Norwegian School of Economics
Bergen, Spring, 2016

The Effect of Asymmetric Information Concerning the Bidder on Earnout Agreements

Morten Refsdal and Pål Fredrik B. Jakobsen

Supervisor: Peter Edlund Frii

Master Thesis, Business Administration, Accounting

NORWEGIAN SCHOOL OF ECONOMICS

Contents

Abstract

It has been argued that earnout contracts has a great attribute in being able to mitigate asymmetric information concerning both parties of a deal simultaneously, but this aspect of earnout agreements has not yet been empirically investigated. To our knowledge, this is the first study that explicitly investigates how the use of earnout agreements is impacted by asymmetric information concerning the bidding company. We examine a large sample of post SFAS 141 (R) acquisitions, and model for asymmetric information on both sides of the deal. We also look at how the interaction between asymmetric information concerning each party affects the likelihood of earnout contracts being employed. Our analysis reveals that characteristics of the bidding company associated with asymmetric information has a significant and positive impact on the likelihood of earnout agreements being employed. We also find that more asymmetric information concerning the target value, has greater impact on the likelihood of employing earnout agreements, when the target also has difficulties in estimating the true value of the bidding party.

We are grateful to the support we have been provided from our guidance counselor and PHD-Candidate at Norwegian School of Economics, Peter Edlund Frii. He has been readily available to answer our question, and guide us through the process of creating this paper.

1. Introduction

Mergers and acquisitions is an integral part of the financial market and manage extraordinary values. In any deal, a choice of payment method has to be made and agreed upon. In a perfect market, the medium of exchange is irrelevant to the value of any deal. However, the medium of exchange in corporate acquisitions has been shown to have a significant impact on how the market reacts to corporate acquisitions (Chang 1998). Different mediums have different applications, and seem to bring value to the deal if applied correctly. While cash and stock is the most frequently used method of payment, other mediums of exchange are becoming more usual. Earnout agreements (also called contingent consideration agreements) are one of these mediums, and are the primary focus of this study. An Earnout agreement is a contractual obligation to distribute an ex-ante agreed upon compensation to the seller, contingent on the achievement of some pre-determined performance target in the post-acquisition period. The performance measure is usually based on accounting metrics, but can also be based on other milestones.[1] Several studies has examined earnout contracts prior to our paper, and has usually investigated which characteristics of the target company makes the bidder more likely to offer earnout agreements as part of the deal. Kohers et.al (2000), Datar et.al (2001) being the cornerstones in this stream of research. These studies suggests that earnout agreements are primarily used as a mechanism to reduce risk of overpaying for targets, which are difficult to value, providing a solution to adverse selection problems arising from such. When there is greater information asymmetry concerning the target company, the bidder is more likely to offer earnout agreements as part of the deal.

An interesting attribute that distinguishes earnout agreements from stock and cash considerations is how earnout agreements are arguably able to mitigate asymmetric information problems, concerning both parties simultaneously. Stock and cash considerations can reduce asymmetric information problems concerning the target or the bidder, respectively, but neither for both. Hence, suggesting that earnout agreements become relatively more favorable when there is more asymmetric information concerning both parties. In light of this feature, we expand upon prior research by also modeling for

[1] Cash flow, pre-tax income, gross profit, net income & earnings per share stand for 52% of performance measures. Sales stands for 32%, non-financial measures for 12%, and stock price in 1.2% of the cases. Cain, Denis & Denis (2011)

[2] ”What metric should be used? How long is the earnout period? What happens if the buyer sells the business? What costs are allocated to the business? Who controls the business during the earnout period? Should there be a cap on the earnout,

asymmetric information concerning the bidder when we examine the determinants of employing earnout agreements. To our knowledge, this has not yet been done.

Our study makes three contributions to the literature on earnout agreements. Firstly, we find that the characteristics of the bidding firm associated with asymmetric information problems, such as idiosyncratic volatility, size of the firm, and whether or not the bidder operates in high-tech or service industries, has a significant impact on the choice to include earnout agreements as part of the consideration.

Secondly, we also find that greater idiosyncratic risk for the bidder is economically more significant on the likelihood of offering earnouts when the target has idiosyncratic risk above the median. And likewise, the impact of the bidder operating in high-tech or service industries on earnout employment is greater when the target also operates in high-tech or service industries. Suggesting that the impact of more asymmetric information concerning the bidder is larger when there is great asymmetric information concerning the target.

Finally, we find the same interaction effect for the impact of more asymmetric information concerning the target value. Increased asymmetric information concerning the target value has greater impact on the likelihood of employing earnout agreements when there is great asymmetric information concerning the bidder.

This paper proceeds as follows. Section 2 introduces and explains the relevant concepts shaping our hypothesis. This includes the concept of asymmetric information, the merits of cash versus stock in the light of asymmetric information, and the rationale for earnout agreements. We simultaneously provide an overview of the literature associated with each concept, but more so on previous studies concerned with earnout agreements. Section 3 presents and argues for our hypothesis based on the discussion in section 2. In section 4 we outline the model that we use to investigate our hypothesis, as well as the variables we construct to proxy for asymmetric information. Section 5 contains a discussion of the results from our regression, and section 6 concludes our study.

2. Relevant concepts and associated literature

In this section we go through the relevant concepts and associated research that is fundamental to our hypothesis. In section 2.1 we discuss the concept of asymmetrical information before we look at its impact on the value of cash and stock. In section 2.2 and 2.3 we explain the rationale for using earnouts and the cost of employing them, respectively.

2.1. Cash versus stock in the framework of asymmetrical information

Asymmetrical information describes a situation where one of the participants in a transaction has proprietary information on the asset to be exchanged. When the transaction is settled in cash, this is a one-sided problem, where the seller has the informational advantage. Akerlof (1970) described this problem as a “market for lemons”, applying the used-car market as an example for how participants adjust in such a market. In a “market for lemons” only the seller knows the true value of the car. Assuming that the car has two possible states, one being of high value, and one being low value, the buyer is willing to pay the expected value of the car given the two states.

Hansen (1987) later applied the Theory of Arkelof to how acquirers in corporate transactions choose between cash and stock as a medium of exchange. As in the market for used-cars, the seller of a company may be of the high-value or low-value kind, and depending on its characteristics, the acquirer may struggle to distinguish the two. Hansen suggested that offering stock as consideration can mitigate the problem of asymmetric information concerning the target company. Since the value of the stock is dependent on the combined firm, the bidder is able to share the risk of overpayment with the target, thus making the problem of asymmetric information less of a consideration. This is what Hansen calls the “contingent pricing characteristic” of stocks. However, as the value of the stock that the target receives as payment is dependent on the value of the combined firm, the value of the bidder now becomes a concern for the target company. And thus, leaves the possibility of a two-sided asymmetric information problem. When the target also has trouble in determining the true value of the bidding company, the bidding company may not get a fair price on its shares. As Finnerty and Yan (2012) argues, in a two-sided asymmetric information problem the choice between cash and stock is therefore influenced by the trade-off between the discount at which the target values the bidder's stock (the consequence of asymmetrical information concerning the bidder), and the cost of overpaying for the target (the

consequence of asymmetrical information concerning the target). Suggesting that if the cost of overpayment dominates the underpricing of the bidder's stock, the bidder is more likely to offer stock. And if the opposite is true, the bidder is more likely to offer cash. Either way, cash and stock does not have the ability to mitigate the information asymmetry on both sides simultaneously, but is only able to mitigate the effect of information asymmetry for either the target or the bidder.

