Do mergers create value for acquirers?
Evidence from U.S. merger contests

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In this thesis, I examine whether carrying out a merger creates or destroys acquirer value in the long-term. The results of prior literature regarding long-term merger impact on the acquirer are inconclusive and potential to causal identification issues. In a recent working paper, Malmendier, Moretti, and Peters (2014) offer an improvement to the previously employed control groups, whose returns are used as a proxy for the returns of the acquirer, in the absence of the merger. Malmendier, Moretti, and Peters (2014) investigate contested mergers and suggest that, with respect to stock returns, acquirers are likely to be more similar to unsuccessful bidders than to the previously used benchmarks.

The results of Malmendier, Moretti, and Peters (2014) indicate that carrying out a merger leads to a severe value disruption in terms of long-term stock performance. In this thesis, I test and critically assess the validity of their results. Thus, this thesis provides an essential robustness check for the authors' results, but also discusses the possible issues related to the novel approach employed to detect long-term abnormal returns. In assessing the value impact, I use both the event-time and calendar-time methodologies, and the improved benchmarks, unsuccessful bidders.

The sample used in this thesis covers a more recent and longer period of time than that of Malmendier, Moretti, and Peters (2014), and it is also larger in size indicating a better reliability. The data set consists of 93 U.S. merger contests all comprising one acquirer and one unsuccessful bidder. The mergers are completed during February 1985 and March 2012. To be included in the sample, the bids by the acquirer and the unsuccessful bidder have to be overlapping and the companies have to have ex-ante an equal chance of winning the merger contest.

The data on bids announcements is extracted from the Securities Data Company's (SDC) U.S. Mergers and Acquisitions Database. The stock price and accounting data is obtained from the Center for Research in Securities Prices (CRSP) and COMPUSTAT, respectively. Furthermore, I use Kenneth French Data Library to obtain average industry returns.

My results build upon a large body of mergers and acquisition literature and they also have real life implications. Based on my results, I do not find evidence of consistent post-merger acquirer value disruption. However, no long-term value creation is detected either. My results are robust across the transaction characteristics, measurable omitted variables, which could potentially bias the estimates.

Keywords mergers and acquisitions, long-term buy-and-hold abnormal returns, merger contests, stock price performance

Pro gradu-tutkielmassani tutkin sitä, luovatko yritysostot arvoa ostajayhtiölle pitkällä aikavälillä osakkeen hintakehityksen kautta. Tuoreessa julkaisemattomassa artikkelissaan, Malmendier, Moretti, ja Peters (2014) ehdottavat, että yrityskauppakilpailun hävinneen osapuolen osakkeen hintakehityksen käyttäminen kuvaamaan ostajayhtiön osakkeen odotettua kehitystä, mikäli yrityskauppaa ei olisi tapahtunut, olisi lähempänä osakkeen hypoteettista hintakehitystä. Tutkijat perustelevat tätä sillä, että yrityskauppakilpailun voittaja ja häviäjä ovat todennäköisesti enemmän samankaltaisia keskenään ja niihin myös kohdistuvat todennäköisemmin samankaltaiset markkinaodotukset kuin aikasemmin käytettyihin verrokkeihin.

Malmendierin, Morettin, ja Petersin (2014) tuloksen viittaavat merkittävään ostajayhtiön arvon heikkenemiseen pitkällä aikavälillä. Tässä tutkimuksessa sekä testaan että analysoin kriittisesti tutkijoiden saamia tuloksia. Näin ollen tämä tutkimus on tärkeä validoimaan tutkijoiden poikkeavia tuloksia sekä tarkastelemaan heidän lähestymistapaansa pitkän aikavälin performanssin määrittämiseen. Arvioidessani fuusioiden ja yritysostojen pitkän aikavälin vaikutusta, käytän event study ja calendar-time – tutkimusmenetelmiä.

Tutkimusaineistoni koostuu 93 yhdysvaltalaisesta yrityskauppakilpailusta, sisältäen aina yhden yrityskauppakilpailun voittajan ja häviäjän. Yrityskaupat tapahtuivat kesäkuun 1985 ja maaliskuun 2012 välisenä aikana. Otokseen ei sisälly yrityskauppoja, joissa voittajan ja häviäjän ostotarjouksia ei ole tehty päällekkäisinä ajanjaksoina. Tämän lisäksi yrityskauppakilpailun voittajalla ja häviäjällä on oltava yhtenäiset mahdollisuudet voittaa tarjouskilpailu.

Aineisto julkisista ostotarjouksista on kerätty SDC -tietokannasta. Lisäksi käytän CRSP ja COMPUSTAT -tietokantoja osakkeiden hintakehitys- ja tilinpäätöstietoja kuvaavan aineiston hankkimiseen. Kenneth Frenchin tietokannasta olen kerännyt tiedot keskimääräisistä toimialatuotoista.

Tulokseni tuovat lisäarvoa fuusioita ja yritysostoja koskevaan aikaisempaan kirjallisuuteen ja niillä on myös merkitystä käytännön elämään. Tulokset osoittavat, että yrityskaupan tekeminen ei ole ostajayhtiölle haitallista, mutta se ei myöskään paranna yhtiön performanssia pitkällä aikavälillä. Saamani tulokset ovat pitäviä kontrolloituani fuusioihin ja yritysostoihin liittyviä tekijöitä, jotka voivat mahdollisesti vääristää tuloksia koskien itse yrityskaupan vaikutusta ostajayhtiön performanssiin.

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1 Introduction

1.1 Background and motivation of the study

The year 2015 was a record-breaking year for global mergers and acquisitions (M&A) pushing the total deal value to US$4.28 trillion, and beating the previous record set in 2007, right before the financial crisis (UNCTAD).[1] Companies seek an M&A transaction for various company-specific reasons, of which most common being an attempt to grow the business either through obtaining new products or technology, expanding into new geographical areas, getting access to a new customer base, and capturing synergistic benefits. However, expanding too aggressively may be detrimental, and one popular view is that the majority of mergers are highly unprofitable to the acquirers. Reflecting this worry, the share price of an acquiring company has a tendency to fall right after an M&A announcement.

Mergers and acquisitions have been and will be a popular topic among researchers, since regardless of the previous empirical results; unanimity is yet to be reached on the fundamental question of whether or not mergers increase the wealth of the acquiring company. The previous empirical studies have predominantly focused on short-term returns when measuring the value creation impact of a merger on the acquirer (see e.g. Asquith, 1983; Bradley et al., 1988; Loderer and Martin, 1990; Agrawal et al., 1992). The long-term impact on the acquirer has been studied to a lesser extent. The long-run return studies are somewhat new and so far academics have mostly reported negative abnormal returns post-merger[2]. It is suggested that the negative performance could be associated with transaction characteristics, such as the payment method (Loughran and Vijh, 1997; Faccio and Masulis, 2005; Malmendier et al. 2014), or the public status of the target (Chang, 1998; Faccio et al. 2006).

The reason for examining short-term rather than long-term returns when assessing M&A effect could be explained by several challenges to be faced when estimating long-term abnormal returns. It is challenging to select a proper benchmark for an acquirer representing its stock returns over long-term in the absence of the merger. Thus, a common practice has been simply to compare the companies that merge to those that do not without taking into account that the acquirers represent a selected sample, unlike the random control group. The

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[1] http://unctad.org/en/Pages/DIAE/FDI%20Statistics/Interactive-database.aspx
[2] See e.g. Mandelker (1974), Langetieg (1978), Asquith (1983), Agrawal et al. (1992), Mitchell and Stafford (1997), Rau and Vermaelen (1998), and Savor and Lu (2009)

endogeneity of the acquisition decision should be considered, since it could be the case that companies pursuing M&A deals are the most overvalued companies in the market, as predicted by the market-timing theory (Shleifer and Vishny, 2003; Savor and Lu, 2009). Hence, assuming that the returns of acquirers in the absence of the merger would have performed similarly as an average company in the market may not be true. If the stock price of a company is above its fundamental value, it is expected to decline eventually, and hence the observed poor post-merger performance in comparison to the matched company could solely reflect the market correction to the overvaluation and not indicate the true merger effect.

One of the most well-known M&A blunders of all time is the merger between America Online and Time Warner that was executed during the dotcom bubble[3]. However, it could be that in the absence of the stock deal, America Online would have performed even worse in terms of stock returns. Shleifer and Vishny (2003, p. 295) suggest: "From our perspective, the central feature of this (America Online and Time Warner) acquisition is not technological synergies, but rather the attempt by the management of the overvalued America Online to buy the hard assets of Time Warner to avoid even worse returns in the long run." Hence, when evaluating the causal effect of the merger and the ultimate benefits to the acquirer, it is essential to take into account the measurable omitted variables that could bias the estimates, such as payment method (e.g. stock-deal), and to have credible estimates of the returns that would have been generated to the acquirer in the absence of the merger.

In a recent working paper, Malmendier et al. (2014) offer an improvement to the previously employed control groups regarding stock performance. The researchers use the data on merger contests and compare acquirers' (winners) post-merger performance to that of unsuccessful bidders (losers) to better address the identification issue. Accordingly, it is likely that the merger contest winner and loser are more similar than simply comparing the winner to an average company in the market, in that sense that they have both selected the strategy to grow inorganically and are pursuing the same target. In their paper, Malmendier et al. (2014) find evidence of significant long-term acquirer value disruption. The researchers examine long-term abnormal return performance of acquirers and show that the acquirers underperform the losers by approximately 50% over the following three years. Malmendier et al. (2014) suggest that the finding could be related to the payment method. However, unlike

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[3] To obtain more information on America Online and Time Warner merger, I refer to http://fortune.com/2015/01/10/15-years-later-lessons-from-the-failed-aol-time-warner-merger/

majority of the financial studies, Malmendier et al. (2014) argue that carrying out a stock-deal, rather than a cash-deal, would lead to a better long-term abnormal performance.

1.2 Main findings

In this thesis the objective is to empirically examine whether mergers create or destroy acquirer value by employing a novel methodology similar to the one used by Malmendier et al. (2014) applied to a sample composed of merger contests including 93 sets of acquirer and unsuccessful bidder pairs. The U.S. mergers in the sample have been completed after a merger contest during the time period between 1985 and 2012. In assessing the value impact, I use both the event-time and calendar time methodologies, and the improved benchmarks (unsuccessful bidders), suggested by Malmendier (2014), to detect long-term abnormal returns.

Contrary to the findings of Malmendier et al. (2014), I do not find evidence of consistent post-merger value disruption, whereas the results are highly sensitive to the selected expected return benchmark in terms of both statistical significance and magnitude. Therefore it cannot be concluded that carrying out a merger would negatively affect long-term post-merger performance. My results are robust across the transaction characteristics, measurable omitted variables, such as method of payment, target size, etc., that could potentially bias the estimates. However, it should be noted that even though the sample size used in this study is larger than the one employed by Malmendier et al. (2014), it is still restricted and this may have an impact on the results. The small sample size may partly explain the differences in the results between this study and the one of Malmendier et al. (2014), as the results conducted using a small sample size are likely to be more sensitive to the changes in the sample. Furthermore, irrespective of the small sample size Malmendier et al. (2014) do not examine the data for extreme values, unlike I did.

With respect to cash-financed acquisitions I do not find that they would be associated with the negative acquirer post-merger performance as suggested by Malmendier et al. (2014). Moreover, I do not find evidence of stock-deals being value disruptive either, which is contrary to typically reported findings in the U.S. studies (see, e.g. Asquith, 1983; Huang and Walking, 1987; Loughran and Vijh, 1997, and Dong et al., 2006).

1.3   Research problem

The purpose of this thesis is to examine acquirer long-term abnormal returns by using a benchmark that is likely to be more similar with the acquirers than the previously used benchmarks, such as the average company in the market. Hence, using this novel approach of Malmendier et al. (2014), I am able to address the problems related to the unobservable characteristics that the prior literature was unable to resolve. Thus in this thesis the endogeneity of the acquisition decision is also taken into account by limiting data to merger contests and treating the contest losers as a valid control group.

In this thesis I limit the data to the U.S. mergers contest, and examine the subsequent long-term value impact of a merger on the acquirer. Hence, I form my research question as follows:

> *Research question: Do mergers create value for acquirers in terms of long-term abnormal returns?*

1.4   Contribution to the existing literature

This thesis contributes to the existing literature by testing whether the winners significantly underperform the contest losers in the long-term, and if the size of the underperformance is close to the findings reported by Malmendier et al. (2014). In this thesis I critically evaluate the validity of the results of Malmendier et al. (2014) and consider the applicability of their approach to detect long-term abnormal returns. The approach used in the study of Malmendier et al. (2014) differs from the conventional statistical methods in employing the merger contest losers as a valid control group. Moreover, the results of Malmendier et al. (2014) are inconsistent with the existing financial literature, showing that extreme value disruption related to a merger. This thesis provides an essential robustness check for their novel and yet untested findings.

I also test the argument of Malmendier et al. (2014) which claims that cash-deals would be more value disruptive compared to stock-deals. The finding is inconsistent with the previous literature (see, e.g. Loughran and Vijh, 1997; Faccio and Masulis, 2005) and it should be tested. The sample used in this study could be deemed as more reliable than the one used by Malmendier et al. (2014), because it covers a more recent and longer period of time, and is also larger in size.

To conclude, with this thesis I test the findings of Malmendier et al. (2014), but also bring more insight into the long-term abnormal post-merger studies, as every additional study sheds more light to the merger effect and the related value creation or disruption.

1.5 Structure of the study

The structure of this thesis is as follows. In Section 2 of this paper, an introduction of the previous literature and methodology used in the long-term abnormal return studies is presented. The data and the employed methodology are discussed in Section 3. Section 4 provides an analysis of the results, including the result of the robustness checks. Section 5 compares the findings of this thesis to those of Malmendier et al. (2014), and also relates the findings of this study to the broader financial literature. Finally, Section 6 concludes the thesis.

2   Previous research

In this section, I first go through the theories regarding motivation and effects of M&A. After that I present what the prior literature states on M&A value creation in terms of long-term abnormal returns and which transaction characteristics could affect the value creation or disruption. In this thesis I focus solely on acquirer returns and hence do not discuss value creation for target shareholders[4] in this chapter. For readers unfamiliar with the M&A terminology I refer to Appendix A.

2.1   Theories regarding motivation and effects of M&A

In general, financial theories suggest that M&A activities can be carried out for several reasons. Some of the most common theories predicting value disruptive mergers are the ones related to manager's overconfidence and self-interest, and the free cash flow theory. But there are also theories suggesting that managers try to time the market and may end up increasing the company value with this practice.

Market timing theory

The idea in the market timing theory is that the decision whether or not to issue equity depends on the share price performance (see, e.g., Lucas and McDonald, 1990; Korajczyk et al., 1992). The market timing refers to a practice of issuing company shares at high prices and buying them back at low prices. The purpose is to take advantage of the temporary fluctuations in the cost of equity (Baker and Wurgler, 2002). Hence, managers have an incentive to try to time the market if they think that the company share price is either undervalued or overpriced. According to the market-timing theory, if a corporate manager perceives that the company share price is overvalued, they could carry out a merger to replace their overvalued equity to hard assets (Shleifer and Vishny, 2003, and Savor and Lu, 2009).

