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Bidder Gains in Takeovers with Shared Auditor

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ABSTRACT

Are abnormal returns in bidder and target companies higher in a takeover when auditor is shared? We find that abnormal returns are higher in bidder companies but weaker in target companies with a shared auditor compared to companies without both on announcement day and days before. The rationale is that a shared auditor contributes to better informed valuation. We obtain a sample of 202 mergers and acquisitions completed in Norway between 2005 and 2017. We use an event study methodology to uncover abnormal returns around the announcement period.

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1. Introduction

The bidder often incurs a "winner's curse" in a takeover (a merger or an acquisition) process, that is, an overpayment for the target's shares. Theory and empirical evidence show that overpayment is the result of strong competition among bidders (Bulow and Klemperer, 1996), bidder managers' hubris (Roll, 1986), or their self-serving motives (Morck, Shleifer, and Vishny, 1990). The common thread in these explanations is that the bidder lacks accurate information on the target.

In this paper, we show that a shared auditor helps the bidder to alleviate overpayment for the target's shares. The shared auditor is in a position to observe the state of the target concerning market outlook, operational fitness with the bidder, and its financial performance. These insights could alleviate the bidder's lack of information. Thus, the bidder is the likely beneficiary in the takeover process if the auditor is willing to reveal information.

The auditor has split motivations to reveal information as it balances opportunism and reputation protection. The opportunistic motivation is that the takeover attempt brings new consulting business to the auditor and a continued auditing relationship after a successful takeover.

On the other hand, the auditor needs to protect its reputation as an independent auditor and to avoid litigation costs. This motivation is stronger the larger the auditor is, since the larger auditor has a larger fixed investment in human capital to protect (DeAngelo, 1981). Thus, from the outset the question if the auditor will act opportunistically or protect reputation does not lead to a given conclusion. The matter is empirical.

Dhaliwal, Lamoreaux, Litov, and Neyland (2016) and Cai, Kim, Park, and White (2016) use US data to show that auditors do act opportunistically. Specifically, the takeover premium is lower in takeovers with a shared auditor. Their findings also align with the notion that relationships matter in takeovers, such as when the bidder and target have the same financial advisor (Agrawal, Cooper, Lian, and Wang 2013) or overlapping boards of directors (Cai and Sevilir 2012).

Our contributions can be summed up as follows. First, if auditors behave opportunistically, information revelation, or leakage, is likely to occur well in advance of the announcement date of the takeover. In contrast to Dhaliwal et al. (2016) and Cai et al. (2016), who study abnormal returns around the nearest dates to the announcement date, we extend the investigation to include in the data twenty days prior to the announcement date. We do find strong evidence of

information revelation prior to announcement. Our main results are that the bidder firm shareholders gain from having a shared auditor and that a shared auditor has a weaker relation to abnormal returns in target firms. Being a bidder involving a shared auditor gives positive abnormal returns at both the announcement date and up to 15 days prior to announcement. These results are strongly significant. The results gain further support in regressions relating abnormal returns on the announcement day to abnormal returns prior to announcement.

Second, we investigate if larger auditing firms protect their reputation (DeAngelo, 1981) by including a "Big *N*" variable (Hay, Knechel, & Wong, 2006; Boone, Khurana, & Raman, 2010). We use a *Big 4* variable and find that abnormal returns are lower in targets when *Big 4* auditors are engaged, as do Cai et al. (2016). But Lawrence, Minutti-Meza, and Zhang (2011) find that when client characteristics, specifically client size, are considered the Big *N* effects disappear. However, we find that company size is positively related to abnormal returns in target companies, while this is absent in bidders.

Third, we test theories on data from outside the USA, that is, from hand collected data on takeovers in the "small, open economy" of Norway in the 2005-2017 period. Conducting an event study of a takeover under these conditions can inform investors of the generality of results reached earlier and bring new perspectives. Institutional characteristics make the Norwegian setting advantageous for takeover studies. Oslo Stock Exchange is a lively marketplace with a foreign ownership share of 35-40% in the 2005-2017 period (*The Norwegian Registry of Securities*, 2019). Takeovers are regulated in the Competition Act. The act stipulates few barriers to takeovers and does not discriminate against foreign companies. Takeovers that may harm competition in product markets can be denied, and larger firms with more than NOK 1 billion (about USD 110 million) in sales need to notify the competition authorities (paragraphs 16 to 21).

Furthermore, Norway has high investor protection and transparent accounting regulations. Strong investor protection is important for trust in a country's corporate governance (LaPorta, Lopez-de-Silanes, Shleifer, and Vishny, 2000). Norway ranks as 9th out of 190 countries on the World Bank Doing Business index 2020. Accounting regulations are uniform and detailed. All shareholder owned companies need to submit audited financial statements to an open, public register, "Brønnøysundregisteret". Strong investor protection and transparent accounting rules can influence a bidder company's valuation of the target (Francis and Wang, 2008).

We also test for contending theories to the shared auditor based on information arguments. These are auditor tenure (Myers, Myers, and Omer, 2003), shared city (Uysal, Kedia, and Panchapagesan, 2008), and shared industry (Morck et al., 1990). We find scant evidence of their importance, probably because they are one step removed from the parties in the transaction. Auction theory implies that a bidding competition enhances abnormal returns, especially for target firms (Bulow and Klemperer, 1996). Accordingly, we investigate if an acquisition has higher abnormal returns than a merger. Other control variables are the takeover premium, a bidder/target variable, and the risk-free rate.

2. Data and descriptive statistics

We start by describing our data. The dependent variable in analyses is the *Abnormal Return (AR)*, or more specifically, the *Cumulative Abnormal Return (CAR)*. Hence, the way to arrive at *CAR* comes first in our exposition.

2.1 To be explained: The Abnormal Return

We employ the event study methodology from MacKinlay (1997). The announcement date is the *event date*, date 0. We calculate abnormal returns for twenty days before the event date, and twenty days after the event. We define the *event window* as the period $(\tau_1 = -20, \tau_2 = 20)$. We study how *CAR* (Cumulative Abnormal Return) varies over the event window for companies with and without a shared auditor, controlling for variables drawn from literature.

We use the *market model* to determine the abnormal return, assuming that the market model covers relevant information at time *t*. Thus, we can write the abnormal return as

$$AR_{it} = R_{it} - E(R_{it}) = R_{it} - R_f - \beta_i\big(E(R_M) - R_f\big) \quad (1)$$

where $E(R_M)$ is the expected return on the market portfolio, R_f is the risk-free rate, and β_i is the beta for company *i*. The return is logarithmic, that is, a given return is $R_{it} = ln(P_{it}/P_{it-1})$ where P_{it} is the stock price of stock *i* at time *t*.