2.2. The rationale for earnout agreements

A large part of the research on earnout agreements has also been examining how asymmetrical information impacts the use of these contracts. The first string of papers on earnout agreements by Kohers & Ang (2000) and Datar, Frankel & Wolfson (2001) argue that earnout contracts are primarily offered to manage the risk of overpaying for targets as a consequence of asymmetrical information. Allowing the target- and acquiring firm to disagree on the value of the target but still reach an agreement. The upfront part of the total consideration reflects the part of the transaction value the parties can agree upon, while the deferred part of the consideration is a function of the residual disagreement. Bidders are therefore able to eliminate the risk of overpaying for the target, assuming that the contract is designed appropriately. If the target performs over expectations, and is revealed to truly be of high-value, the target will receive its fair compensation. Choi (2014) provides an example of such. Consider a deal where the seller has the possibility of being either of high-value or low-value, and the bidder cannot distinguish between the two due to private information on the seller's hand. If the seller is truly of high-value the company is worth $12 million, and if the seller is truly of low-value the company is worth $10 million. By paying $9 million at closing and employing a properly structured earnout contract, it can mitigate the risk of overpaying for the target due to the asymmetric information. If the earnout is paying $5 million contingent on the seller reaching some future milestone, and the high-value seller has a 60% probability of collecting the earnout while the low value seller has a 20% probability, the expected payment for the acquirer will be $12 million for the high-value seller and $10 million for the low-value seller. Thus, the bidder's expected payment and the seller's expected consideration, equals their true value. The example also shows that earnout contracts, if structured correctly, has the potential to “eliminate” the asymmetric information problem, as opposed to stock which mitigates the problem by allowing the bidder to share the downside risk with the target company. Another aspect of the earnout contract that is devoted little attention in the mentioned papers is that these contracts can arguably mitigate

asymmetric information considering both the seller and buyer simultaneously. As the example suggests, earnout contracts has the contingent feature of stocks, but differs from them in that the value is independent of the value of the acquiring company.

As we discussed in the section above, nor cash or stock has this ability. Kohers (2000) and Datar (2001) also show that the importance of retaining management increases the likelihood of including earnouts. These two objectives are however not mutually exclusive. "The acquirer may wish to retain the target manager for the exact purpose of alleviating potential problems arising from information asymmetries, making the two uses for earnouts quite complementary with one another" Kohers & Ang (2000). Cain, Denis & Denis (2011) takes a closer look at the properties of the earnout contracts. Including the length of the earnout period, the size of the payout, and the target metrics. Consistent with the studies mentioned above, the authors show that earnout contracts are more likely to be included in the deal when uncertainty about the target value is high.

2.3. The cost of earnout agreements

Considering that earnout agreements is a better tool than cash or stock in bridging valuation gaps due to asymmetric information, earnout agreements should arguably be taken advantage of in every acquisition. However, several studies has shown that there are both direct and indirect costs associated with employing earnout contracts, which makes them relatively less attractive to cash and stock.

Direct costs linked to earnout contracts are twofold, one up-front and one post-closing. Prior to closing the deal, the terms of the earnout contract has to be negotiated, this is a time consuming and costly process.[2] [3] With the introduction of SFAS 141(R)[4] an additional direct cost emerged. The revised legislation requires the acquiring firm to re-measure and report an increase or decrease in the fair value of the earnout liability for every period until the earnout is settled. Under prior financial reporting standards neither the liability classification of the

[2] "What metric should be used? How long is the earnout period? What happens if the buyer sells the business? What costs are allocated to the business? Who controls the business during the earnout period? Should there be a cap on the earnout, especially if paid in buyer shares? Are but a few examples of the hard issues that need to be settled at the outset. In fact, many parties end up abandoning a proposed earnout before implementation when the weight of these issues—and the resulting tense negotiations—threatens to overwhelm the overall sale process." - Wolf & Fox (2001)

[3] "Some practitioners have even noted that earnouts "are a nightmare to draft, negotiate and...to live with," and as a result, transacting parties would often "give up on [negotiating an earnout] before too long—they simply compromise on the price." Choi (2014).

[4] SFAS 141 (R) superseded SFAS 141 and became effective for firms with fiscal years beginning after December 15, 2008. The implications on financial reporting for U.S. GAAP firms have been codified under ASC Topic 805, Business Combinations. Allee, Hamm & Wangerin (2011)

earnout, nor re-measurements was required. Allee & Wangerin (2013) argues that the use of earnout contracts have declined in the wake of SFAS 141 (R) due to an increase in contracting- and financial reporting costs. Providing evidence that the direct costs of earnouts contracts are a significant consideration in deciding to employ earnout agreements.

While the direct costs of earnout contracts are noteworthy, there is a strong argument towards the indirect costs of earnout contract being more severe. Datar (2001) points out that earnout contracts give rise to moral hazard problems on both sides of the deal. The management of both the target and acquiring firm will have incentives to manipulate the relevant target metric. Respectively trying to increase or decrease the probability of the potential payout going through. Financial performance benchmarks are especially prone to earnings management. Disputes between the target and acquiring firm regarding earnout payments frequently results in litigation claims (Wolf & Fox 2001).[5]

On the "mechanical" side of indirect costs, SFAS 141(R) has several implications. In SFAS 141(R) earnouts are recorded as a liability[6], which may increase the chance of triggering debt covenants violations, rise the cost of debt and restrict future access to capital. Another concern in regard to the use of earnouts is an increase in earnings volatility and unpredictability. This applies as a consequence of SFAS 141 (R), and appears as a great concern of several top-tier accounting firms Allee & Wangerin (2013).

In the next section, based on the literature that is discussed above, we derive our hypotheses and argue for its validity.

[5] Datar (2001) also put emphasis on earnouts being linked to higher risk of post-acquisition litigation claims.

[6] There is also the possibility of equity classed earnouts, equity classified earnouts has no requirement of being re-measured and has no impact on the profit & loss statement, but must still be recognized as earnouts on the acquisition date. Earnouts can be classified as equity if two conditions are met. (1) The payout is a fixed number of shares and (2) the benchmark is based solely on the future performance of the firm. Allee & Wangerin (2013). Equity-classified earnouts are far and few between. Alle & Wangerin only discovered 9 earnouts of this classification on a total sample of 472 earnouts. Cadman, Carrizosa & Faurel (2012) identified 4 equity-classified earnouts of a total 329 earnouts.

3. Hypothesis

One of the common themes in the previous literature on earnout contracts is that the authors have mainly examined the likelihood of offering earnout agreements as a function of asymmetrical information concerning the value of the target company, and does not model for the asymmetric information surrounding the value of the bidder. However, as we discussed in section 2, earnout contracts differs from cash and stock in that they arguably have the ability to mitigate asymmetric information for both the bidder and the target simultaneously. We argue that the implication of this is that the value of earnout contracts increases relative to stock, when there is also asymmetric information concerning the bidder.

Consider a hypothetical deal where the target knows the true value of the bidder, and there is only asymmetric information concerning the target value. Following the arguments of Hansen (1987) and Finnerty & Yan (2012), the bidder will offer stock as consideration since it mitigates the effect of overpaying for the target and the bidder stock will be priced fairly by the target. Holding all else equal, if the asymmetric information concerning the bidder is greater, the deal becomes less valuable to the bidder as the target puts a discount on its shares. Thus, demanding a greater number of shares as payment. The bidder could choose to offer cash instead of stock to avoid the discount-cost on their value, but since cash has no mitigating effect on the risk of overpayment, is still left with the risk of doing so. Since the value of earnout agreement are independent to the value of the bidder, and has the ability to mitigate the risk of overpayment, we argue that earnout agreements becomes increasingly favorable relative to stocks when there is greater information asymmetry regarding the value of the bidder.

Based on this argument we state our main hypothesis:

H1: Greater asymmetrical information concerning the value of the bidder increases the likelihood of earnout agreements being employed.

As previous studies has suggested, as the information asymmetry concerning the target value becomes greater, so does the likelihood of employing earnout agreements. We expand upon this and argue that the impact of more information asymmetry concerning the target has greater effect on the likelihood of offering earnouts when the bidder also has great information asymmetry concerning its value. In other words, when there is great asymmetric

information concerning the bidder, it requires lower level of asymmetric information concerning the target value to deem earnout contracts favorable to cash and stock.

