The Implications of Earnouts

A Study on the Swedish M&A Market

Laura Lindberg Ning Wang

M.Sc. Thesis
Department of Finance
Stockholm School of Economics
Fall 2018

ABSTRACT

In this thesis, we study the effects of earnouts in the Swedish M&A market. We focus on transactions in which public bidders acquire private targets. Propensity score matching (PSM) is used to reduce the potential problems related to random sampling. Our empirical results show that using earnouts will significantly increase the total payment multiple and reduce the initial payment multiple. We also find that using earnouts has a significant negative influence on the acquirers' cumulative abnormal return (CAR), which contradicts previous study results based on the US and UK M&A markets. To further explain this phenomenon, we dig into depth of transactions in Sweden. The possible explanations include the signalling effect of earnouts on the target quality, the investors' concerns of potential transaction costs and the difference in the shareholder structure. For transactions involving earnouts, we find that the structure of the contracts, in terms of the earnout size and the length, does not significantly influence the CAR. We also analyse the determinants of the size and length of earnouts. We find that the factors that significantly influence the earnout size are: whether the target company is 100% acquired, whether the deal is cross-border, the percentage of stock used in the payment, the turnover of the target, and the market-to-book value of the bidder. However, for the determinants of the earnout length, only the turnover of the target and the deal value have significant influences.

Keywords: Earnouts, Sweden, M&A, PSM, CAR, Payment Multiple, Initial Payment Multiple

---

Acknowledgements: We would like to give a special thanks to our tutor Yan Dong. She raised our interests in studying the risk mitigation tools applied in the M&A transactions, and gave us a lot of helpful advice on our thesis. We would also like to thank all the investor relationship mangers who replied to our queries and gave us the relevant information. Further we are very grateful to the Swedish Institute, which supports one of our team members to further her study on the master level in Sweden. Finally, we would like to thank each other, as we support each other to finish this big thesis project.

Table of Contents

1. Introduction 1
2. Literature Review and Hypothesis Formulation 3
2.1 Literature Review 3
2.2 Hypothesis Formulation 10
3. Data and Methodology 13
3.1 Data Collection 13
3.2 Variable Description 15
3.3 Descriptive Statistics 18
3.4 Methodology 21
4. Results and Discussion 25
4.1 The Matching 25
4.2 H1 – The Effect of Earnouts on CAR 29
4.3 H2 – The Effect of Earnout Size and Length on the CAR 36
4.4 H3 – The Effect of Earnouts on the Payment Multiples 37
4.5 H4 – The Effect of Earnouts on the Initial Payment Multiple 39
4.6 H5 – The Determinants of Earnout Size and Length 41
4.7 Data Quality and Match Sensitivity 44
5. Limitations and Conclusions 46
5.1 Limitations 46
5.2 Conclusions 46
6. References 48
6.1 Literature 48
6.2 Other Sources 51
Appendix 52
Appendix A: Variable Definition 52
Appendix B: Tests on the Data 55

1. Introduction

M&A is a very helpful tool for companies to achieve external growth. It is in the interest of the acquirers and the targets to maximize their benefits from the M&A transactions. However, they are exposed to many risks both before and after the transaction. These risks include the stock price volatility (especially for equity financed deals), and the post-transaction performance of the combined entity. In our M&A course, we learned about one risk mitigation tool called collar, which is an effective tool to reduce the influence of material stock price fluctuations on the final price the target company could obtain. This kind of tools intrigues our interest in further studying the tools used to mitigate risks in M&A transactions, and we would like to find out how these tools are applied in the M&A transactions in Sweden.

The three most common risk mitigating tools applied in M&A deals are collars, contingent value rights (CVR), and earnouts. These tools could be separated into two groups: pre-closing instruments and post-closing instruments. Collars provide pre-closure protection for both the bidder and the target by providing a predetermined price range related to the stock price fluctuations. CVRs provide post-closure protection for public targets by offering additional payments per share given that certain events occur within a predetermined period. Similar to CVRs, earnouts are also post-closure instruments. However, earnouts are mainly used to protect the bidder in case the target underperforms after the transaction (Caselli et al., 2006).

We collect data on M&A transactions in the Swedish market from 1978 until now, and we mainly focus on deals in which the acquirers are Swedish public companies and the targets are non-US companies. The result shows that the total deal number is 7,393, and no deal is related to collars or contingent value rights. Earnouts are applied in 272 deals. Obviously, in Swedish M&A market, collars and contingent value rights are not popular tools. This result leads us to focus on earnouts. Meanwhile, we find that the majority of the earnout deals are for private targets. In our data sample, out of 272 earnouts deals, 192 deals are for European private companies. This is in line with what Datar et al. (2001) find for the US market. Hence, we choose to only study deals involving private targets.

It is understandable that earnouts are more often used for private targets, because of potential information asymmetry issues. If the combined entity cannot achieve the expected synergies, or the target company fails to achieve the projected financial performance, the acquirer has overpaid. The risk of overpayment increases as the valuation of the target and the synergies becomes more difficult. Difficulty in valuation is pronounced in deals where

asymmetric information plays a central role and where the targets have a superior knowledge about their true value. If the target is private, then there is a lack of information that can be reliably shared with the bidder, in comparison to if the target is public and obligated to disclose important information. To mitigate the risk of overpayment, the bidder can either try pay a lower price for the target or use an earnout. Compared with pressing down the price, earnouts provide more flexibility for both parties in the negotiation.

The basic mechanism of earnouts is that the bidder and target agree upon a payment scheme in which the bidder only pays a part of the target value at the time of the transaction. The remaining part is dependent upon the performance of the target. To be able to measure this performance, the target company is most commonly set up as a separate subsidiary after the transaction (Kohers and Ang, 2000). There are four important pillars of earnouts: the initial payment, the earnout size, the earnout length, and the performance goal. The initial payment is the part of the transaction that is paid at the time of the acquisition, the remaining part of the value is the earnout size. For the US market, Bates et al. (2018) find that the earnout size tends to be approximately 30% of the total deal value or 11% of the bidders' book value. The performance goal refers to the threshold that the target needs to achieve to get the remaining payment. In most cases, these goals are related to financial performance, such as EBIT, cash flow and sales etc. (Bates et al., 2018). The goals can also be dependent on non-financial factors such as the retainment of the key management team within the agreed-upon period (Kohers and Ang, 2000) or the development milestones for products (Cain et al., 2011). The length of the earnout is the time period in which the target must achieve the predetermined goal in order to gain the remaining payment. Based on the US M&A market, the length of earnouts is most commonly between one and three years, with an average of 2.57 years (Cain et al., 2011). If the goals are not achieved, the earnout is not fully paid out. There are more complex versions where the goals are based on stepwise payments, but the basic principle of the earnout still remains the same. To clearly illustrate the function of an earnout, we have extracted a complete deal from our dataset, which is structured as follows:

On the 11th of December 2015, the publicly traded Swedish company Nobia AB announced the acquisition of the UK company Commodore Kitchens Ltd. The consideration for the deal consisted entirely in cash. The total consideration of the deal was 32MGBP, of which 4MGBP was an earnout payment. This earnout was conditioned on the business performance and that the management team would stay on during the earnout period. The earnout period was set to be two years, with two subperiods. In both 2016 and 2017, Commodore Kitchens Ltd achieved their financial goals and thus received 2MGBP per year. The total consideration earned by the

target company was, therefore, the maximum amount that could have been achieved of 32MGBP[1].

To obtain a better understanding of earnouts and how investors interpret them, we study the effect of earnouts on the Swedish bidders' stock performance and the payment multiple of transactions. Moreover, we choose to study what factors influence the structure of the earnouts, mainly with regards to the earnouts size and length. To our knowledge there is no detailed study on the earnouts in the Swedish M&A market. Our study fills in the gap and provides insights about the implications of earnouts in the Swedish market. This could be of interest of both researchers within the M&A area and investment professionals.

The remaining part of this thesis is structured as follows: literature review and hypothesis formulation; data collection and methodology; results and discussion, limitations and conclusions.

2. Literature Review and Hypothesis Formulation

2.1 Literature Review

2.1.1 M&A Deals with Private Targets

Of all M&A deals in Sweden, in which the bidder is public, almost 50% of the targets are private. This observation is based on the data-collection process (see Table I). This observation is applicable to other countries' M&A markets as well. Capron and Shen (2007) show that for the US M&A transactions from 2000 to 2004, 60% to 75% of the target companies are private. Draper and Paudyal (2006) find a slightly higher number of 87% for the UK market. In contrast with the popularity of private companies in practice, private companies' attractiveness within the academic research area is a lot lower. This is mainly due to the data availability issue.

Compared with acquisitions of public targets, the acquisitions of private targets have some special characteristics. One of the most important features of private targets is the lack of information transparency. Acquirers have to spend more time on collecting information to make the acquisition decision, and at the same time, acquirers are exposed to the risk of improper

[1] Source: Nobia Press Release (2015), Annual Report (2016, and 2017)

target valuation (Ragozzino and Reuer, 2007). Reuer and Shen (2005) show that geographic distance between the acquirer and the target, to some extent, reflects this concern. Since private targets are much more uncertain compared with public ones, acquirers would be more willing to search for local private target companies. When the target companies are far away, the acquirer prefers public ones. Beside geographical distance, business distance also influences the choice between public targets and private targets. Capron and Shen (2007) show that if the target companies are in the same industry as the acquirers, private targets are preferred. If the acquirers enter new industries, they prefer acquiring public companies. On one hand, acquirers bear the risks of overpaying for the private targets because of the severe information asymmetry. On the other hand, acquirers also have the possibility to take advantage of the private information and achieve abnormal returns.

Another important characteristic of private target companies is that they lack market liquidity. Compared with owners of public companies, who can easily cash out in the public market, owners of private companies have fewer choices if they want to exit. Fuller et al. (2002) show that owners of private targets are in a disadvantageous position in M&A transactions. As public acquirers normally have stronger bargaining power, the private target companies have to accept the "the private firm discount". According to Koeplin et al. (2000), compared to public targets, private targets on average have to accept an 18% discount for book multiples, or a 20%~30% discount for earnings multiples.

The third characteristic of private target companies is the concentration of control (Chang, 1998). In comparison to public targets, whose shares are usually distributed among many investors, ownership of private targets is always highly concentrated. To some extent, this characteristic makes the negotiation between the acquirers and the targets more efficient. At the same time, it limits the tools that acquirers could use to facilitate the purchase, such as tender offers.

With regards to these special characteristics listed above, it is complex to tell whether acquirers will gain or lose from acquiring private targets. However, it is worthwhile the effort to further develop the research within this area, as the number of M&A deals involving private targets is large.

2.1.2 Traditional Payment Methods

The characteristics of private targets companies increase the difficulty for both parties to come into agreement on the valuation (Officer et al., 2009). Due to information asymmetry, the acquirers can never be certain about the true situation of the private target company before the transaction is completed. However, the highly concentrated ownership of the private target allows acquirers to reduce their exposure to misvaluation risks by adding more flexible terms in the payment contracts. Compared with the disperse ownership structure of public targets, the concentrated shareholder feature of private targets facilitates the negotiation process.

The most common payment methods in M&A deals are cash, stock, and mixtures of the two. With time passing by, bidders' preferences of payment methods have changed. From 1990 to 2013, the use of pure stock payments decreased by 40% to a level of 20%, the use of pure cash payments increased from 25% to 50% and the use of mixed considerations increased from 10% to 30% (Boone et al., 2014). Many factors influence the choice of the payment method, such as the characteristics of both parties, and the market situation etc. The study of Fishman (1989) shows that if there is a lot of competition around the target, acquirers tend to choose cash as the payment method to stand out among the competitors. From the perspective of the target shareholders, on one hand, cash payment is certain no matter how the integration goes after the transaction. On the other hand, target shareholders also lose the upside potential of owning the shares of the bidders. According to Martin (1996), stock payment is prevalent when acquirers have lower cash positions, higher institutional shareholdings or higher block holdings held by the management team. Stock offers to some extent allow for risk sharing between the bidder and the target, but also introduce volatilities to both parties.

Many studies focus on the relationship between the payment methods and the abnormal returns of acquirers after the announcement. According to Travlos (1987), if successful bids are fully stock financed, the shareholders of the acquirers are exposed to a negative abnormal return after the announcement. However, if the bids are cash financed, shareholders of acquirers only obtain normal returns after the announcement. This result is consistent with his signalling hypothesis, which states that investors treat stock financing as a signal for the overvaluation of the acquirers' stock.

If we zoom in and only study the transactions between public acquirers and private targets, things are different. Fuller et al. (2002) study the US M&A market between 1990 and 2000 and find that when purchasing public targets, acquirers experience negative abnormal returns, which supports the findings of Travlos (1987). However, when purchasing private targets or subsidiaries, acquirers obtain positive abnormal returns, irrespective of payment methods. An

argument used to support this finding is that the liquidity of the private-target market is lower than that of the public-target market. Hence, acquirers pay lower prices for private targets, leading to positive abnormal returns. Moreover, they find that acquirer abnormal returns are larger in equity financed deals than cash financed deals when the target is private.

Chang (1998) has a slightly different conclusion. He shows that when the target company is private, the shareholders of the acquirer obtain positive abnormal returns if they choose stock as the payment method. If they instead offer cash, the bidder has zero abnormal returns. He argues that the willingness of the target owners to accept stock offers is interpreted as a positive signal by the stock market, as they could access more information. Fuller et al. (2002) take this argument one step further through adding the tax implications of stock payment. The use of stock leads to deferred tax payments, which leads the acquirer to pay less.

In general, stock is preferred by acquirers when they are uncertain about the valuation of the targets. The reason is that stock allows acquirers to share the risk with the target shareholders after the transaction. However, from the target perspective, cash is often preferred, because targets may have concerns that the stocks of the acquirers are overvalued (Shleifer and Vishny, 2003).

2.1.3 Earnout Determinants, Structure, and Consequences

Given the potential conflicts regarding the valuation, alternative payment methods have emerged, one of which is the earnout. Earnouts are more commonly used when information asymmetry between the two parties is high (Ragozzino and Reuer, 2009). From the bidders' perspective, earnouts help to mitigate the risk of overpayment (Reuer, 2004, Kohers and Ang, 2000, Caselli et al., 2006). From the targets' perspective, accepting earnout offers allows them to signal their high quality. The reason is that targets that do not believe they can meet the requirements are unwilling to enter the earnout contracts. High quality targets who are confident about their capability to achieve the goals are more likely to benefit from accepting the earnout contracts (Caselli et al., 2006).

Earnouts also serve as "retention bonuses" that motivate the managers of target companies to stay throughout the earnout period and even beyond (Kohers and Ang, 2000, Caselli et al., 2006). Datar et al. (2001) also support this argument, and further find that the tendency of acquirers' willingness to retain the management team is especially high when the target has high intangible assets, such as goodwill and patents. Another plausible reason for why the bidders would want to retain the management team is to prevent the management team from

joining competing businesses. Cadman et al. (2012) show that managers do in fact stay longer when an earnout is in place.

