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"Earnouts in M&A:
how information asymmetry affects the choice of payment method"
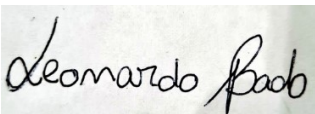
RELATORE:

CH.MO PROF. MARCO GHITTI

LAUREANDO/A: BADO LEONARDO

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Earnouts in M&A: how information asymmetry affects the choice of payment method

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ABSTRACT

Examining a large sample of M&A deals which involves bidder and target companies from selected country in the 2002-2022 period, this study provides specific deal, target and bidder characteristics that affect the type of consideration agreed. In particular great emphasis is put on the role of earnout contracts which represent an effective tool for mitigating adverse selection problems and bridging valuation gap in M&A deals. As expected, this work yields empirical support for the view that the usage of contingent payment mechanism increases in transactions characterized by a high level of information asymmetry. The results show that earnout tends to involve smaller acquiring firms and privately held or subsidiary targets which operate in high-technologies or service-related industries. In addition, contingent payment provisions are more likely to be included in M&A between acquiring and selling companies located in different countries. Supplemental analysis indicates that the same proxies of adverse selection, selected for studying the use of earnout, can be also exploited to define transactions where the stock issuance is more or less likely.

Introduction

According to the research carried out by McKinsey & Company (2019), in any given year about 11% of all large M&A fails. The study was conducted analyzing 2,500 transactions valued more than €1 billion and announced between 2013-2018: from this sample, 265 deals of different sizes, industries and geographical areas were canceled. The main effects of deal failure can affect the reputation and share price of both the parties as well as the waste of time and economic resources. But what is more interesting is the breakdown of reasons why these transactions are canceled. About 60% of the mergers and acquisitions terminates because of price expectations, regulatory concerns and political headwinds. In particular 42% of deals fails because of price disagreements which usually come from different expectations between the parties involved in the transaction about the target's fundamental value. Some types of target companies are more likely to suffer from valuation risk (pioneers in a specific business, high tech companies and firms with high unrecorded or intangible assets) because their future cash flows are harder to forecast. This type of conflict arises especially when one party has not access to the same kind of information than the other party or, in other words, when the level of information asymmetry associated to a specific M&A deal is high. It is clear that usually the buyer cannot rely on the same set of information as the seller. This is why in any

type of M&A transaction the acquiring company tries to reduce this information gap through due diligence. Even if this process is necessary to have a better understanding of the target, analyzing if the deal is worth it and negotiating a fair price, the seller protects the most sensitive and confidential information, since due diligence is not in any case associated to an obligation to purchase: target remains always better informed than bidder company even though the transaction involves the due diligence. So, the level of information asymmetry can affect some of the elements of a common M&A deal. Firstly, a high level of information asymmetry can have an impact on the acquisition premium offered: in this case the bidder may not be able to collect all the relevant information to estimate the fundamental value of the target, thus reducing the likelihood of paying a high acquisition premium. Secondly, the choice of payment method can largely depend on the impact of the adverse selection problem inside the deal. If disagreement between acquiring and selling company is large, transactions with only up-front payment of cash may not be optimal for both the parties: the less informed acquirer bears entirely the risk of overpaying, while the target, which has more information, may not receive what it expects from the transaction. The problem could be solved by using stock payments: the acquirer can shift part of the risk of paying too much the target, while high-performing selling firms can benefit from the success of the transaction. However, stock payments can have a limitation: the use of stock moves the problem of information asymmetry from the target's true value to the true value of the acquiring firm's stock, generating the "bidder undervaluation cost" (Eckbo, Giammarino, & Heinkel, 1990). An alternative to a cash or a stock exchange offer could be the introduction of earnout provisions which consist in deferred payments associated to the target's ability to reach predetermined performance goals within agreed period, after the deal has been completed. This type of solution allows acquirers to reduce their risk of overpayment in case of information asymmetries and, at the same time, allowing targets to obtain a higher price when they achieve good economic performance (or meet specific milestones). The "2021 M&A Deal Term Study" carried out by SRS Acquiom MarketStandard shows that the percentage of deals with earnout provisions increased from 15% in 2019 to 19% in 2020: to reduce the valuation uncertainties coming from pandemic, acquiring and selling companies decide to rely more on contingent payment mechanism.

Considering the characteristics of each type of consideration, the aim of this research is to understand how much the degree of information asymmetry can affect the choice of the mean of payment in M&A. In particular this study considers the earnout as one of the main instruments to mitigate the target misvaluation risk. The structure of the research will be the following one. In Chapter one, the problem of information asymmetry within M&A deals is

presented. Particular attention is paid to the earnout instrument about which the main features, drawbacks and real case examples are presented. It also emerges that economic literature about the study of contingent payment mechanism and the relationship between the consideration agreed and the level of information asymmetry needs to make further progress. In Chapter two the main hypotheses to be tested are formulated, presenting some recurring situations where acquirers will probably propose to negotiate earnout into their M&A deals. The model exploited to test the hypotheses is elaborated and presented in Chapter three: it is borrowed by the paper of Mara Faccio and Ronald W. Masulis named "The Choice of Payment Method in European Mergers and Acquisitions" (2005), but some important changes to the set of variables are made adapting the model to the logic of the earnout. In Chapter four, the main criteria used for data gathering and database formulation are indicated. The objective is to obtain a research sample whose time span and geographical distribution is not influenced by specific events or typical conditions. The resulting sample comprises 42,155 M&A deals completed between 2002 and 2022 among companies located in developed countries of which about 10% are carried out including earnout provisions. In chapter five, the hypotheses are tested through an empirical analysis: the objective is to understand the real impact of the selected proxies of information asymmetry on earnout usage and earnout as proportion of deal value. To test the effectiveness of the analysis, industry and year fixed effects, robustness checks and different types of regression models (OLS, Logit, Probit and Tobit) are used. The results lead to the identification of a set of common factors related to target, bidder and transaction features where a higher likelihood of including contingent payment provisions is associated. Based on the idea that stock and earnout are two possible solutions to mitigate the adverse selection problem, a supplemental analysis is also developed: same determinants of earnout are exploited to specify when the stock issuance is more likely in M&A deals.

In conclusion, unlike the other type of M&A consideration (cash, stock or a combination of both) earnout is extremely effective in mitigating information asymmetry, since it facilitates the valuation of the target firm over a larger period of time; but due to its complexity, it is important that both parties make sure that the terms of the earnout are clearly defined and agreed upon prior to the completion of the deal. The choice of payment method in a M&A transaction must therefore take into account several elements such as the level of uncertainty, the difficulties in reaching an agreement, the main characteristics of bidder and target companies and differences in expectations about the target value.

1. Information Asymmetry in M&A

Completing and implementing a successful M&A deal is extremely complex from a legal, organizational and economic standpoint. Even before the negotiation phase, many obstacles can be found during the M&A process. Preliminary identification of potential risks and issues, difficulties in target scouting, missing information during due-diligence and regulatory issues are only some problems that could arise. During the negotiations, differences in expectations about the target's value represent one of the main forms of disagreement between bidder and target company. In absence of any kind of resolving instrument, this obstacle can jeopardize the successful of the deal.

This conflict on target's value can happen especially in transactions characterized by great information asymmetry such as acquisitions of potential high-growth firms with big R&D expenses or unrecognized assets. In general, information asymmetry in M&A typically arises when the selling company owns more information on its most crucial investments than the buying company.

1.1 "Market of Lemons" in M&A Deals

As Regozzino, Reuer (2009) suggest, it's easier to understand the problem of the information asymmetry in this context by extending the Akerlof's model (1970) of the "market of lemons" in product markets to the M&A word. Considering its natural attitude of getting a higher price, the seller tends not to disclose all the relevant information about firm's value to the buyer. In this case, the bidder faces not only the risk of overpaying for the target (adverse selection) but it bears also high transactions costs searching for good M&A transactions target. For these reasons, the buyer can decide to discount its offer price in absence of any solutions. The main consequence of this situation is that many potentially successful deals collapse. Moreover, in M&A deals that are completed, the seller can get not so attractive prices while the buyer may bear risk of adverse selection or high transaction costs. So, both bidder and target company may be encouraged to find a possible resolution, under such circumstances.

1.2 Tools for Mitigating Information Asymmetry in M&A Deals

After this brief introduction the questions could be: What are the main tools in the hands of the bidder to mitigate the level of information asymmetry in M&A deals? And how did the economic literature study this problem? There are basically three different ways identified to reduce the adverse selection problem in this context. Firstly, the acquisition premium offered by the acquiring company can be regulated conditional on the level of information asymmetry recognized. Secondly, bidder can choose the proper type of consideration (cash, stock or a

combination of both) depending on the target or transaction characteristics to reduce the possible negative impacts of lack of information. Finally, acquiring company could suggest to tie part of the consideration agreed to the future performance of the target company (earnout provision).

1.2.1 Acquisition Premium

When the bidder is not able to collect all the relevant information to estimate the fundamental value of the target company, it may not be willing to pay a price associated with a high acquisition premium. This is idea is also supported by the literature. Dong, Ming, et al. (2006) employ price to book of equity (P/B) and price to residual income value (P/V) as proxies of misevaluation, growth opportunities and agency problems to study how bidder and target valuations (represented by this ratios) are related to various takeover characteristics such as the mean of payment, the mode of acquisition, the level of acquisition premium and the (bidder and target) announcement period returns. Among their findings, they demonstrate that higher target price-to-book ratio, which indicates also a higher degree of information asymmetry, is associated to a lower bid premium.

1.2.2 Choice of the Consideration

It's clear that the level of information asymmetry can have a huge impact on the choice of the type of consideration agreed for a M&A transaction. When the valuation disagreement between bidder and target is large, it will be difficult to close the deal through a lump-sum payment (cash). With an all-cash offer, the bidder bears entirely the risk of overvaluation, since the sum paid does not depend on the value of the target ex post in any way. A first alternative could be to conduct an all-stock transaction. Using stock payment for the M&A deal, the acquiror could share part of the risk of mispricing the target with the seller and at the same time, the seller can take part to the ex post economic results of the combined firm. However, this type of deal structure has an important limitation: the valuation risk is now bearded by target about the true value of the acquiring firm's stock since bidders tend to use shares when they are overvalued. A number of earlier academic papers have analyzed the problem of M&A financing decisions but the economic literature lacks studies that have thoroughly analyzed the relationship between means of payment and the level of information asymmetry. For example, using a large sample of European transactions over the period from 1997 to 2000, Faccio (2005) explores the factors that affect the choice of cash and stock as payment method. According to the author, the choice of the M&A consideration must consider the bidder's trade-off between its corporate control and its financial strength. In general, the choice of the type of consideration offered by the bidder can be affected by its

debt capacity and existing financial leverage or by the management's desire to keep the current corporate governance structure. The balance of these two forces will define the mix of cash and stock chosen by the acquiring company.

1.2.3 Earnout

The implementation of a two-part payment contract can be a possible solution to these problems. It consists on an up-front payment which represents the portion of transaction value agreed by both the parties and subsequent additional future payments (earnout) that are contingent upon ex post results; the second part reflects the size of disagreement between bidder and target firms. With the earnout agreement part of the price will be paid in the future depending on the target's future performance. The second payment is typically calculated on the most important target's financial results (Revenues, Ebit, Ebitda etc…) but in some cases it could be based also on non-financial indicators. For example, earnouts are often included in bio-pharma acquisitions, with contingent payment based on the success of clinical trials or Food and Drug Administration approval[1]. One of the main roles of the earnout mechanism is to encourage agreement between acquiring and selling company when they have different expectations on target's value often based on different availability of information; recall that even if the M&A process involves the due diligence phase, target will be always better informed than bidder company. In other words, by connecting a portion of the consideration to the future target's performance, the earnout works as a bridge valuation mechanism between the two parties, making the deal possible despite disagreements; however, this does not mean that earnouts eliminate the need for appropriate due diligence or other M&A deal instruments. Thanks to the contingent payment mechanism, the bidder company can mitigate the risk of paying too much for the target company (risk of overvaluation). Another important benefit of the earnout provision is that it acts as a "revelation mechanism" (Kohers, 2000): only the target companies that strongly believe to meet expected future performance will accept an earnout; on the contrary all the other firms that know its future expectations are based on over-optimistic growth plans may not agree to this specific provision. At the end, time will distinguish between fair or over-optimistic companies and it will reward them based on the conditions of the earnout agreed. Moreover, since part of the consideration is linked to ex post results, contingent payment gives incentive to the target's management/ownership to stay with company and maximize future performance.

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[1] https://www.forbes.com/sites/allbusiness/2021/06/26/understanding-earnouts-in-mergers-and-acquisitions/?sh=2c213f6f255b

1.2.3.1 Earnout's Drawbacks

In spite all these benefits, earnout presents some negative aspects that may reduce its application. Firstly, earnout could be difficult to negotiate in all its terms: acquiring and selling companies must agree on many conditions such as the potential size of the future payment, the metric on which earnout is based, the duration of the earnout and the form of the second payout. The specificity of the performance measure of the earnout and the short-term duration of these provisions may incentivize target's managers to take actions that increase the size of the contingent payment at the expense of the economic sustainability of the company. A typical example is when the size of the contingent payment depends on some profitability measures and the target's managers decide to reduce discretionary expenses reducing the long-term competitiveness of the company.

