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Returns to Swedish Acquirers from Public and Private M&As

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ABSTRACT

This paper examines Swedish listed acquirers' cumulative abnormal returns surrounding the announcement of acquisitions between the period 1998–2018 of both public and private targets. We find that acquirers earn an average cumulative abnormal return of 0.68% when the target is public and an average cumulative abnormal return of 1.99% when the target is private. The difference in average abnormal returns stays persistent after controlling for the variables: method of payment, acquirer's market capitalization, relative size between the acquirer and the target, whether or not the acquirer and the target functions in the same industry, as well as if the transaction was cross-border, Tobin's Q, pre-announcement leakage of information, deal size, and competing bids. The findings in this paper also show that all-stock payment is preferred when the target is private and all-cash payment is preferred when the target is public.

Keywords: Mergers and Acquisition; Listing effect; Abnormal returns; Value creation; Acquirer returns

JEL Classifications: G34

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1. INTRODUCTION

A popular way to expand and increase firm value is through mergers & acquisitions (M&As). It is one of the most important decisions in corporate activities. Therefore, it is a well-documented and well-researched area (Yaghoubi *et al.,* 2016).

Previous research shows that, on average, the value added from acquisitions creates little to no value for the acquirer, while the target firm on average enjoys a significant gain (Hitt *et al*., 2009). Meckl and Röhrle (2016) measured M&As ability to create value, with a meta-analysis of 33 previous studies worldwide. They provide evidence that a majority of acquirers do destroy value, in only 47.6 per cent of the cases value was created.

Chang (1998) studied cumulative abnormal returns (CARs) around the announcement of M&A deals by dividing the deals into groups by whether the target was public or private (hereinafter we refer to deals where the target is public as public deals and deals where the target is private as private deals). With reference to the study made by Chang (1998) and later researchers[1]; the fact that acquirers earn zero to negative returns when the target is public and positive returns when the target is private, was later referred to as the 'listing effect' in a research made by Faccio, McConnell, and Stolin (2006). Henceforth we refer to the term 'listing effect' as the phenomena that private deals earn greater returns than public deals.

None of the papers published on this topic has brought evidence on what specific economic factors give rise to the listing effect. Chang (1998), proposed that the listing effect may be due to a method of payment effect. This was later rejected by Faccio, McConnell, and Stolin (2006) who stated that further research should be conducted within the topic to find a proper explanation. However, the fact that the method of payment affects the outcome in both private and public deals was stated by both Chang (1998) and Faccio, McConnell, and Stolin (2006).

Most papers analyse the U.S stock market and find that the listing effect is persistent. Faccio, McConnell and Stolin (2006) were among the first researchers who studied the phenomenon on the European market, with a sample of 17 European countries, including Sweden. They find that the listing effect is persistent when looking at the European market as a whole. However, they failed to reject the null hypothesis that the average cumulative abnormal returns in Sweden, for public targets, differs from zero. They further could not bring statistical evidence that there is a significant difference in gains between public and private deals in Sweden.

[1] See Fuller, Netter, and Stegemoller (2002); Moeller, Schlingemann, and Stulz (2004); and Faccio, McConnell, and Stolin (2006).

This paper aims to bring knowledge about the listing effect in Sweden; if it exists and if the method of payment affects the outcome of private and public deals. There is limited statistical evidence on whether the listing effect exists in Sweden. An acquisition is one of the most important decisions for a manager which makes an impact on many different stakeholders, such as employees, executives, and the economy as a whole. The interest of a manager should be to make decisions that create as much value for the shareholders as possible. Our research is important because it aims to bring awareness about the differences between public and private M&A deals for Swedish acquirers, making managers do more well-grounded decisions when it comes to acquisitions of other companies.

This paper is structured as follows: in section 2 we provide previous research on the subject together with some of the theories that try to explain why there is a listing effect. Section 2 ends with the development of hypotheses. In section 3 we describe the data gathering process and present descriptive statistics of the sample. In section 4 we develop our method and models that are to be used to test our hypotheses. In section 5 our results are highlighted. Finally, in section 6, we end with a discussion of the results.

2. Literature and Hypotheses Development

2.1. Empirical Evidence on Acquirers' Returns

2.1.1. Public targets

The documented findings on value creation from acquisitions on public targets are that they destroy value for the acquiring firm more often than they create value.[2] Based on a global sample, Alexandridis, Petmezas, and Travlos (2010) show evidence that firms acquiring a public target, at best, earn zero cumulative abnormal returns. They also provided evidence that acquiring listed targets with stock results in a negative cumulative abnormal return. According to new evidence from Alexandridis, Antypas, and Travlos (2017) based on acquisitions between 2010–2015 in the U.S., the gains for the bidder appear to have grown in acquisitions where the target is a public company. Synergies, which are widely the strongest argument for M&As, have increased dramatically. The results seem to be linked with improved corporate governance after the 2008 financial crisis (ibid). In accordance with the neoclassical theory about M&As discussed in section 2.2.1, these types of deals should create positive values for the acquiring shareholders.

2.1.2. Private targets

Takeovers of private target represent a vast majority, in fact over 80 per cent of all M&As in U.K and 60–75 per cent in the U.S. market, but still there is limited research focusing on private target transactions (Draper and Paudyal, 2006). Available evidence within the field is limited foremost to Hansen and Lott (1996), Chang (1998), Ang and Kohers (2001), and Fuller, Netter, and Stegemoller (2002), all based on the U.S. market. Findings from Hansen and Lott (1996), comparing private and public deals between 1985–1991, implies that private deals abnormal returns for the acquirer are about two per cent higher than in public deals. In 43 per cent of the bids for private target was the return negative in contrast to 65 per cent of the bids for public targets. The results of Ang and Kohers (2001) comparative analysis and Fuller, Netter, and Stegemoller's (2002) study also provides significant evidence of gains from private target M&As.

The study made by Faccio, McConnell and Stolin (2006) investigates the value created for acquirers' shareholders in 17 Western European countries, including Sweden, on both private

[2] See for example Mueller (1997), Andrade, Mitchell, and Stafford (2001), and Alexandridis, Petmezas, and Travlos (2010), among others.

and public targets, which makes this reference important for our analysis and a natural starting point. The period researched is 1996–2001 and they find that, on average, there is an insignificant negative return of -0.38% when the target is a listed company, while there is a significant positive return of 1.48% if the target company is unlisted. According to the cross-sectional regression analysis in the study, acquirer's size, unlisted stand-alone target, and unlisted subsidiary target were the only variables which were significant in explaining the abnormal returns observed.

Regarding the observations on the Swedish stock market by Faccio, McConnell and Stolin (2006), the regression output on listed targets shows an average CAR of 1.33% and a median CAR of 0.97%, these results are however not significant. This concludes that they could not find evidence in rejecting the null hypothesis that the average abnormal returns for the acquirer in Sweden differs from zero. The regression output on unlisted targets shows an average CAR of 2.56% and a median CAR of 1.70%, which in contrast is significant. They also could not give evidence on whether the listing effect exists in Sweden, that is, the differences between public and private transactions were not significant.

2.2. What Theories Could Explain the Listing Effect?

Chang (1998) proposed that the listing effect may be due to the method of payment. However, Faccio, McConnell and Stolin (2006) later followed up on this theory with the answer that this clearly could not be the case. Faccio, McConnell and Stolin's (2006) study failed to bring light on what economic factors could explain the listing effect. We have not found anyone giving a full evidential explanation on why the listing effect exists. In the following section, we present those theories proposed by previous researchers to be the potential economic phenomenon that would explain the listing effect.

2.2.1. The managerial motive hypothesis

The neoclassical theory about M&As states that managers act to maximize shareholders' value. The managerial motive hypothesis contrastingly discusses the private benefit motive of managers which could influence their choices away from the shareholders' interest. If a manager is driven by prestige, the manager could make acquisitions to maximise the size (instead of potential gains) of the company which often leads to more private benefits to the manager himself (Aggarwal and Samwick, 2003).

Listed companies are more well-known to the public in contrast to private companies and in general larger. Increasing firm size comes at a cost of the difficulty to manage chiefs in large

corporations. Reports on the U.S. market show that 61 per cent of large M&A deals (at least $500 million) end up being value destroying for acquiring shareholders (Henry, 2002). On average, public deals have a greater transaction value than private deals meaning that the above-mentioned theory could be one of the explanations to why public deals show less abnormal returns than private deals. The argument that follows is that by acquiring a smaller, less-known private company, the bidding manager is, therefore, more likely to be motivated with thought-out potential synergies and a desire to create value for the shareholders. This will make it less likely that these managers are paying too high premiums. It might also be easier to integrate a smaller privately held target into the business than a larger public target (Draper and Paudyal, 2006).