We employ a modified Eckbo and Langohr (1989) methodology to estimate the normal return for each company. This means the inclusion of binary variables for transactions *F*, while Eckbo and Langohr have binary variables for days in the event window. The effect of these variables is to adjust the general result for the whole sample in the first terms the following estimating relation:

$$R_t = \alpha_1 + \alpha_2 d_t + \beta_1 R_{mt} + \beta_2 R_{mt} d_t + \sum_n^N \delta_n F_n + \varepsilon_t \quad (2)$$

where d_t is a binary variable being 1 if it is in the event window, d_n is a binary variable being 1 if it is day *n* in the event window, and F_n is a binary variable being 1 if it is transaction *n*. Running this regression, leaving out the first transaction to avoid the "dummy trap", for the whole period and then calculating the expected return gives us the opportunity to form the abnormal returns *AR* in the event window for each firm in the sample. By cumulating we arrive directly at the *CAR* in the analyses:

$$CAR_i\ (\tau_1, \tau_2) = \sum_{\tau_1}^{\tau_2} AR_{it} = \sum_{\tau_1}^{\tau_2} \big(R_{it} - E(R_{it}|X_{it})\big) \quad (3)$$

Summing over all companies in the sample and averaging, gives the *cumulative average abnormal return (CAAR)*:

$$CAAR(\tau_1, \tau_2) = \sum_{i=1}^{n} CAR_i \quad (4)$$

We first run the regression in equation (2) as a prelude to the estimation of the abnormal return. For each takeover we include returns from date -140, thus, we utilise 120 days to fix parameters in the market model. We drop the first transaction binary variable. The estimated parameters are

$$\alpha_1 = 0.000;\ \alpha_2 = 0.001;\ \beta_1 = 0.562^{***};\ \beta_2 = -0.020.\ R^2 = 0.015; N = 32{,}316.$$

We do not report all company specific parameters. Unreported regressions in sub-samples of *Shared auditor* and of *Bidder* do not give qualitatively different results.

2.2 Data collection and representativeness

We collect data on all completed takeovers in Norway in the 2005-2017 period from the Thompson Reuters database. To be included in the sample, three requirements must be met. First, at least one of the firms in the takeover needs to be listed on the Oslo Stock Exchange in the period. Second, we require records of at least 140 trading days before the event date. Third, the bidder obtains at least 50% of the total stock. These requirements give a sample of 202 firms involved in either an acquisition or a merger. We classify 152 firms as bidders and 50 as targets. A shared auditor appears in 50 of the total 202 transactions. The unequal sizes of bidders and targets is not uncommon in takeover studies. For instance, in Martynova and Renneboog (2011) 72.0% of takeovers are of bidder firms.

We form the *CAR* and the *CAAR* from stock price data from Oslo Stock Exchange. The database is Titlon Financial data for Academic Institutions. Here, prices are adjusted for dividends, stock splits and other corporate actions affecting the stock price.

Dhaliwal et al. show that the *Bidder* has the most to gain from the *Shared auditor*. To capture this effect, we interact the *Shared auditor* and the *Bidder* variables to form the new variable *Shared*Bidder*.

We hand collect information on each company's auditor at the time of takeover from its Annual Report. From the Report we gather information on whether the auditor is shared or not, and if the auditor belongs to the *Big 4* auditors. The information on the auditor's tenure is hand collected from data on auditor changes from the Company Register at Brønnøysund Register Centre. Here we also extract information on the company's headquarter location by hand. Changes in company name and of auditor exacerbate this time-consuming process.

Titlon also gives us access to the market value of companies. The *risk-free rate* (R_f) is taken to be the rate of Norwegian state 10-year bonds. We obtain the rate from home pages at the central Bank of Norway.

The *Premium* is defined as the transaction price divided by the market value minus 1. The information on the transaction value stems from Thompson Reuters. The market value comes from the database Titlon. We take the market value 20 days before the announcement date.

From Titlon we also derive market values of target and bidder. We define the *market value* of the target's equity as the market value 20 days before the announcement date. Data on *Acquisition* is from the Thompson Reuter database.

Table 1: Definitions of variables

Variable	Definition
CAR	*Cumulative abnormal return* (Equation 3)
CAAR	*Cumulative average abnormal return* (Equation 4)
Shared auditor	A binary variable being 1 if target and bidder have the same auditor, zero otherwise
*Shared*Bidder*	A binary variable being 1 if target and bidder have the same auditor and the company is a bidder, zero otherwise
Big 4	A binary variable being 1 if the auditors in both companies are either PWC, EY, Deloitte, or KPMG, and zero otherwise
Auditor tenure	The number of years the auditor has been with the company
Shared city	A binary variable being 1 if target and bidder have the same headquarter domicile, zero otherwise
Shared industry	A binary variable being 1 if target and bidder belong to the same industry, zero otherwise
Market value	The company's market value at the announcement date
Premium	The price paid for target shares relative to market price on announcement day
Bidder	A binary variable being 1 if the company is a bidder, zero if target
Acquisition	A binary variable being 1 if the transaction is an acquisition, zero if merger
Risk-free rate (R_f)	The rate of interest on 10-year government bonds

Further description of data follows in section 3.

How representative are the data? Netter, Stegemoller, and Wintoki, (2011) note that researchers often limit the sample to companies that are listed and large, and then limit the studies to a short sample period. For instance, the consideration of a limited period can lead researchers to concentrate on transactions that are in or out of a socalled merger wave. We aim to establish a sample as representative as possible. Consequently, we do not exclude firms because they have unwanted characteristics, but include both listed and private firms, both small and large companies, and small and large transactions. Transaction size runs from USD 1 to 29,960 million. Furthermore, our data runs from 2005 to 2017 and thus contains periods of both high and low transaction volumes. The period also covers years with strong growth, the financial crisis of 2008, and the crisis in the Norwegian economy following the large drop in petroleum prices after 2014.

Does bias arise because firm and transaction characteristics differ systematically between firms with shared and different auditors? Table 2 gives an overview of stylised facts of the sample.