Earnout does not represent a good solution also for those acquisitions that seek to get quick synergies: target's performance needs to be measured on stand-alone basis reducing the possibilities of integration in the short-term horizon. Another possible drawback is that the target's shareholders bear the default risk of the bidder company which may not be able to pay the future contingent price. Furthermore, the enforcement of a contract based on future performance can lead to dispute, jeopardizing its feasibility. In this case, it's important for the parties to set ex ante a clear mechanism to solve disputes. The most common resolution mechanism is the so called "confidential binding litigation", an alternative method to long and costly litigation. Here a possible example of arbitration clause proposed by Forbes:

"The parties hereto agree that any dispute arising out of or in connection with this Agreement shall be resolved solely and exclusively by confidential binding arbitration with the Judicial Arbitration and Mediation Services[2] ("JAMS") to be governed by JAMS' Comprehensive Arbitration Rules and Procedures applicable at the time of the commencement of the arbitration (the "JAMS Rules") and heard before one arbitrator. The parties shall attempt to mutually select the arbitrator. In the event they are unable to mutually agree, the arbitrator shall be selected by the procedures prescribed by the JAMS Rules. The location of the arbitration shall be [city], [state]. Each party will bear its own legal fees and expenses, and 50% of the arbitrator's fee."

In other words, with this clause the parties establish now an alternative resolution technique (with the help of a third party) for potential future disputes coming from the earnout agreement.

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[2] JAMS is the world's largest private alternative dispute resolution (ADR) provider. ADR are resolution techniques to solve disputes with the help of a third party.

1.2.3.2 Earnout: Real Case Examples

To better understand how an earnout contract works, a real-case example from Borsa Italiana is proposed later on.

On 12 November 2008, the Italian cooker hood specialist *Elica* acquired 100% of the German company *Gutmann* by negotiating earnout provisions. Since the acquisition was completed on November, the Gutmann's 2008 financial statements were not known yet and they would be probably published during the spring of the following year. The conditions were set as follows: firstly, on the date of the closing, *Elica* would have paid €12 million plus €1 million as an advance payment on the 75% of *Gutmann*'s 2008 Net Profit[3]; a total of €13 million would have been paid immediately. Secondly, on the date of the approval of the 2008 financial statements (therefore in the spring of 2009), *Elica* would have paid the 75% of the 2008 Net Profit of *Guttman* less the million already paid out at closing. Then, at the approval of the 2009 financial statements (approximately in the spring of 2010) *Elica* would have paid the balance between the amount paid out and an overall price calculated by multiplying by seven times the average Ebit of *Gutmann* in 2008 and 2009. Finally, the provision stipulated that in any case the overall price would not have fallen below €14 million in addition to 75% of the Net profit in 2008 (already paid a year earlier). In 2007 the Ebit had already been €2 million, which multiplied by 7 would give precisely the agreed minimum €14 million. From the Gutmann shareholders' perspective, at the closing of the 2009 balance sheet, they would have already cashed in €13 million from 2008 plus the 75% of the 2008 Net Profit (minus one million advanced). Thanks to these earnout provisions, 75% of the 2008 Net profit and a minimum amount of 14 million euros from the sale (of which 13 paid in advanced at the closing date) are guaranteed to the former Gutmann shareholders. Moreover, if the 2008 or 2009 Ebit had exceeded €2 million, the former *Gutmann* partners would have taken more than the minimum €14 million (in addition to the 75% of the 2008 Net Profit); the former Gutmann shareholders were thus incentivized to make the company perform well. Figure 1 helps to better understand the mechanism described above.

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[3] *Guttmann*'s 2008 Net Profit was still unknown at that time, but certainly greater than one million

Figure 1: Earnout mechanism in acquisition of *Gutmann* by *Elica*
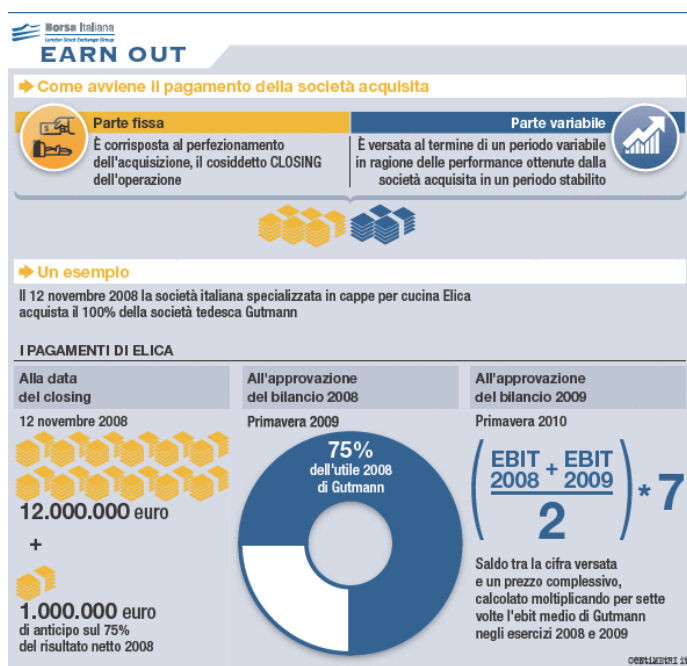
Another good application of the contingent payment mechanism is the acquisition of Swiss International Airlines (known only as Swiss) carried by Lufthansa. Even if the German company announced the agreement on the acquisition of Swiss in March 2005, the greatest portion of the takeover price was linked to the performance of Lufthansa's share price during the subsequent three years.

Initially Lufthansa paid €45 million in 2005 to the minority small shareholders, who held 15% of the Swiss equity. The majority holders of the remaining 85% of the Swiss shares consisted in a combination of the Swiss government and cantons, the two leading Swiss banks (UBS and Credit Suisse) and a number of Swiss corporations including Nestlé and Novartis. This majority accepted to link the price of their holdings to the performance of Lufthansa's share price relative to a predetermined basket of rival shares. Lufthansa declared that its share price had outperformed its main competitors shares (Air France, British Airways and Iberia) by 44,7% in that predefined period, resulting in a payout to the former majority shareholders in Swiss of €172 million. At the end, the total acquisition price paid by Lufthansa was €217 million: an upfront payment of €45 million to the minority Swiss shareholders at the announcement date and a contingent future payment of €172 million to the majority shareholders three years after. This last example represents a particular case of earnout provision since the future payment does not depend on the performance of the target firm, which became a subsidiary of the German group, but it's contingent upon the future performance of the acquiror's share price.

1.2.3.3 Earnout Literature and Earnout Report

The actual academic literature about the study of the contingent payment mechanism (earnout) is not so developed and needs to make further progress. One possible explanation of this lack of academic contents can be the difficulty for most popular Mergers and Acquisitions database to collect accurate information about these specific provisions. Only a few numbers of earlier studies have analyzed the role of the earnout and the M&A financing decisions. Most of the prior earnout literature (Kohers, Datar, Cain, Regozzino) makes an analysis of the economic determinants of the earnout. In other words, they investigate when acquiring firms are likely to include contingent payment provision in M&A deals. Kohers (2000), Datar (2001), Regozzino (2004) suggest that contingent payments reduce the impact of uncertainty of target firm value whenever there are greater information asymmetries. In particular Kohers (2000), studying a sample of mergers with and without contingent payment provisions, shows that the greatest portion of earnout takeovers involve smaller, private companies and subsidiaries in high technology or service-related sectors. Moreover, mergers with earnout provisions tend to be carried out between acquirer and target firms from different business, usually with small level of integration in the post-merger phase. Following the idea that the role of earnout contracts is to mitigate contracting costs, Cain (2011) extend the previous literature studying empirically the potential size of the earnout, the performance measure on which the contingent payment is based, the earnout period and the choice on the form of payment. Among its empirical results, Cain (2011) shows that earnout size is positively associated with proxies of target valuation uncertainty; the earnout period tends to increase when valuation uncertainty is going to be solved over a long period of time and the choice of the performance measure depends on how much information that measure can catch and its verifiability. Finally, Cadman (2014) analyzes how the new implementation of the new SFAS 141(R) affects the determinants of the two-part payment. Under the prior standard SFAS 141 (R) the expected earnout at the time of acquisition was no recognized but it was accounted as an increase of Goodwill only when actually paid. Rather under the revised standard, any earnout included in the M&A deal must be measured at fair value and recognized as part of the initial price in the acquiring company's balance sheet. It's clear that change in SFAS 141(R) standard brings new insights for the earnout research.

The development of a number of reports have partly replaced the lack of a proper literature on the topic of earnout. The main reports divide the study of earnout into two main strands splitting the analyses of the use of contingent payment mechanism for Life Sciences and Non-Life Sciences companies; the use of earnout in transactions involving companies operating in Life Sciences sector is widespread as the instrument is very well suited to the typical

requirements of these transactions. As mentioned before, the introduction of *milestones earnout payments* is very important when the selling company is subject to long R&D phases, clinical trials and market access to products; the achievement of all these steps can completely change the evaluation of the target. The report powered by SRS Acquiom analyzes 295 M&A transactions from 2008 to 2021 involving private target Life Sciences companies in three different sectors: Biotech/Pharmaceutical ("Bio/Pharma"), Medical Devices ("Devices") and Diagnostic and Research technologies ("Dx/Research"). In all the life science sectors, earnouts continue to be very common: 218 deals (out of 295) include an earnout provision (74% of the transactions analyzed).

According to this study, Bio-pharma is the sector that makes the most extensive use of earnout: 87% of M&A transactions that involve Bio-pharma private target companies have earnouts. The percentage appears quite high if compared to the use of contingent payments for the acquisitions of companies operating in Devices (78%), Dx/Research (64%) and Non-Life Science (18%) sector. The massive employment of earnout is demonstrated by the graph in Figure 2: the value of potential earnouts for Bio/Pharma is $51.6 billion and exceeds the value of up-front payments of about $20 billion. This means that in these cases the parties make the greatest portion of the deal value depending on future events that can affect the fundamental value of the target.

Figure 2: Deal count and Aggregate Value
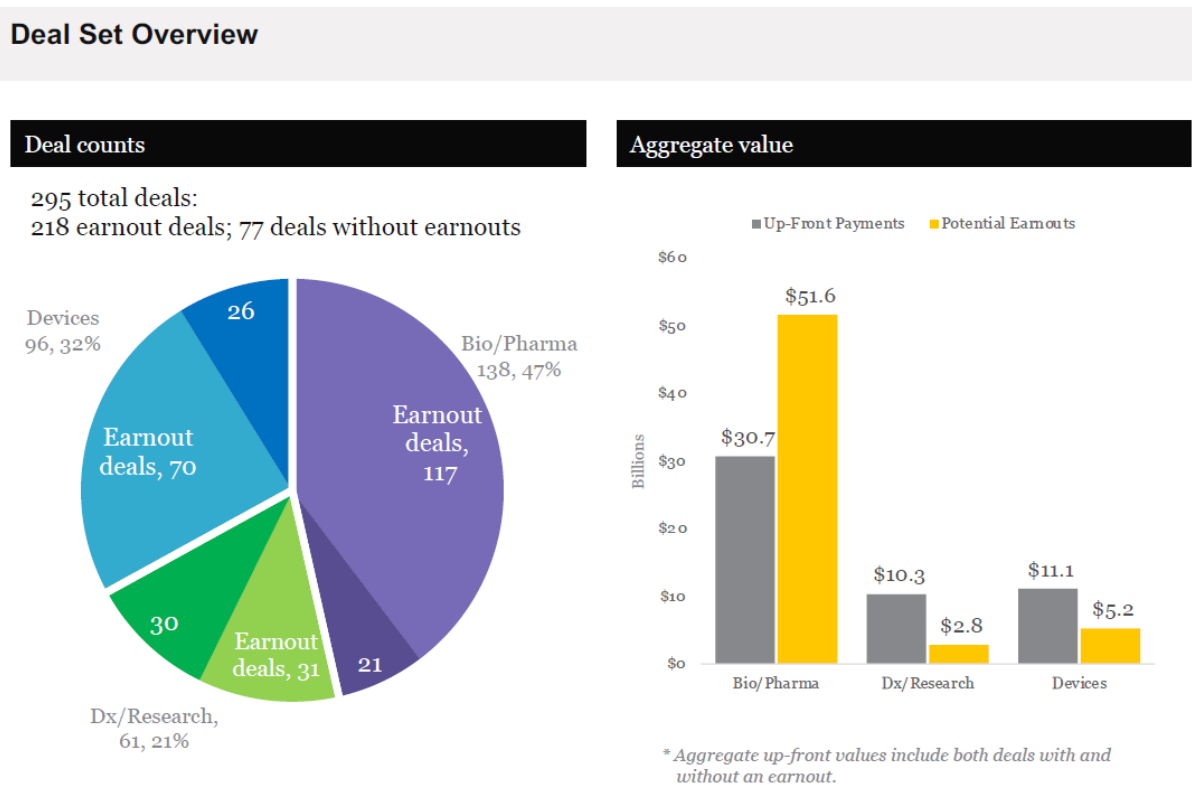
Figure 3: frequency of earnouts divided by sector