Consider the following equations:

As we discussed in section 2, earnout agreements can be favored over cash and stock, even when there is only an asymmetric information problem regarding the target value. We argue that for the bidder to prefer earnouts to stock in this state, the residual risk of overpayment that cannot be mitigated by offering stock should exceed the additional cost of offering earnout agreements. As we discussed in section 2, these costs are argued to be severe and significantly impacts the use of earnouts.

(1)The trade-off between earnouts and stock, bidder receive a fair price on its shares:

(Risk of Overpaying - Risk mitigated by stock) > (Additional cost of earnout) = Earnouts are preferred to stock

If we also consider the effect of information asymmetry on the acquirer's value, the same equation applies but also adds the discount at which the target values the bidder's shares.

(2)The trade-off between earnouts and stock, bidder does <u>not</u> receive a fair price on its shares i.e. there is a asymmetric information problem concerning both parties:

(Risk of overpaying - Risk mitigated by stock + Stock discount) > (Additional cost of earnout) = Earnouts are preferred to stock

Hence, all else equal, earnouts becomes favorable at lower level of target information asymmetry in equation (2) than in equation (1). Thus, as stated above, we expect more information asymmetry concerning the target to have greater impact on the likelihood of employing earnout agreements when the bidder has great information asymmetry.

Furthermore, to provide additional verification to H1, we argue asymmetric information concerning the bidder, is more significant when there is also great asymmetric information concerning the target. This follows the most basic rationale for using earnout agreements. Information asymmetry concerning the bidder should only add value to earnout agreements when there is significant risk of overpaying for the target.

Based on the above argument we state our second hypothesis:

H2: The effect of more information asymmetry concerning the bidder and target value has a larger impact on the likelihood of offering earnouts, when there is also great information asymmetry concerning the opposite party.

4. Our Model

To model for the degree of asymmetrical information on the target and bidders side, we closely follow the model of Finnerty & Yan (2012). This study runs a similar hypothesis on convertible notes as a method of payment. We make use of univariate and multivariate logistical regressions to investigate how private information impacts the likelihood of earnout contracts being employed as part of the deal.

We obtain our sample of transactions form the Securities Data Corporation's (SDC) database and industry risk estimates from the Damodaran Database[7]. Our transactions cover the financial year 2009 through 2015. We limit our sample, and focus on the post SFAS 141(R) period, because it represents the current environment at which earnout agreements are used, and prevents our dataset from being skewed due to changes in accounting standards/costs.

Our data sample follows Finnerty & Yan (2012) and is based on the following criteria: (1) Bidder is a publicly traded firm, so that market value for the bidder is obtainable. (2) Only offers that includes cash-only, common stock-only[8], or offers containing earnouts (that is, earnouts in combination cash-only, stock-only or a hybrid of the two). We choose to compare deals containing earnouts to all-cash and all-stock deals, to be sure that there is no other risk mitigating medium employed, which would skew the results (this includes options, warrants, escrows, or convertible-notes).[9] (3) Bidder is a U.S firm so that accounting standards under which the bidder operates is consistent trough our sample. U.S firms are bound to SFAS 141(R). (4) Financial firms (SIC codes 6000 through 6999) and utilities (SIC codes 4900 through 4999) are excluded. The impact of leverage on Financial firms are usually not comparable to non-financial firms, where for non-financial firms higher leverage is more likely to indicate financial distress[10]. Utilities are excluded due to being extensively regulated. (4) Complete takeovers only, excluding 113 deals where acquirer holds less than 100% of shares after acquisition. (5) We winsorize all variables at 1% and 99% levels, to exclude extreme values that are associated with reporting errors. This follows the procedure of Finnerty & Yan (2012).

[7] Damodaran, A,. Stern NYU. See reference list for link to data page.

[8] In the rest of the paper we will refer to common stock as stock.

[9] Esrows, convertibles and warrants have been argued to have risk mitigating effects, see Bhagat et.al (2014), Finnerty & Yan (2012) and Redor (2015), respectively.

[10] The Cross-section of Expected stock returns, p.429. E. Fama and K. French (1992)

Our final sample include a total of 4138, where 3016 are cash offers only, 404 deals with common stock offers only, and 718 deals where earnouts are offered together with cash, common stock or a hybrid of the two. Similar to Finnerty & Yan (2012) we also divide our sample based on whether the target is a public or private firm. For our private target sub-sample we have 2735 cash offers, 335 all-common-stock offers, 624 deals including earnouts with cash, common stock or a hybrid of the two. For our public sub-sample we have 281 cash offers, 69 all-common-stock-offers and 94 offers where earnouts with cash, common stock or a hybrid of the two, are included.

4.1. Construction of Variables

Previous studies testing for how asymmetrical information impacts the probability of including earnouts has taken quite similar approaches in the choice of independent variables. Most of our independent variables are variations of proxies which are used before, but different in that we include them for both the target and the bidder. We closely follow the variables of Finnerty & Yan (2012), but also expand upon it by implementing some of the commonly utilized variables from the earnout literature.

4.1.1. Dependent Variables

We use a binary dependent variable indicating which form of payment that is used. It takes the value of "1" when earnout agreements are included. We do not separate between cash and earnouts, stock and earnouts, or earnouts with a mix of cash and stock. The dependent variable takes the value of "0" if it the deal is made with all-cash or all-stock considerations.

4.1.2. Construction of independent variables that proxy for asymmetric information

Kohers & Ang (2000) & Datar (2001) can be considered the foundation of which later papers are structured. Both papers proxy for asymmetric information by including dummy variables for whether or not the target operates in industries with high amounts of unrecorded intangible assets or human capital, such as the technology and service industries. Service industries are argued to be difficult to value for outsiders, since human capital is a crucial part of the firm value. Datar (2001) argues, "High-growth companies with unproven technologies and high research and development expenditures tend to have assets whose value does not appear in the financial statements." This trait is common for companies operating in high-technology industries. In previous studies, these variables are focused on the private information on the target's hand, not the bidder.

Following our previous discussion, we argue that unrecorded intangibles on the bidder side are also a guiding factor in the use of earnouts. Contrary to earlier papers on earnout contracts we therefore include a variable accounting for the intangible nature of the bidder. We do so by creating a dummy variable (TSb) which takes the value of "1" if the bidder operates in the service- or high-technology industry and "0" if it operates in other industries. We duplicate this variable for the target company (TSa). We follow Datar (2001) and classify a company as operating in the service industry if the SIC description contains the word "service". We classify a company as operating in the high-tech industry by following the progress of Hall (1997). The methods are imprecise but objective and replicable.

Several studies also include a dummy variable indicating whether or not the acquiring firm and the target operates in different industries. Kohers & Ang (2000) argues that "the levels of asymmetric information would also be elevated for bidders making acquisitions in unfamiliar territories, such as in an unrelated cross-industry" Datar (2001) argues similarly "Buyer assessment of the value of the target firm may also be more difficult if the target is in a different industry than the buyer. In such cases, buyers may lack the ability to judge the value of assets beyond the scope of their existing expertise." This variable was primarily constructed to catch the asymmetric information faced by the bidder, but implicitly captures some of the two-sided asymmetric information problem. Datar et.al (2001) discusses this aspect briefly in their study as they find that the likelihood of stock considerations decrease in cross-industry acquisitions, and argues that this effect may be due to information asymmetry concerning the bidders value. However, this variable is not designed to distinguish between which ways the asymmetric information problem lean. The variable appears similar in all combinations of industries. For instance, if the bidder operates in High Technology and the target in Consumer Staples, the dummy variable takes the value of "1". The dummy would also take the value of "1" in the reversed situation. This is notable since the former example would suggest that the target company faces a greater problem in valuing the bidder, and the latter suggests the opposite.

We construct a similar "cross-industry variable" but also make an attempt to expand upon it by taking account for which party is facing greater asymmetric information. We do so by interacting the (TSb) and (TSa) variable using an interaction dummy (HINF). We explain this interaction variable later in this section.

