subject to higher merger valuation risk, and earnouts are commonly used in acquisitions of unlisted (private or subsidiary) companies, with high information asymmetry, and often operating in an intangible-rich sector such as high technology or healthcare. Considerable media attention has been devoted to earnout-based M&As. In this article, we provide answers regarding the pricing effects of earnouts in M&As. Our results are of significant practical relevance to corporate managers. We employ standard event-study methodology and a comprehensive sample of 31,214 M&A transactions involving unlisted target firms that are announced by UK and US domiciled acquirers.

Our results show that, on average, acquirers' gains are higher in earnout deals than in conventional M&As with a single up-front payment in cash, but lower than in stock-based acquisitions. We also find that earnout-based deals add more value for large and mature acquirers engaged in M&As with relatively small targets. We further find earnout effects to be higher for acquirers of foreign firms and acquirers advised by top-tier or boutique advisors. The results suggest that the earnout effect is particularly pronounced in riskier deals of private and subsidiary companies, and when announced by large and mature acquirers with perhaps more experience, and more resources to effectively design and support earnouts. We address identification concerns using the PSM method, the effect of which is examined in a multivariate context after applying the Hainmueller (2012) and Hainmueller and Xu (2013) method, as well as through a quasi-natural experiment. We also find that regulatory change has affected the use and impact of earnouts, with REAV in the United States significantly larger in the postreform (SFAS 141(R)) period (effective from 2009).

We present three results for the first time in this line of research. First, we show that when listed target M&As are excluded from the analysis of earnout effects on M&As, the generally positive effect of earnouts fades away. This is because of the negative effect of stock-financed listed target M&As in the control group of nonearnout deals. Second, we are the first to examine the valuation effects of earnouts in M&As where the acquirer or the target firm is either individually or jointly advised by top-tier investment banks or boutique financial advisors. Third, we show that acquirers realize the highest returns from earnout-based M&As when the deferred part of the deal consideration is roughly 30% of the total deal consideration. Our results have several practical implications to corporate managers who wish to employ earnouts in their M&As or invest in firms undertaking earnout-based M&As.

## ACKNOWLEDGMENTS

We are grateful to Murali Jagannathan (the editor), an anonymous reviewer, Samer Adra, Stephen Brown, Miroslav Mateev, Nahid Rahman, Pauline Weetman, Jeffrey Wurgler, and participants at the World Finance Conference (Malta) 2020 for their feedback and helpful suggestions on earlier versions of this paper. We also thank Lei Zhou for generously sharing with us the list of financial advisors and their classifications used in the article "The Value of 'Boutique' Financial Advisors in Mergers and Acquisitions." Any remaining errors are ours. Jo Danbolt holds the Baillie Gifford Chair in Financial Markets, and his research is partially funded by a Baillie Gifford endowment held by the University of Edinburgh Business School. Baillie Gifford has no role in or influence over the research conducted.