Manager's overconfidence (hubris) and self-interest

It is intriguing that while numerous studies argue that acquisitions are in the interest of shareholders as they are associated with a value creating effect (e.g. market power, efficiency, asset redeployment, and market discipline); there is also a school of completely opposite view. According to this scholar, acquisitions are value-destroying as managers are interested

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[4] To obtain insights into value effects of M&A targets, I refer to the papers by e.g. Langetieg (1978), Healy et al. (1992), Loughran and Vijh (1997), and DeLong (2001).

in maximizing their own well-being. Roll (1986) argues that management of an acquiring company may exhibit hubris (overconfidence) when undergoing a takeover. Unlike agency-problem, the problem of CEO exhibiting hubris is not mitigated by using a compensation package. In accordance with the hubris theory, the managers would rather pay with cash than equity as they perceive that market undervalues the value of the company (Roll, 1986).

Agrawal & Walkling (1994) have found a link between management compensation and acquisitive behaviour. The paper puts on evidence that industries having higher CEO compensation are more active in acquisitions than industries with more moderate compensations. As by increasing the size of the company, the bonuses are also likely to increase. According to agency theory, compensation contracts should be created so that managers' and shareholders' interests are in line. However, there is a lot of evidence that desire for bigger salary is strong and self-serving motivations are occasionally determining factors in acquisition decision. Consistent with this notion the acquiring CEO's compensation usually increases after the acquisition in terms of equity-based payments, bonuses, and other compensations regardless of the acquisition performance (e.g. Bliss and Rosen, 2001; Grinstein and Hribar, 2004; Harford and Li, 2007).

Free cash flow theory

The free cash flow theory of Jensen (1986) suggests that managers endowed with free cash flow will rather choose to undergo negative net present value (NPV) projects than to pay cash out to shareholders. Jensen defines free cash flow as the cash flow exceeding the amount needed to fund all the available positive NPV investments. The free cash flow hypothesis indicates that agency costs are great for a cash-rich firm that has already exhausted positive NPV projects as it rather tends to move forward with negative NPV projects than to distribute cash out to shareholders (Lang et al., 1991).

Efficient market hypothesis

According to the efficient-market hypothesis of Fama (1970), the stock prices of publicly traded companies should instantly react to the introduction of a new event. The entire valuation effect, the expected net present value of the costs and benefits related to the event, should be incorporated into the stock price at the time of the announcement. Hence, stock prices are considered to reveal investors' perceptions of future performance of a company as well as its level of risk. Accordingly, no long-term abnormal returns should occur, and

subsequently no anomalies should be able to be recognized. According to Fama (1998, p. 284): "most long-term return anomalies can reasonably be attributed to chance." Fama (1998) support this view by stating the long term return is highly sensitive to methodology, and anomalies tend to vanish when used different benchmarks for normal returns.

Although, testing whether or not efficient market hypothesis holds is challenging as Campbell et al. (1997, p. 249) state, "First, any test of efficiency must assume an equilibrium model that defines normal security returns. If efficiency is rejected, this could be because the market is truly inefficient or because an incorrect equilibrium model has been assumed. This joint hypothesis problem means that market efficiency as such can never be rejected."

2.2 Long-term post-merger studies

Methodology

With respect to long-term abnormal studies, there is considerable variation in the measures and statistical tests. Barber and Lyon (1997) examine the empirical power and specification of test statistics employed to detect long-term abnormal stock returns. The sample of Baber and Lyon (1997) comprises a sample of companies listed on the NYSE, AMEX or NASDAQ, during the period between July 1963 and December 1994. According to the authors, long-run abnormal return should be calculated using the buy-and-hold return methodology and use an appropriate benchmark for expected returns.

The advantage of using the BHAR methodology lies in its ability to accurately measure investor experience from buying and holding securities over a certain time period, and therefore the methodology is more suitable in examining long-term performance compared to cumulative abnormal returns. Barber and Lyon (1997) document that with the same sample they report zero annual buy-and-hold abnormal returns relative to market benchmark. However, when using a corresponding 12-month a mean cumulative abnormal return methodology, they find a positive long-term return of 5%, on average. Hence, if using a cumulative abnormal return methodology in estimating long-term performance, it is possible to conclude that long-term return is generated, even in fact that would not be the case. No wonder that BHAR is regarded as a standard approach to test long-run abnormal returns. Mitchell and Stafford (2000, p. 296) describe BHARs as, "the average multiyear return from a strategy of investing in all firms that complete an event and selling at the end of a prespecified holding period versus a comparable strategy using otherwise similar nonevent firms."

Long-term abnormal returns

Mandelker (1974) was one of first academics to examine acquirer long-term abnormal performance related to a merger. Based on his results, conducted using a U.S. data set of 241 companies that completed a merger during the period of 1941-1963, acquirers are associated with an abnormal return of -1.32%. The results giving more support on the view of value disruption are the ones reported by Langetieg (1978). He shows that acquirers are likely to be affected even more severely by the mergers. Langetieg (1978) suggest the impact of a merger on the acquirer is -6.59% over long-term.

Asquith (1983) and Agrawal et al. (1992) also report negative abnormal returns for acquiring firms up to five years post-announcement. Asquith (1983) examines the effect of merger bids on stock returns using U.S. data and a sample of 196 successful bids and 89 unsuccessful bids announced between 1962 and 1976. Asquith (1983) reports that the long-term abnormal return of -7.20% is generated to the successful bidders, whereas the unsuccessful bidders face even worse abnormal return of -9.60%. Hence, it would come with a cost not being able to close a deal after announcing a bid. The results are statistically significant at the 5% level. Agrawal et al. (1992) investigate 765 U.S. acquirers and find that acquirers carrying out a merger are associated with a negative long-term abnormal return of 10.26%, the finding being statistically significant at the 5% level. However, this negative abnormal return is only related to merger, the researchers report that tender offers post-acquisition performance is not statistically different from zero.

One of the studies suggesting that mergers are, in fact, beneficial to the acquirer, is the paper of Loderer and Martin (1992). They have a comprehensive data set of 1,298 U.S. completed mergers and tender offers. Based on their results, acquirers earn a positive long-term abnormal return of 1.5% post-merger. On the contrary, Rau and Vermaelen (1998) support the finding of Agrawal et al. (1992) finding that the post-acquisition returns are negative (-4%) for mergers but positive (+9%) for tender offers. Rau and Vermaelen (1998) have a sample of 3,968 completed mergers and 348 tender offers.

Having also a comprehensive sample of U.S. mergers, Mitchell and Stafford (2000) examine impact of a merger on the acquirers. They calculate the returns using BHAR methodology and as benchmark return they employ both value- and equally-weighted market indexes. By using value-weighted, their results suggest that the average abnormal return for the three years post-merger -0.11% per month (at the 10% level of significance). With respect to using equally-

weighted index, the value disruption is reported to be more severe, suggesting that the average abnormal return is -0.25% per month (at the 5% significance level). Hence, if anomaly exists, it appears to be more profound to small acquirers.

Savor and Lu (2009) examine U.S. acquisition completed between 1978 and 2003. They investigate if stock-deals are in the interest of the acquirer's shareholders by using a sample of successful and failed acquirers. With respect to stock-deals, their results show negative post-merger acquirer returns, but for the unsuccessful stock-bidders the returns are even more negative. Hence, the authors conclude that carrying out a merger is ultimately beneficial to the long-term shareholders. Moreover, the findings support the hypothesis that overvalued firms try to time the market replacing their overvalued equity to hard assets.

The most recent study examining long-term value creation or disruption related to a merger is the working paper of Malmendier et al. (2014). The researches examine acquirers' post-merger long-term performance applying a rather novel approach. They suggest that by investigating merger contests and using the contest loser's performance to construct the counterfactual performance of the winner had he not won the merger contest helps to address the identification issues. In their sample Malmendier et al. (2014) include 180 bids by public U.S. companies, 90 winners and losers, announced between January 1, 1985 and December 31, 2009. The researchers find that abnormal returns of merger contest winners and losers are closely aligned before the merger, but post-merger the returns tend to diverge; winners performing 50% more poorly than the same contest loser over the following three years after the merger.

2.3   Deal characteristics

There is a considerable literature on the specific deal characteristics that have proven to affect the long-term post-merger performance. These transaction characteristics may bias the long-term study results if the post-merger performance is associated with deal characteristics. Instead of trying to cover every deal attributes empirically tested, I select those that are commonly used by academics: payment method (stock or cash), bidder attitude (friendly or hostile), number of bidders, the public status of the target, industry relatedness (focused or diversified), deal size, acquirer size, acquirer Tobin's Q, or target size. The characteristic presented in this chapter will be investigated in this study.

Payment method (cash or stock payment)

Stock-financed acquisitions have clustered around the period of high market valuations and led to negative long-term returns (see e.g. Rhodes-Kropf et al., 2005; Dong et al., 2006). Numerous studies have found that the method of payment plays an essential role in explaining the abnormal stock returns of bidding firms. Stock-financed deals are documented to result in significantly negative abnormal returns over both long and short horizons (see e.g. Asquith, 1983; Huang and Walking, 1987; Loughran and Vijh, 1997).

Loughran and Vijh (1997) argue that acquisitions financed with cash result in a significantly better long-term stock performance in relation to acquisitions financed with stock. The authors investigate the mode of acquisition (merger or tender offer) and the method of payment (stock or cash) with a sample of 947 U.S. acquisitions in during 1970-1989. The researchers find that stock mergers generate significantly negative excess returns of -25.0%, whereas cash tender offers earn positive excess returns of 61.7%. Ghosh (2001) and Linn and Switzer (2001) put more evidence on the argument that cash deal are superior to stock-deals by documenting that cash would be more favorable payment method with respect to a company's long-term operating performance.

If an acquiring company announced a cash-offer, the shareholders would consider this as "good news", and conclude that the management perceives the stock undervalued and it is likely that the stock will readjust upwards. These results support the theories that managers are timing the market and use equity in acquisitions when they believe that the company's stock is overpriced in the market. According to Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004), companies carry out mergers when that their stock overvalued (information asymmetry). Under this scenario, companies obtain undervalued assets, such as a target company, by using their overvalued shares. As a result, the announcement effect of mergers is negative as the acquirers' overvaluation become publicly visible; the level of information asymmetry has decreased. On the other hand, it could be concluded if the company had not undertaken the merger, the stock price could have dropped even more.

However, the free cash flow theory states exactly the opposite. According to "free cash flow" theory of Jensen (1986), managers endowed with free cash flow will rather choose to undergo negative net present value projects than to distribute cash out to shareholders. In line with this theory all-cash acquisition are likely to generate negative abnormal long-term returns, since the manager engage in value-destroying mergers to avoid increasing dividend pay-outs. Cash-

rich firms can either return the excess cash to the owners by means of dividends or invest it to purchasing a company. According to "free cash flow" theory of Jensen (1986), managers endowed with free cash flow will rather choose to undergo negative net present value projects than to distribute cash out to shareholders. In line with this theory all-cash acquisition are likely to generate negative abnormal long-term returns, since the manager engage in value-destroying mergers to avoid increasing dividend pay-outs.

Malmendier et al. (2014) also suggest that the severe underperformance of acquirers in relation to unsuccessful bidders could be related to cash acquisitions. With respect to the cash deals, Malmendier et al. (2014) conclude that acquirers may have to raise additional debt to finance the compensation amount which may explain the observed increase in debt post-merger. Accordingly, the market may consider that the long-term health of the company is endangered due to increased leverage which, in turn, is reflected in the stock price. The interpretation is in line with Myers' (1977) debt overhang theory referring that an increased leverage ratio may constrain the future investments decisions which in turn decreases the value of the firm. Cai and Zhang (2011) show a significant negative correlation between a firm's leverage ratio and its stock prices. Thus increased leverage ratio may lead to a situation where the firms' future investment opportunities are restricted and this is reflected in the share price.

Attitude (friendly or hostile)

The empirical evidence on studies examining shareholder gains related to friendly and hostile bids is rather mixed. It is suggested that hostile bidders may need to bid higher than friendly acquirers (e.g. Loughran and Vijh, 1997). Thus, this may result overbidding which can be associated with negative long-term abnormal stock returns.

Number of bidders

It is logical that the competition for a target company tightens when there are several bidders. Prior studies show that the presence of multiple bidders has affected the bid premium by increasing it. It could be that when there are multiple bidders the winner act irrationally and pays too much (Dodd, 1980; Flanagan and O'Shaughnessy, 2003). According to Mandelker (1974) and Asquith (1983), the absence of significant positive abnormal returns could reflect the existence of perfect competition in the acquisition market.

Target's public status

When an acquisition of a privately held target is financed with common stock, the process resembles a private placement of equity as the number of target shareholders is small. Chang (1998) discovers that the mean value of the acquisition is significantly smaller for privately held targets than for publicly traded targets. Chang (1998) explains the finding with limited competition hypothesis associated with private targets, as it is likely that if markets are highly competitive, the expected profits shrink and the acquisition turns into a zero net present value investment.

As public information on privately held targets is more scarce compared to the listed targets, the cost of information search may be costly. However, if the competition is not as aggressive as for privately held targets, the bidding companies may show positive stock returns due to increased likelihood of underpayment. On the other hand positive bidder returns may be caused by realized synergies (Chang, 1998). Faccio et al. (2006) examine announcement returns of public and private targets in 17 Western Europe countries. The authors report that the acquirers which obtain a private target earn a significant excess return of 1.48%, while the acquirer of public target report a negative abnormal return of 0.38%

Public firms have legal liabilities to disclose information on accounting and future outlook to the public and the information is widely available to bidders. However, private firms are free from this regulated obligation, and therefore the information asymmetry is greater between acquirers and private targets than between public targets. This worry related to information asymmetry is captured with the so-called liquidity premia of Fuller et al. (2002). Moreover, when acquiring a private target, the risk of not evaluating the assets properly is likely to be high (Reuer and Ragozzino, 2007). Hence, bidding for a private target is associated with a risk of adverse selection to which bidders have responded by employing a private company discount in offer price (Akerlof, 1970).

Industry relatedness

During the 1990s, the popular view was that corporate diversification destroys value. Berger and Ofek (1995) point out that conglomerates in the U.S. are priced, on average, at 15% discount. Also papers of Lang and Stulz (1994) and Bradley et al. (1998) support the view that diversification is associated with value disruption. Although it should be noted that in the

paper of Lang and Stulz (1994) the companies performed poorly even before the conglomeration.

In a more recent study, Graham et al. (2002) analyse several hundred companies expanding through acquisition or increasing business lines. Graham et al. (2002) find that units that are added into a conglomerate via a merger are initially priced at significant discount in comparison to an average standalone company operating in the same industry. Hence the discounted units weight down the excess value of the combined company. It is suggested that the reason for carrying out diversified acquisitions may be due to poor growth opportunities in field of industry in which the company operates (Graham et al., 2002; Campa and Kedia, 2002). Flanagan and O'Shaughnessy (2003) report a surprising finding that the presence of multiple bidders has a greater impact on paid premiums when the eventual acquirer and the target operate in industries unrelated to each other.