Table 2: Firm and transaction characteristics of firms in the sample

Variable	Average	Stdev	Min	Median	Max	N	t-test
Different auditor							
Auditor tenure	4.474	2.480	0.750	3.875	14.500	152	
Big 4	0.487	0.501	0.000	0.000	1.000	152	
Shared city	0.382	0.487	0.000	0.000	1.000	152	
Shared industry	0.467	0.501	0.000	0.000	1.000	152	
ln*(Market value)*	21.085	1.858	16.217	21.133	26.621	152	
Premium	0.846	4.014	0.000	0.125	43.110	150	
Bidder	0.763	0.427	0.000	1.000	1.000	152	
Acquisition	0.480	0.501	0.000	0.000	1.000	152	
Risk free rate	0.064	0.214	0.010	0.037	1.595	152	
Shared auditor							
Auditor tenure	4.595	2.911	1.000	4.000	12.000	50	0.265
Big 4	0.940	0.240	0.000	1.000	1.000	50	8.555***
Shared city	0.440	0.501	0.000	0.000	1.000	50	0.720
Shared industry	0.360	0.485	0.000	0.000	1.000	50	-1.344
ln*(Market value)*	21.417	2.275	16.385	21.433	26.327	50	0.936
Premium	0.726	2.058	0.000	0.163	14.186	50	-0.275
Bidder	0.720	0.454	0.000	1.000	1.000	50	-0.592
Acquisition	0.460	0.503	0.000	0.000	1.000	50	-0.247
Risk free rate	0.031	0.011	0.010	0.034	0.051	50	-1.858*
Total							
Shared	0.248	0.433	0.000	0.000	1.000	202	
Auditor tenure	4.504	2.586	0.750	4.000	14.500	202	
Big 4	0.599	0.491	0.000	1.000	1.000	202	
Shared city	0.396	0.490	0.000	0.000	1.000	202	
Shared industry	0.441	0.498	0.000	0.000	1.000	202	
ln*(Market value)*	21.167	1.969	16.217	21.219	26.621	202	
Premium	0.816	3.621	0.000	0.134	43.110	200	
Bidder	0.752	0.433	0.000	1.000	1.000	202	
Acquisition	0.475	0.501	0.000	0.000	1.000	202	
Risk free rate	0.056	0.186	0.010	0.037	1.595	202	

The definitions of variables are in Table 1. The t-test is a test if the average of each variable differs in the *Shared* and *Different* auditor subsamples. Significance levels are indicated by * (10%), ** (5%), and *** (1%).

The table also shows that company characteristics are not statistically significant in most cases, except for the *Big 4* and the *Risk-free rate*. *Big 4* is far more common in the *Shared* subsample than in the *Different*. We assume that our regressions do not suffer from sample selection bias.

Netter et al. (2011) note that takeover studies are often limited to periods of either high or low takeover activity, i.e., their lack time representativeness. Betton et al. (2008) define a merger wave as a clustering in time of successful takeover bids at the industry- and economy-wide

level. Merger waves are not uncommon. We also need to record the frequency of a shared auditor in takeovers. Figure 1 exhibits takeovers in our 2005-2017 sample distributed between those with shared auditor and those with different auditor.

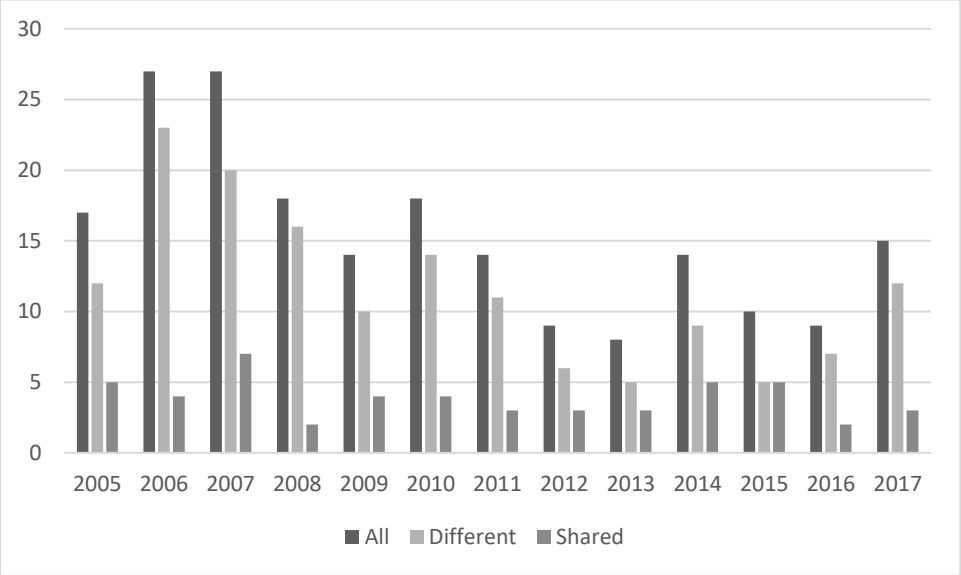

Figure 1: Takeover and mergers in Norway 2005-2017 distributed by Bidder and Target companies.

The figure shows that the total number of takeovers starts at a high level, then falls off at the financial crisis of 2008, and then regains a higher level. The average number of transactions is 15.4 (standard deviation of 6.2) with a maximum of 27 transactions in 2006 and 2007, and a minimum of 8 in 2013. The number of transactions with shared and different auditor follows the overall pattern. We do not find an unequal time pattern for shared and different auditor. A simple Pearson Chi(sqrd) test shows non-significant time distributions of these variables. It seems that the troughs and crests in merger waves are not sufficient to invalidate our study. In regressions we include year indicators to control for year effects.

In addition to the Netter et al. (2011) list, Bonaime, Gulen, and Ion (2018) argue that political uncertainty may create bias in the sample. Political uncertainty might be due to changes in laws or in the political interference with the practice of law. However, this does apply to Norway. In 2017, the World Bank ranked Norway as 16th most stable country politically out of 195 ranked nations. In contrast, USA was ranked as number 75, the UK as number 80. In the takeover area the laws were unchanged during the sample period, despite changes in government. We conclude that the sample is satisfactorially unbiased.

3. Literature review and hypotheses

We investigate how a shared auditor is associated with abnormal returns in takeover transactions, and if the information leakage is larger when the auditor is the same in both bidder and target. Then we move to the investigation of how much the shared auditor contributes to abnormal returns controlling for other variables.

Two parties are involved in an acquisition and a merger, the *bidder* and the *target* (Betton, Eckbo, and Thorburn, 2008). The bidder variable is a binary being one if the firm buys at least 50% of the shares in the target company, and the target company has a zero.

3.1 Opportunism or independence?

Our main variables of interest are the *Shared auditor* and *Big4*. We see this as a contention between opportunism and independence. If the auditor is opportunistic, it will act as an information intermediary in reducing uncertainty and asymmetric information between the parties. This is the assumption in both Dhaliwal et al. (2016) and Cai et al. (2016). Their contribution is to show that the abnormal returns are reduced when the auditor is shared, that is, that the auditor acts opportunistically. But the auditor may act to protect its reputation as an independent institution (DeAngelo, 1981). Then abnormal returns should not be higher in companies using a *Big4* auditor.

In the information intermediary argument Cai et al. (2016) compare shared auditor to different auditors. They argue that the shared auditor is in a better position to identify merger counterparties, that the financial statements are more comparable, and that target and bidder will engage in less financial misreporting prior to the announcement. Dhaliwal et al. (2016) hold that this informational advantage leads to less bidder competition and hence, a lower takeover premium and a higher abnormal bidder return. Shareholders in the target companies receive a lower premium than in takeovers without a shared auditor. The authors put this down to the tendency of auditors to favour the bidder in the hope of winning continued and larger audit orders later. The Dhaliwal et al. (2016) and Cai et al. (2016) arguments lead to our hypotheses about bidder and target:

H1 Bidder abnormal returns in takeovers are higher, but target abnormal returns are lower, when the bidder and target have a shared auditor compared to the case with separate auditors.