## ORCID

Leonidas G. Barbopoulos  <http://orcid.org/0000-0002-9136-3901>

## REFERENCES

- Akerlof, G. A. (1970). The market for "lemons": Qualitative uncertainty and the market mechanism. *Quarterly Journal of Economics*, 84, 488–500.
- Alexakis, D., & Barbopoulos, L. G. (2020). Incentive-compatible contracts in merger negotiations: The role of acquirer idiosyncratic stock return volatility. *Financial Markets, Institutions & Instruments*, 29, 3–40.
- Alexandridis, G., Antypas, N., & Travlos, N. G. (2017). Value creation from M&As: New evidence. *Journal of Corporate Finance*, 45, 632–650.
- Asquith, P., Bruner, R., & Mullins, D. (1983). The gains to bidding firms from merger. *Journal of Financial Economics*, 11, 121–139.
- Bao, J., & Edmans, A. (2011). Do investment banks matter for M&A returns? *Review of Financial Studies*, 24, 2286–2315.
- Barbopoulos, L., Paudyal, K., & Pescetto, G. (2012). Legal systems and gains from cross-border acquisitions. *Journal of Business Research*, 65, 1301–1312.
- Barbopoulos, L. G., & Adra, S. (2016). The earnout structure matters: Takeover premia and acquirer gains in earnout financed M&As, *International Review of Financial Analysis*, 45, 283–294.
- Barbopoulos, L. G., Adra, S., & Saunders, A. (2020). Macroeconomic news and acquirer returns in M&As: The impact of investor alertness. *Journal of Corporate Finance*, 64, 1–29.
- Barbopoulos, L. G., Danbolt, J., & Alexakis, D. (2018). The role of earnout financing on the valuation effects of global diversification. *Journal of International Business Studies*, 49, 523–551.
- Barbopoulos, L. G., Paudyal, K., & Sudarsanam, S. (2018). Earnout deals: Method of initial payment and acquirers' gains. *European Financial Management*, 24, 792–828.
- Barbopoulos, L. G., & Sudarsanam, S. (2012). Determinants of earnout as acquisition payment currency and bidders' value gains. *Journal of Banking & Finance*, 36, 678–694.
- Bates, W. T., Neyland, J. B., & Wang, Y. Y. (2018). Financing acquisitions with earnouts. *Journal of Accounting and Economics*, 66, 374–395.
- Battauz, A., Gatti, S., Prencipe, A., & Viarengo, L. (2021). Earnouts: The real value of disagreement in mergers and acquisitions. *European Financial Management*, 1–44. <https://doi.org/10.1111/eufm.12304>, <https://onlinelibrary.wiley.com/action/showCitFormats?doi=10.1111%2Feufm.12304>
- de Bodt, E., Cousin, J.-G., & Officer, M. S. (2019, May 14). *Acquirer overvaluation and stock payment in M&A transactions: What explains the spurious correlation?* (Working Paper). Available at SSRN <https://ssrn.com/abstract=3392956> or <https://doi.org/10.2139/ssrn.3392956>
- Brown, S., & Warner, J. (1980). Measuring security price performance. *Journal of Financial Economics*, 8, 205–258.
- Brown, S., & Warner, J. (1985). Using daily stock returns: The case of event studies. *Journal of Financial Economics*, 14, 3–31.
- Cadman, B., Carrizosa, R., & Faurel, L. (2014). Economic determinants and information environment effects of earnouts: New insights from SFAS 141(R). *Journal of Accounting Research*, 52, 37–74.
- Cain, M. D., Denis, D. J., & Denis, D. K. (2011). Earnouts: A study of financial contracting in acquisition agreements. *Journal of Accounting and Economics*, 51, 151–170.
- Chang, S. (1998). Takeovers of privately held targets, methods of payment, and bidder returns. *Journal of Finance*, 53, 773–784.
- Chemmanur, T. J., Paeglis, I., & Simonyan, K. (2009). The medium of exchange in acquisitions: Does the private information of both acquirer and target matter? *Journal of Corporate Finance*, 15, 523–542.
- Cleary, S., & Hossain, A. (2020). Postcrisis M&As and the impact of financial constraints. *Journal of Financial Research*, 43, 407–454.
- Datar, S., Frankel, R., & Wolfson, M. (2001). Earnouts: The effects of adverse selection and agency costs on acquisition techniques. *Journal of Law, Economics and Organization*, 17, 201–238.
- Devos, E., Kadapakkam, P. R., & Krishnamurthy, K. (2009). How do mergers create value? A comparison of taxes, market power, and efficiency improvements as explanations for synergies. *Review of Financial Studies*, 22, 1179–1211.
- Draper, P., & Paudyal, K. (2006). Acquisitions: Private versus public. *European Financial Management*, 12, 57–80.
- Eckbo, B. E., Giammarino, R. M., & Heinkel, R. L. (1990). Asymmetric information and the medium of exchange in takeovers: Theory and tests. *Review of Financial Studies*, 3, 651–675.
- Eckbo, B. E., Tanakorn, M., & Thorburn, K. S. (2018). Are stock-financed takeovers opportunistic? *Journal of Financial Economics*, 128, 443–465.
- Faccio, M., McConnell, J., & Stolin, D. (2006). Returns to acquirers of listed and unlisted targets. *Journal of Financial and Quantitative Analysis*, 41, 197–220.

