Determinants of Earnout Materiality: Evidence from North America and Europe

Stockholm School of Economics, MSc in Finance Thesis

Key Determinants of the Materiality of Earnout Agreements: an Empirical Study

Bocconi University, MSc in Finance Thesis

MARGHERITA BONELLI

Stockholm School of Economics Tutor: Anders Anderson, Associate Professor (Department of Finance), Stockholm School of Economics; Program Director of the MSc Program in Finance, Stockholm School of Economics

Bocconi Tutor: Eugenio Morpurgo, CEO and Founding Partner, Fineurop; Associate Professor, Department of Finance, Bocconi University

STOCKHOLM SCHOOL OF ECONOMICS
Department of Finance
4350 Master's thesis in Finance
Fall 2025

BOCCONI UNIVERSITY
Department of Finance
Master's thesis in Finance
April 2024

STOCKHOLM SCHOOL OF ECONOMICS
Department of Finance
4350 Master's thesis in Finance
Fall 2025

Determinants of Earnout Materiality: Evidence from North America and Europe

Margherita Bonelli (42694)

Abstract

Earnout agreements play a crucial role in Mergers and Acquisitions (M&A) transactions, bridging valuation gaps caused by information asymmetry and uncertainty surrounding the target's value.

This study examines earnouts by focusing on their advantages and limitations as well as recent trends in their use. The primary objective is to examine the key determinants of earnout materiality - defined as the ratio of earnout value to total deal value - in North America, and to analyze differences across regions by assessing whether the same determinants apply to the European sample examined in the Bocconi thesis.

Using a North American sample of completed M&A transactions involving earnouts announced between January 1, 2010, and December 31, 2024, we test several hypotheses on earnout materiality through a multivariate linear regression analysis.

The results indicate that earnout materiality is negatively associated with the size of the target and positively associated with the presence of a toehold. Smaller targets exhibit higher earnout materiality due to greater valuation uncertainty arising from less predictable prospects and limited information. Acquirers with prior equity stakes are likely to have better insight into target risk. This increased awareness of the risks increases reliance on earnout mechanisms.

A comparison with European evidence reveals significant regional differences and target size is the only determinant consistently observed across regions, reflecting shared valuation challenges for smaller firms. Overall, the results indicate that institutional and market conditions shape the determinants of earnout materiality, highlighting the importance of the geographical context.

Keywords: Earnout agreements, Earnout materiality, Mergers and acquisitions, Contingent consideration

Author: Margherita Bonelli (42694)
Tutor: Anders Anderson, Associate Professor (Department of Finance), Stockholm School of Economics; Program Director of the MSc Program in Finance, Stockholm School of Economics

Master Thesis
MSc Program in Finance
Stockholm School of Economics

Table of Contents

1. Introduction

An earnout agreement is "an arrangement under which a portion of the purchase price in an acquisition is contingent on the achievement of financial or other performance targets after the deal closes" (Bruner, 2001, page 1).

This study focuses on identifying the main determinants of earnout materiality, defined as the ratio of the earnout component to the total deal value. The decision to focus on this dimension reflects the limited attention it has received in the existing literature, making it a particularly relevant area for further investigation.

The analysis builds on and extends the previous Bocconi thesis, which investigated earnout materiality in the European market. In contrast to that earlier work, the present study shifts the geographical focus to North America. This allows for the identification of the determinants of earnout materiality in a different institutional and market setting, as well as for an assessment of whether the drivers observed in Europe also hold in the North American context. By adopting this comparative perspective, the study contributes to a more comprehensive understanding of earnout materiality across regions. In addition, the analysis discusses the principal advantages and drawbacks of earnouts and outlines the key elements involved in designing earnout agreements, drawing on the framework developed in the Bocconi thesis. This discussion is then extended by reviewing recent trends in the use of earnouts, with a specific focus on the North American market. Finally, the statistical model employed in the Bocconi thesis is adapted to account for the specific characteristics of the new context and is used to test the hypotheses formulated on earnout materiality.

The empirical analysis is based on a sample of 110 completed M&A transactions involving earnout provisions, with North American target companies and announcements between 2010 and 2024. The empirical results indicate that the presence of a toehold and the size of the target firm are key determinants of earnout materiality.

Specifically, earnout materiality is positively associated with the presence of a toehold and negatively related to target firm size. When the acquirer already holds an equity stake in the target prior to the transaction, it is likely to possess a more detailed understanding of the risks and uncertainties surrounding the target's future performance and therefore this increased awareness may lead acquirers to rely more heavily on earnout mechanisms. Moreover, the transition from a minority to a controlling position can heighten the acquirer's perceived exposure to firm-specific risks, further strengthening the positive relationship with earnout materiality. By contrast, smaller target firms tend to be associated with greater valuation

uncertainty due to less diversified operations and a more limited track record, making information harder to obtain for the buyer. These information asymmetries and valuation challenges help explain the negative relationship between target firm size and earnout materiality.

A comparison with European evidence reveals meaningful regional differences. In the European context, statistically significant factors include target size, the age of both the target and the acquirer, and the relative size of the transaction. Hence, target size is the only determinant that consistently emerges across both regions, reflecting common valuation challenges associated with smaller firms. In Europe, firm age and experience as well as relative size appear to play a stronger role as risk-mitigating signals, whereas in North America higher risk tolerance and entrepreneurial intensity may reduce the relevance of such characteristics. The significance of toeholds in North America is likely linked to lower disclosure requirements in this region, which increase the informational value of minority ownership stakes. Overall, the findings suggest that institutional and market conditions play a crucial role in shaping the determinants of earnout materiality, underscoring the importance of geographical context in the design of earnout agreements.

The paper is structured as follows. Chapter 2 provides an overview of earnout agreements, examining their key objectives, associated risks, and main components. Chapter 3 reviews the existing literature on earnouts, positioning the research on earnout materiality within the broader academic discussion and then focusing specifically on this aspect. Chapter 4 explores M&A current trends focusing on the United States and earnout clauses. Chapter 5 presents the sample used for statistical analysis, provides the descriptive statistics and highlights the criteria applied in constructing the dataset. Chapter 6 introduces the research question and outlines the hypotheses to be empirically tested. Chapter 7 describes the regression model and compares the results with the existing literature. Lastly, Chapter 8 draws the conclusions of the study.

2. Overview of Earnout Agreements

Earnouts are price-adjustment clauses that link part of the acquisition consideration to the future economic performance of the target, resulting in a two-part payment structure consisting of an upfront payment and a deferred, performance-contingent component (earnout).

On the one hand, it bridges the valuation gap arising from differing expectations regarding the target future performance between the seller and the acquirer.

On the other hand, since the contingent payment depends on the target future performance, it incentivizes the target management to remain involved and to enhance the company's performance.

Therefore, as investigated by Datar, Frankel, and Wolfson (2001), earnout clauses mitigate two primary issues in M&A: adverse selection and valuation risk.

Sellers typically possess superior information about the target's future prospects, creating information asymmetry during negotiations. By agreeing to a contingent payment, the seller signals confidence in the target's expected performance, thereby conveying information about the quality of the asset being sold. At the same time, the buyer benefits from the contingent structure by shifting part of the business risk to the seller and reducing the likelihood of overpayment. Moreover, when the seller remains involved in the management of the target, the earnout aligns the incentives of both parties toward maximizing post-acquisition performance.

In conclusion, the likelihood of using an earnout clause increases with the degree of uncertainty surrounding the target's fair value. Accordingly, the adoption of earnouts is closely linked to uncertainty in the determinants of target valuation, particularly expectations regarding the target's future standalone performance (Caselli, Gatti, and Visconti, 2006).

2.1. Key Objectives: "Agreeing to Disagree" and "Agreeing to Stay"

The main functions of earnouts can be effectively summarized using the words of Kohers and Ang (2000): "Agreeing to disagree" and "Agreeing to stay".

Earnouts mitigate asymmetric information and valuation risk in M&A transactions by allowing buyers and sellers to reach an agreement despite differing views on the target's value. In situations of high valuation uncertainty, earnouts provide an alternative to full

upfront payments or stock-based consideration, which may otherwise expose bidders to overpayment risk or prevent sellers from realizing the target's perceived value.

A two-part payment structure reduces this conflict by enabling the parties to "agree to disagree": the upfront payment reflects the portion of the value upon which both parties agree, while the deferred earnout payment is tied to the degree of disagreement. As such, earnouts function as a risk-reduction mechanism by enabling the acquirer to hedge against the risk of overpayment (Kohers and Ang, 2000), since only the value perceived as certain is paid upfront. At the same time, the seller retains the possibility of realizing the full value of the target, conditional on its future performance.

Moreover, earnouts serve as a signaling and self-selection mechanism that mitigates adverse selection. By agreeing to a contingent payment structure, only sellers confident in the future performance of their firm are willing to accept such terms, thereby signaling target quality to the buyer (Myers and Majluf, 1984).

Secondly, earnouts can be used as a tool to retain target management by structuring the deferred payment so that part, or all, of the merger premium effectively operates as a delayed bonus. By retaining the management team and aligning their incentives with those of the acquirer, earnouts encourage managers to exert greater effort to achieve the expected performance outcomes (Kohers and Ang, 2000).

Therefore, earnouts act as a dual self-selection mechanism by addressing both asymmetric information and moral hazard through signaling and incentive alignment (Caselli, Gatti, and Visconti, 2006). Finally, earnouts may also facilitate transaction financing by allowing the acquirer to defer part of the consideration, thereby reducing the immediate need for external funding.

2.2. Challenges and Risks of Earnout Clauses

Despite their advantages, earnouts also present several limitations.

Firstly, they can be costly and complex to structure, particularly due to difficulties in defining and measuring performance benchmarks, which are often based on accounting figures subject to discretion and manipulation (Viarengo, Gatti, and Prencipe, 2018).

Secondly, earnouts may give rise to moral hazard, as both acquirers and target managers may adjust their behavior to influence the contingent payment, potentially prioritizing short-term outcomes over long-term value.

Thirdly, since earnout benchmarks typically focus on the target's standalone performance, they may conflict with post-merger integration and synergy objectives, leading to misaligned incentives.

Another critical drawback of earnouts is litigation risk, defined as the possibility of future disputes arising from the contractual arrangement (Viarengo, Gatti, and Prencipe, 2018). As illustrated by the acquisition of Squid Soap's assets by Airborne, while earnouts may initially reduce valuation disagreements by tying payments to future performance, they can later give rise to disputes over the causes of underperformance. As noted by the Delaware Chancery Court (2009, p. 5)[1], 'value is frequently debatable and the causes of underperformance equally so; an earnout often converts today's disagreement over price into tomorrow's litigation over the outcome.' In addition, earnouts expose parties to counterparty risk, namely the possibility that the bidder defaults before the earnout period expires.

Hence, the feasibility of drafting and enforcing an earnout agreement is a critical consideration when evaluating their use in M&A transactions.

2.3. Main Components of Earnout Agreements

Despite inherent variability, certain fundamental components can be commonly found in earnout agreements. Building on the framework proposed by Battauz *et al.* (2021), six distinct features can be identified.

2.3.1. The Benchmark Parameter

The benchmark parameter represents the reference used to assess whether the conditions required to trigger the earnout payment are met. To be effective, a benchmark should be clearly identifiable, precisely measurable in order to limit potential legal disputes, and able to capture the uncertainty that originally generated disagreement between the parties.

[1] *Airborne Health, Inc. v. Squid Soap, LP* (C.A. No. 4410-VCL, Del. Ch., 23 November 2009). Airborne acquired Squid Soap's assets in 2007 with US$1 million in cash at closing and an earnout up to US$26.5million.

Benchmarks can take different forms depending on the characteristics of the transaction and can be broadly classified into two categories: performance-based benchmarks and event-based benchmarks, often referred to as 'cash-or-nothing'.

Performance-based benchmarks typically rely on profitability measures such as Cash Flow, EBITDA, EBIT, Gross Profit, or Net Income, or on sales figures. Sales-based benchmarks are well suited to transactions where disagreement concerns the target's ability to expand into new markets (Battauz et al., 2021).

Cain, Denis, and Denis (2011) found that approximately 88% of earnout clauses in their sample rely on financial performance indicators (i.e. the first category just discussed) and only a minority used non-financial measures.

Event-based earnouts, instead, link payments to the realization of specific milestones. These are especially relevant when uncertainty relates to product development, as in the acquisition of Convergence Pharmaceuticals by ILEX Oncology Inc.[2], the uncertainty revolves around product development milestones (e.g. obtaining a patent, completing clinical trials, or receiving FDA approval[3]). Given these characteristics, this type of benchmark is commonly employed in the acquisition of pharmaceutical or high-tech companies.

Finally, a related variation is the so-called 'reverse earnout' or 'clawback', which allows for a reduction in the purchase price if the target fails to achieve predefined economic or commercial objectives during the earnout period.

2.3.2. The Length of the Earnout Period

The earnout period refers to the time horizon over which the benchmark parameter is evaluated. Its duration is often a key point of negotiation, reflecting the conflicting interests of the parties involved, and therefore varies considerably across transactions. Cain, Denis, and Denis (2011) report an average earnout duration of 2.57 years, with observed periods ranging from approximately one month to 20 years.

[2] In 1999, Ilex Oncology Inc. acquired Convergence Pharmaceuticals Inc., a company specialized in angiogenesis and DNA repair inhibitors. As part of the agreement, Convergence Pharmaceuticals Inc. is entitled to approximately $10 million worth of acquiror's common stock, with an additional $1 million contingent upon the advancement of two compounds to the clinical stage.

[3] The Food and Drug Administration (FDA) is a division of the United States Federal Government that enforces regulations to safeguard public health.

2.3.3. Amount and Limits to the Payments

This section focuses on the relationship between the benchmark parameter and the contingent payment, which can be structured in various ways given the considerable contractual flexibility available to the parties. In some cases, the earnout is calculated as a multiple of the difference between the realized value of the benchmark and a predefined threshold. In other cases, the contingent payment is triggered only if a minimum threshold (floor) is met, resulting in a payoff structure similar to a binary option (Battauz et al., 2021). In addition, the total payout is often subject to a cap. Overall, earnout structures can be broadly classified into linear payoffs, where the contingent payment represents a fixed share of the underlying metric, and non-linear payoffs, where payments follow a more complex structure incorporating elements such as caps, floors, or variable payment rates.

2.3.4. Earnouts with Multiple Objectives

This refers to the performance objective defined in the contract. Typically, a single objective is specified; however, in some cases, multiple objectives may be included.

2.3.5. Payment Methods

Earnouts are most commonly paid in cash, consistent with their role in mitigating information asymmetry. In some cases, equity may be used instead; however, this can introduce additional information asymmetry related to the valuation of the acquirer's stock, potentially reducing the effectiveness of the earnout mechanism (Battauz et al., 2021).

2.3.6. Materiality of the Earnout

Earnout materiality, often referred to as earnout size, is defined as the share of the earnout component relative to the total deal value. This study focuses specifically on understanding the determinants of this measure. The total deal value reflects the overall consideration paid by the acquirer, combining both the upfront payment and the contingent earnout.

3. Literature Review

The academic literature on earnouts is quite fragmented, consisting of a wide range of studies that explore different aspects of the topic with varying depth. Broadly speaking, three main research streams can be distinguished: determinants of earnouts use, implications of earnout use, and earnout structure.

A recent review by Dahlen (2024), which examines 64 studies published between 1970 and 2023, shows that the majority of contributions rely on empirical methodologies (77%), while a smaller proportion adopts mixed methods (9%). The review further indicates that earnout research is predominantly concentrated on North America (27% of the studies) and China (25%), whereas European-focused analyses represent only 11% of the examined papers.

The stream with the largest number of publications is the one investigating the implications of earnouts (46% of the total), followed by the stream focusing on the determinants of earnouts use (35% of the total). The remaining stream, which focuses on earnout structure, is the least explored, representing only 19% of the literature; hence, this study concentrates on this latter stream, as it offers an interesting opportunity for further analysis.

The following sections present the key contributions within each of these three research streams, with a particular focus on earnout structure, the area to which this thesis seeks to contribute. It is worth noting that empirical results in this field are often sensitive to sample selection, which can produce mixed or even contradictory findings. Consequently, apart from a limited number of well-established determinants, several questions remain open.

3.1. Research stream 1: Determinants of Earnout Use

Two of the main foundational contributions to the earnout literature are Kohers and Ang (2000) and Datar, Frankel, and Wolfson (2001), both of which build on the idea that M&A transactions are characterized by information asymmetries that generate valuation differences between buyers and sellers.

In line with this argument, higher levels of information asymmetry are associated with a greater likelihood of earnout use (Kohers and Ang, 2000). Subsequent studies extend this framework by identifying several sources of uncertainty related to four areas: target determinants, acquirer determinants, transaction determinants, and macroeconomic and regulatory factors.

Among target determinants, the literature shows that earnouts are more frequently used when the target is private, operates in R&D-intensive or high-growth sectors (Datar, Frankel, and Wolfson, 2001; Cadman, Carrizosa, and Faurel, 2014), or belongs to industries with a high concentration of intangible assets. Earnout clauses are also more common in transactions involving subsidiary targets (Kohers and Ang, 2000). Conversely, prior evidence points to a negative relationship between earnout use and both the target's asset-to-sales ratio (Jansen, 2020) and its years of operation (Ragozzino and Reuer, 2009).

When examining the determinants on the acquirer's side, earnouts are more likely when the acquiring firm lacks prior acquisition experience (Reuer, Shenkar, and Ragozzino, 2004) or is relatively small in size, based on market capitalization or total assets (Barbopoulos and Sudarsanam, 2012). Consistent with Kohers and Ang (2000), earnouts are also positively associated with the retention of target management, serving as a tool to preserve human capital. More recent studies indicate that financially constrained acquirers are more likely to use earnouts (Bates, Neyland, and Wang, 2018; Barbopoulos, Danbolt, and Nechbaoui, 2023), though findings remain mixed (Ragozzino and Reuer, 2009). Public acquirers also tend to rely on earnouts more frequently (Jansen, 2020).

Regarding the transaction determinants, most studies agree that cross-industry deals exhibit a higher likelihood of including earnout provisions (Kohers and Ang, 2000). Some research also suggests a greater use of earnouts in cross-border transactions, although findings are not unanimous. Finally, the presence of a toehold (i.e. pre-acquisition minority shares held by the acquirer in the target) reduces the likelihood of earnout use (Viarengo, Gatti, and Prencipe, 2018).

For what concerns macroeconomic and regulatory determinants, Bates, Neyland, and Wang (2018) find that indicators of adverse economic conditions are positively linked to earnout use. Similarly, Viarengo, Gatti, and Prencipe (2018) report a positive association between earnouts and the quality of enforcement. In terms of accounting regulation, Allee, Hamm, and Wangerin (2011) show that public acquirers are less likely to include earnouts following the adoption of SFAS 141(R).

Overall, the evidence emerging from these strands of the literature is consistent with the role of earnouts as a mechanism for mitigating risk in M&A transactions. This risk primarily stems from information asymmetry, which explains why earnouts are more frequently observed in deals involving private targets and firms operating in intangible-intensive industries.

3.2. Research stream 2: Implications of Earnouts

Within this well-developed stream of the literature, two main perspectives can be distinguished: the external reaction of capital markets and firms' internal responses to earnout transactions (Dahlen, 2024).

Prior research documents positive short-term abnormal returns around earnout announcements (Kohers and Ang, 2000), while evidence on long-term performance is more mixed. Studies on Anglo-Saxon markets report superior long-term outcomes (Barbopoulos, Molyneux, and Wilson, 2016), whereas research on China points to negative effects linked to regulatory changes and managerial moral hazard (Song et al., 2019). Barbopoulos and Adra (2016) highlight that relatively larger earnouts and longer earnout periods are associated with higher takeover premia compared to comparable non-earnout deals, as the target owners are compensated for sharing post-acquisition risk with the acquirer.

Regarding firms' internal responses, retaining target management has been shown to enhance performance (Kohers and Ang, 2020), although evidence from the Chinese market indicates that earnouts may incentivize earnings management during the earnout period (Tao et al., 2022).

Overall, the findings suggest that while earnouts are associated with positive market outcomes and higher takeover premia, they may also entail risks linked to managerial incentives..

3.3. Research stream 3: Earnout Structure

Earnout materiality, or earnout size, is generally measured as the ratio of the earnout value to the total deal value. Evidence suggests a positive link between earnout materiality and the degree of valuation uncertainty.

Cain, Denis, and Denis (2011) highlight that materiality is usually higher when the target is a private company, reflecting the greater information asymmetry present in such transactions. Similarly, Kohers and Ang (2000) show that earnout materiality tends to be greater for targets in intangible-rich industries, where accurately assessing value is more challenging. By contrast, earnout materiality is generally lower in deals where the acquirer and target operate in the same industry, as industry familiarity helps reduce valuation uncertainty.

Cain, Denis, and Denis (2011) document a positive association between earnout materiality and characteristics such as target industry daily return volatility, R&D intensity, and Tobin's Q.

They also find a negative relationship between earnout materiality and the relative size of the transaction (i.e. ratio of total deal value to the acquirer's market value) indicating that larger deals relative to the acquirer tend to have lower earnout materiality. In contrast, Kohers and Ang (2000) report the opposite pattern: as the relative size of the transaction increases, earnout materiality also rises. They argue that because the cost of valuation errors grows with the target's size relative to the acquirer, risk-averse bidders structure deals with higher earnout materiality to mitigate potential misvaluation.

In the context of accounting standard changes, evidence suggests that earnout materiality increased after the introduction of SFAS 141(R) (Barbopoulos and Danbolt, 2021), though this effect remains debated (Allee, Hamm, and Wangerin, 2011). Allee and Wangerin (2018) also report a positive link between earnout size and high-quality auditor involvement.

Enforcement quality similarly affects earnouts: Viarengo, Gatti, and Prencipe (2018) find a positive association with measures such as the anti-self-dealing index, the PCA index, and the creditor protection index.

More recently, Barbopoulos, Danbolt, and Nechbaoui (2023) show that financially constrained acquirers or targets tend to engage in deals with higher earnout materiality.

Regarding earnout design, Cain, Denis, and Denis (2011) highlight that higher R&D intensity in the target industry is associated with longer earnout periods. They also note that sales-based performance metrics are more common in industries with volatile returns, while non-financial measures prevail when acquirer and target operate in the same industry or when Tobin's Q is high.

On valuation approaches, scholars generally agree that earnouts have option-like features, making option pricing methods particularly suitable (Caselli, Gatti, and Visconti, 2006). Early work used Monte Carlo simulations on case studies to estimate expected payoffs (Dahlen, 2024). Lukas, Reuer, and Welling (2012) modeled cash flows as arithmetic Brownian motion, showing that costs rise substantially with greater uncertainty about the target's future value. Battauz et al. (2021) extended this by including counterparty risk (bidder default before the earnout expires) and litigation risk (potential contractual disputes).

As noted, this last research stream remains the least explored, offering significant scope for further investigation, precisely the focus of the present study.

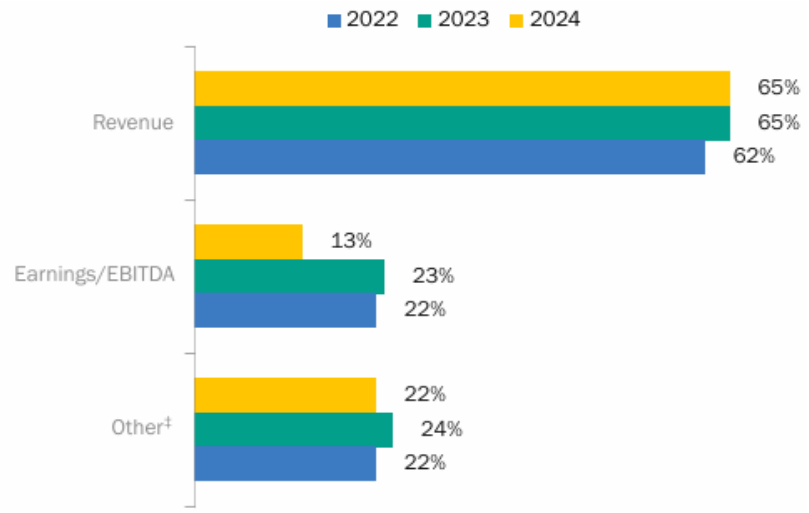
4. The Evolving United States M&A Landscape: Recent Trends and Earnout Practices

The 2025 M&A Deal Terms analyses more than 2,200 private-target acquisitions ($505 billion) that closed between 2019 and 2024 in the United States. This study focuses on non-life science deals, as for those specifically there is a separated report (not been released in the last two years). According to the analysis, activity among financial buyers, including private equity, increased in 2024, while strategic buyers remained as engaged as in 2023.

Despite a notable decline from the exceptionally high levels of 2023, the use of earnouts remained elevated, slightly above the historical average of roughly one in five non-life sciences private-target transactions. An examination of deal terms, such as earnout and indemnification provisions, indicates a clear shift in favor of sellers. In particular, earnout periods have continued to shorten, with no arrangements exceeding four years for non-life sciences private-target deals in 2024.

Overall, the study reports that 22% of the transactions included an earnout clause. While this is lower than the 33% observed in 2023, it remains above the long-term historical average. Among these earnout deals, 32% featured a single earnout, while the remaining 68% incorporated multiple earnouts.