2.2.2. The limited competition hypothesis

Chang (1998) states that the net present value (NPV) of an acquisition transaction made by cash will be, on average, zero in a competitive market, for the acquirer, hence, as long as the potential synergies exceeds the premium offered, other firms will bid up to a value where the synergies are equal to the premium. However, the competition for privately held targets is limited. One possible reason is the high search cost of getting information on unlisted companies due to the lack of public information. If these statements are true, then it is more likely that a manager will underpay when acquiring private companies and therefore create positive abnormal returns for the shareholders (Draper and Paudyal, 2006).

The market for private companies is often illiquid, which creates more bargain power for the acquirer and is another explanation for underpayment (Fuller, Netter, and Stegemoller, 2002). In the sense of liquidity, private companies often have shareholders who contribute a large share of their own wealth into the company, in other words, they are under-diversified. The cash acquisition creates an opportunity for the target´s owners to reduce their risk and reinvest in a more diversified portfolio. The bidder's liquidity can, therefore, be valuable for the private target and make them agree to the takeover more easily (Berk and DeMarzo, 2017).

2.2.3. The bargaining power hypothesis

Private companies are often owned by a small group of shareholders, for example, a family or a group of a few partners. The agency problem that exists in public companies is reduced or even eliminated in a private company. This creates better opportunities as a company to choose the timing of any sale and to whom they want to sell their company. A closely controlled

company could have the potential to possess a stronger bargaining power which implies that acquirers' average abnormal return should be higher for public targets than private. This implication is on the contrary to the liquidity theory discussed in section 2.2.2 (Draper and Paudyal, 2006).

2.2.4. The effect caused by the method of payment

In a competitive market, as discussed in the limited competition hypothesis in section 2.2.2, an acquisition should be a zero NPV transaction, in other words, the premium should be equal to the synergies created. However, research shows that the decision of making a deal in cash, stock, loan notes or a combination has an effect on the bidders share price performance (Draper and Paudyal, 1999), which could imply that the listing effect rather is a method of payment effect (Faccio, McConnell and Stolin, 2006).

Chang (1998) examines bidder returns in a sample of 281 privately held targets between 1981–1992 in a comparison with public deals. He looks at abnormal returns for a two-day [-1,0] window but was not able to show significant abnormal returns for private targets acquired by cash, however, transactions with stock have a significant abnormal return of 2.64% (ibid).

Myers and Majluf (1984) find that firms tend to issue equity to the public when managers believe that the firm's stock is overvalued. Due to the asymmetric information between managers and the public, the market reaction will be negative. Applying this theory to M&A transactions implies that bidders offering stock as payment to public targets have a negative effect on value creation (Chang, 1998). Several studies since Myers and Majluf (1984) show the same results (for example, Draper and Paudyal, 1999).

In contrast to the negative reaction from offering stock when acquiring a public target, private targets show the opposite result according to Chang (1998). The incentive for the private target to closely examine the bidder´s case is strong due to the small and concentrated ownership, which lowers the information asymmetry. After the completion of an M&A transaction paid with shares, the shareholders of the privately held target will hold a large block of shares in the newly merged firm. If the bid is accepted by the target company it implies that the target´s owners have a positive outlook on the private information about the acquirer. Thus, the implication of an announced deal should also be positive from the market's point of view. This theory suggests that acquirers who pay with shares when the target is private receive a positive abnormal return in contrast to when the target is public.

Faccio, McConnell and Stolin (2006) give evidence that the differences in both average and median CARs remain intact after grouping the sample by the method of payment. They draw the conclusion that the listing effect must be separated from the method of payment, that is, there are significant differences in returns for the acquirer depending on the listing status of the target, which cannot be explained by the method of payment. However, they conclude that, as in the U.S., European acquirers earn higher abnormal returns when the target is private and the deal is paid with stock; they earn lower abnormal returns when the private target is paid with cash. This also has the reversed effect if the target is public, that is, higher abnormal returns when paying with cash and lower abnormal returns when paying with stock, which also is consistent with previous research on the U.S. market.

2.3. Hypotheses Development

The aim of this research is to bring knowledge about the listing effect in Sweden which leads us to the following hypothesis:

> *$H_{0,1}$: The acquiring company does not earn a greater average cumulative abnormal return when targeting a private company in contrast to when targeting a public company.*

If rejected, we would start believing that private deals earn greater average cumulative abnormal returns than public deals, hence, giving evidence on the existence of the listing effect in Sweden. In line with previous research, we will conduct both univariate and multivariate tests to bring evidence on this hypothesis.

Travlos (1987), Chang (1998), and Fuller, Netter, and Stegemoller (2002) all propose that the method of payment has an effect on the outcome of an acquisition, more specifically, that the choice should depend on the listing status of the target. Faccio, McConnell, and Stolin (2006) could not find any variable with the potential of explaining the existence of the listing effect and stated that "Further investigation will be required to identify what that fundamental factor is or those fundamental factors are. In the meantime, managers who are evaluating alternative acquisitions may wish to take into account the listing status of target companies" (p. 218). This paper has no aim to give evidence on the economic factors that causes the potential listing effect to arise. However, we want to extend the knowledge about private and public transactions by researching whether the method of payment has an effect on the outcome of private and public deals, separately. The following two hypotheses are divided into public and private targets:

$H_{0,2}$: There is no difference in average cumulative abnormal returns for the acquiring company paying only with cash or only with stock when targeting a private company.

$H_{0,3}$: There is no difference in average cumulative abnormal returns for the acquiring company paying only with cash or only with stock when targeting a public company.

Previous papers (see for example Chang 1998 and Faccio, McConnell, and Stolin 2006) have only tested these hypotheses on a univariate basis.[3]

[3] In line with Chang (1998) and Faccio, McConnell, and Stolin (2006), no analysis will be conducted on a multivariate basis to bring evidence on hypothesis 2 and 3.

3. DATA

The sample of M&A transactions is retrieved from Bloomberg and includes announced Swedish deals between 1998 and 2018. All deal values are inflation adjusted to 2018 Swedish SEK terms using KPIF measures from the Swedish Riksbank. We only include deals where the acquiring company, on the announcement day, is listed on the Swedish Stock Exchange. We exclude deals with a lack of information on the method of payment. Also, we only include completed deals and exclude any withdrawn, pending, proposed, or terminated deals. The acquiring company ends up with more than 50% of the equity stake in the target company following completion. The target company can be both private and public with no restriction on the home country. There are a total of 958 deals that fulfils these criteria out of which 163 are public deals and 795 are private deals.

Table 1 and Figure 1 show the distribution of our sample over time by listing status of the target. It seems to have been a shift in private versus public deals pre – and post the financial crisis of 2008. A feature of M&As documented is that they come in waves, so-called "merger waves". One can see a visualised picture of this phenomenon in the Swedish market as well. There are two main theories which explain merger waves. The neoclassical model explains the clustering of merger activity as a cause of industries responding to economic shocks, through M&As (Harford, 2005). The behavioural model explains the pattern as an effect of rational managers taking advantage of consistent mispricing in the market, buying real assets with overvalued stock (ibid). In this paper, we only illustrate the pattern seen in Sweden over the last two decades, but we do not focus on or explain anything about the variables causing this. However, we do suggest merger waves and the shift in the number of public to private deals after the financial crisis as a topic for further research.

Column 3 and column 7 show the average deal size by public and private target companies, respectively. The deal size seems to be positively correlated with whether the target is public. In fact, the correlation matrix in Appendix I brings evidence to this assumption. In only 3 out of 21 years is the average deal value for private deals greater than that of public deals.