- Faccio, M., & Masulis, R. W. (2005). The choice of payment method in European mergers and acquisitions. *Journal of Finance*, 60, 1345–1388.
- Financial Accounting Standards Board. (2007). Statement of Financial Accounting Standards No. 141 (revised 2007): Business Combinations, Financial Accounting Series No. 299-A.
- Fuller, K. P., Netter, J. M., & Stegemoller, M. (2002). What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions. *Journal of Finance*, 57, 1763–1793.
- Golubov, A., Petrmezias, D., & Travlos, N. G. (2012). When it pays to pay your investment banker: New evidence on the role of financial advisors in M&As. *Journal of Finance*, 67, 271–311.
- Gormley, M. (2017, October 3). Startups push for leverage in earnout acquisition deals. *Wall Street Journal*. <https://www.wsj.com/articles/startups-push-for-leverage-in-earnout-acquisition-deals-1507072413>
- Gormley, M., & Haggin, P. (2017, August 30). Rise of “earnouts” muddies M&A waters. *Wall Street Journal*. <https://www.wsj.com/articles/startups-push-for-leverage-in-earnout-acquisition-deals-1507072413>
- Haggin, P. (2017, June 23). In age of high valuations, earnouts grow in importance. *Wall Street Journal*. <https://www.wsj.com/articles/in-age-of-high-valuations-earnouts-grow-in-importance-1498217405>
- Hainmueller, J. (2012). Entropy balancing: A multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis*, 20, 25–46.
- Hainmueller, J., & Xu, Y. (2013). Ebalance: A stata package for entropy balancing. *Journal of Statistical Software*, 54, 1–18.
- Hansen, R. G. (1987). A theory for the choice of exchange medium in mergers and acquisitions. *Journal of Business*, 60, 75–95.
- Hunter, W. C., & Jagtiani, J. (2003). An analysis of advisor choice, fees, and effort in mergers and acquisitions. *Review of Financial Economics*, 12, 65–81.
- Kale, J., Kini, O., & Ryan, H. (2003). Financial advisors and shareholder wealth gains in corporate takeovers. *Journal of Financial and Quantitative Analysis*, 38, 475–501.
- Kohers, N., & Ang, J. (2000). Earnouts in mergers: Agreeing to disagree and agreeing to stay. *Journal of Business*, 73, 445–476.
- Kohers, N., & Kohers, T. (2001). Takeovers of technology firms: Expectations vs. reality. *Financial Management*, 30, 35–54.
- Krishnan, C. N. V., & Masulis, R. (2013). Law firm expertise and merger and acquisition outcomes. *Journal of Law and Economics*, 56, 189–226.
- Latham & Watkins LLP. (2020). *Earnouts are rising across Europe, but can they unlock COVID-19 valuation gaps?* Posted in M&A and Private Equity. <https://www.latham.london/2020/09/earnouts-are-rising-across-europe-but-can-they-unlock-covid-19-valuation-gaps/>
- Lukas, E., Reuer, J. J., & Welling, A. (2012). Earnouts in mergers and acquisitions: A game theoretic option pricing approach, *European Journal of Operational Research*, 223, 256–263.
- Lyon, J., Barber, B., & Tsai, C. (1999). Improved methods for tests of long-run abnormal stock returns. *Journal of Finance*, 54, 165–201.
- Maksimovic, V., Phillips, G., & Yang, L. (2013). Private and public merger waves. *Journal of Finance*, 68, 2177–2217.
- Mantecon, T. (2009). Mitigating risks in cross-border acquisitions. *Journal of Banking & Finance*, 33, 640–651.
- McConnell, J. J., & Servaes, H. (1990). Additional evidence on equity ownership and corporate value. *Journal of Financial Economics*, 27, 595–612.
- Moeller, B. S., & Schlingemann, P. F. (2005). Global diversification and bidder gains: A comparison between cross-border and domestic acquisitions. *Journal of Banking & Finance*, 29, 533–564.
- Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2007). How do diversity of opinion and information asymmetry affect acquirer returns? *Review of Financial Studies*, 20, 2047–2078.
- Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2004). Firm size and the gains from acquisitions. *Journal of Financial Economics*, 73, 201–228.
- Morck, R., Shleifer, A., Vishny, R. W., Shapiro, M., & Poterba, J. M. (1990). The stock market and investment: Is the market a sideshow? *Brookings Papers on Economic Activity*, 1990, 157–215.
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13, 187–221.
- Officer, M., Poulsen, A., & Stegemoller, M. (2009). Target firm information asymmetry and acquirer returns. *Review of Finance*, 13, 467–493.
- Rau, R., & Vermaelen, T. (1998). Glamour, value and the post-acquisition performance of acquiring firms. *Journal of Financial Economics*, 49, 223–253.
- Rosenbaum, P. R. (2002). *Observational studies* (2nd ed.). Springer.
- Rosenbaum, P. R., & Rubin, D. B. (1985). The bias due to incomplete matching. *Biometrics*, 41, 103–116.
- Song, W., Wei, J. D., & Zhou, L. (2013). The value of “boutique” financial advisors in mergers and acquisitions. *Journal of Corporate Finance*, 20, 94–114.



- Stulz, R. M., Walkling, R. A., & Song, M. H. (1990). The distribution of target ownership and the division of gains in successful takeovers. *Journal of Finance*, 45, 817–833.
- Travlos, N. G. (1987). Corporate takeover bids, method of payment, and bidding firm's stock returns. *Journal of Finance*, 52, 943–963.
- Viarengo, L., Gatti, S., & Prencipe, A. (2018). Enforcement quality and the use of earnouts in M&A transactions: International evidence. *Journal of Business Finance & Accounting*, 45, 437–481.
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48, 817–838.
- Zhang, X. F. (2006). Information uncertainty and stock returns. *Journal of Finance*, 61, 105–137.