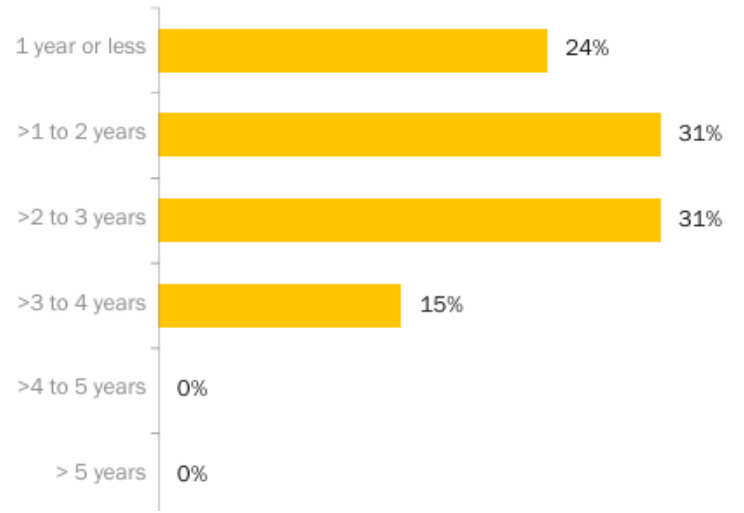
Graph 1 – Earnout metrics evolution over years, non-life science deals



Source: SRS Acquiom Inc. (2025)

Other common earnout metrics may include targets such as unit sales, the successful launch of new products, or the divestiture of specific assets.

Graph 2 – Earnout length overview, non-life science deals



Source: SRS Acquiom Inc. (2025)

As shown in Graph 2, in the sample there are no earnouts with a duration exceeding four years, and more than 60% of all earnout transactions fall within a 1-to-3-year range.

Turning to life sciences and pharmaceuticals, deal value in 2024 declined, in contrast to overall global M&A activity, which remained relatively flat. This represents a sharp reversal from 2023, when life sciences deals significantly outperformed the market, with a 50% increase in deal value compared to 2022, while total M&A across all sectors decreased by 7%.

However, it is important to put these figures into perspective. Despite a 33.7% drop in deal value from 2023, life sciences and pharma transactions continue to take place, with the number of deals falling by only 5.2% year-over-year. The main difference lies in deal size: in 2024, the largest U.S. biotech exit was Vertex Pharmaceuticals' $4.9 billion acquisition of Alpine Immune, whereas in 2023 there were eight U.S. biotech acquisitions exceeding $5 billion.

A key trend in 2024 was the return of the dual-track strategy, whereby companies prepare simultaneously for both an M&A exit and an initial public offering (IPO), maximizing optionality in an uncertain market. Given the smaller deal sizes, mid- and late-stage biotech companies increasingly became attractive acquisition targets. Strong buyer appetite, particularly for companies with proven products, led to a substantial increase in upfront cash payments and consequently, the earnout value as a percentage of total deal value decreased significantly.

4.1. Earnout Contractual Complexity and Litigation Risk

The lower prevalence of earnouts in Life Sciences transactions highlighted above is also influenced by regulatory and litigation risk, as evidenced by recent Delaware court decisions. These include the ruling awarding former shareholders of Auris Health more than $1 billion in damages in an earnout dispute arising from Auris's acquisition by Johnson & Johnson. Such outcomes may discourage buyers from including contingent consideration, even in transactions where post-closing effort obligations are relatively limited.

As previously discussed, while earnouts can resolve valuation disagreements at closing, they may also become a source of future litigation. Consistent with this view, the growing use of earnouts in recent years has been accompanied by a notable increase in court opinions addressing earnout-related disputes. This trend underscores the importance of carefully structuring earnout provisions to mitigate litigation risk. Moreover, although Delaware courts have historically tended to favor buyers, more recent decisions suggest a shift toward greater scrutiny of buyer conduct and, in several cases, outcomes more favorable to sellers. An illustrative example of this evolving judicial approach is provided below.

In 2018, Alexion Pharmaceuticals acquired Syntimmune, a clinical-stage biotechnology company, for an upfront payment of $400 million, with the potential for additional milestone-dependent payments of up to $800 million. The agreement required Alexion to use "commercially reasonable efforts"[4] for seven years to achieve the contractual milestones. After the transaction, and following Alexion's subsequent acquisition by another company, the buyer progressively shifted its strategic focus toward other initiatives aimed at the launch of new products. These programs were prioritized over Syntimmune's assets, which, despite encouraging early results, faced development difficulties, including a temporary pause linked to the Covid-19 pandemic.

In 2024, the court ruled in favor of Syntimmune, finding that the buyer had failed to comply with its obligation to use commercially reasonable efforts to reach the contractual milestones. A key element of the decision was the standard agreed upon by the parties, which was an "outward-facing" rather than an "inward-facing" one. As a consequence, the court did not assess Alexion's conduct by reference to its internal priorities or to the way it developed other products within its portfolio. Instead, it compared the buyer's actions to those that would have

[4] "Using such efforts and resources typically used by biopharmaceutical companies similar in size and scope to [Alexion] for the development and commercialization of similar products at similar development stages taking into account" (*Shareholder Representative Services LLC v. Alexion Pharmaceuticals, Inc.* (C.A. No. 2020-1069-MTZ, Del. Ch., 5 September 2024), page 38).

been undertaken by a hypothetical company of similar size and operating under comparable circumstances. The court concluded that Alexion had effectively discontinued the development of Syntimmune's products in order to prioritize the synergies associated with its own acquisition, an objective that was considered idiosyncratic and not one that a comparable hypothetical firm would have pursued. On this basis, the court found in favor of Syntimmune.

Despite the inherent complexity involved in drafting earnout provisions, there are a number of best practices that may help mitigate the risk of future litigation (the list below is not exhaustive):

1. First, subjectivity in the choice of earnout metrics should be minimized as much as possible. The fewer discretionary judgments required in determining whether earnout conditions have been met, the lower the probability that disputes will arise between the parties
2. Second, while some degree of ambiguity in contractual language is often unavoidable, it is essential to clarify potentially ambiguous terms as early and as explicitly as possible. Earnouts are most commonly structured around EBITDA or revenue targets. According to evidence reported by the American Bar Association, between 50% and 70% of earnout provisions rely on these measures. In particular, EBITDA-based earnouts are especially prone to disagreement due to the interpretive flexibility permitted under most accounting standards. EBITDA can encompass a wide range of adjustments, and the precise components included in its calculation are not always straightforward (e.g. adjusted EBITDA, Other expenses included or excluded). (for example, whether "adjusted EBITDA" is used, or which expenses are included or excluded). To limit the scope for disputes, it is therefore crucial that transaction documents clearly specify how these metrics are to be calculated, including whether the computation should be consistent with historical accounting practices or instead follow a newly defined standard.
3. Third, sellers should seek to retain some degree of post-transaction operational control whenever feasible, or, at a minimum, negotiate explicit "anti-gaming" provisions aimed at preventing buyers from acting opportunistically to avoid earnout payments. To understand why, let's look at a real case. In the *Fortis Advisors v Medtronic*, the buyer could act in its "*sole and absolute discretion*" with respect to the commercial exploitation of certain products. As a result, the relevant business decisions were entirely within the buyer's control, and the

court ultimately dismissed the sellers' claims that the buyer had intentionally deprived them of the earnout. If instead, the earnout clause required the buyer to use "reasonable efforts" to achieve the earnout goals, the court could have ruled in favor of the seller.

4. Fourth, buyers may enter into financing arrangements after closing that effectively restrict or prevent earnout payments. To mitigate this risk, sellers may seek contractual protections, such as requiring the buyer to obtain lender consent in advance or to structure financing in a way that does not impair the earnout obligation.
5. Fifth, the acquired business may be sold again during the earnout period. Despite this possibility, only around 20% of transactions provide for an acceleration of the earnout upon a subsequent change of control. Where a resale is a realistic scenario, earnout provisions should explicitly address how such an event would affect the contingent payments.
6. Finally, both parties should maintain comprehensive documentation from the early stages of negotiation onward. A clear and consistent record of how the earnout terms were understood at the time of contracting can be crucial in the event of a dispute, particularly if a court later finds the contractual language to be ambiguous.

4.2. Earnouts as a Contractual Response to Uncertainty: Insights From the COVID-19 Pandemic and Tariffs

Market uncertainty and divergent expectations between transaction parties often generate valuation gaps. Earnouts address this issue by making a portion of the deal consideration contingent on the future performance of the target business, thereby serving as an effective mechanism to bridge valuation differences and facilitate agreement. Through the use of earnouts, buyers are able to transfer a greater share of risk to sellers, aligning payments more closely with realized outcomes.

In line with this reasoning, Barbopoulos, Prencipe, and Viarengo (2024), analyzing a U.S. sample, document that earnouts are used more frequently during periods of heightened economic uncertainty. This pattern was particularly pronounced during the Covid-19 pandemic, when the share of M&A transactions including earnouts increased to 23%, compared to 10.6% in non-pandemic years. These findings suggest that earnouts function as an effective tool to

mitigate the adverse effects of uncertainty, whether driven by broad macroeconomic conditions or by extraordinary events such as Covid-19.

However, when focusing on earnout materiality, the evidence becomes more nuanced. While earnout size generally increases during periods of elevated economic uncertainty, this relationship did not hold during the Covid-19 years. Barbopoulos, Prencipe, and Viarengo (2024) argue that the pandemic represented an exceptionally uncontrollable source of risk, prompting sellers to limit their exposure to the downside risk associated with a prolonged and unpredictable economic shock.

The first half of 2025 was marked by renewed trade tensions following the tariffs imposed by President Trump, who famously referred to "tariff" as the most beautiful word in the dictionary. April proved particularly turbulent, as the administration announced its most severe tariff measures before suspending them for 90 days shortly thereafter. This suspension did not apply to China, where tariffs escalated to a minimum of 145%. The measures affected countries exporting a wide range of goods to the United States, with expected repercussions for consumers in the form of higher prices on products such as automobiles, electronics, and alcohol.

These ongoing tariff disputes have further intensified macroeconomic uncertainty. In this environment, private equity firms assessing European targets have increasingly turned to earnouts as a structuring device to manage uncertainty surrounding the potential impact of tariffs. At the portfolio company level, firms have instead adjusted their expansion strategies, pivoting toward alternative markets in order to reduce exposure to the U.S.

The current context appears particularly conducive to the use of earnouts, as reflected in the words of Allan Bertie, Head of European Investment Banking at Raymond James: "we have seen discussion in some transactions where the buyer says, 'if the tariffs remain, this is the price. If they soften, we will give you an earnout based on the original assumptions'" (PE Hub, May 2025).

Clearly, this outcome is not what most sellers would ideally prefer. Nevertheless, in a setting where the previously dominant narrative of a "U.S.-led rollout" as a core growth driver has lost credibility, transaction terms are inevitably adjusting to reflect this new reality. Heightened geopolitical and trade-related uncertainty has made buyers more cautious, and this caution is increasingly evident in deal structures.

If current conditions persist, a broader and more systematic use of earnout clauses is likely to emerge. Even if tariff-related uncertainty were to be resolved in the near term, the precedent it has established remains significant. It introduces a lasting element of caution that is likely to shape how parties approach valuation risk and post-closing performance, providing further justification for the continued adoption of structured, performance-contingent mechanisms such as earnouts.

5. Data and Statistical Analysis

The study focuses on M&A transactions announced from January 1, 2010, to December 31, 2024, that include earnout provisions, considering only deals where the earnout value is greater than zero. The 15-year period follows the methodology applied by Barbopoulos, Danbolt, and Nechbaoui (2023). All data employed in the analysis were obtained from SDC Platinum through LSEG Workspace (previously Refinitiv Workspace).

For inclusion in the sample, transactions were required to meet specific criteria: they must have been completed[5], and the target company must be headquartered in North America (United States and Canada). The decision to focus on North America is driven by the widespread use of earnouts in this region, which makes it an ideal geography to study. Moreover, since the majority of existing literature concentrates on this region, it becomes particularly interesting to examine whether, by using a different time frame and an alternative data source, one arrives at results that are consistent with previous findings. In addition, this approach serves to complement the analysis conducted in the Bocconi thesis, which sought to identify the main determinants of earnout materiality in Europe, investigating whether the key drivers identified are still relevant in this context or whether distinct patterns emerge.

Additionally, the sample was restricted to transactions categorized as mergers or acquisitions in which the acquiring firm obtained majority control of the target (i.e. an increase in ownership from less than 30% to more than 50%). This restriction was applied to eliminate deals involving minority or residual stakes and to focus solely on transactions representing a transfer of control from the seller to the acquirer.

Transactions such as spin-offs, buybacks, leveraged buyouts, repurchases, and recapitalizations were excluded, along with any deals for which key data required for the analysis were unavailable.

The initial raw sample extracted from the database consists of 2,759 observations. After applying the selection criteria outlined above, the final sample used in this study comprises 110 observations. When compared with the European sample used in the Bocconi thesis, which originated from a similar initial pool of transactions, the final North American sample is approximately one fifth the size of its European counterpart. This discrepancy is largely attributable to the differing disclosure requirements across the two regions.

[5] The last download was done on the 13th of January 2025.

5.1. Different Disclosure Requirements: North America and Europe

The goal of both the European and the United States or Canadian jurisdictions is fundamentally the same: ensuring the protection of investors and the proper functioning of financial markets. Consequently, securities and financial market regulations in the two jurisdictions have increasingly converged in several areas (e.g. prohibition of market manipulation). However, despite this convergence, each system pursues this objective in different ways.

For example, although both jurisdictions recognise that the disclosure of material corporate information by issuers is essential to ensure market efficiency, they differ in how and when such disclosure must occur. In the European market, there is a strict requirement to disclose any inside information "as soon as possible." Inside information is defined as "any non-public financial information that directly concerns the issuer or its financial instruments and that, if made public, would likely have a significant effect on the price" [Mosca, C. and Picciau, C. (2023)]. This obligation applies on a continuous basis, meaning that inside information must be disclosed immediately upon occurrence, without waiting for the next scheduled or periodic disclosure deadline. This continuous disclosure regime reflects the European Union's emphasis on market transparency and investor protection through the immediate dissemination of relevant information.

On the other hand, in the United States, "there is no general duty to disclose all material information," and the disclosure of such information is typically tied to periodic reporting or the occurrence of specific events. Indeed, only particular events (e.g. changes in control or the entry into a material agreement) must be disclosed as they occur, generally within four business days. For matters not included in this specific list, only periodic disclosures, such as annual (Form 10-K) and quarterly (Form 10-Q) reports, are required.

Given the above, it appears evident that the European disclosure requirements are more stringent than those enforced under the U.S. system. The differences between the two frameworks emerge both in terms of the subject matter covered and the timing of the disclosure obligations. Another important distinction lies in the allocation of responsibility: in the United States, it is the Securities and Exchange Commission that determines what constitutes material information by listing the items that must be disclosed. In contrast, under the EU framework, it is the issuer who must independently assess and identify the information that qualifies as inside information and ensure its prompt disclosure.

This comparison illustrates how the two systems adopt fundamentally different approaches to disclosure, which ultimately influence both the quantity and nature of the information released

to the market. This divergence extends beyond mere regulatory compliance; it gradually shapes business practices and even corporate culture. In the European context, the absence of an exhaustive list as exists in the U.S., may lead companies to adopt a more cautious or proactive disclosure strategy, subtly increasing their transparency to ensure compliance with the broader and more ambiguous European requirements.

Taking a step back, despite these differences, the two systems are relatively aligned - at least in the context of mandatory disclosure for publicly traded companies. However, the same level of convergence does not apply to private companies. In the United States, disclosure obligations for private entities are governed by the laws of the state in which the company is headquartered, although the level of disclosure required tends to be consistent across states. In Europe, the landscape is similar in principle, but it is further shaped by EU directives on corporate law, which introduce harmonising elements that help smooth out some of the divergences across member states.

United States

Companies in the United States are required to file their formation documents with the state in which they are incorporated. This filing typically includes basic information such as the company's legal name, registered address, and corporate purpose, along with other structural provisions. However, this document is not intended to serve as a vehicle for financial disclosure; rather, it functions more as a foundational legal agreement or "contract" between the shareholders and the company itself.

After the initial filing, there are generally no further disclosure obligations imposed on the company, except in cases where amendments to the original filing are necessary or "events that occur as a matter of state law" - such as a conversion into another entity form, merger, or consolidation. As a result, private companies in the United States are not required to disclose any financial information to the public.

Europe

Several European regulations govern corporate disclosure, but Directive 2013/34/EU serves as the main legislative instrument currently in force. This directive repealed Directives 78/660/EEC and 83/349/EEC and was required to be transposed into national law by 20 July

2015 (Beuselinck et al., 2023). Its objective was to enhance the comparability of financial reporting across EU Member States by establishing harmonised requirements.

The Directive identifies four categories of private companies, each of which is subject to a different level of reporting obligations (Beuselinck et al., 2023).

A company is considered a "micro" firm if it does not exceed at least two of the following thresholds:

- Total assets of €350,000
- Net turnover of €700,000
- Average number of 10 employees per year

A "small" company is defined as one that does not exceed at least two of the following:

- Total assets of €4,000,000
- Net turnover of €8,000,000
- Average of 50 employees

A "medium-sized" company falls within the following thresholds, again based on not exceeding at least two:

- Total assets of €20,000,000
- Net turnover of €40,000,000
- Average of 250 employees

Finally, any firm that exceeds the thresholds for medium-sized companies is classified as a "large" company.

The directive establishes different disclosure requirements depending on company size. With the exception of micro-companies - which benefit from exemptions - all other firms are required to publish some form of financial disclosure. However, Member States retain discretion in how they implement the Directive within their national legal frameworks. For example, in Germany, "small" companies are exempt from filing income statements, whereas in Italy, these are typically required, with limited exceptions primarily applicable to "micro" enterprises.

Despite the national differences, it is clear that the level of disclosure required for private companies in Europe is considerably higher than that in the U.S. system. In many EU countries, even relatively small private firms are obligated to publish financial statements, thereby

allowing access to financial information that would not be publicly available in the United States.

This difference in disclosure requirements between U.S. and EU legislation directly explains the disparity in sample sizes. In fact, the European sample is approximately five times larger than the U.S. one, precisely due to the limited availability of data for private companies - the type of firms for which earnouts are most commonly used. The lack of publicly available financial information for these private U.S. companies has often resulted in the exclusion of transactions from the dataset, as they could not be included without sufficient disclosure.

Table 1 summarizes the primary descriptive statistics of the variables under study, with particular emphasis on earnout materiality and its principal components.

Table 1 - Descriptive statistics of earnout value, total deal value and earnout materiality

USD mln, %	*Cumulative*	*Mean*	*Median*	*Maximum*	*Minimum*
Earnout Value	10,885.8	99.0	30.0	3,736.2	0.0
Total Deal Value	61,862.6	562.4	106.0	23,898.9	0.4
Earnout Materiality	17.6%	31.9%	27.6%	100.0%	1.8%

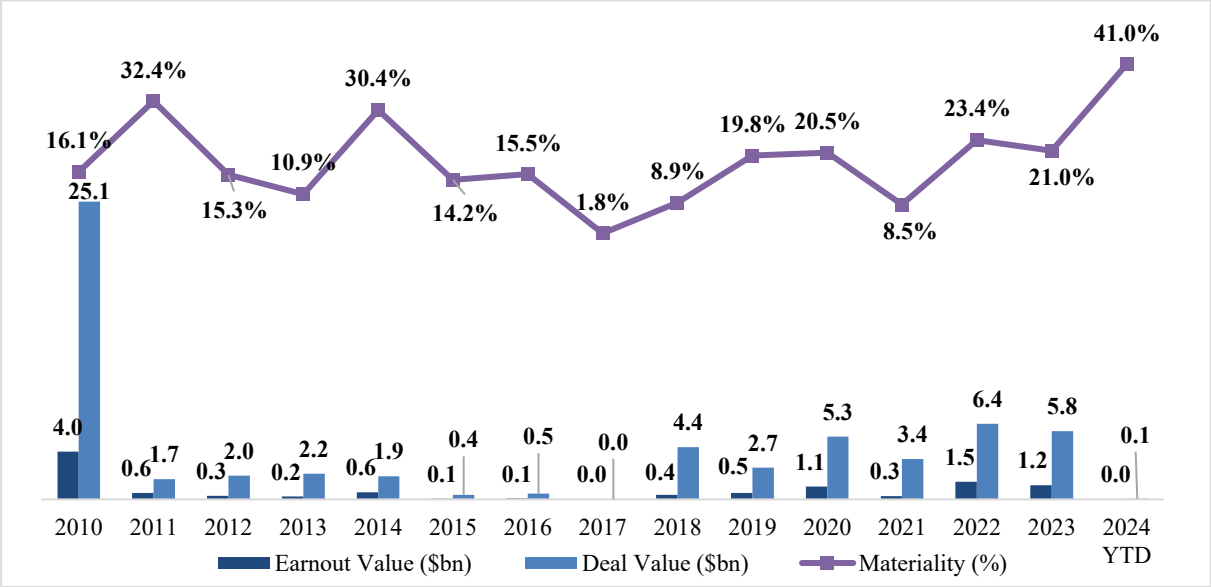
Table 2 illustrates the historical evolution of transactions incorporating earnouts within the sample analyzed. Unlike the European sample analyzed in the Bocconi thesis, which exhibited a non-linear growth with a peak in 2022 - coinciding with the record year of nearly 58,000 total global M&A deals (Dahlen, 2024) - the North American sample displays a different pattern. Here, the peak is observed in the early years of the period (2010-2012), followed by several years with lower activity, before stabilizing around 2022-2023. Given the limited size of the sample, drawing definitive conclusions from this trend would not be appropriate.

Table 2 - Historical trend and distribution of earn-out deals in the North American sample analyzed: annual breakdown from 2010 to 2024 YTD (Year-To-Date)

Ann. Date	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024 YTD*	*Total*
# Deal	**10**	**18**	**16**	**8**	**4**	**5**	**3**	**1**	**5**	**6**	**6**	**5**	**12**	**10**	**1**	**110**
% Total	*9%*	*16%*	*15%*	*7%*	*4%*	*5%*	*3%*	*1%*	*5%*	*5%*	*5%*	*5%*	*11%*	*9%*	*1%*	*100%*

An examination of the historical trend in earnout materiality (Graph 3) reveals that it does not follow a simple linear trajectory but instead exhibits significant fluctuations over the years, ranging from 1.8% in 2017 to 41% in 2024 YTD. Notably, these two extreme values correspond to years with only one observation each, which likely skews the reported materiality. This variation is driven by the two components of the ratio. The earnout value, which constitutes the numerator, has remained relatively stable (excluding the peak observed in 2010), with a low in 2017 that rebounded in subsequent years and generally stabilized at higher levels compared to previous periods. In contrast, the deal value displays a pronounced peak in 2010 ($25.1bn), followed by considerably lower values in later years, predominantly below $5bn.

Graph 3 - Historical trend of earnout materiality and distribution of earnout and total deal value in the analyzed North American sample: annual breakdown from 2010 to 2024 YTD



The characteristics of the financial transactions included in the sample were examined in relation to several key variables commonly analyzed in the existing literature. The sample is broadly split between cross-industry transactions and deals occurring within the same industry, while approximately one third of the observations involve cross-border acquisitions. Although prior research has primarily focused on whether cross-border and cross-industry deals are more likely to feature earnout clauses, this study instead investigates whether these factors also influence the materiality of earnouts. While the distribution is not identical, it appears broadly consistent with patterns observed in the European sample.

Existing literature suggests that earnouts are more prevalent in industries with a high concentration of intangible assets. In particular, Viarengo, Gatti, and Prencipe (2018) argue that

such characteristics increase the likelihood of earnout usage in M&A transactions. Building on this insight, the present analysis explores whether industry intangibility also affects earnout size. In our sample, 65% of the transactions are concentrated in high-intangible industries (*Technology, Telecommunications, Services, Healthcare & Pharma*). The percentage seems to be even higher than what we have encountered in the European sample.

Furthermore, prior studies indicate that transactions involving private targets or subsidiaries are more likely to incorporate earnout provisions (Kohers and Ang, 2000), and these factors may also influence earnout materiality. In the analyzed sample, 64% of transactions involve targets falling into one of these categories, suggesting a potential association between target ownership structure and earnout usage. This proportion is substantially lower than the 98% observed in the European sample. The discrepancy is likely attributable to lower disclosure requirements for private companies in North America, which result in missing data for certain variables and the subsequent exclusion of those transactions from the sample.

Finally, as discussed earlier, the literature reports that the presence of a pre-existing ownership stake in the target firm is generally associated with a lower likelihood of earnout inclusion. However, evidence regarding its relationship with earnout materiality remains inconclusive; an issue this study seeks to address. Within the sample, similar to what encountered in the European sample, approximately 2% of earnout transactions involve deals characterized by an acquirer toehold.

Table 3 - Breakdown of deal characteristics

	Cross-Border	*Cross-Industry*	*High Intangibles*	*Private*	*Subsidiary*	*Toehold*
Number of Deals (#)	34	44	71	57	13	2
% of Total	*31%*	*40%*	*65%*	*52%*	*12%*	*2%*

Turning to the industry-level analysis of the sample, Table 4 provides an overview of the key differences across sectors. The largest earnout values are observed in *Healthcare & Pharma*, an industry characterized by a high concentration of intangible assets. *Technology, Media, and Telecommunications* (TMT), another sector with substantial intangible intensity, ranks third in terms of earnout value. Combined, these industries account for over 70% of the total earnout value in the sample, a share ~10% higher than that observed in the European sample. Interestingly, within the North American sample, the second-highest earnout value is associated

with the *Industrial* sector, which is typically considered less intangible-intensive and more capital-heavy, with investment cycles closely tied to property, plant, and equipment.