Cross-border deals are more uncertain than domestic deals. Earnouts could, therefore, be assumed to be used more in cross-border transactions. However, previous studies on the US market show that earnouts are not used more in these deals (Datar et al., 2001). One possible reason is that the target would like to avoid the potential disputes on the final deferred payment regarding the differences in accounting policies and corporate governance practices. Mantecon (2009) also shows that acquirers do not gain the expected benefits from using earnouts in cross-border transactions. Things are different for cross-industry transactions. Based on the study of Cain et al. (2011), the likelihood of earnout-usage is slightly higher in cross-industry deals than in intra-industry deals. Moreover, Reuer et al. (2004) find that the specific industry of the target, such as high-tech or services, plays an important role in determining the use of earnouts.

Kohers and Ang (2000) study the US market and find that the use of earnouts is related to the size of acquirers and the relative size of the deals. Compared with large bidders, bidders with small valuation tend to use earnouts more often, especially when they bid for large targets. Barbopoulos and Sundarsanam (2012) obtain similar results when analysing the UK market. The reasoning behind is that the larger the deal size, the more severe the potential losses are for the bidders. Barbopoulos and Sundarsanam (2012) also find that the use of earnouts is more common for older bidders. They argue that this is due to the fact that older bidders are superior in handling potential valuation issues. They further show that earnouts are more often used when the overall M&A market is hot. This is understandable because potential overpayment problems are more severe during the peaks of the M&A waves.

Bates et al. (2018) dig into depth about the effect of acquirers' financial situations on the use of earnouts. Based on US data, they find that earnouts serve as means of financing for financially constrained bidders. They observe that when the bidder does not have a credit rating, they are 17.5% more likely to use an earnout. Therefore, the earnout could also be treated as a signal of the financial situation of the bidder.

The outcome of how much the target in an earnout financed deal actually receive is varied. One interesting observation is that in the US less than 50% of the targets receive the full earnout payment after the earnout period is completed. More particularly, 46% receive the full payment while 9% does not receive an earnout payment at all. The remaining 45% of the targets receive on average 40% of the earnout payment (Kohers and Ang, 2000). The same study shows that there are some cases where the targets are divested before the end of the earnout period. This mainly occurs in cross-industry deals where the integration process is more difficult.

Regarding the structure of earnouts, there are two main theories: adverse selection and moral hazard (Cain et al., 2011). There are very few studies on this topic. For the US market, Cain et al. (2011) study the determinants of the earnout size, the earnout length and the performance measurements. They find that the earnouts size is positively related to the uncertainty of the targets' valuation and the importance of the targets' management team. The length is positively related to the bidders' view on how long the uncertainties would be eliminated and negatively related to the "noise in the performance signal". The choice of performance measurement metric depends on the availability and reliability of information from the target. Acquirers choose the best available performance proxy they can obtain to keep track of the target performance. Kohers and Ang (2000) study the determinants of the earnout size based on the UK market, and find that the earnout size is highly related to the magnitude of diversion in views about the target value between the two parties.

Barbopoulos and Adra (2016) study the effect of the earnout structure on acquirers' payment premium. They find that an increase in the length by one-month results in a 0.6% higher premium, and that an increase in the relative earnout size of 10% results in a 6.45% increase in the premium. The higher premium is explained as the compensation to the target for agreeing to a deferred payment. The larger the deferred payment and the longer the earnout period, the higher the compensation. Even though the total premium is higher, the initial payment is found to be smaller than or at most equal to the consideration of a deal that does not involve an earnout. This result is intuitive, because otherwise, the target does not have the motivation to achieve the goal and the bidder cannot reduce overpayment risks.

Barbopoulos and Sudarsanam (2012) examine the influence of using earnouts on abnormal returns in the UK M&A market. They show that for deals with public targets, using earnouts benefit the acquiring companies' shareholders more than stock offers. At the same time, they find no significant difference when using earnouts in comparison with cash offers. However, for deals with private targets, bidders gain when using earnouts instead of pure cash offers. When compared with pure stock offers, the gain of using earnouts is not significant. The result could be explained by the relative strength of the signalling effect of earnouts. The risk mitigation effects of earnouts are stronger than cash offers in the case of private target transactions, and stronger than stock offers in the case of public target transactions. Also, Barbopoulos and Adra (2016) find that the use of earnouts leads to positive short-term abnormal returns, based on the UK market. This result is in line with what Kohers and Ang (2000) find on the US market. From the target perspective, Elnahas et al. (2017) conduct a study on public

targets in the Islamic market, and find that the target abnormal return is positive in the short run when using earnouts but negative in the long run.

There are different ideas about interpreting the relationship between abnormal returns and premiums. Antoniou et al. (2007) believe that the relationship is positive given that the premium is a proxy for potential synergies. That is, the higher the premium, the higher the synergies and the higher the acquirer abnormal returns. However, Schwert (2003) opposes this idea. He believes that a higher premium is a signal of overpayment that leads to a negative abnormal return. Using data of European banks between 1995 and 2004, Diaz et al. (2009) show that the relationship between the payment premium and the bidder's abnormal return is quadratic: below a certain level, the premium has a positive influence on the returns; after that level, the influence becomes negative.

There are some potential problems associated with the earnouts. The most obvious one is the interest conflicts between the targets' management team and the acquirers' management team within the earnout period (Sudarsanam, 2010). The targets' management team is incentivized to try hard to achieve the predetermined performance goal within the earnout period, in order to maximize the deferred payment they could obtain. The behaviour can potentially impede the long-term interests of the bidders. Elnahas et al. (2017) support the notion that with the use of earnouts, there is the risk of agency problems. The authors relate this to the long run negative abnormal returns of the target. Based on the empirical analysis of Reuer et al. (2004), earnouts are less often used in cross-border deals when the targets obtain weaker legal protection and are exposed to higher risk of moral hazard and renegotiation. This finding is supported by the study of Sudarsanam (2010). Also, from the acquirer's perspective, incentives exist to bias the accounting results. If the target does not achieve the financial goals, the acquirer does not need to pay the earnout. The bidder may be able to influence the financial results of the target by increasing the expenses, such as R&D and depreciation. These manipulations could lead to legal disputes (Caselli et al., 2006). Kohers and Ang (2000) further look at the specific legal systems of the parties in the transaction. They find that if the target is a US company in an earnout deal, then the bidder is more likely to be from a country that has an English-tradition court system. This supports the idea that ensuring smooth implementation of the contract is an important consideration in earnout deals, as potential disputes are big concerns for both parties.

2.2 Hypothesis Formulation

To our knowledge, there is no literature about the Swedish M&A transactions involving earnouts. Moreover, the studies on the influence of earnouts structures and the determinants of earnout structures are quite limited. To fill in the gap in the research area and meet our interests, we empirically analyse the earnout transactions in Sweden from the following five areas: the influence of using earnouts on the bidders' cumulative abnormal returns; the influence of earnouts structures on the bidders' cumulative abnormal returns; the influence of using earnouts on the bidders' total payment multiples; the influence of using earnouts on the bidders' initial payment multiples, and the determinants of earnout structures.

2.2.1 H1: The Relationship Between the CAR and the Use of Earnouts

CAR reflects how the investors in the stock market interpret the influence of M&A events on bidders. As mentioned in the literature review, bidders obtain positive abnormal returns if they acquire private targets (Fuller et al., 2002). The question we are interested in is how the abnormal returns will be influenced by involving earnouts. There are different arguments which support contrary ideas. It is difficult for investors to assess the quality and valuation of the acquisition, as the information disclosed about private targets is quite limited. Earnouts can partly signal the insiders' opinions about the deal. On one hand, accepting earnouts could imply high-quality targets. The reason is that targets that are aware of their quality and bad targets (the ones not likely to achieve the goals) would not accept an earnout contract (Caselli et al., 2006). In essence, earnouts are designed to reduce the potential overpayment risk of bidders through deferred payments. Hence, it is possible that the investors interpret earnouts as a positive signal for bidders. On the other hand, using earnouts means that bidders are uncertain about the target quality. Good targets have sufficient reliable information to share. Taking bidding competition into consideration, acquirers would not use earnouts if they want to win the bid and complete the acquisition of the good target company. If this is the case, the bad targets would be the ones left. The market could also treat this as a negative signal. Hence, the influence of the earnouts on CAR is ambiguous. The empirical analysis results in the US and UK show that using earnouts have a positive influence on CAR. We think that it is highly possible that the same also applies to the Swedish market, which means that the positive signalling effects of earnouts overweigh the negative effects. H1 is therefore that *earnouts have a significant positive influence on CAR.*

2.2.2 H2: The Relationship Between the CAR and Earnout Structure

There are very few papers covering the relationship between the earnout structure and the CAR. We believe that the earnout structure can signal how uncertain the acquirers are about the value of the targets and how confident the targets are that they could obtain the earnout payment. The higher the earnout size, the lower the overpayment risk of the bidders, and the more confident the owners of the target companies are to achieve the goals. Regarding the earnout length, a shorter earnout period leads to a higher discount factor, hence putting more weight on the deferred payment. Moreover, a shorter earnout period would increase the possibility for the target to accept the deal. Based on the model and empirical analysis by Lukas and Heimann (2014), bidders would benefit from a shorter earnout period. H2 is therefore that *the earnout size has a significant positive influence on CAR, and the length has a significant negative influence on CAR.*

2.2.3 H3: The Relationship Between the Payment Multiple and Earnout Usage

When deciding an appropriate proxy of the payment multiple, we find that the disclosure custom is different for different countries and different industries. When we read through the press releases and annual reports related to our sample, we find that public companies in Sweden often disclose the sales of the private targets one year before the announcement. There are also a few cases that EBIT or profit before taxes are provided. For the purpose of comparison, we choose to use the ratio of the deal value and the target turnover one year before the announcement to represent the payment multiple.

According to Kohers and Ang (2000), acquirers often use earnouts to retain the targets' management team, especially for targets whose human capital plays an important role. In order to retain the management team, bidders need to pay a higher price. Moreover, time value of money should also be taken into consideration. It is reasonable to set the total payment multiple higher for earnout deals. H3 is therefore that *earnouts have a significant positive influence on the payment multiple*.

2.2.4 H4: Relationship Between Initial Payment Multiple and Earnouts

According to Kohers and Ang (2000), bidders would like to pay the initial payments based on how certain they are about the target companies' valuation. The purpose of earnouts is to reduce the risk of overpayment for the bidders, and this is achieved through postponing part of the payment. Compared with the non-earnout deals, for which bidders pay everything at the beginning, the initial payment needs to be smaller for earnout deals. If this is not the case, then the acquirer does not obtain the benefits of reducing the overpayment risk. H4 is therefore that *usage of earnouts significantly reduces the initial payment multiple*.

2.2.5 Determinants of Earnout Size and Earnout Length

The four key aspects in an earnout contract are the earnout size, the earnout length, the goals that are used to measure the performance of the target companies, and the methods that are used to pay the earnout. Most earnouts are paid in cash, and the information related to the measurement in Sweden is rather limited and ambiguous. We, therefore, focus on the remaining two factors: the size and length.

There are very few articles covering this topic. The only one that studies the determinants of the size and length of earnouts is by Cain et al. (2011), which we mentioned in the literature review. However, they mainly focus on the US market, and include both public targets and private targets. Hence, their methodology is not fully applicable to our study. Compared with the data sample of the US, here in Sweden, the number of transactions is much smaller, and the available variables are much fewer. Therefore, we choose to use the available information to figure out what factors significantly determine the relative earnout size and earnout length.

3. Data and Methodology

3.1 Data Collection

In order to test our hypotheses, we collect data related to the Swedish mergers and acquisitions market. The main part of our dataset is from the Securities Data Company (SDC) Platinum and Bloomberg. We also use Amadeus and collect information from the investor relationship managers to find missing data regarding target characteristics.

In this study we analyse the effect of using earnouts on the cumulative abnormal returns (CAR), the initial payment multiple as well as the full payment multiple of a transaction. The multiples are further defined in section 3.2. To do this analysis, we collect a dataset containing merger and acquisition transactions in Sweden. This dataset contains two parts: one with deals that apply earnouts and the other with deals that do not. The deals involving earnouts, are considered being the *treatment group*, and deals without earnouts, are regarded as the *control group*. To distinguish between the two groups, a dummy variable is generated (EO_Dum): one for earnout deals, and zero for non-earnout deals.

The bidders in this study are publicly traded companies in Sweden. The targets used are private European companies, because the majority of earnout deals in Sweden are for private targets and studies of M&A transactions involving private targets are underrepresented in academic research. By doing so, we avoid the status of bidders and targets to affect our results.

To enable our dataset to be as large as possible, we choose to use all available dates in the SDC database. This is particularly important as there is a limited amount of deals conducted in Sweden, especially with regards to earnouts. Based on the screening result from SDC Platinum database, the total amount of M&A transactions where the bidder is a public Swedish company and the target a private European company is 7,393. These deals take place between January 1978 and June 2018. Out of the 7,393 deals, 192 contain earnouts. Inspired by Barbopoulos and Adra (2016), we also apply the following criteria to filter out our desired study objectives:

(1) The deal value is greater than 1MUSD
(2) The deal is completed
(3) The acquirers' market share four weeks before the acquisition announcement is greater than 1MUSD
(4) The acquirer buys at least 50% of the target company

For these deals, we further collect the following variables from the SDC database: the acquirer age, the target age, country of target, deal value, earnout value, value of initial payment,

percent acquired, industry of acquirer, industry of target, length of the earnout, market value of the acquirer four weeks before the acquisition, the turnover of the target (one year before the acquisition), the announcement date, the payment method, the percent of cash, stock and other (mainly earnout) to finance the deal.

We then use Bloomberg to collect the book-to-market value of the acquirer four weeks before the announcement date; the stock price of the acquirers two trading days before the announcement date, and two trading days after the announcement date; the representative equity index of the Swedish stock market (OMX 30) two trading days before the announcement date and two trading days after the announcement date.

We also use Bloomberg to collect part of the shareholder structure information. This is used to explain our regression result. The shareholder structure information collected includes the percentage of floating shares held by institutional investors four weeks before the announcement date and on the announcement date, the percentage of domestic (Swedish) shareholders four weeks before the announcement date and on the announcement date, and the insider trading information (net shares bought or sold by the insiders from four weeks before the announcement date to two trading days after the announcement). Moreover, we use Amadeus to collect part of the target company financial information. This is also used to explain our results. The collected information includes the following variables (dated one year before the acquisition): EBIT, profit before tax, net income, total assets, and the book value of equity.

We then manually collect data points that are missing in the databases through press releases, annual reports, and by contacting the investor relationship managers of the companies. The missing data mainly refers to the target turnover, method of payment, length of the earnout and age of the companies. Another reason why we try to obtain this information from sources other than the SDC is that the database has been known for having some mistakes (Officer, 2007). Chain et al. (2008) also express concerns regarding the way SDC presents earnouts and recommend that the numbers should be taken with caution. They observe that SDC in some cases reports the maximum earnout value, and in other cases reports the expected earnout value. We have therefore tried to manually check the transactions in our dataset, to ensure that the data is correct, by doing so we could improve the accuracy of our results.

Table I summarizes our data cleansing process and how many deals are left after each step. Our final dataset contains 153 observations, of which 61 are earnouts and 92 are non-earnouts. Variables that are presented in monetary units are transformed to millions of US dollars using the corresponding exchange rate on the announcement date of each transaction.