Frequency of Earnouts: By Sector

Percent of deals with an earnout — Life Sciences sectors and other industries

Note: Background displays U.S. stock indices for each sector.
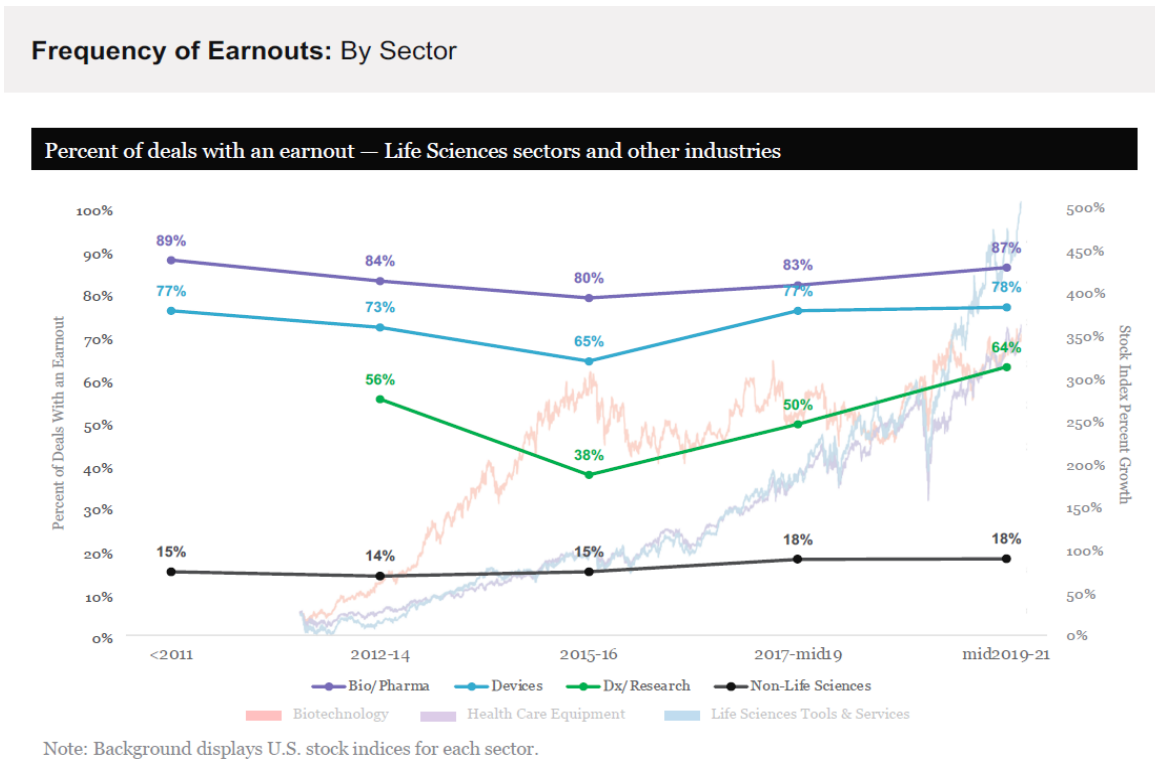
Figure 4: Average Transaction Values for Devices and Dx/Research sectors

Average Transaction Values: Devices and Dx/Research

Average per deal – number of milestone events and earnout potential dollar
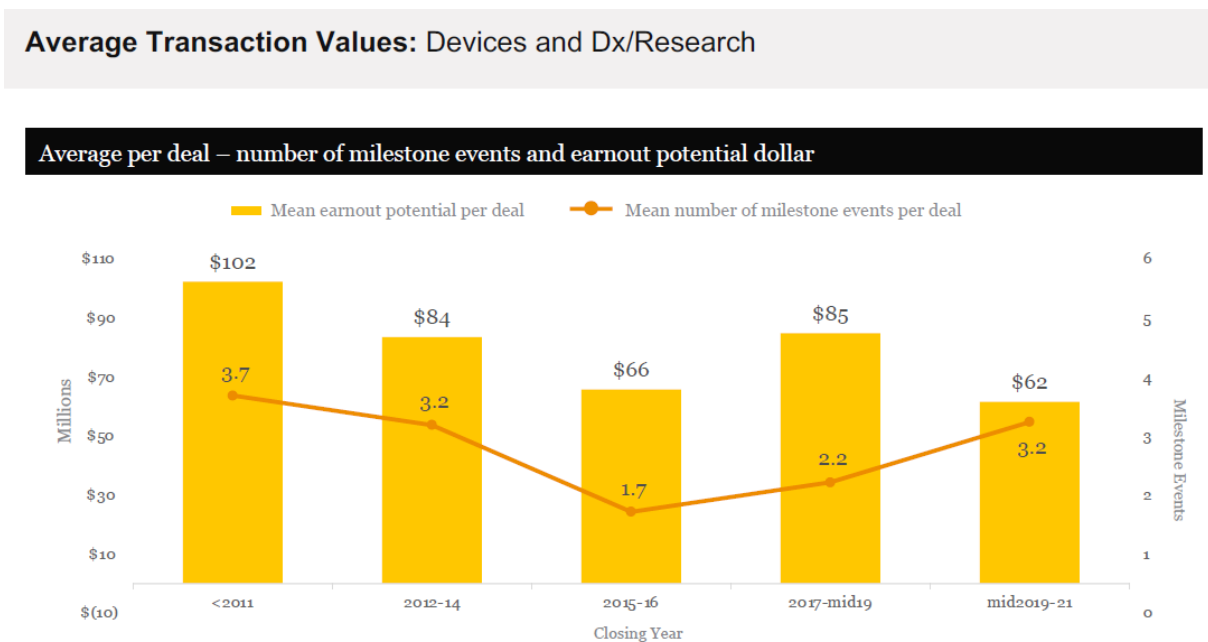
Figure 5: Average Transaction Values for Bio/Pharma sector

Average Transaction Values: Bio/Pharma

Trends over time in earnout potential and number of milestone events
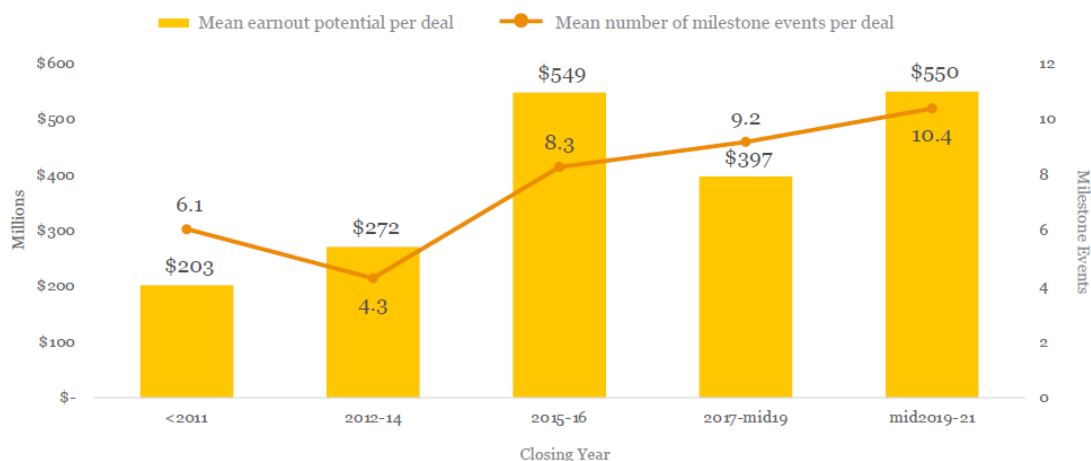
Bio-pharma is also the sector which relies mostly on milestone earnout payments: the mean number of milestone events per deal in Bio/Pharma is 10.4 while it's 3.2 when target belongs to Devices and Rx/Research industry. This is probably because Bio/pharma companies are usually subjected to more steps for development and commercial phases than Rx/Research industry.

In the previous paragraph, the risk of disputes coming from the enforcement of earnout provisions is presented: about this topic the study on Life Science companies reports that earnout disputes are quite common (29% of the deals), but at the same time more than half of those M&A deals have been renegotiated.

Focusing now on Non-Life Science deals, the "2021 M&A Deal Term Study" reported by SRS Acquiom MarketStandard have analyzed more than 1,400 private-target acquisitions ($285.8 billion) that closed from 2016 through 2020 finding that about 19% of the transactions exploit the benefits of the contingent payment mechanism. According to the study, significant developments in the use of earnout were influenced by pandemic: the percentage of deals with earnout provisions increased from 15% in 2019 to 19% in 2020 and in the same year the median of the potential value of the earnout as percentage of deal value increased to 39%. One possible explanation of these results is that parties decide to rely more on earnouts to bridge the valuation gaps coming from the pandemic uncertainties.

Figure 6: Earnout frequency and earnout metrics for NON-Life Sciences Deals

Earnouts (Non-Life Sciences Deals*)

Earnout included

Earnout metrics†

2020 ■ 2019 ■ 2018

	2020	2019	2018
Revenue	58%	67%	69%
Earnings/EBITDA	24%	16%	16%
Other‡	40%	28%	50%

► **COVID-19 pandemic, target industry, and other factors may have influenced this deal point. Visit srsacquiom.com/marketstandard/ to explore.**

* For a more detailed analysis of SRS Acquiom life sciences deals, please see the 2019 SRS Acquiom Life Sciences M&A Study.
† Earnouts can include more than one metric, such as a combination of revenue and earnings.
‡ Examples: unit sales, product launches, divestiture of assets.

Figure 7: Earnout potential and Earnout Length

Earnouts (Non-Life Sciences Deals*)

Median earnout potential as % of closing payment†

Earnout length‡ (2020 median: 24 months)

1 year or less	29%
>1 to 2 years	23%
>2 to 3 years	29%
>3 to 4 years	8%
>4 to 5 years	6%
> 5 years	4%

► **COVID-19 pandemic, target industry, and other factors may have influenced this deal point. Visit srsacquiom.com/marketstandard/ to explore.**

* For a more detailed analysis of SRS Acquiom life sciences deals, please see the 2019 SRS Acquiom Life Sciences M&A Study.
† Calculated as the sum of potential earnout payments over the amount paid at closing (including escrowed amounts).
‡ Measured by the date the latest earnout period ends.

As shown in Figure 6, the most common structure for earnout provisions in 2020 in based on Revenues even if the use of Earnings and EBITDA as earnout metrics had performed a slightly increase in the last three year. Finally, Figure 7 shows that earnout periods for 2020 deals became longer, with fewer deals with an earnout period of one year or less and more transactions with an earnout length set between 2 and 3 years.

2. Study Presentation and Hypotheses

2.1 The Study

Considering the features of each type of payment explained above, the main goal of this research is to investigate how much the level of information asymmetry affects the choice of the mean of payment in a M&A deal. The earnout represents the main focus of the study but its relationship with the other type of consideration (cash and stock) is also investigated. In particular the research, which is conducted on a large sample of M&A transactions carried out between bidder and target companies from selected countries in the 2002-2022 period, is built around the idea that the earnout is one of the main instruments in order to reduce the uncertainty around the value of the target. A higher use of earnout provisions is expected to be found in most of the deals characterized by a relevant information asymmetry in order to mitigate the risk of target misevaluation. In other words, earnout may play an important role in acquisitions of target with no disclosed information (privately held companies or subsidiaries), many intangible assets or when acquiring companies carried out takeovers in unrelated industries or in a foreign country. The research is also going to understand whether the level of adverse selection in M&A deals affects also the size of the earnout agreed by contract. Another important aspect this study is going to investigate is the relationship between earnout and stock payment. Since stock payment and earnout are considered two different instruments to solve information asymmetry problems in M&A deals, we expect to demonstrate the same determinants of the earnout can also explain the use of stock payment. The "mutually-exclusive" relationship between earnout and stock payment is also demonstrated by the table below (which summarizes some important information from data collected).

Table 1: Dual Frequency Distribution Earnout Yes or No, Final Consideration Structure

	Final Consideration Structure				
Earnout Yes or No	Cash and Stock Consideration Offered	Cash Consideration Offered	Choice between Cash or Stock or Combination of Both	Stock Consideration Offered	Total
NO	5,706	26,991	668	4,740	38,105
YES	1,418	2,613	15	2	4,048
Total	7,124	29,604	683	4,742	42,153

Earnout Yes or No distinguish M&A deals with or without earnout provisions. *Final Consideration Structure* is defined by Eikon as "the description of the consideration offered by the acquiror in its final offer – at deal competition – for the target in the transaction". Dual frequency distribution table investigates the type of consideration offered conditional on the presence of the earnout.