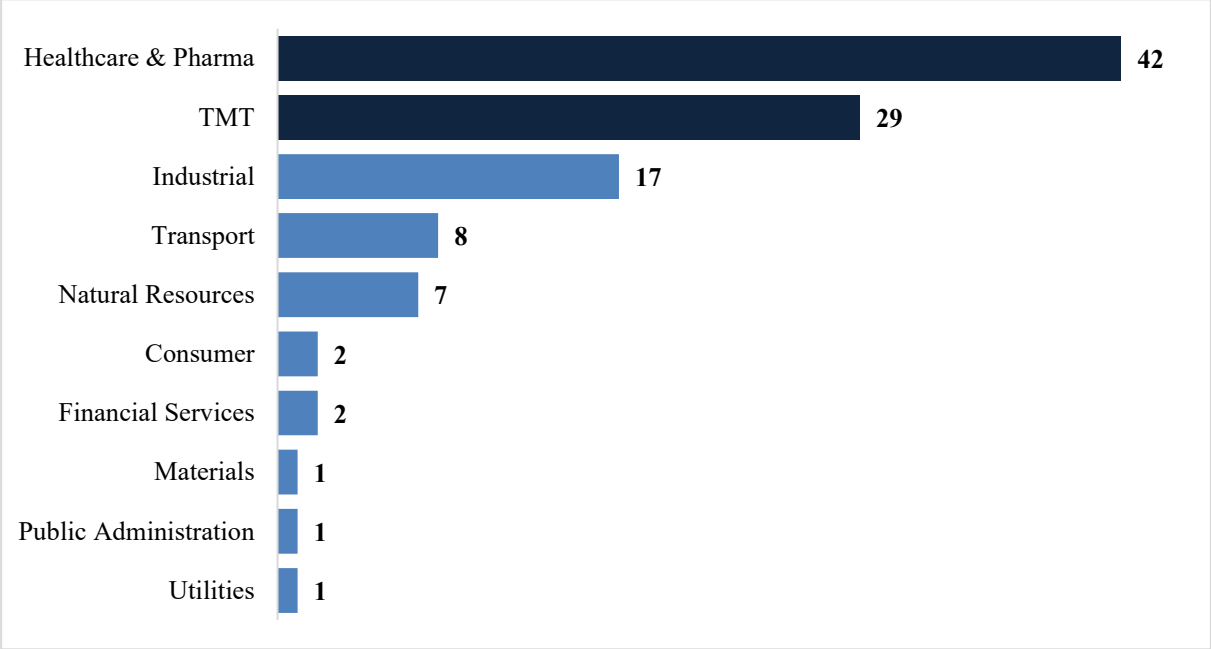
Notably, the data indicate an absence of earnout transactions in the Hospitality, Primary, and Wholesale sectors. While this may partly reflect the limited sample size, a similar pattern was also observed in the European sample for Hospitality. This outcome is likely linked to the business models prevalent in these industries (e.g. hotels, restaurants, and resorts) which are typically dominated by tangible assets that still do not have the same capex requirement of industrial businesses (characterized by ongoing maintenance and replacement capex, in addition to growth capex in contrast with capex concentrated in periodic refurbishments in Hopsitality). The presence of substantial physical assets facilitates more objective valuation, thereby reducing the need for earnout structures to bridge valuation gaps commonly associated with intangible-intensive sectors.

Table 4 – Summary of sample data by industry

Industry	*Earnout value (USD bn)*	*Earnout value as % of total*	*Total deal value (USD bn)*	*Materiality (%)*	*#*
Healthcare & Pharma	6.55	60.18%	40.4	16.21%	42
Industrial	1.72	15.81%	4.5	38.16%	17
TMT	1.26	11.58%	6.6	19.05%	29
Materials	0.50	4.59%	2.1	24.05%	1
Natural Resources	0.34	3.16%	5.7	6.08%	7
Transport	0.33	3.06%	1.5	22.40%	8
Financial Services	0.07	0.66%	0.1	52.37%	2
Consumer	0.05	0.49%	0.6	8.39%	2
Utilities	0.05	0.46%	0.3	15.63%	1
Public Administration	0.00	0.01%	0.0	10.00%	1
Hospitality	0.00	0.00%	0.0	0.00%	0
Primary Sectors	0.00	0.00%	0.0	0.00%	0
Retail Trade	0.00	0.00%	0.0	0.00%	0
Wholesale	0.00	0.00%	0.0	0.00%	0
Total	***10.89***	**100.00%**	***61.86***	**-**	***110***

In line with prior research and consistent with the evidence from the European sample, the results indicate that industries with a high intensity of intangible assets record the greatest number of earnout transactions. The *Healthcare & Pharmaceuticals* sector is particularly prominent, with 42 deals, followed by *TMT* with 29 transactions, placing it well ahead of the next-ranked industry.

Graph 4 – Number of earnout deals by industry



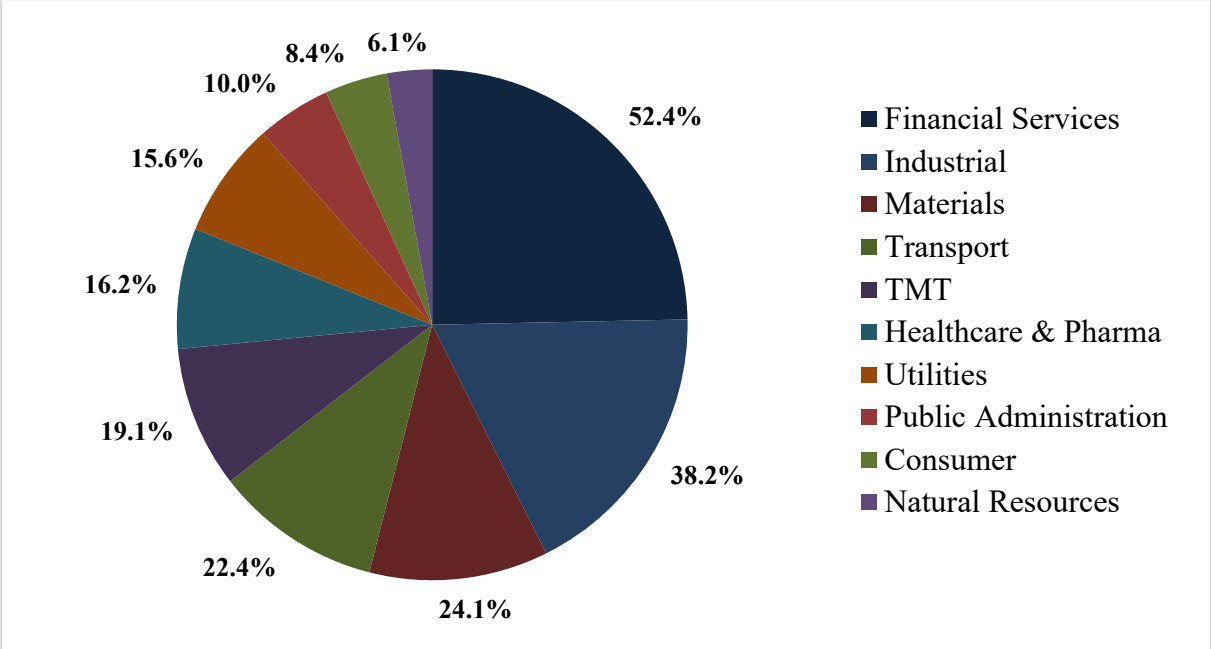
When shifting the focus to earnout materiality, the overall picture changes.

As shown in Graph 5, the *Financial Services* sector ranks first. The elevated level of earnout materiality in this industry can be attributed to substantial valuation uncertainty, as future performance is closely linked to volatile variables such as interest rates and credit risk. In addition, strong regulatory constraints and exposure to macroeconomic conditions make risk difficult to price at the transaction date, thereby encouraging the use of contingent consideration as a mechanism for risk sharing between buyers and sellers. Furthermore, the relevance of intangible, relationship-based assets and the importance of client retention support the use of performance-contingent payments to align post-acquisition incentives.

Consistent with the evidence presented in the previous table, the Industrial sector ranks second in terms of earnout materiality. By contrast, while *TMT* and *Healthcare & Pharma* remain prominent in terms of deal frequency, they rank fifth and sixth, respectively, when earnout materiality is considered.

These results differ from those observed in the European sample analyzed in the Bocconi thesis, making the investigation of the drivers of earnout materiality in the North American context particularly compelling.

Graph 5 – Earnout materiality by industry



6. Hypothesis Development

After a detailed examination of the structure and main features of earnout agreements, a review of the relevant literature, and an in-depth analysis of the sample considered, we now introduce the research question that defines the objective of this study:

What are the main determinants influencing the materiality of earnouts, namely the ratio of earnout value to total deal value, in M&A transactions? Are the findings consistent across different geographic areas, specifically Europe and North America?

The primary objective of this research is to identify the factors that drive earnout size. In particular, the analysis seeks to determine whether specific characteristics are systematically associated with higher levels of earnout materiality. To address these questions, a set of testable hypotheses is developed and subsequently examined through empirical analysis.

The variables considered in this study capture characteristics of the target firm and the acquirer, features of the transaction itself, and elements of the broader regulatory environment. As emphasized in the existing literature, higher valuation uncertainty is typically associated with greater earnout materiality. In M&A transactions where information is asymmetrically distributed between the parties, the less informed party faces increased uncertainty regarding the target's valuation or the realization of future outcomes. This information asymmetry generates a valuation gap between buyer and seller, often complicating negotiations.

Such uncertainty can arise along several dimensions. It may stem from ambiguity surrounding the target's future financial performance, concerns about its current financial condition, changes in the regulatory landscape, or wider external factors affecting market stability. In this context, earnouts function as a contractual mechanism to address valuation challenges by reallocating risk and better aligning incentives between the transacting parties.

Table 5 below summarizes the key variables included in the empirical model.

Table 5 – Possible determinants of earnout materiality

#	Variables	Expected Relationship
1	Cross-Border	+
2	Cross-Industry	+
3	Private Target	+
4	Subsidiary Target	+
5	Toehold	-
6	High Intangibles	+
7	Quality of Regulatory Environment	+
8	Target Size	-
9	Target Heritage	-
10	Acquirer Heritage	-
11	Relative Size	+
12	Uncertainty	+

Cross-Border Transactions

H1: Earnout materiality is positively associated with cross-border M&A transactions.

Investing in a firm located in a country different from that of the acquiring company is, all else equal, more complex than undertaking a domestic acquisition. This additional complexity stems from several sources. The acquirer may have limited familiarity with the target country's institutional setting, prevailing business practices, and the role of the target's industry within the local economic context. Moreover, both current and prospective regulatory conditions can further complicate the transaction.

These factors can increase uncertainty in the valuation process, potentially widening the gap between the price expectations of buyers and sellers. Given its deeper understanding of local market conditions and regulatory constraints, the target firm typically enjoys an informational advantage over the acquirer. As documented in the literature, earnout arrangements are frequently employed in settings characterized by elevated information asymmetry to mitigate such discrepancies.

In the context of cross-border transactions, higher earnout materiality can therefore serve as a mechanism for the acquirer to manage the additional risks associated with geographic and institutional distance. By linking a larger portion of the consideration to post-acquisition performance, the acquirer effectively shares these risks with the better-informed party, while

simultaneously preserving the opportunity for the target's shareholders to benefit from superior future outcomes.

Cross-Industry Transactions

H2: Earnout materiality is positively associated with cross-industry M&A deals.

Cross-industry acquisitions are typically undertaken as a diversification strategy, allowing acquirers to enter new markets and broaden their product or service portfolio in order to enhance their competitive positioning. While such transactions may offer substantial strategic advantages, they are also associated with a higher degree of complexity.

Each industry has its own unique characteristics, operational practices, and market dynamics, which vary widely across sectors. Acquiring a company in a different industry presents substantial challenges, including understanding industry-specific trends, future prospects, and accurately incorporating these factors into a realistic valuation aligned with industry standards. Deep, specialized knowledge of the target industry is essential to confidently validate the assumptions underlying the acquisition and properly assess the company. However, in cross-industry transactions, acquirers frequently lack this level of expertise, whereas the target firm benefits from prolonged experience within its own industry.

This imbalance in industry-specific knowledge can give rise to pronounced information asymmetry between the parties. Accordingly, we posit that the elevated information asymmetry characterizing cross-industry transactions is associated with higher earnout materiality.

Private Targets

H3: Earnout materiality in M&A transactions is positively associated with the target company being a private company.

Access to accurate and comprehensive information is generally easier for publicly listed firms due to strict regulatory disclosure requirements. In contrast, private companies—particularly smaller ones—are subject to significantly lighter reporting obligations, which, although varying across countries, remain consistently less stringent. Consequently, acquirers must rely largely on due diligence to obtain detailed financial and operational information.

This setting creates substantial information asymmetry: the target's owners possess full knowledge of the firm's financial condition and business prospects, while the acquirer operates

with limited visibility. Valuing private firms is further complicated by the absence of a market price that could serve as a benchmark, often leading to valuation discrepancies between the parties.

To mitigate these challenges, acquisitions of private targets typically involve higher earnout materiality.

Subsidiary Targets

H4: Earnout materiality in M&A deals is positively associated with the target company being a subsidiary.

As seen, private targets are typically not bound by stringent disclosure regulations unless they fall under specific national laws or operate in regulated industries and the requirements for subsidiaries follow a similar trend. Depending on their size, sector, and the parent company's policies, subsidiaries may face particular reporting obligations. Notwithstanding these specific cases, acquirers of subsidiaries may still encounter similar challenges in gathering sufficient information, as is the case with private companies. Additionally, the valuation of a subsidiary, similar to that of a private company, can be difficult due to the absence of a market price to serve as a benchmark, frequently resulting in valuation gaps between buyer and seller. Consequently, we anticipate a positive relationship with earnout materiality.

Toehold

H5: Earnout materiality in M&A transactions is negatively associated with the presence of pre-acquisition minority shares held by the acquirer in the target company.

When the acquirer already holds a minority stake in the target, they are likely to have monitored the firm over time and developed a deeper understanding of its operational and financial aspects. Having had greater access to information and involvement in the company's activities, the acquirer faces lower uncertainty. Accordingly, consistent with the literature review, this reduced information asymmetry is associated with a negative relationship between earnout materiality and pre-acquisition minority ownership.

High Intangibles

H6: Earnout materiality in M&A deals is positively associated with target industries characterized by the presence of high intangible assets.

Industries such as *Technology, Telecommunications, Services* and *Healthcare & Pharma* are heavily characterized by intangible assets, including intellectual property (patents, copyrights, trademarks), customer relationships, technical know-how, and licenses. The non-physical nature of these assets makes them challenging to value accurately. Valuation often relies on subjective, assumption-driven methods, which are less reliable than cash-flow-based approaches, particularly because linking these assets directly to future cash flows is difficult.

This valuation uncertainty can significantly affect the overall assessment of the target, making earnout materiality generally higher in deals involving firms with substantial intangible assets.

Regulatory Environment

H7: Earnout materiality in M&A transactions is positively associated with the quality of the enforcement system in the country where the transaction takes place.

As noted by Viarengo, Gatti, and Prencipe (2018), the quality of a country's enforcement system influences earnout materiality due to litigation risk. In jurisdictions with weak legal protection, sellers may prefer lower earnout ratios, as pursuing contingent payments through litigation can be costly, lengthy, and uncertain. Conversely, a strong enforcement system offers greater legal protection, making higher earnout ratios more feasible.

Therefore, a high-quality enforcement system is expected to be positively associated with a higher earnout ratio.

Target Size

H8: Earnout materiality in M&A transactions is negatively associated with the size of the target company.

Smaller companies typically have less diversified revenue streams and a more limited financial history than larger firms. They often provide less publicly available information, receive limited coverage in reports and analyses, and face lighter disclosure requirements. In M&A transactions, this makes obtaining reliable financial and operational data more difficult,

increasing the likelihood of valuation gaps between buyer and seller. By contrast, larger firms usually enjoy stronger market positions, greater negotiating power, and more transparent information, reducing the uncertainty regarding future prospects.

Given the heightened uncertainty surrounding the valuation of smaller firms and the difficulties in gathering reliable information, we argue that earnout materiality is negatively related to the size of the target company.

Target Heritage

H9: Earnout materiality in M&A transactions is negatively associated with the years of activity of the target company.

Relatively new companies tend to be more difficult to be valued compared to established ones (Ragozzino and Reuer, 2009). Newly incorporated firms often have limited historical data, and past performance records may be unreliable or lack accountability (Hannan and Freeman, 1989), increasing uncertainty and the risk of disputes in M&A transactions. In contrast, long-established companies can draw on their historical performance and operational legacy, making valuation more straightforward and providing acquirers with greater confidence in future prospects.

In this context, high earnout materiality provides an effective mechanism to manage valuation uncertainty, resolving it over the earnout period as the company's performance becomes clearer.

Acquirer Heritage

H10: Earnout materiality in M&A transactions is negatively associated with the years of activity of the acquiring company.

Acquirers with a longer operational history have typically navigated multiple economic cycles, gaining experience that enhances decision-making and confidence in handling unforeseen challenges. This expertise also allows them to anticipate and manage post-acquisition issues more effectively. As a result, a long-standing heritage provides acquirers with greater confidence in their decision-making processes and a toolkit to face unforeseen future challenges. This increased confidence and experience reduces the need for high earnout materiality, as seasoned acquirers are better equipped to assess valuations and manage future risks.

Relative Size

H11: *Earnout materiality in M&A transactions is positively associated with the ratio total deal value to size of the acquiring company.*

As the ratio of total deal value to the size of the acquiring company increases, the transaction becomes increasingly material for the acquirer. In such cases, any unforeseen negative event occurring post-transaction is more challenging to absorb, given the relative size of the deal compared to the company itself. Accordingly, a higher deal-to-acquirer size ratio increases the acquirer's incentive to negotiate greater earnout materiality to mitigate potential risks.

Uncertainty

H11: *Earnout materiality in M&A transactions is positively associated with periods of increased uncertainty.*

Periods of heightened uncertainty are positively associated with higher earnout materiality, as earnouts represent an effective contractual mechanism for managing valuation risk when future performance is difficult to predict, which is precisely the case in such contexts.

Moreover, during volatile periods or economic crises, financing constraints tend to tighten and risk aversion increases. In this environment, earnouts help reduce immediate cash outlays, thereby making transactions more feasible.

When the target's future cash flows become harder to forecast and overall economic conditions are more uncertain, deferring a portion of the consideration contingent on the achievement of specific events allows parties to bridge valuation gaps and facilitate deal completion. This explains the forecasted positive relation.

7. Empirical Analysis

To test the hypotheses mentioned above, a multiple linear regression model estimated using ordinary least squares (OLS) was employed, with heteroskedasticity-robust standard errors, as we aim to understand the effects of various independent variables on our dependent variable and whether similar determinants are observed in both the European and North American samples. The specification largely mirrors the model used for the European analysis, with minor adjustments highlighted below to reflect differences in sample composition and geographic context. To conduct the analysis, we use Python.

7.1. The Model

The sample covers a 15-year period, over which a multiple linear regression model was estimated. Given the limited size of the sample, fixed effects were not included; instead, an alternative explanatory variable was introduced to account for this limitation. The regression consists in the following equation:

$$Earnout\_materiality_i = \beta_0 + \beta_1 Cross\_Border_i + \beta_2 Cross\_Industry_i + \beta_3 Target\_Private_i + \beta_4 Target\_Subsidiary_i + \beta_5 Toehold_i + \beta_6 High\_Int_i + \beta_7 Civil\_Law_i + \beta_8 Target\_Size_i + \beta_9 Target\_Heritage_i + \beta_{10} Acquirer\_Heritage_i + \beta_{11} Relative\_Size_i + \beta_{12} Uncertainty_i + \varepsilon_i$$

Where β_0 represents the intercept, ε_i the error term and:

- *Earnout_materiality*: natural logarithm of the ratio between earnout value and total deal value[6], indicating the percentage of the total price paid by the buyer in the form of a contingent payment.
- *Cross_Border*: dummy variable equals to 1 if the M&A deal involves a target company headquartered in a different country than the acquiring company and 0 otherwise.
- *Cross_Industry*: dummy variable equals to 1 if the M&A deal involves a target company operating in a different industry than the acquiring company and 0 otherwise.
- *Target_Private*: dummy variable equals to 1 if the M&A deal involves the acquisition of a private company and 0 otherwise.

[6] Total deal value represents the total consideration paid by the acquirer, including both upfront payments and earnout.

- *Target_Subsidiary*: dummy variable equals to 1 if the M&A deal involves the acquisition of a subsidiary and 0 otherwise.
- *Toehold*: dummy variable equals to 1 if the M&A deal involves the acquisition of a target in which the acquirer held a minority stake before the acquisition and 0 otherwise.
- *High_Int*: dummy variable equals to 1 if the M&A deal involves the acquisition of a company operating in an industry typically characterized by a high level of intangible assets, namely *Technology, Telecommunications*, *Services*, *Healthcare & Pharma* and 0 otherwise.
- *Civil_Law*: numerical variable representing the quality of the enforcement system in the country where the target company is headquartered.

  It is proxied using Factor 7 of the World Justice Project Rule of Law Index, which evaluates the effectiveness of civil justice systems in enabling dispute resolution. Specifically, the index assesses the accessibility and affordability of civil justice, the absence of discrimination, corruption, and improper influence by public authorities, as well as the timeliness of judicial processes and the enforcement of court rulings. In addition, it considers the availability, impartiality, and effectiveness of alternative dispute resolution mechanisms.

  In the European sample, a different proxy was employed to capture the same institutional dimension, following the methodology and empirical relevance documented by Viarengo, Gatti, and Prencipe (2018). Specifically, the analysis relied on the anti–self-dealing index developed by Djankov *et al.* (2008b), a country-level measure of investor protection constructed as the average of several components related to disclosure requirements, liability standards, and judicial access to evidence in investor-related litigation (Viarengo, Gatti, and Prencipe, 2018).

  In the North American sample, however, the use of this index would provide limited variation, as the dataset includes only the United States and Canada, resulting in largely homogeneous values across observations. By contrast, Factor 7 of the World Justice Project Rule of Law Index allows for temporal variation at the monthly level, enabling the capture of changes over time and generating meaningful cross-observation differences within the sample.
- *Target_Size*: numerical variable representing the size of the target company, measured as the natural logarithm of its total assets. The choice of total assets as a measure for the size of the acquirer follows the methodology used in the existent

literature by Barbopoulos, Danbolt, and Nechbaoui (2023) as well as Ragozzino and Reuer (2009).

- *Target_Heritage*: numerical variable representing the years of operation of the target company, calculated from its foundation date to the acquisition date.
- *Acquirer_Heritage*: numerical variable representing the years of operation of the acquiring company, calculated from its foundation date to the acquisition date.
- *Relative_Size*: A dummy variable equal to 1 if the ratio total deal value to the acquirer's size, measured in total assets, is higher than the median of the sample, 0 otherwise. This variable, which captures the relative size of the deal with respect to the acquirer size, is borrowed from Barbopoulos, Danbolt, and Nechbaoui (2023).
- *Uncertainty*: numerical variable representing the degree of uncertainty in the target country of incorporation in a specific month and year.

  It is based on one of the three components of the Economic Policy Uncertainty (EPU) Index, namely the newspaper-based measure, which quantifies the extent of media coverage related to economic policy uncertainty. Only this component is employed to ensure comparability across countries, as it represents the primary measure available outside the United States.

  For the United States, the newspaper-based component is an index of search results from 10 large newspapers[7]. These sources are used to create a normalized index reflecting the volume of articles addressing economic policy uncertainty.

For further statistical considerations and analysis please refer to the Appendix.

7.2. Results

We now proceed with the analysis of the results in the North American sample to understand what the main drivers of the earnout materiality in this region are (for further statistical considerations please refer to the Appendix).

From the analysis, two variables emerge as statistically significant in explaining the materiality of earnout: *Toehold* and *Target_Size*.

The coefficient of *Toehold* is positive and statistically significant, which is contrary to our initial expectations.

[7] USA Today, the Miami Herald, the Chicago Tribune, the Washington Post, the Los Angeles Times, the Boston Globe, the San Francisco Chronicle, the Dallas Morning News, the New York Times, and the Wall Street Journal.

One possible interpretation is that when the acquirer already holds a stake in the target prior to the acquisition, they have a more comprehensive understanding of the potential risks and uncertainties related to the target's future performance. In fact, they may have access to more detailed information and observe the target's operations more closely over time. This heightened awareness of the company's challenges can lead the acquirer to structure a larger earnout as a precautionary measure, effectively serving as a risk-mitigation mechanism. Furthermore, in the context of an acquisition, the transition from a minority to a majority shareholder position often amplifies the perceived exposure to these risks.

The coefficient of *Target_Size* is negative and statistically significant, which supports our hypothesis. Smaller targets are inherently more difficult to value, as previously noted. They generally exhibit less diversified revenue streams and possess a more limited financial history compared to larger firms. In addition, smaller targets often have less publicly available information, receive lower coverage in financial reports and industry analyses, and are subject to less stringent disclosure requirements, ceteris paribus. Consequently, target size is negatively associated with earnout materiality, reflecting the greater uncertainty surrounding the valuation of smaller firms and the inherent challenges in obtaining reliable information.

We now turn to a qualitative comparison across geographical regions to assess whether the drivers of earnout materiality are the same in Europe and North America.

The results obtained for the North American sample differ substantially from those for the European sample. In the European context, four variables - *Target_Size, Target_Heritage, Acquirer_Heritage,* and *Relative_Size* - emerge as statistically significant determinants of earnout materiality. In contrast, in the North American sample, Toehold is statistically significant, and the only variable that is significant in both regions is *Target_Size*.