Following the model of Finnerty & Yan (2012) we also include size (SIZE) as a proxy for asymmetric information. They argue that smaller firms are less likely to have stabilized cash

flows, less available information for outsiders, and larger growth options. (SIZE) is calculated as the log of the market value of bidders total assets. In regard to the target company, there are two contradictory arguments for how its size affects the use of earnouts. On one hand, it should be more available information on a large target, suggesting less information asymmetry. But on the other hand, overvaluing a target that is significant in size relative to the acquirer, is more consequential, and amplifies the risk arising from information asymmetry. Empirical studies suggest that the latter effect dominates the former and we therefore calculate a different size metric for the acquirer (RATIO), Finnerty & Yan (2012). (RATIO) is calculated as the logarithm of the ratio of the deal value to the market value of the bidder. Larger (RATIO) then suggests that the bidder becomes more concerned about asymmetric information.

Lastly we include idiosyncratic volatility as a proxy for asymmetric information, also known as unsystematic-, firm-, or industry-specific risk IDRISKb for bidder and IDRISKa for target). Idiosyncratic volatility has to our knowledge not previously been made use of in papers concerned with earnout agreements, but has been employed as a proxy for asymmetric information by Finnerty & Yan (2009). Krishnaswami & Subramaniam (1999) argues that "If the investors and the firm's managers are equally well-informed about the economy-wide factors influencing the firm's value, then the residual volatility in the firm's stock returns captures the information asymmetry between the investors and the managers about firm-specific information.". Thus, higher idiosyncratic volatility is argued to be associated with a larger degree of information asymmetry Finnerty & Yan (2009).[11]

We construct IDRISK in respect to the 2-digit SIC code industry in which the bidder or target operates. We use an industry metric since most target companies are private, and we have insignificant observations on public target deals. To calculate IDRISK for each company, we need access to stock prices that is unavailable for private targets. Hence, by calculating average idiosyncratic volatility by industry we can fully utilize our data sample. More specifically, we measure IDRISK by the error term of the average industry beta regression for the three fiscal years prior to the deal announcement. We obtained the average beta measures and its associated error terms from the Damodaran Database. This approach differs from Finnerty & Yan (2009), which calculated idiosyncratic volatility for each

[11] Krishnaswami & Subramaniam (1999) highlights that idiosyncratic volatility may "overestimate of the true measure of information asymmetry, since it also contains the impact of information that was previously unavailable to both the investors and the managers".

company. Cadman (2001) employs a similar strategy in using annualized volatility in returns of the target industry.

We also create an interaction variable (HINF) to help us investigate H2. (HINF) is a dummy variable, and takes the value of "1" if the variable that proxy for asymmetric information on the opposite side of the transaction is above the median, and "0" if it is below. In other words, if we run the regression for a specific independent variable proxy for asymmetric information concerning the bidder, HINF takes the value of "1" if the related variable that proxy for asymmetric information concerning the target value is above the median (this works inversely for SIZE, as greater SIZE suggests less information asymmetry). In regard to TSa and TSb, (HINF) takes the value of "1" if the opposite party is operating in high-tech or service industries, and "0" if they operate in other industries. The potential downside of this variable is that the decision to differentiate "great" and "moderate" information asymmetry at the median observation is somewhat arbitrary. It is however, consistent with prior research concerned with how the interaction between information asymmetry concerning acquirer and target impacts the choice of medium, Finnerty & Yan (2012).[12]

4.1.3. Construction of control variables

We also construct a set of control variables that arguably impacts the use of earnouts, but are less related to information asymmetry. First, we take the bidders investment opportunities into account, considering that research has shown that companies with large sets of investment opportunities favors stock as the method of payment. Enabling the bidder to preserve discretion over future investments. We measure investment opportunity by using the market-to-book ratio (MB) following Finnerty & Yan (2012). Note that the market-to-book ratio also serves as a proxy for overvaluation. We take financial restrictions of the bidder into account by using the ratio of long-term debt to the book value of assets (LDR). Finnerty & Yan (2012) argues that bidders with greater debt burden may refrain from using cash and convertible notes as a method of payment, due to higher probability of financial distress. We argue that the same argument applies to earnout agreements, considering that earnouts are usually recorded as a liability and settled in cash. Datar (2001) finds that financing considerations are an important factor in choice between earnouts and stock.

[12] We first intended to follow Finnerty & Yan (2012) in including an absolute forecast error, and the standard deviation of forecast error as the measures of asymmetric information. However, due to a lack of accessibility to the I/B/E/S forecast database we were not able to do so.

Lastly, we control for the bidders profitability. Bidders with poor profitability may struggle to raise enough cash to pay for the target, and therefore settle the deal in stocks. We measure profitability as a ratio of their earnings before interest, taxes, depreciation and amortization EBITDA to the book value of assets (OPINC). Lastly, we include a variable indicating whether the deal is domestic or cross-border. (DOME) takes the value of "1" if the acquisition happens domestically, and "0" if it is across borders. Datar et.al (2001) hypothesize that earnouts are more likely to be included in cross-border deals due to increased information asymmetry. Contrary to their hypothesis, the results show that earnouts are less likely to be included in cross-border deals. Datar et.al argues that the result may be due to a lack of enforceability of the earnout deal terms in cross-border acquisitions, and that differences in accounting standards and legal systems may deem earnout agreements too risky.

5. Results and Discussion

In this section we test our hypotheses, present our results and discuss their implications.

5.1. Descriptives

In this section we break down the full sample into sub-samples representing various degrees of asymmetric information faced by the target and acquirer. Each panel is based on one of our variables proxy for asymmetric information on the target or bidders hand. The frequencies and percentages of each payment method are calculated with respect to the relevant sub-sample. For panel A and B, the "Large" and "Small" category is based on whether or not the relevant variable for each observation is above or below the median within the full sample. In panel A we use idiosyncratic volatility IDRISK to measure asymmetric information, in panel B we use SIZE to measure asymmetric information concerning the bidder, and RATIO for the target. Lastly, in panel C, we look at the combinations of the type of companies that are part of the deal. The difference in the sample size of panel B is due to SIZE and RATIO being calculated for the specific companies, while the variables in panel A and B is based on SIC codes.

TABLE 1: Sample distribution of earnout agreements, cash and stock offerings, grouped by degrees of information asymmetry.

Panel A - *IDRISK as a proxy for for the degree of asymmetric information concering both bidder and target*

	Small IDRISK (Bidder)				**Large IDRISK (Bidder)**			
	Large IDRISK (Target)		**Small IDRISK (Target)**		**Large IDRISK (Target)**		**Small IDRISK (Target)**	
	Freq.	Percentage	Freq.	Percentage	Freq.	Percentage	Freq.	Percentage
All-Cash	320	75,8%	1064	80,1%	1333	70,5%	366	73,6%
All-Stock	55	13,0%	135	10,2%	185	9,8%	55	11,1%
Earnouts	47	11,1%	130	9,8%	372	19,7%	76	15,3%
Total	**422**	**100,0%**	**1329**	**100,0%**	**1890**	**100,0%**	**497**	**100,0%**

Panel B - *SIZE as a proxy for degree of asymmetric information for bidder and RATIO for targets*

	Small SIZE (Bidder)				**Large SIZE (Bidder)**			
	Large RATIO		**Small RATIO**		**Large RATIO**		**Small RATIO**	
	Freq.	Percentage	Freq.	Percentage	Freq.	Percentage	Freq.	Percentage
All-Cash	652	59,4%	502	73,7%	537	85,4%	1031	87,7%
All-Stock	207	18,9%	29	4,3%	32	5,1%	12	1,0%
Earnouts	239	21,8%	150	22,0%	60	9,5%	133	11,3%
Total	**1098**	**100,0%**	**681**	**100,0%**	**629**	**100,0%**	**1176**	**100,0%**