Deal size

Larger mergers should generate larger value losses, if managers are motivated by corporate control and empire building, suggesting that the underlying reason for a merger is not to increase corporate value, but to satisfy manager's self-interests (Gorton and Rosen, 1995). In addition, Bliss and Rosen (2001) point out that CEO compensation is usually positively related to the firm size. Hence, closing bigger deals may trigger bigger bonuses. In contrast, Houston and Ryngaert (1994) and DeLong (2001) find that gains earned in financial mergers are positively related to the deal size.

Target size (large or small)

It could be the case that the target size may be proxy for the unobserved complexity associated with large deals. According to Loderer and Martin (1990) acquiring a large target is associated with greater losses compared to obtaining a small target. The authors conclude that companies pursuing larger target are likely to overpay. Alexandridis et al. (2013) examine U.S. completed deals between 1990 and 2007 finding that takeovers of large target underperform small targets by 2.37% in terms of announcement returns. Alexandridis et al. (2013) suggest that their findings are associated with the relatively greater complexity inherent in large deals and it is more difficult to carry out post-merger integration and capture the estimated synergies when the target is large in size.

On the other hand, the difficulty to integrate huge target into a combined enterprise may refer to the fact that there are fewer acquirers seeking large targets, which may decrease the level of competition, and hence lead to a lower takeover premia (Gorton et al., 2009; Alexandridis et al., 2010).

3 Data and metodology

In this section, I first introduce how the sample set of U.S. merger contests is obtained. Second, I go through the data construction process, after which I present the methodology employed in this study. In the methodology chapter, I present the two long-term approaches common in the recent empirical studies: buy-and-hold abnormal returns and calendar-time portfolio regressions.

3.1 Sample design

The data utilized in this study is obtained from different data sources: the Securities Data Company's (SDC) U.S. Mergers and Acquisitions Database, The Center for Research in Security Prices (CRSP), CRSP/Compustat Merged Database, and Kenneth French Data Library[5]. In Table 1 I present the summary of data retrieved from the corresponding databases.

Table 1. Data extracted from the corresponding data source.

The sample of merger contests utilized in this study is constructed using three different data sources: the SDC Mergers and Acquisitions Database, The Center for Research in Security Prices (CRSP) and CRSP/Compustat Merged Database. SDC database is used to identify all U.S. mergers with overlapping bids by at least two potential acquirers. CRSP and Compustat meet the information need for financial and accounting data.

SDC	Sample of bid announcement for U.S. target 1/1985- 12/2012	CUSIP codes
		Name of acquirer
	Transaction value	Name of competing bidder
	Means of Payment	Tickers
	Nation	Competing bid deal code
	SDC deal number	Status of the offer
	Attitude	Challenged deal acquirer CUSIP
	SIC codes	Deal effective date
	Bid announcement date	Target of the competing bid
	Bid withdrawal date	Target public status
	Number of bidders	History File Event
	% of stock	Synopsis
	% of cash	% of other
Kenneth French Data Library	Industry definition	Industry returns on a monthly basis.
CRSP	Stock returns	Fama-French three factors and
	Delisting returns	a momentum factor
	Delisting	Value-weighted index return
	Acquirer PERMCO	Acquirer PERMNO
Compustat (Annual and quarterly)	Total assets	Sales
	Stockholder's equity	Cost of goods sold
	Operating income	Selling, general and administrative expenses
	Property, plants and equipment	Fiscal quarter closing price
	Debt in current liabilities	Common shares outstanding
	Long-term debt	Closing stock price

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[5]I thank Kenneth French for providing this data on his Web page under Data Library:
http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

SDC database, a standard information source on mergers and acquisitions, is used to identify the sample of U.S. mergers with overlapping bids by at least two potential acquirers. CRSP and Compustat, in turn, meet the information need for financial and accounting data, while Kenneth French Data Library is utilized to obtain industry returns. I combine data gathered from these sources to construct a comprehensive data set of merger contests including information on deal, target, and bidder characteristics.

3.2   Sample construction

I start my sample collection with SDC database by extracting bid announcements from U.S.-based public companies between January 1, 1985 and December 31, 2012. Thus, bids related to either completed or uncompleted U.S. mergers are included in the sample. When gathering data from SDC database, I impose the following additional identifying restrictions. I collect bids only by companies engaged in a merger contest by using an additional criterion in SDC; I set the flag representing competing bidders as "yes". I continue excluding bidders following the criteria suggested by Malmendier et al. (2014):

- privately held and government-owned companies,
- joint ventures,
- investor groups,
- mutually owned companies,
- subsidiaries and unidentifiable companies, and
- bidders classified as white knights[6]

The listed criteria are set to be able to examine merger contests in which all the bidders have ex-ante an equal chance of acquiring a target company. It could be possible that targets would be less receptive to bids by overvalued companies. Based on the findings of Dong et al. (2006), the bidder valuation has no effect on the probability of deal success, and therefore I do not address this concern in my paper. Furthermore, I eliminate bidders that are parent companies of a target, as a parent company is unlikely to be a good comparison to other rival bidders in terms of chances of winning. With respect to the public status, only publicly listed companies are included in the sample enabling analyses based on stock performance and an easy access to comprehensive accounting information.

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[6] White knights have higher chances in winning the merger contest as they are usually in favor of both the board of directors' and the target management. Moreover, white knights have tendency to overbid as are likely to enter into a merger contest for other than strictly value creation purposes (Niden, 2003).

Company identification codes

Accordingly, I extract the following information on the acquirers and targets from SDC database: company name, SIC code, nation, public status, six-digit CUSIP, company ticker. I also collect deal-specific information: SDC deal number, competing bid deal code, status (whether the bid is completed or withdrawn), attitude (friendly or hostile), number of bidders involved in a merger contest, challenged deal acquirer CUSIP, name of the challenging bidder, target of the competing bid (name), challenged deal target CUSIP, bid announcement date, bid withdrawal date, deal effective date, transaction value denominated in dollars, and the percentage of the transaction value paid in cash, stock, or other means of payment. To examine the backgrounds of merger contests, I extract both synopsis and History File Event from SDC.

The initial sample size of public bids either completed or withdrawn is 877, out of which 388 bids stands for both the number acquirers and merger contests, while the rest 489 bids represent unsuccessful competing bidders (status as withdrawn). I demand that in each bidding contests there is only one acquirer that has completed the transaction and that at least one bidder has withdrawn its bid after competing for the same target which is identified based on the SDC's target CUSIP code. Furthermore, I also verify that the same target appears only once in the whole sample and that the bid announcements for the target company are overlapping. I exclude bids by those acquirers (competing bidders) that are not effective at the same time as the bids by competing unsuccessful bidders (acquirers).

After identifying the number of merger contests and related acquirers and competing bidders, I match the company specific six-digit CUSIP (SDC) codes of acquirers, targets and competing unsuccessful bidders to CRSP's historical CUSIP (NCUSIP) codes. CRSP's CUSIP codes are eight-number codes, and by removing the last two numbers, the codes become identical to those extracted from SDC. By using CRSP' CUSIP codes I collect CRSP's permanent company identifier (PERMCO), and CRSP's permanent issue identifier (PERMNO) codes for acquirers, targets and competing unsuccessful bidders. PERMCO code is a permanent for all securities issued, regardless of changes in company names[7]. I manually confirm that the names of companies recorded by SDC (CUSIP codes) match to those disclosed by CRSP (CUSIP codes).

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[7] http://www.crsp.com/products/documentation/crsp-link

Following the approach of Megginson et al. (2004) and Savor and Lu (2009) I exclude all the overlapping acquisitions by the same acquirer and competing bidders. In my sample it means that no bids can be registered by the same company for another target for the following three years. Furthermore, as the sample is relatively small and thus sensitive to possible mismatches, I manually verify that each bids by acquirers are overlapping and that the names of the contest winner and the contest loser match to those given by SDC. Moreover, to confirm that the SDC data is valid I search articles concerning the merger contests presented in the data set from the following sources: Bloomberg News, Los Angeles Times, The New York Times, and Ebsco Electronic News.

Extracting financial and accounting data

Utilising the collected company specific PERMNO and PERMCO codes described above, I obtain monthly stock returns for the acquirers and competing bidders around the merger contest from CRSP Monthly Stock database. In CRSP I select as an output value-weighted index return (VWRETD), and monthly holding period stock return (RET) for bidding companies for the period between June 28, 1982 and March 31, 2015. In addition, I extract delisting codes (DLSTCD), and delisting returns (DLRET) for bidders. The CRSP holding period total returns are from month-end to month-end and adjusted for stock splits, exchanges, and cash distributions (common events around mergers). The acquirers and competing bidders are listed either on NYSE, AMEX or NASDAQ and have data available on CRSP and Compustat. Both the acquirers' and the competing bidders' stock prices have to be available for three years before the first bid announcement is published and three years after the merger contest is ended. If the return data is not available for the period of three years after the merger due to delisting, I use delisting returns and the newly issued stock (if available) or the value-weighted index to represent the returns. Monthly industry returns needed as benchmark returns are based on the Fama-French 12-industry classification using SIC codes and provided by the Kenneth French Data Library. I use the Fama-French 12-industry classification, because a broad classification ensures that mergers categorized as diversifying are truly unrelated.

Lastly, I merge the resulting data with accounting data extracted from the Compustat Fundamentals Annual and Quarterly Database by using the 6-digit CUSIP identifier and the permanent company (PERMCO) and security numbers (PERMNO). I gather the following announcing information from Annual Database: total assets (AT), stockholder's equity (SEQ),

operating income (OIBDP), and property, plants and equipment (PPENT). From Fundamentals Quarterly Database I obtain debt in current liabilities (DLCQ), long-term debt (DLTTQ), total assets (ATQ), common shares outstanding (CSHOQ), fiscal quarter closing price (PRCCQ), book value of shareholders' equity (SEQQ), sales (SALEQ), cost of goods sold (COGSQ), and selling, general and administrative expenses (XSGAQ). From CRSP Fama-French data library I collect the one-month Treasury Bill rate (RF), the Fama-French factor returns (MKTRF, SMB, HML) and the momentum factor return (UMD).

The sample in this paper consist of 93 merger contests: 194 bidders, 93 winners, 101 losers, and 13,968 event-time observations. I balance the sample based on the closest transaction values and the time spent between the bid announcement and withdrawal, resulting to a final sample of 93 winners, losers, and a total of 13,392 event-time observations.

3.2.1 Contest duration

In the empirical analysis, I apply the idea of Malmendier et al. (2014) and divide my sample based on contest duration so that I am able to make a difference between merger contests based on their duration. Those contests in which bidders have ex-ante similar changes of winning are likely to last longer time, as both the bidders hold similar valuations of the target. As a result, more bidding rounds is needed until the valuation of the target exceeds either of the bidder's limit. After an intensive bidding contest profit for the acquirer tends to be smaller, however if the acquirers are rational they are expected to make profit on average. On the other hand, if the merger contest last only a couple of months, it is likely that the valuations of the bidders differ a lot. In that case, it is likely the winner makes a nice profit having to pay only the valuation of the rival bidder, even if the winner would have valued the target a lot higher.

I examine all the merger contests in my sample by studying media reports[8], History File Events (from SDC), and synopsis (from SDC). I discover that in the long-duration contests the offers have typically been sweetened in a consequence of several bidding rounds, whereas in the short-duration contests another bidder tends to withdraw shortly after the contest has begun, perhaps because of not seeing much chance to win due to e.g. major differences in valuations with other bidders. Moreover, I find out that the values of the offers are closest to each other in the long duration contests compared to other contest durations. These findings

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[8] Bloomberg News, Los Angeles Times, The New York Times, and Ebsco Electronic News.

support the view that contest duration could be associated with winner-loser similarity. Hence, it could be concluded that the performance of a competing bidder engaged in a long-duration contest is likely to be a valid counterfactual for the performance of a contest winner.

Malmendier et al. (2014) state that, "the merger effect estimated on the subsample of close contests provides the most credible causal interpretation." Accordingly, the authors split their sample into four subsamples to separate the long-duration contests (close contests) from those in which a winner is likely to have higher changes of winning. As the number of observations is relatively small, I split the sample into three subgroups based on the length of a merger contest. In the short-duration contests, duration varies between two and four months and in the medium-duration between five and nine months. All the rest of the merger contests, exceeding or equalling ten months, fall into the long-duration contest group, i.e. the close contest. As a result, the sample size split is the following: 32, 34, and 27 contests in the long, medium, and short-duration contests, respectively. The number of contests in the study of Malmendier et al. (2014) are 22, 23, 21, and 24 from the longest to the shortest contest quartile.

3.2.2 Deal characteristics

Method of payment

The payment method for the deals is observed from SDC database, based on which I divide the sample into two groups: all-cash deals and all-stock deals. In all-cash deals all mergers are financed with cash only, while in all stock-deals acquirers' only stock is used as a payment method. The mean deal value for all-stock deals is $6,684 million and for the all-cash deals the value is approximately $791 million. This indicates that all-stock deals tend to be larger in value in relation to all-cash deals, however there is a lot more value dispersion in all-stock deals as standard deviation is almost 20 times that in all-cash deals group.

Organization form of the target

Based on the information derived from the SDC, the whole sample is divided into two subsets: private and public targets. The average purchase price for a private target is $2,257 million while the average deal value with a listed target is $3,983 million. Hence, listed target seems to be

Related or diversifying merger

I use SIC codes retrieved from SDC database and Fama-French 12-industry (FF12) classification to identify in which industry both the acquirers and target companies operate. The broad FF12 classification is employed to ensure that when identified a merger as a diversifying merger, the acquirer and target are truly unrelated. In the sample the manufacturing industry is most frequently presented accounting for 20% of the sample.

Relative deal size

The relative deal size is conducted by dividing the transaction value by the acquirer's market value. I split the sample in half based on the median value.

Large target Small target

To examine if target size could explain the merger effect, I divide the full sample into half based on the target's market value. When splitting the sample I use the median target' market value. However, target data are not always available as approximately 16% of the targets are not publicly listed.

Number of bidders

The number of bidders involved in a merger contest is extracted from SDC database. Based on SDC information, I divide the sample so that the contests in which there are only two bidders form one group and contests with more than two bidders fall into the other sample group.

Bid attitude (friendly vs. hostile)

I split my sample into two groups based on takeover attitude from the target's perspective identified by SDC database. In my sample friendly mergers are far more common compared to hostile ones amounting to 79 merger contests.

Large Acquirer

To examine if the acquirer is large or not, I calculate the acquirers' market values. After which I split the sample in half using the median of the market values.

High Acquirer Q

To examine whether the acquirer is overvalued, I calculated Tobin's Q for all acquirers. Tobin's Q it the market value divided by total assets. I split the sample in half using the median of the calculated Tobin's Q values.