The fact that *Toehold* is statistically significant only in the North American context may be linked to differences in disclosure requirements across regions, as discussed above. In particular, disclosure obligations for private firms in North America - especially in the United States - are relatively limited. As a result, holding a minority stake in the target may provide the acquirer with access to information that would otherwise be unavailable. This enhanced information access can increase the acquirer's awareness of firm-specific risks, thereby strengthening the incentive to rely on earnouts as a risk-mitigation mechanism and leading to higher earnout materiality.

Additionally, the fact that *Target_Heritage* and *Acquirer_Heritage* appear to be relevant determinants of earnout materiality only in the European sample may be linked to differences

in the broader economic environment and in risk tolerance across regions. North America - particularly the United States - is widely recognised as the cradle of startups and entrepreneurial activity, characterised by a significantly larger and more mature venture capital ecosystem. This environment supports innovation and rapid scaling, with substantial funding available throughout the firm life cycle, including at later stages. By contrast, although Europe exhibits a strong entrepreneurial spirit, funding gaps often constrain firm growth, resulting in higher likelihood of stagnation or early failure.

Within the North American context, the greater prevalence of entrepreneurial experience and serial founders may reduce the informational and risk-mitigating role typically associated with firm heritage. Both targets and acquirers are more likely to have prior exposure to high-growth, high-risk ventures, which may enable them to better anticipate and manage uncertainty regardless of the number of years a firm has been in operation. At the same time, the higher overall tolerance for risk that characterizes the North American market may reduce the importance of experience-based signals, such as corporate longevity, in shaping contractual structures.

This interpretation may also help explain why *Relative_Size* does not emerge as a significant driver of earnout materiality in the North American sample. In an environment where risk appetite is higher and transactions involving substantial relative deal size are more common, acquirers may be more willing to absorb potential post-acquisition uncertainty without relying heavily on earnouts as a protective mechanism.

These findings suggest that the drivers of earnout materiality are, at least in part, geography-specific, and that institutional, market, tax and deal-structural differences across regions may influence the role played by individual determinants.

8. Conclusion

8.1. Concluding Remarks

Earnout arrangements serve as effective contractual devices to address valuation gaps arising from information asymmetries and uncertainty about the target's future performance. They enable parties in M&A transactions to "agree to disagree" by structuring a two-part payment: an upfront payment, reflecting the portion they agree upon, and a deferred payment, contingent on the achievement of expected performance, which reflects the degree of disagreement. Since only sellers confident in the target's prospects are willing to accept such conditional payments, earnouts also function as a signaling mechanism.

Despite their advantages, earnouts also entail notable disadvantages. Their design can be complex and costly, particularly due to difficulties in defining and monitoring performance benchmarks, as well as issues related to moral hazard and counterparty risk, which may limit their attractiveness. Among these concerns, litigation risk represents a particularly relevant drawback, as emphasized by Viarengo, Gatti, and Prencipe (2018).

The aim of this study was to critically examine the key components of earnout clauses, assessing their advantages and disadvantages, while providing a comprehensive overview of the recent trends and existing literature.

Furthermore, the main goal of this work was to examine the main determinants of earnout materiality, defined as the ratio of the earnout component to total deal value. Despite the relevance of this dimension, it has received relatively limited attention in the existing literature and therefore we aim at bridging the gap.

Building on the previous Bocconi thesis, which investigated earnout materiality in the European market, this study extends the analysis to the North American context. This shift in geographical focus allows for the identification of the key drivers of earnout materiality in a different institutional and market setting, while also enabling a comparison with the European evidence. In doing so, the study assesses whether the determinants identified in Europe remain relevant in North America or whether meaningful differences emerge across regions. Overall, this comparative approach contributes to a broader and more comprehensive understanding of earnout materiality.

The study employs a dataset of 110 completed M&A transactions that include an earnout provision, all involving target companies headquartered in North America, and announced between January 1, 2010, and December 31, 2024.

To analyze the North American sample, we rely on a multivariate linear regression framework that includes both variables commonly examined in the literature and more recently proposed determinants. The model builds on the one employed in the Bocconi thesis and is adapted to reflect the different context and sample considered in this study.

The empirical results indicate that both the presence of a toehold and the size of the target firm are key determinants of earnout materiality. Specifically, the presence of a toehold is positively associated with earnout materiality, whereas target firm size exhibits a negative relationship.

When the acquirer already holds a stake in the target prior to the acquisition, they have a more comprehensive understanding of the potential risks and uncertainties related to the target's future performance leading to higher earnout materiality given the increased awareness. Additionally, the transition from a minority to a majority shareholder position often amplifies the perceived exposure to these risks leading to a positive relationship with earnout materiality.

Gathering reliable information for smaller target companies is relatively more challenging, as they are characterized by higher uncertainty surrounding their prospects (e.g. less diversified businesses, a less established position within the industry). Information asymmetry and valuation challenges drive the negative relation with earnout materiality.

When comparing these results with those obtained from the European sample, the picture changes significantly. In the European context, only *Target_Size*, *Target_Heritage*, *Acquirer_Heritage*, and *Relative_Size* emerge as statistically significant determinants of earnout materiality.

These differences may stem from the distinct startup and economic environments across regions. Indeed, the relevance of *Target_Heritage* and *Acquirer_Heritage* only in the European sample may reflect lower risk tolerance and a less developed venture capital ecosystem, where firm age and experience play a stronger role as risk-mitigating signals. In contrast, the higher risk tolerance and prevalence of entrepreneurial experience in North America may reduce the importance of firm heritage and help explain why *Relative_Size does* not emerge as a significant driver in this context. The common driver is only *Target_Size* as gathering reliable information for smaller target companies and evaluating them is likely equally challenging in both geographies.

Lastly, the fact that *Toehold* is statistically significant only in the North American context may be linked to lower disclosure requirements: holding a minority stake in the target provides the

acquirer with access to otherwise unavailable information, increasing awareness of firm-specific risks and, consequently, earnout materiality.

Overall, the findings highlight that valuation uncertainty, driven by toehold and target size, plays a critical role in determining earnout materiality in North America. In addition, differences in the institutional and economic context between Europe and North America lead to distinct drivers of earnout materiality, with the size of the target representing the only common determinant across the two regions.

8.2. Limitations and Future Research

Despite the effort in constructing our model, there are some limitations that should be acknowledged.

First, an important aspect concerns the sample size. Although the initial dataset was larger, the final analysis is based on 110 M&A transactions. Several observations had to be excluded due to the lack of available data for some of the variables included in the model. This issue mainly arises from the fact that most target firms involved in earnout transactions are private companies or subsidiaries, for which financial information is less available compared to publicly listed firms. Moreover, as discussed above, this limitation is further affected by the different disclosure requirements in North America and Europe, which also help explain the differences in sample size across the two regions.

Second, the analysis relies on proxy variables to capture certain characteristics of the target and the transaction, and alternative measures could potentially provide more accurate insights. In line with the existing literature, total assets are used as a proxy for firm size; however, other measures, such as market value or enterprise value, could also be considered. Similarly, relative deal size is captured through a dummy variable based on total assets as a proxy for acquirer size, while a continuous measure or alternative size metrics could be used instead. Future research could explore whether the use of different proxies affects the results. Finally, when comparing the two regional samples, it would have been preferable to maintain full consistency across proxies, particularly with respect to the *Civil_Law* / *Anti_Self*. However, given the data limitations discussed above, this was not possible. Future studies could apply this institutional variable (*Civil_Law*) also to the European sample to assess whether it changes the results.

Thirdly, some limitations also relate to the set of independent variables included in the analysis. Although a relatively broad range of variables is considered, it is possible that additional

relevant factors have not been captured. While our R^2 value is consistent with the existing literature, there remains room for improvement. Further research could investigate additional explanatory variables that may enhance the model's ability to explain the dependent variable.

More generally, future research should further develop this still underexplored stream of literature in order to provide deeper insights into the determinants of earnout materiality. In particular, examining interaction effects between independent variables could offer additional evidence. For instance, it would be interesting to assess whether *Cross_Border* and *Cross_Industr*y transactions interact in a way that significantly affects earnout materiality.

In addition, since valuation uncertainty emerges as one of the key drivers of earnout materiality, future studies could focus on identifying further target characteristics that contribute to this uncertainty. For example, analysing potential discontinuities - both positive and negative - in target EBITDA, revenues, or profit levels could help explain variations in earnout materiality. A key challenge in this respect remains data availability, which often results in relatively small samples and limits the robustness of empirical conclusions. A more extensive manual data collection process could represent a possible solution to expand the dataset.

Furthermore, previously studied variables for other research streams should be retested to assess their significance in explaining earnout size, while also verifying whether similar relationships hold true in other geographical regions. This cross-country comparison could provide a more comprehensive understanding of the determinants of earnout materiality in M&A transactions.

9. Appendix

9.1. Multicollinearity, Autocorrelation, Heteroskedasticity, Normal Distribution of the Residuals and R-Squared

Multicollinearity occurs when there is a strong correlation among independent variables, leading to redundancy in the information provided by the affected variables that makes it difficult to separately identify the influence of each variable. In cases of severe multicollinearity, the variance of the regression coefficients increases, leading to higher standard errors, wider confidence intervals, and lower t-statistics, ultimately making the model less reliable. As a preliminary diagnostic, the correlation matrix of the explanatory variables included in the model is examined to assess the correlation among independent variables.

Table 6 – Correlation matrix (without dummies for Fixed Effects)

	Cross_ Border	*Cross_ Industry*	*Target_ Private*	*Target_ Subsidiary*	*Toehold*	*Civil_ Law*	*High_Int*	*Target_ Size*	*Target_ Heritage*	*Acquirer_ Heritage*	*Relative_ Size*	*Uncer-tainty*
Cross_ Border	1	-0.024	-0.182	-0.062	0.203	0.135	0.043	0.187	0.208	-0.048	-0.157	-0.016
Cross_ Industry	-0.024	1	0.156	0.046	-0.111	-0.156	-0.171	-0.093	-0.153	-0.081	0.111	0.072
Target_ Private	-0.182	0.156	1	-0.380	-0.141	-0.059	0.008	-0.390	-0.202	-0.142	0.091	0.053
Target_ Subsidiary	-0.062	0.046	-0.380	1	-0.050	0.124	-0.200	-0.035	-0.052	0.200	0.084	-0.028
Toehold	0.203	-0.111	-0.141	-0.050	1	-0.054	0.101	-0.016	0.153	-0.058	0.000	-0.035
Civil_Law	0.135	-0.156	-0.059	0.124	-0.054	1	-0.094	-0.060	-0.121	-0.061	0.110	0.146
High_Int	0.043	-0.171	0.008	-0.200	0.101	-0.094	1	-0.101	-0.064	-0.216	0.057	-0.070
Target_ Size	0.187	-0.093	-0.390	-0.035	-0.016	-0.060	-0.101	1	0.264	0.268	-0.227	-0.002
Target_ Heritage	0.208	-0.153	-0.202	-0.052	0.153	-0.121	-0.064	0.264	1	0.135	-0.412	-0.204
Acquirer_ Heritage	-0.048	-0.081	-0.142	0.200	-0.058	-0.061	-0.216	0.268	0.135	1	-0.069	-0.113
Relative_ Size	-0.157	0.111	0.091	0.084	0.000	0.110	0.057	-0.227	-0.412	-0.069	1	0.110
Uncertainty	-0.016	0.072	0.053	-0.028	-0.035	0.146	-0.070	-0.002	-0.204	-0.113	0.110	1

A preliminary review does not indicate the presence of significant concerns. In contrast to the European sample, Target_Private and Target_Subsidiary do not exhibit an almost perfect negative correlation in this dataset (–0.948 in the European case). Consequently, both variables are retained in the regression analysis.

Among the tools commonly used to detect multicollinearity, the Variance Inflation Factor (VIF) is one of the most widely applied. In this study, the VIF is employed to evaluate the presence of multicollinearity among the independent variables. The VIF is calculated by performing a linear regression of each independent variable against all the other independent variables to obtain the R^2 from that regression. The VIF is then computed as:

$$VIF = \frac{1}{1 - R^2}$$

The general rule states that VIF values exceeding 10 indicate strong multicollinearity, while values between 5 and 10 require further assessment. From Table 8, we observe that none of the variables exceed the critical thresholds, suggesting that multicollinearity is not a concern.

Table 7 – VIF results for the regression

Variable	VIF
Cross_Border	1.189
Cross_Industry	1.167
Target_Private	1.594
Toehold	1.409
Civil_Law	1.122
High_Int	1.183
Target_Size	1.171
Target_Heritage	1.449
Acquirer_Heritage	1.395
Relative_Size	1.214
Uncertainty	1.090

Moving now to the second point, we assess homoskedasticity. OLS assumes homoskedasticity, meaning that the variance of the error term remains constant across all values of the independent variables. When this assumption is violated, heteroskedasticity occurs, meaning that the variance of the error term is not constant across different levels of a regressor. This leads to inefficient standard errors, which in turn affect hypothesis testing by producing unreliable significance tests and inaccurate confidence intervals.

To assess the presence of heteroskedasticity, White's test is applied, as it is capable of detecting both linear and non-linear forms. A low p-value indicates a rejection of the null hypothesis of homoskedasticity.

With a p-value of 0.722 from White's test, we fail to reject the null hypothesis of homoskedasticity. Nonetheless, we use heteroskedasticity-robust standard errors (specifically

HC0 in Python) as a precaution, since they provide reliable inference even in the presence of potential heteroskedasticity.

Examining the last potential issue, we assess autocorrelation, which occurs when error terms are not independent but instead exhibit correlation among them. To test for autocorrelation, we use:

- The Durbin-Watson test to assess first-order autocorrelation (correlation between consecutive residuals),
- And the Breusch-Godfrey test to detect higher-order autocorrelation (correlation beyond the first lag).

The Durbin-Watson statistic indicates that values around 2 suggest no autocorrelation, values below 2 indicate positive autocorrelation, and values above 2 indicate negative autocorrelation. With a Durbin-Watson statistic of 1.935, we find no evidence of first-order autocorrelation.

For the Breusch-Godfrey test, the null hypothesis states that there is no autocorrelation. Given a p-value of 0.869, which is higher than 5%, we can't reject the null hypothesis.

We now assess the OLS assumption of normally distributed residuals. If this assumption is violated, hypothesis tests based on t-statistics may become unreliable in small samples, leading to inaccurate p-values and confidence intervals. To evaluate the distribution of residuals, we use the Jarque-Bera (JB) test, which examines two key characteristics: skewness (symmetry of the distribution) and kurtosis (tailedness of the distribution).

Since the JB test statistic is 15.554 with a p-value close to zero, we reject the null hypothesis of normality. By the Central Limit Theorem (CLT), when the number of observations is sufficiently large, the assumption of normality becomes less critical (examination of the Q-Q plot of the residuals indicates minor deviations from normality in the tails).

Lastly we look at the F-test and R-squared.

Examining the F-test, which evaluates whether at least one of the independent variables has a significant effect on the dependent variable (i.e., whether the overall model is statistically significant), we reject the null hypothesis (H_0) that all regression coefficients are equal to zero, given the p-value of 4.45e-20.

The R-squared, which measures how well the independent variables explain the variation in the dependent variable, is 20.6%. Although this value may appear relatively low in absolute terms,

its materiality is consistent with findings in the corporate finance literature, where similar levels of explanatory power are common. The adjusted R-squared, which accounts for the number of predictors in the model, is lower at 10.8%.

9.2. Results – Additional Considerations

Table 8 - Regression coefficients and significance[8] of the regression run with Year and Target Industry Fixed Effect

Variable	Exp. sign	Coefficient	Std. Error	t-Statistic	P-Value	Significance	[0.025	0.975]
const		1.801	1.834	0.982	0.329		-1.839	5.441
Cross_Border	+	0.158	0.176	0.901	0.370		-0.190	0.507
Cross_Industry	+	0.044	0.164	0.269	0.788		-0.281	0.369
Target_Private	+	-0.043	0.184	-0.231	0.818		-0.408	0.323
Target_Subsidiary	+	-0.363	0.304	-1.196	0.235		-0.966	0.240
Toehold	-	0.850	0.186	4.562	0.000	***	0.480	1.220
Civil_Law	+	-3.225	2.853	-1.130	0.261		-8.887	2.437
High_Int	+	0.210	0.172	1.223	0.224		-0.131	0.550
Target_Size	-	-0.133	0.050	-2.666	0.009	***	-0.232	-0.034
Target_Heritage	-	0.001	0.003	0.371	0.712		-0.005	0.007
Acquirer_Heritage	-	-0.001	0.005	-0.127	0.899		-0.011	0.010
Relative_Size	+	0.194	0.148	1.308	0.194		-0.100	0.488
Uncertainty	+	0.000	0.001	-0.354	0.724		-0.002	0.002

Among the coefficients that are not statistically significant, *Cross_Border, Cross_Industry, High_Int, Relative_Size*, and *Uncertainty* display positive signs, while *Acquirer_Heritage* exhibits a negative sign. Although these signs are consistent with our hypotheses and with prior literature, the lack of statistical significance prevents strong inferences.

Lastly, four variables - *Target_Private, Target_Subsidiary, Civil_Law*, and *Target_Heritage* - are also not statistically significant but display signs opposite to those predicted; the lack of statistical significance prevents strong inferences.

[8] *** 1% significance.

9.3. AI Disclosure

In line with SSE guidelines, artificial intelligence was used as a support tool during both the coding and the writing phases of this thesis. The only artificial intelligence tool used was ChatGPT.

For the coding part, ChatGPT was used primarily for debugging when more complex errors arose and for suggesting alternative python syntax aimed at simplifying certain specific procedures. The main benefits of this support were linked to the data management part of the code, through a reduction in debugging time and the exploration of alternative graphical representations of the data. However, ChatGPT proved less effective in debugging or simplifying the statistical parts of the code. For this reason, any AI suggestions related to statistical code snippets were carefully verified and corrected when necessary.

With respect to the writing process, ChatGPT was used as an advanced support tool for proofreading, including the identification of typos and unclear sentences, beyond what the Microsoft Word grammar checker offers. While this assistance was useful in highlighting potential issues in the text, some suggested revisions occasionally altered the intended meaning or reduced the emphasis on key points. Consequently, in both coding and writing, ChatGPT outputs were used as inspiration and/or warning signal, whilst its outputs were never incorporated directly without independent verification and revision.

10. References

Airborne Health, Inc. v. Squid Soap, LP (C.A. No. 4410-VCL, Del. Ch., 23 November 2009). <https://courts.delaware.gov/opinions/download.aspx?ID=130230>
[Latest access: 08/01/2026]

Allee, K.D., Hamm, S.J., and Wangerin, D.D. (2011). *Have accounting standards affected deal structures in mergers and acquisitions? Evidence from earnouts.* Technical report. Working paper. Michigan State University.

Allee, K.D. and Wangerin, D.D. (2018). "Auditor monitoring and verification in financial contracts: evidence from earnouts and SFAS 141(R)". *Review of Accounting Studies*, 23(4): 1629-1664.

Barbopoulos, L.G. and 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. and Danbolt, J. (2021). "The real effects of earnout contracts in M&As". *Journal of Financial Research*, 44(3): 607-639.

Barbopoulos, L.G., Danbolt, J., and Nechbaoui, S. (2023). *M&A and financial constraints: an assessment of the choice of earnout structure.* European Financial Management Association 2023 annual meeting.

Barbopoulos, L.G., Molyneux, P., and Wilson, J.O. (2016). "Earnout financing in the financial services industry". *International Review of Financial Analysis*, 47: 119-132.

Barbopoulos, L.G., Prencipe, A., and Viarengo, L. (2024). *Earnout agreements: Dealing with uncertainty in M&A*. Working Paper. The University of Edinburgh, Bocconi University, Università Cattolica del Sacro Cuore.

Barbopoulos, L.G. and Sudarsanam, S. (2012). "Determinants of earnout as acquisition payment currency and bidder's value gains". *Journal of Banking & Finance*, 36(3): 678-694.

Bates, T.W., Neyland, J.B., and Wang, Y.Y. (2018). "Financing acquisitions with earnouts". *Journal of Accounting and Economics*, 66(2): 374-395.

Battauz, A., Gatti, S., Prencipe, A., and Viarengo, L. (2021). "Earnouts: The real value of disagreement in mergers and acquisitions". *European Financial Management*, 27(5): 981-1024.

Beuselinck, C., Elfers, F., Gassen, and J. and Pierk, j. (2023). "Private firm accounting: the European reporting environment, data and research perspectives". *Accounting and Business Research*, 53(1): 38-82.

Bianchi, M. (2021). "M&A – Le clausole di earn-out nei contratti di acquisizione societaria – SPA – Sale and Purchase Agreement". *Contratti Internazionali*, April.
<https://contrattiinternazionalidimarcobianchi.it/ma-le-clausole-di-earn-out-nei-contratti-di-acquisizione-societaria-spa-sale-and-purchase-agreement/>
[Latest access: 08/01/2026]

Bojilova, E.D., Liebman, H. M, and Sonnie, M. W. (2012). "Public Disclosure Requirements for Private Companies: U.S. vs. Europe", Jones Day, 24th of October.
<https://www.jonesday.com/en/insights/2012/10/public-disclosure-requirements-for-private-companies-us-vs-europe?utm_source=chatgpt.com>
[Latest access: 08/01/2026]

Broughton, K. (2024). “Companies Turn to Earnouts to Find Common Ground on M&A Valuations”, CFO Journal, 26th of June. <https://www.wsj.com/articles/companies-turn-to-earnouts-to-find-common-ground-on-m-a-valuations-146bf2c9>
[Latest access: 08/01/2026]

Bruner, R. (2001). *Technical note on structuring and valuing incentive payments in M&A: earnouts and other contingent payments to the seller*. Darden Case UVA-F-1322-S.

Cadman, B., Carrizosa, R., and Faurel, L. (2014). “Economic determinants and information environment effects of earnouts: New insights from SFAS 141(R)”. *Journal of Accounting Research*, 52 (1): 37-74.

Cain, M.D., Denis, D.J., and Denis, D.K. (2011). “Earnouts: a study of financial contracting in acquisition agreements”. *Journal of Accounting and Economics*, 51(1): 151-170.

Caselli, S., Gatti, S., and Visconti, M. (2006). “Managing M&A risk with collars, earn-outs, and CVRs”. *Journal of Applied Corporate Finance*. 18(4): 91-104.

Dahlen, N. (2024). “Earnouts in mergers and acquisitions: A systematic literature review of a contingent payment mechanism”. *Management Review Quarterly*, 1-40.

Datar, S., Frankel, R., and Wolfson, M. (2001). “Earnouts: The effects of adverse selection and agency costs on acquisition techniques”. *Journal of Law, Economics, and Organization*. 17(1): 201-238.

Djankov, S., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A. (2008b). “The law and economics of self-dealing”. *Journal of Financial Economics*. 88(3): 430-465.

Hannan, M.T. and Freeman, J.H. (1989). *Organizational Ecology*. Cambridge, MA: Harvard University Press.

Hu, J.J., Kupiec, J., Zutshi, R., Steen, C.G., and Hamilton LLP (2024). “Delaware Court of Chancery finds buyer failed to use commercially reasonable efforts in pharma milestone payment case*”. Harvard Law School Forum on Corporate Governance*, 17th of September. <https://corpgov.law.harvard.edu/2024/09/17/delaware-court-of-chancery-finds-buyer-failed-to-use-commercially-reasonable-efforts-in-pharma-milestone-payment-case/>
[Latest access: 08/01/2026]

Jansen, M. (2020). “Resolving information asymmetry through contractual risk sharing: the case of private firm acquisitions.” *Journal of Accounting Research*, 58(5):1203-1248.

Kohers, N. and Ang, J. (2000). “Earnouts in mergers: Agreeing to disagree and agreeing to stay”. *The Journal of Business,* 73(3): 445-476.

Lukas, E., Reuer, J. J., and Welling, A. (2012). "Earnouts in mergers and acquisitions: A game-theoretic option pricing approach*". European Journal of Operational Research,* 223(1): 256-263.

McGlashan, C. (2025). “European PE buyers lean into earnouts amid tariff impact uncertainty”, PE Hub, 15th of May.
<https://www.pehub.com/european-pe-buyers-lean-into-earnouts-amid-tariff-impact-uncertainty/>
[Latest access: 08/01/2026]

McMillin, C., Phelps, T., and George, R. (2025). "M&A in 2024 and Trends for 2025". *Morrison Foerster*, 9th of January.
<https://www.mofo.com/resources/insights/250109-m-a-in-2024-and-trends-for-2025>
[Latest access: 08/01/2026]

Myers, S. and Majluf, N. (1984). "Corporate Financing and Investment Decisions when Firms Have Information that Investors Do Not Have". *Journal of Financial Economics*, 13(2): 187-221.

Mosca, C. and Picciau, C. (2023). "How EU and U.S. Disclosure Requirements Differ While Sharing the Same Goals", Columbia Law School, 23rd of May.
<https://clsbluesky.law.columbia.edu/2023/05/23/how-eu-and-u-s-disclosure-requirements-differ-while-sharing-the-same-goals/>
[Latest access: 08/01/2026]

Ragozzino, R. and Reuer, J.J. (2009). "Contingent earnouts in acquisitions of privately held targets". *Journal of Management*, 35(4):857-879.

Reuer, J.J., Shenkar, O., and Ragozzino, R. (2004). "Mitigating risk in international mergers and acquisitions: the role of contingent payouts". *Journal of International Business Studies*, 35(1):19–32.

Shareholder Representative Services LLC v. Alexion Pharmaceuticals, Inc. (C.A. No. 2020-1069-MTZ, Del. Ch., 5 September 2024).
<https://courts.delaware.gov/Opinions/Download.aspx?id=369130l>
[Latest access: 08/01/2026]

Song, D., Su, J., Yang, C., and Shen, N. (2019). “Performance commitment in acquisitions, regulatory change and market crash risk-evidence from China”. *Pacific-Basin Finance Journal,* 57: 101052.