Panel C - *Cross-industry dummy variable for which party is facing asymmetric information*

	Both Lowtech		**Bidder High Target Low**		**Bidder Low Target High**		**Both High_Service**	
	Freq.	Percentage	Freq.	Percentage	Freq.	Percentage	Freq.	Percentage
All-Cash	1183	80,3%	178	69,3%	297	76,0%	1425	70,6%
All-Stock	161	10,9%	45	17,5%	51	13,0%	173	8,6%
Earnouts	129	8,8%	34	13,2%	43	11,0%	419	20,8%
Total	**1473**	**100,0%**	**257**	**100,0%**	**391**	**100,0%**	**2017**	**100,0%**

In panel A we find that the smallest proportion (9.8%) of earnout agreements are employed when both the bidder and target has idiosyncratic volatility below the median observation, this is also the sub-category where we find the largest proportion of all-cash deals (80.1%). Panel A also shows that most earnout agreements are employed (19.7%) when both parties has greater idiosyncratic volatility, in this state we also find the lowest percentage of cash deals (70.5%). Lastly panel A shows that the greatest proportion of stock deals, occurs when only the target has IDRISK above the median (13.0%). This provides some support to our hypothesis and previous discussion.

In panel B, we find that the greatest proportions of earnout agreements are employed granted bidder SIZE being below the median, which is true to our expectations. However, we do not see much difference between large and small ratio RATIO within this category (21.8% versus 22%). Though, there is a big difference in the use of stock and cash between large and small RATIO. As RATIO increases, the frequency of stock deals occur (18.9% versus 4.3%) and fewer cash deals (59.4% versus 73.7%). Remember that we expected SIZE and RATIO to have an inverse impact on the likelihood of earnout contracts. Smaller SIZE implies greater asymmetrical information problems and a larger RATIO implies the same.

Panel C shows that the greatest proportion of earnout agreements are employed when both the target and the bidder are service or high-tech companies (20.8%). That is, when both companies are reliant on human capital and research and development, and hence, faced with asymmetric information concerning their values. It also shows that the smallest proportion (8.8%) of earnout agreements is used in transactions where both parties are non-high-tech or service companies, which we argued to be more straightforward to value. This result conforms to our prior predictions. In the sub-categories where only the bidder, or only the target, is a high-tech or service company, the proportion of earnout agreements falls in between the two extremes (13.2% when only the bidder is a high-tech or service company, and 11% in the inverse state). In all, the patterns of panel C show some support for our hypothesis.

5.2. Univariate regression results

In table 2 presented below, are the results from the univariate regression of our continuous variables. Comparing the means of deals containing earnouts to the means of deals using all-cash or all-stock. The regression shows differences in means and medians, and indicates that

IDRISKb bidder and IDRISKa target is higher in earnout offers than cash-only offers. According to the t-test and Wilcoxon test, the difference is significant at one percent level in means and medians. Thus, we see that in earnout offers bidder and target is typically in industry sectors with higher idiosyncratic risk compared to cash-only deals. Further, we find similar results for IDRISKb bidder and IDRISKa target when comparing deals employing earnouts to all-stock deals, with means significantly higher in the when consideration offered is earnout agreements. These are consistent with our hypothesis and suggest that bidders and target with earnout consideration in takeovers face more asymmetric information. We find that both SIZE (average firm size of bidder) and RATIO (size of the target relative to the bidder) is significantly different in mean and medians between cash-earnouts and stock-earnouts, but only RATIO in the comparison between cash-earnouts holds the expected coefficient. Earnouts has significantly larger RATIO than cash-only deals, a larger RATIO represents greater risk of overpaying the target is greater.

TABLE 2: Univariate Regression Results - Mean and Median Comparison

	Earnout offers - Cash Offers					Earnout offers - Stock offers				
Variables	**N**	**Mean**	**Sig.**	**Median**	**Sig**	**N**	**Mean**	**Sig**	**Median**	**Sig**
Panel A: Full Sample										
MB	3310	0,83***	.024	0,07	.186	916	15,51***	.000	0,74***	.004
LDR	3546	-0,08***	.000	-0,12***	.000	886	-0,01	.732	0,06***	.008
OPINC	3561	-0,01	.186	-0,01***	.000	890	0,57***	.000	0,25***	.000
SIZE	3708	0,05***	.004	0,00**	.032	1055	-0,05**	.021	0,00**	.017
IDRISKb	3708	5,51***	.000	0,00***	.000	1055	3,01**	.023	0,00	.177
IDRISKa	3708	0,21***	.000	0,00***	.000	1055	0,22***	.000	0,00***	.000
RATIO	3407	0,12***	.000	0,14***	.000	997	-0,96***	.000	-0,97***	.000

In the next section we formally test our hypothesis, and control for financing concerns, profitability, growth opportunities and valuation on the bidder side.

5.3. Multivariate regression results: Determinants of earnout employment

In this section we study a sample of takeovers that includes both public and private targets[13]. We start by testing our sample for heteroskedasticity using a visual approach,[14] analyzing scatter-plots of predicted values with earnout agreements and the different unstandardized residuals, to evaluate how the residuals are distributed around zero. We find that the residual are exhibiting greater dispersion, which may suggest that we have some evidence of

[13] We found similar results for private and public targets compared to the full sample, therefore we choose not to distinguish between the two

[14]Stark, P, B,.(2014) "Regression Diagnostics".

heteroskedasticity, or lack of homoscedasticity. Further, we visually test our independent variables on the x-axis against the unstandardized residuals, and find similar results. We then perform a White's test to find statistical evidence of the lack of homoscedasticity, by squaring predictor variables and creating cross variables. We again find evidence of statistical significant errors. We therefore conduct our significant tests using heteroskedasticity-consistent standard errors terms with the Huber–White procedure.[15]

5.3.1 Empirical test of H1

We first investigate H1 and check to see if asymmetric information concerning the value of the bidder is significantly impacting the likelihood of offering earnout agreements and if more information asymmetry makes earnout agreements more likely to be implemented. To do so, we use a multivariate logistic regression. Logistic regressions are arguably better in handling categorical dependent variables then linear probability models (OLS regression)[16]. Logistic regressions are also commonly used in earnout studies Kohers & Ang (2000), Cain et.al (2011). Similarly to Finnerty and Yan (2012) we run the following logistic regression:

$$Log\left[\frac{P(y=1}{1-P(y=1)}\right] = \beta_0 + \beta_1 INFO + \beta_2 X_t + \varepsilon$$

Where the dependent variable "y" takes the value of "1" if earnouts are in place, and "0" if the deal is financed with all-stock or all-cash. INFO is a vector of the proxies for asymmetric information consisting of IDRISKb, TSb and bidders SIZE. Xt refers to the vector of control variables MB, LDR, OPINC and DOME.

[15] Williams, R,. 2015 "Heteroskedasticity", University of Notre Dame.

[16] We also test all our models using linear probability regression (OLS) with the same heteroskedasticity-consistent standard errors, as this has been discussed as an alternative approach for binary dependent variables (Friedman, J 2012). This by using (A.Hayes and L.Cai's, 2007) SPSS Syntax'. Result for all our regression is consistent significant compared with our models.

TABLE 3: The Impact of Information Asymmetry Concerning the Bidder's Value on the Use of Earnouts.