3.2.3   Descriptive statistics

Table 2 provides descriptive statistics for the sample covering winner, loser and deal characteristics, and event study returns. The winner and loser characteristics (Panel A) stand for the end of the fiscal year preceding the contest. The mean value of winners' total assets is half that of losers. The difference is driven by a couple of big companies categorized as losers, like in market value figures, which are computed as the sum of total assets plus market value of equity minus book value equity. However, the sales seem to be around the same magnitude. Tobin's Q, calculated as market value divided by total assets, is higher for winners amounting to 1.86 compared to 1.80, indicating that winners may be slightly more overvalued that the contest losers on average. There seem to be practically no difference between the contest winners and losers in the ratios of property plant and equipment to total assets, profitability, book leverage or market leverage. The leverage ratios are calculated as dividing the sum of long-term debt plus debt in current liabilities by total assets (book leverage) or market value (market leverage). The test for differences in means is reported on the right hand side next to the winner-loser characteristics. Based on the test results, none of the winners' characteristics differ significantly from those of the losers, supporting the view that contest losers could be regarded as a valid counterfactual for contest winners.

Deal characteristics (Panel B) reveal that transaction values of executed deals are at least $3.3 million and the highest deal value goes up to $89 billion. This highest deal was closed in 2000, when Pfizer Inc, a multinational pharmaceutical company, acquired Warner-Lambert Co, also a U.S.-based pharmaceutical company. In the sample the winners acquire at least 50% of the target shares in all other mergers, expected for the one that was between Cathay Gen Bancorp and Great Eastern Bank and the amount shares acquired was 41%. For categorizing the deals to diversifying or related mergers, I use the Fama–French 12 industry classification. Over 80% of mergers in this samples are related mergers, meaning that the target operates in related industry as the acquirer. The vast majority of the deals, approximately 85%, are classified as friendly meaning that the attitude of the target company's management and the board is friendly towards the acquirer. The fraction of the deals financed with pure cash is 33.3%, while the percentage of all-stock mergers is around 20.4%. The percentage of deals paid with mixed/other means of payment amounts to 46.2%. The maximum number of bidders in my sample is four bidders, but most of the merger

contests are between two bidders. In this sample almost 84% of the targets are publicly traded companies. The average contest duration for the whole sample is almost nine months.

Table 2. Summary Statistics

The sample includes all U.S. mergers with overlapping bids of at least two potential acquirers documented in the SDC database from January, 1985 to December, 2012 that meet the criteria described in subsection 3.1.1. Summary statistics are presented for winners and losers separately in Panel A. Accounting data on winner and loser characteristics is from the Compustat database and reported for the end of the fiscal year preceding the first bid announcement. The data on deal characteristics is from the SDC database and it is summarized in Panel B. Total assets are the book value of total assets. Market value is defined as the sum of total assets minus book value of shareholder's equity plus market value of equity (fiscal quarter end closing price multiplied by common shares outstanding). Sales/turnover presents net sales and Tobin's Q is calculated as market value divided by total assets. PP&E is book value of property, plant and equipment over total assets. Profitability is operating income before depreciation divided by total assets. Book leverage is calculated as dividing the sum of long-term debt plus debt in current liabilities by total assets. Market leverage is the sum of long-term debt plus debt in current liabilities divided by market value. The results for the test reporting whether differences in means are statistically significant are shown in diff column on the right. Deal value is the SDC transaction value of the deal. Deal size is defined as the deal value over the market value of the acquirer. Shares acquired is the percentage of shared acquired in the deal. Same industry refers to industrial relatedness decided based on the Fama–French 12 industry classification. Hostile (Friendly) attitude is the fraction of deals in which the attitude of the target company's management or board of directors is hostile (friendly) toward the acquirer. All-cash deal is financed with pure cash, whereas all-stock deals denote a pure stock deal. Mixed/other payment types comprise all the remaining deals. Listed targets are targets that are listed on public stock market. Number of bidders represents how many bidders participated in a merger contest. Contest duration presents contest duration for the whole sample and three different contest duration lengths.

Panel A: Winner and Loser characteristics

	Contest Winners			Contest Losers			Diff.
	Mean	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**	**p-value**
Total assets ($m)	16,947.86	66,116.18	93	31,009.92	226,570.3	93	0.21
Market value ($m)	23,722.33	76,162.23	93	35,967.42	230,532.7	93	0.24
Sales ($m)	6,729.99	15,969.4	93	5,553.39	17,695.26	93	0.74
Tobin's Q	1.86	1.37	93	1.80	1.34	93	0.67
PP&E	0.28	0.24	93	0.29	0.26	93	0.29
Profitability	0.12	0.08	93	0.13	0.12	93	0.14
Book leverage	0.40	0.23	93	0.38	0.19	93	0.85
Market leverage	0.27	0.19	93	0.26	0.17	93	0.68

Panel B: Transaction characteristics

	Mean	**Median**	**Std. Dev.**	**1%**	**99%**	**N**
Deal value ($m)	3,704.38	440	11,935.04	3.3	89,167.72	93
Deal size (%)	35.36	12.50	63.70	0.20	137.40	93
Shares acquired (%)	97.11	100	9.44	41	100	93
Related industry (%-share of deals)	82.80		37.95			93
Hostile attitude (%-share of deals)	10.75		31.15			93
Friendly attitude (%-share of deals)	84.95		35.95			93
All stock deal (%-share of deals)	20.43		40.54			93
All cash deal (%-share of deals)	33.33		47.40			93
Mixed/Other payment (%-share of deals)	46.24		50.13			93
Listed targets (%-share of deals)	83.87		36.98			93
Number of bidders	2.20	2	0.46	2	4	93
Contest duration (months), short	3.52	4	0.75	2	4	27
Contest duration (months), medium	6.62	6.5	1.21	5	9	34
Contest duration (months), long	15.44	11.5	9.29	10	54	32
Contest duration (months), full sample	8.75	7	7.42	2	54	93

The final sample illustrated in Figure 1 presents the overtime distribution of completed mergers contests and the average contest duration in months for each year. However, it should be noted that merger contests shown in Figure 1 represent only a marginal fraction of all acquisitions executed under the observation window, and therefore it is not a representation of all U.S. mergers and acquisitions completed over the given time line. Though, it can be concluded from Figure 1 that the number and duration of merger contests increase during the three most recent recognized merger waves[9]. The 4th merger wave in the U.S. started in 1981 and ended by 1989, while the 5th wave occurred between 1993 and 1999. The 6th merger wave took place between 2003 and 2007 peaking around 2006, just as the average contest duration. Many transactions completed during the 5th merger wave, in the late 1990s, were compensated with richly valued equity (Andrade et al., 2001; Holmstrom and Kaplan, 2001). Shleifer and Vishny (2003) suggest that overvalued companies would carry out a merger to acquirer hard asset at discount, which can explain the observed all-stock clustering during the fifth merger wave in my sample.
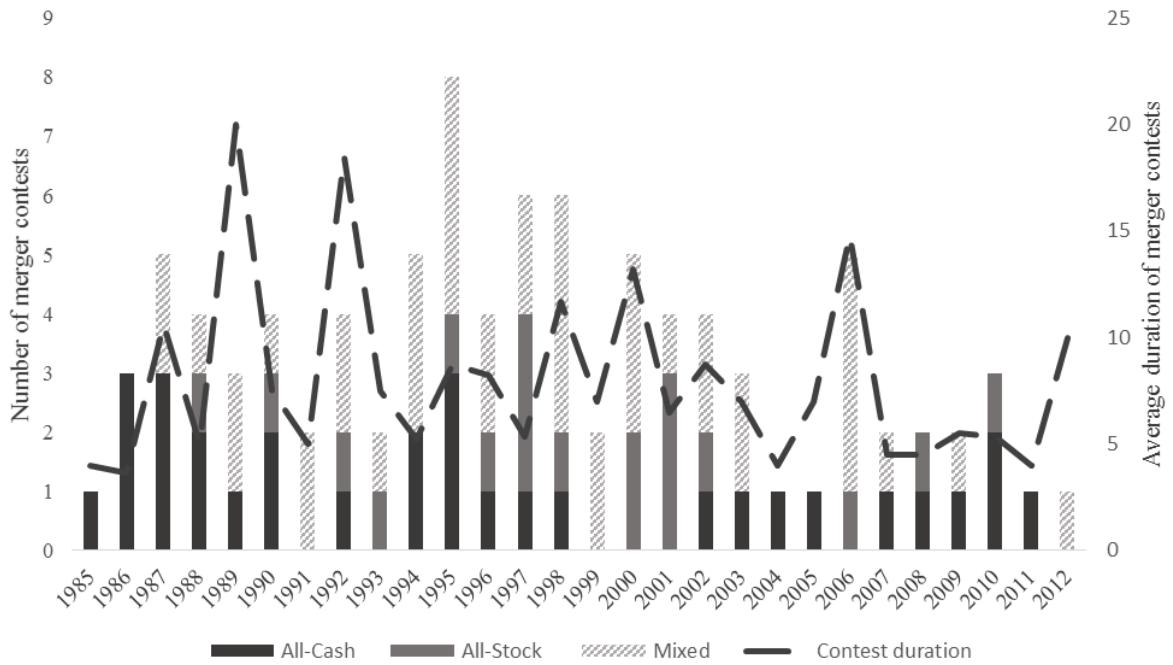
Figure 1. Mergers contests over time, June 1985 and March 2012. Data are from the SDC Merger and Acquisitions Database. Figure presents the distribution of completed merger contests over time. Years are the calendar years in which the contest ended and the deal was closed. The columns correspond to the vertical axis on the left and plot the number of merger contests over time, they also classify whether the merger was financed with all-cash, all-stock or with a mix of different payment types. The dotted line corresponds to the vertical axis on the right and represents the average contest duration in months for each year. All data is obtained from SDC Merger and Acquisitions Database.

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[9] To obtain more insight into merger wave I refer to e.g. Harford (2005)

3.3 Event study methodology

An event study is a research methodology to measure stock performance following a certain event. The methodology received a broad audience when introduced by Fama, Fisher, Jensen and Roll (1969) who conducted the methodology to test the stock market's reaction to stock splits. Since then executing an event study has become a standard choice among capital market researchers. MacKinlay (1997) documents in his study that the roots of event study go back to Dolley (1933) and several other publications, and that by the 1960s, event studies had already found their way into leading economics journals (see, e.g. Myers and Bakay, 1948; Barker, 1956, 1957, 1958; Ashley, 1962).

The purpose of event studies is to detect abnormal changes in stock price performance of listed companies, occurring because of an identified "event", such as mergers and acquisitions, initial public offerings, or seasoned equity offerings. I construct the event study in a typical way: first the event is identified and the event widow surrounding it is determined (Section 3.3.1). After that, I estimate the expected returns (Section 3.3.2), and calculate the abnormal returns (Section 3.3.3).

3.3.1 Defining event window

The first step in employing an event study is to identify the event and then define an event window (time frame) surrounding that event. The event, a merger contest, begins in the same month when the first bid is announced by either the contest winner of loser. The merger contest is considered to be terminated in the end of that month when the merger is completed. This approach to determine an event window is in line with the previous empirical tests investigating long-term abnormal returns (e.g. Mitchell and Stafford, 2000; Betton et al., 2008; Malmendier et al., 2014). Accordingly the event time is defined so that when $t = 0$, it indicates the end of month preceding the beginning of a merger contest, while $t = 1$ stands for the end of month of the merger completion. Both the pre- and post-event window last three years, a total of 36 months.

Figure 2 shows an example of the time line construction for a merger contest involving two bidders, companies A and B. Company A announces its bid first, which starts the merger contest. Thus, only the first initial bid from either the bidders, Company A or B, activated the merger contest. Later, Company A withdraws and Company B completes the merger, which ends the merger contest in the end of that month.

The event window, i.e. the length between $t = 0$ and $t = 1$, varies depending on duration of a merger contest, and thus the return at $t = 1$ embodies the performance over the whole merger contest, from the beginning to its end.
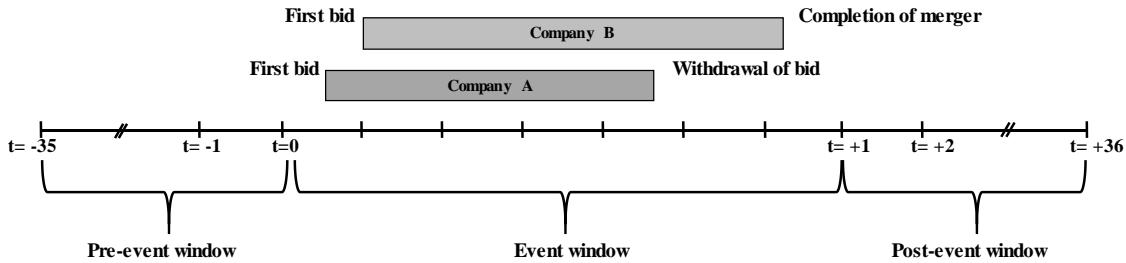
Figure 2. Time line for the event study. $t = 0$ presents the end of month preceding the beginning of the merger contest, i.e. the end of month preceding the earliest bid announcement. $t = -1$ is the end of month preceding $t = 0$, and so forth. $t = +1$ stands for the end of month, in which the merger is completed and the contest is ended. Thus, the length between $t = 0$ and $t = +1$ varies depending on the contest duration. Before $t = 0$ and after $t = +1$ every period is exactly one month long. $t = +2$ is the end of the following moth after $t = +1$.

3.3.2 Selecting expected return benchmarks

When estimating merger-related abnormal returns calculated over a long horizon, the results are highly sensitive to the chosen benchmark returns, as concluded in Section 2. As a result, it is common in long-run event studies that several different proxies for expected return are employed to achieve a more comprehensive understanding of the effect under review, by limiting the sensitiveness of the results towards one specific benchmark. In this study I use the following common expected return benchmarks: market returns and industry returns.

Market returns

Market return data represents CRSP value-weighted index. The model assumes that the expected return of an individual company can be estimated by the market return. Hence, the expected return when using market return as a benchmark return is as follows:

$$E(r_{ijt}) = r_{mt}, \tag{1}$$

where r_{mt} is the market return based on a value weighted index[10] at time t for a merger contest j and a bidder i.

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[10] See e.g. Moeller et al. (2005), and Malmendier et al., (2014) using value weighted index as a proxy for market return

Industry returns

In addition to market returns, another normal return benchmark used in this study is industry returns, or more specifically, average value weighted industry returns. When dividing contest bidders into different industry sectors I base my approach on a broad industry classification, Fama-French 12-industry (FF12) classification. To identify in which industry a bidder operates, I use a four-digit Standard Industrial Classification code (SIC code).

When constructing industry returns I notice that there are bidders changing their industry membership over the observation time, and thus I rebalance the industry returns on a yearly-basis. The expected return when using industry return as a benchmark return is calculated as:

$$E\left(r_{ijt}\right) = r_{kt}, \tag{2}$$

where r_{kt} is the return on industry group k to which an individual bidder i belongs to, while t denotes time and j represents the merger contest in question.