The literature on shared auditors is small at this time of writing. However, the number of studies of information intermediaries in general is rising. For instance, transaction parties' use of an advisor, either shared or separate, appear in many studies (Agrawal et al., 2013). Evidence

points towards better abnormal performance for bidder firms using a top-tier investment bank advisor in public acquisitions (Golubov, Petmezas, and Travlos, 2012). Other studies employing overlapping directorships (Cai and Sevilir, 2012) or a former director (Rousseau and Stroup, 2015), social networks (Stuart and Yim, 2010) confirm the importance of social ties. The effects of links between bidder and target also extend to social ties between CEOs and directors, such as shared educational and employment background (Ishii and Xuan, 2014), and to institutional cross-ownership (Brooks, Chen, and Zeng, 2018). In summary, the results from studies where bidder and target are related in some way, are in line with the opportunism hypothesis of this paper.

Robust findings in the takeover literature are that the target shareholders experience a high and positive abnormal return and the bidder shareholders receive an abnormal return around zero or negative (e.g. Jensen and Ruback, 1983; Loderer and Martin, 1990; Akbulut and Matsusaka, 2010; Moeller, Schlingemann, and Stulz, 2004; Andrade, Mitchell, and Stafford, 2001; Goergen and Renneboog 2004; Martynova and Renneboog, 2011; Alexandridis, Fuller, Terhaar, and Travlos 2013; Mulherin, Netter, and Poulsen, 2017). The findings hold for both American and European companies. However, new evidence in Alexandridis, Antypas, and Travlos (2017) reveals that after 2009 the deal improvement for bidders is substantial. The question is whether the greater information availability to parties when the auditor is shared induces higher abnormal returns for the bidder and lower for the target relative to the case when the auditor is separate.

The independence argument (DeAngelo, 1981) is that the short-term opportunistic gain can be offset by long-term loss of confidence in the auditor, and hence the loss of customers. The auditor seeks to protect the reputation as an independent monitor through considerable investments in personnel and human capital assets. The investment is higher, the larger the auditor. Therefore, the larger the auditor is, the less opportunistically he or she will act. We capture this auditor size effect with an indicator variable *Big 4* representing Deloitte, EY, KPMG, and PWC in keeping with former literature (Hay et al., 2006; Boone, Khurana, & Raman, 2010). Research shows that the Big *N* auditors perform audits with higher quality than smaller (DeFond, Erkens, & Zhang, 2017), and generate an audit fee premium well above smaller competitors (Moizer, 1997; Hay, 2013). In our sample local auditors constitute the contrast to the *Big 4* auditors. This adds another international versus national layer of independence. This leads to our second hypothesis:

H2 Abnormal returns for bidders are lower when the bidder and target in takeovers have a Big4 auditor to the case with local auditors.

Lawrence et al. (2011) supply arguments for no difference between Big *N* auditors and others. They hold that both types must adhere to the same regulatory framework, local auditors are likely to have better knowledge of the local market, and there is knowledge transfer as personnel switch from Big *N* to local and vice versa. These arguments could well apply to Norway, where most auditors by tradition attend the same university to obtain their certified public auditor qualifications. Personal relations are accordingly close. However, Francis and Wang (2008) find the Big *N* effect in countries with high investor protection, such as Norway. Overall, the Big *N* effect in Norway is an open question.

Dhaliwal et al. (2016) and Cai et al. (2016) use the event window (-1,1). We extend the window to (-20,20) since abnormal returns before the official announcement date can arise as information escapes of a possible shared auditor takeover, which the market participants will then incorporate in their valuations. Such abnormal returns, "runup", also appear in event studies in different time periods and under different market conditions (Jarrell and Poulsen, 1989). Ideally, the information should be private until the announcement date to prevent information leakage. We should expect a stronger runup in transactions with a shared auditor compared to transactions with different auditors. Such information leakage is evident in the early study of Keown and Pinkerton (1981).

H3 Bidder abnormal returns in the runup in takeovers are higher, but Target abnormal returns are lower, when the bidder and target have a shared auditor compared to the case with separate auditors.

We compare runups for all companies differentiated by their having a shared auditor or not and then extend the analysis to bidder and target firms.

3.2 First results from univariate analyses

We now examine some univariate evidence for the effect of a shared auditor and the effect of having a Big4 auditor. Then we turn to the question if abnormal returns are visible in the period before the announcement date.

First, we examine the question if there is a difference in *CAR* between companies that use a shared auditor versus companies that use different auditors. At the same time, we examine how *CAR* varies with Big4. We do this for the full sample and for Bidder and *Target* subgroups. From hypothesis 1 we expect bidder gains to be larger than target gains, and that the gains for

Big4 companies are smaller than for companies using a local auditor. The results are set out in Table 3.

Table 3: Summary statistics for abnormal returns (*CAAR*) distributed by *Shared auditor* with a *t*-test of their difference.

Full sample

	CAR by Shared					*CAR by Big4*			
Auditor	Mean	Ste.	Std.	Obs	Auditor	Mean	Ste.	Std.	Obs
Different	-0.004	0.003	0.198	6,232	Local	0.009	0.003	0.178	3,321
Shared	0.017	0.003	0.150	2,050	Big4	-0.003	0.003	0.194	4,961
diff	-0.021	0.004	t stat	-5.012***	Diff	0.012	0.004	t stat	2.961***

Bidder subgroup

	CAR by Shared					*CAR by Big4*			
Auditor	Mean	Ste.	Std.	Obs	Auditor	Mean	Ste.	Std.	Obs
Different	-0.026	0.003	0.181	4,756	Local	-0.027	0.003	0.143	2,583
Shared	0.005	0.003	0.122	1,476	Big4	-0.014	0.003	0.186	3,649
diff	-0.031	0.004	t stat	-7.522***	Diff	-0.013	0.004	t stat	-3.128***

Target subgroup

	CAR by Shared					*CAR by Big4*			
Auditor	Mean	Ste.	Std.	Obs	Auditor	Mean	Ste.	Std.	Obs
Different	0.070	0.006	0.231	1,476	Local	0.133	0.008	0.226	738
Shared	0.050	0.008	0.202	574	Big4	0.025	0.006	0.212	1,312
Diff	0.020	0.010	t	1.931*	diff	0.108	0.010	t stat	10.602***

Variables are defined in Table 1. "Ste" is standard error, and "Std" is standard deviation. Significance levels from simple t-test of differences are indicated by * (10%), ** (5%), and *** (1%)

The table shows that hypotheses H1 and H2 are confirmed. We look at the *Shared* auditor first. H1 is confirmed in all samples. In the full sample the effect of a shared auditor dominates. In the Bidder subgroup the effect is even stronger. Coefficient differences of *CAR* are higher in absolute value, and the difference has higher statistical significance. For the target subgroup the opposite happens, as the *CAR* is higher for those companies that use different auditors. This is in fact as expected.