Table 1 is a dual frequency distribution table which investigates simultaneously the presence of earnout ("Earnout Yes or No") and the final type of consideration offered by the acquiror. What is really interested for the purposes of the research, is the distribution of the type of consideration offered in case of earnout usage. Only in 2 cases out of 4,048 (i.e., 0.0005%), the acquiror decides to offer its own stock as form of the contingent payment. For this reason, the research will consider form now on the use of earnout and the use of stock as two possible separate solutions to reduce the level of adverse selection in M&A transactions.

It's clear that both stock and earnout may solve the typical "leave the table problem" of acquisitions completed with cash payments. In an all-cash deal, the acquiring firm bears the risk of overpaying the selling company while former target owners "leave the negotiating table" with no residual interest. But what are the main differences between stock payment and earnout provisions? Stock payment binds former target shareholders to upside and downside performance of bidder's shares (new company) for an unlimited time horizon (or unless stocks are sold). Earnout retains instead the interest of former target shareholder for a pre-specified period of time and it puts a "floor" on possible negative results because typically an up-front payment is already granted and the range of contingent payment is established by contract.

2.2 Hypothesis

In the light of the main features of the earnout described in the first chapter, this section presents some situations where acquirers and targets will probably decide to negotiate

contingent payment provisions into their M&A deals. Most of the conditions presented below enumerates target, acquiror and deal characteristics that are likely to be associated with adverse selection obstacles. These hypotheses are also presented to identify what are the expected results from the empirical analysis that will be discussed in the next session.

Difficulties in obtaining private information by the acquiring company is usually a greater problem in private target companies rather than in public target companies. Unlisted companies do not have to prepare audited financial statements on a timely basis according to the rules imposed by the national stock exchanges. Moreover, since privately held target companies do not have available market prices, the acquiring firm hasn't got a benchmark for their value estimation. Many features of private targets mentioned above can also be applied to the acquisition of subsidiaries. Further, according to Datar (2001) the acquirer's ability to assess the economic value of a subsidiary can be influenced negatively by joint cost allocation and transfer pricing issues. For all these reasons, information asymmetries are greater when the M&A transactions involve private targets or subsidiaries[4] compared to public targets. The access to target information can be more limited also in case of cross-border or cross-industry M&A transactions. In general, completing an acquisition of a firm belonging to another industry or located in a foreign country can make the valuation phase more difficult for the acquiror. For example, the management of the acquiring firm may not have the necessary knowledge to evaluate target's assets of a different industry or the bidder may not be familiar with the main risks and prospects of a different state. Moreover, in some countries where shares are not so actively traded, market prices may be not so good in reflecting the intrinsic value (Datar 2001), removing the opportunity of having a benchmark for the target value.

Moving to the characteristics of target's activities, valuation of service-related and high-technology target companies may be more complicated since their core businesses are mainly based on human capital and intangible assets. Acquiring companies that face this misevaluation risk are more likely to exploit earnout provisions in M&A deals which involve high-tech and service-related targets. Further, use of earnout may be also positively affected by acquiror's desire to retain managers in service-related firms where the role of human capital is quite important, giving management also a reason for maximizing target value. Similar to service-related and high-tech companies, acquisitions of companies with high R&D may be associated with valuation and adverse selection problems. It not easy for the acquirer

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[4] For Kohers (2000) the level of information asymmetry in buying subsidiaries often is not as huge as the one in acquiring private companies. In some cases, subsidiaries may be sold by public parent companies, increasing the level of accessibility of information since financial statements of parent company can include separate information about the performance of subsidiaries.

to fully understand the power of the R&D expenses and the related projects. At the same time, target managers may have an incentive to hide the real economic value of the R&D programs to agree a higher final price.

The dimensions of the two parties involved in the transaction is an important topic to analyze. The effect of the size of the deal (or equally the size of the target) on the use of earnout must be investigated both in absolute and relative terms, considering the stand-alone value of deal and comparing it to the size of the acquiring firm. As the size of the target company increases, so does the possibility of making mistakes about its value since the risk of possible overpayments rises[5]. In this context, earnout therefore acts as a "risk-shifting mechanism" (Kohers, 2000): the less informed bidder shifts the risk of misevaluation to the more informed target, achieving a more efficient risk sharing. Considerations about the acquiror size are developed too. As supported by Kohers (2000), earnout provisions provide protection to smaller acquiring companies offsetting the lower level of bargaining power. Small acquirors may also lack resources to reduce the information gap between buyer and seller, increasing consequently the risk of misevaluating the target.

As discussed in the previous chapters (see Table 1), the choice of employing bidder's shares as mean of payment in M&A deals can be considered as a separate alternative to the use of earnout provision. They are both good solutions to mitigate the level of adverse selection in M&A transactions. Acquiror Market-to-Book ratio is an approximation of the level of attractiveness of bidder's stock for selling shareholders (Faccio 2005). Higher market-to-book ratio makes acquiror's shares more valuable as M&A consideration, lowering the bidder's need for using earnout. As supported also by Table 1, the greatest portion (about 65%) of the M&A deals which include earnouts, is carried out with the commitment of up-front and future cash payments[6]. The level of financial leverage can be exploited as a good approximation of the acquiring company's ability to raise external funds (issue new debt), today and in the future, in order to finance the payments coming from the earnout provisions included. This is also supported by Regozzino, Reuers (2009) which highlight that firms with higher leverage tend to use earnouts less, since earnout payments usually require financial slack and flexibility. Finally, another financial statement indicator, the percentage of tangible assets inside the bidder's balance sheet, can affect the employment of future payment mechanism.

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[5] It's also true that target firms with greater size are usually associated to a higher level of availability of information and bargaining power. This can in some ways mitigate the effect on the use of contingent payments.
[6] In Table 1, about 65% of M&A transactions which include earnout are associated to (fully) cash consideration offered.

The percentage of acquiror "collateral assets" can be associated to a greater capacity of making up-front and contingent (cash) payouts[7].

Considering all that has been presented above, the following first hypothesis is formulated. Hypothesis 1: the likelihood of using earnout is higher when smaller acquiring firms decide to purchase big privately-held or subsidiary target companies which operates in service-related, high-technology sector or that more in general have high R&D expenses. Further, earnouts are more likely to be used in M&A which involve two parties located in different countries or operating in different industries. Finally, acquiring companies with low market-to-book ratio, low level of financial leverage or high percentage of tangible assets are more likely to exploits the benefits of earnout.

The object of analysis shifts now from the likelihood of including contingent payment provisions to the value of the earnout. Since the same characteristics presented in hypothesis one about target, acquirer and transaction are approximations of the adverse selection problem, they can equally be exploited to investigate how they affect the size of the earnout because it is reasonable to assume that - as supported by Kohers (2000) - the portion of the earnout within a merger is mainly determined by the extent of information asymmetry. For this reason, a second hypothesis is built.

Hypothesis 2: the same conditions presented above that affect negatively or positively the use of earnout, are expected to have the same impact on the size of the earnout as proportion of deal value.

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[7] The relationship between earnout and acquisition premiums can also affect the effect of percentage of acquiror tangible assets on the use of earnout (see Appendix B).

3. The Model

The model chosen to test the hypotheses is borrowed by the paper of Mara Faccio and Ronald W. Masulis named "The Choice of Payment Method in European Mergers and Acquisitions" (2005)[8]. Its specification will initially be the following one:

$$
\begin{aligned}
\text{EARNOUT} = {}& \alpha + \beta 1 \ * \log(\text{AcqTotAssets}) + \beta 2 \ * \text{AcqCollateral} + \beta 3 \\
& * \log(\text{DealValue}) + \beta 4 * \text{Unlisted} + \beta 5 * \text{Subsidiary} + \beta 6 * \text{IntraIndustry} \\
& + \beta 7 * \text{CrossBorder} + \beta 8 * \text{Serv} + \beta 9 \ * \text{HighTech} + \text{Firm FE} + \text{Time FE} \\
& + \varepsilon
\end{aligned}
$$

where

Log(AcqTotAssets) is logarithm of book value of bidder's total assets before the M&A deal (1 year prior),

AcqCollateral is the ratio of acquiror's property, plant and equipment to book value of total assets 1 year prior the bid,

Log(DealValue) is logarithm of the value of the M&A transaction. According to the definition provided by Eikon, in case of contingent payment mechanism, the deal value includes the "contractual" value of the earnout[9],

Unlisted is a dummy that equals 1 if the target is a privately held company not listed on any stock exchange, and it is 0 for listed targets and unlisted subsidiary,

Subsidiary takes the value of 1 when the (unlisted) target is a subsidiary of another firm, and equals 0 otherwise[10],

IntraIndustry is 1 if acquiror and target are in the same industry and is 0 otherwise,

CrossBorder equals 1 if M&A transaction is carried out between bidder and target from different countries and is 0 otherwise,

Serv is a dummy that equals 1 if the target is service-oriented and 0 otherwise[11],

HighTech equals 1 if the target is a high-technology company, 0 otherwise,

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[8] The original model included other variables not related to earnout. These variables are explained in Appendix A.

[9] The contractual value of the earnout is the maximum value the bidder could pay to the target according to the contingent events set by the earnout provision.

[10] Recall that variable Subsidiary catch all the unlisted targets that are subsidiaries.

[11] The classification of target industry is proposed by Eikon and it is based on SIC codes, Naic codes and overall company business description

Time FE considers the effect of the years relating to transactions included in the database from 2002 to 2022,

Company FE includes the effect of each target industry, considering the identification proposed by Eikon.

Some other variables, which are presented below, are also included during the analysis in order to check the robustness of the model.

Finlev is the acquiror's financial leverage calculated as the ratio of acquiror's book value of debt (prior to the M&A announcement) plus the deal value divided by the sum of the book value of total assets (again prior to the announcement) plus the deal value.

RelSize is the relative size of the transaction computed as the ratio of deal value divided by the sum of the deal value plus the acquiror's market value of equity four weeks before the announcement date,

AcqMktToBook is a ratio calculated as acquiror market value of equity plus book value of debt over the sum of book value of equity plus book value of debt prior to the bid,

RDSAL is the ratio of target's R&D expenses divided by the target's Net Sales,

CASH is a dummy which equals to 1 when the acquiring company decides to made an all-cash offer and 0 when the bid is composed only by acquiror's stocks or a combination of cash and stocks.

The dependent variable will be firstly dichotomous investigating whether bidder and target companies decide to include contingent payment inside their deals or not (1=acquisitions with earnout provisions, 0= otherwise). In supplemental analysis, the proportion of total deal value attributed to the earnout will be set as dependent variable to investigate if the relative value of the earnout too (in addition to the simple presence of this provision) is sensitive to information asymmetries in M&A. Multiple linear regression, Logit, Probit and Tobit are carried out on both the dependent variables – use of earnout and relative value of earnout – to understand the best suitable model for our data. To test the robustness of the model other supplemental variables are also included and industry and year fixed effects are carried out alternatively and simultaneously. Finally, using the same set of variables it is investigated whether fully stock payments really constitute an alternative to earnout in M&A deals.

4. Data and Sample

Table 2.a: Tabulation of Earnout Yes or No

Earnout Yes or No	Freq.	Percent (%)	Cum.
NO	38,107	90.40	90.40
YES	4,048	9.60	100.00
Total	42,155	100.00	

Earnout Yes or No distinguish M&A deals with or without earnout provisions. Table shows how many transactions include or not earnout both in absolute terms and as a percentage.

Table 2.b: Deal Value summary statistics conditional on presence of earnout (data in millions of dollars)

Earnout Yes or No	Mean	Median	Min	Max
NO	460.40	54.30	5	101,490.60
YES	171.60	31.20	5	21,025.21
Total	432.60	50.60	5	101,490.60

Earnout Yes or No distinguish M&A deals with or without earnout provisions. The table shows some summary statistics (mean, median, minimum and maximum value) of the deal value conditional on the presence of contingent payment provision.

Table 2.c: Summary statistics of Value of Earnout and Earnout over Deal Value (data in millions of dollars)

	Mean	Min	Max
Value of Earnout	42.566	0	5,900
Earnout Over Deal Value	0.332	0.019	1

Value of Earnout expresses the value of the contractual earnout at the announcement date, which is the full amount of potential payments during the predefined period. *Earnout Over Deal Value* divides the *Value of Earnout* by the value of the deal. The table shows some summary statistics (mean, minimum and maximum value) for these two variables.

Table 2.d: Double Frequency table between Target Industry and Use of Earnout

	Earnout Yes or No		
Target Industry	NO	YES	Total
High-Tech	6,405	1,052	7,457
	0.15	0.02	0.18
Service	11,185	1,411	12,596
	0.27	0.03	0.30
Other	20,517	1,585	22,102
	0.49	0.04	0.52
Total	38,107	4,048	42,155
	0.91	0.09	1

High Tech is a dummy variable equals to 1 when a target company belongs to the high-tech industry. *Service* is a dummy variable equals to 1 in case target operates in a service-related sector. The classification of target industry is proposed by Eikon and it is based on SIC codes, Naic codes and overall company business description. *Earnout Yes or No* distinguishes M&A deals with or without earnout provisions. The table investigates simultaneously the target industry (in particular highlighting high-tech and service-related industry) and the presence of the earnout.