TABLE 1

Sample Distribution by Listing Status of Target

Year	Public deals (n)	Public deals (mSEK)	Average Public	Private deals (n)	Private deals (mSEK)	Average Private
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1998	5	5,340	1,068	4	4,469	1,117
1999	11	86,891	7,899	14	11,160	797
2000	24	110,547	4,606	45	31,373	697
2001	15	14,457	964	28	14,428	515
2002	4	109,653	27,413	10	15,261	1,526
2003	7	4,062	580	26	20,304	781
2004	11	32,702	2,973	23	15,498	674
2005	13	55,991	4,307	57	29,416	516
2006	14	36,571	2,612	74	20,412	276
2007	14	97,146	6,939	80	28,696	359
2008	5	13,989	2,798	48	30,159	628
2009	4	6,083	1,521	26	10,601	408
2010	8	18,986	2,373	44	47,392	1,077
2011	5	14,261	2,852	63	33,007	524
2012	4	2,499	625	29	22,063	761
2013	5	25,809	5,162	27	34,214	1,267
2014	4	20,577	5,144	32	60,744	1,898
2015	6	15,629	2,605	40	42,783	1,070
2016	0	0	0	46	98,208	2,135
2017	2	1,864	932	38	31,649	833
2018	2	37,486	18,743	41	53,620	1,308
All	163	710,542	4,359	795	655,459	824

The table shows the annual number of M&A transactions within a period reaching from 1998 to 2018. The data is retrieved from Bloomberg Terminal. All acquirers, on the announcement date, are listed on the Swedish Stock Exchange, the acquiring firm buys more than 50% of the equity in the target company, all deals are completed (i.e. there are no withdrawn, pending, proposed, or terminated deals), and deals, where the method of payment is undisclosed, are left out. The targets are private or public firms without any restrictions on the home country. Columns 3 and 7 show the average deal size per year by public and private targets, respectively.

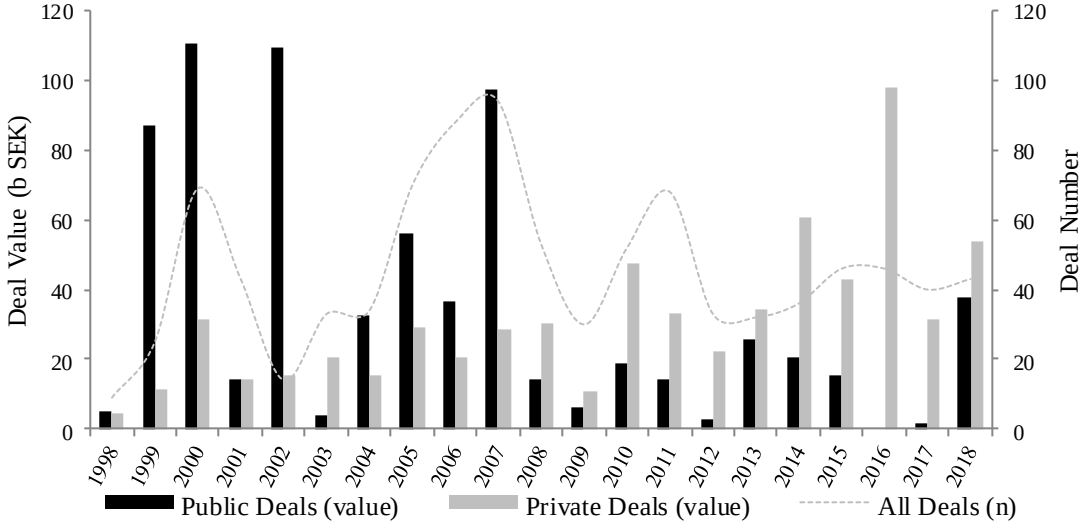


Fig. 1. Deal activity through time by listing type of the target. The figure shows the annual aggregated value in billion SEK for public and private deals as described in Table 1 together with the total number of deals per year.

TABLE 2

Descriptive Statistics by Characteristics of the Deal and the Acquirer, Ordered by the Listing Status of the Target

Panel A. Deal Characteristics

Variable	All Targets	Listed Targets	Unlisted Targets
Fraction of all-cash acquisitions	0.735	0.675	0.747
Fraction of all-stock acquisitions	0.138	0.209	0.123
Fraciton of cross-border acquisitions	0.689	0.650	0.702
Fraction of within-industry acquisitions	0.484	0.638	0.453

Panel B. Acquirer Characteristics

	Mean	Median	Mean	Median	Mean	Median
Acquirer's market capitalization (m. SEK)	37,972	7,058	80,742	31,137	29,203	5,934
Deal value (m. SEK)	1,426	196	4,359	817	824	142
Target/acquirer relative market size	0.190	0.031	0.258	0.048	0.171	0.027
Acquirer's Tobin's Q ratio	2.04	1.58	1.92	1.53	2.06	1.60

An acquisition is all-cash and all-stock if the payment is made only by cash or stock, respectively. Mixed payment transactions are left out in this table. An acquisition is cross border if the target company's home country is any other than Sweden. A within-industry transaction is classified as an acquisition where both the bidder and the target have the same 4 digits Bloomberg Industry Classification System (BICS) code. The acquirer's market capitalization is the acquirer's inflation adjusted (2018 SEK terms) market cap as of 30 days prior to the announcement. Deal Value is the inflation-adjusted deal value (2018 SEK terms) of the transaction. The relative size of acquirer-target is calculated as the inflation-adjusted market capitalization of the acquirer divided by the inflation-adjusted value of the deal. Tobin's Q ratio is calculated as the (acquirer's market cap + total liabilities + preferred equity + minority interest) / acquirer’s total assets.

Table 2 shows the descriptive statistics of our sample. By looking at the differences in the values recorded for mean and medians, one can notice that the data contains outliers. With reference to previous studies, handling outliers can be done in various ways.

There is a similar distribution of all-stock and all-cash deals by listed and unlisted targets. Based on the theory about the method of payment and previous studies on the U.S. and European market, we would have expected a higher fraction of all-stock deals for private targets. However, all-cash payments fall in line with the theory about public transactions. As can be seen in Table 1, both the mean and median deal values are higher for public targets than they are for private targets. We can also note that the companies acquiring public targets tend to have a higher market valuation than those acquiring private targets. As both the mean and median deal values are over 5 times larger in public deals than in private deals, the need for a greater balance sheet would fall naturally, hence the greater market capitalization.

4. METHOD

4.1. Event Study

We conduct an event study to investigate what effect the M&A announcement has for the bidding company's shareholders. An event study is a common method for this type of research (see Brown and Warner, 1985; MacKinlay, 1997).

The method adopted in our research is in line with that described by MacKinlay (1997). The structure of the study is to first estimate the normal performance of a security and then to compare this to the performance around the event of interest. The deviation from the expected return is referred to as the abnormal return. MacKinlay (1997) presents several methods for estimating the normal performance of a security. We have decided to use the market model; a one-factor statistical model which relates each security's return relative to a market portfolio and in that way measuring the normal performance of a security. This model offers potential advantages over simpler models such as the constant mean model which assumes that the securities mean returns are constant through time (ibid). According to MacKinlay, the gains from using a more complex multifactor model are often small since the extra variables added over the market variable generates marginal improvements.

A broad-based benchmark index in the country being analysed should be used as a proxy of the market portfolio. Our proxy for Sweden's market portfolio is the OMX Stockholm All-Share Index (OMXSPI), previously called SAX- index. The index includes all the shares listed on OMX Nordic Exchange Stockholm, which makes it a good benchmark for our sample.

4.1.1. Measuring abnormal returns

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad (1)$$
$$E(\varepsilon_{it} = 0) \qquad var(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

The market model equation is shown in equation (1) above where R_{it} and R_{mt} are the returns of the security *i* and the market portfolio, respectively, on period *t*. ε_{it} is the zero disturbance term with a variance of $\sigma_{\varepsilon_i}^2$.

The parameters ($\hat{\beta}_i$) and ($\hat{\alpha}_i$) are estimated over a period prior to the announcement called the estimation window and the period around the announcement is called the event window. In line with Faccio, McConnell and Stolin (2006), the estimation window stretches from 255 trading days prior to the announcement day up to 46 trading days prior to the announcement,

that is, [-255, -46]. The estimation window and event window are illustrated in fig. 2. as L_1 and L_2, respectively.