Table I

Sample Selection

This table summarizes the criteria used for selecting the sample and illustrates how the sample size for both the treatment group (earnout) and the control group (non-earnout) is affected by each step of the selection process. Manual correction is included in the numbers presented. Missing values include target turnovers, payment methods, size of the earnouts for earnouts deals, length of earnouts for earnouts deals, acquirers' market value to book value (four weeks before the announcement), and cumulative abnormal returns. The final row represents the final data sample size used in this study.

		Sample Size	
	Selection Criteria	**Earnout**	**Non-earnout**
(1)	Is it an earnout deal?	10 245	801 459
(2)	The acquirer is a Swedish public company, and the target is a non-US company	272	7 121
(3)	The target is a European private company	192	3 352
(4)	The deal value is greater than 1MUSD	167	840
(5)	The deal is completed	144	671
(6)	The acquirer market value four weeks before the acquisition is greater than 1MUSD	121	291
(7)	The acquired share is at least 50%	120	267
(8)	Exclude targets in the real estate or financial industry	118	220
(9)	Exclude deals with missing values	61	92
	Final Sample	**61**	**92**

3.2 Variable Description

The dependent variables of interest in this paper are the cumulative abnormal returns (CAR), the initial payment multiple, the payment multiple, the length of the earnout and the relative earnout value. In this subsection we briefly provide an explanation for the dependent variables as well as for independent variables. A more detailed explanation for the variables can be found in Appendix A.

The CAR is calculated for a five-trading day window, of which two trading days occur before the announcement day and two trading days after. For each trading day, the abnormal return is calculated. The benchmark used to calculate the abnormal return is the OMX30, which represents the overall performance of Swedish stock market. The CAR is thus calculated using the following formula:

$$CAR(\tau_{-2}, \tau_2) = \sum_{\tau_{-2}}^{\tau_2}(R_{stock} - R_{benchmark}) = \sum_{\tau_{-2}}^{\tau_2} AR \qquad \text{Eq. (1)}$$

The initial payment multiple is the initial payment divided by the target turnover. The initial payment for earnout deals is the payment that the acquirer pays at the time of the acquisition. In comparison to the earnout value, the initial payment is certain. The initial payment for non-earnout deals is the total payment. In practice, the EV/EBIT ratio is often used as the multiple metric to measure M&A transactions. However, in Sweden, many companies only release the turnover of the target one year before the acquisition in the press-releases, and this may because that bidders do not want to share too much information and protect themselves from the industry competition. Moreover, the enterprise value of the target is normally not released. Therefore, in this thesis, we choose to use the initial payment over the target turnover ratio as a proxy of the initial payment multiple, and the total deal value over the target turnover as a proxy of total payment multiple. Defining both the initial payment multiple and the total payment multiple allows us to compare the effect of earnouts at different stages.

The length of the earnout is the number of years within which the target is tracked to determine whether they can achieve the predetermined goals. The relative earnout size is measured as the earnout value over the total deal value.

Regarding the independent variables we mainly collect data from three perspectives: the characteristics of the targets, the characteristics of the acquirers, and the characteristics of the transactions.

For the characteristics of the targets, we collect the age of targets and the turnover of targets. We believe the age of targets could reflect the development stage of the target companies, and influence the confidence of the bidders when they evaluate the target companies. The size of the target influences the use of earnouts, as the study of Datar et al. (2001) shows that earnouts are more often used for smaller private targets

For the characteristics of the acquirers, we collect the market-to-book ratio four weeks before the announcement date. This is believed to reflect the market pricing on the acquires before the announcement date. According to previous studies, the valuation level for public acquirers influences their choice of payment method. The size of the acquirer is also included as this has been proven to affect the use of earnouts (Kohers and Ang, 2000). The number of bids indicates the times the acquirer has participated in acquisitions in the SDC database and is used to reflect how active the bidder is in the M&A markets.

Regarding the characteristics of the transactions, a dummy variable is used to measure whether the deal is cross-border or not. Dummies are also used to signal if the deal is cross-industry or not and to show if the acquirer buys 100% of the target or not (named as the *Full* variable). The *Full* variable indicates whether the acquirers chooses to share the risk with the

target or control the entire combined entity by itself. Further, a culture index is constructed. This reflects the accounting transparency in different regions and is constructed following the studies of Barbopoulos and Adra (2016) and Gray (1988).

The method of payment is also included as this has been proven to affect the cumulative abnormal returns as well as the payment multiples (Travlos,1987, Chang, 1998). The payment methods include cash, stock, mix, and earnout. We also collect the percentage of cash, percentage of stock and percentage of other (earnouts). If the deals also involve equity-related payment methods, we treat them as stock. This is done to simplify the analysis. From our descriptive analysis, we find that during periods in which M&A activities are popular, the percentage of using earnouts is much larger compared with the remaining periods when the M&A market calms down. Hence, we design a year dummy to reflect this phenomenon. The average percentage of using earnouts in transactions is 6.25%. For years that the percentage is above the average, the dummy variable is one; otherwise, the dummy variable is zero.

3.3 Descriptive Statistics

Table II
Data Summary

This table shows the summary statistics for the dataset containing 153 observations separated by year. The first panel contains the type of deal financing (cash, stock or mix). It also contains the full variable representing 1 if the bidder acquired 100% of the company and 0 otherwise. CB denotes cross-border deals and is represented by a dummy equal to one if it is cross border and zero otherwise. The target industry contains six categories representing different industries: Durable Goods (DG), Healthcare (HE), Industrial (IN), Materials (MA), Non-durable Goods (NDG), Service (SV) and Technology, Media and Telecom (TMT). The final row in the table represents the percentage of each respective category over the total deal number. The row above this shows the sum for each column. With regards to the second panel the number within the brackets is the number of earnout deals within each industry.

Year	**Deal Type**							**Target Industry**						
	All	**Cash**	**Stock**	**Mix**	**EO**	**Full**	**CB**	**DG**	**HE**	**IN**	**MA**	**NDG**	**SV**	**TMT**
2003	2	1	1	0	0	1	1	1	1	0	0	0	0	0
2004	3	1	0	2	0	2	1	1	0	0	0	0	1	1
2005	4	2	0	2	0	4	2	1	0	2	0	0	0	1
2006	11	6	0	4	1	10	8	1	2	3	0	1	3	1
2007	16	7	2	2	5	13	8	1	0	1	0	0	11	3
2008	10	2	2	1	5	9	3	0	1	3	0	1	3	2
2009	5	1	1	2	1	3	0	0	3	0	0	0	2	0
2010	9	3	2	2	2	8	4	0	1	3	0	0	3	2
2011	9	4	1	2	2	9	6	0	2	1	0	0	4	2
2012	15	4	2	1	8	15	6	1	3	0	4	2	3	2
2013	12	3	1	1	7	9	8	1	0	2	1	1	3	4
2014	8	4	1	0	3	6	6	2	1	2	0	1	1	1
2015	11	5	1	1	4	9	5	0	1	2	2	0	5	1
2016	10	0	0	6	4	8	2	0	1	1	0	3	3	2
2017	17	0	2	5	10	17	6	0	0	1	4	1	6	5
2018	11	0	0	4	7	11	5	1	0	2	2	1	4	1
Total	153	43	16	35	59	134	71	10 (6)	16 (5)	23 (15)	13 (4)	11 (4)	52 (18)	28 (9)
%	**100**	**28.1**	**10.5**	**22.9**	**38.6**	**87.6**	**46.4**	**6.5**	**10.5**	**15.0**	**8.5**	**7.2**	**34.0**	**18.3**

Table II shows the structure of the final dataset. One observation is that the number of deals varies over time, supporting the existence of merger waves. 38.6% of the transactions involve earnouts. Earnouts are more often used when the overall M&A market is hot. This is consistent with what Barbopoulos and Sudarsanam (2011) find in the UK market. This is understandable, because potential overpayment problems are more severe during the peaks of the M&A waves.

Regarding the method of payment, 28.1% use pure cash and 22.9% use a mixed consideration. Pure stock is the least common payment method and only represent 10.5% of the sample. 87.6% of the sample contains fully acquired targets, indicating that owning 100% is more common in this type of acquisition. Out of the 153 deals, 46.5% are cross-border.

Regarding the industries, the majority of the observations in absolute numbers are found in the service, TMT and industrial industries. When looking at relative numbers, we find that

earnouts are more commonly used within durable goods and industrial sectors. In both industries, earnouts are used in approximately 60% of the cases; while all other sectors obtain an earnout ratio of about 30-35%. This differs from the statistics in the US M&A market where earnouts are more common in high-tech and service industries (Kohers and Ang, 2000). This could be related to differences in industry structures in different countries.

Table III

Independent Variables Characteristics

This table represents the independent variables. The table is separated into three panels. The independent variables included are: the market value of the acquirer four weeks before the announcement date (MV), the acquirer market-to-book value (MVBV), the total deal value (DV), the acquirer age (Age_Acq), the target age (Age_Tgt), the percentage of stock used in the consideration (Stock_Perct), the deal-to-market value of the acquirer (DVMV), the culture index (Culture_Index), the target turnover one year before the acquisition (Turnover_Target), the deal value as a fraction of the target turnover (DV_Turnover), the value of the earnout (EO_Value), the earnout value as a fraction of the deal value (EODV), and the length of the earnout. The variables related to time are measured in years. The ones related to monetary units are measured in millions of US dollars. The table shows the mean and median for each variable with regards to all deals in the dataset (All), the ones using pure cash payment (Cash), the ones using pure stock payment (Stock), the one using a mixed consideration (Mix), the deals using earnouts (EO), the ones not using earnouts (NEO), the cross border deals (CB) and the deals in which the target is domestic (DOM).

Panel A	**MV($m)**		**MVBV**		**DV($m)**		**Age_Acq (Years)**		**Age_Tgt (Years)**	
	Mean	**Med.**	**Mean**	**Med.**	**Mean**	**Med.**	**Mean**	**Med.**	**Mean**	**Med.**
All	861.5	111.1	2.9	2.2	37.9	8.6	39.5	21	19.5	14
Cash	2,432.0	334.0	2.9	2.0	78.0	15.0	50.0	33	21.0	14
Stock	96.0	24.0	4.0	2.0	6.1	3.0	25.0	19	16.0	9
Mixed	122.0	58.0	2.9	2.5	17.0	8.6	36.0	15	18.0	13
EO	364.0	151.0	2.7	2.0	30.0	8.8	37.0	20	20.0	15
NEO	1,174.0	104.2	3.1	2.2	43.0	8.5	40.9	22	19.0	13
CB	995.0	204.0	2.7	2.2	57.0	13.0	47.0	26	21.0	15
DOM	746.0	49.0	3.1	2.1	22.0	5.8	33.0	19	18.0	13

Panel B	**Stock_Perct**		**DVMV**		**Culture_Index**		**Turnover_Target ($m)**		**DV_Turnover**	
	Mean	**Med.**	**Mean**	**Med.**	**Mean**	**Med.**	**Mean**	**Med.**	**Mean**	**Med.**
All	25.7	4.0	0.48	0.12	2.2	2	31.2	8.1	2.5	1.0
Cash	0.0	0.0	0.2	0.1	2.3	2	63.0	14.0	1.4	1.0
Stock	100.0	100.0	1.2	0.5	1.9	2	8.4	3.3	7.3	0.7
Mixed	45.0	48.0	0.9	0.2	2.1	2	15.0	6.5	2.9	0.9
EO	13.0	0.0	0.3	0.1	2.2	2	24.0	8.0	1.7	1.0
NEO	33.7	16.6	0.6	0.1	2.2	2	35.7	8.1	3.0	0.9
CB	16.0	0.0	0.2	0.1	2.4	2	46.0	13.0	1.7	1.1
DOM	34.0	19.0	0.7	0.2	2.0	2	18.0	5.0	3.2	0.9

Panel C	**EO_Value($m)**		**EO_DV**		**Length**	
	Mean	**Med.**	**Mean**	**Med.**	**Mean**	**Med.**
EO	5.7	2.6	0.3	0.3	2.4	2.0
CB	6.1	5.5	0.3	0.3	2.5	2.0
DOM	5.2	1.6	0.3	0.3	2.3	2.0

Based on the variable characteristics presented in table III, one can say that use of cash as a consideration in Swedish M&A deals is more common for larger acquirers. This can be seen by comparing the mean and the median of cash deals to the ones using stock and mixed payments. We also observe that the spread between the means and medians is large.

The mean and median of MVBV ratio is quite similar when comparing different payment methods, as well as the cross-border and domestic deals. This shows that the market valuation level in the Swedish stock market is consistent.

The deal value is much smaller than the market value of the acquirers. Similar to the pattern of the acquirers' market value, the deal value is larger on average if the deal is paid by pure cash. Moreover, the mean and median deal value is larger for cross-border deals than domestic transactions.

The average age of targets is around ten years smaller than the average age of acquirers. For older acquirers and targets, cash payment seems to be the superiorly used method of payment, while stock is more common for younger targets and acquirers. A reason for this could be the risk-sharing character of equity and the increased risk imposed by young targets.

In comparison with domestic deals, the percentage of stock used is smaller in cross-border deals. The percentage of stock used is also smaller for earnout deals than for non-earnout deals. A reason for this may be that both methods have the risk-sharing capability. The use of earnouts therefore diminishes the need for stock. For deals that use stock, the relative deal value tends to be larger. Based on the culture index analysis result, most of the transactions happen in the Nordic area (2 represents Nordic). Further information about the culture index is presented in Appendix A.

The average target turnover is larger for cross-border and cash-paid transactions. This can be explained by the wish of the acquirer to buy a less risky target, since acquires are more often exposed to extra risks in cross-border deals. The less risky target leads the bidder to obtain a higher certainty and results in a cash payment.

For the median of deal value to target turnover ratio, the difference is not obvious. However, the means clearly differ, once again indicating the possible existence of extreme values for this variable in our dataset.

For deals involving earnouts, represented in panel C, the earnout value is smaller for domestic transactions than for cross-border transactions. The relative earnout-to-deal value is around thirty percent, and the average length of earnout period is around two years. This is consistent with the findings of other authors such as Bates et al. (2018) and Cain et al. (2011).

3.4 Methodology

In order to find the relationship between the dependent variables and the earnout, a multivariate analysis is carried out. This allows for the inclusion of multiple independent variables that may help to improve the accuracy of the outcome (Alexopoulos, 2014). An ordinary least square analysis is used for the multivariate analysis. Equation (2) represents the general structure of the models.

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u \qquad \text{Eq. (2)}$$

The dependent variables in the regressions are the CAR, the payment multiple and the initial payment multiple respectively. To detect the effect of the earnout on these factors, an earnout dummy is used as an independent variable in combination with a set of variables described in section 3.2. For further description, see Appendix A.

The study conducted is an observational study. To determine casual effects, random sampling is needed. A shortcoming of observational studies is that it is difficult to obtain a random sample. For the raw data sample, the characteristics of the treated observations may differ from the ones of the controlled observations. If this is not accounted for, there is a risk that the OLS regression result reflects the underlying characteristics of the treated group rather than the treatment effect itself. This is referred to as the selection bias. Selection bias is not a problem in randomized experiments (Sekhon, 2011).

A common way to mitigate selection bias is to use matching. The basic concept of matching is that, observations from the control group are paired with observations from the treatment group, based on the similarity of observable characteristics. If all relevant covariates are captured during the matching process, selection bias is no longer a problem.