Turning to the Big 4 a similar picture emerges, but now reversed. Big4 auditors induce a higher *CAR* in the bidder subgroup, but a much lower in the target subgroup. For bidder companies the auditor should be a member of Big4, but for target companies the auditor should be local.

We can also investigate Hypothesis H3, saying that gains appear well in advance of the announcement date. In figure 2 we present the *CAR* for shared and different auditor companies in target and bidder subgroups for the entire event window.

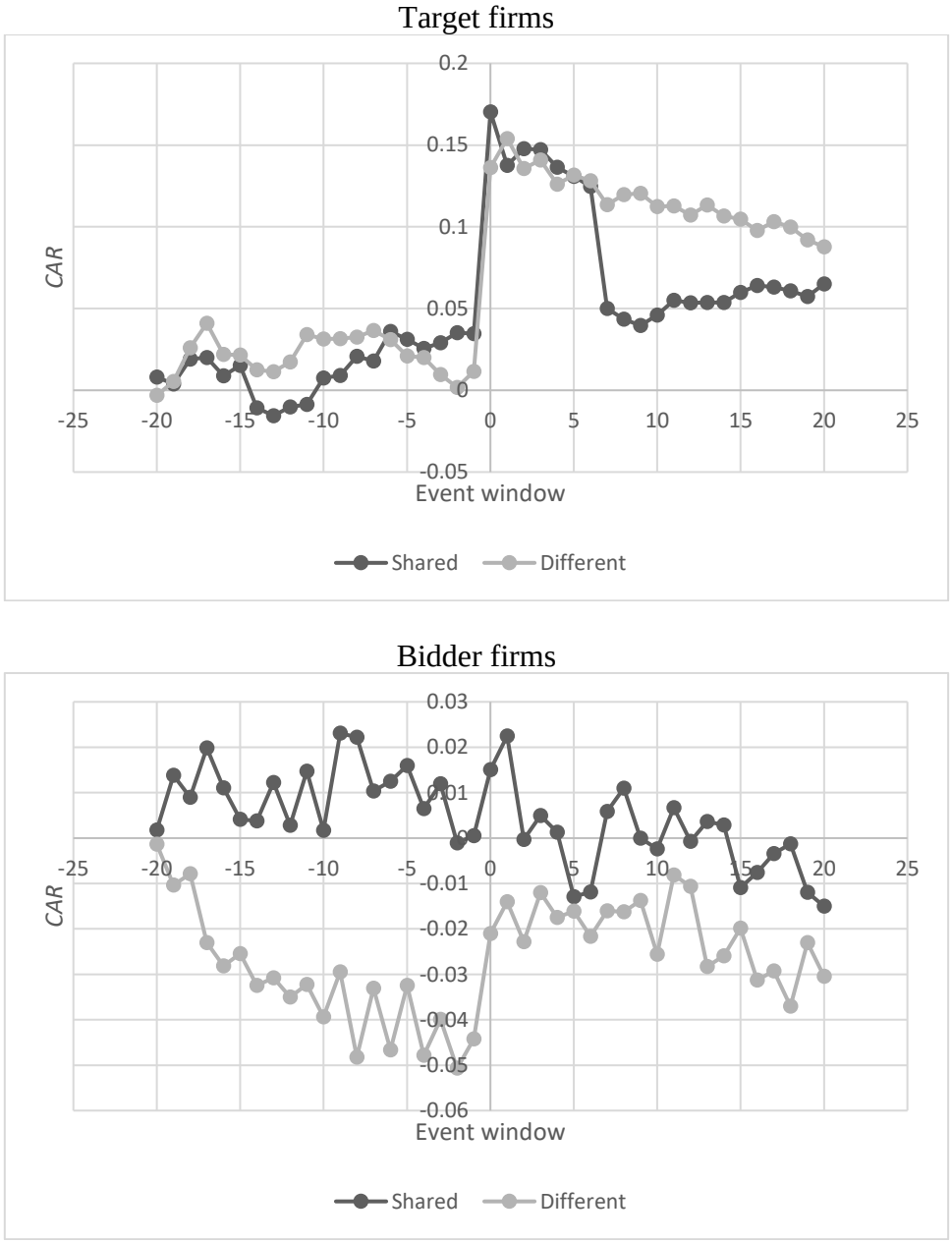

Figure 2: *CAR* in event window for *Shared* and *Different auditor* for Target and Bidder companies.

The two figures are strikingly different. In the target subgroup shared and different auditor companies' *CARs* are almost indistinguishable from the beginning of the event window until date 6, while in the bidder subsample the *CAR* in the shared auditor companies is clearly well above the *CAR* in different auditor companies. This confirms the findings in table 3 and in Dhaliwal et al. (2016) that the bidder gains from a shared auditor. When the auditors are different, the runup in bidder companies is the same as in former event studies. Figure 2 also clearly demonstrates that the bidder gains in *CAR* happen before the announcement date,

although the runup is rather weak compared to, e.g., Jarrell and Poulsen (1989). The *CAR* is about 2% the day before the event, compared to 11% in the Jarrell and Poulsen study. The positive runup in *Shared auditor* firms before the event day is evidence of information leakage. This is compelling evidence that a shared auditor is important for abnormal returns.

4 Can other variables explain abnormal returns?

Table 3 and in Figure 2 explore the effects of the shared auditor and of Big4 in isolation. But other explanations may better explain the abnormal returns. In this section we introduce other variables that have been used in the literature, and then we examine their properties as explanatory variables in later multivariate regressions.

4.2 Suggestions from former literature

First, the auditor's tenure may play a role. Myers et al. (2003) suggest that a long-serving auditor is likely to give superior service. We include the audit tenure and expect that a long-serving auditor is better able to give valuable advice in a takeover or merger. We expect that *CAR* is higher, the longer the tenure is.

Second, it can be argued that if bidder and target share location in the same city, they are better informed about each other than if locations are in different (Uysal et al., 2008). Location in the same city should give higher abnormal returns for the bidder. Third, and as for same-city location, the industry classification of bidder and target can be related to abnormal returns. Morck et al. (1990) show that abnormal returns are higher when target and bidder belong to the same industry. We use the Fama and French (1997) industry classification.

We call auditor tenure, shared city, and shared industry "contending information variables". They are contending theories of how better-informed parties can avoid the winner's curse. Since the variables are one step removed from the transaction compared to the shared auditor, we expect weaker evidence of their importance.