Table 2.e: Tabulation of Target Public Status and Earnout Yes No

	Earnout Yes or No		
Target Public Status	NO	YES	Total
Private	16,455	3,072	19,527
	0.39	0.07	0.46
Public	6,979	50	7,029
	0.16	0	0.16
Subsidiary	14,673	926	15,599
	0.35	0.02	0.37
Total	38,107	4,048	42,155
	0.90	0.10	1

Target Public Status is a variable which distinguishes between privately-held, listed and subsidiary target companies. *Earnout Yes or No* identifies M&A deals with or without earnout provisions. Conditional on the presence of the earnout, the table summarizes how many transactions involve each type of target company.

The sample of data is collected from Eikon Mergers and Acquisitions Database, a section of the Eikon software useful to collect data about M&A deals. The same software also provides the necessary target and bidder's financial information to conduct the research. Specifically, this study collects data for completed takeovers with and without the use of earnout between companies from Western Europe, North America, and China. The choice of this geographical restriction is made for obtaining a sample where transactions are carried out in similar economic conditions. The reference period is from January 1, 2002 to January 1, 2022. In

order to align the size of the transaction as much as possible, only mergers and acquisitions with a related deal value higher than $5 million are included. Furthermore, Acquisitions of partial interest, Acquisitions of remaining interest, Buybacks and Recapitalizations are excluded from the sample[12]. The characteristics of this type of extraordinary transactions are extremely specific and they would have distorted the results of the research.

At the end the final sample is composed by 42,155 deals, of which 4,048 completed with the use of earnout (9.6%) and 38,107 without earnout provisions (90.4%). In particular, for the earnout-sample, the average value of the deal is $171 million and the maximum transaction value of about $21 billion; on the contrary, for the no-earnout-sample the average value of the deal is $460 million and its maximum value is $101 billion. On average, the value of a M&A deal is higher when earnout provisions are not included. For the transactions carried out with the contingent payment mechanism, the database provides also the value of the contractual earnout at the announcement date. This corresponds to the full amount of potential earnout payments and it is not the final value of all the contingent payments made during the earnout period since Eikon does not provide this type of information. The average value of the contractual earnout is approximately $43 million with a maximum value of $5.9 billion. Then the average of the contractual earnout considered as percentage of the deal value[13] is 33% with a maximum of 100%; in this last case the entire value of the M&A transaction will depend on future events or results.

Table 2.d is a double frequency table between Target Industry and Use of Earnout; focusing on transactions with contingent payment mechanism, 61% (2,463 delas out of 4,048) of earnout transactions involve target firms that belongs to high-tech or service-related industry, showing that this type of companies may favor the use of earnout. Shifting to the status of the target firm, data in table 2.e indicate that only 50 out of the 42,155 mergers and acquisitions considered, involve the use of earnout to acquire public targets. Furthermore, the same table highlights the need of further research for the information asymmetries' problem when seller is a privately held company since 76% of "earnout transactions" are carried out with target private firms.

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[12] On the contrary only Acquisitions, Acquisitions of Assets, Acquisitions of Certain Assets, Acquisitions of Majority Interest, Exchange Offer and Mergers are included
[13] Also known as "relative value of the earnout"

5. Analysis

To examine the validity of the hypotheses presented in Chapter 2, proxies of information asymmetry are exploited for different types of regressions. Before presenting the empirical findings, Table 1 reports the summary statistics used to test the hypotheses. Focusing on the number of the observations available for each variable, they are quite constant considering that the database is composed by 42,155 M&A deals. Relative Size of the deal calculated on acquiror market capitalization and the Acquiror Market to Book Ratio undergo a large reduction in observations because not all the acquiror companies considered for the analysis are listed in a stock exchange. Approximately 64% (25.971 firms out of 42.155) of the acquiring companies are listed. The worst variable in terms of observations is RDSAL, probably because not all the targets have R&D expenses inside their P&L statements and only few companies want to reveal this type of data for strategic reasons.

5.1 Use of Earnout

As mentioned before, dependent variable in Table 4.a (and following) is 1 if earnout is employed and 0 if it's financed with other means of payment: cash, cash and stock, choice between cash and stock or only stock[14].

Multiple linear regressions are performed adding selected variable progressively to assess whether the effect of each variable on the use of earnout remains constant across the regression and to check there is no strong correlation between the selected proxies of information asymmetry. Some variables such as *RelSizeMktCap* and *AcqMktToBook* are temporarily excluded (and included inside the robustness checks) to evaluate separately the introduction in the sample of the acquiror public companies. Moreover, following the research performed by Kohers (2000), the two variables (*RelSize* and *logDealValue*) which investigate the so-called "size effect" of the deal both in absolute and relative terms on the earnout, are included alternatively since the effect analyzed is the same. Except for *logDealValue*, all the independent variables have a p-value lower than 0.001, demonstrating the good explanatory power of the variables in the multiple linear regression. Looking at (8) we can evaluate the single effect of each variable on the choice of using the earnout. Consistent with the predictions on acquirer size, smaller acquiring firms (measured in terms of total assets on their balance sheet) are more likely to exploits the benefits of the contingent payments mechanism to compensate for the lower bargaining power. In particular the sign of *logAcqTotAsset* is negative and significant at 0.001 level.

Gathering information useful for valuation should be more difficult in case target is private-

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[14] See Table 1 for the distribution of the consideration offered in the M&A deals analyzed

held or subsidiary than listed firms. Thus, the coefficients on the private status of the target company, *Unlisted,* and the subsidiary form, *Subsidiary,* are expected to be positive since acquirers are more likely to use earnout for filling the information gap. As shown in Table 3, the coefficients *Unlisted* and *Subsidiary* are significant and positive in all the models. In hypothesis reported in Chapter 2, closing a M&A agreement with a target company located in a foreign country can create some difficulties for the acquiring company, which makes more likelihood the use of protective instruments such as earnout. So, the inclusion of contingent payments is expected to reduce the level of uncertainty around the transaction. Table 4.a indicates that the coefficient on *Crossborder* is significantly positive in model (8) and in all the other models. Then the relation between some specific target sectors and the use of earnout is examined. Consistent with hypothesis, acquirers that purchase target firms in high-technologies industries tend to choose more earnout provisions; this is shown also by *HighTech* in Table 4.a which is positive and significant at 0.001 level in all models. The significant and positive coefficient of *Service* demonstrates that also service-related target companies are more likely to be acquired with the use of contingent payment mechanism, reflecting mainly the difficulty of valuing service-based activities. Model (8) in Table 4.a indicates that the variable investigating the size of the deal *(logDealValue)* is not statistically significant: no further discussions can be made. Contrary with our predications, Table 4.a shows that M&A are more likely to employ earnout in case of target and acquirer that belong to the same industry (*IntraIndustry* is significantly positive)[15]. Another result in contrast with our hypothesis is the coefficient of *AcqCollateral* which is surprisingly significant and negative[16].

In Table 4.b eight more regressions are performed to check the robustness of the model, introducing new variables for supplemental analysis and demonstrating that the effect on the use of earnout of the proxies of information asymmetry selected in Table 4.a remain constant.

Firstly, having a low level of financial leverage can be an important feature for the acquiror to facilitate the commitment of future contingent payments. The coefficient on the financial leverage of the acquiring company, *FinLeverage* is expected to be negative since a good financial flexibility can favor the use of earnout. In regression (3) the variable *logDealValue* is substituted by *RelSizeMktCap* (the relative size of the deal calculated with the market capitalization of the acquiror); also, the market to book ratio of the acquiring companies is included in model (4) in order to capture the potential effects of a regression performed only

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[15] See Appendix C for further analysis
[16] Again, see Appendix B for further details

with public companies. The variable *AcqMktToBook* is negative and significant at 0.001 level: acquiring firms with higher market-to-book ratio tends to exploit its overvalued stocks to finance the transactions, having a negative impact on the earnout utilization. Surprisingly, *RelSizeMktCap* is statistically significant and negative in both model (3) and (4): one possible reason is that larger target companies (compared to acquirer's size) may exploit its bargaining power closing the M&A deal without future contingent payments. Regressions in model (5) and (6) are performed for giving greater clarity to what is reported in Appendix B. The great drop in the observation in model (7) is caused by introduction of the variable RDSAL, which investigates the percentage of R&D expenses on target's Net Sales. Even if many variables are not significant in model (7), it's interesting to analyze the positive effect of RDSAL: acquisitions that involve target firms with high R&D expenditures are linked to uncertainty on target valuation (higher possibilities of unrecorded assets) favoring the earnout. Finally, model (8) is carried out to check for possible bias coming from the financial sector; for this reason, acquiror and target companies that belongs to the financial industry are temporarily excluded from the sample. The dynamics of the M&A word for the financial sector could be in some cases quite different compared to all the other industries. Furthermore, some of the variables computed using traditional accounting items can lose its relevance with the specific accounting system of the financial sector. At the end, from the comparison of model (1) and model (8), no specific bias is identified.

Table 3: Table of Summary statistics

	N	Mean	SD	Variance	Skewness	Kurtosis	p25	p75
logAcqTotAsset	42,155	6.712	2.467	6.086	-0.276	3.702	5.296	8.221
AcqCollateral	40,654	0.814	0.219	0.048	-1.163	3.277	0.687	0.991
logDealValue	42,155	4.169	1.652	2.730	0.602	2.74	2.862	5.247
RelsizeMktcap	27,021	0.160	0.192	0.037	1.893	6.572	0.027	0.222
RelSizeTotalAsset	42,155	0.172	0.232	0.054	1.918	6.065	0.021	0.221
Unlisted	42,155	0.463	0.499	0.249	0.148	1.022	0	1
Subsidiary	42,155	0.370	0.483	0.233	0.538	1.29	0	1
IntraIndustry	42,155	0.638	0.481	0.231	-0.573	1.328	0	1
CrossBorder	42,155	0.325	0.469	0.219	0.747	1.557	0	1
AcqMktToBook	25,971	3.938	9.411	88.560	6.904	54.370	1.251	3.249
Serv	42,155	0.299	0.458	0.201	0.879	1.773	0	1
HighTech	42,155	0.177	0.382	0.146	1.694	3.868	0	0
Finlevpaper	41,824	0.243	0.316	0.100	0.095	3.084	0.049	0.437
RDSAL	5,998	0.090	0.350	0.122	6.113	42.330	0	0.021
CASH	42,155	0.702	0.456	0.209	-0.884	1.783	0	1

The table shows the most important summary statistics - such as number of observations, mean, standard deviation, variance, skewness, kurtosis, 25th and 75th percentile - for all the independent variables included in the following empirical analyses. *logAcqTotAssets* is logarithm of book value of bidder's total assets before the M&A deal (1 year prior); *AcqCollateral* is the ratio of acquiror's PPE to book value of total assets 1 year prior the bid; *logDealValue* is logarithm of the value of the M&A transaction; *Unlisted* is a dummy that equals 1 if the target is a privately held company not listed on any stock exchange, and it is 0 for listed targets and unlisted subsidiary; *Subsidiary* takes the value of 1 when the (unlisted) target is a subsidiary of another firm, and equals 0 otherwise; *IntraIndustry* is 1 if acquiror and target are in the same industry and is 0 otherwise; *CrossBorder* equals 1 if M&A transaction is carried out between bidder and target from different countries and is 0 otherwise; *Serv* is a dummy that equals 1 if the target is service-oriented and 0 otherwise; *HighTech* equals 1 if the target is a high-technology company, 0 otherwise; *Finlev* is the acquiror's financial leverage calculated as the ratio of acquiror's book value of debt (prior to the M&A announcement) plus the deal value divided by the sum of the book value of total assets (again prior to the announcement) plus the deal value; *RelSize* is the relative size of the transaction computed as the ratio of deal value divided by the sum of the deal value plus the acquiror's market value of equity four weeks before the announcement date; *AcqMktToBook* is a ratio calculated as acquiror market value of equity plus book value of debt over the sum of book value of equity plus book value of debt prior to the bid; *RDSAL* is the ratio of target's R&D expenses divided by the target's Net Sales; *CASH* is a dummy which equals to 1 when the acquiring company decides to made an all-cash offer and 0 when the bid is composed only by acquiror's stocks or a combination of cash and stocks.