In traditional matching, one observation in the treatment group is matched with one or more observations in the control group. Pairs having the same values of each respective characteristic are matched together. The limitation of the traditional matching is that one either needs to have a very large dataset or to use few variables for the matching (Olmos and Govindasmy, 2015). An alternative matching method that could mitigate this limitation is called propensity score matching (PSM), introduced by Rosenbaum and Rubin (1983). PSM is commonly used in the field of medicine study, where random assignments to the treatment group can be seen as unethical. However, the method also appears in the research of social science. Within the area of mergers and acquisitions, the method is adopted by some researchers, like Behr and Heid (2011), Huang et al. (2014), Szücs (2014), and Barbopoulos and Adra (2016). Therefore, we also apply PSM to reduce the influence of selection bias.

The first step of a PSM analysis is to calculate the propensity scores. Propensity scores reflect the probability that an observation will be assigned to the treatment group. These probabilities are calculated by using a logistic regression, in which the dependent variable is the treatment variable, as recommended by Rosenbaum and Rubin (1983). The propensity score method is superior to traditional matching in the sense that it captures the individual covariates used in traditional matching in a single number, on which you can match. That is, it reduces the dimensionality (Olmos and Govindasmy, 2015, and Dehejia and Wahba, 2002). For variables used to calculate the propensity score, there is not consensus in previous studies on whether only significant covariates should be included or variables that make economic sense but are not significant should also be included. Stuart (2010) argues that we should include non-significant variables if they are potentially important. The reason is that, although the inclusion of these variables slightly increases the variance, exclusion could lead to worse consequences due to increased bias in the results. This is supported by Caliendo and Kopeinig (2008).

For our study, the dependent variable in the estimation of assignment probabilities is the earnout dummy. The independent variables chosen to predict the earnout dummy variable include: the year dummy, the percent of stock used in the payment, the full dummy, the deal value, the cross-border dummy, the industry dummy, the bidders' market-to-book value, the bidders' market value, acquirers' age, targets' age and targets' turnover. For further explanations of why these variables are chosen and the result of the logistic regression, see section 4.1, and in particular Table IV.

The second step of a PSM is to match the observations based on the scores. The scores that are estimated by the logistic regression are therefore the basis for a PSM. Due to the size of our sample, we choose to employ a 1-to-1 nearest neighbour matching, which is one of the most common methods for matching (Stuart, 2010). Using nearest neighbour matching minimizes the difference between the propensity score of the treated group and the control group. The match is done without replacement, meaning that one observation from the control group cannot be used more than once (Leite, 2017). Choosing not to use replacement leads to easier interpretation of results and eliminates the risk that only a small number of control observations are used in the study (Stuart, 2010).

When matching the scores without using replacement, the order of the observations is random (Caliendo and Kopeinig, 2008). Based on the random order, the scores are matched by minimizing the distance between individual observations of the two groups, one by one. Since the order of observations is random, the final matched dataset may vary. Since we match the scores without using replacement, it is possible that the distance between the last matched peers

is still far. To mitigate this risk, an option is to use a caliper, which is a boundary that defines the maximum distance allowed between the matched peers. This distance is measured in standard deviations of the estimated propensity scores in the data (Olmos and Govindasmy, 2015, and Austin, 2010). Although using caliper could improve the precision of the matching, it sacrifices the sample size after matching. Since our sample size is not large, we decide not to employ the caliper in our analysis.

When the matching is completed, a dataset containing the matched observations is constructed. To analyse the quality of the match, a comparison of the means of the treated and the control group before and after the match is conducted. If the mean differences of the treated and control observation are smaller after the match than before, the two groups are more similar, and the data can be assumed to be more balanced.

We implement our empirical analysis using both before matching and after matching data sample. The hypotheses for which we use the matched dataset are *H1*, *H3* and *H4*. These are the ones in which we aim at showing the effect of earnouts.

One assumption made when conducting the PSM is the Stable Unit Treatment Value Assumption (SUTVA) (Rosenbaum and Rubin, 1983). SUTVA is built on two assumptions. The first assumption states that the fact that one observation has received treatment does not affect the performance of another observation (Rubin, 2005). In our case, this would imply that one deal (X) using an earnout does not affect the initial payment multiple, the payment multiple and CAR of another deal (Y). The second assumption is the Ignorable Treatment Assignment Assumption (ITAA). This assumption states that there are no unobservable covariates, and everything is captured by the propensity scores (Guo and Fraser, 2015). If all influencing factors are captured in the matching, then the matching leads to unbiased estimates of the treatment effect (Dehejia and Wahba, 2002). According to Rubin (2005), after applying the PSM method, the conclusions about the causal effect from an observational study should be the same as what one can get from a randomized experiment.

To analyse how sensitive results are to hidden bias, Rosenbaum (2002) asks "How much hidden bias would need to be present to alter this conclusion?". To answer this, he defines the Rosenbaum bounds. Denoting π_j as the probability that observation j receives treatment, and π_k as the probability that observation k receives treatment, Rosenbaum (2002) specifies the Rosenbaum bounds as follows:

$$\frac{1}{\Gamma} \leq \frac{\pi_j\,(1-\pi_k)}{\pi_k\,(1-\pi_j)} \leq \Gamma \qquad \text{Eq. (3)}$$

Γ represents that in order to change the conclusions of the regression, how much more likely one observation needs to be assigned to the treatment group instead of the control group due to unobservable factors (Rosenbaum, 2015). For example, if $\Gamma = 1$, then the observations are equally likely to be assigned to treatment and control group, without changing the conclusions. If $\Gamma = 2$, then one observation is twice as likely to be assigned to one of the groups as another one, without changing the conclusions. The Rosenbaum bounds is an odds ratio telling us how large the hidden bias needs to be to change either the sign of the result or the significance of it. We adopt the Rosenbaum bounds to analyse how sensitive our results are to unobservable variables.

For the hypotheses *H2* and *H5*, we do not apply the PSM, as we only analyse the dataset containing earnout deals. These regressions study the factors affecting the earnout size and length, as well as the effect of earnout size and length on CAR. To test the effects of earnout size and length on CAR, an OLS regression is used. To study the determinants of earnout size and length, a Tobit regression is used following the study of Cain et al. (2011). This is because the censoring characteristic of the relative earnout size and length. Furthermore, a set of tests are conducted to check the quality of our data. All results are presented in Section 4 and Appendix B.

4. Results and Discussion

4.1 The Matching

4.1.1 The Matching Model

Table IV
Matching Variables

This table presents the logistic regression results for which the dependent variable is the earnout dummy (1 for earnout deals and 0 for non-earnout deals). The regression results are used to calculate the propensity scores used in the matching process. The independent variables include Year_Dum, the percentage of stock used (Percent Stock), a dummy for whether the entire target is fully acquired (Full), the log of the deal value (log(DV)), the cross border dummy (CB_Dum), the industry dummy (IND_Dum), the log of the market-to-book value of the acquirer four weeks before the announcement (log(MV_BV)), the log of the market value of the acquirer four weeks before the announcement (log(MV)), the log of the bidder age (log(AAge)), the log of the target age (log(TAge)), the target turnover one year prior to the deal (log(Turnover_Target)). For further explanation about the variables, see Appendix A.

Constant	-1.220	**IND_Dum**	-0.216
	(1.244)		(0.396)
Year_Dum	1.288***	**log(MV_BV)**	-0.290
	(0.485)		(0.255)
Perct_Stock	-0.028***	**log(MV)**	-0.138
	(0.008)		(0.148)
Full	1.091*	**log(AAge)**	-0.054
	(0.632)		(0.227)
log(DV)	0.322	**log(TAge)**	0.121
	(0.251)		(0.232)
CB_Dum	0.255	**log(Turnover_Target)**	-0.304
	(0.402)		(0.204)

*p<0.1, **p<0.05, ***p<0.01

Table IV contains the chosen variables for the calculation of the propensity scores. To select the most appropriate variables, variables within three areas are analysed: the characteristics of the acquirers, the characteristics of the targets, and the characteristics of the transactions. Following the recommendations of Stuart (2010), we include variables that make economic sense, although not all of them are statistically significant.

The years in which the earnout frequency is high (Year_Dum) has a significant positive influence, indicating that there is a connection between using earnouts and the total number of deals during the year, which is consistent with the findings of Barbopoulos and Sudarsanam (2012). The percentage of stock has a negative significant influence, meaning that the higher the percentage of stock used, the lower the probability that the bidders would apply an earnout.

Both of these notions fall in line with what we observe in the summary statistics (see Table II). Further, the acquirers that buy the entire target are more likely to use earnouts than those who do not. This makes intuitive sense, as a full acquisition implies higher risk for the bidder and thus lead to higher probability of using earnouts.

Beside the significant variables discussed above, we also include other factors that, according to the economic intuition and previous literature, should have an impact on the use of earnouts. One of these variables is the deal value. Barbopoulos and Sundarsanam (2012) argue that as the deal value increases, the use of earnouts also increases, because the deal becomes more important. Kohers and Ang (2000) also support the observation. Although not significant, the direction of the coefficient for the deal value is consistent with previous studies.

The market-to-book value is also included. The reason is that bidders who are overvalued would prefer to use stock as the financing method (Shleifer and Vishny, 2003). We also observe in Table II, that the percentage of stock is less for earnout deals compare with non-earnout ones. The market-to-book value of the bidder should influence the probability of earnout usage. We, therefore, include this in the propensity score estimation.

The bidder and target size are included following the findings of Kohers and Ang (2000). One possible reason for why the target turnover would be negatively related to earnout usage is that as the target size increase, the information asymmetry decreases, making it less necessary to use earnouts.

Further, the industry dummy is included. The industry dummy measures whether the transaction is cross-industry or not. The reasoning behind the inclusion of this variable is that bidders acquiring a company in another industry are exposed to higher risk. This is due to the lack of knowledge in the new industry, and more difficulties in achieving the expected integration results. This should lead to a higher use of earnouts in cross-industry deals. The notion that industry affects the probability of using earnouts follows the findings of Reuer et al. (2004). The cross-border variable is also included, following the study of Datar et al. (2001).

The final two variables included are the bidder age and the target age. The acquirer age is included as it has been shown that older acquirers tend to use earnouts less. The reason for this is that older bidders are better at handling potential valuation problems (Barbopoulos and Sundarsanam, 2012). For the target age, we think it is also reasonable to be included, as the target age could reflect some information asymmetry problems.

4.1.2 Match Evaluation

Table V

Mean Difference Improvement

This table represents the mean propensity score for each variable used in the control group and the treatment group used in Table IV, both before and after matching. The last column of this table represents the percent of mean balance improvement. That is, the percent of decreased differences in means between the control group and the treatment group before matching in comparison to after matching. The variables used for matching are the year dummy, the percentage of stock used, the full dummy, the logarithm of the deal value, the cross-border dummy, the industry dummy, the log of the bidders market-to-book value four weeks prior to the acquisition, the log of the bidders market value four weeks prior to the acquisition, the log of the bidders age, the log of the targets age, and the log of the target turnover.

	Before Matching		After Matching		Percentage of Balance Improvement
	Mean Treated	Mean Control	Mean Treated	Mean Control	
Year_Dum	0.864	0.660	0.864	0.746	42.16%
Perct_Stock	13.044	33.652	13.044	17.477	78.49%
Full	0.932	0.840	0.932	0.915	81.52%
log(DV)	2.459	2.300	2.459	2.433	83.65%
CB_Dum	0.525	0.426	0.525	0.458	32.32%
IND_Dum	0.407	0.426	0.407	0.390	10.53%
log(MV_BV)	0.662	0.809	0.662	0.709	68.03%
log(MV)	4.887	4.684	4.887	4.900	93.60%
log(AAge)	3.217	3.247	3.217	3.214	90.00%
log(TAge)	2.683	2.592	2.683	2.684	98.90%
log(Turnover_Target)	2.272	2.200	2.272	2.376	-44.44%

To evaluate the performance of the matching, we analyse the mean differences between the treated group and the control group. The aim of the matching is to make the two groups similar in terms of the independent variables, and obtain a dataset that resembles one from a randomized experiment. If the two groups look the same, then we have taken away the effect of the selection bias. In Table V, the means for the respective group before and after matching are presented. To see whether the balance has improved, we calculate the mean balance improvement according to the following formula:

$$Percent\ Balance\ Improvement = \frac{|M_{TB}-M_{CB}|-|M_{TA}-M_{CA}|}{|M_{TB}-M_{CB}|} = \frac{|MD_{BM}|-|MD_{AM}|}{|MD_{BM}|} \quad \text{Eq. (4)}$$

Where M denotes mean, T treatment, C control, B before, and A after in the M_{TB}, M_{CB}, M_{TA}, and M_{CA}. Further, the MD_{BM} is the mean difference before the match and MD_{AM} is the mean difference after the match. The absolute numbers are used, as it is the magnitude of the difference that matters rather than the sign.

The mean balance improvement is presented in the last column of Table V. It seems that the mean balance for the log of the target turnover becomes slightly worse. For the remaining variables, the mean difference improves obviously. One good example of this is the

improvement of the percent stock, whose mean difference decreases from 20 to 4. Based on the mean balance improvement, we can see that the treatment group and the control group are more similar. If we capture all relevant covariates, then this implies that selection bias should not be a problem anymore.

Although we have chosen not to include a caliper, the mean in difference shows that our data has greatly improved after matching. The distribution of the propensity scores below shows that there is an upwards bias for the treatment group before matching. If a caliper is included, then this bias would decrease, leading to a better mean difference improvement. But as mentioned earlier, this comes at the cost of the sample size, and as data availability is an issue in our case, our current matching without a caliper is deemed to be sufficiently good.

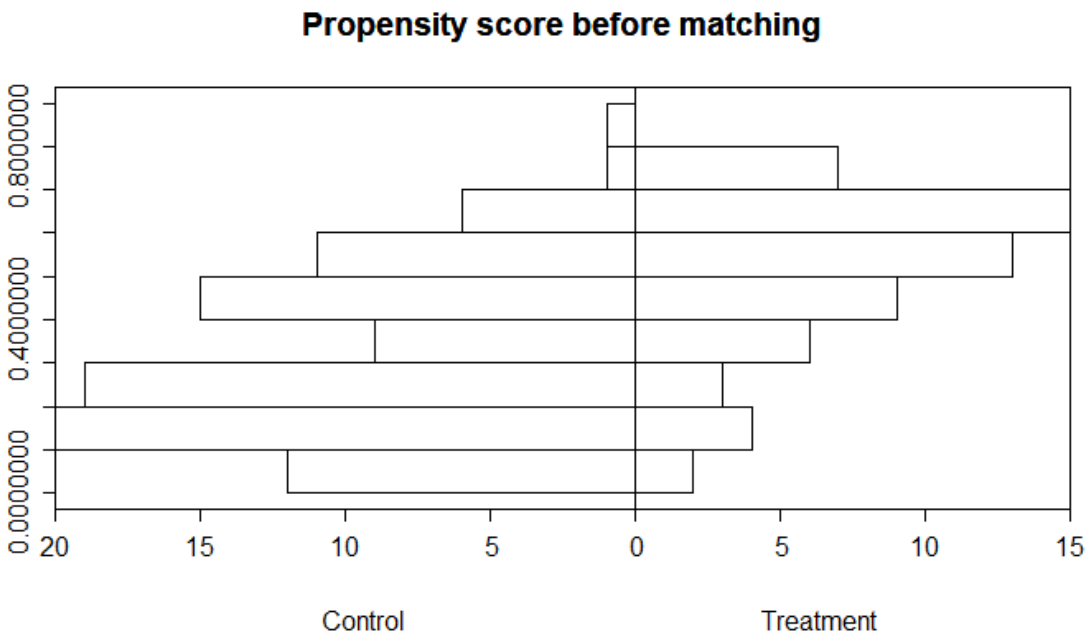


Figure 1: *The table represents the propensity scores before the match. The left panel is for the control-group and the right panel is for the treatment group. The y-axis shows the assigned score for each observation and the x-axis shows the frequency of observations for the respective group. These are the scores on which the match is based.*

4.2 H1 – The Effect of Earnouts on CAR

Table VI

Regression Results for CAR

The table contains the regression results when using the CAR as the dependent variable. The first column shows the OLS result based on the pre-matching dataset. The second column shows the result based on the after-matching dataset. The matching is a nearest-neighbour matching without replacement. The independent variables in the table are the earnout dummy (EO_Dum), the year dummy (Year_Dum), the log of the acquirers market value four weeks prior to the acquisition (log(MV)), the percentage of stock in the consideration (Perct_Stock), the Full dummy, the log of the targets age (log(TAge)), the log of the deal value (log(DV)), and the log of the target turnover (log(Turnover_Target)). For more information about the variable construction, see appendix A.