3.3.3 Long-term buy-and-hold abnormal returns

In this subsection I present the employed post and pre-merger buy-and-hold abnormal return methodology. Nowadays, the buy-and-hold abnormal return methodology (BHAR) can be regarded as a standard methodology when investigating long-term abnormal returns.[11] BHARs present the difference between the compounded bidder stock returns and the compounded selected benchmark return over the same time period. To obtain more insight into the BHAR methodology, I refer to Section 2.2. The post- and pre-merger BHARs presented in this subsection are calculated following the approach of Malmendier et al. (2014). To address the issue of possible outliers in the abnormal returns, I have winsorized the BHARs at the 1% and 99% levels.

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[11] See studies of e.g. Ikenberry, Lakonishok, and Vermaelen (1995), Loughran and Vijh, (1997), Barber and Lyon (1997), Affleck-Graves (1999), Mitchell and Stafford (2000), and Malmendier et al. (2014)

Post-event Buy-and-hold abnormal returns

I conduct post-merger monthly BHARs separately for each bidder engaged in a merger contest for the period of three years after the merger is completed. The BHARs for a bidder i, contest j, during a period t is conducted as follows:

$$BHAR_{ijt} = \prod_{t=1}^{\tau}[1 + r_{ijt}] - \prod_{t=1}^{\tau}[1 + E(r_{ijt})] \ , \tag{3}$$

where r_{ijs} is a bidder return i at month t, and $E(r_{ijt})$ denotes the expected return for the same bidder i at time t. As a proxy for expected returns I use the two previously listed benchmarks: market and industry returns. The calculation of post-merger BHARs starts from the month when the first bid is publicly announced and ends when the merger is completed, embodying the performance over the whole merger contest as presented in Figure 2.

The compounded return at $t = 1$ is calculated separately for the bidders and the return benchmarks:

$$r_{ij1} = \prod_{t}^{\tau}[1 + r_{ijt}] \ , \tag{4}$$

where t represents the month when the first bid for the target company was publically announced by one of the bidders engaged in a merger contests j, while T denotes the length of the merger contest, i.e. the end of month of merger completion.

Pre-event Buy-and-hold abnormal returns

When constructing BHARs for the period of three years before to the first bid announcement, commencing the merger contest, I cumulate the returns backward as follows:

$$BHAR_{ijt} = \prod_{t=1}^{\tau}[1 + r_{ijt}]^{-1} - \prod_{t=1}^{\tau}[1 + E(r_{ijt})]^{-1} \ , \tag{5}$$

where the variables are equal to Equation (3) above, but the beginning of the cumulating period differs from the one used in Equation (3), by starting from the end of month preceding the beginning of merger contest, i.e. the end of month before the first bid announcement.

3.4   Measuring winner-loser post-merger differences

In this study I follow the novel methodology of Malmendier et al. (2014) in estimating the long-run returns to mergers by treating merger contest losers as counterfactuals. The idea behind focusing on a merger contest is to use post-merger performance of a contest loser as a counterfactual, benchmark performance for a winner, had he not won the contest. Even though, the assumption would not be exactly true, it is likely that winners are more similar to losers than to the average company in the market. Besides, the bidders engaged in a merger contests are identical in that sense that they both have selected a strategy to grow inorganically, and the acquisition target is the same for both. To test post and pre-merger return correlations between winners and losers, I compare average abnormal market and industry adjusted stock returns of winners and losers before the merger contest, similar to Malmendier et al. (2014).

3.4.1   Piecewise linear regression to analyze winner-loser differences

Provided, that contest losers are a valid counterfactual, I run a piecewise linear regression, a switching regression for time series, which enables me to estimate break-points in regression with respect to differences between contest winners and losers. The formula for piecewise regression is as follows:

$$BHAR_{ijt} = \alpha_0 + \alpha_1 W_{ijt} + \alpha_2 t + \alpha_3 t W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5 Post_{ijt} W_{ijt} + \alpha_6 t Post_{ijt} + \alpha_7 t Post_{ijt} W_{ijt} + n_j + \varepsilon_t, \tag{6}$$

where the dependent variable $BHAR_{ijt}$ is the buy-and-hold abnormal return +/- 3 years around the merger contest *j* for the bidder *i* in month *t,* calculated in Equations (3) and (5). BHARs are normalized to zero in the month preceding the start of the contest, i.e. the first bid announcement. W_{ijt} denotes a dummy for a winner in a merger contest *j*, taking the value of 1 when the bidder *i* is also a winner. *t* is an event time variable, and $Post_{ijt}$ is also a dummy, indicating whether or not a period *t* belongs to the post-merger period. When running the regression I cluster standard errors by merger contests. In Equation (6), n_j represents contest fixed effects, i.e. indicator variables for each merger contest taking into account characteristics in each contest groups.

3.4.2 Merger effect

After running Equation (6), I use its coefficient estimates to capture a similar merger effect as conducted in the paper of Malmendier et al. (2014):

$$\hat{\alpha}_1 + \hat{\alpha}_5 + 35(\hat{\alpha}_3 + \hat{\alpha}_7) \tag{7}$$

The winner dummy's coefficient estimate is denoted as $\hat{\alpha}_1$, while $\hat{\alpha}_5$ corresponds to the shift in the winner-loser performance when the pre-event time dummy ($t = 0$) turns to post-event time ($t = 1$). The terms $\hat{\alpha}_3$ and $\hat{\alpha}_7$ capture monthly coefficient estimates for winner-loser trend difference in performance during the pre- and post-merger period. I multiply the term ($\hat{\alpha}_3 + \hat{\alpha}_7$) by 35 (months) to report the total long-term divergence after three years has passed since the contested merger was completed.

3.4.3 Differences in payment method

When examining whether a payment method could affect the results, I run the regression employed in the paper of Malmendier et al. (2014). The regression is an extension to the previously presented piecewise linear regression. The regression is formed by adding a new variable, $PctStock$ representing the percentage paid in stock, into the equation:

$$BHAR_{ijt} = \alpha_0 + \alpha_1 W_{ijt} + \alpha_2 t + \alpha_3 t\, W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5 Post_{ijt}\, W_{ijt} +$$
$$\alpha_6 t\, Post_{ijt} + \alpha_7 t\, Post_{ijt}\, W_{ijt} + \alpha_8 PctStock + \alpha_9 PctStock\, W_{ijt} + \alpha_{10} PctStock\, t +$$
$$\alpha_{11} PctStock\, t\, W_{ijt} + \alpha_{12} PctStock\, Post_{ijt} + \alpha_{13} PctStock\, Post_{ijt}\, W_{ijt} +$$
$$\alpha_{14} PctStock\, t\, Post_{ijt} + \alpha_{15} PctStock\, t\, Post_{ijt}\, W_{ijt} + n_j + \varepsilon_t \tag{8}$$

3.5 Calendar-Time Portfolio

An alternative to buy-and-hold technique in long horizon event studies is the Jensen-alpha approach or the calendar-time portfolio approach. The calendar-time methodology was first introduced by Jaffe (1974) and Mandelker (1974) to eliminate the problem of cross-sectional dependence of returns. In the financial-economics literature the methodology is suggested to overcome the potential issues related to event-time approaches, such as overlapping returns.

The significant results generated with BHARs may be explained by cross-sectional dependence of abnormal returns. As Fama (1998) and Mitchell and Stafford (2000) have documented all cross-correlations of event companies are taken into account in calendar-time

portfolio approach. To mitigate the problems associated with the BHAR methodology, I run the calendar-time portfolio regressions on the common risk factors, Fama-French three factors and Carhart four factors.

3.5.1 Fama-French three factor model

I construct an equally-weighted zero-cost portfolio long in the successful bidders' stock and short in the unsuccessful bidders' stocks. The bidders' monthly stock returns (total returns) taking place between the merger contest and 36 months after the merger completion are included in the portfolio. The long-short portfolio is rebalanced every month to drop bidders' returns exceeding the given period and to add bidders that have just entered into a merger contest. The excess returns of the long-short portfolio are regressed on the common risk factors, Fama-French three factors and Carhart four factors, presumed to generate expected returns (Moeller et. al., 2005). First, I estimate alphas regressing the long-short portfolio excess returns on the three Fama-French (1993) factors:

$$r_{pt} - r_{ft} = \alpha + \beta(r_{mt} - r_{ft}) + sSMB_t + hHML_t + \varepsilon_t, \tag{9}$$

where r_{pt} is the equal weighted long-short portfolio's return in month t, r_{ft} denotes the one-month Treasury bill rate, i.e. the risk free rate. r_{mt} is the market return on the CRSP value weighted index, SMB_t stands for the monthly return on the zero investment portfolio representing the difference in returns between small-cap stocks and large-cap stocks, while HML_t is the monthly return on the zero investment portfolio representing the difference in returns between high book-to-market stocks and low book-to-market stocks. The regression intercept or alpha, α, is the measure of average monthly abnormal return on the portfolio. If the Fama-French model provides a complete description of expected returns, the alpha deviating from zero provides support to the question on whether or not the unsuccessful bidders tend to outperform the successful ones in the long-run.

3.5.2 Carhart four factor model

A later modification of Fama-French three factor model was developed by Carhart (1997) who added the fourth factor, a momentum-related factor, into the equation:

$$r_{pt} - r_{ft} = \alpha + \beta(r_{mt} - r_{ft}) + sSMB_t + hHML_t + mMom_t + \varepsilon_t \tag{10}$$

where all the variables are identical to Fama-French model, Equation (9), except for Mom_t which is the difference between returns of winners and losers over the past 12 months.

4 Empirical results

In this Section, I present the empirical results. First, I investigate the winner-loser differences in the long-run abnormal returns by looking at the visual evidence. Second, I test the statistical significance and the magnitude of the visual impression. Third, I examine if the transaction characteristics affect acquirer long-term performance, and I look more closely into the impact of payment method. Finally, I probe the robustness of the reported results.

4.1 Visual evidence

In Panel A of Figure 3 I illustrate differences in paths of the market adjusted buy-and-hold abnormal returns of the contest winners and losers. The abnormal returns are calculated based on piecewise linear regression and normalized to zero in the month preceding the first bid announcement commencing a merger contest. For completeness, I present the graph separately for the full sample and the three contest subsamples.

When looking at the graph of the full sample, it can be observed that the contest winners have underperformed the contest losers already in a pre-merger phase, but the underperformance becomes more severe after the merger is completed. However, the winner-loser gap seems to stabilize after a year has passed since the winner has closed the deal. In the long-duration contests graphs, the losers slightly outperform the contest winners before the merger. When the merger is completed the abnormal returns of the contest losers gradually increase over the whole post-merger observation period of 36 months, whereas the abnormal returns of the winners turn to negative and widen further the gap between winners and losers. When looking at the graph of the medium-duration contests, no clear trend can be identified in the pre-merger stage, but with respect to the post-merger performance, it seems that winners outperform the losers. In the short-duration contests, the contest winners outperform the contest losers pre-merger, but the trend is reversed post-merger.

Three years (+36 months) after a merger is completed the gap in post-merger abnormal returns between contest winners and losers amounts to approximately -13.32, -43.59, +11.10, and -20.10 percentage points for the full sample, long-duration, medium-duration and short-duration contests, respectively. Based on the visual impression it appears that winners perform worse than losers after the merger, except for the medium-duration contests in which winners seem be outperform the losers. Hence, the visual evidence supports findings of

Malmendier et al. (2014) disclosing that long-duration contest winners are associated with a negative long-term performance, but the short-term duration contest winners are likely to be better off after the merger. However, I have divided the sample into terciles, and therefore my subsamples are not exactly equivalent to those of Malmendier et al. (2014).

In Panel B of Figure 3 I test whether the assumption of winners performing worse than losers still holds by using a different proxy for expected returns, industry returns, and simply the raw returns. Panel B depicts the distribution of the full sample when industry returns are used as a benchmark and when only raw returns are used. The full sample industry-adjusted BHARs are close to market-adjusted BHARs, reporting the underperformance of -8.56 percentage points for the full sample. The graph of unadjusted full sample BHARs illustrates that the contest losers beat the winners before and after the merger in terms of raw abnormal returns.

Based on the graphs in Panel A and B of Figure 3, it can be concluded that the difference between the abnormal returns of winners and losers varies a lot depending on which subsample is under scrutiny. However, it seems that in every subsample the correlation between winners and losers increases significantly months before the merger. Following the approach of Malmendier et al. (2014) I compare average abnormal market- and industry-adjusted stock returns of winners and losers before the merger contest. I find that approximately a year before the merger the correlation is the strongest and most significant between abnormal returns of winners and losers in the long-duration contests. Thus, the contest winners and losers in the longest contest group are likely to have performed more similarly months before the merger, and the trends of both bidders are closely aligned in a pre-merger stage. The findings together with the visual evidence support the view that competing bidders engaged in a same merger contest as a contest winner could serve as a credible control group, especially in the longest duration contests. With respect to the post-merger period, the correlations of abnormal performance are weaker in every subsample compared to those reported one year before the merger contest had commenced.