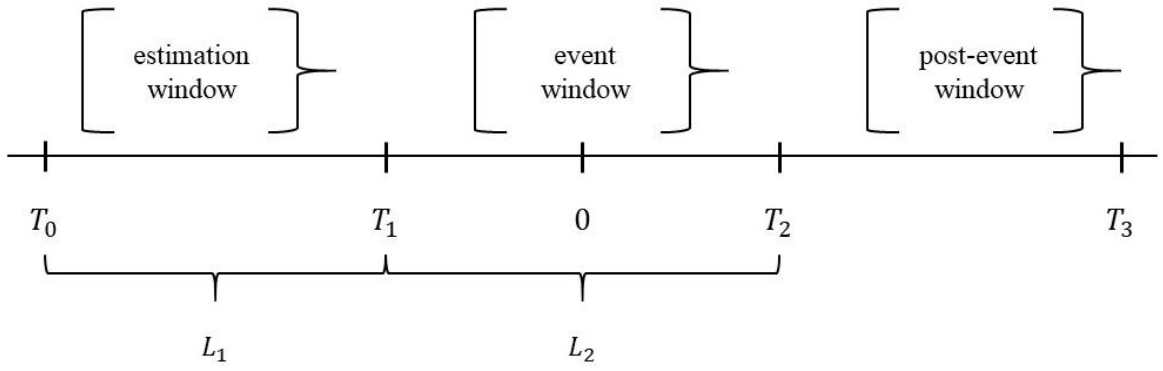


Fig. 2. shows an illustration of the estimation window, event window, and the post-event window as described by MacKinlay (1997) where $\tau = 0$ is the event day.

The parameters of the estimation window are calculated as follows

$$\hat{\beta}_i = \frac{\sum_{\tau=T_0+1}^{T_1}(R_{i\tau} - \hat{\mu}_i)(R_{m\tau} - \hat{\mu}_m)}{\sum_{T_0+1}^{T_1}(R_{m\tau} - \hat{\mu}_m)^2}. \tag{2}$$

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_i\hat{\mu}_m. \tag{3}$$

$$\hat{\sigma}_{\varepsilon_i}^2 = \frac{1}{L_1 - 2}\sum_{\tau=T_0+1}^{T_1}(R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau})^2. \tag{4}$$

where,

$$\hat{\mu}_i = \frac{1}{L_1}\sum_{\tau=T_0+1}^{T_1}(R_{i\tau}). \tag{5}$$

and,

$$\hat{\mu}_m = \frac{1}{L_1}\sum_{\tau=T_0+1}^{T_1}(R_{m\tau}). \tag{6}$$

$R_{i\tau}$ and $R_{m\tau}$ are the returns in the event period τ for the security *i* and for the market, respectively.

The abnormal returns, which is the unexpected return at any point in time τ for each security *i*, can then be calculated as*:*

$$AR_{i\tau} = R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau}. \quad (7)$$

It is expected that the abnormal returns will be jointly normally distributed with a mean of zero and the conditional variance of $\sigma^2_{\varepsilon_i}(AR_{i\tau})$ (MacKinlay, 1997). With reference to MacKinlay (1997), the variance can be calculated as:

$$\sigma^2_{\varepsilon_i}(AR_{i\tau}) = \sigma^2_{\varepsilon_i}\left[1 + \frac{1}{L_1} + \frac{(R_{m\tau} - \hat{\mu}_m)^2}{L_1 \hat{\sigma}^2_m}\right] \quad (8)$$

The second component, inside the brackets in equation (8), is a correction due to the sampling error in the market model variables α_i and β_i, which may lead to a serial correlation of the abnormal returns even though they are independent (MacKinlay, 1997). Mackinlay (1997) states that, as the estimation window L_1 increases, the variance of the abnormal returns $\sigma^2_{\varepsilon_i}(AR_{i\tau})$ move towards the variance of the security $\sigma^2_{\varepsilon_i}$. This is due to the fact that the additional variance decreases and that the term inside the brackets moves towards 1.

Given the null hypothesis, that the event has no impact on the mean or variance of the abnormal returns, Mackinlay (1997) states that the distribution of the sample abnormal returns in L_2 is

$$AR_{i\tau} \sim N\big(0, \sigma^2(AR_{i\tau})\big). \quad (9)$$

4.1.2. Aggregation of abnormal returns – cumulative abnormal returns

To conduct the test that the event has no impact on the abnormal returns of any security, we first need to use the information presented in section 3.2.1. and aggregate equation (9) through two dimensions, both through time and across securities (Mackinlay, 1997). The aggregated abnormal returns are defined as cumulative abnormal return CAR (Mackinlay, 1997) and are calculated as

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau}. \quad (10)$$

MacKinlay (1997) states that for reasonable values of L_1 the variance of the aggregated abnormal returns can be calculated as:

$$\sigma^2_i(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\sigma^2_{\varepsilon_i}. \quad (11)$$

MacKinlay makes no specification on what should be a reasonable length of L_1 to make the assumption that equation (11) could be used without the correction from equation (8). We suggest that equation (8) always should be tested to see what differences both equations give to the final conclusion.

The distribution under the null hypothesis is:

$$CAR_i(\tau_1, \tau_2) \sim N(0, \sigma_i^2(\tau_1, \tau_2)). \quad (12)$$

The equation (10) shows the aggregation through time by each of the individual securities *i* in the sample. We now need to aggregate the individual CARs through all of the securities in the sample to be able to conduct any useful tests. MacKinlay (1997) states that the assumption for this aggregation is that there is not any clustering between the securities in the sample. If one assumes that the sample is free from clustering, there is no serial correlation between any of the securities *i* and one can calculate the variance of the aggregated sample cumulative abnormal return without any concern. Clustering can occur in two forms: 1) total clustering, which emerges if several of the securities in the sample have an announcement on the same date, and 2) overlapped event windows, which arise when the events lay closely together so that the event windows overlap (MacKinlay, 1997). Correction needs to be taken if the sample shows evidence of clustering. If the sample contains clustering, MacKinlay presents two solutions to this problem. First, if there is total clustering, one can analyse the abnormal returns without aggregation. In our sample, this is not a problem. The second method is to aggregate the abnormal returns into a portfolio around each of the announcement dates which will allow for cross-correlation of abnormal returns (ibid). Mandelker (1974) explains this procedure as: on each trading day, construct a portfolio consisting of a long position in the acquirers' targeting private firms with an equally weighted short position in those acquirers' whose event window overlap with the acquirers' in the long portfolio. For both portfolios, an offsetting position should be placed in the acquirer's home country index, which in our case would be the OMXSPI (ibid). With respect to time constraints, we have decided not to conduct this test. Faccio, McConnell and Stolin (2006) conducted this analysis in their research but stated that the result of the test did not change.

Given *N* events, the aggregated abnormal returns for period τ can be aggregated through the whole sample by using the equation (7) of $AR_{i\tau}$ where $\tau = T_1 + 1, \dots, T_2$ (MacKinlay, 1997):

$$\overline{AR}_\tau = \frac{1}{N}\sum_{i=1}^{N} AR_{i\tau}. \quad (13)$$

Again, as the estimation window L_1 becomes increases, the variance can be calculated as

$$\text{var}(\overline{AR}_\tau) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_{\varepsilon_i}^2. \quad (14)$$

With equation (13) we can now aggregate each security's abnormal returns in the event window L_2. The following equations (15) and (16) show the sample CAR aggregated through time and across securities followed by its respective variance, respectively.

$$\overline{CAR}(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \overline{AR}_\tau \,, \tag{15}$$

$$\text{var}(\overline{AR}_\tau) = \frac{1}{N^2} \sum_{i=1}^{N} \sigma_{\varepsilon_i}^2. \tag{16}$$

The distribution of the aggregated abnormal returns under the null hypothesis is:

$$\overline{CAR}(\tau_1, \tau_2) \sim N[0, \text{var}(\overline{CAR}(\tau_1, \tau_2))]. \tag{17}$$

Equation (15) and (16) are then used to test the null hypothesis that the event has no effect on the abnormal returns, under the assumption that the average aggregated CARs is distributed as shown in equation (17) (MacKinlay, 1997). MacKinlay shows that the null hypothesis can be tested using

$$\theta = \frac{\overline{CAR}(\tau_1, \tau_2)}{\text{var}\big(\overline{CAR}(\tau_1, \tau_2)\big)^{1/2}} \sim N(0,1). \tag{18}$$

4.2. Univariate Model

With reference to the study made by Faccio, McConnell and Stolin (2006) we split our sample into four subgroups: method of payment, deal size, the home country of the target, and the size of the acquirer. The structure of this set-up is used for comparative reasons. We classify acquirers above the third quantile of their market capitalization 30 days prior to the announcement, inflation-adjusted to 2018 SEK terms, as 'Big' and below the third quantile as 'All others'. This set-up is chosen based on the theories presented as explanations to the listing effect. In contrast to the study made by Faccio, McConnell, and Stolin (2006) we have chosen to additionally include the subgroup deal size. Large deals are separated from other deals with transactions above and below the third quantile, all inflation adjusted to 2018 SEK terms. With reference to the theories presented in section 2, deal size could have an indirect effect on the outcome of the deal. If the difference in mean CARs stays significant for a subgroup, the conclusion would be that this specific subgroup, in itself, cannot be the full explanation of why the listing effect exists. The subgroup by method of payment will have a central role in the conclusion about hypotheses 2 and 3.