The size of the company can be important for the size of abnormal returns. Reynolds and Francis (2000) find that larger firms receive better auditor services than smaller. The auditor is more concerned with greater litigation risk from larger companies. Moeller et al. (2004) document that larger bidder firms experience negative abnormal returns, while smaller bidders gain. In line with this evidence, we expect that the company size, defined as equity market value here, is negatively associated with abnormal returns.

The takeover premium can relate to abnormal returns (Louis and Sun, 2010). The takeover premium is the difference between the transaction price and the price per share in the market just before the takeover announcement. A higher premium should be associated with higher abnormal returns for both bidder and target.

The form of transaction can matter for abnormal returns. We differentiate between acquisitions and mergers. Since a bid for acquisition often elicits counterbids from other companies, general market theory predicts that abnormal returns are higher for acquisitions than for mergers (Bulow, Huang, and Klemperer, 1999). Their model predicts that the takeover price increases if a rival also has a toehold. Betton and Eckbo (2000) confirm this prediction.

We include the important risk-free rate of return since the interest level impacts takeovers. The takeovers in our sample are from different years, spanning the financial crisis and after.

We do not consider the method of payment although Travlos (1987) demonstrates the value of this variable. We restrict the analysis to the variables mentioned above in the interest of parsimony.

4.2 The relevance of suggested explanations

Are the variables we choose for analysis relevant? In table 4 we relate the *CAR* to the variables laid out above. When we study the *CAR* in the entire event window, we obtain a total of 8,282 observations (202 companies x 41 days).

Table 4: *CAR* and firm characteristics. *CAR* average levels and standard errors in firm and transaction characteristic variables

	Indicator value			
	0	1	Total	t-value
*Shared*Bidder*	*Different*	*Shared*		
Average	0.001	0.005	0.002	-0.701
Std.error	0.002	0.003	0.002	
Tenure	*< 5 years*	*> 5 years*		
Average	0.008	-0.011	0.002	4.229***
Std.error	0.003	0.003	0.002	
Shared city	*Different*	*Shared*		
Average	-0.007	0.015	0.002	-5.387***
Std.error	0.003	0.003	0.002	
Shared industry	*Different*	*Shared*		
Average	0.015	-0.016	0.002	7.567***
Std.error	0.003	0.003	0.002	
Market value	*Lower*	*Higher*		
Average	-0.001	0.004	0.002	-1.342
Std.error	0.003	0.002	0.002	
Premium	*Lower*	*Higher*		
Average	-0.008	0.011	0.002	-4.797***
Std.error	0.003	0.003	0.002	
Acquisition	*Merger*	*Acquisition*		
Average	-0.001	0.004	0.002	-1.120
Std.error	0.003	0.003	0.002	
Bidder	*Target*	*Bidder*		
Average	0.064	-0.019	0.002	17.706***
Std.error	0.005	0.002	0.002	
Risk-free	*Lower*	*Higher*		
Average	-0.001	0.004	0.002	-1.242
Std.error	0.003	0.002	0.002	

The definition of *CAR* and other variables are in Table 1. *Lower/Higher* indicates a partition of the continuous variable at the variable's median value. 8,282 observations. Student's *t*-test gives significance level. Significance levels are indicated by * (10%), ** (5%), and *** (1%).

Table 4 reveals that most of the variables are significantly related to *CAR*. In many cases, the sign in the subgroups differs. In particular, the sign is negative for the different auditor and positive for the shared auditor variable in *Tenure* and the *Same city*, two contending information variables. In summary, the variables are relevant candidates for inclusion in regression analyses.

5. Econometric evidence

In this section we report the results from multivariate regressions of various specifications. We estimate at the announcement date, but also for days in the event window prior to the announcement. First, we report results from the full sample. The central part of our investigation is to uncover if bidder and target experience different abnormal returns at and prior to announcement using the interaction variable *Shared*Bidder*. Due to the multicollinearity problem between *Shared* and *Shared*Bidder*, we drop *Shared* in these regressions from (6). Correlations between other right-hand side variables are well below the 70% level that Kennedy (2008) judges critical. Second, dropping the *Shared* variable in the overall regressions motivates a split in the sample between bidder and target companies, where we drop *Shared*Bidder* and *Bidder* from regressions, but introduce the *Shared* variable. If our hypotheses hold, the results from the two analyses should overlap. Finally, we use lagged *CAR* of various lengths in regressions with the announcement date *CAR* as dependent to further explore if valuable information escapes prior to the announcement.

5.1 The multivariate method

An advantage of the event methodology is that it allows the researcher to find firm characteristics to explain differences in abnormal returns without worrying about endogeneity issues. Firm characteristics are measured as annual observations in our study, and these are antecedent to the abnormal returns. Furthermore, by contrasting results in bidder and target, we are close to an experimental situation, as companies with a shared auditor are "treated" and those without are "untreated".

We perform multivariate regressions of the relation between *CAR*, *Shared auditor*, *Big4* and other variables. We use all *CAR* records for the entire event window period (-20,20) and then for sub-periods. Thus, in this way we execute regressions in an ever-increasing period before the announcement date and discover if information leakage happens before the announcement date. Lastly, we perform regressions on the short window (-1,1) that is commonly used in event studies. Then we run the same regressions on bidder and target sub-samples. We perform regressions with heteroskedasticity-robust standard errors (Wooldridge, 2010, chapter 4).

5.2 Results from the full sample

The results of regressions for the first step with the full sample are in table 5 below.

Table 5: Regressions with *CAR* as dependent variable. Adjustments for heteroskedasticity. Full sample

	Event window					
Variable	(-20,20)	(-20,0)	(-20,-5)	(-20,-10)	(-20,-15)	(-1,1)
*Shared*Bidder*	0.041***	0.054***	0.054***	0.048***	0.036***	0.046**
Auditor tenure	0.002***	0.002***	0.002*	0.001	0.000	0.003
Big 4	-0.028***	-0.036***	-0.037***	-0.033***	-0.024**	-0.026
Shared city	0.002	0.006	0.001	-0.004	-0.005	0.012
Shared industry	-0.013***	0.008*	0.006	0.000	-0.004	-0.008
ln*(Market value)*	-0.006***	0.001	0.001	0.001	0.000	-0.006
Premium	-0.009***	-0.006***	-0.006***	-0.008***	-0.008***	-0.012***
Bidder	-0.112***	-0.085***	-0.076***	-0.071***	-0.063***	-0.158***
Acquisition	0.014***	0.024***	0.024***	0.023***	0.016**	0.014
Risk-free rate	0.064***	0.067***	0.063***	0.061***	0.052***	0.064**
Constant	0.002	-0.170***	-0.170***	-0.162***	-0.097	0.060
Rsqrd	0.146	0.140	0.139	0.155	0.159	0.211
F probability value	0.000	0.000	0.000	0.000	0.000	0.000
Observations	8,282	4,242	3,232	2,222	1,212	606

The definitions of variables are in Table 1. We estimate the following relation.

$$CAR = \beta_1 Shared + \beta_2 ShareBid + \beta_3 Tenure + \beta_4 Big4 + \beta_5 ShCity + \beta_6 ShInd + \beta_7 ln(MV) + \beta_8 Premium + \beta_9 Bidder + \beta_{10} Acqui + \beta_{11} R_f + Constant \quad (4)$$

We drop time subscripts in the expression (6) in the interest of economy.