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0,270***	-2,330***	-0,438***	-2,496***	-2,141***	-0,103
	[0,000]	*[0,000]*	*[0,000]*	*[0,000]*	*[0,000]*	*[0,762]*
Control Variables						
MB				0,002	0,002	0,001
				[0,604]	*[0,669]*	*[0,809]*
LDR				-1,762***	-1,482***	-1,519***
				[0,000]	*[0,000]*	*[0,000]*
OPINC				0,684***	0,672***	1,057***
				[0,000]	*[0,000]*	*[0,000]*
DOME				0,395***	0,353***	0,284**
				[0,001]	*[0,002]*	*[0,013]*
Test Variables						
IDRISKb	0,014***			0,012***		
	[0,000]			*[0,000]*		
TSb		0,891***			0,825***	
		[0,000]			*[0,000]*	
SIZE			-0,0212***			-0,251***
			[0,000]			*[0,000]*
Obs	4138	4138	3851	3564	3564	3564
Chi2	45.618	100.095	25.275	122.492	154.935	105.814
Pseudo R^2	0.019	0.042	0,011	0,057	0.072	0,05

The results of our test variables that proxy for asymmetric information concerning the bidder, suggest that greater IDRISKb, smaller SIZE, makes the bidder significantly more likely to offer earnout agreements as part of the deal, relative to cash or stock. It also shows that bidding firms, which operate in high-tech or service industries, are more likely to include earnouts than bidding firms, which operates in other industries. All independent variables are therefore true to our expectations. Thus, suggesting that the bidder is more likely to offer earnout contracts as asymmetric information concerning its value becomes greater. If earnouts were only employed as the consequence of asymmetric information problem concerning the target value, we would expect the variables that proxy for asymmetrical information on the bidder side to be mainly insignificant. The results indicate that earnout agreements are deemed relatively more valuable when there is greater information concerning the bidder. Thus, supporting hypothesis H1.

To provide some verification to suggest that our variables do in fact work as a proxy for asymmetric information, we perform the same logistic regression for asymmetrical information concerning the target. This regression is similar to prior studies on earnout contracts and we expect greater asymmetric information concerning the target to

significantly increase the likelihood of offering earnout agreements. Table 4 presents the results.

TABLE 4: The Impact of Information Asymmetry Concerning the Target's Value on the Use of Earnouts.

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0,1418***	-0,794***	-1,163***	-2,343***	-2,058***	-1,681***
	[0,000]	*[0,000]*	*[0,000]*	*[0,000]*	*[0,000]*	*[0,000]*
Control Variables						
MB				0,002	0,002	0,002
				[0,646]	*[0,699]*	*[0,583]*
LDR				-1,766***	-1,535***	-1,908***
				[0,000]	*[0,000]*	*[0,000]*
OPINC				0,675***	0,638***	0,728***
				[0,001]	*[0,002]*	*[0,001]*
DOME				0,368***	0,333***	0,309***
				[0,001]	*[0,003]*	*[0,007]*
Test Variables						
IDRISKa	0,012***			0,011***		
	[0,000]			*[0,000]*		
TSa		0,825***			0,714***	
		[0,000]			*[0,000]*	
RATIO			-0,018			0,112*
			[0,735]			*[0,068]*
Obs	4138	4138	3803	3564	3564	3564
Chi2	33.832	78.446	88.157	111,765	136,246	90,55
Pseudo R²	0,014	0,033	0,021	0,052	0,064	0,043

Our independent variables IDRISK and TSa turn up significant, with and without the inclusion of control variables, while RATIO only turns up significant in the latter. All independent variable holds the expected coefficient. The results suggest that the bidder is more likely to offer earnouts when the bidder has difficulties in valuing the target due to asymmetric information. The result is consistent with earlier studies like Kohers et.al (2000) and Datar et.al (2001), and conforms to our own predictions. Hence, it provides some verification of our variables capturing the aspect of asymmetric information.

5.3.2. Empirical test of H2

To investigate H2, we run the same logistic regression as in H1, but also incorporate an interaction effect between the asymmetric information concerning the bidder and target value, adding (HINF) to the equation. Providing the following logistic regression:

$$Log\left[\frac{P(y=1}{1-P(y=1)}\right] = \beta_0 + \beta_1 INFO * HINF + \beta'_1 INFO * (1 - HINF) + \beta_2 X_t + \varepsilon$$

Where the (INFO*HINF) variable represents the impact of greater asymmetric information concerning one side of the deal, granted that the opposite party has great information

asymmetry concerning its value. Conversely, (INFO*(1-HINF)) then represent the impact of information asymmetry provided that the opposite party has moderate information asymmetry concerning its value.

In regard to H2, we expect the coefficient for (INFO*HINF) to be of higher significance than (INFO*(1-HINF)). Suggesting that the effect from more information asymmetry on the target and bidder value has a larger impact on the likelihood of offering earnouts, when there is also great information asymmetry concerning the opposite party. Table 5 presents our results:

TABLE 5: Logistic Regression on the Likelihood of Employing Earnouts Relative to Cash or Stock, under Various Degree of Information Asymmetry.

	Concerning the Bidder			**Concerning the Target**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant	-2,255***	-2,138***	-0,154	-1,905***	-2,074***	-1,645***
	[0,000]	*[0,000]*	*[0,665]*	*[0,000]*	*[0,000]*	*[0,000]*
Control Variables						
MB	0,002	0,002	0,001	0,002	0,001	0,002
	[0,568]	*[0,704]*	*[0,794]*	*[0,636]*	*[0,726]*	*[0,627]*
LDR	-1,1769***	-1,464***	-1,534***	-1,794***	-1,487***	-1,385***
	[0,000]	*[0,000]*	*[0,000]*	*[0,000]*	*[0,000]*	*[0,000]*
OPINC	0,694***	0,657***	1,053***	0,695***	0,643***	0,888***
	[0,001]	*[0,002]*	*[0,000]*	*[0,000]*	*[0,002]*	*[0,000]*
DOME	0,391***	0,344***	0,280**	0,396***	0,336***	0,270**
	[0,001]	*[0,003]*	*[0,015]*	*[0,001]*	*[0,003]*	*[0,019]*
Test Variables						
IDRISK * (HINF)	0,011***			0,0027***		
	[0,000]			*[0,002]*		
IDRISK * (1 - HINF)	0,006*			0,001		
	[0,051]			*[0,537]*		
TS * (HINF)		0,862***			0,811***	
		[0,000]			*[0,000]*	
TS * (1-HINF)		0,449**			0,059	
		[0,039]			*[0,766]*	
SIZE * (HINF)			-0,237***			
			[0,000]			
SIZE * (1-HINF)			-0,245***			
			[0,000]			
RATIO * HINF						0,153**
						[0,012]
RATIO * (1-HINF)						-0,197**
						[0,019]
Obs	3564	3564	3564	3564	3564	3564
Chi2	133.362	159.195	105.946	142.872	155.321	124.973
Pseudo R^2	0.062	0.074	0.050	0.067	0.072	0.059

For column (1-3) in Table 5, INFO is based on bidder characteristics and the value of HINF is based on information asymmetry concerning the target company. The results in column (1) shows that bidders IDRISKb is significant, and increases the likelihood of offering earnouts regardless of target IDRISKa being below or above the median. However, the economic significance of the result is greater when IDRISKa is above the median. The result is therefore consistent with our expectations.

In column (2) INFO*HINF represent deals where both parties are characterized by operating in high-tech or service industries. This proxy for great information asymmetry on both sides of the deal. Conversely, (INFO*(1-HINF)) proxies for deals where the target has difficulties in gauging the true value of the bidder. That is, only the bidder operates in high-tech or service industries. The result suggests that whether or not the bidder is in high-tech or service is significant regardless of the target also being high-tech or service. However, similar to column (1), the result is economically more significant for deals where both parties are operating in high-tech or service, than if only the bidder is in high-tech or service, thus implying that the likelihood of employing earnouts are greater when both parties faces a asymmetrical information problem. The result is therefore consistent with our expectations and H2.

In column (3) we study SIZE. In this instance HINF is based upon RATIO and equals “1” if RATIO is above the median, and “0” otherwise. Due to the inverse relationship between the SIZE and RATIO variable, we expect (SIZE*HINF) to be less significant than (SIZE*(1-HINF)) on the likelihood of offering earnouts. As previously discussed, smaller SIZE implies greater informational asymmetry, while larger RATIO implies the same. The results show that the size of the bidder is significant regardless of the target RATIO being above or below the median. And larger SIZE implies slightly less likelihood of employing earnouts when the target variable RATIO is below the median. Which is consistent with our expectations, but the interaction effect seems to have a marginal impact. Thus, the result is not in conflict with our expectations, but does not provide strong evidence for our hypothesis.