SRS Acquiom Inc. (2025). “2025 M&A Deal Terms Study: An analysis of deal terms in private-target M&A transactions that closed between 2019–2024*”*
< https://www.srsacquiom.com/our-insights/deal-terms-study/>
[Latest access: 08/01/2026]

United States Department of Labor. <https://www.osha.gov/data/sic-manual>
[Latest access: 08/01/2026]

Tao, Q., Liu, M., Hu, S., and Zhang, Y. (2022). “Is a promise a promise? Analyzing performance commitment in acquisitions and target firm performance”. *The European Journal of Finance*, 28(4-5): 487-513.

The Appraisal Foundation. <https://appraisalfoundation.org/imis>
[Latest access: 08/01/2026]

U.S. FOOD & DRUG ADMINISTRATION. <https://www.fda.gov/drugs/development-approval-process-drugs>
[Latest access: 08/01/2026]

Viarengo, L., Gatti, S. and Prencipe, A. (2018). “Enforcement quality and the use of earnouts in M&A transactions: International evidence”. *Journal of Business Finance & Accounting, 45(3-4)*: 437-481.

Welch, M. (1999). “Ilex Pays Stock For Convergence, Raises $20M In Private Placement”. *BioWorld*, 20th of July. <https://www.bioworld.com/articles/481105>
[Latest access: 08/01/2026]

BOCCONI UNIVERSITY
Department of Finance
Master's thesis in Finance
April 2024

Key Determinants of the Materiality of Earnout Agreements: an Empirical Study

Margherita Bonelli (42694)

Abstract

Earnout agreements play a crucial role in Mergers and Acquisitions (M&A) transactions, bridging valuation gaps caused by information asymmetry and uncertainty surrounding the target's value. These agreements usually link a portion of the acquisition consideration to the economic and financial performance of the target company. Their inclusion has become increasingly common due to the advantages they offer. However, they also present challenges, particularly in the measurement of benchmark parameters.

This study examines earnouts by analyzing their advantages, limitations, accounting treatments, valuation methodologies, the impact of Covid-19, and recent trends in their use. The primary objective is to analyze the determinants of earnout materiality, defined as the ratio of earnout value to total deal value. We focus on this specific aspect as it has received relatively less attention in the existent literature. Using a European sample of completed M&A transactions involving earnouts announced between January 1, 2010, and December 31, 2024, we test several hypotheses on earnout materiality through a multivariate regression analysis. We focus on Europe because this region has been relatively underexplored in literature. The results indicate that earnout materiality is negatively associated with the size of the target, the heritage of both the target and acquirer, and the relative size of the deal compared to the acquirer size. Smaller target companies tend to be associated with higher earnout materiality due to increased valuation uncertainty driven by less predictable prospects and limited data availability. Similarly, recently established target companies often lack detailed historical performance records, further increasing valuation risk. This dynamic explains the negative relationship between target heritage and earnout materiality. Additionally, acquirers with extensive operational history accumulate experience that helps them manage unforeseen post-acquisition challenges more effectively and reinforces their confidence in their valuation capabilities. This explains the negative relationship between the acquirer heritage and earnout materiality. Finally, M&A transactions in which the total deal value relative to the acquirer size is higher often involve larger target companies. These firms are usually easier to value, possess greater bargaining power, and can negotiate higher upfront payments, thereby reducing the materiality of earnouts.

Keywords: Earnout agreements, Earnout materiality, M&A, Contingent consideration

Author: Margherita Bonelli (42694)
Tutor: Eugenio Morpurgo, CEO and Founding Partner, Fineurop; Associate Professor, Department of Finance, Bocconi University

Master Thesis
MSc Program in Finance
Bocconi University

Table of Contents

1. Introduction

An earnout agreement is "an arrangement under which a portion of the purchase price in an acquisition is contingent on the achievement of financial or other performance targets after the deal closes" (Bruner, 2001, page 1).

This mechanism enables the parties involved in Merger and Acquisition (M&A) transactions to bridge valuation gaps and reduce information asymmetry. Indeed, the contingent payment reflects the degree of disagreement between the parties, while the upfront payment represents the agreed-upon value at the time of the transaction. Additionally, earnout agreements serve also as a signaling tool, mitigating adverse selection.

Information asymmetry arises when the amount and quality of information available to the acquirer are lower than those available to the seller. In this context, the inclusion of an earnout clause can serve as a solution to mitigate overpricing risk and as a signal of target quality. Indeed, only sellers who truly believe in the future performance of their company are likely to accept contingent payments, therefore reducing uncertainty for the buyer.

Additionally, earnouts can be used to retain the target management. Furthermore, earnouts can also facilitate the financing process, as they allow the acquirer to postpone part of the payment, in this way delaying the need for financing on that portion.

However, earnouts can be difficult to structure and costly, primarily due to the challenges associated with selecting an appropriate benchmark parameter and ensuring its accurate measurement. In this context, litigation risk is a critical concern, as earnouts may become a mechanism to defer today’s disagreements into future legal disputes. Additionally, moral hazard concerns may arise, as the acquirer could strategically reduce post-acquisition efforts to avoid meeting the earnout conditions, thereby preventing the contingent payment from being triggered.

The primary aim of this study is to investigate the key determinants of earnout materiality, defined as the ratio of earnout value to total deal value. This specific topic is the focus of the research because it remains underexplored in the existing literature and therefore presents a valuable opportunity for further analysis. Additionally, this work highlights the main advantages and disadvantages of earnouts, the key components to consider when structuring an earnout agreement, and recent trends in earnouts. Moreover, after providing an in-depth review of the existing literature, particularly the research stream related to earnout materiality, the study examines the accounting treatment and the valuation techniques relevant to the earnouts.

Finally, a statistical model is developed to test the hypotheses formulated on earnout materiality.

The paper will be structured as follows. Chapter 2 provides an overview of earnout agreements, examining their key objectives, associated risks, and main components. Chapter 3 reviews the existing literature on earnouts, positioning the research on earnout materiality within the broader academic discussion and then focusing specifically on this aspect. Chapter 4 discusses the impact of the COVID-19 pandemic on earnouts and explores current trends. Chapter 5 covers the accounting treatment of earnouts, analyzing the implications of IFRS 3(R) and SFAS 141(R) introduction. Chapter 6 focuses on the valuation techniques of earnouts, focusing on scenario-based methods and option pricing models, and also provides practical examples. Chapter 7 presents the sample used for statistical analysis, provides the descriptive statistics and highlights the criteria applied in constructing the dataset. Chapter 8 introduces the research question and outlines the hypotheses to be empirically tested. Chapter 9 describes the regression model, discusses the methodological challenges and mitigation strategies, and compares the results with the existing literature. Lastly, Chapter 10 draws the conclusions of the study.

2. Overview of Earnout Agreements

Earnouts are contractual agreements that belong to the category of "price adjustment" clauses, as they link a portion of the acquisition consideration to specific events tied to the economic and financial performance of the target company.

Consequently, the acquisition takes the form of a two-part payment structure: an initial upfront payment made at the time of the merger and a deferred contingent payment, conditional on the target achieving certain measurable performance objectives agreed upon beforehand. The latter payment, known as earnout, addresses several challenges by linking the final consideration to the future performance of the target.

On the one hand, it bridges the valuation gap arising from differing expectations regarding the target future performance between the seller and the acquirer.
On the other hand, since the contingent payment depends on the target future performance, it incentivizes the target management to remain involved and to enhance the company's performance.

Therefore, as investigated by Datar, Frankel, and Wolfson (2001), earnout clauses mitigate two primary issues in M&A: adverse selection and valuation risk.

Indeed, the seller typically has more information about the target company's future prospects than the buyer and this information asymmetry can lead to challenges during negotiations. However, by accepting a contingent payment, the seller signals confidence in the target future performance, effectively demonstrating the quality of the asset being sold. Additionally, the less knowledgeable party (the buyer) benefits from the contingent nature of the earnout payment by transferring a portion of the business risk to the seller and reducing the risk of overpaying. Furthermore, when the seller remains involved in the target management, the earnout mechanism aligns the seller's incentives with the buyer's objective of maximizing performance outcomes.

In conclusion, the greater the uncertainty around the target fair value, the greater the likelihood of using an earnout clause. Hence, the probability of introducing such a clause is closely tied to the uncertainty surrounding the target value determinants, primarily the target future expected performance as a standalone entity (Caselli, Gatti, and Visconti, 2006).

2.1. Key Objectives: "Agreeing to Disagree" and "Agreeing to Stay"

The main functions of earnouts can be effectively summarized using the words of Kohers and Ang (2000): "Agreeing to disagree" and "Agreeing to stay".

Firstly, earnouts address the issue of asymmetric information, mitigating valuation risk in M&A transactions by allowing the parties to disagree on the target value while still reaching an agreement. In cases of significant valuation uncertainty, the bidder and the seller may struggle to find common ground regarding the target true value. Under these circumstances, high-upfront cash payments or stock transactions are often not the best solutions. This is because the bidder, as the less informed party, bears the risk of overvaluation, while the seller, having more precise information, may be unable to realize the full value of the target due to the bidder's skepticism.

A two-part payment structure reduces this conflict by enabling the parties to "agree to disagree", thereby facilitating the transaction. Indeed, the upfront payment reflects the portion of the value upon which both parties agree, while the deferred earnout payment is tied to the degree of disagreement. In this way, the earnout acts as a risk-reduction mechanism, allowing the acquirer to hedge against the risk of overpaying (Kohers and Ang, 2000). The bidder only pays upfront for the value she/he is confident in, significantly reducing the risk of misvaluation. Simultaneously, the seller retains the opportunity to realize the full value of the target, contingent on achieving the expected performance.

Furthermore, an earnout functions as a signaling mechanism or self-selection tool, mitigating adverse selection. Only sellers who genuinely believe in the future performance of their company are likely to accept contingent payments, thereby signaling the quality of the target to the buyer (Myers and Majluf, 1984).

Secondly, earnouts can be used to retain the management of the target by structuring the deferred payment in such a way that part or all of the merger premium serves as a deferred bonus. This is crucial as the human capital component, particularly in industries like *Healthcare & Pharma*, is a significant part of the target value and is factored into the valuation. Retaining the management team and aligning their incentives with those of the buyer ensures that they will put maximum effort into achieving the expected results. (Kohers and Ang, 2000).

Therefore, earnouts serve as a dual-purpose self-selection mechanism, addressing both asymmetric information and moral hazard problems through signaling and incentive alignment (Caselli, Gatti, and Visconti, 2006).

Lastly, earnouts can contribute to facilitating the financing strategy by enabling the acquirer to defer a portion of the payment. This mechanism allows the acquiring firm to postpone the immediate need for external financing on that specific amount.

2.2. Challenges and Risks of Earnout Clauses

As discussed, earnouts offer several advantages; however, they also have some drawbacks.

Firstly, depending on the specific details of the transaction, earnouts can be costly and complex to structure.

Additionally, their use may be discouraged by challenges related to the measurement of the benchmark parameter chosen. In most cases, the benchmark parameters are based on accounting figures, which can be subject to manipulation or measurement discretion, potentially reducing the final payment (Viarengo, Gatti, and Prencipe, 2018).

Secondly, the possibility of moral hazard represents a significant limitation. Indeed, the acquirer may intentionally reduce their efforts to optimize the target potential performance, just enough to avoid triggering the conditions for the deferred payment without drastically impacting the company's overall results. Moreover, if the target management remains involved post-acquisition, the presence of a short-term earnout may incentivize them to prioritize the target short-term performance to secure the contingent payment, potentially at the expense of its long-term health.

Thirdly, earnout benchmark parameters typically focus on the target performance as a standalone entity. This can create challenges when integrating such clauses into a merger agreement designed to achieve synergies between the two companies as it may result in misaligned incentives depending on the interests of the management team, whether it is the original target team or a completely new one.

Of paramount importance is also the risk of litigation (i.e. the possibility of future lawsuits arising in connection with these contracts), as highlighted by Viarengo, Gatti, and Prencipe (2018). For instance, in the court case following the acquisition of Squid Soap's assets by Airborne, the earnout mechanism reduced the initial disagreements over the valuation by linking additional payments to the target future performance.

However, as observed in this case, "value is frequently debatable and the causes of underperformance equally so; an earnout often converts today's disagreement over price into

tomorrow's litigation over the outcome" (Delaware Chancery Court, 2009, page 5)[1]. Moreover, counterparty risk, the possibility of the bidder defaulting before the earnout period expires, is also an important concern.

Hence, the feasibility of drafting and enforcing an earnout agreement is a critical consideration when evaluating their use in M&A transactions.

2.3. Main Components of Earnout Agreements

Earnout agreements are the result of detailed negotiations between the parties and are specifically designed to fit the unique requirements of the specific transaction. As a result, each earnout agreement possesses unique characteristics and can differ substantially from others. Despite this inherent variability, certain fundamental components can be commonly found in these agreements. Building on the framework proposed by Battauz *et al.* (2021), six distinct features can be identified.

2.3.1. The Benchmark Parameter

The benchmark parameter represents the reference used to evaluate the conditions required to activate the earnout payment. An effective benchmark capable of fulfilling its purpose should be clearly identifiable, measurable with precision in order to minimize the risk of legal disputes, and able to capture the uncertainty that caused disagreement between the parties.

There are several types of benchmarks, depending on the specific characteristics of the transaction. Broadly speaking, they can be linked either to performance indicators or to the realization of specific events, the latter often referred to as "cash-or-nothing."

For the first category, the parameters employed typically include measures of profitability (e.g. Cash Flow, EBITDA, EBIT, Gross Profit, Net Income) or measures of Sales. In particular, Sales can be a suitable benchmark for transactions where disagreements are linked to the target ability to expand its activities in new markets (Battauz *et al.*, 2021). While this parameter may create misaligned incentives by focusing excessively on the top-line growth at the expense of profitability, it offers clear advantages: it is straightforward to compute and it is less inclined to earnings management compared to other metrics. Indeed, accounting measures like Net Income

[1] *Airborne Health, Inc. v. Squid Soap, LP* (C.A. No. 4410-VCL, Del. Ch., 23 November 2009). Airborne acquired Squid Soap's assets in 2007 with US$1 million in cash at closing and an earnout up to US$26.5million.

can be artificially inflated or deflated using accounting techniques. However, they remain valuable as they effectively capture the profitability of the target (Battauz *et al.*, 2021).

Cain, Denis, and Denis (2011) found that approximately 88% of earnout clauses in their sample rely on financial performance indicators (i.e. the first category just discussed) and only a minority used non-financial measures.

In the second category, earnouts are linked to the realization of specific events, with payment contingent on their occurrence. These are particularly suitable for cases where, as in the acquisition of Convergence Pharmaceuticals by ILEX Oncology Inc.[2], the uncertainty revolves around product development milestones (e.g. obtaining a patent, completing clinical trials, or receiving FDA approval[3]). Given these characteristics, this type of benchmark is commonly employed in the acquisition of pharmaceutical or high-tech companies.

An interesting variation of the two categories discussed above is the so-called "reverse earnout" or "clawback", which involves a reduction in the purchase price if the target fails to meet predefined economic or commercial objectives during the earnout period.

2.3.2. The Length of the Earnout Period

The earnout period represents the time interval over which the benchmark parameter is assessed. Negotiations on the duration of the earnout period can be particularly challenging because of the conflicting interests of the parties. Consequently, the length of the earnout period varies significantly across transactions. According to Cain, Denis, and Denis (2011), the average duration of an earnout is 2.57 years, with a range spanning from about one month to 20 years.

The effect of time on the value of the earnout depends on the net impact of two opposing forces. On the one hand, given the optionality structure of earnouts, a longer horizon increases the value of the contract (positive effect). On the other hand, an extended time horizon raises the probability of the bidder defaulting (negative effect) (Battauz *et al.*, 2021).

[2] In 1999, Ilex Oncology Inc. acquired Convergence Pharmaceuticals Inc., a company specialized in angiogenesis and DNA repair inhibitors. As part of the agreement, Convergence Pharmaceuticals Inc. is entitled to approximately $10 million worth of acquiror's common stock, with an additional $1 million contingent upon the advancement of two compounds to the clinical stage.

[3] The Food and Drug Administration (FDA) is a division of the United States Federal Government that enforces regulations to safeguard public health.

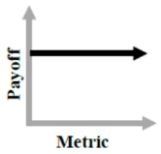
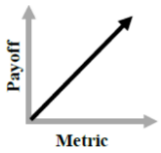
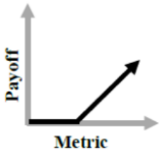
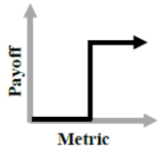
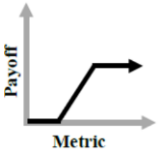
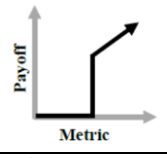
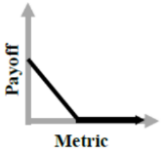
2.3.3. Amount and Limits to the Payments

This section refers to the relationship between the benchmark parameter and the contingent payment. Indeed, the contingent payment can be structured in various ways, reflecting the significant discretion granted to the parties.

In some cases, it may be calculated as a multiple of the difference between the realized value of the benchmark parameter and a pre-established threshold. In other instances, no contingent payment is made unless a minimum threshold (floor) is met, resulting in a payoff structure analogous to that of a binary option (Battauz *et al.*, 2021). Moreover, the maximum potential payout is frequently constrained by the inclusion of a cap. Broadly speaking, we can differentiate between linear payoff structures, where the contingent consideration is a fixed percentage of the underlying metric, and non-linear payoffs, where the payment is determined by a more complex, non-linear function of the underlying metric (e.g. caps, floors, or varying rates of payment per unit of improved performance).

Table 1 below summarizes the most common payoff structures for earnouts.

Table 1 - Earnouts payoff structure - Common examples

Constant (Debt-like) *Linear payoff involving a fixed deferred payment*	
Linear *Linear structure involving a payment equal to a fixed percentage of the outcome of the underlying metric*	
Excess above a threshold (Call option) *Non-linear structure with a payment equal to a percentage of the excess of the underlying metric above a threshold*	
Milestone (Digital / Binary option) *Non-linear payoff where the payment is contingent upon achieving a specific milestone or performance threshold*	
Excess above a threshold with a cap (Capped call option) *Non-linear payoff with a capped payment equal to a percentage of the excess of the underlying metric above a threshold*	
Percentage of total above a threshold (Asset-or-nothing Call option) *Non-linear structure where the payment is a percentage of the underlying metric only if the threshold is reached*	
Clawback (Put option) *Non-linear payoff where the payment is a percentage of the shortfall of the underlying metric below a threshold*	

***Source**: The Appraisal Foundation (2019)*

2.3.4. Earnouts with Multiple Objectives

It refers to the performance objective defined in the contract. Typically, only a single objective is established; however, in some cases, we can see that multiple objectives are specified.

2.3.5. Payment Methods

The most common means of payment for earnouts is cash, in line with the objective of addressing information asymmetry. In some cases, stocks could be chosen as the payment method. However, this approach can introduce issues related to asymmetric information regarding the stock's value, potentially undermining the effectiveness of these instruments (Battauz *et al.,* 2021).

2.3.6. Materiality of the Earnout

Also known as earnout size, the materiality of the earnout is typically measured as the ratio of the earnout value to the total deal value. The total deal value represents the full consideration paid by the acquirer, including both the upfront payments and the earnout. This specific feature is the primary focus of this work.

3. Literature Review

The literature review regarding earnouts is fragmented, composed of a scattered landscape that investigates different aspects of the subject with varying degrees of depth. Broadly speaking, it is possible to identify three main streams of research: determinants of earnouts use, implications of earnout use, and earnout structure.

In a recent study by Dahlen (2024), which analyzes 64 papers published between 1970 and 2023, it is highlighted that 77% of these papers use empirical methods, while 9% employ a mixed methodology. Additionally, he finds that research on earnouts focuses primarily on North America (27% of the total) and China (25% of the total), while studies concerning Europe account for only 11% of the papers analyzed.

The stream with the largest number of publications is the one investigating the implications of earnouts (46% of the total), followed by the stream focusing on the determinants of earnouts use (35% of the total). Therefore, we have chosen to focus on the remaining one, the least investigated accounting for only 19% of the total, as it provides an interesting opportunity.

It is now provided an overview of each of the three streams, with the main focus on the latter, which is the area this work aims to contribute to. It is important to highlight that, depending on the sample selection for testing, contradictory results can emerge. Consequently, aside from certain specific determinants, the question remains open.

3.1. Research stream 1: Determinants of earnout use

Two of the most fundamental contributions to the literature on earnouts are the ones of Kohers and Ang (2000) and Datar, Frankel, and Wolfson (2001), both grounding their analyses on the idea that M&A transactions are affected by information asymmetries, which result in diverging valuations among parties.

Coherently with this idea, the greater the information asymmetry, the higher the likelihood of using earnouts (Kohers and Ang, 2000). Expanding on their work, other authors have identified various sources of uncertainty linked to four areas: target determinants, acquirer determinants, transaction determinants, and macroeconomic and regulatory factors.

Among target determinants, it has been found that if the target public status is private, the chances of using an earnout are greater due to the higher information asymmetry in such cases.

Following the same reasoning, if the target operates in a sector with high R&D intensity and growth momentum (Datar, Frankel, and Wolfson, 2001; Cadman, Carrizosa, and Faurel, 2014) or in an industry rich in intangible assets, the likelihood of using an earnout is higher. Additionally, earnout clauses are more likely to be used in deals involving subsidiary targets (Kohers and Ang, 2000).

Other studies suggest a negative relationship between the use of earnouts and the target asset-to-sales ratio (Jansen, 2020), as well as with the target years of operation (Ragozzino and Reuer, 2009).

When examining the determinants on the acquirer's side, it has been noted that the likelihood of employing earnout clauses increases when the acquirer lacks prior acquisition experience (Reuer, Shenkar, and Ragozzino, 2004) or when its size (measured in terms of market value or total assets) is relatively small (Barbopoulos and Sudarsanam, 2012). A few studies, expanding on the early work of Kohers and Ang (2000), suggest that the retention of management after the acquisition is also positively correlated with the presence of earnouts, making these clauses a useful tool for retaining human capital.

Additionally, very recent studies indicate that financially constrained acquirers are more likely to use earnouts (Bates, Neyland, and Wang, 2018; Barbopoulos, Danbolt, and Nechbaoui, 2023); however, the results on this aspect are not unanimous (Ragozzino and Reuer, 2009). Finally, earnouts are also more likely to be employed by public buyers (Jansen, 2020).

Regarding the transaction determinants, the majority of studies find that cross-industry deals are more likely to include earnout clauses (Kohers and Ang, 2000). Other research highlights that the likelihood of earnouts increases in cross-border transactions but results are not unanimous. Moreover, the presence of a toehold (i.e. pre-acquisition minority shares held by the acquirer in the target) reduces the likelihood of earnout use (Viarengo, Gatti, and Prencipe, 2018).

For what concerns macroeconomic and regulatory determinants, Bates, Neyland, and Wang (2018) highlight that proxies for strained economic circumstances are positively linked to the use of earnouts. Similarly, Viarengo, Gatti, and Prencipe (2018) find a positive relationship between the employment of earnouts and the quality of enforcement.

In investigating the effect of changes to accounting standards, Allee, Hamm, and Wangerin (2011) discover that public acquirers are less likely to use earnouts following the implementation of SFAS 141(R).

All the findings of the above-described streams are consistent with the function of earnouts as a risk-mitigation tool. At the root of the risk inherent in the transaction usually lies the information asymmetry involved: therefore, private targets active in high-intangible industries increase the likelihood of earnouts.

3.2. Research stream 2: Implications of earnouts

In this extensively explored stream, two broad groups can be identified: the capital market's external reaction and firms' internal response to earnout deals (Dahlen, 2024).

Regarding the capital market's external reaction, key areas of focus include short- and long-term abnormal returns and takeover premia. Various studies support the idea that earnout deals yield short-term positive abnormal returns (Kohers and Ang, 2000).

In contrast, the field of long-term abnormal returns has received less attention. Research on Anglo-Saxon markets indicated better long-term performance of earnout transactions (Barbopoulos, Molyneux, and Wilson, 2016). Moreover, studies on the Chinese market have revealed a negative relationship between long-term abnormal returns and both regulatory changes in the Chinese capital market and the moral hazard of top management (Song *et al.*, 2019). Additionally, various studies suggest that takeover premiums are higher in earnout deals. Barbopoulos and Adra (2016) highlight that relatively larger earnouts and longer earnout periods are associated with higher takeover premia compared to comparable non-earnout deals, as the target owners are compensated for sharing post-acquisition risk with the acquirer.

Regarding firms' internal response to earnout deals, Kohers and Ang (2020) demonstrate that earnout deals generate higher returns when target management is retained. On the other hand, evidence from the Chinese market indicates that such deals can also trigger negative behaviors, including earnings management during the earnout period (Tao *et al.*, 2022).

The results above highlight that, while earnouts contribute to positive short-term, long-term abnormal returns and higher takeover premia, they also introduce potential risks, such as incentivizing earnings management.

3.3. Research stream 3: Earnout structure

Earnout materiality (or earnout size) is typically measured as the ratio of earnout value to total deal value. There appears to be a positive relationship between earnout materiality and the level of valuation uncertainty.

Indeed, as highlighted by Cain, Denis, and Denis (2011), earnout materiality tends to be higher when the target company is a private firm, as M&A transactions involving private targets generally are characterized by greater information asymmetry. Similarly, according to Kohers and Ang (2000), earnout materiality is positively associated with targets operating in intangible-rich industries, where valuation is inherently more challenging. Conversely, earnout materiality tends to be lower in M&A transactions where the acquirer and target operate within the same industry, as industry familiarity reduces valuation uncertainty.