	CAR	
	Pre-Matching	**After-Matching**
Constant	0.063	0.023
	(0.043)	(0.040)
EO_Dum	-0.035**	-0.028**
	(0.016)	(0.013)
Year_Dum	0.031*	0.037**
	(0.017)	(0.017)
Perct_Stock	0.001*	0.0002
	(0.0003)	(0.0003)
Full	0.021	0.025
	(0.023)	(0.025)
log(DV)	0.025***	0.024**
	(0.009)	(0.009)
log(MV)	-0.021***	-0.019***
	(0.005)	(0.005)
log(Turnover_Target)	-0.012	-0.011
	(0.008)	(0.007)
log(TAge)	0.008	0.015*
	(0.009)	(0.008)
Observations	153	118
R^2	0.281	0.241
Adjusted R^2	0.241	0.185
Residual Std. Error	0.090 (df = 144)	0.070 (df = 109)
F Statistic	7.030*** (df = 8; 144)	4.318*** (df = 8; 109)

*p<0.1, **p<0.05, ***p<0.01

Table VI shows the regression result for H1. The coefficient for the earnout dummy is negatively significant, which is opposite to our hypothesis. This is also contrary to what Barbopoulos and Adra (2016) find for the UK M&A market and what Kohers and Ang (2000) find for the US M&A market. In order to find plausible explanations, we explore four different areas.

One plausible reason is that the targets using earnouts have different characteristics from the ones that do not. This difference could not be captured in the PSM. Since the earnouts have a negative and significant influence on the CAR, it is possible that investors treat earnouts as a negative signal of the target quality. Using earnouts could mean that the target company is much more uncertain compared with other target companies who are acquired without involving earnouts. To check whether this is the case, we use Amadeus to collect the available financial information of all available target companies, including the EBIT, the PBT, the NI, the total assets and the equity. All of these are collected for the year prior to the acquisition. Due to the limited information of private companies, we only obtain information for 50 companies, out of which, 28 targets are in deals that include earnouts, and 22 are in deals that do not.

Considering the small dataset, we choose to use descriptive analysis rather than conducting regressions. The aim is to see whether there is a significant difference between the targets involved in earnout deals and targets acquired without earnouts. Firstly, we compute related financial ratios based on the variables we collect. This is to make them comparable. The ratios calculated are: the EBIT ratio (EBIT over total assets), the PBT ratio (PBT over equity), the NI ratio (NI over equity) and the leverage ratio (equity over total assets). Secondly, we compare the means and the medians of the earnout targets and the non-earnout targets. The results are presented in Table VII. The mean EBIT ratio is slightly better for earnout targets than non-earnout targets, and the median EBIT ratio shows the same patterns. For the medians of the PBT and NI ratios, there is no huge difference between the earnout targets and the non-earnout targets. However, the mean PBT ratio and NI ratio of non-earnout targets are much better than the those of earnout targets, contradicting the medians. The leverage ratio indicates that the earnout targets have a lower equity ratio than the non-earnout targets, both with regards to the means and medians.

With regards to the PBT and NI ratios, it is hard to tell the implications on the targets' quality, since the patterns of means and medians are opposite. The EBIT ratio implies that earnout targets are not worse. However, the equity ratio implies that non-earnout targets have a comparatively robust capital position.

Although according to the t-test and the Wilcoxon test, the differences in means and medians are not statistically significant, the results could provide some hints for us to understand the potential difference between earnout targets and non-earnout targets. If more data points would be available, the analysis results could be improved.

Table VII

Target Financials

This table shows the financial ratios for 50 observations within our dataset of 153 observations. 28 of these are earnout targets, while 22 are non-earnout targets. We compare the mean and median for earnout targets and non-earnout targets in each group. For difference in means, a t-test is used to check the significance. For difference in medians, the Wilcoxon test is used to check the significance. The t-test result shows the t value with corresponding p-value in the parenthesis. The Wilcoxon test result shows the W-statistic with corresponding p value in the parenthesis.

	EBIT/Asset		**PBT/Equity**		**NI/Equity**		**Equity/Asset**	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
EO	0,194	0,197	0,041	0,435	-0,064	0,386	0,397	0,448
Non-EO	0,135	0,166	0,295	0,382	0,196	0,305	0,473	0,474
t / Wilcoxon test	0.862 (0.394)	351 (0.620)	-0.683 (0.500)	379 (0.307)	-0.742 (0.464)	393 (0.198)	-1.090 (0.281)	282 (0.437)

Another possible explanation for the negative influence of earnouts on CAR refers to the transaction costs related to earnout usage discussed by Sudarsanam (2010), Elnahas et al. (2017), Kohers and Ang (2000), Lukas and Heimann (2014) and Caselli et al. (2006).

Lukas and Heimann (2014) argue that the value of earnouts decreases, as the transaction costs of completing or monitoring an earnout deal increase. The Anglo-American capital markets or the universal banks in Germany could provide better external monitoring, which reduce the negative influence of transaction costs resulting from principal-agency problem. However, this may not be the case in Sweden.

The issue of potential legal disputes arises, because both parties have the incentives to manipulate the accounting results, in order to either trigger the earnout or to prevent the trigger. The time limit of the earnout puts pressure on the target to meet the goals. At the same time, actions that lead to meeting the short-term requirements may hurt the benefits of the combined company shareholders from a long-term perspective. Conflicts of interest between the target and the acquirer management team could lead to disputes. Hence, in earnout transactions, investors have concerns on the potential accounting manipulation issues and disputes, leading to a negative CAR.

We lean on other articles that talk about the issue of the legal risk associated with earnouts and acknowledge that this might be one reason that could result in a negative CAR in Sweden.

We also go through our own data to see if there are any examples of earnout disputes occurring in Sweden. We find one dispute case regarding the size of the earnout payment, which is between Betsson and Nordic Gaming Group (NGG). The deal was announced in April 2012, with an initial value of 65MEUR and an additional payment of maximum 20MEUR. The earnout could be obtained based on the development of the target in 2012. However, the final payment of 15.5MEUR was not settled until December 2014[2]. Although we do not have information regarding the precise reasons for the dispute, we can say that it did take time and effort from both parties to agree upon the final consideration. This example illustrates that this concern is not groundless and that it should be taken into account when earnouts are used. The potential disputes imply that external third-party help is often needed when setting up an earnout contract. The external help causes extra costs compared to non-earnout deals. These potentially increased costs could result in a negative CAR.

A third possible reason for the negative shareholder reaction in Sweden could be related to the shareholder structure and shareholder behaviours. We use Bloomberg to collect the percentage of floating shares in the acquirers that are held by institutional investors and the percentage of domestic investors four weeks before the announcement date and on the announcement date. We also collect the insider trading on the stocks of these acquirers four weeks before the announcement to two trading days after the announcement.

Information about the shareholder structure is only available on Bloomberg after March 2013 and the insider trading information is only available at Bloomberg after September 2014. We therefore only obtain effective information from 45 deals, including 25 earnout deals and 20 non-earnout deals. Due to the size of our sample, we choose to only analyse the means and medians.

[2] Source: Dagens Industri, 2014, Betsson har nått en uppgörelse i tvisten

Table VIII

Shareholder Structure

This table shows the shareholder structure and insider trading of 45 observations within our dataset of 153 observations. 25 of these are acquirers using earnouts, and 20 are acquirers not using earnouts. % of Institutional Investors represents the percentage of floating shares held by institutional investors four weeks before the announcement date. % of Domestic Investors represents the percentage of Swedish investors four weeks before the announcement date. % of Insider Trading represents the ratio of net shares bought (+) or sold (-) by insiders over with total share outstanding from four weeks before the acquisition to two trading days after the announcement date. % of Institutional Investors Change represents the change in % of Institutional investors from four weeks before the announcement date to the announcement date (increase: +; decrease: -). % of Domestic Investors Change represents the change in % of Domestic Investors from four weeks before the announcement date to the announcement date (increase: +; decrease:-). For difference in means, a t-test is used to check the significance. Difference in medians, the Wilcoxon-test is used to check the significance. The t-test result shows the t-value with corresponding p-value in the parenthesis. The Wilcoxon test result shows the W statistic with corresponding p value in the parenthesis.

	% of Institutional Investors		**% of Domestic Investors**		**% of Insider Trading**		**% of Institutional Investors Change**		**% of Domestic Investors Change**	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
Earnouts	0.5468	0.53	0.4888	0.46	0.016378	0	-0.0024	0	-0.0084	0
Non-earnouts	0.3837	0.355	0.3075	0.235	-0.00177	0	0.0405	0	0.02	0
t / Wilcoxon test	2.025** (0.049)	334.5* (0.055)	2.433** (0.019)	342.5** (0.036)	1.066 (0.297)	217 (0.366)	-1.405 (0.175)	211 (0.313)	-1.228 (0.227)	182* (0.054)

Table VIII shows the means and medians of the collected shareholder information. An interesting observation is that earnout acquirers on average have a higher percentage of institutional and domestic investors, in comparison with non-earnout bidders. The differences in means and medians are significant. What's more, the mean and median percentage of institutional investors account for more than 50% of the earnout acquirers' investor base, which means that the share price of the earnout acquirers are much more influenced by institutional investors. One could assume that institutional investors are more rational in comparison to individual investors. If this is the case, then they could have a tendency to dig more into details of the qualities of the targets, instead of directly accepting the stories that earnouts could protect acquirers and benefit shareholders. From four weeks before the transactions to the announcement date, the average percentage of institutional investors increases for non-earnout acquirers by around 4%, while for the earnout acquirers, this percentage decreases by 0.2%. During the same period in time, the average percentage of domestic investor increases by 2% for non-earnout acquires, while for earnout acquirers, this percentage decreases by 0.8%. From the perspective of insider trading, the earnout acquires have around 1.2% net insider buying from four weeks before the acquisition, and the non-earnout acquirers have around 0.2% net insider selling. The institutional investors are assumed to know more about the earnout mechanism itself than individual shareholders and may also be more rational than individual

investors. The domestic shareholders can be assumed to know more about the bidder and also about the target. The insiders have more information about both the deal and the bidder.

The insider trading behaviour is not completely reliable. Out of 45 transactions, there are 14 transactions in which insiders trade during the monitoring period. These 14 transactions include 7 earnout deals and 7 non-earnout deals. Among these 7 insider trading transactions for earnout acquirers, we obtain 3 transactions with net buying, and 4 transactions with net selling. However, among the 7 insider trading transactions for non-earnout acquirers, we obtain 5 transactions with net buying, and 2 transactions with net selling. From the median aspect, the change of different metrics is not that obvious. Although our descriptive analysis may be influenced by the data availability problem, we believe it provides some hints that earnout deals are less favoured by institutional investors, who drive the Swedish stock market.

We further compare the CAR distribution of earnout deals and non-earnout deals. By doing so, we find that the CAR of earnout deals is distributed within a normal range, while for non-earnout deals, there are transactions that have huge positive CARs within the five trading days window. Figure 2 shows the back-to-back histogram of the CAR distribution for earnout deals and non-earnout deals. Based on this, we can say that the CAR for non-earnout deals are quite positive skewed, and these extreme positive CARs could distort the result. This result is also corresponding with our findings related to the preference of shareholders in Sweden.

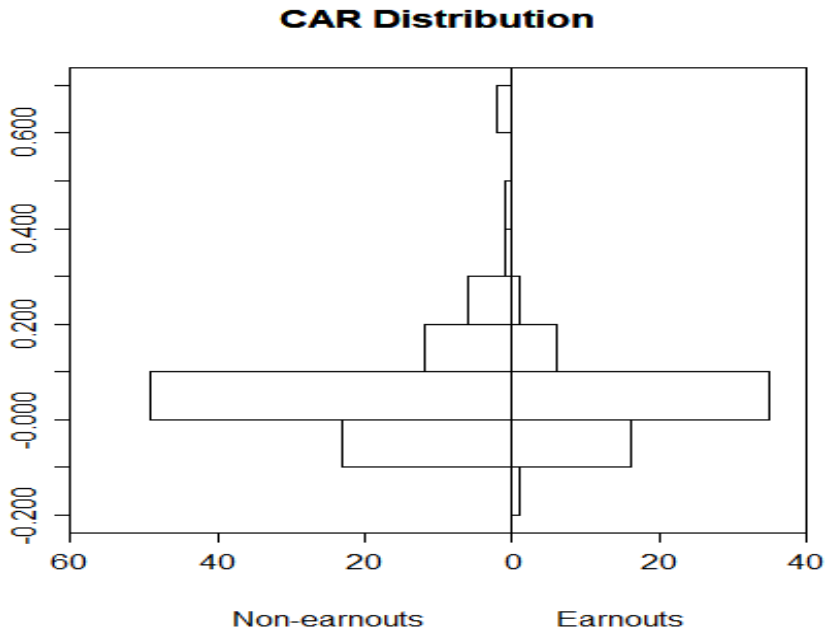


Figure 2. *The distribution of the CAR variable for the earnout deals and the non-earnout deals. The back-to-back histogram shows the entire dataset of 153 observations, of which 59 are earnout deals and 94 are non-earnout deals. The y-axis represents the cumulative abnormal return within the 5-day trading window. The x-axis represents the frequency of deals.*

To finalize the discussion about the influence of earnouts on the CAR, we would like to shed light on a comment by Alexandidris et al. (2013), who say:

"It is in line with the tenet that acquirer abnormal returns may greatly reflect influences beyond overpayment, such as concerns about the strategic potential and/or the complexity of the deal"

The complex mechanisms hidden under the earnout tool bring a lot of potential concerns to investors. For those acquirers trying to use earnouts to protect themselves, the potential worse quality of the targets and the potential future disputes would possibly lead to a negative influence on CAR, at least within the short run.