Table 4.a: Linear Regression, Dependent variable: Use of Earnout

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
logAcqTotAsset	-0.0143***	-0.0165***	-0.0140***	-0.0117***	-0.0115***	-0.0116***	-0.0122***	-0.0127***	-0.0126***
	(-25.95)	(-28.45)	(-22.39)	(-18.74)	(-18.55)	(-18.76)	(-19.49)	(-20.14)	(-19.90)
AcqCollateral		-0.239***	-0.239***	-0.218***	-0.216***	-0.216***	-0.210***	-0.207***	-0.199***
		(-30.45)	(-30.54)	(-28.44)	(-28.19)	(-28.24)	(-27.29)	(-26.93)	(-25.16)
logDealValue			-0.00715***	-0.000356	0.00140	0.00131	0.00158	0.00163	0.00170
			(-8.18)	(-0.40)	(1.52)	(1.43)	(1.72)	(1.78)	(1.85)
Unlisted				0.0954***	0.127***	0.129***	0.129***	0.131***	0.131***
				(31.28)	(41.12)	(41.14)	(41.18)	(41.79)	(41.57)
Subsidiary					0.0430***	0.0447***	0.0437***	0.0466***	0.0482***
					(17.99)	(18.36)	(17.96)	(18.85)	(19.23)
IntraIndustry						0.0134***	0.0137***	0.0125***	0.0123***
						(4.41)	(4.49)	(4.13)	(4.08)
CrossBorder							0.0332***	0.0342***	0.0342***
							(10.23)	(10.55)	(10.54)
Serv								0.0320***	0.0388***
								(9.79)	(11.69)
HighTech									0.0262***
									(5.86)
_cons	0.192***	0.404***	0.418***	0.312***	0.271***	0.263***	0.250***	0.239***	0.224***
	(43.42)	(46.38)	(45.81)	(34.38)	(29.17)	(27.67)	(25.99)	(24.78)	(22.17)
N	42155	40654	40654	40654	40654	40654	40654	40654	40654

The table shows multiple OLS regressions, run adding the independent variables progressively. OLS regressions investigate the impact of selected proxies of information asymmetry on the use of earnout. The dependent variable is equal to one if earnout provisions are included inside M&A deal while it is equal to zero in case some other means of payment are used.

t statistics in parentheses

Source: auto.dta

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

Table 4.b: Robustness Checks, Dependent variable: Use of Earnout

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
logAcqTotAsset	-0.0126***	-0.0180***	-0.0171***	-0.0174***	-0.0109***	-0.00829***	-0.00246***	-0.0127***
	(-19.90)	(-26.82)	(-18.88)	(-18.39)	(-15.82)	(-12.03)	(-3.55)	(-18.54)
AcqCollateral	-0.199***	-0.210***	-0.222***	-0.214***	-0.201***		-0.0183*	-0.194***
	(-25.16)	(-26.78)	(-21.65)	(-20.58)	(-25.32)		(-2.16)	(-23.40)
logDealValue	0.00170	0.00981***			0.000133	-0.000731	0.000314	0.00113
	(1.85)	(9.90)			(0.14)	(-0.75)	(0.49)	(1.16)
Unlisted	0.131***	0.130***	0.175***	0.169***	0.134***	0.148***	0.0258	0.134***
	(41.57)	(41.46)	(42.21)	(40.60)	(41.73)	(45.36)	(1.58)	(39.69)
Subsidiary	0.0482***	0.0498***	0.0615***	0.0599***	0.0532***	0.0642***	0.0356*	0.0481***
	(19.23)	(19.74)	(18.09)	(17.51)	(19.82)	(24.43)	(2.37)	(18.14)
IntraIndustry	0.0123***	0.0106***	0.00582	0.00509	0.0113***	0.00854**	-0.000695	0.0112***
	(4.08)	(3.51)	(1.33)	(1.15)	(3.73)	(2.78)	(-0.26)	(3.55)
CrossBorder	0.0342***	0.0310***	0.0553***	0.0568***	0.0361***	0.0449***	0.00241	0.0342***
	(10.54)	(9.59)	(12.18)	(12.34)	(10.99)	(13.80)	(0.95)	(10.10)
Serv	0.0388***	0.0343***	0.0467***	0.0450***	0.0370***	0.0433***	0.00742**	0.0354***
	(11.69)	(10.44)	(10.36)	(9.92)	(11.04)	(12.76)	(3.02)	(8.66)
HighTech	0.0262***	0.00700	0.0177**	0.0203***	0.0258***	0.0447***	-0.00378	0.0259***
	(5.86)	(1.53)	(3.03)	(3.43)	(5.77)	(10.20)	(-1.18)	(5.77)
Finlevpaper		-0.0978***						
		(-18.47)						
RelsizeMktcap			-0.0870***	-0.0853***				
			(-8.04)	(-7.80)				
AcqMktToBook				-0.00112***				
				(-4.97)				
CASH					-0.0194***			
					(-5.15)			
CASHbyAcqCollateral						-0.0513***		
						(-13.15)		
RDSAL							0.0307**	
							(3.09)	
_cons	0.224***	0.266***	0.300***	0.300***	0.232***	0.0528***	0.0341**	0.223***
	(22.17)	(26.11)	(22.77)	(22.00)	(22.37)	(8.14)	(3.28)	(20.28)
N	40654	40630	26997	25952	40654	40654	5806	37057

Multivariate OLS regressions are performed to check for robustness introducing supplemental independent variables. The dependent variable is equal to one if earnout provisions are included inside M&A deal while it is equal to zero in case some other means of payment are used. The variables *logDealValue* and *RelsizeMktcap* in models (1) and (3) are two mutually exclusive variables because they investigate "size effect" of the deal on the earnout both in absolute and relative terms. In model (4) *RelSizeMktCap* and *AcqMktToBook* are included simultaneously reducing the sample to only listed companies. Models (5) and (6) are run just for the purposes of Appendix B.

t statistics in parentheses
Source: auto.dta
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 4.c fixed-effect regressions are run for eliminating omitted variables bias. In model (2) and (3) fixed effects for target's industry and year are considered separately while in model (4) they are included simultaneously. The impact of the independent variables on the use of earnout in the fixed effect regressions remain completely consistent with those of the base model (1). The variables *Serv HighTech* and *IntraIndustry* are excluded from the models when the industry fixed effect is activated because otherwise this effect would be double counted. In other words, including these variables we would investigate the industry fix effect within one specific sector or for deals occurred in the same industry.

Since the dependent variable is a dummy, Probit and Logit regressions are run to evaluate if the model is flexible about change of assumptions on distribution. As shown in Table 4.d, nothing changes about the direction of the impact of the factors chosen on the use of the contingent payment mechanism.

Table 4.c: Fixed effect for Industry and Year, Dependent variable: Use of Earnout

	(1)	(2)	(3)	(4)
logAcqTotAsset	-0.0126***	-0.0120***	-0.0121***	-0.0116***
	(-19.90)	(-18.49)	(-18.95)	(-17.75)
AcqCollateral	-0.199***	-0.182***	-0.195***	-0.180***
	(-25.16)	(-21.58)	(-24.80)	(-21.34)
logDealValue	0.00170	0.00208*	0.00180	0.00219*
	(1.85)	(2.27)	(1.96)	(2.39)
Unlisted	0.131***	0.127***	0.137***	0.134***
	(41.57)	(40.20)	(41.91)	(40.64)
Subsidiary	0.0482***	0.0484***	0.0553***	0.0555***
	(19.23)	(19.02)	(21.10)	(20.85)
IntraIndustry	0.0123***		0.00938**	
	(4.08)		(3.09)	
CrossBorder	0.0342***	0.0328***	0.0329***	0.0316***
	(10.54)	(10.06)	(10.15)	(9.70)
Serv	0.0388***		0.0381***	
	(11.69)		(11.50)	
HighTech	0.0262***		0.0246***	
	(5.86)		(5.51)	
_cons	0.224***	0.267***	0.224***	0.264***
	(22.17)	(23.32)	(18.31)	(19.86)
N	40654	40654	40654	40654
INDUSTRY	NO	YES	NO	YES
YEAR	NO	NO	YES	YES

Multivariate OLS regressions are performed to check for omitted variables bias introducing industry and year fixed effects both alternatively and simultaneously. The dependent variable is equal to one if earnout provisions are included inside M&A deal while it is equal to zero in case some other means of payment are used. In models (2) and (4), when industry fixed effect is activated, *Serv*, *HighTech* and *IntraIndustry* are excluded to avoid the risk of double counting the effect on specific target's sector.

t statistics in parentheses

Source: auto.dta

Table 4.d: Logit and Probit regression, Dependent Variable: Use of Earnout

	(1)	(2) LOGIT	(3) PROBIT
main			
logAcqTotAsset	-0.0126***	-0.149***	-0.0827***
	(-19.90)	(-20.39)	(-20.15)
AcqCollateral	-0.199***	-1.981***	-1.079***
	(-25.16)	(-28.79)	(-28.53)
logDealValue	0.00170	0.0235	0.0173*
	(1.85)	(1.78)	(2.51)
Unlisted	0.131***	3.068***	1.390***
	(41.57)	(20.91)	(24.72)
Subsidiary	0.0482***	2.135***	0.915***
	(19.23)	(14.38)	(16.01)
IntraIndustry	0.0123***	0.107**	0.0615**
	(4.08)	(2.93)	(3.22)
CrossBorder	0.0342***	0.375***	0.206***
	(10.54)	(10.28)	(10.64)
Serv	0.0388***	0.455***	0.248***
	(11.69)	(11.14)	(11.59)
HighTech	0.0262***	0.325***	0.174***
	(5.86)	(7.10)	(7.16)
_cons	0.224***	-2.833***	-1.351***
	(22.17)	(-15.78)	(-17.61)
N	40654	40654	40654

The table shows OLS, Logit and Probit regressions which are performed on the same set of independent variables to check for changes in the underlying assumptions on distribution. The dependent variable is equal to one if earnout provisions are included inside M&A deal while it is equal to zero in case some other means of payment are used.

t statistics in parentheses
Source: auto.dta
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.2 Relative Value of Earnout

Based on the same set of factors, multivariate linear regression in Table 5.a is performed to

understand whether the value of the contingent payments, expressed as percentage of the deal value, is affected by the level of information asymmetry. The dependent variable corresponds to the relative value of earnout, considering the value of the transaction as denominator and the contractual value of the earnout at the announcement date as numerator. The *contractual value* of the earnout is the maximum value the acquirer could pay to the target according to the contingent events set by the earnout provision. As mentioned before, same information asymmetry proxies are exploited as independent variables in regression of Table 5.a.

Number of observations in model (1) are consistently decreased compared to previous tables (about 4,000 number of observations in Table 5.a) because in this case are considered only M&A deals where earnout provisions are included. Model (1) in Table 5.a shows that many variables, such as *AcqCollateral, Unlisted, Subsidiary, Intraindustry* and *CrossBorder* are not significant so, the effect of these factors on the relative value of the earnout cannot be investigated and studied in depth.

The remaining results show that the same variables that affect the likelihood that earnout is used in M&A deals also affect the size of the earnout proportion of deals. For example, consistent with what is reported in Table 4.a, small size acquiring firms are more likely to include earnout provisions and to close transactions with a higher relative value of earnout. Furthermore, acquirers that purchase service-related and high-technology target companies tend to be associated with mergers and acquisitions whose deal value has a greater percentage of value of earnout; the level of uncertainty for high-tech and service companies is typically higher than the other sectors.

Following the same path as when use of earnout was the dependent variable, the robustness of the model is checked in Table 5.b by carrying out further multivariate linear regressions. The overall situation is quite constant as in Table 5.a: the variables *AcqCollateral, Unlisted, Subsidiary, Intraindustry* and *CrossBorder* are still statistically not significant; while the effect on the relative value of the earnout of factors considering the target company's sector (*Serv* and *High-Tech*) and the acquirer's size (*LogAcqTotAsset*) remain the same (as described above).

Moving to supplemental variables included in Table 5.b, the value of earnout (as percentage of deal value) is likely to be smaller for acquiring firms with higher financial leverage (*Finlevpaper*). Finally, the significant and positive coefficient on *Cash* demonstrates that when the transaction consists in fully cash payments the likelihood of having a higher relative value of earnout increases.