Cain, Denis, and Denis (2011) highlight a positive relationship between earnout materiality and factors such as target industry daily return volatility, target industry R&D intensity, and target industry Tobin's Q[4].

Additionally, they identify a negative relationship between the relative size of the transaction to the acquirer (ratio total deal value to acquirer market value) and earnout materiality, suggesting that larger deals relative to the acquirer's market value tend to involve lower earnout materiality.

However, Kohers and Ang (2000) report the opposite relationship: as the relative size of the transaction increases[5], earnout materiality also increases. Their findings suggest that, since the cost of valuation errors rises with the target relative size, risk-averse bidders seek to mitigate misvaluation risks by structuring deals with higher earnout materiality.

In the context of accounting standard changes, it has been shown that the earnout ratio increased following the introduction of SFAS 141(R) (Barbopoulos and Danbolt, 2021); however, this effect remains unclear (Allee, Hamm, and Wangerin, 2011). Moreover, Allee and Wangerin (2018) highlight a positive relation between earnout materiality and high-quality auditor involvement.

[4] Tobin's Q is defined as the ratio of market value of a firm (calculated as book value of total assets less book value of equity plus market value of equity) to the book value of its total assets.
[5] Total transaction value divided by acquirer's market value plus total transaction value.

Viarengo, Gatti, and Prencipe (2018) analyze the impact of enforcement quality on the materiality of earnouts and find a positive association, particularly for the anti-self-dealing index[6], the PCA index[7], and the creditor protection index[8].

A recently studied dimension is the financial situation of both target and acquirer: according to Barbopoulos, Danbolt, and Nechbaoui (2023), the more financially constrained the acquirer or target, the higher the materiality of the earnout.

Regarding the length of the earnout period, it has been shown that a higher R&D ratio for the target industry is positively correlated with longer earnout durations (Cain, Denis, and Denis, 2011).

With respect to the performance benchmark, Cain, Denis, and Denis (2011) highlight that in target industries with high standard deviation of returns, sales-based performance measures are the most commonly used. Conversely, non-financial metrics are more prevalent when the target and acquirer operate in the same industry and when the industry is characterized by a high Tobin's Q.

When it comes to the literature regarding valuation approaches, there is a general consensus among scholars that earnouts possess option-like features, making option pricing methods particularly suitable for their valuation (Caselli, Gatti, and Visconti, 2006). Early studies primarily employed Monte Carlo simulations applied to a case studies (Dahlen, 2024), simulating various potential future payoff scenarios and combining them to estimate the expected outcome. In 2012, Lukas, Reuer and Welling developed a model in which cash flows follow an arithmetic Brownian motion. They discovered that earnout associated costs increase substantially when there is significant uncertainty regarding the target firm's future value.

Battauz *et al.* (2021), on the other hand, developed a model that accounts for two risk factors previously overlooked: counterparty risk, referring to the possibility of the bidder defaulting before the earnout period expires, and litigation risk, which pertains to the possibility of disputes arising in connection with these contracts.

[6] This index is constructed based on a questionnaire distributed to attorneys from Lex Mundi, an association of international law firms with members in 108 countries, and it measures the extent to which minority shareholders are protected against expropriation by corporate insiders.
[7] The PCA index is designed to exhibit a strong correlation with both the Rule of Law Index, which reflects aspects such as the perceived quality of regulation, and the anti-self-dealing index.
[8] Developed by the World Bank, it measures the effectiveness of the legal systems to protect the rights of creditors.

As previously mentioned, this last stream of research remains the least investigated and therefore it offers a valuable opportunity for further research. This is precisely the aim of this work and the reason for focusing on this specific area.

4. Earnouts in M&A: Covid-19 Pandemic and Current Topics

Barbopoulos, Prencipe, and Viarengo (2024), analyzing a U.S. sample, found that earnouts are more frequently used during periods of economic uncertainty. This trend was particularly evident during the Covid-19 pandemic, where the ratio of deals involving earnouts to all M&A deals rose to 23%, compared to 10.6% in other years. This suggests that earnouts are a valuable tool to mitigate the negative effects of uncertainty, whether linked to the broader economy or specific events like Covid-19.

However, when considering the materiality of earnouts, while a positive relationship generally exists between periods of higher economic uncertainty and the materiality of earnouts, this pattern did not hold during the Covid-19 years. Barbopoulos, Prencipe, and Viarengo (2024) argue that the pandemic represented a uniquely uncontrollable source of uncertainty, leading sellers to limit their exposure to the risks of a prolonged economic downturn.

Earnouts have become increasingly important in recent years thanks to their ability to bridge valuation gaps between parties. However, as previously mentioned, they can also become a way to resolve today's disagreements only to lead to litigation in the future. Indeed, the rise of earnouts in recent years has been accompanied by a surge in court opinions addressing disputes related to them. This highlights the growing importance of carefully crafting earnout agreements to minimize the risk of litigation. Additionally, recent Delaware court decisions have tended to rule against buyers, although Delaware courts have historically shown a judicial trend favoring buyers. Below is an example of a recent court decision that reflects these trends.

The increasing importance of properly crafting the earnout contract and the litigation risk

In 2018, Alexion Pharmaceuticals acquired Syntimmune, a clinical-stage biotechnology company, for an upfront payment of $400 million, with the potential for additional milestone-dependent payments of up to $800 million. The agreement required Alexion to use "commercially reasonable efforts"[9] for seven years to achieve the contractual milestones. However, Alexion, later acquired by another company, shifted its focus to other initiatives aimed at launching new products. These programs were prioritized over Syntimmune's products, which, despite promising initial results, encountered development challenges (e.g. pause due to the covid-19 pandemic).

[9] "Using such efforts and resources typically used by biopharmaceutical companies similar in size and scope to [Alexion] for the development and commercialization of similar products at similar development stages taking into account" (*Shareholder Representative Services LLC v. Alexion Pharmaceuticals, Inc.* (C.A. No. 2020-1069-MTZ, Del. Ch., 5 September 2024), page 38).

In 2024, the court ruled in favor of Syntimmune, concluding that the buyer failed to use commercially reasonable efforts to achieve the contractual milestones. The buyer and seller had agreed to an “outward-facing” standard, as opposed to an “inward-facing” one. Consequently, rather than evaluating the buyer’s actions against their decisions in developing other products pre-acquisition, the court assessed Alexion’s efforts by comparing them to those of a 'hypothetical company' of similar size and circumstances. The court found that Alexion had terminated the Syntimmune’s product development to prioritize the synergies promised by its acquiring company - an idiosyncratic corporate objective that a comparable “hypothetical company” would not have pursued. As a result, the court ruled in favor of Syntimmune.

5. Accounting treatment for Earnouts

The accounting treatment of earnouts is particularly important as it influences strategic decisions. Given its critical relevance, this topic has been revised with the implementation of IFRS 3(R) (revised in 2008) and SFAS 141(R) (now codified as ASC 805).

Prior to IFRS 3 (2008), only earnouts deemed to be both "probable" and "reliably measurable" were recognized, with subsequent changes in value adjusted against goodwill. However, as a result of this rule, very rarely earnouts were recognized at the acquisition date (Ferguson, Hu, and Lam, 2023).

In 2008, the revised IFRS 3 (R) significantly altered the accounting treatment for earnouts. To enhance transparency and provide more detailed information, IFRS 3 (R) requires acquirers to recognize earnouts at the acquisition date, either as a liability or as equity based on the definition provided by IAS 32 (PwC 2017). Generally, earnout payments are recognized as liabilities when they are in the form of cash, a variable number of shares, or a combination of both (most common case). In contrast, an earnout is categorized as equity at fair value when the contingent payment is settled with a fixed number of shares (Ferguson, Hu, and Lam, 2023).

Earnouts classified as liabilities are subsequently remeasured, with fair value changes recognized as operating gains or losses. Conversely, equity-classified earnouts are not reassessed, and their settlement is directly reflected in equity.

Concerns about this new approach primarily revolve around the reliability of its measurement, given the removal of the “probable” and “reliably measurable” criteria, as well as the potential distortion effects of earnout remeasurements on acquirers’ earnings post-acquisition.

In the United States, prior to the introduction of SFAS 141(R), earnouts were recognized only “if and when the conditions for the payment of the earnout were satisfied” (Barbopoulos and Danbolt, 2021, page 7). However, following the introduction of SFAS 141(R), earnouts must now be recognized at fair value as of the deal closing date.

Liability-classified earnouts are subsequently subject to periodic adjustments at each reporting date until the contingencies are settled, with these adjustments recorded as gains or losses on the buyer's income statement. On the other hand, settlement differences for equity-classified earnouts are accounted for within equity as the contingencies are resolved. According to Cadman, Carrizosa, and Faurel (2014), only about 3% of earnout provisions in their sample fall into this latter category. Earnouts are classified as liabilities when payments are in the form of cash, transfers of other assets, and/or equity payments settled with a variable number of shares.

Conversely, they are recorded as equity when payments are in the form of equity payments settled with a fixed number of shares (Cadman, Carrizosa, and Faurel, 2014).

Hence, similarly both in Europe and the United States, the objective of this revised accounting standard is to improve the monitoring of earnout payments, enhance accountability, increase transparency, and reduce opportunistic manipulation or overly optimistic performance targets (Barbopoulos and Danbolt, 2021).

6. Valuation Techniques for Earnouts

According to The Appraisal Foundation[10] (2019), three main approaches are commonly employed to calculate the fair value of earnouts: the Market Approach, the Cost Approach, and the Income Approach.

The Market Approach relies on market transactions involving comparable assets or liabilities, using observed ranges of market value multiples tied to key financial metrics. However, in the context of earnouts, due to the judgment required in selecting appropriate ranges, the absence of an active trading market, the intrinsic complexity of earnouts, and the inability of this method to account for future expectations, it is rarely utilized in practice.

The Cost Approach determines the fair value of an earnout based on the current replacement cost, which represents the amount required to replace the service capacity of an asset at a given time. However, this approach is also seldom used in practice due to the challenges in estimating the replacement cost of contingent consideration and its inability to incorporate future expectations.

The Income Approach is based on the present value of future expected cash flows, considering market expectations and associated risks. It is the primary method employed in calculating the fair value of earnouts, as it effectively incorporates future expectations. Key elements of this approach include the expected contingent consideration cash flows, the probability distribution surrounding them, the discount rate, and the required metric risk premium.

Two widely used methods within the Income Approach are the Scenario-Based Method and the Option Pricing Method. In conjunction with these, Monte Carlo simulations can also be employed.

6.1. Scenario-Based Method

The Scenario-Based Method (SBM) can be broadly summarized in two steps.

Firstly, for each period relevant to the earnout, it is necessary to calculate the expected payoff as the probability-weighted average of the possible earnout payoffs across the various scenarios

[10] The Appraisal Foundation (TAF) is one of the United States' leading authorities on the valuation profession, setting congressionally authorized standards for real estate appraisers and providing voluntary guidance for valuation professionals across various sectors.

in that specific period and their respective probabilities. Secondly, to determine the expected present value of the contingent consideration, the expected payoff calculated in the previous step must be discounted.

The discount factor employed should incorporate the following elements (The Appraisal Foundation, 2019):

- The time value of money, typically represented by the risk-free rate.
- Counterparty credit risk, which reflects the risk that, at the time the payment is due, the buyer may not be able to fulfill the obligation.
- Required Metric Risk Premium (RMRP), which accounts for exposure to systematic risk and any additional risk premiums (e.g., size premiums) associated with the metric over the relevant timeframe (The Appraisal Foundation, 2019). Simplified, the Required Metric Risk Premium can be calculated as:

$$RMRP = \beta_{Equity} \, x \, MRP + AP_{Metric}$$

  - RMPRP= Required Metric Risk Premium for the metric of the earnout.
  - $ß_{Equity}$ = The beta of the metric.
  - MRP = The Market Risk Premium.
  - AP_{Metric}= The portion of additional risk premiums linked to the earnout metric (i.e. country risk premium and company-specific premiums).
- Contingent consideration structure's effect on risk, if the structure is non-linear.

This method is well-suited if the risk of the underlying metric is diversifiable (i.e. milestone event metrics such as the completion of a software integration project before a deadline) and/or if there is a linear payoff structure (i.e. a percentage of revenues).

The use of Monte Carlo simulation is particularly useful when earnout payoff structures span multiple periods and exhibit path-dependent features or involve multiple, interdependent metrics. In this approach, each Monte Carlo simulation iteration generates values for each earnout metric, drawn from the assumed distribution for each period of the earnout. The earnout payoffs calculated based on the simulated metrics are then discounted to their present value using a rate that accounts for the risk associated with the payoffs. The estimated value of the earnout is finally determined as the average present value of the simulated earnout payoffs across all iterations (The Appraisal Foundation, 2019).

Example of the SBM applied to a Linear Payoff Structure with a Financial Metric (The Appraisal Foundation, 2019)

Company Gamma (Acquirer) will need to pay 40% of Beta (Target)'s EBITDA earned over the following one-year period. It is assumed that the probability of the EBITDA being negative is *de minimis*. The payment is due three months after the end of the year. It is assumed that the management estimates future revenues as follows:

- Low scenario: €1,000 with probability 35%
- Base scenario: €2,000 with probability 50%
- High scenario: €3,000 with probability 15%

The RMRP of Beta's EBITDA is 9%, and the risk-free rate for the timeframe of the earnout payment is 1% (making the discount rate applicable to future EBITDA 10%). The credit spread of Gamma is 5.0%, assumed constant for simplicity. All rates are per annum and continuously compounded.

Solution

Given the linearity of the contingent consideration payoff function, the SBM is a suitable method for this situation. Hence, we employ SBM. Due to the linearity of the function, the earnout consideration carries the same risk as the metric, and consequently, the discount rate applicable to future EBITDA is also applicable to the contingent consideration payoff, ignoring counterparty credit risk.

First, it is necessary to compute the expected earnout payoff:

Scenarios	EBITDA (a)	Earnout Payoff (b) = 40% × (a)	Probability of each scenario (c)	Probability Weighted Earnout Payoff (d) = (b) × (c)
Low	€1,000.0	€400.0	35%	€140.0
Base	€2,000.0	€800.0	50%	€400.0
High	€3,000.0	€1,200.0	15%	€180.0
Total			100%	€720.0

Second, it is now time to discount the expected payoff.

The EBITDA is an accounting metric earned over the course of a full year, and its present value is calculated as of the mid-point of the year. However, since the payment is due three months

after the year-end (and it is not paid on average at mid-year), it is effectively payable 1.25 years after the valuation date. Therefore, the present value of the earnout cash flow accounts for:

i) EBITDA risk discount factor: exp(-10%×0.5)

ii) The time value of money for the 0.75 additional year (1.25-0.5) from mid-period to payment date: exp(-1%×0.75)

iii) Credit Spread for Gamma for the 1.25 years: exp(-5.0%×1.25)

€638.6 = €720 x (i)× (ii) × (iii)

Example of the SBM applied to Diversifiable Non-financial Milestone (The Appraisal Foundation, 2019)

Company Gamma (the Acquirer) is obligated to pay €5,000 to Beta (the Target) if the drug currently under development by Beta receives regulatory approval within one year from the acquisition date. The payment is scheduled to be made three months after the end of this one-year period.

The risk-free rate is 1% per annum (continuously compounded) and the credit spread of Gamma is 5% per annum (continuously compounded), assumed constant for simplicity.

Solution

The assumptions made by Gamma's management are summarized in the table below:

Scenarios	Amount (a)	Probability of each scenario (b)	Probability Weighted Earnout Payoff (c) = (a) × (b)
Approval Received	€5,000.0	50%	€2,500
Approval Not Received	0	50%	0
Total		100%	€2,500

Given the diversifiable metric (no systematic risk affects the payoff function) the discount rate can be computed as risk-free rate plus an adjustment for the credit risk of Gamma. Hence:

€2,319.4 = €2,500 x exp(-(5.0% + 1%) x1.25)

6.2. Option Pricing Method

The Option Pricing Method is best suited for computing the value of earnouts characterized by a non-linear payoff structure and involving a metric or event with non-diversifiable risk (The Appraisal Foundation, 2019). As highlighted by The Appraisal Foundation (2019), this methodology uses a risk-neutral framework. Broadly speaking, the metric forecast is adjusted for risk, and subsequently the expected earnout payoff is calculated based on the risk-neutral distribution of the metric, which is typically assumed to be lognormal. Finally, the expected earnout payoff is discounted using the risk-free rate, with an additional adjustment to account for counterparty credit risk.

As discussed in the literature review, earnouts resemble options on the target company's fair value. For instance, if the payoff structure is like "*Excess above a threshold with a cap*" (Table 1), it is as if the owners of the target hold a long position in a European call option on their company's value plus a short position against the buyer, on a European call with a strike price higher than the one on which they hold a long position (Caselli, Gatti, and Visconti, 2006). Beyond this higher strike price, all excess value generated post-transaction belongs to the buyer. If the payoff of the earnout allows, an option pricing method that can be used is the Black-Scholes model that provides an analytical solution for determining the price of the option.

However, if the payoff is path-dependent or relies on multiple interdependent metrics, it is appropriate to employ a Monte Carlo simulation.

Generally, the higher the volatility of the underlying asset of an option, the higher the value of the contract. Similarly, the value also rises if the option has a longer tenor, as there are more opportunities for it to expire in the money. Following this logic, the target owners will seek to extend the earnout period as much as possible, while the acquirer will aim to shorten it (Caselli, Gatti, and Visconti, 2006).

Example of the Black-Scholes-Merton Call Option Formula (Threshold Structure / Call Option) (The Appraisal Foundation, 2019)

Gamma (Buyer) will need to pay 40% of the excess Beta (Target)'s EBITDA above €5,000 over the following one-year period. The payment is due 3 months after the end of the year. Beta's forecasted EBITDA is €5,000 and its volatility is 50%, the discount rate for the future EBITDA is 10%, the risk free is 1%, RMRP is 9% and Gamma's credit spread is 5%.

Solution

The earnout payoff structure can be replicated by taking a long position on a call option with a strike price of €5,000. Consequently, by using the OPM, it is possible to perform the valuation in a risk-neutral environment, effectively capturing the impact of the nonlinear payoff structure on the discount rate.

Call Option = $S_0 \times N(d_1) - K \times N(d_2) \times e^{-rT}$ *(formula adapted to t=0)* [*]

$d_1 = (\ln(S_0/K) + (r+0.5\sigma^2) \times T) / \sigma\sqrt{T}$ *(formula adapted to t=0)*

$d_2 = d_1 - \sigma\sqrt{T}$ *(formula adapted to t=0)*

where N(.) is a standard normal cumulative distribution function, K is the strike price, σ is the volatility of the underlying, S_0 is the present value of the underlying, r is the T-year risk-free rate, T is the term of the option.

(i) Expected present value of EBITDA: 5,000 × exp(-10% × 0.5)= €4,756.15

(ii) Exp. future value of EBITDA (risk-neutral): (i) x exp(1% × 0.5)= €4,779.99

(iii) Equivalent RMRP-adjusted forecast: 5,000 x exp(-9% × 0.5)= €4,779.99

(iv) Expected future earnout cash flow (risk-neutral):
40% x [*] x exp(1% × 0.5)= €232.67, where [*] has the following inputs:
S_0 = (i); K = 5,000; r = 1%; σ = 50%; Term = 0.5

(v) Discount factor for credit risk and time value:
exp(-(5%+1%) × 1.25)=0.9277

(vi) Value of Earnout: (iv) x (v) = € 215.85

7. Data and Statistical Analysis

The study examines M&A financial transactions announced between January 1, 2010, and December 31, 2024, that include earnout clauses, specifically transactions where the earnout value is greater than zero. This 15-year timeframe was selected in alignment with the methodology employed by Barbopoulos, Danbolt, and Nechbaoui (2023). All data utilized in this analysis were extracted from SDC Platinum through LSEG Workspace (formerly Refinitiv Workspace).

For inclusion in the sample, transactions were required to meet specific criteria: they must have been completed[11], and the target company must be headquartered in Europe[12]. The decision to focus on Europe is driven by the observation, as discussed in the literature review, that this region remains relatively underexplored in the context of earnout agreements. By narrowing the geographical scope to Europe, this study aims to address this gap and contribute to a more comprehensive understanding of earnout materiality in M&A transactions.

Additionally, only transactions classified as mergers or acquisitions, in which the acquirer attained majority control of the target (i.e. an increase in ownership from less than 30% to more than 50%), were included. This criterion was implemented to exclude transactions involving residual or partial interests, concentrating exclusively on those that signify a change of control from seller to acquirer.

Transactions such as spin-offs, buybacks, leveraged buyouts, repurchases, and recapitalizations were excluded from the dataset as well as transactions lacking essential data to the analysis.

The initial raw sample extracted from the database consists of 2,627 observations. After applying the selection criteria outlined above, the final sample used in this study comprises 503 observations.

Table 2 below presents the main descriptive statistics of the variables analyzed, with a particular focus on earnout materiality and its key components.

[11] The last download was done on the 13th of January 2025.
[12] The United Kingdom is also included in the sample.

Table 2 - Descriptive statistics of earnout value, total deal value and earnout materiality

USD mln, %	*Cumulative*	*Mean*	*Median*	*Maximum*	*Minimum*
Earnout value	12,964.5	25.8	4.2	1,249.8	0.1
Total deal value	59,335.5	118.0	15.8	7,373.1	0.1
Earnout materiality	21.8%	31.4%	27.1%	100.0%	1.1%

As highlighted in Table 3, the number of deals employing earnout clauses has increased in recent years. Following 2014, a non-linear increase in the number of such deals is observed, with a peak in 2022. This peak coincides with a record high of nearly 58,000 M&A transactions recorded globally in the same year (Dahlen, 2024). This positive trend aligns with the growing attention dedicated to the subject in academic literature. In this context, the data from our sample provides additional confirmation of this pattern, supporting the increasing relevance of earnout clauses in M&A transactions.

It is worth noting that the relatively low number of earnout deals observed in 2019 may still be consistent with existing findings, which suggest a positive relationship between periods of economic uncertainty and the use of earnouts (Barbopoulos, Prencipe, and Viarengo, 2024). This apparent discrepancy arises because the present analysis considers earnout deals in absolute terms (i.e. the total number of transactions including earnout clauses), whereas the literature typically examines them in relative terms (i.e. the proportion of earnout deals to total M&A transactions).

Table 3 - Historical trend and distribution of earn-out deals in the European sample analyzed: annual breakdown from 2010 to 2024 YTD (Year-To-Date)

Ann. Date	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024 YTD*	*Tot.*
# Deal	**13**	**6**	**11**	**19**	**18**	**35**	**27**	**33**	**33**	**28**	**52**	**70**	**78**	**49**	**31**	**503**
% Tot.	*3%*	*1%*	*2%*	*4%*	*4%*	*7%*	*5%*	*7%*	*7%*	*6%*	*10%*	*14%*	*16%*	*10%*	*6%*	*100 %*

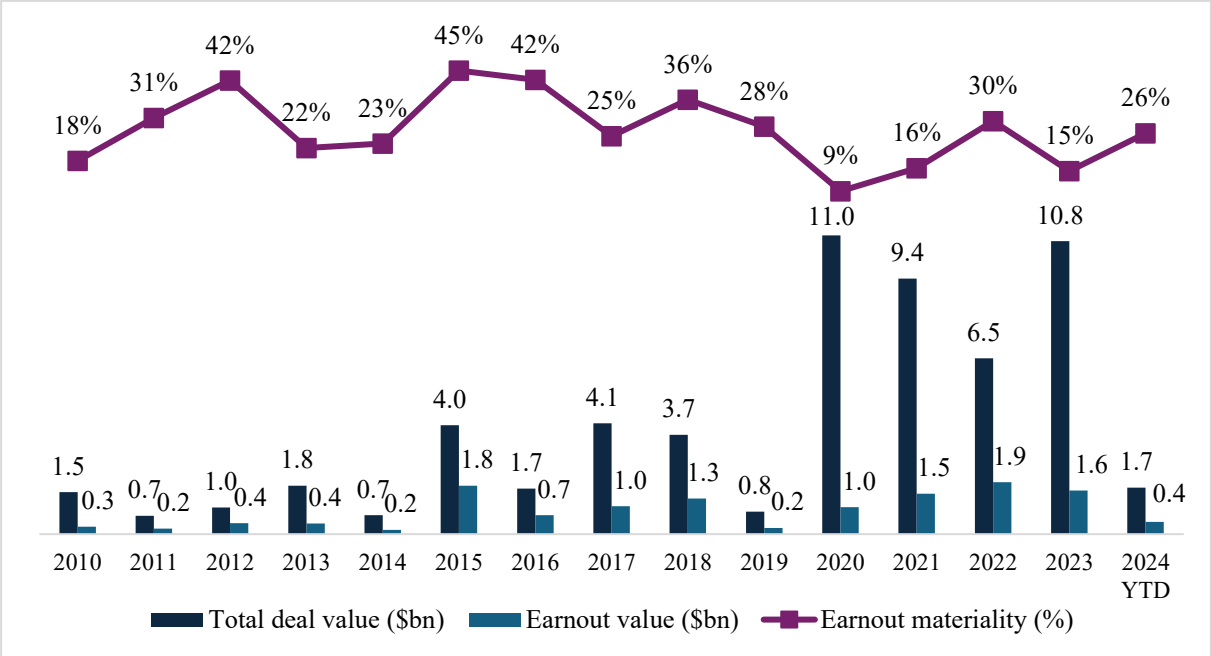
Analyzing the historical trend of earnout materiality (Graph 1), it becomes evident that it does not follow a straightforward linear pattern, whether positive or negative. After peaking at 45% in 2015, it dropped sharply to 9% in 2020 before reaching 26% in 2024 YTD. To better understand this dynamic, it is necessary to examine the two components of this ratio. The

earnout value, which serves as the numerator, has generally increased over time in a non-linear fashion, aligning with the broader trend of earnouts becoming more prevalent in M&A transactions. However, a notable decline can be observed in 2019.