With regards to other statistically significant variables, the pre-matching regression and the after-matching regression show similar results. There are however two exceptions. The first one is the percentage of stock that goes from significant in the pre-matching result to non-significant in the after-matching result. The other variable is the target age that goes from non-significant in the pre-matching result to significant in the after-matching result. The different results before matching and after matching could be related to the reduction of the potential random sampling issue.

The percentage of stock is significantly positive before matching. For private firms this sign is to be expected following Chang (1998). Nevertheless, the result should be taken with caution as it is not any more significant after matching. The target age has a positive significant coefficient after matching. A reason for this might be that as the target gets older, the information asymmetry decreases, and the investors can be more certain about the valuation. Therefore, it leads to a positive reaction of investors.

The remaining results that are significant both before and after matching include: the year dummy variable, the deal value, and market value of the acquirer. The year dummy variable has a positive significant influence, indicating that abnormal returns are higher in years when the M&A market is hot. Similarly, the deal value has a positive significant influence on the CAR. The acquirer size is negatively significant. This result is consistent with the findings of Moeller et al. (2003) who explain the negative significant results for large acquirers by managerial hubris. It is also in line with the findings of Alexandidris et al. (2013).

4.3 H2 – The Effect of Earnout Size and Length on the CAR

Table IX

Earnout Size and Length on CAR

This table shows the regression results for the effect of the earnout length and size on the CAR. The regression is made on a sub-set of data containing only earnout deals. The independent variables used are the relative earnout size (EO_DV), the earnout length (Length_EO), the full acquisition dummy (Full), the cross-border dummy (CB_Dum), the percentage of stock used (Perct_Stock), the log of the times the acquirer has participated in bidding (log(Bid_Times)), the log of the acquirers market value four weeks prior to the acquisition (log(MV)), the log of the deal value (log(DV)), the log of the market-to-book value of the acquirer four weeks prior to the acquisition (log(MV_BV), the industry dummy (IND_Dum), the log of the target age (log(TAge)). For more information about the variable construction, see appendix A.

Constant	-0.093	log(Bid_Times)	0.021*
	(0.060)		(0.010)
EO_DV	0.057	log(MV)	-0.021***
	(0.055)		(0.007)
Length_EO	-0.005	log(DV)	0.017**
	(0.005)		(0.008)
Full	0.059*	log(MV_BV)	0.018
	(0.031)		(0.011)
CB_Dum	-0.053***	IND_Dum	0.025
	(0.018)		(0.016)
Perct_Stock	0.001*	log(TAge)	0.027***
	(0.0004)		(0.010)
Observations	59		
R^2	0.405		
Adjusted R^2	0.266		
Residual Std. Error	0.056 (df = 47)		
F Statistic	2.910*** (df = 11; 47)		

*p<0.1, **p<0.05, ***p<0.01

Table IX shows the effect of the relative earnout size and the earnout length on the CAR. Neither variable has a significant influence on the CAR. Even though the signs of the coefficients are consistent with our hypothesis, neither is significant, leading to the rejection of the hypothesis. This finding implies that although the CAR is affected by the use of earnouts, it is not affected by the earnout structure. That is, the market reacts to the use of earnouts, not the structure.

The result is based on a small dataset, and we think there is a chance that significance could be influenced by this.

4.4 H3 – The Effect of Earnouts on the Payment Multiples

Table X

Regression Results for the Payment Multiple

The table contains the regression results when using the log of the payment multiple as the dependent variable. The payment multiple is the deal value (DV) over the target turnover. The first column shows the results before-matching. The second shows the results after-matching. The independent variables included are the earnout dummy (EO_Dum), the dummy for high M&A activity years (Year_Dum), the percentage of stock used (Perct_Stock), the full dummy (Full), the log of the market value of the acquirer four weeks prior to the acquisition (log(MV)), the log of the deal-to-market value four weeks before the acquisition (log(DV_MV), the log of the target turnover (log(Turnover_Target)), and the log of the target age (log(TAge)). For more information about the variable construction, see appendix A.

	Payment Multiple	
	Pre-Matching	**After-Matching**
Constant	0.290	0.066
	(0.266)	(0.293)
EO_Dum	0.178*	0.174*
	(0.101)	(0.097)
Year_Dum	-0.161	-0.193
	(0.107)	(0.124)
Perct_Stock	0.001	0.002
	(0.002)	(0.002)
Full	-0.469***	-0.298
	(0.143)	(0.183)
log(MV)	0.585***	0.576***
	(0.043)	(0.046)
log(DV_MV)	0.507***	0.465***
	(0.040)	(0.044)
log(Target_Turnover)	-0.693***	-0.680***
	(0.040)	(0.043)
log(TAge)	0.088	0.087
	(0.054)	(0.058)
Observations	153	118
R^2	0.705	0.714
Adjusted R^2	0.689	0.693
Residual Std. Error	0.560 (df = 144)	0.519 (df = 109)
F Statistic	43.022*** (df = 8; 144)	33.995*** (df = 8; 109)

*p<0.1, **p<0.05, ***p<0.01

For the payment multiple both the result before-matching and after-matching support our third hypothesis, that the earnout variable has a positive and significant relationship with the payment multiple. Deals that include earnouts therefore have a higher total consideration than the ones that do not. This also confirms the findings of Kohers and Ang (2000) for the US market. This intuitively makes sense, as the target management team needs to get compensated for the delayed payment as well as for neglecting other opportunities during the earnout period. The higher multiple could also be treated as the compensation for the risk that the target will not receive the whole payment. The sign of the payment multiple thereby makes sense.

The market value of the acquirer has a positive significant effect. This falls in line with the study of Moeller et al. (2003) that larger companies pay higher premiums.

The influence of target turnover is negative and significant, indicating that larger targets receive lower payment multiples. This follows the findings of Alexandidris et al. (2013) who associate large targets with difficulties in implementation of synergies. The deal-to-market value is positively correlated with the payment multiple, indicating that as the deal value increases relative to the market value, the transaction becomes more important for the bidders, and bidders would pay higher multiples to make sure that they could win the bid.

The influence of whether the target is fully acquired is not significant after matching. The year dummy variable, the percentage of stock and the target age do not seem to have any significant impact on the payment multiple.

Although when we test our first hypothesis, we find that the influence of payment multiple on CAR is not significant, the empirical result here is still consistent with our analysis on the first hypothesis. Higher multiples resulting from earnouts could possibly dilute the original purpose of using earnouts, which lead the bidders to still have to pay more for targets finally.

4.5 H4 – The Effect of Earnouts on the Initial Payment Multiple

Table XI

Regression Results for the Initial Payment Multiple

The table contains the regression results when using the log of the initial payment multiple as the dependent variable. The initial payment multiple is the initial payment over the target turnover. The first column shows the results before-matching. The second shows the results after matching. The independent variables included are the earnout dummy (EO_Dum), the dummy for high M&A activity years (Year_Dum), the percentage of stock used (Perct_Stock), the full dummy (Full), the log of the market value of the acquirer four weeks prior to the acquisition (log(MV)), the log of the deal-to-market value four weeks before the acquisition (log(DV_MV), the log of the target turnover (log(Turnover_Target)), and the log of the target age (log(TAge)). For more information about the variable construction, see appendix A.

	Initial Payment Multiple	
	Pre-Matching	**After-Matching**
Constant	0.015	-0.284
	(0.279)	(0.310)
EO_Dum	-0.207*	-0.216**
	(0.106)	(0.103)
Year_Dum	-0.122	-0.147
	(0.112)	(0.131)
Perct_Stock	0.002	0.004*
	(0.002)	(0.002)
Full	-0.429***	-0.233
	(0.149)	(0.194)
log(MV)	0.605***	0.599***
	(0.045)	(0.049)
log(DV_MV)	0.507***	0.459***
	(0.042)	(0.046)
log(Target_Turnover)	-0.678***	-0.663***
	(0.042)	(0.045)
log(TAge)	0.105*	0.106*
	(0.057)	(0.061)
Observations	153	118
R^2	0.686	0.688
Adjusted R^2	0.669	0.666
Residual Std. Error	0.586 (df = 144)	0.550 (df = 109)
F Statistic	39.394*** (df = 8; 144)	30.098*** (df = 8; 109)

*p<0.1, **p<0.05, ***p<0.01

Table XI shows the results for the regression on the initial payment multiple. In terms of the signs of the coefficients for variables, other than the earnout dummy, the results are rather similar to the regression for the payment multiple. However, the significance varies slightly.

For the earnout variable, the coefficient is negatively significant both before and after matching. This indicates that using earnouts could significantly reduce the initial payment multiples. This supports our hypothesis, as well as the findings of Barbopoulos and Adra (2016).

Earnouts are designed to protect the bidder from overpaying for a target by deferring part of their payment to the future. This mechanism can only work when the initial payment multiple is lower than that of non-earnout deals. In the case of a higher initial payment, the bidder would lose its benefit of decreasing the risk of overpayment. Thus, the initial payment multiple should be smaller or at most equal to the payment multiple of a non-earnout deal.

The market value of the acquirer is, as in the case of the payment multiple, positively significant for before and after matching. If the reason for the positive coefficient is managerial hubris, as Moeller et al. (2003) argues, then this holds not only for the entire payment multiple but also for the initial payment multiple.

The percentage of stock has a positive significant influence on the initial payment multiple after matching. This is consistent with our previous analysis. Since the target would concern whether the stock of the acquirers is overvalued or not, they prefer higher initial payment multiples if the acquirers choose to use stock to finance their payment.

The target turnover is once again negatively significant. The deal-to-market value, the year dummy and the full variable also exhibit the same results for the initial payment multiple as for the payment multiple. In comparison to the payment multiple, the initial payment multiple is significantly affected by the target age. The coefficient is positive, indicating that older targets receive a higher initial payment multiple.

4.6 H5 – The Determinants of Earnout Size and Length

Table XII

Determinants of Earnout Size and Length

The table contains the Tobit regression results for what factors determine the relative size and the length of the earnout deals. The first column shows the results for the relative earnout size and the second the earnout length. The dataset used is a subset of the entire dataset containing only earnout deals. This dataset contains 59 observations. The independent variables included are the full dummy (Full), the cross-border dummy (CB_Dum), the percentage of stock used (Perct_Stock), the log of the target turnover (log(Turnover_Target)), the log of the deal value (log(DV)), and the log of the acquirers market-to-book value four weeks prior to the acquisition (log(MV_BV)). For more information about the variable construction, see appendix A.

	Size	**Length**
Constant	0.612***	2.070***
	(0.077)	(0.796)
Full	-0.184***	0.203
	(0.071)	(0.739)
CB_Dum	0.086**	0.288
	(0.038)	(0.392)
Perct_Stock	-0.002**	0.009
	(0.001)	(0.009)
log(Turnover_Target)	-0.052***	-0.697***
	(0.013)	(0.237)
log(DV)		0.670**
		(0.274)
log(MV_BV)	-0.064***	-0.270
	(0.023)	(0.235)
Observations	59	59
Log Likelihood	34.200	-103.000
Wald Test	35.200*** (df = 5)	10.600 (df = 6)

*p<0.1 **p<0.05 ***p<0.01

4.6.1 The Earnout Size

For the determinants of the relative size of the earnout, all independent variables are statistically significant. The full dummy variable has a significant negative influence on the size of earnouts. This means that if the target company is 100% acquired, the earnout size is smaller. If the target company is fully acquired, the management team of the acquirer company is in control of the combined company. If the target company is not fully acquired, there are different shareholders representing their own interests after the transaction. Different interests make the integration process after the transaction harder. Hence, if the target company is not fully controlled by the acquirer, the acquirer could tend to use a larger earnout value to facilitate the integration process. The result of the regression therefore is intuitive. This is consistent with the purpose of using earnouts to mitigate the moral hazard concerns.

The cross-border dummy has a positive and significant coefficient, implying that if the target is in a country other than Sweden, the earnout size increases. Cross-border deals are exposed to a higher degree of information asymmetry, and this result would support the notion that if earnouts are involved in cross-border transactions, a larger relative size of earnouts will be applied in order to reduce the potential overpayment risk. This result also supports the adverse selection theory, and bidders would use higher earnout size to reduce the concerns related to uncertainties of targets. In the article of Cain et al. (2011), they use cross-industry as one of the proxies to measure the uncertainties of targets. However, based on our tests, cross-industry dummy variable is very insignificant in explaining the relative earnout size.

The percentage of stock has a negative and significant coefficient. This is consistent with our intuition, since the usage of stock already accommodates some extent of risk sharing between the two parties, and thus the need for extra risk-sharing through the earnout decreases.

The coefficient of the target turnover is negative and significant, meaning that as the target size increases, the earnout size decreases. Consistent with previous discussions this could support the notion that larger targets have more information and thus need smaller earnout values. Moreover, management teams in smaller target companies would possibly be more important. Hence, the relationship between the target turnover and the earnout size provides supports for both moral hazard and adverse selection.

The coefficient of the market-to-book value is negatively significant. We think this result provides support that when the bidder has a higher valuation and in a favourable capital market situation, they would be confident with their acquisition, and have fewer concerns regarding the uncertainties of the acquired target.

4.6.2 The Earnout Length

Based on the empirical result, only two factors are found to play very important roles in determining the length of earnouts: the target turnover and the deal value. The target turnover has a negative and significant coefficient, meaning that as the size of the target increases, the length of the earnout period decreases. There may be multiple explanations for this observation, one of which is that the stage in which the firm is may affect the role of management. As we have mentioned previously, one common reason to why firms apply earnouts to their deal terms is that the acquirer wants to maintain the key management team. The purpose is to leverage the expertise of the target management, and to facilitate the integration process. Smaller targets have fewer employees, and one can assume that the management team plays a more important role. For smaller targets, it would, therefore, be beneficial to increase the earnout period to retain the target management team as long as possible. This also aligns with the observation that smaller targets get a higher earnout payment. As the earnout length for smaller targets is longer than that of large targets, the earnout payment for smaller targets is also greater than that for large targets, which compensates the target management team for the extra time.

Another reason could be related to the arguments of Cain et al. (2011), that the key determinant of the length of earnouts is the bidders' view on how long the uncertainties of the target companies could be eliminated. As mentioned above, bidders may face higher information asymmetry risks, when facing smaller targets. It could be possible that the bidders need longer time to reduce this concern, which means the bidders would set up a longer earnout period to keep tracking the performance of the target company after the transaction.

The deal value has a positive and significant influence on the earnout length. This means that as the deal becomes larger, the length of the earnout period becomes longer. Larger deals should be more important for the bidder. The large deals may also imply high payment multiples. Higher payment multiples mean that bidders attach higher potential growth opportunities on target companies. Therefore, bidders could negotiate for a longer earnout period to make sure the growth goals would be achieved.

From our analysis, we find that the determinants of the size of earnouts are more clear than the determinants of the earnout length. In practice, there should be a lot of complex considerations that influence the design of earnouts. Considering our limited data sample, we only find the above significant variables. We believe that our analysis could be further improved if more data points were disclosed.

4.7 Data Quality and Match Sensitivity

4.7.1Data Quality

To make sure that our regressions are not influenced by misguiding data, we conduct a series of tests to check the quality of the data. Our regressions are tested for multicollinearity, heteroscedasticity, multivariate normality and endogeneity.