Table 5.a: Linear Regression, Dependent variable: Relative Value of Earnout

	(1)
logAcqTotAsset	-0.00802***
	(-3.46)
AcqCollateral	-0.00860
	(-0.56)
logDealValue	-0.0228***
	(-7.34)
Unlisted	0.00684
	(0.22)
Subsidiary	-0.0279
	(-0.87)
IntraIndustry	0.0109
	(1.48)
CrossBorder	0.00578
	(0.79)
Serv	0.0868***
	(10.24)
HighTech	0.0215*
	(2.47)
_cons	0.426***
	(11.41)
N	4001

In this table the dependent variable corresponds to the ratio between the contractual value of the earnout at the announcement date and the value of the transaction. The *contractual* value of the earnout is the maximum sum, the acquirer could pay to the target according to the contingent events set by the earnout provisions. OLS regression investigates the impact of selected proxies of information asymmetry on the earnout portion of the total deal.

t statistics in parentheses
Source: auto.dta
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5.b: Robustness Checks, Dependent variable: Relative Value of Earnout

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
logAcqTotAsset	-0.00802***	-0.0110***	-0.0199***	-0.0206***	-0.0104***	-0.00948***	-0.0314	-0.00854***
	(-3.46)	(-4.38)	(-9.07)	(-8.53)	(-4.13)	(-3.92)	(-1.61)	(-3.43)
AcqCollateral	-0.00860	-0.0220	-0.0205	-0.0282	-0.00988		0.126	-0.00356
	(-0.56)	(-1.36)	(-1.28)	(-1.67)	(-0.65)		(0.84)	(-0.22)
logDealValue	-0.0228***	-0.0187***			-0.0211***	-0.0219***	0.00294	-0.0223***
	(-7.34)	(-5.45)			(-6.64)	(-7.00)	(0.10)	(-6.90)
Unlisted	0.00684	0.00755	0.0235	0.0200	0.00695	0.00766	0.00175	0.00739
	(0.22)	(0.24)	(0.64)	(0.53)	(0.22)	(0.24)	(0.02)	(0.23)
Subsidiary	-0.0279	-0.0248	-0.0129	-0.0187	-0.0294	-0.0299	-0.0304	-0.0254
	(-0.87)	(-0.78)	(-0.35)	(-0.49)	(-0.92)	(-0.94)	(-0.33)	(-0.77)
IntraIndustry	0.0109	0.00965	0.00557	0.000287	0.0115	0.0106	-0.118	0.0119
	(1.48)	(1.31)	(0.71)	(0.03)	(1.56)	(1.44)	(-1.16)	(1.58)
CrossBorder	0.00578	0.00582	0.00233	0.00430	0.00507	0.00528	0.0590	0.00487
	(0.79)	(0.80)	(0.30)	(0.53)	(0.70)	(0.73)	(0.92)	(0.65)
Serv	0.0868***	0.0834***	0.0851***	0.0915***	0.0872***	0.0891***	-0.00275	0.0895***
	(10.24)	(9.82)	(9.43)	(9.71)	(10.30)	(10.58)	(-0.03)	(9.80)
HighTech	0.0215*	0.0150	0.0184*	0.0214*	0.0211*	0.0232**	-0.0108	0.0218*
	(2.47)	(1.66)	(1.98)	(2.20)	(2.43)	(2.69)	(-0.11)	(2.49)
Finlevpaper		-0.0374**						
		(-2.67)						
RelsizeMktcap			-0.0506	-0.0464				
			(-1.75)	(-1.52)				
AcqMktToBook				0.000120				
				(0.24)				
CASH					0.0217**			
					(2.74)			
CASHbyAcqCollateral						0.0239*		
						(2.44)		
RDSAL							0.110*	
							(2.53)	
_cons	0.426***	0.446***	0.416***	0.432***	0.420***	0.414***	0.412**	0.422***
	(11.41)	(11.77)	(9.59)	(9.49)	(11.29)	(11.72)	(2.76)	(10.82)
N	4001	3999	3577	3319	4001	4001	46	3762

Multivariate OLS regressions are performed to check for robustness introducing supplemental independent variables. In this table the dependent variable corresponds to the ratio between the contractual value of the earnout at the announcement date and the value of the transaction. The *contractual* value of the earnout is the maximum sum the acquirer could pay to the target according to the contingent events set by the earnout provisions. The variables *logDealValue* and *RelsizeMktcap* in models (1) and (3) are two mutually exclusive variables because they investigate "size effect" of the deal on the relative value of earnout both in absolute and relative terms. In model (4) *RelSizeMktCap* and *AcqMktToBook* are included simultaneously reducing the sample to only listed companies. Models (5) and (6) are run just for the purposes of Appendix B.

t statistics in parentheses
Source: auto.dta
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 5.c further regressions which consider the fixed effects for target's industry and the reference year of the M&A deal are performed. Variables, which already study for specific target's sector (*Serv* and *HighTech*) or transactions within the same sector (*IntraIndustry*), are omitted when industry-fixed effect is activated to avoid the risk of double counting this effect. As shown in Table 5.c, comparing the models with and without the inclusion of industry and year fixed effects, no bias is identified. Using the same set of proxies of information asymmetry, Table 5.d compares multivariate linear regression carried out also in Table 5.a with Tobit regression[17]. The effect of the variables on the relative value of earnout remains constant so the model proves to be flexible to changes in the underlying assumptions.

Table 5.c: Fixed effect for Industry and Year, Dependent variable: Relative Value of Earnout

	(1)	(2)	(3)	(4)
logAcqTotAsset	-0.00802***	-0.00716**	-0.00989***	-0.00911***
	(-3.46)	(-3.10)	(-4.25)	(-3.92)
AcqCollateral	-0.00860	0.00409	-0.0151	-0.00274
	(-0.56)	(0.26)	(-0.98)	(-0.17)
logDealValue	-0.0228***	-0.0233***	-0.0200***	-0.0207***
	(-7.34)	(-7.53)	(-6.34)	(-6.56)
Unlisted	0.00684	0.0124	0.00963	0.0151
	(0.22)	(0.39)	(0.31)	(0.49)
Subsidiary	-0.0279	-0.0217	-0.0278	-0.0218
	(-0.87)	(-0.68)	(-0.88)	(-0.69)
IntraIndustry	0.0109		0.00883	
	(1.48)		(1.19)	
CrossBorder	0.00578	0.00513	0.00643	0.00591
	(0.79)	(0.71)	(0.89)	(0.82)
Serv	0.0868***		0.0868***	
	(10.24)		(10.23)	
HighTech	0.0215*		0.0210*	
	(2.47)		(2.41)	
_cons	0.426***	0.440***	0.464***	0.475***
	(11.41)	(11.71)	(11.07)	(11.37)
N	4001	4001	4001	4001
INDUSTRY	NO	YES	NO	YES
YEAR	NO	NO	YES	YES

Multivariate OLS regressions are performed to check for omitted variables bias introducing industry and year fixed effects both alternatively and simultaneously. The dependent variable corresponds to the ratio between the contractual value of the earnout at the announcement date and the value of the transaction. The *contractual* value of the earnout is the maximum sum the acquirer could pay to the target according to the contingent events set by the earnout provisions. In models (2) and (4), when industry fixed effect is activated, *Serv*, *HighTech* and *IntraIndustry* are excluded in order to not double counting the effect on specific target's sector.

t statistics in parentheses
Source: auto.dta

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[17] The dependent variable (relative value of earnout) is no more a dummy so Tobit regression is performed rather than Logit and Probit.

Table 5.d: Tobit regression, Dependent Variable: Relative Value of Earnout

	(1)	(2) TOBIT
main		
logAcqTotAsset	-0.00802***	-0.00802***
	(-3.46)	(-3.84)
AcqCollateral	-0.00860	-0.00860
	(-0.56)	(-0.58)
logDealValue	-0.0228***	-0.0228***
	(-7.34)	(-7.42)
Unlisted	0.00684	0.00684
	(0.22)	(0.21)
Subsidiary	-0.0279	-0.0279
	(-0.87)	(-0.85)
IntraIndustry	0.0109	0.0109
	(1.48)	(1.45)
CrossBorder	0.00578	0.00578
	(0.79)	(0.80)
Serv	0.0868***	0.0868***
	(10.24)	(10.23)
HighTech	0.0215*	0.0215*
	(2.47)	(2.36)
_cons	0.426***	0.426***
	(11.41)	(11.58)
/		
var(e.EarnoutOverDealValue)		0.0497***
		(44.73)
N	4001	4001

The table shows OLS and Tobit regressions which are performed on the same set of independent variables to check for changes in the underlying assumptions on distribution. The dependent variable corresponds to the ratio between the contractual value of the earnout at the announcement date and the value of the transaction. The *contractual* value of the earnout is the maximum sum the acquirer could pay to the target according to the contingent events set by the earnout provisions.

t statistics in parentheses
Source: auto.dta
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.3 Use of Stock

Like Datar (2001), this study provides an additional analysis on the differences between the use of the earnout and the use of common stock in M&A deals. Based on the idea that stock

and earnout can be considered as two alternatives to solve adverse selection problem, this section is going to understand whether the same proxies of information asymmetry selected to study earnout can be also used to specify when the stock issuance is more likely in M&A deals.

For this purpose, model (9) in Table 4.a and model (2) and (4) in Table 4.b are replicated with a dummy variable for common stock use as dependent variable. The dummy is set to one if common stock is entirely used as final consideration offered and zero otherwise. Consistently with Table 1, for this analysis only transactions with final consideration structure in form of stock and without the use of earnout are considered. This means that the two special cases of use of earnout combined with issuance of stock are excluded.

Table 6 shows that some of the variables included follow the same logic of the earnout. For example, the size of acquiring firms (measured as total assets in their balance sheet) is negatively associated to the use of stock; obtaining information about the target is a costly process and smaller acquirers can choose to use stock to have extra protection and compensate their lack of resources. Following the same logic, the greater the size of the deal (or the size of the target) both in absolute and relative terms (*RelMktSize* and *LogDealvalue*) the higher the likelihood for acquirer to choose to finance the transaction using its stocks; the acquirer will be in this way more protected from the risk of overpayments. Thus, both the coefficients on the target size are positive and significant at 0.001 level. As for the use of earnout, when target company operates in the service industry, acquirers are more willing to choose stock as mean of payment in M&A deal, since it is more complicated to evaluate the activities of companies which do not make tangible products. So, the variable *Serv* is positive and significant at 0.001 level. Surprisingly, in contrast with what could be expected considering (the positive effect of service-related selling companies) what has been described above about service-related selling companies, the coefficient associated to high technology target firms is negative and significant in all the models.

The effect of some other variables in Table 6 on the use of stock differs from how the same factors affects the likelihood of choosing earnout. The use of acquiror's stock as mean of payment in M&A deals shifts the problem of adverse selection to the target's side: now it is the target company that has to collect useful information to assess whether the acquirer's shares are overvalued[18]. The negative coefficients on the subsidiary form and the private status of the target in all the models of Table 6 show that this type of companies is less likely to accept acquirer's stock since it's usually more complicated for them to investigate the true value of the stock received. Similarly, if the acquiror is located in a foreign country, target

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[18] Recall that acquirer's managers usually issue stock when they believe their company is overvalued.

firm is more reluctant to accept stock in M&A transaction. In some foreign countries, stocks can be subjected to specific rules for trading and tax purposes and, when local stock-exchanges are not so active, the fundamental value of the stock is far from corresponding to the market price. For all these reasons, the coefficient on *Crossborder* is significantly negative in model (1) and in all the other models.

Table 6 shows that the variable investigating M&A transactions within the same industry is not statistically significant in all the models so this effect cannot be study. The variable *Finlevpaper* investigates the level of financial leverage in acquirer's balance sheet. It is positive and significant at 0.001 level since acquirer with higher financial leverage has more difficulties in financing the deal by collecting external funds and it's more likely to issue stock. Unexpectedly, Table 6 indicates that acquiring firms with a greater percentage of tangible assets are more likely to issue stock in contrast with the idea that having more collateral assets increases the possibilities of using cash financing (and so less stock employment). Model (3) shows also that listed acquiring firms with greater market-to-book ratio (*AcqMktToBook*) tends more to use stock in M&A deals exploiting the potential overvaluation of its shares.