A similar pattern emerges for the total deal value, the denominator of the ratio, characterized by fluctuations before experiencing a downturn in 2019. The global COVID-19 pandemic has likely contributed to this decline, significantly affecting both variables. However, while the total deal value peaked in 2020 - driven, among other factors, by exceptionally low interest rates - the earnout value increased at a proportionally lower rate. As a result, earnout materiality reached an exceptionally low level in 2019.

In the literature review, as seen previously, a positive relationship has been shown between periods of economic uncertainty and the use of earnouts; however, this does not hold for earnout materiality (Barbopoulos, Prencipe, and Viarengo, 2024). Our data align with this finding, indicating an extremely low earnout materiality level in 2019.

Graph 1 - Historical trend of earnout materiality and distribution of earnout and total deal value in the analyzed European sample: annual breakdown from 2010 to 2024 YTD



The characteristics of the financial transactions included in the sample were analyzed in relation to key variables frequently investigated in the existing literature. The sample appears to be almost evenly divided between cross-industry transactions and those within the same industry. Additionally, slightly less than half of the transactions are cross-border. While most of the existent literature investigates whether cross-border and cross-industry transactions are more

likely to include earn-out clauses, we aim at understanding whether these variables have some effects also on earnout materiality.

Viarengo, Gatti, and Prencipe (2018) argue that M&A transactions in industries characterized by high intangible asset values tend to employ earnouts more frequently. In this work, we want to investigate whether this characteristic influences also earnout size. In our sample, 49% of the transactions are concentrated in high-intangible industries (*Technology, Telecommunications, Services, Healthcare & Pharma*).

Moreover, in the literature review we have seen that transactions involving private targets or subsidiaries (Kohers and Ang, 2000) are more likely to include earnouts and these variables can also affect the materiality of earnouts. 98% of the companies in our sample fall within one of these categories, pointing in the direction of a link between target ownership structure and earnout.

Lastly, as discussed above, scholars have reported findings that when the acquirer holds a pre-existing stake in the target company (toehold), the likelihood of earnout decreases. However, the relationship with earnout materiality remains inconclusive, a point that we aim to clarify. In our sample, less than 1% of the earnout deals involved transactions characterized by a toehold.

Table 4 - Breakdown of deal characteristics

	Cross-Border	*Cross-Industry*	*High Intangibles*	*Private*	*Subsidiary*	*Toehold*
Number of Deals (#)	207	229	246	407	88	3
% of Total	*41%*	*46%*	*49%*	*81%*	*17%*	*1%*

We now turn our attention to an industry-level analysis of the sample, beginning with an overview of the key differences across industries. Table 5 summarizes the main findings. The highest cumulative earnout values belong to *Technology, Media & Telecommunications (TMT)* and *Healthcare & Pharma* - two industries characterized by high intangible assets. Together, these sectors account for more than 60% of the cumulative earnout value in our sample.

Notably, the data reveal that no earnout transactions are recorded in the Hospitality sector. This is likely due to the nature of businesses in this industry—such as hotels, restaurants, and resorts—which typically possess a high proportion of tangible assets. The presence of substantial physical assets makes valuation more straightforward and objective compared to

industries where intangible assets play a more significant role. As a result, the need for earnout clauses to bridge valuation gaps is reduced.

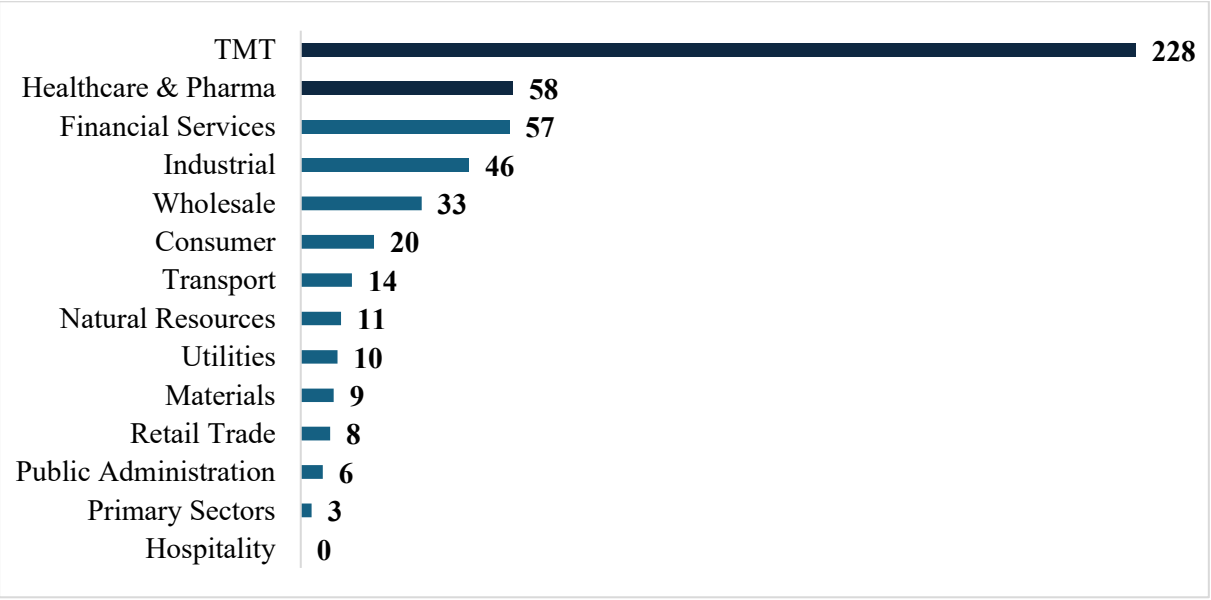
Table 5 – Summary of sample data by industry

Industry	*Earnout value (USD bn)*	*Earnout value as % of total*	*Total deal value (USD bn)*	*Materiality (%)*	#
TMT	4.99	38.50%	22.1	22.58%	228
Healthcare & Pharma	4.46	34.41%	13.42	33.24%	58
Financial Services	1.04	8.02%	11.37	9.14%	57
Industrial	0.76	5.87%	3.85	19.79%	46
Natural Resources	0.65	5.01%	2.14	30.34%	11
Wholesale	0.27	2.09%	1.50	18.12%	33
Transport	0.24	1.86%	1.64	14.76%	14
Utilities	0.18	1.41%	0.95	19.32%	10
Retail Trade	0.14	1.09%	0.42	33.51%	8
Consumer	0.10	0.81%	0.62	16.81%	20
Materials	0.09	0.69%	1.19	7.47%	9
Public Administration	0.02	0.18%	0.09	25.19%	6
Primary Sectors	0.01	0.05%	0.04	17.83%	3
Hospitality	0.00	0.00%	0.00	0.00%	0
Total	***12.96***	**100.00%**	***59.34***	**-**	***503***

Consistent with the existing literature, our analysis reveals that industries characterized by high levels of intangible assets exhibit the highest number of earnout deals.

The *TMT* sector stands out prominently, accounting for 228 transactions, more than double the number recorded in the second-ranking sector. *Healthcare & Pharma* follows with 58 deals, positioned closely ahead of the third industry in the ranking.

Graph 2 – Number of earnout deals by industry



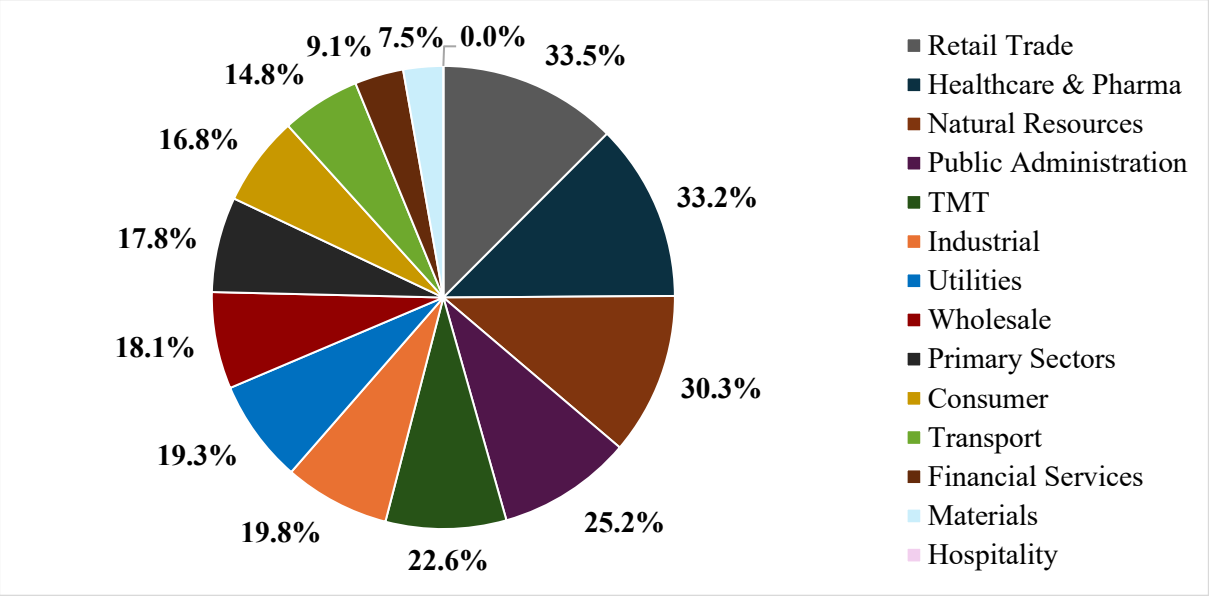
When focusing on the materiality of earnouts, however, the scenario changes.

From Graph 3, we observe that *Retail Trade* ranks at the top of the list. The high earnout materiality level in this sector is likely attributable to the strong importance of consumer preferences and behaviors, which tend to be highly volatile, thereby increasing uncertainty in valuation. Nevertheless, the degree of uncertainty varies on a case-by-case basis, depending on the specific characteristics of each deal.

Although *TMT* does not rank first, it remains among the top five industries with the highest earnout materiality. Meanwhile, *Healthcare & Pharma* maintains its position as the second-ranking sector in terms of earnout materiality, aligning with its overall deal volume.

These findings suggest that transactions in industries with a high proportion of intangible assets and, more broadly, in sectors where valuation is inherently more challenging tend to be associated with greater earnout materiality. This reinforces the link between valuation uncertainty and the structuring of contingent payments, as earnouts serve as a mechanism to bridge valuation gaps in transactions where future performance is more difficult to predict.

Graph 3 – Earnout materiality by industry



8. Hypothesis Development

After thoroughly analyzing the structure and key elements of earnout agreements, critically reviewing the existing literature on the subject, and conducting an in-depth examination of the sample under study, we now present the research question that defines the objective of this work:

What are the main determinants influencing the materiality of earnouts, namely the ratio of earnout value to total deal value, in M&A transactions?

The primary aim of this research is therefore to understand the factors that drive the earnout size. What causes this variation in earnout materiality? Can we identify specific characteristics that are consistently associated with higher levels of materiality? To address these questions, several hypotheses are formulated and subsequently tested through empirical analysis.

The variables examined in this study encompass the characteristics of both the target company and the acquirer, the nature of the transaction, and the broader regulatory environment. As highlighted in the literature review, higher levels of valuation uncertainty are generally associated with greater earnout materiality. When in an M&A transaction information is not symmetrically distributed between the parties involved, the less informed party faces heightened uncertainty regarding the valuation of the target company or the likelihood of certain future events. The resulting information asymmetry creates a valuation gap between the acquirer and the seller, often complicating the negotiation process.

This uncertainty manifests across multiple dimensions within a transaction. It may arise from ambiguity surrounding the target future financial performance, concerns regarding its current financial health, fluctuations in regulatory conditions, or broader external factors that influence market stability. As a result, the use of earnouts serves as a mechanism to mitigate these valuation challenges by aligning incentives and distributing risk between the transacting parties.

Table 6 below provides a summary of the key variables analyzed in the model.

Table 6 – Possible determinants of earnout materiality

#	Variables	Expected Relationship
1	Cross-Border	+
2	Cross-Industry	+
3	Private Target	+
4	Subsidiary Target	+
5	Toehold	-
6	High Intangibles	+
7	Quality of Regulatory Environment	+
8	Target Size	-
9	Target Heritage	-
10	Acquirer Heritage	-
11	Relative Size	+

Cross-Border Transactions

H1: Earnout materiality is positively associated with cross-border M&A transactions.

Investing in a company active in a different country from that of the acquiring firm is inherently more complex, ceteris paribus, than domestic investments. This complexity arises from several factors. First, the acquirer may lack familiarity with the target country's administrative framework, standard business practices, and sector-specific positioning within the local economy. Additionally, regulatory environments, both existing and forthcoming, may present further challenges.

These complexities can create valuation difficulties, leading to differences in price expectations between the buyer and the seller. The target company, having more knowledge of its local market and regulatory environment, holds an informational advantage over the acquirer. In situations of high information asymmetry, as highlighted in the literature, earnouts are often used as a tool to bridge this gap.

In cross-border transactions, higher earnout materiality helps the acquirer manage the additional risks linked to geographical differences. By tying part of the payment to future performance, the acquirer shares this risk with the more informed party (i.e. the target company) while offering the potential for greater rewards if performance targets are achieved.

Cross-Industry Transactions

H2: Earnout materiality is positively associated with cross-industry M&A deals.

A cross-industry transaction usually represents a diversification strategy aimed at entering new markets and expanding the acquirer's product or service offerings to strengthen its competitive position. While such diversification can provide significant strategic benefits, it also introduces considerable complexities.

Each industry has its own unique characteristics, operational practices, and market dynamics, which vary widely across sectors. Acquiring a company in a different industry presents substantial challenges, including understanding industry-specific trends, future prospects, and accurately incorporating these factors into a realistic valuation aligned with industry standards. Deep, specialized knowledge of the target industry is essential to confidently validate the assumptions underlying the acquisition and properly assess the company. However, in cross-industry transactions, acquirers often lack this in-depth expertise, which is, on the other hand, possessed by the target company that has been operating within the industry for an extended period.

This discrepancy can result in significant information asymmetry. Given this, we argue that the information asymmetry inherent in cross-industry transactions is linked to higher earnout materiality.

Private Targets

H3: Earnout materiality in M&A transactions is positively associated with the target company being a private company.

Acquiring accurate and comprehensive information about a publicly listed company is relatively straightforward due to stringent transparency and disclosure requirements imposed by regulatory bodies. In contrast, private companies, especially smaller ones, face much lighter disclosure obligations, which vary depending on the country but usually remain consistently less rigorous than those for public companies. Consequently, acquirers rely heavily on due diligence to access detailed financial and operational information.

This clearly represents a major source of information asymmetry: the owner of the target has full access to information about the company's health, both from a financial and business perspective, while the buyer is at a clear disadvantage. Moreover, valuing a private company is

more challenging than valuing a public company due to the absence of a market price that could serve as a benchmark. This often results in valuation gaps between the parties involved.

To mitigate these aspects, M&A transactions involving private targets incorporate higher earnout materiality.

Subsidiary Targets

H4: Earnout materiality in M&A deals is positively associated with the target company being a subsidiary.

As seen, private targets are typically not bound by stringent disclosure regulations unless they fall under specific national laws or operate in regulated industries and the requirements for subsidiaries follow a similar trend. Depending on factors such as size, sector, and the parent company's policies, subsidiaries may be subject to specific disclosure obligations. Notwithstanding these specific cases, acquirers of subsidiaries may still encounter similar challenges in gathering sufficient information, as is the case with private companies. Additionally, the valuation of a subsidiary, similar to that of a private company, can be particularly challenging due to the absence of a market price that could serve as a benchmark. This lack of reference often leads to valuation gaps between the parties involved. As a result, we expect a positive link with earnout materiality.

Toehold

H5: Earnout materiality in M&A transactions is negatively associated with the presence of pre-acquisition minority shares held by the acquirer in the target company.

If the acquirer already holds a minority stake in the target company, it is likely that she/he has been closely monitoring the firm for longer and has a deeper understanding of its key operational and financial aspects. Additionally, having had the opportunity to gather information and be relatively more involved in the company’s activities, the acquirer is expected to face lower levels of uncertainty. Consequently, consistent with what is mentioned in the literature review, this reduced information asymmetry leads to a negative relation between earnout materiality and the presence of pre-acquisition minority ownership.

High Intangibles

H6: Earnout materiality in M&A deals is positively associated with target industries characterized by the presence of high intangible assets.

Industries such as *Technology, Telecommunications, Services, Healthcare & Pharma* are characterized by a high presence of intangible assets. These assets include items such as intellectual property (e.g. patents, copyrights, trademarks), customer relationships, technical know-how, and licenses. Due to their non-physical nature, such assets can be complex to assess and value accurately. Depending on the type of asset, different valuation approaches are applied, often relying on subjective, assumption-driven methods that are less reliable than more solid, cash-flow-based methodologies, particularly given the difficulty in directly linking these intangible assets to future cash flows.

The uncertainty surrounding their accurate valuation can have significant repercussions on the overall valuation of the target company. As a result, earnout materiality tends to be positively associated with deals in which targets operate in industries with a high level of intangible assets.

Regulatory Environment

H7: Earnout materiality in M&A transactions is positively associated with the quality of the enforcement system in the country where the transaction takes place.

As investigated by Viarengo, Gatti, and Prencipe (2018), the quality of the enforcement system plays a role in the materiality of earnouts due to the risk of litigation. In countries where legal protection is weak, sellers may prefer to minimize the earnout ratio. For example, in cases where litigation arises from opportunistic behavior by the bidder post-acquisition, the seller may seek legal recourse for the contingent payment. However, in jurisdictions with low-quality legal systems, litigation is likely to be costly, prolonged, and may ultimately fail to produce a concrete resolution.

Therefore, a high-quality enforcement system is expected to be positively associated with a higher earnout ratio, as it provides greater legal protection.

Target Size

H8: Earnout materiality in M&A transactions is negatively associated with the size of the target company.

Smaller companies typically have less diversified revenue streams and a less well-documented financial history compared to larger firms, *ceteris paribus*. Moreover, they often have limited publicly available information, receive less coverage in financial reports and industry analyses, and are subject to less stringent disclosure requirements. In an M&A transaction, bidders may encounter difficulties in obtaining reliable financial and operational information for smaller targets, making the valuation process more challenging. This lack of transparency can lead to discrepancies between the buyer's and seller's valuation, increasing the risk of a valuation gap. In contrast, larger companies generally possess greater negotiating power, stronger brand recognition, and a more established market position, reducing the uncertainty regarding future prospects.

Given the heightened uncertainty surrounding the valuation of smaller firms and the difficulties in gathering reliable information, we argue that earnout materiality is negatively related to the size of the target company.

Target Heritage

H9: Earnout materiality in M&A transactions is negatively associated with the years of activity of the target company.

Relatively new companies tend to be more difficult to be valued compared to established ones (Ragozzino and Reuer, 2009). Indeed, newly incorporated firms often have limited historical information, and their past performance data may be unreliable or lack accountability (Hannan and Freeman, 1989). These factors contribute to greater uncertainty surrounding the valuation of new ventures and increase the likelihood of disputes between the parties involved in the transaction. On the other hand, companies with a long history can rely on their past performance and the heritage built over years of operations. This makes them not only easier to value but also gives acquirers greater confidence in their prospects, thanks to their established legacy.

In this context, high earnout materiality serves as an effective mechanism to address valuation uncertainty, allowing it to be resolved over the earnout period as the company's performance unfolds.

Acquirer Heritage

H10: Earnout materiality in M&A transactions is negatively associated with the years of activity of the acquiring company.

Acquirers with a longer operational history have typically experienced multiple economic cycles and have been exposed to a wide range of situations. This accumulated experience enhances their ability to make well-considered decisions, while also giving them the confidence and capability to face future unforeseen negative circumstances more easily. Additionally, their experience enables them to better anticipate and absorb potential post-acquisition challenges, minimizing the impact of unforeseen setbacks. As a result, a long-standing heritage provides acquirers with greater confidence in their decision-making processes and a toolkit to face unforeseen future challenges. This increased confidence and experience reduces the need for high earnout materiality, as experienced acquirers are better equipped to assess valuations and face future challenges.

Relative Size

H11: *Earnout materiality in M&A transactions is positively associated with the ratio total deal value to size of the acquiring company.*

As the ratio of total deal value to the size of the acquiring company increases, the transaction becomes increasingly material for the acquirer. In such cases, any unforeseen negative event occurring post-transaction is more challenging to absorb, given the relative size of the deal compared to the company itself. Consequently, the larger the total deal value in proportion to the acquirer's size, the greater the acquirer's incentive to negotiate a higher earnout materiality to mitigate potential risks.

9. Empirical Analysis

To test the hypotheses mentioned above, we use a Multiple Linear Regression with OLS estimation that accounts for heteroskedasticity, as we aim to understand the effects of various independent variables on our dependent variable. To conduct the analysis, we use Python.

9.1. The Model

Given that the sample spans over a 15-year period, we constructed a Multiple Linear Regression incorporating Year Fixed Effects. We also introduced Target Industry Fixed Effects.

The regression consists in the following equation:

$$Earnout\_materiality_i = \beta_0 + \beta_1 Cross\_Border_i + \beta_2 Cross\_Industry_i + \beta_3 Target\_Private_i + \beta_4 Target\_Subsidiary_i + \beta_5 Toehold_i + \beta_6 High\_Int_i + \beta_7 Anti\_Self_i + \beta_8 Target\_Size_i + \beta_9 Target\_Heritage_i + \beta_{10} Acquirer\_Heritage_i + \beta_{11} Relative\_Size_i + Year\_FE + Target\_Industry\_FE + \varepsilon_i$$

Where β_0 *represents the intercept,* ε_i the error term and*:*

- *Earnout_materiality*: Represents the natural logarithm of the ratio between earnout value and total deal value[13], indicating the percentage of the total price paid by the buyer in the form of a contingent payment.
- *Cross_Border*: A dummy variable that takes the value 1 if the M&A deal involves a target company headquartered in a different country than the acquiring company and 0 otherwise.
- *Cross_Industry*: A dummy variable that takes the value 1 if the M&A deal involves a target company operating in a different industry than the acquiring company and 0 otherwise.
- *Target_Private*: A dummy variable that takes the value 1 if the M&A deal involves the acquisition of a private company and 0 otherwise.
- *Target_Subsidiary*: A dummy variable that takes the value 1 if the M&A deal involves the acquisition of a subsidiary and 0 otherwise.
- *Toehold*: A dummy variable that takes the value 1 if the M&A deal involves the acquisition of a target in which the acquirer held a minority stake before the acquisition and 0 otherwise.

[13] Total deal value represents the total consideration paid by the acquirer, including both upfront payments and earnout.

- *High_Int*: A dummy variable that takes the value 1 if the M&A deal involves the acquisition of a company operating in an industry typically characterized by a high level of intangible assets, namely *Technology, Telecommunications*, *Services*, *Healthcare & Pharma* and 0 otherwise.
- *Anti_Self*: Numerical variable representing the quality of the enforcement system in the country where the target company is headquartered.

  As a proxy for this - following the methodology and significance results obtained by Viarengo, Gatti, and Prencipe (2018) - we use the anti-self-dealing index developed by Djankov *et al.* (2008b).

  This index serves as a country-level indicator of investor protection and is constructed as the average value of various variables related to financial disclosure requirements, liability associated with disclosure, and judges' ability to access evidence that can prove wrongdoing in investor-related disputes (Viarengo, Gatti, and Prencipe, 2018).
- *Target_Size*: A numerical variable representing the size of the target company, measured as the natural logarithm of its total assets. The choice of total assets as a measure for the size of the acquirer follows the methodology used in the existent literature by Barbopoulos, Danbolt, and Nechbaoui (2023) as well as Ragozzino and Reuer (2009).
- *Target_Heritage*: A numerical variable representing the years of operation of the target company, calculated from its foundation date to the acquisition date.
- *Acquirer_Heritage*: A numerical variable representing the years of operation of the acquiring company, calculated from its foundation date to the acquisition date.
- *Relative_Size*: A dummy variable equal to 1 if the ratio total deal value to the acquirer's size, measured in total assets, is higher than the median of the sample, 0 otherwise. This variable, which captures the relative size of the deal with respect to the acquirer size, is borrowed from Barbopoulos, Danbolt, and Nechbaoui (2023).
- *Year_FE*: A set of dummy variables for each year in the analysis, except for one (since the intercept is included, requiring the exclusion of one category). Each dummy variable takes the value 1 if the acquisition was announced in the corresponding year and 0 otherwise.
- *Target_Industry_FE*: A set of dummy variables for each of the industries, except for 2, namely *Hospitality* (that doesn't have any deal) and another one (since the

intercept is included, requiring the exclusion of one category). Each dummy variable takes the value 1 if the target belongs to that industry and 0 otherwise.

9.2. Multicollinearity, Autocorrelation, Heteroskedasticity and Normal Distribution of the Residuals

Multicollinearity occurs when there is a strong correlation among independent variables, leading to redundancy in the information provided by the affected variables that makes it difficult to separately identify the influence of each variable. In cases of severe multicollinearity, the variance of the regression coefficients increases, leading to higher standard errors, wider confidence intervals, and lower t-statistics, ultimately making the model less reliable. To initially assess the correlation among independent variables, we examine the correlation matrix of the variables used in the regression.