For column (4-6) in Table 5, INFO is based on independent variables that proxy for asymmetric information concerning the target value, while HINF is based on the bidder. Column (4) suggests that target IDRISKa is only significant in when the bidder has idiosyncratic volatility above the median. The coefficient is positive as expected. The result from column (5) also suggests that the likelihood of using earnouts is greater when both

parties are characterized by operating in high-tech and service. However, it does not appear to have a significant impact on the likelihood of employing earnout contracts when the bidder is in other industries than high-tech or service.

We argue that the results from column (4) (IDRISKa*HINF) and (5) (TSa*HINF) suggests that the choice of employing earnout contracts instead of stock, as means to mitigate risk of overpayment, is influenced more so by asymmetric information concerning the bidder, rather than the target. There is no contradiction between this finding and the discussion we developed for our hypothesis. And may therefore be explained by equation 2 which we argued for in section 3:

The trade-off between earnouts and stock, bidder does not receive a fair price on its shares i.e. there is a asymmetric information problem concerning both parties:

(Risk of overpaying - Risk mitigated by stock + Stock discount) > (Additional cost of earnout) = Earnouts are preferred to stock

In regard to the equation; Earnout agreements should be becoming favorable by X amount for each X amount discount that asymmetric risk concerning the bidder inflicts on its stock. This follows from that the earnout agreements being independent on the bidding firm. On the other hand, since both stock and earnout agreements has the ability to mitigate the risk of overpaying, earnout agreements should therefore become less than X amount favorable to stock, for each X amount of overpayment risk arising from asymmetric information concerning the target. Hence, as the dependent variable consists of stock and cash considerations, the result is consistent with our H2.

For column (8), the independent variable concerning the target company is RATIO, and HINF is based upon SIZE. In this regression, HINF takes the value of "1" if SIZE is below the median, since smaller SIZE is argued to imply greater information asymmetry. The results in column (8) suggest that RATIO has a significant impact on the likelihood of employing earnouts regardless of the bidder SIZE. While the coefficient is positive and as expected when SIZE is below the median (HINF = 1), the coefficient turns negative when SIZE is above the median. Thus, suggesting that an increase in RATIO decreases the likelihood of offering earnout agreement, when the size of the bidder (and therefore the target) is large. This is not coherent with our predictions, and is in conflict with our hypothesis. We suspect that the interaction between SIZE and RATIO, does not only capture the aspect of asymmetric information, but may also proxy for financing considerations. An

increase in financing difficulties, arguably impacts the use earnouts inversely to that of information asymmetry. As RATIO increase, that is, the ratio between the deal value and the size of the bidder, financing the deal through cash or earnouts may become increasingly difficult, and arguably more so when the deal is large. Thus, stock as a medium will become increasingly favorable, or at least necessary to the feasibility of the deal. Faccio & Masulis (2005) finds that a significantly less proportion of cash is used, as the relative size of the deal value increase, and that the average deal size for all-stock financed acquisition is dramatically larger (17 times) than all-cash deals. Hence, as RATIO*(1-HINF), measures the impact of an increase in RATIO, granted that the SIZE of the bidder is large (HINF is takes the value of "1" granted that the SIZE of the bidder is below the median), we may expect to find a negative impact on the likelihood of using earnout agreements. Earnouts may still be preferred to all-cash deals, but not all-stock deals. As mentioned in section 4, Datar (2001) found that larger targets negatively impacts the likelihood of employing earnout agreements, and argued that financing considerations may be an important factor in the choice between stock and earnout agreements. With this in mind, the negative coefficient we found in in Table 5 may be explained by financing considerations. We therefore argue that the discrepancy in our results, related to the interaction between RATIO and SIZE, is as a consequence of financing concerns. And the variable therefore fails to accurately depict the impact of asymmetric information on the use of earnout agreements. Hence, we do not see the result as disproving our hypothesis. The significance of (SIZE) and (RATIO) in Table 3 and 4 must also be interpreted with some caution, as we can not be certain that the variables are clear of financing concerns when acting on their own.

The results from all other variables reported in Table 5, supports H2. The effect of more asymmetric information concerning the bidder has greater impact on the likelihood of offering earnout agreements when there is great information asymmetry concerning the target. And on the other hand, the impact of asymmetric information concerning the target is larger when there is great information asymmetry concerning the bidder.

In regard to our control variables, the results from Table 3, 4 and 5 shows similar coefficients, pointing in the expected direction, and only MB turns up insignificant. The results suggest that as LDR increase, and the debt burden becomes greater, earnout agreements are less likely to be used. As we argued, earnouts would increase the debt burden and the probability of financial distress. Also, as the bidders profitability increase, and arguably its access to external capital, so does the likelihood of offering earnouts. Coherent with previous studies, we also find that there is significantly less likelihood of using earnout

agreements in cross-border acquisitions. Datar et.al (2001) argues the findings is due to a lack of contract enforceability, and that differences in accounting standards and legal systems may deem earnout agreements too risky.

6. Conclusion

In this paper we have expanded upon prior research concerning the choice of medium of exchange in corporate acquisitions. Previous empirical work on earnout agreements has primarily focused on the risk of overpayment, arising from asymmetric information concerning the target company, and how it impacts the use of earnout agreements. We have formally tested the relationship between earnout agreements and asymmetric information concerning the bidder. To our knowledge, this had previously not yet been explicitly investigated. Our first hypothesis suggested that the likelihood of offering earnout agreements increase as information asymmetry concerning the bidder becomes greater. This is due to the stock considerations being devalued as an alternative method of payment. Our empirical findings suggested true to our predictions, that characteristics of the bidding firm associated with asymmetrical information has a significant and positive impact on the likelihood of employing earnouts agreements. This includes the level of idiosyncratic risk (IDRISKb) , bidder size (SIZE), and whether or not the bidder operates within the high-tech or service industry (TSb). Hence, supporting our first hypothesis. To further verify our result, we then replaced bidder size with relative deal size (RATIO), and ran the same regression based on target characteristics. Similar to prior studies, we found that greater asymmetric information concerning the target increases the likelihood of offering earnout agreements. Thus, providing evidence to suggest that our independent test variables effectively measures information asymmetry.

We also argued that the impact of more asymmetric information concerning the bidder on the likelihood of using earnouts, is larger when there is great information asymmetry concerning the target value. Since earnout agreements are argued to be costly to implement, there should be a significant risk of overpaying for the target, for earnout agreements to be considered. Our results showed that greater idiosyncratic risk for the bidder is economically more significant on the likelihood of offering earnouts when the target has idiosyncratic risk above the median. And likewise, the impact of the bidder operating in high-tech or service industries on earnout employment is greater when the target also operates in high-tech or service. Thus, supporting our prediction and increasing the reliability of our prior findings.

Lastly, we hypothesized that the effect from more information asymmetry on the target value, has a larger impact on the likelihood of offering earnouts, when there is also great information asymmetry concerning the value of the bidder. We based this prediction on

earnout agreements arguably becoming favorable to stock at a lower level of asymmetric information, when stock is devalued as an alternative medium. The results turned up consistent with our predictions for all but one variable. When interacting relative deal size (RATIO), and bidder size (SIZE), the variable behaved in conflict with our expectation. We argued that the variable may also proxy for financing concerns, and that the result is therefore not in conflict with our asymmetric information hypothesis. Except from this, the results shows that an increase in idiosyncratic risk, and whether or not the target is in high-tech- or service, only has a significant impact on the likelihood of offering earnouts when the bidding company has idiosyncratic risk above the median, or is also operating in high-tech or service industries. Supporting our second hypothesis.