4.7.1.1 Multicollinearity

Multicollinearity occurs when two or more variables co-vary. This leads to potentially misleading results and therefore needs to be checked for. The variance inflation factor (VIF) is used to check for multicollinearity. If the VIF-value for a variable is greater than ten, there is a risk that the regressions contain multicollinearity (Kutner et al., 2004). The results for the VIF-factors are presented in Appendix B. All our VIF-values are lower than five. Multicollinearity is therefore not a problem for us.

4.7.1.2 Heteroscedasticity

Heteroscedasticity means the error terms for the variables do not have constant variance. To test this issue, we use the Breuch-Pegan test. The null hypothesis of the test is that there is homoscedasticity. The resulting p-values from the test are presented in Appendix B. In the cases where there is heteroscedasticity, we construct the robust standard errors for the regression in question. For all regressions that are affected by heteroscedasticity, using robust standard errors still leads to significant regression results.

4.7.1.3 Multivariate Normality

To test for the multivariate normality, we plot the distribution of the standardized residuals for each regression. Based on these plots, our regressions seem to have multivariate normality.

4.7.1.4 Endogeneity

To check the potential endogeneity issue, we mainly go through the plots between fitted values of each regression and independent variables and the corresponding residuals. Based on the graphs we obtain, our regressions are not suffered from the endogeneity problem.

4.7.2 Match Sensitivity

When using propensity score matching, we assume that we include all the relevant variables in our matching. However, in practice, this is hard to implement, and our analysis could be influenced by unobserved variables. To test whether our analysis is sensitive to unobserved covariates, we conduct a sensitivity analysis using the Rosenbaum bounds as described in the methodology part. The results are presented in table XIII.

Table XIII

Rosenbaum Sensitivity

The table displays the gamma level at which the regression conclusions will change. The regressions used are the ones presented in table VI, X and XI.

	CAR	Payment Multiple	Initial Payment Multiple
Γ (Gamma)	1.05	1.15	1.13

To simplify the interpretation, the higher the gamma, the less sensitive our result would be. The results from the sensitivity analysis show that all three dependent variables are sensitive to unobserved covariates, especially for CAR. A gamma of 1.05 means that the observations in the control group need to be 1.05 times as likely to be assigned to the treatment group, to change our study conclusions (that is, alter the direction of the coefficients or the significance).

The fact that our regressions are sensitive to unobservable variables lead us to interpret the regression results with caution. There is a risk that our conclusion could be changed due to unobserved variables. For example, other than target turnovers, most other financial information of the target is hard to obtain. If the information could be observed, our analysis results might be adjusted.

Even though the results are not perfect in terms of sensitivity, we believe they make sense and could provide interesting guidance and a deeper understanding of the use of earnouts in the Swedish market.

It is also worth noting that in this analysis we do not pay attention to the magnitude of the numbers but rather to the direction and the significance of them. This is because the main purpose of this paper is not to provide information about the extent to which the earnout impacts the deals but rather whether the earnout has an impact and if it does, in which direction.

5. Limitations and Conclusions

5.1 Limitations

The most important limitation of our analysis is the small dataset. As our main study objectives are related to private target companies, the public data sources are limited. The data sample we could use to conduct empirical analysis shrank a lot from the raw data, as many data points we need are missing. Our sensitivity analysis shows that our empirical results are sensitive to unobserved variables. We believe that our analysis accuracy and robustness could improve with more data, especially with regards to financial characteristics of the target companies.

An area that is not discussed in this thesis, but is touched upon during the data collection process is how the use of earnouts affects the long-term financial performance of the combined companies. During the data collection process, we collect the three-year financial performance of the combined companies. Then we try to compare the year over year performance change to see if there is a difference between companies using earnout and companies not using earnouts. However, we did not get significant results. For this area, the missing data problem is even more severe, due to the fact that most deals after 2015 are still in the earnout period today. Moreover, there are many complicated external factors we need to control if we want to figure out the influence of earnouts. One example of these is more than one acquisition could occur during the earnout period. It would be very interesting to further study on this topic. Given the scarcity in data, a larger graphic area, such as the Nordic countries or the EU, might be required to obtain significant result.

5.2 Conclusions

In Sweden, earnouts are more often used on private targets during the period when the M&A activities are frequent. We study the influence of using earnouts for public bidders when they acquire private targets. We find that using earnouts has a significant negative influence on CAR. Our result is opposite to the empirical results of the US and UK M&A markets. There are several possible reasons which we think could explain this phenomenon. One possible reason is that the investors in Sweden interpret the use of earnouts as a signal of highly uncertain targets. Another reason is that the transaction costs for earnout deals may be higher than those for non-earnout deals. According to our analysis, the percentage of institutional shareholders

for companies using earnouts are significantly higher than that for non-earnouts companies. We think that the trading behaviour behind the earnouts companies are more rational. This is also supported by our observations of extreme values. Almost all the extreme high CAR values around the announcement date are for non-earnout companies. Therefore, we believe a possible third reason is that earnouts are less favoured by the institutional investors in Sweden.

Our studies of the influence of earnouts on the payment multiple and initial payment multiple support the empirical results of the US and UK market. This shows that the basic pricing mechanisms of earnouts are similar here in Sweden as in the US and UK. The only difference is that the investors have a different interpretation regarding earnouts in Sweden.

Based on our empirical analysis, we think that investors will respond on whether the companies use earnouts or not in a transaction. However, they are not sensitive to the design of the earnouts contracts, because both the size of the earnouts and the length of the earnouts do not have significant influences on CAR.

When companies design the structure of earnouts, we agree that their major concerns are related to adverse selection and moral hazard. The structure design is to reduce these concerns. Based on our data sample, we find some variables that reflect these concerns, and play important roles when bidders determine the size and length of earnouts. These variables include the full dummy, the percentage of stock they would use for the payment, whether the deal is cross-border, the turnover of the targets, and the market valuation level of the bidder itself. All these factors are important and significant for the determinants of earnout size. However, for the length of earnouts, the significant influence factors we could find are quite limited, only including the turnover of the target and the deal size.

In a nutshell, we think our empirical analysis shows the overall picture of the transactions between public bidders and private targets in Sweden and reflects some interesting aspects of the influence of earnouts and determinants of earnouts structures. This adds some value to both bidders and target companies in practice. We also learn quite a lot during the process of collecting data points, applying PSM method, conducting empirical regressions, and trying to find out the reasonable explanations behind the results.

6. References

6.1 Literature

Alexandridis, G., Fuller, K., Terhaar, T., and Travlos, N., 2013, *Deal size, acquisition premia and shareholder gains*, Journal of Corporate Finance 20, pp.1-13

Alexopoulos, E., 2014, *Introduction to Multivariate Regression Analysis*, Hippokratia 14, pp.23-28

Antoniou, A., P. Arbour, and H. Zhao, 2007, *How much is too much: Are merger premiums too high?*, European Financial Management 14, pp.268 - 287

Austin, P., 2010, *Optimal caliper widths for propensity-score matching when estimating differences in means and differences in proportions in observational studies*, Pharmaceutical Statistics 10, pp.150-161

Barbopoulos, L. and Adra, S., 2016, *The earnout structure matters: Takeover premia and acquirer gains in earnout financed M&As*, International Review of Financial Analysis 45, pp.283-294

Barbopoulos, L. and Sudarsanam, S., 2012, *Determinants of earnout as acquisition payment currency and bidder's value gains*, Journal of Banking and Finance 36, pp.678-694

Bates, T., Neyland, J., and Wang, Y., 2018, *Financing acquisitions with earnouts*, Journal of Accounting and Economics (in press)

Behr, A., and Heid, F., 2011, *The success of bank mergers revisited. An assessment based on a matching strategy*, Journal of Empirical Finance 18, pp.117-135

Boone, A., Lie, E., and Liu, Y., 2014, *Time Trends and Determinants of the Method of Payment in M&As*, Journal of Corporate Finance 27, pp. 296-304

Cadman, B., Carrizosa, R., and Faurel, L., 2012, *Economic Determinants and Information Environment Effects of Earnouts: New Insights from SFAS 141(R)*, Journal of Accounting Research 52, pp.37-74

Cain, M, Denis, D.J., and Denis, D.K., 2011, *Earnouts: A study of financial contracting in acquisition agreements*, Journal of Accounting and Economics 51, pp.151-170

Caselli, S., Gatti, S., and Visconti, M., 2006, *Managing M&A Risk with Collars, Earn-outs, and CVRs*, Journal of Applied Corporate Finance 18, pp.91-104

Caliendo and Kopeinig, 2008, *Some Practical Guidence for the Implementation of Propensity Score Matching*, Journal of Economic Surveys 22, pp.31-72

Capron, L. and Shen, J.S., 2007, *Acquisitions of Private vs. Public Firms: Private Information, Target Selection, and Acquirer Returns*, Strategic Management Journal 28, pp.891-911

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

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

Díaz, S., Azofra, S., and Gutiérrez, C., 2009, *Are M&A premiums too high? Analysis of a quadratic relationship between premiums and returns*, Quarterly Journal of Finance and Accounting 48, pp.5-21

Dehejia, R., and Wahba, S., 2002, Propensity Score-Matching *Methods for Nonexperimental Causal Studies*, The Review ofEconomics and Statistics 84, pp.151-161

Draper, P. and Paudyal, K., 2006, Acquisitions: Private versus Public, European Financial Management 12, pp.57-80

Elnahas, A., Hassan, M., and Ismali, G., 2017, *Religion in Mergers and Acquisitions Contracting: The Case of Earnout Agreements*, Journal of Corporate Finance 42, pp.221-246

Fishman, M., 1989, *Preemptive Bidding and the Role of the Medium of Exchange in Acquisitions*, The Journal of Finance 44, pp.41-57

Fuller, K., Netter, J., and Stegemoller, M., 2002, *What Do Returns to Acquiring Firms Tell Us? Evidence from Firms That Make Many Acquisitions*, The Journal of Finance 57, pp.1763-1793

Gray, S., 1988, *Towards a theory of cultural influence on the development of accounting systems internationally*, Abacus 24, 1–15

Guo, S. and Fraser, H., 2014, *Propensity score analysis: statistical methods and applications*, Ch2, pp.29-30

Huang, Q, Jiang, F., Lie, E., and Yang, K., *The role of investment banker directors in M&A*, Journal of Financial Economics 112, pp.269-286

Koeplin, J., Sarin, A., and Shapiro, A., 2000, *The Private Company Discount*, Journal of Applied Corporate Finance 12, pp.94-101

Kutnet, M., Nachtsheim, C., and Neter, J., 2004, *Applied linear regression models*, 5th edition, New York, New York: McGraw-Hill/Irwin

Kohers, N. and Ang, J., 2000, *Earnouts in mergers: Agreeing to disagree and agreeing to stay*, Journal of Business 73, pp.445-476

Leite, W., 2017, *Practical propensity score methods using R*, Ch5, Thousand Oaks, CA: Sage Publications

Lukas E., Heimann C., 2014, *Technological-induced information asymmetry, M&As and earnouts: stock market evidence from Germany*, Applied Financial Economics 24, pp. 481-493

Mantecon, T., 2009, *Mitigating risks in cross-border acquisitions*, Journal of Banking and Finance 33, pp.640–651

Martin, K., 1996, *The Method of Payment in Corporate Acquisitions, Investment Opportunities, and Management Ownership*, The Journal of Finance 51, pp.1227-1246

Moeller, S., Schlingemann, F., and Stulz, R., 2003, *Firm size and the gains from acquisitions*, Journal of Financial Economics 73, pp.201-228

Officer, M., 2007, *The price of corporate liquidity: Acquisition discounts for unlisted targets*, Journal of Financial Economics 83, pp.571-598

Officer, M., Poulsen, A., and Stegemoller, M., 2009, *Target-firm information asymmetry and acquirer returns*, Review of Finance 13, pp.467-493

Olmos, A., and Govindasamy, P., 2015, *Propensity Scores: A Practical Introduction Using R*, Journal of MultiDisciplinary Evaluation 11, pp.68-88

Ragozzino, R. and Reuer, J., 2007, *Mind the Information Gap: Putting New Selection Criteria and Deal Structures to Work in M&A*, Journal of Applied Corporate Finance 19, pp.82-89

Ragozzino, R. and Reuer, J., 2009, *Contingent Earnouts in Acquisitions of Privately Held Targets*, Journal of Management 35, pp.857-879

Reuer, J. and Shen, J., 2005, *Adverse Selection in Acquisitions of Small Manufacturing Firms: A Comparison of Private and Public Targets*, Small Business Economics 24, pp.393-407

Reuer, J., Shenkar, O., and Ragozzino, R., 2004, *Mitigating risk in international mergers and acquisitions: the role of contignent payouts*, Journal of International Business Studies 35, pp.19-32

Rosenbaum, P., 2002, *Observational Studies (Second ed.)*, Ch2, New York, NY: Springer series in statistics

Rosenbaum, P., 2015, *Two R Packages for Sensitivity Analysis in Observational Studies*, Observational Studies 1, pp.1-17

Rosenbaum, P. and Rubin, D., 1983, *The central role of the propensity score in observational studies for causal effects*, Biometrica 70, pp. 41-55

Rubin, D., 2005, *Causal Inference Using Potential Outcomes: Design, Modeling, Decisions*, Journal of the American Statistical Association 100, pp.322-331

Sekhon, J., 2011, *Multivariate and Propensity Score Matching: Software with Automated Balance Optimization: The Matching Package for R*, Journal of Statistical Software 42

Schwert, G.W., 2003, *Handbook of the Economics of Finance*, Ch15, North Holland, University of Rochester and NBER

Shleifer, A. and Vishny, R., 2003, *Stock market driven acquisitions*, Journal of Financial Economics 70, pp.295-311

Stuart, E., 2010, *Matching methods for causal inference: A review and a look forward*, Stat Sci. 25, pp.1-21

Sudarsanam, S., 2010, *Creating Value from Mergers and Acquisitions: The Challenges*, Ch 1, Pearson Education Limited, London

Szücs, F., 2014, *M&A and R&D: Asymmetric Effects on acquirers and targets?*, Research Policy 43, pp.1264-1273

Travlos, N., 1987, *Corporate Takeover Bids, Methods of Payment, and Bidding Firms' Stock Returns*, The Journal of Finance 42, pp.943-963

6.2 Other Sources

Dagens Industri, 2014, *Betsson har nått en uppgörelse i tvisten*, December 27. Available at: https://www.di.se/artiklar/2014/12/23/betsson-har-natt-en-uppgorelse-i-tvisten/

Nobia AB (publ), 2015, *Nobia acquires Commodore and CIE* [Press Release], 12 November. Avaliable at: https://www.nobia.com/media/press-releases/2015/nobia-acquires-commodore-and-cie/ (Accessed 2018-09-18)

Nobia AB (publ), 2016, *Annual Report 2016*. Avaliable at: https://www.nobia.com/globalassets/documents/reports/2016/en_nobia_annual_report_2016.pdf (Accessed 2018-09-18)

Nobia AB (publ), 2017, *Annual Report 2017*, Avaliable at: https://www.nobia.com/globalassets/documents/reports/2017/en_nobia_annual_report_2017.pdf (Accessed 2018-09-18)

Appendix

Appendix A: Variable Definition

Appendix A

Definition and Source of Variables

This table shows the description of the variables used in this paper. The first column includes the variable name and in parenthesis the acronym of the variable. The second column describes the variable in question. If necessary, the second column includes the formula on which the variable was calculated. The third column contains the main source of the variable.