Panel A: Market-adjusted average BHARs, full sample and the three subsamples
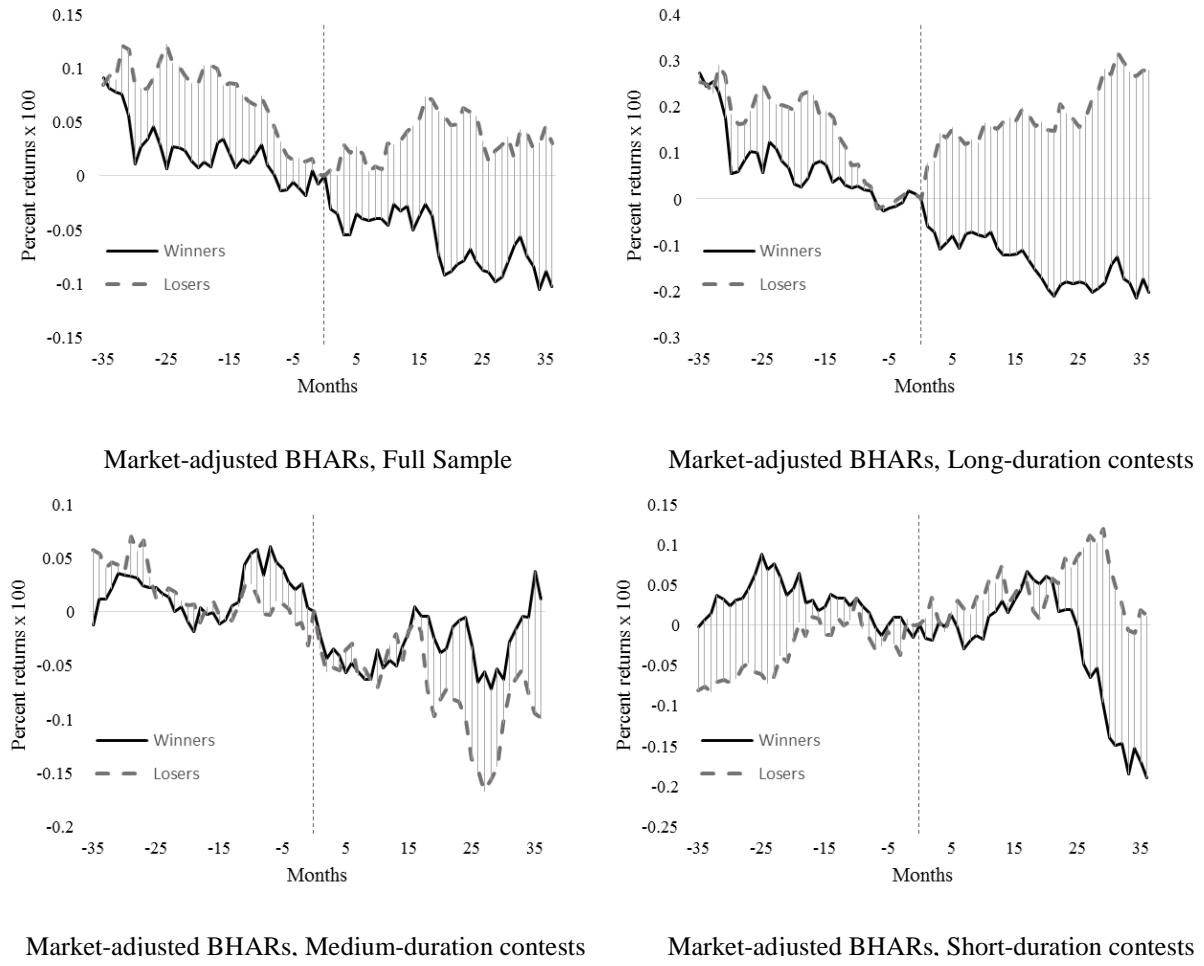
Market-adjusted BHARs, Full Sample

Market-adjusted BHARs, Long-duration contests

Market-adjusted BHARs, Medium-duration contests

Market-adjusted BHARs, Short-duration contests

Panel B: Industry-adjusted and unadjusted average BHARs, full sample

Industry-adjusted BHARs, Full sample

Unadjusted BHARs, Full Sample
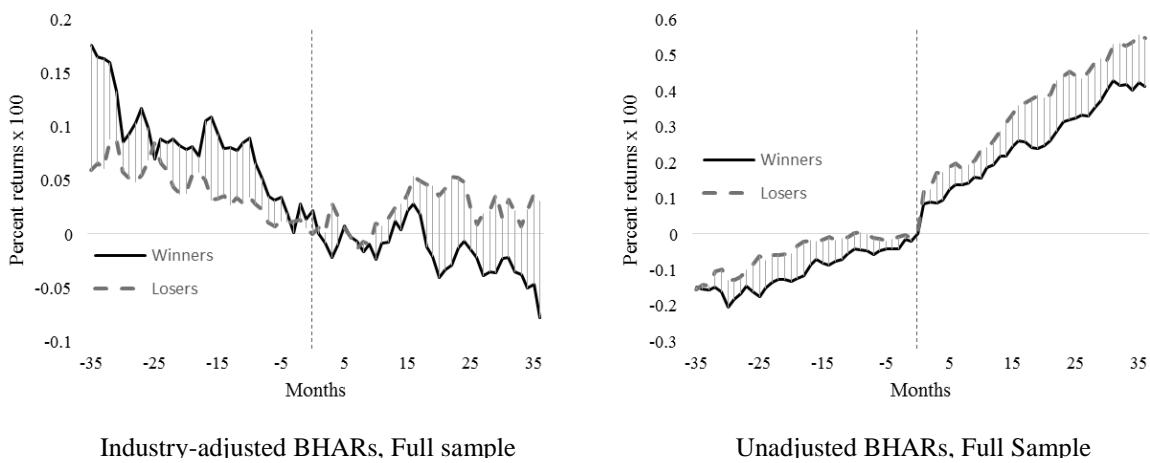
Figure 5. Long-term abnormal path of contest winners and losers. The four graphs in Panel A show the average monthly market-adjusted buy-and-hold abnormal returns (BHARs) of winners and losers for the full sample and the three contest duration subsamples: short-, medium-, and long-duration contests. Panel B depicts the average stock price performance of winners and losers for the full sample. The graphs present industry-adjusted BHARs, and unadjusted BHARs (raw BHARs). The solid line represents the average abnormal return of contest winners and the dotted line denotes that of contest losers.

4.2   Winner-loser differences in post-merger performance

Table 3 reports results of the long-term abnormal return differences in the performance of contest winners and losers for the three contest duration subsamples (columns (1) to (3)) and the full sample (column (4)). The difference in performance of winners and losers is calculated using market-adjusted BHARs and running the previously presented piecewise linear regression. The merger effect is captured following Equation (7), referring to contest winners under- or outperformance in relation to contest losers after three years has passed since the merger was completed.

When looking at the results regarding the merger effect, the difference between contest winners and losers appears to be most pronounced in the long duration subgroups, indicating that acquirers obtaining a target company after fighting over it for at least ten months underperform the contest losers by 15.52%. The underperformance is statistically significant at the 10% level. On the contrary, the winner-loser performance differences are small in magnitude and statistically insignificant for the medium- and short-duration contests, and also for the full sample. The results are similar when using a broader, unbalanced, sample in which there can be more than one contest loser pair for every contest winner.

As a result, it appears that contest winners would underperform contest losers with respect to long-lasting merger contests. This indicates that merger deals preceded by long merger contests are not value-creating for the acquirers. Hence, the companies would have been better off without buying the target, provided that contest losers serve as a valid control group as the paper of Malmendier et al. (2014) the presented visual evidence suggest. Thus, the "cost" of winning a long-duration merger contest is around 15.52% over the time period starting from the beginning of the merger contest and ending three years after the deal is closed.

My results differ from those presented by Malmendier et al. (2014), as they present a market-adjusted winner underperformance of 46.4% in relation to losers for the long-duration contests. Moreover, Malmendier at al. (2014) also show that short-duration contest winners outperform contest losers by 54.27% in terms of market-adjusted abnormal returns. Both of the result of Malmendier et al. (2014) are statistically significant at the 5% level.

Table 3. Long-Term Market-Adjusted Abnormal Returns – Duration Subsamples

This table presents the results for the following piecewise regression:

$$BHAR_{ijt} = \alpha_0 + \alpha_1 W_{ijt} + \alpha_2 t + \alpha_3 t W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5 Post_{ijt} W_{ijt} + \alpha_6 t Post_{ijt} + \alpha_7 t Post_{ijt} W_{ijt} + n_j + \varepsilon_t ,$$

where the dependent variable $BHAR_{ijt}$ denotes the buy-and-hold abnormal returns + /- 3 years around a merger contest j for a bidder i in a month t. W_{ijt} is a dummy variable, stating whether bidder i is a winner in a merger contest j. t is an event time variable and $Post_{ijt}$ indicates whether or not a period t belongs to a post-merger period, while n_j denotes the contest fixed effects. The buy-and-hold abnormal returns are normalized to zero in the month preceding the start of the contest (the first bid announcement) and calculated as follows:

$$BHAR_{ijt} = \prod_{t=1}^{T}(1 + r_{ijt}) - \prod_{t=1}^{T}(1 + E(R_{ijt}),$$

where r_{ijt} denotes the return of the bidder i involved in a merger contest j during a period t. $E(R_{ijt})$ represents the expected return during the same period. In this regression the market return (CRSP value-weighted index) is used as a proxy for the expected return. The merger effect is reported on the bottom between two lines, which estimates the winner-loser difference in the end of the sample period. Merger effect is calculated following the approach of Malmendier et al. (2014): $\hat{\alpha}_1 + \hat{\alpha}_5 + 35 (\hat{\alpha}_3 + \hat{\alpha}_7)$. Wald test is used to get the p-values and the standard errors are clustered by contests. The column (4) represents the full sample, while columns (1), (2), and (3) stand for the three contest duration subsamples. ***,**,*, indicates statistical significance at the 1%, 5%, or 10% level, respectively. t-statistics are provided in the brackets.

	Market-adjusted BHARs			
Contest duration	Long-duration (1)	Medium-duration (2)	Short-duration (3)	Full Sample (4)
Winner (α_1)	-13.99 (-1.58)	1.828 (0.18)	-12.31 (-1.19)	-7.717 (-1.36)
Period (α_2)	-0.515* (-1.94)	0.0624 (0.29)	-0.110 (-0.44)	-0.186 (-1.31)
Winner x Period (α_3)	0.249 (0.96)	-0.245 (-0.90)	0.352 (1.28)	0.0983 (0.63)
Post Merger (α_4)	-24.76 (-1.12)	-12.86 (-0.87)	14.15 (0.86)	-9.113 (-0.87)
Winner x Post Merger (α_5)	18.46 (0.95)	8.067 (0.43)	-6.768 (-0.35)	7.335 (0.67)
Period x Post Merger (α_6)	0.809* (1.87)	0.0674 (0.18)	-0.277 (-0.69)	0.223 (0.94)
Winner x Post Merger x Period (α_7)	-0.820* (-1.82)	-0.0118 (-0.03)	0.110 (0.22)	-0.255 (-0.96)
Merger Effect	-15.524*	0.917	-2.922	-5.850
N	4,608	4,896	3,888	13,392
R^2	0.334	0.293	0.161	0.269
Merger contests	32	34	27	93

4.3   Transaction characteristics and post-merger performance

Furthermore, I continue testing whether winners' underperformance should be interpreted as the causal effect of mergers or if there are some possible measurable omitted variables that may bias the estimates. The transaction characteristics underperformance of winners may be associated with some deal characteristics, such as payment method or deal size, as discussed in the literature review Section 2.3. Accordingly, I split the sample into different subsamples based on the transaction characteristics that have empirically proven affect the long-term post-merger performance. To investigate whether any of these characteristics may explain the underperformance of winners, I rerun the BHAR piecewise regression (Equation (6)) separately for each subsamples.

Table 4 reveals the results for market-adjusted abnormal performance for the different subsamples related to payment method (columns (1) and (2)), deal attitude (columns (3) and (4)), and number of bidders (columns (5) and (6)). The payment method and number of bidders seem to have no impact on the merger effect, whereas the deal attitude appears to affect the long-term performance. If the deal attitude is categorised as hostile, winners underperform losers by 22% with the 10% significance level. The result could be explained by overbidding, as it is likely that friendly bidders may not need to sweeten the deal as much as hostile bidders have to. This view is well documented in the previous literature. The deal attitude could potentially explain the reported winners' underperformance in long duration subsample as it is reasonable to assume that it would take longer for a hostile bidder to win the target if entered into a merger contest. Hence, if the hostile deal attitude is more frequently presented in long duration merger contests, hostile attitude may be the omitted variable explaining the reported underperformance.

When splitting the sample based on target public status, the columns (1) and (2) in Table 5 presents that if the target of a contested merger is a private company, after three years the merger is completed the contest winners show 14.29% worse performance than the unsuccessful bidders. The finding is significant at the 5% level. This result could imply that when buying a private company it may be difficult to estimate its true value which may lead to overpayment (Reuer and Ragozzino, 2007). This risk of overpaying is acknowledged by company managers which is why private company discounts are generally employed. However, according to the previous literature, most of the studies indicate that purchasing a

private target would be more beneficial to long-term shareholders in relation to obtaining a public target (see, e.g. Chang, 1998; Faccio et al., 2006).

Table 4. Long-Term Market-Adjusted Abnormal Returns – Transaction Characteristics

This table presents the results for the following piecewise regression:

$$BHAR_{ijt} = \alpha_0 + \alpha_1 W_{ijt} + \alpha_2 t + \alpha_3 t W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5 Post_{ijt} W_{ijt} + \alpha_6 t Post_{ijt} + \alpha_7 t Post_{ijt} W_{ijt} + n_j + \varepsilon_t ,$$

where the dependent variable $BHAR_{ijt}$ denotes the buy-and-hold abnormal returns + /- 3 years around a merger contest j for a bidder i in a month t. W_{ijt} is a dummy variable, stating whether bidder i is a winner in a merger contest j. t is an event time variable and $Post_{ijt}$ indicates whether or not a period t belongs to a post-merger period, while n_j denotes the contest fixed effects. The buy-and-hold abnormal returns are normalized to zero in the month preceding the start of the contest (the first bid announcement) and calculated as follows:

$$BHAR_{ijt} = \prod_{t=1}^{T}(1 + r_{ijt}) - \prod_{t=1}^{T}(1 + E(R_{ijt})),$$

where r_{ijt} denotes the return of the bidder i involved in a merger contest j during a period t. $E(R_{ijt})$ represents the expected return during the same period. In this regression the market return (CRSP value-weighted index) is used as a proxy for the expected return. The merger effect is reported on the bottom between two lines, which estimates the winner-loser difference in the end of the sample period. Merger effect is calculated following the approach of Malmendier et al. (2014): $\hat{\alpha}_1 + \hat{\alpha}_5 + 35 (\hat{\alpha}_3 + \hat{\alpha}_7)$. Wald test is used to get the p-values and the standard errors are clustered by contests. ***,**,*, indicates statistical significance at the 1%, 5%, or 10% level, respectively. t-statistics are provided in the brackets. The sample is divided in accordance with the method of payment (columns (1) and (2)), deal attitude (columns (3) and (4)), and number of bidders (columns (5) and (6)).