The results of our study may have implications for how we view corporate transaction that incorporate earnout agreements. Bidders that employ earnouts, are not necessarily acquiring riskier target than deals that use stock considerations. Earnouts may be taken advantage of because asymmetric information concerning the bidder has made them relatively more favorable to stock as the medium of exchange. Our paper contributes to the existing literature on mergers and acquisitions, and provides nuance to existing papers concerning earnout agreements.

References

Akerlof, G., 1970. “The market for lemons: Qualitative uncertainty and the market mechanism”. Quarterly Journal of Economics, 89, pp 488-500.

Allee, D., Hamm, S., & Wangerin., 2011. “Have Accounting Standards Affected Deal Structures in Mergers & Acquisitions? Evidence From Earnouts”.

Allee, D., & Wangerin, D., 2013 “Auditor's Role in Financial Contracting: Evidence from SFAS 141 (R)”.

Bhagat, S., Klasa, S., & Litov, P., 2014. “The Use of Escrow Contracts in Acquisition Agreements”.

Cadman, B., Carrizosa, R., & Faurel, L., 2013. “Economic Determinants and Information Environment Effects of Earnouts: New Insights from SFAS 141(R)”. Journal of Accounting Research, 52

Cain, M., Denis, D., & Denis., D,. 2011. “Earnouts: A study of Financial Contracting in Acquisition Agreements”. Journal of Accounting and Economics, 51, pp 151-70.

Chang, S., 1998. “Takeovers of Privately Held Targets, Methods of Payment, and Bidder Returns.” Journal of Finance, 53, pp 773-784.

Choi, H., 2014. “Facilitating Mergers and Acquisitions with Earnouts and Purchase Price Adjustments”.

Damodaran, A,.(2015) Stern NYU, Damodaran Database. Available from: <http://people.stern.nyu.edu/adamodar/New_Home_Page/home.htm>

Datar, S., Frankel, R., Wolfson, M,. 2001. “Earnouts: The Effects of Adverse Selection and Agency Costs on Acquisition Techniques.” Journal of Law, Economics, & Organization, 17, pp 201-238.

Faccio, M., Masulis, R., 2005. “The Choice of Payment Method in European Mergers and Acquisitions”. Journal of Finance, 60, pp 1345-1388.

Fama, E., French, K., 1992. “The Cross-section of Expected stock returns.” pp 423-429

Finnerty, J.D., & Yan, A., 2009. “Convertible Securities in Merger Transactions.” EFA 2006 Zurich Meetings.

Finnerty, J.D., & Yan, A., 2012. “Convertible Securities in Mergers and Acquisitions”. Journal of Banking & Finance, 36, pp 275-289.

Friedman, J,.2012. “Whether to probit or to probe it: in defense of the Linear Probability Model”. Available from: <http://blogs.worldbank.org/impactevaluations/whether-to-probit-or-to-probe-it-in-defense-of-the-linear-probability-model>

Hall, Bronwyn H., and Katrin Vopel,.1997, "Innovation, Market Share, and Market Value," UC Berkeley, NBER, and Mannheim U

Hansen, R. G., 1987 “ A Theory for the Choice of Exchange Mediums in Mergers and Acquisitions”. The Journal of Business, 60, pp 75-95.

Hayes, A., & Cai, L.,2007 “Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation”, pp718-720.

Kohers, N., & Ang, J., 2000. “Earnouts in Mergers: Agreeing to Disagree and Agreeing to Stay”. Journal of Business, 73, pp 445-76.

Krishnaswami, S., & Subramaniam, V., 1999. “Information asymmetry, valuation, and the corporate spin-off Decision.” Journal of Financial Economics, 53, pp 73-112.

Redor, E., 2015. “The Use of Warrants in Merges and Acquisitions”. International Corporate Governance, pp 65-86.

Stark,P., 2014. “Regression Diagnostics”. U,C.Berkeley. Available from: <http://www.stat.berkeley.edu/~stark/SticiGui/Text/regressionDiagnostics.htm>

Williams, R., 2015 “Heteroskedasticity”. University of Notre Dame. Available from: <https://www3.nd.edu/~rwilliam/stats2/l25.pdf>

Wolf, D., & Fox, D., 2010. “Earnouts - A Siren Song?”. The Harvard Law School Forum on Corporate Governance and Financial Regulation. Available from: <http://blogs.law.harvard.edu/corpgov/2010/02/13/earnouts-a-siren-song/>

Appendix

Table 7 - Sample by year

This table reports the number of takeover deals between the years 2009 and 2015, group by the payment method. Earnout refers to consideration including earnouts, and deals with cash and stock refers to Cash-only and Common-Stock only considerations.

	Whole Sample			Sample with private targets			Sample with public targets		
Year	**Earnout**	**Cash**	**Stock**	**Earnout**	**Cash**	**Stock**	**Earnout**	**Cash**	**Stock**
2009	152	693	132	104	622	103	48	71	29
2010	200	371	60	192	339	54	8	32	6
2011	90	397	49	84	357	42	6	40	7
2012	87	430	37	74	389	33	13	41	4
2013	75	366	52	64	340	42	11	26	10
2014	70	431	51	62	382	42	8	49	9
2015	79	398	52	69	356	39	10	42	13
Total	**753**	**3086**	**433**	**649**	**2785**	**355**	**104**	**301**	**78**

Table 8 - Descriptive Statistics

This table reports the number of observations, means and medians of the variables used in the paper.

	Earnouts			Cash Offers			Stock offers		
Variables	**N**	**Mean**	**Median**	**N**	**Mean**	**Median**	**N**	**Mean**	**Median**
Panel A: Full Sample									
MB	583	3,45	2,36	2727	2,62	2,28	333	-12,06	1,62
LDR	600	0,21	0,16	2946	0,29	0,28	286	0,21	0,10
OPINC	603	0,10	0,11	2958	0,11	0,13	287	-0,48	-0,14
SIZE	603	5,76	5,73	2960	6,13	6,17	288	4,50	4,45
DOME	625	0,80	1,00	3083	0,74	1,00	430	0,85	1,00
IDRISKb	625	73,88	67,69	3083	67,52	65,75	430	68,84	65,75
IDRISKa	625	72,49	65,75	3083	66,99	65,75	430	69,49	65,75
TSb	625	0,72	1,00	3083	0,52	1,00	430	0,51	1,00
TSa	625	0,74	1,00	3083	0,56	1,00	430	0,52	1,00
RATIO	601	1,75	1,78	2806	1,63	1,64	396	2,70	2,75
Panel B: Private Target Sub Sample									
MB	520	3,46	2,34	2452	2,51	2,26	262	-15,08	1,73
LDR	535	0,20	0,15	2653	0,29	0,28	218	0,19	0,06
OPINC	538	0,09	0,11	2665	0,11	0,13	218	-0,58	-0,20
SIZE	538	5,68	5,66	2667	6,10	6,14	219	4,24	4,23
DOME	557	0,79	1,00	2785	0,74	1,00	353	0,86	1,00
IDRISKb	557	72,75	65,75	2785	66,91	65,75	353	67,58	65,75
TSb	557	0,71	1,00	2785	0,50	1,00	353	0,52	1,00
RATIO	535	1,78	1,79	2528	1,64	1,64	319	2,73	2,75
Panel C: Public Target Sub Sample									
MB	63	3,33	3,08	275	3,53	2,57	71	-0,94	1,50
LDR	65	0,26	0,28	293	0,29	0,28	68	0,30	0,26
OPINC	65	0,14	0,13	293	0,12	0,13	69	-0,14	0,03
SIZE	65	6,48	6,36	293	6,45	6,50	69	5,30	5,26
DOME	68	0,81	1,00	298	0,82	1,00	77	0,83	1,00
IDRISKb	68	83,11	81,65	298	73,15	67,20	77	74,64	67,69
TSb	68	0,84	1,00	298	0,67	1,00	77	0,45	0,00
RATIO	66	1,51	1,57	278	1,53	1,49	77	2,60	2,67