**How to cite this article:** Barbopoulos, L. G., & Danbolt, J. (2021). The real effects of earnout contracts in M&As. *Journal of Financial Research*, 1–33. <https://doi.org/10.1111/jfir.12256>

## APPENDIX: VARIABLE DEFINITIONS

Variable name	Description	Source
All	Entire sample analyzed in this article	SDC
Acquirer age	Number of days between the acquirer's first recorded day on Datastream and the deal's announcement day	Datastream
Acquirer cash ratio	Acquirer's ratio of total cash and cash equivalents to total assets in the quarter before the deal's announcement	Datastream
Acquirer MV	Acquirer's market value of equity (measured 20 days before the deal's announcement)	Datastream
Acquirer MTBV	Acquirer's ratio of market value to book value of equity (measured 20 days before the deal's announcement)	Datastream
Boutique AFA	Dummy = 1 if the acquiring company is advised by a boutique bank, and 0 otherwise	SDC; as in Song et al. (2013)
Boutique TFA	Dummy = 1 if the target company is advised by a boutique bank, and 0 otherwise.	SDC; as in Song et al. (2013)
Boutique TFA and TFA	Dummy = 1 if the acquiring and the target companies are advised by boutique banks, and 0 otherwise	SDC; as in Song et al. (2013)
CAR	Acquirer cumulative abnormal return	Equation (2)
Cash	Dummy = 1 when payment is 100% cash	SDC
Deal value	Deal transaction value, in millions of US dollars	SDC
Diversified	Dummy = 1 when acquirer and target do not share the same two-digit primary Standard Industrial Classification (SIC) code, and 0 otherwise	SDC
Domestic	Dummy = 1 when acquirer and target are domiciled in the same country, and 0 when the deal involves a foreign target (= Foreign)	SDC
Earnout	Dummy = 1 when payment includes an earnout provision, and 0 otherwise (= Nonearnout)	SDC
Earnout value	Value of deferred payment, in millions of US dollars	SDC

(Continues)

Variable name	Description	Source
Focused	Dummy = 1 when acquirer and target share the same two-digit primary SIC code, and 0 otherwise	SDC
Foreign	Dummy = 1 when acquirer and target are domiciled in different countries, and 0 when the deal involves a domestic target (= Domestic)	SDC
Mixed	Dummy = 1 when the payment is a mixture of cash, stock, and/or other methods of payment, excluding earnout provisions, and 0 otherwise	SDC
Nonearnout	Dummy = 1 for full cash, full stock, or mixed payment without earnout provisions, and 0 when an earnout provision is included	SDC
Private target	Dummy = 1 if the acquired company is a private one, and 0 otherwise	SDC
Relative earnout value	Ratio of earnout value to deal value	SDC
Relative deal size	Ratio of deal value to Acquirer MV 20 days before the deal's announcement	SDC & Datastream
Sigma	Acquirer's sigma, measured by the standard deviation of the residuals in the capital asset pricing model over $t-256$ and $t-6$ , where $t = 0$ is the M&A announcement day	Alexakis and Barbopoulos (2020)
Stock	Dummy = 1 when payment is 100% stock exchange	SDC
Subsidiary target	Dummy = 1 if the acquired company is a subsidiary target, and 0 otherwise	SDC
Target in intangible-rich sector	Dummy = 1 when the acquired company belongs to an intangible-rich sector (media, retail, high technology, healthcare, or telecommunications), and 0 otherwise	SDC
Top-tier AFA	Dummy = 1 if the acquiring company is advised by any of the following companies: Goldman Sachs, Merrill Lynch (now Bank of America Merrill Lynch), Morgan Stanley, JP Morgan, Citi/Salomon Smith Barney, Credit Suisse First Boston, Lehman Brothers (now Barclays Capital), and Lazard, and 0 otherwise.	SDC league tables
Top-tier TFA	Dummy = 1 if the target company is advised by any of the following companies: Goldman Sachs, Merrill Lynch (now Bank of America Merrill Lynch), Morgan Stanley, JP Morgan, Citi/Salomon Smith Barney, Credit Suisse First Boston, Lehman Brothers (now Barclays Capital), and Lazard, and 0 otherwise	SDC league tables
Top-tier TFA and TFA	Dummy = 1 if the acquiring and target companies are advised by any of the following companies: Goldman Sachs, Merrill Lynch (now Bank of America Merrill Lynch), Morgan Stanley, JP Morgan, Citi/Salomon Smith Barney, Credit Suisse First Boston, Lehman Brothers (now Barclays Capital), and Lazard, and 0 otherwise	SDC league tables

Abbreviation: SDC, Securities Data Company Thomson ONE Banker database.