Variable (Acronym)	Description	Source
Acquirers Age (AAge)	The age of the acquiror in the year of the acquisition, calculated as: *AGE = Announcement Year – Foundation Year + 1*	SDC and manually collected
Number of Bids for the Acquirer (Bid_Times)	The number of registered completed bids for the acquirer in the SDC between January 1978 and June 2018.	SDC
Frequent Bidder Dummy (Freq_Bid_Dum)	After ranking the bid times, a dummy is created that is equals to one if the bidder is within the fourth quartile regarding the bid percentile, and zero for bidders that fall in quartiles below the fourth.	SDC
Cummulative Abnormal Return (CAR)	The CAR is calculated for a five-trading day window, of which two trading days occur before the announcement day and two trading days after. For each trading day, the abnormal return is calculated. The formula used is: $CAR(\tau_{-2},\tau_2) = \sum_{\tau_{-2}}^{\tau_2}(R_{stock} - R_{benchmark}) = \sum_{\tau_{-2}}^{\tau_2} AR$	Bloomberg
Cross Border Dummy (CB_Dum)	A dummy representing one if the target nation is not Sweden, and zero if it is.	SDC
Culture Index (Cul_Index)	Following the study of Barbopoulos and Adra (2016) the culture index is determined by the transparency and flexibility in accounting standard and organizational challenges in different target nations. The nations are sorted from the most flexible (group 1) and transparent to the most flexible and least transparent (group 5) based on the study by Gray (1988). The following groups are determined: Group 1. Anglo-Saxon: UK and Irish Republic Group 2. Nordic: Sweden, Norway, Denmark, Finland, Iceland, and the Netherlands Group 3. Germanic: Austria, Germany, Switzerland, and Belgium Group 4. South-West: France, Portugal, Italy, and Spain Group 5. Remaining: Croatia, Czech-Republic, Poland, Romania, Turkey, Ukraine, Georgia, Greece, Hungary, Latvia, Lithuania, Malta, Slovenia, and Russia	SDC in combination with Barbopoulos and Adra (2016) and Gray (1988)
EBIT Ratio (EBIT/Assets)	The EBIT ratio is the ratio between the targets EBIT and the targets assets one year before the acquisition.	Amadeus
Deal Value (DV)	The total value of the deal, in millions of USD.	SDC
Deal-to-Market Value (DV_MV)	The total deal value divided by the market value of the acquirer four weeks before the acquisition.	SDC

Initial Payment Multiple (Initial Payment Multiple)	The initial payment over the target turnover one year preceding the acquisition. $$Payment\ Multiple = \frac{Initial\ Payment}{Turnover_Target}$$	SDC, press releases and IRs of the acquirers
Payment Multiple (Payment Multiple)	The value of the deal over the target turnover one year preceding the acquisition. $$Payment\ Multiple = \frac{DV}{Turnover_Target}$$	SDC, press releases and IRs of the acquirers
Domestic Shareholders (% of Domestic Investors)	The domestic shareholders represent the percentage of Swedish investors four weeks before the announcement date.	Bloomberg
Domestic Shareholder Change (% od Domestic Investor Change)	The domestic shareholder change represents the change (in %) of domestic investors from four weeks before the announcement date to the announcement date (increase: +; decrease:-)	Bloomberg
Earnout Dummy (EO_Dum)	A dummy representing one if the deal contains an earnout and zero if it does not.	SDC
Earnout Value (EO_Value)	The value of the earnout, in millions of USD.	SDC
Earnout Size (EO_DV)	The earnout value as a fraction of the total deal value.	SDC
Equity Ratio (Equity/Assets)	The equity ratio is the targets equity over the targets assets one year prior to the acquisition.	Amadeus
Full Acquisition Dummy (Full)	A dummy representing one if the bidder acquired 100% of the shares in the target and zero otherwise.	SDC
Industry Dummy (IND_Dum)	A dummy representing one if the bidder and the target are in different industries, and zero otherwise.	SDC
Initial Payment (Initial_Payment)	The value of the initial payment. For non-earnout deals this is equal to the deal value (DV). For earnout deals this represents only the initial payment (that is the deal value less the earnout value).	SDC
Insider Trading (% of Insider Trading)	The insider trading represents the ratio of net share bought (+) or sold (-) by insiders over with total share outstanding from four weeks before the acquisition to two trading days after the announcement date.	Bloomberg
Institutional Shareholders (% of Institutional Investors)	The institutional shareholders represent the percentage of floating shares held by institutional investors four weeks before the announcement date.	Bloomberg
Institutional Shareholder Change (% of Institutional Investor Change)	The institutional shareholder change represent change (in %) of institutional investors from four weeks before the announcement date to the announcement date (increase: +; decrease: -)	Bloomberg
Earnout Length (Length_EO)	The length of the earnout is the earnout period for which the financial performance of the target is measured and the earnout payment is determined. This is predetermined at the time of the acquisition.	SDC, press releases and IRs of the acquirers
Market Value of the Acquirer (MV)	The market value of the acquirer four weeks before the acquisition.	SDC
Market-to-Book Value (MV_BV)	The market-to-book value of the acquirer four weeks before the acquisition.	SDC

NI Ratio (NI/Equity)	The NI ratio is the targets net income (NI) over the targets equity the year prior to the acquisition.	Amadeus
PBT Ratio (PBT/Equity)	The PBT ratio is the targets profits before tax (PBT) over the equity of the target the year prior to the acquisition.	Amadeus
Payment Method (Payment_Method)	Method of payment, all earnout deals are labelled 'Earnout' resulting in the following four categories: cash, stock, mix or earnout.	SDC
Percent Acquired (Perct_Acqd)	Percent of the target that is acquired.	SDC
Percent of Cash (Perct_Cash)	The percent of the total payment consisting in cash. Earnout payments are not treated as cash here.	SDC
Percent of Stock (Perct_Stock)	The percent of the payment consisting in stock. Earnout payments are not treated as stock here. However, stock includes equity related payments.	SDC
Percent of Other (Perct_Other)	The percent of the payment consisting the earnout.	SDC
Target Age (TAge)	The age of the target in the year of the acquisition calculated as: *AGE = Announcement Year – Foundation Year + 1*	SDC and manually collected
Turnover of the Target (Turnover_Target)	The turnover of the target the year preceding the acquisition.	Press releases
Year Dummy (Year_Dum)	The average percentage of using earnouts in transactions is 6.25%. For years that the percentage is above the average, the dummy variable is one; otherwise, the dummy variable is zero.	SDC

Appendix B: Tests on the Data

B1: Multicollinearity

Appendix B1

The VIF Test

This table shows the VIF-values for each variable used in each regression used in this paper. H1 is represented by CAR_{OLS} and CAR_{PSM}, H2 by slCAR, H3 by PM_{OLS} and PM_{PSM}, H3 by IPM_{OLS} and IPM_{PSM}, and the last part by SIZE and LENGTH.

	CAR_{OLS}	CAR_{PSM}	slCAR	PM_{OLS}	PM_{PSM}	IPM_{OLS}	IPM_{PSM}	SIZE	LENGTH
EO_Dum	1.20	1.05		1.18	1.04	1.18	1.04		
Year_Dum	1.10	1.08		1.09	1.06	1.09	1.06		
Perct_Stock	1.61	1.32	1.51	1.61	1.31	1.61	1.31	1.06	1.06
Full	1.08	1.03	1.15	1.08	1.03	1.08	1.03	1.03	1.05
log(DV)	3.07	3.91	1.79						3.34
log(MV)	1.87	1.94	2.08	3.59	2.99	3.59	2.99		
log(Turnover_ Target)	2.72	3.16		1.93	2.11	1.93	2.11	1.10	3.36
log(TAge)	1.06	1.06	1.21	1.06	1.06	1.06	1.06		
EO_DV			1.67						
Length_EO			1.08						
CB_Dum			1.45					1.14	1.16
log(Bid_Times)			1.50						
log(MV_BV)			1.49					1.05	1.08
IND_Dum			1.21						
log(DV_MV)				2.68	2.23	2.68	2.23		

B2: Heteroscedasticity

Appendix B2

The Breuch-Pegan Test

This table shows the Breuch-Pegan values (BP) for each variable used in each regression used in this paper. The Adj. column shows "ok" if the BP value is significant and the significance of coefficients after adjusting standard errors is still the same; "no" if the significance changes after using robust standard errors, and "-" if the p-value is non-significant and the robust standard errors are not checked for. H1 is represented by CAR_{OLS} and CAR_{PSM}, H2 by slCAR, H3 by PM_{OLS} and PM_{PSM}, H3 by IPM_{OLS} and IPM_{PSM}, and the last part by SIZE and LENGTH.

	CAR_{OLS}	**CAR_{PSM}**	**slCAR**	**PM_{OLS}**	**PM_{PSM}**	**IPM_{OLS}**	**IPM_{PSM}**	**SIZE**	**LENGTH**
BP	0.00	0.00	0.95	0.34	0.41	0.32	0.27	0.95	0.20
Adj.	ok	ok	-	-	-	-	-	-	-

B3: Multivariate Normality

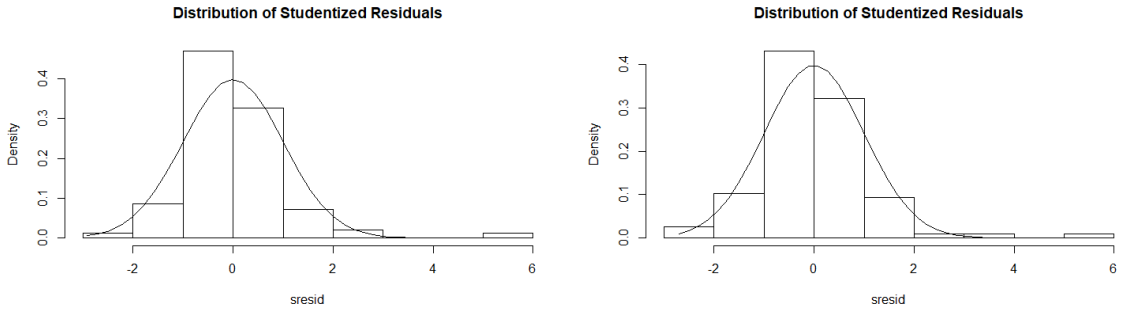


Figure 3 and 4: *The two figures represent the distribution of the standardized residuals for H1. The left one is for the regression before matching, the right one for the regression after matching.*

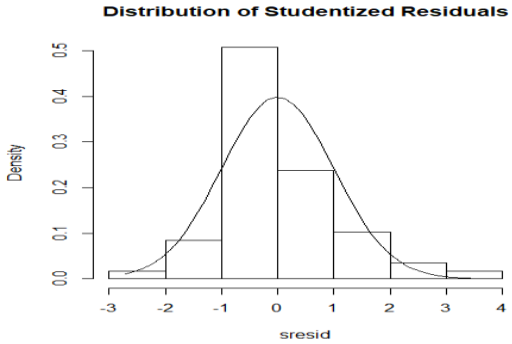


Figure 5: *The figure represents the distribution of the standardized residuals for H2.*

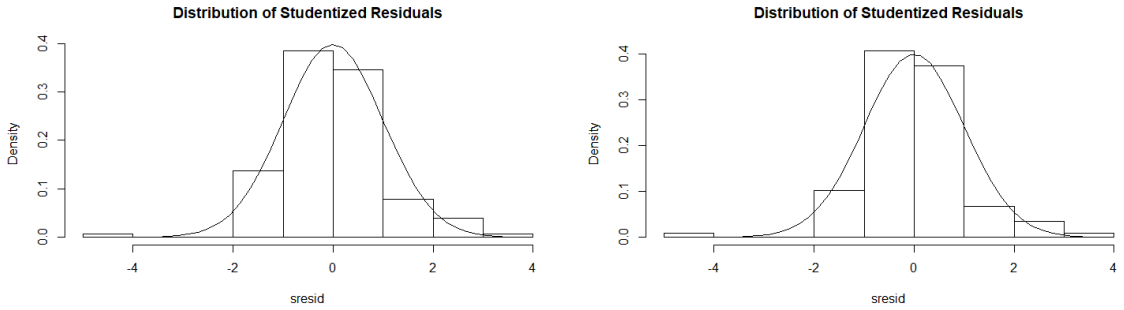


Figure 6 and 7: *The two figures represent the distribution of the standardized residuals for H3. The left one is for the regression before matching, the right one for the regression after matching.*

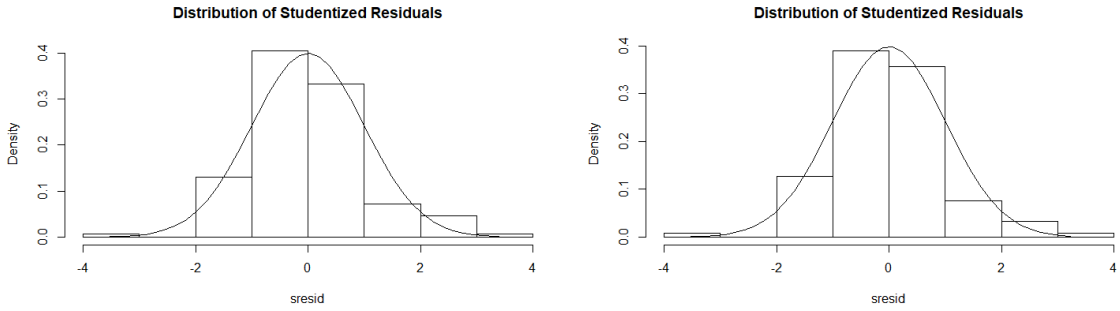


Figure 8 and 9: *The two figures represent the distribution of the standardized residuals for H4. The left one is for the regression before matching, the right one for the regression after matching.*

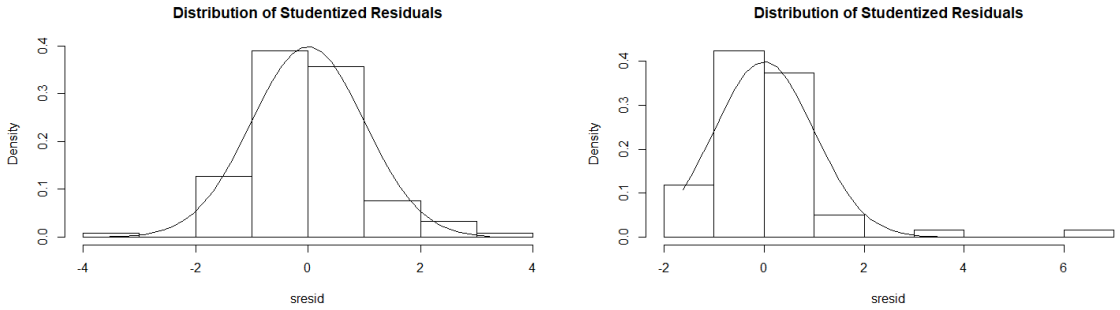


Figure 10 and 11: *The two figures represent the distribution of the standardized residuals for the last test (determinants of size and length). The left one is for the earnout size, the right one for the earnout length.*