With the evident fact, from Table 2, that there exist outliers and in line with the research made by Faccio, McConnell and Stolin (2006), we will conduct the univariate test on both the medians and the means.

4.3. Multivariate Model

In our cross-sectional regression, we use the three-day CAR [-1, +1] as the dependent variable and examine if the listing effect stays persistent after controlling for other variables. When choosing between different time frames on the event window we are facing the truncation dilemma. A short event window can only estimate a small fraction of the total value contributed by the deal. However, a wider window has the potential to capture the market´s assessment of the full effect of the value of the transaction (Sanjai Bhagat *et al.*, 2005). At the same time, the possibility of greater noise together with benchmark errors is introduced if choosing a wider event window. The shorter time-frame on the event window is chosen based on two reasons. The first being that previous research stretches from [-1, +1] to [-2, +2] (see Chang, 1998; Fuller, Netter, and Stegemoller, 2002; Moeller, Schlingemann, and Stulz, 2004; and Faccio, McConnell, and Stolin, 2006) which would make our analysis comparable. The other reason is that we want to reduce the impact of noise, for example, insider trading as discussed in the study made by Faccio, McConnell and Stolin (2006).

As been done in the study by Faccio, McConnell, and Stolin (2006), we will conduct the multivariate test on average values only. However, with reference to Alexandridis, Antypas, and Travlos (2017) and with the evident fact that our data contains outliers, all variables except dummies are winsorized at the top and bottom 1% to remove outliers.

4.3.1. OLS model

The model used in our cross-sectional analysis will be the Ordinary Least Square (OLS) model. This model relies on five classical assumptions (Wooldridge, 2016). Wooldridge (2016) describes these assumptions in the following manner:

1. *Linearity in parameters*: the dependent and independent variables must have a linear relationship where the variables must be of the first order. The model can be written as: $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u$.
2. *Random sampling*: the sample must be representative of the population and randomly drawn in order to estimate each β_i.

3. *No perfect collinearity*: there should not be any exact linear relationship between the independent variables.
4. *Zero conditional mean*: the expected value of the unobserved variables (u) is equal to zero. Additional information about the unobserved variables cannot tell us anything more about the independent variables, that is, $E[x_i|u] = 0$.
5. *Homoscedasticity*: the unobserved term u has the same variance over any values of the independent variables: $\text{var}(u|x_1, x_2, \dots, x_k) = \sigma^2$.

Each of the assumptions above is taken into consideration and tested before the final models are determined. Each of the variables used is in first order making the first assumption valid. Assumption two is assumed to be fulfilled. Assumption three is tested both with analysing the correlation matrix (seen in Appendix I) where we look if any of the variables are highly correlated, i.e. have a correlation of over 0.8, and by running a variance inflation factor (VIF) test, where we look if any of the variables have a VIF value of over 10 (Kennedy, 2009). By looking at the correlation matrix and VIF outputs in Appendix I and II, respectively, we conclude that OLS assumption 3 holds in all three regression models used. To address the problem of heteroscedasticity, we use robust standard errors in all of our models.

The potential problem of the zero conditional mean assumption arises when there are variables left out from the model which correlates with the dependent variable and the variable of interest. We have analysed several studies who conduct similar research to develop an understanding of what variables are commonly used to control this problem. The zero conditional mean assumption will further be discussed in the following section.

4.3.2. Control variables

The first regression model used will be replicated from the model used by Faccio, McConnell, and Stolin (2006). For our main explanatory variable, an indicator for whether the deal is public (1) or private (0) is used. We include a dummy for all-cash deals (All-Cash) and a dummy for whether the transaction was any other than all-stock or all-cash (Mixed Payment), to control for the associated findings around the method of payment theory discussed in section 2.2.4.

The natural logarithm of the acquirer's market capitalization (inflation-adjusted in 2018 Swedish SEK terms) 30 days prior to the acquisition is used to cope with the existence of a size effect on abnormal returns (Moeller, Schlingemann, and Stulz, 2004).

Cross-border acquisitions (Cross-border) have lower announced returns according to documented findings by Moeller, Schlingemann, and Stulz (2005). We include a dummy for whether the deal is cross-border (1) or not (0).

To account for research evidence by Lang, Stultz, and Walkling (1989) and Servaes (1991) on U.S. acquirers having higher CARs when Tobin´s Q is higher, Tobin´s Q is also used as a control variable in our regression model.

Conglomerate acquisitions, when the bidder's target operating in an unrelated business, creates a possibility for diversification. However, investors can achieve diversification on their own by creating a well-diversified portfolio which makes the argument of creating value through diversification acquisitions less valid. Reports published on this subject shows that acquirer's abnormal returns are higher in within-industry (non-diversifying) deals compared to diversifying takeovers which confirms that the argument is not well grounded. To control for this, an indicator variable is used to differentiate whether the deal is within- industry (1) or not (0), based on the four-digit Bloomberg Industry Classification System codes (Maquieira, Megginson, and Nail, 1998).

Reports based on U.S. acquirers show evidence that there is a positive correlation between the acquirer's CAR and the size of the target relative to the size of the acquirer (Asquith, Bruner, and Mullins, 1989). Studies made by Jarrell and Poulsen (1989) and Servaes (1991) confirm these findings. There are also research made on Canada and Korea, made by Eckbo and Thorburn (2000) and Bae, Kang, and Kim (2002), respectively, showing the same results. To control for these documented findings we include relative size (Relative Size) as a control variable, which is calculated as the inflation-adjusted (2018 SEK terms) amount paid for the target divided by the market capitalization of the acquirer 30 days prior to the announcement, inflation-adjusted to 2018 SEK terms.

In line with Faccio, McConnell and Stolin (2006) we include the variable (Pre-Announcement Returns) to control for the possibility of pre-announcement leakage of information (also referred to as insider information). This variable is calculated as the total CAR starting 15 days prior to the announcement and ending 2 days prior to the announcement. One can also note from Figure 3 that there seems to be an obvious run-up effect for private targets in Sweden.

The following equation shows the first regression which is based on the study made by Faccio, McConnell and Stolin (2006), which we use in comparison matters.

$$CAR = \beta_0 + \beta_1 Public + \beta_2 All\text{-}Cash + \beta_3 Mixed\_Payment + \beta_4 Acquirer\_Size + \beta_5 Relative\_Size + \beta_6 Within\_Industry + \beta_7 Cross\text{-}Border + \beta_8 Tobin's\_Q + \beta_9 Pre\_Announcement\_Returns + \varepsilon \quad \text{(R. 1)}$$

Since empirical evidence shows that large acquisitions destroy more value then they create for the acquirers, we include the natural logarithm of the transaction size (inflation adjusted to 2018 Swedish SEK terms) to control for this (Henry, 2002). The endogeneity problem can only be reasoned to validity by economic intuition. In Table 1 we show that public deals in 17 out of 21 years, on average, have a higher deal value than private deals. By analysing the correlation matrix, we can see that deal size is correlated with the variable of interest. Excluding this variable would potentially cause endogeneity problems and challenge the OLS assumption. The correlation matrix however tells us that deal value is significantly correlated with the other control variables, which potentially could introduce a multicollinearity problem. However, by looking at the low VIF values from Appendix II, one can see that the inclusion of this variable does not create any multicollinearity problems, hence, giving us well-grounded reasons to include deal size in our model. The second model is structured as follows:

$$CAR = \beta_0 + \beta_1 Public + \beta_2 All\text{-}Cash + \beta_3 Mixed\_Payment + \beta_4 Acquirer\_Size + \beta_5 Relative\_Size + \beta_6 Within\_Industry + \beta_7 Cross\text{-}Border + \beta_8 Tobin's\_Q + \beta_9 Pre\_Announcement\_Returns + \beta_{10} Deal\_Size + \varepsilon \quad \text{(R. 2)}$$