	Market-adjusted BHARs					
	Payment method		Attitude		Number of bidders	
	All-cash	All-stock	Friendly	Hostile	2 bidders	>2 bidders
	(1)	(2)	(3)	(4)	(5)	(6)
Winner (α_1)	-18.69*	-5.882	-8.907	0.646	-10.37	4.139
	(-1.95)	(-0.48)	(-1.38)	(0.06)	(-1.60)	(0.39)
Period (α_2)	-0.284	-0.423	-0.214	-0.171	-0.131	-0.434
	(-1.07)	(-1.60)	(-1.39)	(-0.41)	(-0.83)	(-1.36)
Winner x Period (α_3)	0.480*	-0.0299	0.132	-0.220	0.134	-0.0596
	(1.88)	(-0.09)	(0.74)	(-0.62)	(0.74)	(-0.21)
Post Merger (α_4)	0.737	-19.26	-11.24	0.893	-10.84	-1.399
	(0.04)	(-0.70)	(-1.01)	(0.02)	(-0.88)	(-0.08)
Winner x Post Merger (α_5)	15.10	-4.670	4.645	-10.11	6.533	10.92
	(0.73)	(-0.27)	(0.40)	(-0.47)	(0.58)	(0.32)
Period x Post Merger (α_6)	-0.0241	0.462	0.263	0.102	0.157	0.517
	(-0.05)	(1.09)	(1.07)	(0.11)	(0.58)	(1.10)
Winner x Post Merger x Period (α_7)	-0.479	0.0498	-0.193	-0.140	-0.190	-0.544
	(-0.99)	(0.12)	(-0.65)	(-0.27)	(-0.66)	(-0.77)
Merger Effect	-3.555	-9.858	-6.369	-22.044*	-5.804	-6.081
N	4,464	2,736	11,376	1,440	10,944	2,448
R^2	0.210	0.196	0.262	0.347	0.260	0.326
Merger contests	31	19	79	10	76	17

Table 5. Long-Term Market-Adjusted Abnormal Returns – Target characteristics

This table presents the results for the following piecewise regression:

$$BHAR_{ijt} = \alpha_0 + \alpha_1 W_{ijt} + \alpha_2 t + \alpha_3 t W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5 Post_{ijt} W_{ijt} + \alpha_6 t Post_{ijt} + \alpha_7 t Post_{ijt} W_{ijt} + n_j + \varepsilon_t ,$$

where the dependent variable $BHAR_{ijt}$ denotes the buy-and-hold abnormal returns + /- 3 years around a merger contest j for a bidder i in a month t. W_{ijt} is a dummy variable, stating whether bidder i is a winner in a merger contest j. t is an event time variable and $Post_{ijt}$ indicates whether or not a period t belongs to a post-merger period, while n_j denotes the contest fixed effects. The buy-and-hold abnormal returns are normalized to zero in the month preceding the start of the contest (the first bid announcement) and calculated as follows:

$$BHAR_{ijt} = \prod_{t=1}^{T}(1 + r_{ijt}) - \prod_{t=1}^{T}(1 + E(R_{ijt})),$$

where r_{ijt} denotes the return of the bidder i involved in a merger contest j during a period t. $E(R_{ijt})$ represents the expected return during the same period. In this regression the market return (CRSP value-weighted index) is used as a proxy for the expected return. The merger effect is reported on the bottom between two lines, which estimates the winner-loser difference in the end of the sample period. Merger effect is calculated following the approach of Malmendier et al. (2014): $\hat{\alpha}_1 + \hat{\alpha}_5 + 35 (\hat{\alpha}_3 + \hat{\alpha}_7)$. Wald test is used to get the p-values and the standard errors are clustered by contests. ***,**,*, indicates statistical significance at the 1%, 5%, or 10% level, respectively. t-statistics are provided in the brackets. The sample is divided in accordance with the target's public status (columns (1) and (2)), industry relatedness (columns (3) and (4)), and deal size (columns (5) and (6)).

	Market-adjusted BHARs					
	Target public status		Relatedness		Deal size	
	Private target (1)	Public target (2)	Diversified (3)	Focused (4)	Large Deal (5)	Small Deal (6)
Winner (α_1)	6.828	-10.51	4.068	-10.17	-0.908	-14.67*
	(0.79)	(-1.61)	(0.61)	(-1.52)	(-0.11)	(-1.85)
Period (α_2)	0.131	-0.247	0.295	-0.287*	-0.00524	-0.372*
	(0.60)	(-1.51)	(1.52)	(-1.74)	(-0.03)	(-1.69)
Winner x Period (α_3)	-0.267	0.169	-0.120	0.144	-0.169	0.371
	(-0.79)	(0.96)	(-0.61)	(0.78)	(-0.82)	(1.60)
Post Merger (α_4)	-45.56*	-2.105	7.289	-12.52	-3.980	-14.36
	(-1.78)	(-0.19)	(0.27)	(-1.10)	(-0.31)	(-0.86)
Winner x Post Merger (α_5)	-27.22**	13.98	-10.20	10.98	4.609	10.12
	(-2.17)	(1.09)	(-0.44)	(0.88)	(0.28)	(0.70)
Period x Post Merger (α_6)	0.855	0.101	-0.389	0.350	0.0386	0.411
	(1.71)	(0.38)	(-0.67)	(1.35)	(0.13)	(1.08)
Winner x Post Merger x Period (α_7)	0.441	-0.389	0.0270	-0.313	-0.116	-0.397
	(0.83)	(-1.30)	(0.05)	(-1.04)	(-0.31)	(-1.05)
Merger Effect	-14.287**	-4.233	-9.372*	-5.124	-6.25	-5.45
N	2,160	11,232	2,304	11,088	6,768	6,624
R^2	0.308	0.264	0.192	0.281	0.255	0.282
Merger contests	15	78	16	77	47	46

With respect to industry relatedness, several papers have examined the effect of focused vs. diversified acquisition on the acquiring company's abnormal stock returns (see, for example, Morck et al., 1990; Flanagan, 1996; Maquieira et al., 1998). However, the results of these studies are somewhat mixed and it has been unclear whether to pursue a diversified or a focused merger. Based on my results, a column (3) in Table 5, the diversified merger is associated with negative abnormal returns of approximately 9.37%, and the finding is statistically significant at the 10% level. It could be that there are fewer synergistic opportunities to be utilised after carrying out a diversified merger, and hence improving the competitive position of the combined company is more limited. This may be reflected in the long-term performance.

The reason for underperformance could also imply that unrelated acquirers are more prone to overbidding when entered into a merger contest, as they may not be as well informed about the true value of the target as the related acquirers. Flanagan and O'Shaughnessy (2003) suggest that the presence of multiple bidders has a greater impact on tender offer premia, when the acquirer is not related to the target's core-activities.

When splitting the sample based on deal size (columns (5) and (6)), neither small nor large deals appear to have impact on the long-term post-merger performance. In Table 6 I report and base the results on transaction characteristics related to acquirer size, acquirer Tobin's Q, and target size. The sample including only large acquirers underperform losers by 11.64% and the result is statistically significant at the 10% level. As Grinstein and Hribar (2004) and Harford and Li (2007) point out that equity-based payments, bonuses, and other compensations increase with the size of the company and, therefore managers have an incentive to carry out mergers simply to expand the company, regardless of whether or not it is an appropriate strategy from the company's point of view. Thus, the negative merger effect linked to acquirer size could be related to managers' misaligned personal objectives. With respect to other deal characteristic (columns (3) – (6)) I do not observe any statistically significant merger effect.

Table 6. Long-Term Market-Adjusted Abnormal Returns – Bidder Characteristics

This table presents the results for the following piecewise regression:

$$BHAR_{ijt} = \alpha_0 + \alpha_1 W_{ijt} + \alpha_2 t + \alpha_3 t W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5 Post_{ijt} W_{ijt} + \alpha_6 t Post_{ijt} + \alpha_7 t Post_{ijt} W_{ijt} + n_j + \varepsilon_t ,$$

where the dependent variable $BHAR_{ijt}$ denotes the buy-and-hold abnormal returns + /- 3 years around a merger contest j for a bidder i in a month t. W_{ijt} is a dummy variable, stating whether bidder i is a winner in a merger contest j. t is an event time variable and $Post_{ijt}$ indicates whether or not a period t belongs to a post-merger period, while n_j denotes the contest fixed effects. The buy-and-hold abnormal returns are normalized to zero in the month preceding the start of the contest (the first bid announcement) and calculated as follows:

$$BHAR_{ijt} = \prod_{t=1}^{T}(1 + r_{ijt}) - \prod_{t=1}^{T}(1 + E(R_{ijt}),$$

where r_{ijt} denotes the return of the bidder i involved in a merger contest j during a period t. $E(R_{ijt})$ represents the expected return during the same period. In this regression the market return (CRSP value-weighted index) is used as a proxy for the expected return. The merger effect is reported on the bottom between two lines, which estimates the winner-loser difference in the end of the sample period. Merger effect is calculated following the approach of Malmendier et al. (2014): $\hat{\alpha}_1 + \hat{\alpha}_5 + 35 (\hat{\alpha}_3 + \hat{\alpha}_7)$. Wald test is used to get the p-values and the standard errors are clustered by contests. ***,**,*, indicates statistical significance at the 1%, 5%, or 10% level, respectively. t-statistics are provided in the brackets. The sample is divided in accordance with the acquirer size (columns (1) and (2)), acquirer's Tobin's Q (columns (3) and (4)), target size (columns (5) and (6)).

	Market-adjusted BHARs					
	Acquirer size		Acquirer's Tobin's Q		Target size	
	Large (1)	Small (2)	Large (3)	Small (4)	Large (5)	Small (6)
Winner (α_1)	-12.05	-3.294	-17.91**	2.698	-1.595	-17.62*
	(-1.46)	(-0.42)	(-2.15)	(0.36)	(-0.16)	(-1.88)
Period (α_2)	-0.160	-0.214	-0.0984	-0.276	-0.228	-0.210
	(-0.82)	(-1.02)	(-0.44)	(-1.57)	(-1.01)	(-0.79)
Winner x Period (α_3)	0.152	0.0435	0.346	-0.155	-0.161	0.395
	(0.71)	(0.19)	(1.55)	(-0.72)	(-0.58)	(1.65)
Post Merger (α_4)	11.43	-30.11*	-2.423	-15.95	4.862	-4.708
	(0.81)	(-2.01)	(-0.17)	(-1.03)	(0.37)	(-0.24)
Winner x Post Merger (α_5)	-7.589	22.58	29.01*	-14.81	2.175	23.58
	(-0.53)	(1.35)	(1.75)	(-1.07)	(0.12)	(1.20)
Period x Post Merger (α_6)	-0.114	0.566*	-0.0213	0.472	0.0308	0.117
	(-0.34)	(1.70)	(-0.06)	(1.54)	(0.09)	(0.27)
Winner x Post Merger x Period (α_7)	0.0766	-0.593	-0.770*	0.272	0.000229	-0.701
	(0.24)	(-1.40)	(-1.89)	(0.83)	(0.00)	(-1.50)
Merger Effect	-11.635*	0.0516	-3.727	-8.029	-5.039	-4.743
N	6,768	6,624	6,768	6,624	4,896	6,616
R^2	0.305	0.234	0.258	0.277	0.236	0.255
Merger contests	47	46	47	46	34	39

4.4 Payment Method – Stock Deal vs. Cash Deal

Malmendier et al. (2014) find that the acquirer underperformance three years after winning a long duration merger contest can be explained by the means of payment. The authors reason that if winners offer more stock-financing in long duration contests than in short duration, the winners' poor performance in the long duration would be concentrated in stock-finance deals. Based on this, Malmendier et al. (2014) re-estimate the previously used piecewise linear regression, by adding the percentage offered in stock and a new set of interaction variables, leading to Equation (8). For comparability reasons, I follow their approach and run the re-estimated regression.

Table 7 presents a winner underperformance of 20.63% in relation to a contest loser for all cash deals, preceded by a long merger contest, in which the initial bids have been typically sweetened. Even though, the result is statistically significant at the 10% level, the sample size of seven merger contests is too small to draw conclusions on the matter. The sample size should have been at least ten merger contests so that conclusions on the matter could be made.

As a point of comparison, Malmendier et al. (2014) state that the long-term performance associated with winners engaged in a long-duration merger contest is 97.95% worse than losers. The result is shown to be statistically significant at the 5% level. However, Malmendier et al. (2014) do not disclose how many merger contests they have in all-cash deals. With respect to all-stock deals I did not get significant results, similar to Malmendier et al. (2014). Thus, based on the results in Table 7, it cannot be concluded that either stock- or cash-financing would have an adverse effect on long-term post-merger performance.

Table 7. Payment method – Stock Deal vs. Cash Deal

This table presents the results for the following piecewise regression:

$BHAR_{ijt} = \alpha_0 + \alpha_1 W_{ijt} + \alpha_2 t + \alpha_3 t\, W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5 Post_{ijt}\, W_{ijt} + \alpha_6 t\, Post_{ijt} + \alpha_7 t\, Post_{ijt}\, W_{ijt} + \alpha_8 PctStock + \alpha_9 PctStock\, W_{ijt} + \alpha_{10} PctStock\, t + \alpha_{11} PctStock\, t\, W_{ijt} + \alpha_{12} PctStock\, Post_{ijt} + \alpha_{13} PctStock\, Post_{ijt}\, W_{ijt} + \alpha_{14} PctStock\, t\, Post_{ijt} + \alpha_{15} PctStock\, t\, Post_{ijt}\, W_{ijt} + n_j + \varepsilon_t,$

where the dependent variable $BHAR_{ijt}$ denotes the buy-and-hold abnormal returns + /- 3 years around a merger contest j for a bidder i in a month t. W_{ijt} is a dummy variable, stating whether bidder i is a winner in a merger contest j. t is an event time variable and $Post_{ijt}$ indicates whether or not a period t belongs to a post-merger period, while n_j denotes the contest fixed effects. $PctStock$ represents the percentage paid in stock. The buy-and-hold abnormal returns are normalized to zero in the month preceding the start of the contest (the first bid announcement) and calculated as follows:

$$BHAR_{ijt} = \prod_{t=1}^{T}\big(1 + r_{ijt}\big) - \prod_{t=1}^{T}\big(1 + E(R_{ijt})\big),$$

where r_{ijt} denotes the return of the bidder i involved in a merger contest j during a period t. $E(R_{ijt})$ represents the expected return during the same period. In this regression the market return (CRSP value-weighted index) is used as a proxy for the expected return. The merger effect is reported on the bottom between two lines, which estimates the winner-loser difference in the end of the sample period. Merger effect is calculated following the approach of Malmendier et al. (2014): $\hat{\alpha}_1 + \hat{\alpha}_5 + 35\,(\hat{\alpha}_3 + \hat{\alpha}_7)$. Wald test is used to get the p-values and the standard errors are clustered by contests. ***,**,*, indicates statistical significance at the 1%, 5%, or 10% level, respectively. t-statistics are provided in the brackets. The long- and short-duration subsamples are divided in accordance with the form of payment; all-cash (columns (1) and (2)), all-stock (columns (3) and (4)).

	BHAR Market adjusted			
	All-cash		All-stock	
	Long-duration (1)	Short-duration (2)	Long-duration (3)	Short-duration (4)
Winner (α_1)	-14.88	-3.553	-3.469	-3.553
	(-1.09)	(-0.30)	(-0.14)	(-0.30)
Period (α_2)	-0.293	-0.255	-0.328	-0.255
	(-0.61)	(-1.09)	(-0.70)	(-1.09)
Winner x Period (α_3)	0.459	0.0711	-0.491	0.0711
	(0.98)	(0.30)	(-0.53)	(0.30)
Post Merger (α_4)	14.98	-17.73	15.08	-17.73
	(0.54)	(-0.58)	(0.56)	(-0.58)
Winner x Post Merger (α_5)	20.59	-19.21	-32.77	-19.21
	(1.10)	(-0.71)	(-0.60)	(-0.71)
Period x Post Merger (α_6)	0.0133	0.124	0.0501	0.124
	(0.02)	(0.16)	(0.09)	(0.16)
Winner x Post Merger x Period (α_7)	-1.212**	0.382	0.505	0.382
	(-2.50)	(0.61)	(0.35)	(0.61)
Merger Effect	-20.634*	-6.887	-35.751	-6.888
N	936	792	1,728	864
R^2	0.398	0.236	0.362	0.405
Merger contests	7	5	10	5

4.5   Robustness tests

In this section, I check for robustness of the reported negative long-term abnormal performance of acquirers. At first I examine acquirers' performance belonging to the long-duration merger contest subsample by using calendar-time portfolio regressions: Fama-French three-factor model and Carhart four factor model. After that I investigate the results rerunning Equation (6), but this time I use industry returns as expected returns. Finally, I test if the underperformance is caused by the following deal characteristics: hostile attitude, target public status, industry relatedness, and size of the acquirer.