Table 7 – Correlation matrix (without dummies for Fixed Effects)

	Cross_ Border	*Cross_ Industry*	*Target_ Private*	*Target_ Subsidiary*	*Toehold*	*Anti_Self*	*High_Int*	*Target_ Size*	*Target_ Heritage*	*Acquirer_ Heritage*	*Relative_ Size*
Cross_ Border	1	-0.034	-0.139	0.104	-0.012	-0.355	0.038	0.200	0.061	0.090	0.070
Cross_ Industry	-0.034	1	-0.084	0.062	-0.019	0.041	-0.128	0.036	-0.002	0.033	0.022
Target_ Private	-0.139	-0.084	1	-0.948	-0.028	0.218	0.080	-0.364	-0.217	-0.067	-0.112
Target_ Subsidiary	0.104	0.062	-0.948	1	0.032	-0.191	-0.084	0.319	0.230	0.071	0.074
Toehold	-0.012	-0.019	-0.028	0.032	1	0.004	-0.024	0.130	-0.003	-0.074	-0.026
Anti_Self	-0.355	0.041	0.218	-0.191	0.004	1	-0.024	-0.193	-0.182	-0.156	-0.017
High_Int	0.038	-0.128	0.080	-0.084	-0.024	-0.024	1	-0.144	-0.171	-0.143	0.097
Target_ Size	0.200	0.036	-0.364	0.319	0.130	-0.193	-0.144	1	0.287	0.200	0.137
Target_ Heritage	0.061	-0.002	-0.217	0.230	-0.003	-0.182	-0.171	0.287	1	0.210	-0.029
Acquirer Heritage	0.090	0.033	-0.067	0.071	-0.074	-0.156	-0.143	0.200	0.210	1	-0.182
Relative_ Size	0.070	0.022	-0.112	0.074	-0.026	-0.017	0.097	0.137	-0.029	-0.182	1

We observe that *Target_Private* and *Target_Subsidiary* are almost perfectly negatively correlated (-0.948), which is not surprising since together they account for 98% of the sample. Given their nature as dummy variables, they are almost complementary. To verify this, we also ran a separate regression including only *Subsidiary_Target*. The results show that the coefficients of the other independent variables remain consistent with those in the previous regression, but the coefficient for Subsidiary_Target is the opposite of that for Private_Target, further supporting our interpretation. Given this high negative correlation, we exclude

Subsidiary_Target from the analysis. To address this issue, we conduct the regression including only one of the two variables, namely *Target_Private*.

Among the diagnostic tools for detecting multicollinearity, one of the most commonly used is the Variance Inflation Factor (VIF). We employ the VIF to assess whether multicollinearity is present among the independent variables. The VIF is calculated by performing a linear regression of each independent variable against all the other independent variables to obtain the R^2 from that regression. The VIF is then computed as:

$$VIF = \frac{1}{1 - R^2}$$

The general rule states that VIF values exceeding 10 indicate strong multicollinearity, while values between 5 and 10 require further assessment. From Table 8, we observe that none of the variables exceed the critical thresholds, suggesting that multicollinearity is not a concern[14].

Table 8 – VIF results for the regression that excludes *Target_Subsidiary* and includes Fixed Effects

Variable	VIF
Cross_Border	1.298
Cross_Industry	1.218
Target_Private	1.298
Toehold	1.182
Anti_Self	1.342
High_Int	2.559
Target_Size	1.424
Target_Heritage	1.294
Acquirer_Heritage	1.271
Relative_Size	1.179

Moving now to the second point, we assess homoskedasticity. OLS assumes homoskedasticity, meaning that the variance of the error term remains constant across all values of the independent variables. When this assumption is violated, heteroskedasticity occurs, meaning that the variance of the error term is not constant across different levels of a regressor. This leads to inefficient standard errors, which in turn affect hypothesis testing by producing unreliable significance tests and inaccurate confidence intervals.

[14] If we include *Target_Subsidiary*, we observe that the VIF values for both *Target_Subsidiary* and *Target_Private* exceed the threshold of 10, indicating strong multicollinearity. This confirms the necessity of removing one of the two variables to avoid multicollinearity issues and ensure the reliability of the regression model.

To test for heteroskedasticity, we employ White's test, which detects both linear and non-linear forms of heteroskedasticity. A low p-value leads to the rejection of the null hypothesis of homoskedasticity.

With a p-value of 0.011 from White's test, we reject the null hypothesis. To address this issue, we use an estimator of heteroskedasticity-robust standard errors, specifically HC0 in Python.

Examining the last potential issue, we assess autocorrelation, which occurs when error terms are not independent but instead exhibit correlation among them. To test for autocorrelation, we use:

- The Durbin-Watson test to assess first-order autocorrelation (correlation between consecutive residuals),
- And the Breusch-Godfrey test to detect higher-order autocorrelation (correlation beyond the first lag).

For values around 2 the Durbin-Watson indicates no autocorrelation, while values lower than 2 suggest positive autocorrelation and values higher than 2 indicate negative autocorrelation. With a Durbin-Watson statistic of 2.034, we find no evidence of first-order autocorrelation.

For the Breusch-Godfrey test, the null hypothesis states that there is no autocorrelation. Given a p-value of 0.780, which is higher than 5%, we can't reject the null hypothesis.

Lastly, we assess the OLS assumption of normally distributed residuals. If this assumption is violated, hypothesis tests based on t-statistics may become unreliable in small samples, leading to inaccurate p-values and confidence intervals. To evaluate the distribution of residuals, we use the Jarque-Bera (JB) test, which examines two key characteristics: skewness (symmetry of the distribution) and kurtosis (tailedness of the distribution).

Since the JB test statistic is 43.062 with a p-value close to zero, we reject the null hypothesis of normality. However, given the sample size, the violation of normality is not a concern for this study. By the Central Limit Theorem (CLT), when the number of observations is sufficiently large, the assumption of normality becomes less critical.

9.3. Results

After assessing the main issues surrounding the OLS regression, we now proceed with the analysis of the results.

Examining the F-test, which evaluates whether at least one of the independent variables has a significant effect on the dependent variable (i.e., whether the overall model is statistically significant), we reject the null hypothesis (H_0) that all regression coefficients are equal to zero, given the p-value of 3.35e-15.

The R-squared, which measures how well the independent variables explain the variation in the dependent variable, is 22.5%. Although this value may appear relatively low in absolute terms, its materiality is consistent with findings in the corporate finance literature, where similar levels of explanatory power are common. The adjusted R-squared, which accounts for the number of predictors in the model, is slightly lower at 16.6%.

Turning to the regression coefficients, we analyze both their signs in relation to expected values and their statistical significance.

Table 9 - Regression coefficients and significance[15] of the regression run with Year and Target Industry Fixed Effect

Variable	Exp. sign	Coefficient	Std. Error	t-Statistic	P-Value	Significance	[0.025	0.975]
const		-0.312	0.232	-1.345	0.179		-0.767	0.144
Cross_Border	+	-0.085	0.071	-1.195	0.233		-0.225	0.055
Cross_Industry	+	0.060	0.070	0.853	0.394		-0.078	0.198
Target_Private	+	0.084	0.097	0.867	0.386		-0.107	0.276
Toehold	-	0.074	0.394	0.188	0.851		-0.701	0.849
Anti_Self	+	0.029	0.124	0.234	0.815		-0.215	0.273
High_Int	+	0.067	0.101	0.662	0.508		-0.132	0.266
Target_Size	-	-0.098	0.018	-5.375	0.000	***	-0.134	-0.062
Target_Heritage	-	-0.008	0.002	-3.296	0.001	**	-0.012	-0.003
Acquirer_Heritage	-	-0.004	0.002	-2.250	0.025	**	-0.007	-0.000
Relative_Size	+	-0.155	0.066	-2.337	0.020	**	-0.285	-0.025

From our analysis, four variables emerge as statistically significant in explaining the materiality of earnout: *Target_Size*, *Target_Heritage*, *Acquirer_Heritage*, and *Relative_Size*.

[15] *** 1% significance; ** 5% significance.

The coefficient of *Target_Size* is negative and statistically significant, which supports our hypothesis. Smaller targets are inherently more difficult to value, as previously discussed. As a result, the size of the target company is negatively associated with earnout materiality, given the higher uncertainty surrounding their valuation and the challenges in gathering reliable information.

The coefficient of *Target_Heritage* is negative and statistically significant, providing empirical support for our hypothesis. Younger target companies are inherently more challenging to assess due to their limited financial and operational track record. The history of the target company appears to play a crucial role in determining earnout materiality, as a more established track record provides the acquirer with greater confidence, facilitates the valuation process, and ultimately reduces the valuation gap and consequently earnout materiality.

Similarly, the coefficient of *Acquirer_Heritage* is negative and statistically significant, confirming our hypothesis that the acquirer's history plays a crucial role in determining the size of the earnout. Acquirers with greater accumulated business experience are better equipped to evaluate targets accurately and manage unforeseen post-transaction issues, thereby reducing the need for substantial earnouts. This finding can be interpreted in two ways: either as a genuine ability to assess and mitigate risk more effectively or as a manifestation of overconfidence bias. In either case, the result points to a negative relationship between the acquirer heritage and earnout materiality.

Relative_Size is statistically significant but exhibits the opposite sign from what was initially expected. While this result may appear counterintuitive, it can be explained by the fact that higher values of this ratio are associated with larger deal size relative to the acquirer. Such deals typically involve more established target firms, which are inherently easier to value. Moreover, these companies tend to have relatively greater bargaining power, enabling them to negotiate more favorable transaction terms. Consequently, this dynamic may explain why *Relative_Size* is negatively associated with earnout materiality.

Among the independent variables that are not statistically significant, *Cross_Industry* has a positive coefficient, aligning with the findings of Cain, Denis, and Denis (2011), which suggest that cross-industry acquisitions involve higher levels of uncertainty and information asymmetry.

Similarly, while *Target_Private* and *High_Int* are not statistically significant, their positive coefficients are consistent with the findings of Kohers and Ang (2000), among others. Moreover, the positive coefficient of *Anti_Self*, despite not being statistically significant, aligns

with the conclusions of Viarengo, Gatti, and Prencipe (2018), who highlight a positive relationship between the quality of enforcement and earnout materiality.

Two coefficients that are not statistically significant and have signs opposite to those predicted are *Cross_Border* and *Toehold*.

A possible explanation for the unexpected sign of *Cross_Border* is that earnouts require continuous monitoring of the target post-deal financial and operational performance to assess whether earnout conditions are met. In a cross-border setting, several factors (e.g. important differences in corporate governance, varying business practices, language barriers) complicate this process. As a result, the complexity of enforcing earnout agreements in such transactions may lead to lower earnout materiality. Alternatively, it might also be that the European context is not the ideal one for testing this hypothesis, given the relative similarities in legislation across countries due to the presence of centralized regulations that reduce cross-border differences and consequently the uncertainty related to this point (though the extent of this harmonization varies depending on the specific topic and country in the sample).

Regarding *Toehold*, one possible explanation is that when the acquirer already holds a stake in the target prior to the acquisition, she/he has greater awareness of potential risks and uncertainties related to the target future performance. Consequently, this heightened awareness of the target challenges may lead the acquirer to structure a larger earnout as a risk-mitigation mechanism. Additionally, in the context of an acquisition, the shift from minority to majority shareholder increases the perceived risk, leading to greater earnout materiality.

9.4. Limitations and Future Research

Despite the effort in constructing our model, there are some limitations that should be acknowledged.

Firstly, an important consideration concerns the sample size. Although the original dataset was larger, the final analysis includes 503 M&A transactions. The elimination of several transactions was due to the unavailability of data for some of the variables included in the analysis. This limitation derives primarily from the fact that the majority of target companies involved in earnout M&A transactions are either private firms or subsidiaries. In such cases, the availability of financial data is lower compared to publicly listed companies.

Secondly, the study employs proxies to capture specific features of the target and transaction, but alternative measures could potentially provide more precise insights. For instance,

following the existing literature, total assets were used as a proxy for company size. Nevertheless, other measures such as market value or enterprise value could also be considered. Similarly, for the relative size of the transaction to acquirer size, we used a dummy variable with total assets as a proxy for buyer size. However, an alternative approach could involve using a continuous numerical variable or other metrics for the acquirer size. Future research could explore how these alternative measures impact the results.

Thirdly, limitations exist regarding the independent variables included in the analysis. Despite the broad range of variables employed, some relevant factors may still be missing. While our R^2 value is consistent with the existing literature, there remains room for improvement. Further research could investigate additional explanatory variables that may enhance the model's ability to explain the dependent variable.

Future research should further develop this underexplored stream of research to provide deeper insights into earnout materiality.

Firstly, it would be valuable to investigate whether the relationships analyzed in our European sample hold true in other geographical contexts, such as the United States or Asia. Expanding the analysis to different markets could help determine whether the findings are region-specific or generalizable across different countries.

Secondly, examining interaction effects between independent variables could yield additional insights. For instance, it would be interesting to assess whether Cross-Border and Cross-Industry transactions interact in a way that significantly influences earnout materiality.

Additionally, since valuation uncertainty is identified as one of the key drivers of earnout materiality, future research could explore additional target characteristics that contribute to this uncertainty. For example, it would be insightful to examine whether discontinuities, both positive and negative, at target EBITDA, Revenue, or Profit levels could explain variations in earnout materiality. However, a major challenge remains the limited availability of data, leading to relatively small samples that may constrain the ability to draw robust conclusions. A manual collection process could be considered as a way to expand the dataset.

Furthermore, previously studied variables for other research streams should be retested to assess their significance in explaining earnout size, while also verifying whether similar relationships hold true across different countries. This cross-country comparison could provide a more comprehensive understanding of the determinants of earnout materiality in M&A transactions.

10. Conclusions

Earnout agreements are effective tools for bridging valuation gaps caused by information asymmetry and uncertainty surrounding the target value. They enable parties in M&A transactions to "agree to disagree" by structuring a two-part payment: an upfront payment, reflecting the portion they agree upon, and a deferred payment, contingent on the achievement of expected performance, which reflects the degree of disagreement. Only sellers who genuinely believe in the target value are likely to accept such a structure, making earnout clauses a signaling mechanism.

Notwithstanding their benefits, earnouts also present significant drawbacks. They can be costly and complex to structure, with challenges related to the measurement of benchmark parameters, moral hazard, and counterparty risk, all of which may discourage their use. A particularly critical issue is litigation risk, as highlighted by Viarengo, Gatti, and Prencipe (2018).

The aim of this study was to critically examine the key components of earnout clauses, assessing their advantages and disadvantages, while providing a comprehensive overview of the existing literature. Additionally, the work explored the accounting treatment of earnouts, their recent trends, and their valuation techniques, specifically scenario-based methods and option pricing models, with practical examples.

Despite the contributions of previous studies, the European market has remained relatively underexplored. This research aims to help bridge this gap by offering new insights into the earnouts in European M&A transactions.

Furthermore, while the vast majority of the existing literature has focused primarily on the determinants of earnout use and the implications of their use, this study seeks to shed light on an aspect that has so far received significantly less attention. Specifically, it examines the factors influencing earnout materiality, which is defined as the ratio of earnout value to total deal value.

The study employs a dataset of 503 completed M&A transactions that include an earnout provision, all involving target companies headquartered in Europe, and announced between January 1, 2010, and December 31, 2024.

To achieve this, we employ a multivariate linear regression, incorporating both variables that are typically analyzed in the literature and relatively newer ones. The results of the analysis indicate that the key determinants of earnout size are the size of the target company, the heritage of the target company, the heritage of the acquirer, and the relative size of the deal compared

to the acquirer's size. All these variables exhibit a negative relationship with earnout materiality.

Gathering reliable information for smaller target companies is relatively more challenging. Additionally, the valuation of smaller target is relatively more complex, as they are characterized by higher uncertainty surrounding their prospects (e.g. less diversified businesses, a less established position within the industry). Information asymmetry and valuation challenges drive the negative relation with earnout materiality.

Similarly, recently established target companies often have minimal historical data, and their past performance records may be unreliable (Hannan and Freeman, 1989). Their limited heritage makes it more difficult to project future performance, as fewer benchmarks are available, making valuation more challenging and disputes among the real value more likely. Consequently, the acquisition of targets with a longer operational track record provides acquirers with greater confidence and reduces valuation uncertainty. The heritage of the target is therefore negatively associated with earnout size.

Moreover, acquirers with a more extensive operational history have accumulated experience over the years, making them better equipped to manage post-acquisition challenges and unforeseen issues. Due to this experience, they tend to have greater confidence in their own capabilities, which in turn leads to a negative relationship between the heritage of the acquirer and earnout materiality.

Finally, M&A transactions in which the ratio of total deal value to acquirer size is relatively higher exhibit lower levels of earnout size. A plausible explanation for this is that such deals often involve larger target companies with stronger bargaining power that are therefore able to negotiate higher upfront payments and, in this way, reduce the earnout size.

Overall, the findings highlight that valuation uncertainty, driven by target size and heritage, plays a critical role in determining earnout materiality. Additionally, relative deal size compared to the acquirer's size and heritage of the acquirer, emerge as key factors influencing earnout size.

11. References

Airborne Health, Inc. v. Squid Soap, LP (C.A. No. 4410-VCL, Del. Ch., 23 November 2009). <https://courts.delaware.gov/opinions/download.aspx?ID=130230>
[Latest access: 17/01/2025]

Allee, K.D., Hamm, S.J., and Wangerin, D.D. (2011). *Have accounting standards affected deal structures in mergers and acquisitions? Evidence from earnouts.* Technical report. Working paper. Michigan State University.

Allee, K.D. and Wangerin, D.D. (2018). "Auditor monitoring and verification in financial contracts: evidence from earnouts and SFAS 141(R)". *Review of Accounting Studies*, 23(4): 1629-1664.

Barbopoulos, L.G. and 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. and Danbolt, J. (2021). "The real effects of earnout contracts in M&As". *Journal of Financial Research*, 44(3): 607-639.

Barbopoulos, L.G., Danbolt, J., and Nechbaoui, S. (2023). *M&A and financial constraints: an assessment of the choice of earnout structure.* European Financial Management Association 2023 annual meeting.

Barbopoulos, L.G., Molyneux, P., and Wilson, J.O. (2016). "Earnout financing in the financial services industry". *International Review of Financial Analysis*, 47: 119-132.

Barbopoulos, L.G., Prencipe, A., and Viarengo, L. (2024). *Earnout agreements: Dealing with uncertainty in M&A*. Working Paper. The University of Edinburgh, Bocconi University, Università Cattolica del Sacro Cuore.

Barbopoulos, L.G. and Sudarsanam, S. (2012). "Determinants of earnout as acquisition payment currency and bidder's value gains". *Journal of Banking & Finance*, 36(3): 678-694.

Bates, T.W., Neyland, J.B., and Wang, Y.Y. (2018). "Financing acquisitions with earnouts". *Journal of Accounting and Economics*, 66(2): 374-395.

Battauz, A., Gatti, S., Prencipe, A., and Viarengo, L. (2021). "Earnouts: The real value of disagreement in mergers and acquisitions". *European Financial Management*, 27(5): 981-1024.

Bianchi, M. (2021). "M&A – Le clausole di earn-out nei contratti di acquisizione societaria – SPA – Sale and Purchase Agreement". *Contratti Internazionali*, April.
<https://contrattiinternazionalidimarcobianchi.it/ma-le-clausole-di-earn-out-nei-contratti-di-acquisizione-societaria-spa-sale-and-purchase-agreement/>
[Latest access: 17/01/2025]

Bruner, R. (2001). *Technical note on structuring and valuing incentive payments in M&A: earnouts and other contingent payments to the seller*. Darden Case UVA-F-1322-S.

Cadman, B., Carrizosa, R., and Faurel, L. (2014). "Economic determinants and information environment effects of earnouts: New insights from SFAS 141(R)". *Journal of Accounting Research*, 52 (1): 37-74.

Cain, M.D., Denis, D.J., and Denis, D.K. (2011). “Earnouts: a study of financial contracting in acquisition agreements”. *Journal of Accounting and Economics*, 51(1): 151-170.

Caselli, S., Gatti, S., and Visconti, M. (2006). “Managing M&A risk with collars, earn-outs, and CVRs”. *Journal of Applied Corporate Finance*. 18(4): 91-104.

Dahlen, N. (2024). “Earnouts in mergers and acquisitions: A systematic literature review of a contingent payment mechanism”. *Management Review Quarterly*, 1-40.

Datar, S., Frankel, R., and Wolfson, M. (2001). “Earnouts: The effects of adverse selection and agency costs on acquisition techniques”. *Journal of Law, Economics, and Organization*. 17(1): 201-238.

Deloitte (2012). “IFRS 3 - Continuing employment”. *Deloitte IAS PLUS*, 18th of September. <https://www.iasplus.com/en/meeting-notes/ifrs-ic/2012/september-2012/ifrs-3-continuing-employment>
[Latest access: 06/12/2024]

Djankov, S., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A. (2008b). “The law and economics of self-dealing”. *Journal of Financial Economics*. 88(3): 430-465.

Ferguson, A., Hu, C. W., and Lam, P. (2023). “Fair Value of Earnouts: Valuation Uncertainty or Managerial Opportunism?”. *The Accounting Review*, 99 (3):141-167.

Hannan, M.T. and Freeman, J.H. (1989). *Organizational Ecology*. Cambridge, MA: Harvard University Press.

Hannon, J. and Westerbeke, O. (2021). “Best practices in the valuation of contingent consideration”. *Grant Thornton LLP*, March.
<https://cbvinstitute.com/wp-content/uploads/2021/03/Presentation-Contingent-Considerations-Mar-4-2021.pdf>
[Latest access: 27/01/2025]

Hu, J.J., Kupiec, J., Zutshi, R., Steen, C.G., and Hamilton LLP (2024). “Delaware Court of Chancery finds buyer failed to use commercially reasonable efforts in pharma milestone payment case*”. Harvard Law School Forum on Corporate Governance*, 17th of September.
<https://corpgov.law.harvard.edu/2024/09/17/delaware-court-of-chancery-finds-buyer-failed-to-use-commercially-reasonable-efforts-in-pharma-milestone-payment-case/>
[Latest access: 27/01/2025]

Jansen, M. (2020). “Resolving information asymmetry through contractual risk sharing: the case of private firm acquisitions.” *Journal of Accounting Research*, 58(5):1203-1248.

Kohers, N. and Ang, J. (2000). “Earnouts in mergers: Agreeing to disagree and agreeing to stay”. *The Journal of Business,* 73(3): 445-476.

Lukas, E., Reuer, J. J., and Welling, A. (2012). "Earnouts in mergers and acquisitions: A game-theoretic option pricing approach*". European Journal of Operational Research,* 223(1): 256-263.

McMillin, C., Phelps, T., and George, R. (2025). “M&A in 2024 and Trends for 2025”. *Morrison Foerster*, 9th of January.
<https://www.mofo.com/resources/insights/250109-m-a-in-2024-and-trends-for-2025>
[Latest access: 10/01/2025]

Myers, S. and Majluf, N. (1984). “Corporate Financing and Investment Decisions when Firms Have Information that Investors Do Not Have”. *Journal of Financial Economics*, 13(2): 187-221.

PwC (2017). “Business combinations and noncontrolling interests: Global edition”. *PwC Accounting Guide*, December.
<https://www.pwc.nl/nl/audit-assurance/assets/documents/pwc-guide-business-combinations-noncontrolling-interests.pdf>
[Latest access: 27/01/2025]

Ragozzino, R. and Reuer, J.J. (2009). “Contingent earnouts in acquisitions of privately held targets”. *Journal of Management*, 35(4):857-879.

Reuer, J.J., Shenkar, O., and Ragozzino, R. (2004). “Mitigating risk in international mergers and acquisitions: the role of contingent payouts”. *Journal of International Business Studies*, 35(1):19–32.

Shareholder Representative Services LLC v. Alexion Pharmaceuticals, Inc. (C.A. No. 2020-1069-MTZ, Del. Ch., 5 September 2024).
<https://courts.delaware.gov/Opinions/Download.aspx?id=369130l>
[Latest access: 17/01/2025]

Song, D., Su, J., Yang, C., and Shen, N. (2019). “Performance commitment in acquisitions, regulatory change and market crash risk-evidence from China”. *Pacific-Basin Finance Journal,* 57: 101052.

United States Department of Labor. <https://www.osha.gov/data/sic-manual>

[Latest access: 06/12/2024]

Tao, Q., Liu, M., Hu, S., and Zhang, Y. (2022). "Is a promise a promise? Analyzing performance commitment in acquisitions and target firm performance". *The European Journal of Finance*, 28(4-5): 487-513.

The Appraisal Foundation. <https://appraisalfoundation.org/imis>
[Latest access: 06/12/2024]

The Appraisal Foundation (2019). "Valuations in financial reporting valuation advisory 4: Valuation of Contingent Consideration". *The Appraisal Foundation*, February. <https://static1.squarespace.com/static/5baff06daadd345a68e6bd99/t/5c81895653450a5e7a25b494/1551993177090/VFR_4_FINAL_021419.pdf>
[Latest access: 27/01/2025]

U.S. FOOD & DRUG ADMINISTRATION. <https://www.fda.gov/drugs/development-approval-process-drugs>
[Latest access: 01/23/2024]

Viarengo, L., Gatti, S. and Prencipe, A. (2018). "Enforcement quality and the use of earnouts in M&A transactions: International evidence". *Journal of Business Finance & Accounting, 45(3-4)*: 437-481.

Welch, M. (1999). "Ilex Pays Stock For Convergence, Raises $20M In Private Placement". *BioWorld*, 20th of July. <https://www.bioworld.com/articles/481105>
[Latest access: 23/01/2025]