According to the limited competition hypothesis discussed in section 2.2.2, one possible explanation of the listing effect is that the public market is more competitive, hence a public transaction should go towards an NPV of zero. To account for this, we run a final regression with the variable 'Competing Bid'. Since our sample only includes the first bid by the acquirer who won and completed the deal, we gathered data on all deals which were not completed in the time span 1998–2018. We then matched those times where there was a previous bid on any of the targets listed in our sample within a year from the winning bid was announced. We find that, in our sample, competing bids occurred 43 times out of which 28 were on public targets and 15 were on private targets, which corresponds to 17.18% and 1.89%, respectively. One can see that the theory itself, that the public market is exposed to higher competition than the private market, seems to apply on the Swedish M&A environment. Even though competing bids only occurs 43 times (4.49%) in our sample, it is included in the final version of the model. The variable 'Competing Bid' is a dummy variable which takes the value 1 if there was an earlier bid on the target within one year from the winning bid announcement.

$$CAR = \beta_0 + \beta_1 Public + \beta_2 All\text{-}Cash + \beta_3 Mixed\_Payment + \beta_4 Acquirer\_Size + \beta_5 Relative\_Size + \beta_6 Within\_Industry + \beta_7 Cross\text{-}Border + \beta_8 Tobin's\_Q + \beta_9 Pre\_Announcement\_Returns + \beta_{10} Deal\_Size + \beta_{11} Competing\_Bid + \varepsilon \quad \text{(R. 3)}$$

As done by Faccio, McConnell, and Stolin (2006), all regressions will include yearly dummies controlling for the potential differences in returns between different years. As do Alexandridis, Antypas, and Travlos (2017), we include industry dummies based on the acquirer to control for differences between sectors.[4]

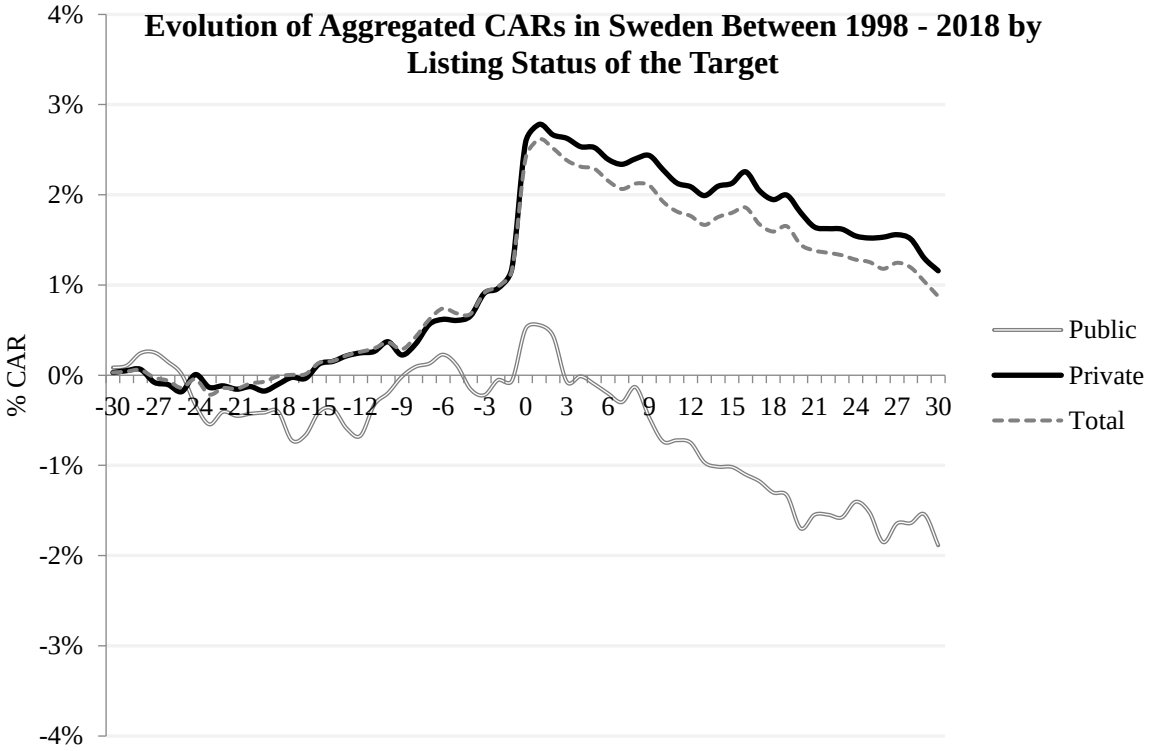
[4] In our sample, there is only one observation from the utility sector. As the regression cannot be run when one dummy takes 0 for all observations but one, this observation will be excluded in the multivariate models, hence the difference in sample size.

5. RESULTS

5.1. Univariate Analysis

Table 3 shows the summary of our univariate analysis. Contrary to previous studies (Hansen and Lott (1996) reports a mean CAR of -0.98%, Chang (1998) reports a mean CAR of -1.49%, and Faccio, McConnell, and Stolin (2006) report a mean CAR of -0.38%, all when the target is a public company) saying that the average cumulative abnormal return for public deals should be zero to negative, we can show a significant average CAR of 0.68% for public deals. This indicates that the synergies created in Swedish public deals exceed the premium paid.

Fig. 3. Shows the evolution of CARs around the announcement day of M&As where the acquiring company is listed in Sweden grouped by the listing status of the target.



However, looking at Figure 3, one can clearly see that the positive significant average CAR for public targets is merely a short-term effect. When analysing the average CARs in wider event windows[5]; we can see that this effect disappears. However, the evidence that M&A deals in Sweden where the target is public seem to have a short-term positive abnormal return will not disprove the evidence that the listing effect in Sweden is persistent.

[5] We investigated the abnormal returns for public targets in the windows [-2,+2], [-3,+3], [-4,+4], and [-5,+5] and found that the effect either could not be rejected to be statistically different from zero or that the average CAR was statistically less than zero.

TABLE 3

Acquirer's Announcement Average Cumulative Abnormal Returns in Percentage by Total Sample, Listed Targets and Unlisted Targets

Sample		All Targets (1)	Listed Targets (2)	Unlisted Targets (3)	Difference col 3 - col 2 (4)
Panel A. Total CARs					
	Mean	1.76***	0.68**	1.99***	1.30***
	Median	0.88***	0.11	0.97***	0.86***
	n	958	163	795	
Panel B. By Method of Payment					
Cash	.	1.51***	0.79**	1.64***	0.85***
	.	0.88***	0.55**	0.92***	0.37
	.	703	109	593	
Stock		2.35***	0.36	3.04***	2.68***
		0.66*	-2.14	1.24***	3.38***
		132	34	99	
Difference: Cash-Stock (means)			**0.43****	**-1.40*****	
Mixed		2.59***	0.63	2.96***	2.33***
		1.31***	-0.78	1.57***	2.35
		123	20	103	
Panel C. By Deal Size					
Large		2.37***	1.27***	3.02***	1.75***
		1.39***	0.81	1.54***	0.73***
		240	89	151	
All others		1.56***	-0.02	1.74***	1.77***
		0.76***	-0.45	0.82***	1.37***
		718	74	644	
Panel D. By Home Country of Target (Cross-Border)					
Domestic		1.74***	0.58	2.02***	1.44***
		0.78***	-0.34	0.97***	1.31**
		299	57	242	
Cross-Border		1.77***	0.74*	1.97***	1.23***
		0.92***	0.44	0.97***	0.53*
		659	106	553	
Panel E. By Size of the Acquirer					
Big		0.48***	0.10	0.66***	0.56***
		0.57***	0.26*	0.63***	0.37
		242	78	164	
All others		2.20***	1.22**	2.33***	1.11***
		1.17***	-0.06	1.35***	1.41***
		716	85	631	

The CARs for each acquisition is calculated by summing the difference between the actual return and the expected return (based on the market model parameters estimated in the estimation window) for each day beginning one day prior to the announcement and ending one day after the announcement. Column 2 and 3 give information on CARs when the target is listed and unlisted, respectively. The numbers presented are, starting from the top row, the acquirer's mean percentage CAR, the acquirer's median percentage CAR, and the total number of transactions within each specific acquisition characteristic. *** = significance at 0.01, ** = significance at 0.05, and * = significance at 0.10. Significances for means are based on the t-test as described by MacKinlay (1997). Significances for medians are based on the signed-ranks test. Significances for the difference in means and medians are based on the *t*-test and the Mann-Whitney test, respectively. All mean and median values in Table 3 are presented as percentages.