Each regression contains year indicator variables with 2005 excluded. Significance levels are indicated by * (10%), ** (5%), and *** (1%).

The table demonstrates the importance of a *Shared auditor* for the *Bidder*. The *Shared* Bidder* variable is positive and strongly significant in all regressions controlling for other variables in the model. Thus, the *Bidder* gains from having a *Shared auditor*. Having the same auditor in both the *Bidder* and the *Target* companies enhances the *CAR* throughout the event window. The result confirms our expectations in H1 and H2. We confirm the Dhaliwal et al. (2016) result when employing the same event window (-1,1). A remarkable result is that the abnormal returns for the bidder with a shared auditor are consistently high in the runup to the announcement date. The economic significance of the result is considerable. To be a *Bidder* and to have *Shared auditor* with the target company means a higher *CAR* in the area 0.040 to 0.050 compared to not having a *Shared auditor* in the different specifications of the event window.

Furthermore, the *Bidder* indicator variable is significantly negative in all five regressions, and the coefficients are always higher than the *Shared*Bidder* variable. Takeover studies regularly yield the negative *Bidder* result. The overall effect in this study confirms this, but also adds that having a shared auditor mitigates the negative effect of being a bidder even before the announcement. This is also evident in Figure 1 (*Bidder).*

Thus, the evidence in Table 5 confirms findings in Dhaliwal et al. (2016). We add to this that positive abnormal returns accrue to bidder shareholders in the runup to the announcement date. We interpret this so that a shared auditor helps the bidder overcome the winner's curse, managerial hubris (Roll, 1986) or self-serving (Morck et al., 1990). The evidence is also in line with studies that explore the importance of a relation between bidder and target matter for valuation. The relation includes shared advisors (Golubov et al., 2012; Agrawal et al., 2013), shared institutional investors (Brooks et al., 2018), shared directors (Cai and Sevilir, 2012; Rousseau and Stroup, 2015; and Stuart and Yim, 2010), and social ties (Ishii and Xuan, 2014). A relation seems to yield better informed parties, thereby avoiding overpaying.

The results for the *Shared* auditor indicate that the auditor acts opportunistically, thus confirming hypotheses H1 and H3. Hypothesis H2 for *Big4* is also explored here. Being a *Big 4* auditor means that the *CAR* is negative and significant for almost all period specifications. The effect is also economically meaningful, around 3.0%. These results are in line with DeFond et al. (2017) and most former research, implying the greater independence of the *Big 4* auditor. The Lawrence et al. (2011) result says that company size is related to abnormal returns and *Big 4* is not. Our findings cannot confirm this.

In contrast to the *Shared auditor* variable, contending information variables, *Auditor tenure*, *Shared city* and *Shared industry* are less important and have unstable coefficients. *Auditor tenure* is positive and significant in three window specifications, but the economic significance is small at about 0.2%. *Shared industry* even changes sign over the runup. This means that we cannot confirm the finding in Morck et al. (1990) of a significant relation between *Shared industry* and abnormal returns. Among the information variables in this study the *Shared auditor* stands out as the most important.

Including control variables do not upset the results for *Shared auditor.* Our size variable *Market value* in Table 5 is significant only in the longest event window and then negative, and the sign shifts over different window specifications. Both the *Big 4* and the *Market value* results mean

that we cannot support Lawrence et al. (2011). The negative *Market value* supports Moeller et al. (2004) among others.

An *Acquisition* transaction as opposed to a *Merger* is significantly positive at around 1.5-2.0%. The result is in line with predictions in Bulow and Klemperer (1996). The takeover premium in acquisitions is higher than in merger. Controlling for this and other commonly applied variables do not upset the results that to have shared auditor in a takeover is beneficial for bidder shareholders.

5.2 Results from the split sample

We now perform analyses of *CAR* and the explanatory variables in sub-groups of *Bidder* and *Target* to investigate the relation between *Shared auditor* and abnormal returns. In this setup the *Bidder* and *Shared*Bidder* variables fall out. Estimation in sub-groups has the advantage of revealing if the effect of a shared auditor applies in both *Bidder* and *Target*. The results are set out in table 6 below.

Table 6: Regressions with *CAR* as dependent variable in sub-groups. Adjustments for heteroskedasticity.

Panel A: Bidder companies

	Event window					
Variable	(-20,20)	(-20,0)	(-20,-5)	(-20,-10)	(-20,-15)	(-1,1)
Shared auditor	0.022***	0.037***	0.037***	0.032***	0.022***	0.026
Auditor tenure	0.003***	0.002***	0.002**	0.002*	0.001	0.004
Big 4	0.005	-0.014**	-0.018**	-0.016*	-0.008	0.010
Shared city	0.004	0.000	-0.001	0.000	0.003	0.006
Shared industry	-0.010**	0.001	0.000	-0.004	-0.007	-0.008
ln*(Market value)*	-0.011***	-0.002	-0.001	-0.001	-0.003*	-0.011*
Premium	0.007***	0.001	0.000	0.000	-0.001	0.009
Acquisition	0.026***	0.025***	0.019***	0.012**	0.002	0.044***
Risk-free rate	0.038***	0.055***	0.059***	-0.112***	0.057***	0.025
Constant	0.046	-0.175***	-0.185***	-0.180***	-0.119**	0.079
Rsqrd	0.086	0.106	0.106	0.101	0.104	0.113
F probability value	0.000	0.000	0.000	0.000	0.000	0.000
Observations	6,232	3,192	2,432	1,672	912	456

Panel B: Target companies

	Event window					
Variable	(-20,20)	(-20,0)	(-20,-5)	(-20,-10)	(-20,-15)	(-1,1)
Shared auditor	0.040***	0.024*	0.006	-0.005	-0.001	0.099*
Auditor tenure	-0.009***	-0.012***	-0.015***	-0.016***	-0.017**	-0.008
Big 4	-0.126***	-0.110***	-0.106***	-0.102***	-0.097***	-0.118**
Shared city	-0.046***	-0.004	-0.004	-0.015	-0.022	-0.055
Shared industry	-0.013	0.027***	0.018	0.009	0.006	0.030
ln*(Market value)*	0.016***	0.013**	0.018***	0.023***	0.025**	0.011
Premium	-0.006***	-0.010***	-0.009***	-0.008***	-0.008***	-0.012***
Acquisition	0.039***	0.060***	0.087***	0.104***	0.097***	-0.060
Risk-free rate	0.140***	0.099***	0.120***	0.133***	0.120**	0.020
Constant	-0.593***	-0.419**	-0.646***	-0.866***	-0.878**	0.236
Rsqrd	0.308	0.358	0.381	0.408	0.428	0.404
F probability value	0.000	0.000	0.000	0.000	0.000	0.000
Observations	2,050	1,050	800	550	300	150

The definitions of variables are in Table 1. The regressions are as in Table 5, but adapted to *bidder* and *target* sub-samples. Each regression contains year indicator variables with 2005 excluded. Significance levels are indicated by * (10%), ** (5%), and *** (1%).