Table 6: Linear Regression, Dependent variable: Use of Stock

	(1)	(2)	(3)	(4)	(5) Earnout
logAcqTotAsset	-0.0454***	-0.0384***	-0.0232***	-0.0221***	-0.0126***
	(-49.81)	(-45.32)	(-20.38)	(-26.29)	(-19.90)
AcqCollateral	0.151***	0.166***	0.181***		-0.199***
	(23.74)	(25.94)	(21.21)		(-25.16)
logDealValue	0.0318***	0.0212***		0.00580***	0.00170
	(26.36)	(17.81)		(5.18)	(1.85)
Unlisted	-0.180***	-0.179***	-0.190***	-0.150***	0.131***
	(-31.56)	(-31.44)	(-28.44)	(-30.12)	(41.57)
Subsidiary	-0.170***	-0.172***	-0.156***	-0.104***	0.0482***
	(-30.33)	(-30.73)	(-23.49)	(-21.16)	(19.23)
IntraIndustry	-0.00179	0.000428	-0.00897*	-0.0138***	0.0123***
	(-0.60)	(0.14)	(-2.12)	(-5.09)	(4.08)
CrossBorder	-0.0326***	-0.0283***	-0.0447***	-0.0193***	0.0342***
	(-11.08)	(-9.67)	(-10.97)	(-7.29)	(10.54)
Serv	0.0360***	0.0417***	0.0231***	-0.00971**	0.0388***
	(10.01)	(11.63)	(4.77)	(-2.96)	(11.69)
HighTech	-0.0165***	0.00836*	-0.0168***	-0.0628***	0.0262***
	(-4.30)	(2.09)	(-3.31)	(-17.66)	(5.86)
Finlevpaper		0.127***			
		(23.25)			
RelsizeMktcap			0.358***		
			(23.73)		
AcqMktToBook			0.00247***		
			(8.97)		
CASHbyAcqCollateral				-0.335***	
				(-75.74)	
_cons	0.318***	0.264***	0.245***	0.566***	0.224***
	(29.37)	(24.30)	(17.11)	(65.42)	(22.17)
N	40654	40630	25952	40654	40654

In this table multivariate OLS regressions are performed on the same set of independent variables to understand whether the selected proxies of information asymmetry can be both used to explain the use of earnout and the use of stock as means of payment inside M&A deals. From model (1) to (4) the dependent variable is a dummy which is set to one if common stock is entirely used as final consideration offered and zero otherwise. In model (5), which is introduced just for sake of comparison, the output variable is equal to one if earnout provisions are included inside M&A deal while it is equal to zero in case some other means of payment are used.

t statistics in parentheses
Source: auto.dta
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Summary And Conclusions

This study extends the analysis of the adverse selection problem proposed by Akerlof (1970) to the word of the mergers and acquisitions. The starting point is to study how an uneven distribution of information among the parties can affect the level of acquisition premium and the choice of payment method. When the level of information asymmetry is high, acquisition premium will be lower and stock payments will be probably made (on the contrary an all-cash offer will be avoided). But there is another possible instrument in the hands of the bidder to mitigate the adverse selection problem: the implementation of two-part payment provisions inside the deal (earnout). By connecting part of the price to the future target's performance, earnout provision favors agreement between acquirer and target especially when the two parties have different expectations on target's fundamental value. In other words, it works as a bridge valuation mechanism. However, the use of earnout in M&A deals is limited by some drawbacks: earnout is not easy to be negotiated in all its terms (size, metric, duration and form of the future payments). Furthermore, difficulties relating to the measurement of future performance and enforcement of future payment can limit the earnout feasibility. The results of the research show that earnout tends to involve smaller acquiring firms and privately held or subsidiary targets operating in high-technologies or service-related industries. Then, the majority of M&A which include earnout involves acquiring and selling companies located in different countries. The earnout mechanism is also most often used when the acquirer has a lower level of financial leverage and lower market-to-book ratio (for listed companies). Supplemental analysis suggests also that acquisitions which involve targets in service-related or high-tech sectors and smaller acquirers are positively associated to the relative value of the earnout. The last section provides further evidence on the differences between earnout use and stock use in M&A transactions. Considering their specific features, both the instrument can be exploited for mitigating the level of information asymmetry. The results show that many of the adverse selection proxies can be also used to define mergers and acquisitions where the stock issuance is more or less likely. Stock payment is more likely when smaller acquirers purchase greater targets operating in service-related sectors. In addition, privately held and subsidiary targets are less willing to accept stocks from acquiring firms. The effect is also amplified when acquirers are located in a foreign country. Finally, stock is more likely to be used when acquiring companies has a greater level of financial leverage in their balance sheet and higher market-to-book ratio (for listed companies).

In sum, this study provides a complete analysis of the adverse selection problem and its effect on choice of the mean of payment in M&A transactions, but there is for sure further space for research since the academic literature about this topic is not so developed.

Appendix

Appendix A

The basic structure of the model proposed by Faccio (2005) starts from this multivariate statistical regression:

$$CASH\ PORTION\ [0, 100] = \alpha + \beta 1 \ * CONTROL + \beta 2 \ * CONTROL^2 + \beta 3 \ * CONTROL^3 + \beta 4 \ * CONTROL\ LOSS + \beta 5 \ * COLLATERAL + \beta 6 \ * FIN'L\ LEVERAGE + \beta 7 \ * INTERLOCK + \beta 8 \ * LOG(TOTAL\ ASSETS) + \beta 9 \ * REL\ SIZE + \beta 10 \ * RUNUP + \beta 11 * UNLISTED\ TARGET + \beta 12 \ * SUBSIDIARY + \beta 13 \ * INTRA\ INDUSTRY + \beta 14 \ * MKTTOBOOK + \beta 15 \ * CROSS\ BORDER + \beta 16 \ * MKT\ RUN + \varepsilon$$

This type of model wants to investigate the potential determinants of the choice of the M&A payment method between cash and stock, excluding the use of earnout from the research. The dependent variable is the cash portion (between 0% and 100%) of the M&A consideration and the remaining part is supposed to be financed with stock. The independent variables selected by Faccio (2005) are briefly presented in the table below.

Table 7: List of variables proposed by Faccio (2005)

Name of Variable	Description	Effect on Cash Proportion
CONTROL	It is the **bidder voting control** represented by the percentage of the block that controls the bidder.	With high levels of control in a bidder, the dominant shareholder is not so *concerned with losing control due to a stock-financed acquisition.*

CONTROL LOSS	It is the product between the **target's control block** and **the deal's relative size**. The relative deal size is computed as the **ratio of offer size** (excluding assumed liabilities) **to the sum of a bidder's equity pre-offer capitalization plus, the offer size**. The target's controlling blockholder is assumed to have *100% ownership for unlisted targets and subsidiary targets.* For listed targets, we determine the preacquisition control structure of the target using the sources	*Concentrated ownership of a target* means that a stock-financed acquisition can create a *large blockholder*, *threatening the corporate governance of the acquirer.* This implies that *financing the M&A deal with stock can create a new blockholder in the bidder.* While the risk of creating a new bidder blockholder with stock financing is higher when a target has a concentrated ownership structure, this is *especially true when the relative size of the deal is large*.
COLLATERAL	COLLATERAL is measured by the **ratio of property, plant, and equipment (PPE) to book value of total assets** at the year-end prior to the bid.	**The more the fraction of tangible assets the more the bidder's ability to pay cash. Greater ability to be** financed by additional borrowing.

FIN'L LEVERAGE	The bidder's financial leverage is measured by the **sum of the bidder's face value of debt** (prior to the M&A announcement) **plus the deal value** (including assumed liabilities) **divided by the sum of the book value of total assets prior to the announcement plus the deal value** (including assumed liabilities). This captures the bidder's post-deal leverage **if the transaction is debt financed.**	Since cash is primarily obtained by issuing new debt, **highly levered bidders are constrained in their ability to issue debt and as a consequence use stock financing more frequently.**
INTERLOCK	INTERLOCK takes the value **of 1 if a top bidder director is also a director of a bank, and 0 otherwise.**	Companies may establish **connections with banks through interlocking directorships** that may **facilitate access to debt financing**.
TOTAL ASSETS	It is measured as the **logarithm of premerger book value of bidder's total assets**	Larger firms are more diversified and thus have proportionally lower expected bankruptcy costs. Thus, **cash financing should be more feasible in the case of larger firms.**

REL SIZE	The relative size of the deal is computed as the **ratio** of **deal offer size** (excluding assumed liabilities) **divided by the sum of the deal's offer size plus the bidder's pre-offer market capitalization** at the year-end prior to the bid.	**Bidders may have greater incentives to finance with stock when the asymmetric information about target assets is high**. This can happen when **target assets rise in value relative to those of a bidder**
RUNUP	RUNUP represents a proxy for bidder overvaluation calculated from a **bidder's buy and hold cumulative stock return over the year preceding the M&A announcement month.**	**Bidders usually prefer to finance with stock when they consider their stock overvalued** by the market.
UNLISTED TARGET	The variable takes a value of **1 if the target is a stand-alone company, not listed on any stock exchange**, and is **0 for listed targets and unlisted subsidiary.**	When selling companies are unlisted targets, they tend to prefer cash to realize their financial or asset restructuring deals.
SUBSIDIARY	The variable **equals 1 when the (unlisted) target is a subsidiary of another firm, and equals 0 otherwise**.	Because of its typical concentrated ownership, bidders tend to prefer cash financing when target company is a subsidiary.
INTRAINDUSTRY	It is a dummy that **equals 1 if bidder and target are in the same industry and is 0 otherwise**	**Sellers prefers to accept a continuing equity position in an intra-industry merger**, since they have great

		knowledge about industry risks and prospects.
CROSS BORDER	The variable takes a value of **1 if bidder and target countries differ and is 0 otherwise**	The acceptance of stock from foreign investors can be linked with different kinds of problems. This **reduces the seller demand for bidder stock.**
MKT-TO-BOOK	The variable MKT-TO-BOOK is defined as a **market value of equity plus book value of debt over the sum of book value of equity plus book value of debt prior to the bid.** It is a proxy of the bidder's investment in growth opportunities.	**High-growth bidders can make an attractive equity investment for selling shareholders.** **We expect a higher market-to-book ratio to increase a bidder stock's attractiveness as an M&A consideration.**

Exploiting the model proposed by Faccio (2005) as starting point, this study make some changes to the set of variables trying to adapt the model to the logic of the earnout. For this reason, some independent variables are left out and new variables are introduced in order to include in the new model the main problems which the contingent payment mechanism aims to solve. In particular the variables *CONTROL*, *CONTROL LOSS*, *RUNUP* and *INTERLOCK* are excluded from this study just because they are not good at explaining the impact of the adverse selection problem on the M&A payment method. On the contrary, by watching also at the previous earnout literature, new information asymmetries' proxies are introduced since one of the main purposes of the earnout is to solve the adverse selection problem.

Appendix B

Appendix B tries to understand why in model (8) of Table 4.a, acquirors with a great percentage of tangible assets are less likely to exploit earnout. For this purpose, Table 8 investigates how the level of acquisition premium change with and without the presence of

earnout. This table indicates that the mean of the acquisition premium conditional on the presence of earnout is higher for M&A deals which include contingent payment provisions[19].

Table 8**: PREMIUM** 4 WEEKS BEFORE **MEAN** CONDITIONAL ON EARNOUT PRESENCE

	Acquisition Premium
Earnout Yes No	Mean
NO	36.98
YES	65.87
Total	***37.14***

Earnout Yes or No distinguish M&A deals with or without earnout provisions. *Acquisition Premium* is defined by Eikon as the premium of offer price to target closing stock price 4 weeks before the original announcement date, expressed as a percentage: ((HOSTPR – HOSTC1DAY) / HOSTC1DAY) * 100.

One possible explanation for the negative effect of acquirer's tangible assets on the use of earnout is to support the hypothesis that considers Earnout and Cash as two separate alternative means of payment, considering data in Table 8. Since the measure of acquisition premium increases in presence of earnout, then the acquiror that has more cash (expressed as a greater percentage of collateral) is willing to pay less for the target without using earnout, bearing the risk of information asymmetry. To strengthen the theory of Earnout and Cash as two alternatives, further regressions are performed introducing the variable *Cash*[20] and an interacted variable between *Cash* and *AcqCollateral* in Table 4.b. As shown in model (6) in Table 4.b, the coefficient on *CashbyAcqCollateral* remains negative and significant as the variable *AcqCollateral* in Table 4.a, further supporting the thesis of earnout and cash as two separate payment methods.

Appendix C

Quite often the problem for target companies when an earnout provision is offered is whether they would prefer (less) cash today or (more) cash tomorrow; obviously payments receive tomorrow include earnout while payments receive today not. Considering that in an intra-industry transaction the acquiring company tends to know better the target and vice versa,

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[19] This is also supported by Kohers (2000): "in mergers using earnouts, the total premia, including the entire earnout portion, is higher than the premia in mergers using cash and stock, respectively. [...] We find that the premiums paid to targets in deals involving earnouts are, on average, significantly larger than the premiums paid in cash or stock offers."

[20] CASH is a dummy which equals to 1 when the acquiring company decides to made an all-cash offer and 0 otherwise

target firm is willing to accept more "cash tomorrow" (which means earnout) when the M&A deal involves an acquiror that operates in the same sector. To test the problem of "cash today vs cash tomorrow" in intra-industry transactions, model (8) in Table 4.a is replicated considering only deals for which cash consideration is offered[21]. In this way differences in the use of earnout are investigated within "fully cash" deals.

Table 9: Linear Regression, Dependent variable: Use of Earnout, **Only cash deal**

	(1)
logAcqTotAsset	-0.0168***
	(-19.22)
AcqCollateral	-0.167***
	(-18.70)
logDealValue	0.00720***
	(6.27)
Unlisted	0.125***
	(31.59)
Subsidiary	0.0457***
	(14.80)
IntraIndustry	0.00836*
	(2.45)
CrossBorder	0.0286***
	(7.95)
Serv	0.0449***
	(11.16)
HighTech	0.0317***
	(6.14)
_cons	0.208***
	(17.16)
N	28154

The dependent variable is equal to one if earnout provisions are included inside M&A deal while it is equal to zero in case some other mean of payment is used. In this table the sample is restricted considering only transactions for which cash consideration is offered.

t statistics in parentheses
Source: auto.dta
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
ONLY "CASH CONSIDERATION OFFERED"

As shown in Table 9, the effect of the independent variables on the earnout employment remains constant (if compared to Table 3). In particular the coefficient on *IntraIndustry* is still positive and significant at 0.05 level, demonstrating that target companies tend to take the risk

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[21] See also Table 1 for distribution of consideration offered

of receiving more future payments in cash when the acquiring firms belong to their same sector.

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