The significant average CAR of 1.99% for private deals is in line with previous research and as can be seen in Figure 3, this positive average CAR is not a short-term effect. Looking at column 4 in Table 3 panel A, the differences in both mean and medians are significant. This tells us that, on the univariate basis, we find statistical evidence from both the average and the median that the listing effect exists in Sweden. On a univariate basis, this is a rejection of $H_{0,1}$.

In Table 3, column 4, panel B–E, all the differences in means are significant. The conclusion can be drawn that the listing effect stays persistent in all subgroups, and, hence, cannot solely be explained by any of these variables. This implies that, in accordance with the study by Faccio, McConnell, and Stolin (2006), we find no statistical evidence that the listing effect should be a method payment effect.

In the following sections, we will follow up on the theories presented in section 2, even though, by the rejection of $H_{0,1}$, they are statistically sublime to - and separated from the listing effect.

5.1.1. Cumulative abnormal returns by the method of payment

Panel B in Table 3 examines CARs based on the method of payment. We can see that M&As paid with cash are most common for both private and public transactions. According to the mean average abnormal returns on privately held targets, the evidence is provided that stock payment creates more value than cash deals. This result falls in line with the proposed asymmetric information hypothesis by Chang (1998), that the market reacts more positive to stock deals in comparison with cash deals. This implies a rejection of $H_{0,2}$ which in turn might imply that there is a difference in value created from private deals depending on whether the acquirer pays with only stock or only cash.

Looking at listed targets, statistical evidence is provided that cash deals create more value than stock deals. This finding is in line with previous research and suggests that the asymmetric information problem explained by Myers and Majluf (1984) is considered by managers when making deals. This leads to a rejection of $H_{0,3}$ and suggests that there is a difference in value created from public deals depending on whether the deal was paid with all-cash or all-stock.

5.1.2. Cumulative abnormal returns by deal size

In panel C, for both public and private targets, we find statistical support, based on *t*-tests, that large deals create more value than other deals. This contravenes the theories discussed in section 2.2.1 that large deals tend to destroy more value for the acquiring company's

shareholders. Theories that could give an explanation to the findings of Swedish acquirers is that in large deals, the managers and the board tend to make more detailed valuations to avoid too high premiums (Alexandridis, Petmezas, and Travlos, 2010). The difficulties of integrating a company with a large target is another aspect that could make managers think twice about the potential transaction (ibid).

5.1.3. Cumulative abnormal returns by home country of the target

The cross-border effect presented by Moeller, Schlingemann, and Stulz (2005), shows that the bid announcement returns for firms acquiring cross-border targets are significantly lower than domestic targets. However, reports from Hamberg, Overland and Lantz (2013) on Swedish listed target firms conclude that the cross-border effect disappears after controlling for toeholds and board participation. They suggest that information asymmetries and adverse selection are partly an explanation for the cross-border effect (ibid). In Panel D, we measure the differences in means for cross-border and domestic deals by each group public and private deals and find, in contrast to Moeller, Schlingemann, and Stulz (2005), no evidence of a cross-border effect.

5.1.4. Cumulative abnormal returns by the size of the bidder

Loderer and Martin (1990), and Schwert (2000) published evidence of a negative relationship between the acquirer's size and the average cumulative abnormal return created, with significantly higher returns for smaller acquiring firms.

In Panel E, the mean average abnormal returns on listed and unlisted targets are statistically lower for 'big' acquirers than for others, hence, previous research seems to apply on the Swedish M&A market.

5.2. Multivariate Analysis

The output from the multivariate analysis shows that the variable of interest 'Public', stays significant in each of the three versions of the model. The estimated slope is negative in each of the regressions suggesting that public deals on average create less value than private deals for Swedish acquirers. All regression outputs fall in line with the results gotten from the univariate analysis and imply a rejection of $H_{0,1}$ giving evidence that the listing effect in Sweden exists and that it is persistent even after including control variables. As previous

researchers have shown on the U.S. market, as well as Faccio, McConnell, and Stolin (2006) showed on the European market, this study implies that the Swedish market is no exception to the listing effect phenomena.

With reference to the arguments on why we include the logarithm of the deal value and competing bid as additional variables and by the notable positive effect on adjusted R^2, the third model is the one giving the most reliable results. This result suggests that public deals for Swedish acquirers on average gain 1.84% less cumulative abnormal returns than private deals.

When included, deal size and size of the acquirer is significant in all of the regressions. In the final model, deal size has an estimated slope of 0.71. This implies that when deal size increases with one per cent, the average cumulative abnormal returns for the acquirer increases with 0.007 percentage units. This result gives further statistical evidence on the analysis presented in the univariate analysis; it appears that larger deals tend to give higher gains for the bidding company's shareholders in Sweden. The findings presented in the univariate analysis regarding the size of the acquirer stay persistent in the multivariate analysis; in all regressions, the size of the acquirer is negative and significant.

A final note on the regression models is that we have conducted a robustness test on each of the models used. After running the regressions, we, one by one excluded variables with the least significance and explanation power to the dependent variable and run a new regression without them. The test concludes that the significance of our variable of interest, Public, is not dependent on any of these variables.

We also tested the significance of Public by splitting the sample into different time periods. We split the sample into a period between 1998–2008 and a period between 2009–2018. The estimated coefficient for Public was negative and significant in both cases. Finally, we tested the significance of Public in different event windows. We tested [-2, +2], [-3, +3], [-4, +4], and [-5, +5] and got significant results for Public in all cases.

TABLE 4

Regressions of Acquirer's Average Cumulative Abnormal Returns

Variable of Interest	All Targets Faccio *et al.* (1)	All Targets + Deal Size (2)	All Targets + Competing Bid (3)
Public	-1.615***	-1.977***	-1.841***
Control Variables			
All-Cash	1.390*	1.471*	1.467*
Mixed Payment	1.146	0.734	0.782
Acquirer Size	-0.302**	-0.756***	-0.751***
Relative Size	4.304***	1.886	1.878
Within Industry	0.047	0.036	0.032
Cross-Border	0.628	0.442	0.437
Tobin's Q	0.208	0.266	0.254
Pre-Announcement Returns	-3.489	-3.494	-3.555
Deal Size		0.701***	0.707***
Competing Bid			-0.896
Yearly dummies	*(Yes)*	*(Yes)*	*(Yes)*
Industry dummies	*(Yes)*	*(Yes)*	*(Yes)*
Intercept	-0.299	0.012	-0.019
No. of Observations	957	957	957
R Square	0.103	0.126	0.127
Adjusted R Square	0.067	0.090	0.090
p -value of F -test	0.000	0.000	0.000

Public is a dummy variable which takes the value 1 if the listing status of the target was public. Deal Size is the logarithmic value of the inflation-adjusted (2018 SEK terms) deal value. All-Cash is a dummy which takes the value 1 if the transaction was paid only with cash. Mixed Payment is a dummy which takes the value 1 if the method of payment was a combination of cash, stock, and debt. Acquirer Size is the logarithmic value of the acquirer's inflation adjusted (2018 SEK terms) market cap 30 days prior to the announcement. Relative Size is the deal value divided by the market capitalization of the acquirer. Within Industry is a dummy which takes the value 1 if the target and the bidder have the same 4-digit Bloomberg Industry Classification System (BICS) code. Cross-Border is a dummy which takes the value 1 if the target's location is any other than Sweden. Tobin's Q is calculated as the acquirer's (market cap. + total liabilities + preferred equity + minority interest) / total assets on the calendar year-end prior to the announcement. Pre-Announcement Returns is the total cumulative abnormal return calculated over the window [-15, -2] in relation to the announcement day. Competing Bid is a dummy which takes the value 1 if there was an earlier bid on the target within a year from the winning bidder's announcement. The estimated slopes and intercept are all presented in percentages. R^2 and p-values are presented in decimal form. *** = significance at 0.01, ** = significance at 0.05, and * = significance at 0.10. All variables except the dummies are winsorized at the top and bottom 1%.

5.3. Critical Discussion

When estimating the parameters of the market model, due to time constraints, we do not consider any overlapping confronting events, such as earnings announcements, which could make the parameters biased. It is possible that one had gotten other results if taking this into consideration.

Since we have several events that overlap with each other, we have, with reference to MacKinlay (1997), problems with clustering. We were not able to conduct the proper test for handling this problem which may mean that we have a serial correlation between events. It is possible that the results of this study had been affected by this correction.