The table is split in two panels, where Panel A contains estimations in the *Bidder* sub-group and Panel B the *Target* sub-group. Panel A clearly shows that *Shared Auditor* is positive and significant in all specifications but the shortest, confirming the results in Table 5. The coefficients for *Shared Auditor* are of the same magnitude in different regressions. We interpret this finding that most of the abnormal returns are in the runup, suggesting information leakage before the announcement date. In contrast, Panel B shows that *Shared Auditor* is far less consistent; first positive and significant and then negative. The association between *Shared Auditor* and abnormal returns is not as strong for the *Target* companies as for the *Bidder*. In summary, Table 6 confirms our expectations in H1 and H3. The *Shared auditor* is significantly related to abnormal returns for *Bidder* companies and much of the positive abnormal returns are in the pre-announcement period. The results for the target companies are not as clear-cut. The results for *Big4* are not as clear-cut. It seems that *Big4* has a dampening effect on the *CAR* in target companies, but for the bidder the evidence is not consistent.

5.3 *CAR* and the runup

Last, we study if the relation between the runup and *CAR* is positive using the *CAR* at the event date as the dependent variable. We look at the runup as the lagged *CAR* 15, 10, and 5 days before the event date, and add each lagged *CAR* successively into our original estimation model. Results appear in Table 7.

Table 7: The importance of the runup for the cumulative abnormal return at event day 0. Year indicator variables are in the regressions. Regressions are adjusted for heteroskedasticity.

Variable	(1)	(2)	(3)
CAR(-15)	0.709***		
CAR(-10)		0.862***	
CAR(-5)			0.836***
*Shared*Bidder*	0.013	-0.002	-0.002
Auditor tenure	0.005	0.004	0.004
Big 4 auditor	-0.001	0.007	0.003
Shared city	0.029	0.033**	0.014
Shared industry	0.018	0.015	0.001
ln(Market value)	-0.004	-0.004	0.000
Premium	-0.004	-0.005*	-0.008**
Bidder	-0.040	-0.024	-0.013
Acquisition	0.019	0.005	0.004
Risk-free rate	0.016	0.007	-0.026
Constant	0.041	0.052	0.132
Rsqrd	0.477	0.697	0.774
F probability value	0.000	0.000	0.000
Observations	202	202	202

The definitions of variables are in Table 1. We estimate the following relation.

$$CAR_0 = \alpha CAR_{-t} + \beta_1 ShareBid + \beta_2 Tenure + \beta_3 Big4 + \beta_4 ShCity + \beta_5 ShInd + \beta_6 ln(MV) + \beta_7 Premium + \beta_8 Bidder + \beta_9 Acqui + \beta_{10} R_f + Constant \quad (5)$$

where t = 15, 10, 5. Each regression contains year indicator variables with 2005 excluded. Significance levels are indicated by * (10%), ** (5%), and *** (1%).

The table indicates that all runup definitions are significant and positive. This means that a former runup relates to a further increase on the event day, as in Jarrell and Poulsen (1989). Besides these, only the *Premium* and the *Shared city* are significant in the regressions. One explanation for lack of significance is that the number of observations is lower than in Table 5. Another explanation is that the important variables in Table 5, namely *Shared auditor*, *Bidder*, and *Shared*Bidder*, correlate with the lagged *CAR*. We note as well the relatively high and increasing R(squared) in the regressions. This indicates that the information content in the runup are becoming increasingly exact as we approach the event day.

The regressions in Table 7 only suggest that information leakage happens in *Shared auditor* transactions. We need more information on the bidding process to determine the question (Eckbo 2009). But the regressions in Tables 5, 6 and 7 could signal an estimation problem. It appears that the researcher must choose to either study relations of the *CAR* with plausible variables as in Table 5, or to study the impact of the runup for the final *CAR* as in Table 7.

6. Conclusion

This paper investigates if an acquiring company (a *Bidder*) and an acquired company (a *Target*) gain from having the same auditor. Earlier studies on US data in Dhaliwal et al. (2016) and Cai et al. (2016) find that abnormal returns are higher in companies with shared auditor compared to companies with different auditors, especially for the *Bidder*. They argue that the shared auditor acts as an information intermediary, lowering of asymmetric information between the parties. We build upon these findings in our study of Norwegian data and confirm results found earlier. In addition, we study if information leakage is large, that is, if abnormal returns are affected prior to the announcement date of the takeover.

We employ a largely hand-collected sample of 202 acquisitions and mergers in Norway in the period from 2005 to 2017. The sample contains stock return records of 50 *Shared auditor* and 152 *Different* in 152 *Bidder* and 50 *Target* companies. We use the event study method in MacKinley (1997) and Eckbo and Langohr (1989) to study effects on abnormal returns around the announcement day and then relate the abnormal returns to *Shared auditor* and control variables studied in the literature.

We find that the *Bidder* gains substantially in terms of higher abnormal returns from having a shared auditor with the target compared to the situation with a separate auditor. The *Target* has inconsistent results, sometimes positive and sometimes negative when the two parties in the takeover have the same auditor. Furthermore, the abnormal gains start well in advance of the announcement of the takeover. In regressions it turns out that the cumulative abnormal returns are related to the interaction variable *Shared*Bidder* controlling for other variables. Specifically, we do not find that contending information related variables, such as the auditors residing in the same city or belong to the same industry, have any significant relation with the cumulative abnormal returns. This confirms findings in Dhaliwal et al. (2016) and Cai et al. (2016) and extend results to a substantially smaller equity market and to substantially longer event windows. Lastly, we find that a runup in abnormal returns prior to the announcement day is strongly related to the abnormal return on the announcement day.

Mulherin et al. (2017) encourage more studies of takeover using corporate governance explanations. We offer some insights into the importance of a shared auditor in this paper. Naturally, this aspect is only partial. We leave it to future research to investigate how a shared auditor compares with, e.g., overlapping directorships in explaining abnormal returns on the announcement date or before.

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