The null hypotheses 2 and 3, regarding whether the method of payment has an effect on the outcome of private and public deals, are, in contrast to the hypothesis regarding the listing effect, only tested on the univariate basis. We could not find any other articles[6]; analysing the method of payment on the multivariate basis, however, there is a chance that testing these hypotheses in a regression with control variables would give other answers than those presented in this study.

[6] Chang (1998), as was one of first researchers to propose the method of payment effect, did not test this on a multivariate basis, neither did Faccio, McConnell, and Stolin (2006). They both draw conclusions based on the *t*-test made in the univariate analysis (in our study seen in Table 3).

6. CONCLUSION AND COMMENTS

Our research brings new evidence on the listing effect in the Swedish stock market. We are able to show significant results that the short-term average cumulative abnormal return for the acquirer of public targets is 0.68% and 1.99% for private targets. Further, we are able to show that there is a significant difference between public and target deals. We show significant differences in average cumulative abnormal returns for private and public targets, independently from which of the subgroups; method of payment, deal size, the home country of the target, and the size of the acquirer; we study. We are also able to show that the difference in mean average cumulative abnormal returns persists after controlling for the key variables: method of payment, deal size, size of the acquirer, the relative size of the target and the acquirer, whether or not the target company is within the same industry as the bidding company, whether the deal was cross-border, Tobin's Q, pre-announcement returns, and competing bid. The conclusion from these findings is that the listing effect is not only a phenomenon which applies to the U.S. and European market, but also extends inside the Swedish borders. However, what specific economic factor causing this listing effect to arise is a topic for further study. Our study implies that when managers in Sweden make decisions on possible takeovers, they should take into consideration whether the target is public or private.

We are also able to show statistical evidence that the method of payment has an effect on the outcome of both private and public deals. Our research shows that when acquiring a public company, cash is preferred over stock as the method of payment and when acquiring a private company, stock is preferred over cash as the method of payment. We believe that the average fraction of all-stock deals for private targets is due to the illiquidity theory, that is, shareholders look to cash-out rather than having a block of shares in the newly merged company. However, the suggestion from this study is that managers should strive to have the stock payment option as the first choice when acquiring a private company. Further research should be done to find proxy variables which control for the asymmetrical information – and agency problem. Since this paper does not control for these variables, we believe that the explanation to the listing effect may be due to these problems.

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APPENDICES

Appendix I.

Correlation Matrix

	CAR	Public	Tobin's Q	Pre Announcement Returns	All-Cash	Mixed Payment	Deal Value	Acquirer Size	Relative Size	Cross-Border	Within Industry	Competing Bid
CAR	1.0000											
Public	-0.0737*	1.0000										
Tobin's Q	0.0458	-0.0355	1.0000									
Pre Announcement Returns	-0.0288	-0.0240	-0.0058	1.0000								
All-Cash	-0.0640*	-0.0616	-0.201*	-0.0565	1.0000							
Mixed Payment	0.0479	-0.0146	0.1222*	0.0316	-0.6360*	1.0000						
Deal Value	0.0834*	0.3346*	-0.0731*	0.0074	0.0529	0.0067	1.0000					
Acquirer Size	-0.1598*	0.2199*	-0.0271	-0.0971*	0.4518*	-0.239*	0.4998*	1.0000				
Relative Size	0.0552	0.0357	-0.0236	0.2767*	-0.1865*	0.0339	0.1393*	-0.2092*	1.0000			
Cross-Border	0.0019	-0.0378	-0.0188	-0.0221	0.3116*	-0.1356*	0.1535*	0.3056*	-0.1253*	1.0000		
Within Industry	-0.0037	0.1393	0.0015	-0.0050	-0.0141	-0.0256	0.1303*	0.1068*	0.0061	0.0827*	1.0000	
Competing Bid	-0.0506	0.2775	-0.0703*	-0.0334	-0.0183	0.0684*	0.1582*	0.1085*	0.0033	0.0041	0.0219	1.0000

This table shows the correlation matrix for all variables used in the final version of our multivariate model. * = significance at 0.05. According to Kennedy (2009), no correlation should be over 0.8 between any of the variables.

Appendix II.

VIF Outputs from all Regressions - Test for Multicollinearity

Regression 1.			***Regression 2.***			***Regression 3.***		
Variable	Value	1/VIF	Variable	Value	1/VIF	Variable	Value	1/VIF
F2007	2.97	0.34	Acquirer Size	3.10	0.32	Acquirer Size	3.10	0.32
F2006	2.89	0.35	F2007	2.99	0.33	F2007	2.99	0.33
All-Cash	2.78	0.36	F2006	2.91	0.34	F2006	2.91	0.34
F2000	2.70	0.37	All-Cash	2.78	0.36	All-Cash	2.78	0.36
Technology	2.61	0.38	F2000	2.70	0.37	F2000	2.70	0.37
F2005	2.55	0.39	Technology	2.63	0.38	Technology	2.63	0.38
F2011	2.45	0.41	F2005	2.56	0.39	F2005	2.56	0.39
Industrials	2.27	0.44	Deal Value	2.51	0.40	Deal Value	2.52	0.40
F2008	2.16	0.46	F2011	2.47	0.41	F2011	2.47	0.41
F2010	2.16	0.46	Industrials	2.27	0.44	Industrials	2.27	0.44
Consumer Discretionary	2.08	0.48	F2008	2.18	0.46	F2008	2.18	0.46
F2001	2.04	0.49	F2010	2.16	0.46	F2010	2.16	0.46
F2015	2.01	0.50	Consumer Discretionary	2.10	0.48	Consumer Discretionary	2.10	0.48
F2016	1.99	0.50	Relative Size	2.10	0.48	Relative Size	2.10	0.48
Acquirer Size	1.94	0.52	F2001	2.07	0.48	F2001	2.07	0.48
F2017	1.88	0.53	F2015	2.01	0.50	F2015	2.01	0.50
F2004	1.83	0.55	F2016	1.99	0.50	F2016	1.99	0.50
F2003	1.83	0.55	F2017	1.88	0.53	F2017	1.88	0.53
Mixed Payment	1.81	0.55	F2004	1.85	0.54	F2004	1.85	0.54
F2014	1.81	0.55	Mixed Payment	1.84	0.54	Mixed Payment	1.85	0.54
F2012	1.75	0.57	F2003	1.83	0.55	F2003	1.83	0.55
F2013	1.72	0.58	F2014	1.81	0.55	F2014	1.81	0.55
F2009	1.70	0.59	F2012	1.76	0.57	F2012	1.76	0.57
F1999	1.63	0.61	F2013	1.72	0.58	F2013	1.72	0.58
Health Care	1.62	0.62	F2009	1.71	0.59	F2009	1.71	0.59
Communications	1.54	0.65	F1999	1.63	0.61	F1999	1.63	0.61
Tobin's Q	1.49	0.67	Health Care	1.62	0.62	Health Care	1.62	0.62
Relative Size	1.42	0.70	Communications	1.55	0.65	Communications	1.55	0.65
F2002	1.36	0.73	Tobin's Q	1.50	0.67	Tobin's Q	1.51	0.66
Materials	1.36	0.74	F2002	1.36	0.73	Public	1.42	0.71
Public	1.31	0.76	Materials	1.36	0.74	F2002	1.37	0.73
Cross-Border	1.29	0.78	Public	1.33	0.75	Materials	1.36	0.74
F1998	1.23	0.81	Cross-Border	1.30	0.77	Cross-Border	1.30	0.77
Consumer Staples	1.17	0.86	F1998	1.23	0.81	F1998	1.23	0.81
Within Industry	1.14	0.88	Consumer Staples	1.17	0.86	Consumer Staples	1.17	0.86
Energy	1.07	0.93	Within Industry	1.14	0.88	Competing Bid	1.14	0.88
Pre Announcement Returns	1.06	0.95	Energy	1.07	0.93	Within Industry	1.14	0.88
			Pre Announcement Returns	1.06	0.95	Energy	1.08	0.93
						Pre Announcement Returns	1.06	0.95
Mean VIF	**1.85**		**Mean VIF**	**1.93**		**Mean VIF**	**1.91**	

The VIF-tests are done in STATA and measures how much the variance of an estimated variable's coefficient is increased because of collinearity. Kennedy (2009) states that a VIF-value > 10 indicates high collinearity. The low VIF-values reported from the regressions indicates that we do not have a problem with multicollinearity in any of the models used.