4.5.1   Robustness of long term performance: Calendar-time portfolio regression

The underperformance of winners documented using BHARs methodology (Table 3 and Figure 3) may be caused by cross-sectional dependent abnormal returns of the sample companies. To eliminate the problems associated with BHAR approach, I run Fama-French three-factor regression and Carhart four factor regression analyses with respect to monthly returns of a portfolio that is long in merger contest winners and short in contest losers in the long-duration subsample. Table 8 reports the results for Fama-French model showing that the long-short portfolio has a significantly negative alpha of -0.35 percent per month (5% significance level). The merger effect is extracted by using the estimate of Malmendier et al. (2014): alpha x (36 + average contest duration). The results imply that a winner engaged in a long-duration merger contest underperform the contest loser by 18.11% over the time period between the beginning of the merger contest and three years after the completion of the merger. The merger effect is statistically significant at the 10% level and in line both with the magnitude and direction of the BHAR piecewise regression results presented in Table 3.

I also report Carhart four factor regression results for the long-duration subsample in Table 8. The long-short portfolio alpha is significantly negative at 0.30 percent per month with a slightly lower statistical power. The merger effect in Carhart model is approximately 15% and it is also statistically significant at the 10 percent level. Thus, the merger effect reported by Carhart four factor model is smaller in magnitude compared to the three-factor model.

The calendar-time portfolio regressions are found to be robust to issues within the BHAR approach; hence they provide appropriate robustness checks. The results of the calendar-time portfolios show that the underperformance of acquirers relative to losers is significant and varies between 15% and 18% with respect to long-duration merger contests. Hence, the results of the robustness checks are in line with the BHAR result presented in Table 3, column (1).

Table 8. Robustness Test – Calendar-Time Portfolio Regressions

The table presents Fama-French three factor and Carhart four factor calendar-time portfolio regressions for the long-duration contests. The portfolio is a zero investment portfolio that is long in the winning bidders and short in the losing bidders. The portfolios are equal weighted and rebalanced every calendar month to maintain equal weights. The portfolios are formed starting in February 1985: bidders are added to the portfolio in the beginning of the event contest and held till the 36 months has passed following the merger completion. The abnormal return estimation ends in March 2015. The month is dropped out from the time series if there is no firm return in a calendar month. Abnormal returns are estimated employing the following Fama-French three factor model and Carhart four factor model:

$$r_{pt} - r_{ft} = \alpha + \beta(r_{mt} - r_{ft}) + sSMB_t + hHML_t + \varepsilon_t$$

$$r_{pt} - r_{ft} = \alpha + \beta(r_{mt} - r_{ft}) + sSMB_t + hHML_t + mMom_t + \varepsilon_t$$

where r_{pt} is the equal weighted long-short portfolio's return in month t, r_{ft} denotes the one-month Treasury bill rate, r_{mt} is the market return, SMB_t stands for the size factor, and HML_t is book-to-market factor, Mom_t is the average return on the two high prior return portfolios subtracted with the average return on the two low prior return portfolios over the past 12 months. Merger effect is presented in percentage and it is calculated as alpha x (36 + average contest duration). For the long-duration merger contests the average duration is 15.44 months. The coefficients are estimated using OLS. ***,**,*, indicates statistical significance at the 1%, 5%, or 10% level, respectively. t-statistics are provided in the brackets.

	Long-duration merger contests	
	Fama-French three factor model (1)	Carhart four factor model (2)
MktRf	0.0599 (1.50)	0.0426 (1.04)
SMB	0.0999* (1.77)	0.101* (1.81)
HML	0.0630 (1.01)	0.0401 (0.63)
Mom		-0.0664* (-1.78)
Alpha	-0.00352** (-2.06)	-0.00295* (-1.70)
Merger Effect	-18.107*	-15.175*
N	330	330
R^2	0.019	0.031

4.5.2   Robustness test: Industry-adjusted abnormal returns

I rerun the same Equation (6) employed in Table 3, but this time I use industry-adjusted abnormal returns, instead of using market-adjusted. The results in Table 9 report that the acquirer underperformance is no longer statistically significant when changing the benchmark returns to average industry returns, yet the direction still indicates underperformance. Hence, the findings are highly sensitive to methodology, and therefore it could be concluded that the market efficiency assumption holds. In accordance with Fama (1998), possible observed anomalies disappear when used different benchmarks for normal returns, and therefore the market efficiency survives the challenge from the literature when investigating long-term return anomalies.

Next I investigate the robustness of the results reported previously regarding the deal characteristics. I split the sample in subgroups based on the deal characteristics, and rerun the piecewise linear regression for different subgroups, but this time I have replace market-adjusted to industry-adjusted returns. Table 10 reports that the merger effect associated to the characteristics is not statistically significant after the change in expected return benchmark. In line with the previous robustness check, these results support the view of Fama (1998, p. 284), "most long-term return anomalies can reasonably be attributed to chance".

Table 9. Robustness Test – Long-Term Industry-Adjusted Abnormal Returns

This table presents the results for the following piecewise regression:

$$BHAR_{ijt} = \alpha_0 + \alpha_1\, W_{ijt} + \alpha_2\, t + \alpha_3\, t\, W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5\, Post_{ijt} W_{ijt} + \alpha_6\, t\, Post_{ijt} + \alpha_7\, t\, Post_{ijt}\, W_{ijt} + n_j + \varepsilon_t\,,$$

where the dependent variable $BHAR_{ijt}$ denotes the buy-and-hold abnormal returns + /- 3 years around a merger contest j for a bidder i in a month t. W_{ijt} is a dummy variable, stating whether bidder i is a winner in a merger contest j. t is an event time variable and $Post_{ijt}$ indicates whether or not a period t belongs to a post-merger period, while n_j denotes the contest fixed effects. The buy-and-hold abnormal returns are normalized to zero in the month preceding the start of the contest (the first bid announcement) and calculated as follows:

$$BHAR_{ijt} = \prod_{t=1}^{T}\bigl(1 + r_{ijt}\bigr) - \prod_{t=1}^{T}\bigl(1 + E(R_{ijt})\bigr),$$

where r_{ijt} denotes the return of the bidder i involved in a merger contest j during a period t. $E(R_{ijt})$ represents the expected return during the same period. In this regression the average industry returns are used as a proxy for the expected returns. The merger effect is reported on the bottom between two lines, which estimates the winner-loser difference in the end of the sample period. Merger effect is calculated following the approach of Malmendier et al. (2014): $\hat{\alpha}_1 + \hat{\alpha}_5 + 35\,(\hat{\alpha}_3 + \hat{\alpha}_7)$. Wald test is used to get the p-values and the standard errors are clustered by contests. The column (4) represents the full sample, while columns (1), (2), and (3) stand for the three contest duration subsamples. ***,**,*, indicates statistical significance at the 1%, 5%, or 10% level, respectively. t-statistics are provided in the brackets.

	BHAR Industry-adjusted			
	Long-duration (1)	Medium-duration (2)	Short-duration (3)	Full Sample (4)
Winner (α_1)				
	-6.187	20.49	-2.773	4.558
	(-0.53)	(1.53)	(-0.28)	(0.66)
Period (α_2)				
	-0.814*	0.329	-0.203	-0.219
	(-1.89)	(1.45)	(-0.85)	(-1.16)
Winner x Period (α_3)	0.141	-0.742**	0.287	-0.139
	(0.34)	(-2.07)	(0.98)	(-0.65)
Post Merger (α_4)				
	-39.81	0.405	15.11	-9.165
	(-1.62)	(0.02)	(0.90)	(-0.78)
Winner x Post Merger (α_5)	44.81	-16.07	-33.54	-0.193
	(1.40)	(-0.57)	(-1.52)	(-0.01)
Period x Post Merger (α_6)	1.339**	-0.318	-0.258	0.269
	(2.48)	(-0.74)	(-0.57)	(0.94)
Winner x Post Merger x Period (α_7)	-1.374*	0.613	0.705	-0.0439
Merger Effect	-5.359	-0.0856	-1.579	-2.043
N	4,608	4,896	3888	13,392
R^2	0.233	0.227	0.228	0.211
Merger contests	32	34	27	93

Table 10. Robustness Test – Deal Characteristics

This table presents the results for the following piecewise regression:

$$BHAR_{ijt} = \alpha_0 + \alpha_1 W_{ijt} + \alpha_2 t + \alpha_3 t W_{ijt} + \alpha_4 Post_{ijt} + \alpha_5 Post_{ijt} W_{ijt} + \alpha_6 t Post_{ijt} + \alpha_7 t Post_{ijt} W_{ijt} + n_j + \varepsilon_t \,,$$

where the dependent variable $BHAR_{ijt}$ denotes the buy-and-hold abnormal returns + /- 3 years around a merger contest j for a bidder i in a month t. W_{ijt} is a dummy variable, stating whether bidder i is a winner in a merger contest j. t is an event time variable and $Post_{ijt}$ indicates whether or not a period t belongs to a post-merger period, while n_j denotes the contest fixed effects. The buy-and-hold abnormal returns are normalized to zero in the month preceding the start of the contest (the first bid announcement) and calculated as follows:

$$BHAR_{ijt} = \prod_{t=1}^{T}(1 + r_{ijt}) - \prod_{t=1}^{T}(1 + E(R_{ijt})),$$

where r_{ijt} denotes the return of the bidder i involved in a merger contest j during a period t. $E(R_{ijt})$ represents the expected return during the same period. In this regression the average industry returns are used as a proxy for the expected returns. The merger effect is reported on the bottom between two lines, which estimates the winner-loser difference in the end of the sample period. Merger effect is calculated following the approach of Malmendier et al. (2014): $\hat{\alpha}_1 + \hat{\alpha}_5 + 35 (\hat{\alpha}_3 + \hat{\alpha}_7)$. Wald test is used to get the p-values and the standard errors are clustered by contests. ***,**,*, indicates statistical significance at the 1%, 5%, or 10% level, respectively. t-statistics are provided in the brackets. The sample is split in accordance with the hostile attitude (column (1)), private target (column (2)), diversified merger (column (3)), and large acquirer (column (4)).

	BHAR Industry adjusted			
	Hostile (1)	Private target (2)	Diversified (3)	Large Acquirer (4)
Winner (α_1)	6.251 (0.90)	16.91 (1.37)	10.74 (1.68)	3.818 (0.48)
Period (α_2)	-0.262 (-0.74)	-0.203 (-0.40)	0.222 (1.02)	-0.0553 (-0.32)
Winner x Period (α_3)	-0.297 (-0.87)	-0.634 (-0.99)	-0.261 (-1.29)	-0.127 (-0.58)
Post Merger (α_4)	-4.666 (-0.12)	-49.01 (-1.43)	-1.627 (-0.07)	6.377 (0.50)
Winner x Post Merger (α_5)	10.61 (0.36)	-36.55 (-1.18)	-5.302 (-0.20)	2.992 (0.14)
Period x Post Merger (α_6)	0.200 (0.22)	0.972 (1.40)	-0.104 (-0.22)	-0.0324 (-0.10)
Winner x Post Merger x Period (α_7)	-0.700 (-0.83)	0.908 (0.94)	-0.122 (-0.18)	-0.0635 (-0.12)
Merger Effect	-18.0357	-10.034	-7.949	0.135
N	1,440	2,160	2,304	6,768
R^2	0.363	0.188	0.209	0.211
Merger contests	10	15	16	47

5   Discussion of the results

In this section I discuss the empirical results of this thesis by comparing them to the findings of Malmendier et al. (2014), which served as a motivation for this study. I also critically evaluate the validity of the results of Malmendier et al. (2014) and consider issues related to their approach to detect long-term abnormal returns. In addition to linking the findings of this study to the paper of Malmendier et al. (2014), I also discuss contributions of this thesis to the broader financial literature.

5.1   *Comparing the results to those of Malmendier et al.*

This paper is motivated by the unconventional findings of Malmendier et al. (2014), and I have followed their approach to evaluate the validity of their results. Their novel approach to examine merger contests, when estimating long-term value impacts of mergers on the acquirers, is able to resolve some of the problems related to the unobservable characteristics of a company, present in the previous studies. However, it cannot be ruled out that there would not be any additional unobserved factors affecting stock returns. Furthermore, Malmendier et al. (2014) argue that that sample is limited to bidders having equal chance of winning pre-merger, but the researchers do not exclude deals with hostile attitude, even though hostile attitude is considered to decreased the probability of acquiring the target (Baker and Savasoglu, 2002). Including hostile deals in the sample could be related to an attempt not to cut down the sample size any more than necessary, and instead choose to control the deal attitude separately, like other identified observable characteristics. Accordingly, applying the approach of Malmendier et al. (2014) comes with a cost, as the sample size decreases significantly when exploiting data solely on merger contests.

The time period used in this thesis is three years longer than that used by Malmendier et al. (2014). In addition, the sample size of 93 merger contest is six bidders larger than the sample used by Malmendier et al. (2014). Even though the time periods are overlapping in our papers, it is unclear which companies Malmendier et al. (2014) have included in their sample. Furthermore, to my knowledge the academics do not examine their data for extreme values, irrespective of their small sample size. On the contrary, I winsorized my data set by replacing the outliers with less extreme values.

The results reported in this thesis differ significantly from those presented by Malmendier et al. (2014). The dissimilarities between the results can be explained by the aforementioned differences in the sample and sample size. Thus, it appears that the findings are highly sensitive to the changes in the sample, which is expected considering the sample size. Malmendier et al. (2014) report that the contest winners underperform the losers by as much as 46.4% and 45.25% in the long-duration contests in terms of the market- and industry-adjusted abnormal returns, respectively. The results of Malmendier et al. (2014) are statistically significant at the 5% level. The acquirer underperformance reported in this thesis varies between 5.36% and 18.11% and is statistically highly sensitive to the expected return benchmark. The sample size employed by Malmendier et al. (2014) in the long-duration contest subsample is almost one third smaller than mine. In addition, Malmendier at al. (2014) report that the short-duration contest winners outperform the losers by 54.27% and 50.95%, in terms of market and industry adjusted abnormal returns. The outperformance is statistically significant at the 5 and 10% level, respectively. My results do not support the observed positive performance for winners engaged in the short-duration contests.

With respect to the payment method, Malmendier et al. (2014) examine the long-duration subsample and find that financing the acquisition with cash is associated with a severe negative post-merger underperformance of 97.95% in relation to the contest losers. The result is statistically significant at the 5% level. Although, Malmendier et al. (2014) do not disclose how many merger contests they have in the combined all-cash and long-duration subsample. As a point of comparison, when conducting a similar regression I have only seven merger contests included in the corresponding subsample, on the basis of which I concluded that no decisive conclusion can be made regarding the impact of cash-financing on long-term post-merger stock returns.

5.2   *Linking the results to the financial literature*

Long-term effects of a certain event are challenging to examine, because it is hard to measure the isolated effects of one event over a long period of time. Hence, performance and valuation effects caused by corporate acquisitions are difficult to observe directly, as benefits may be achieved after a longer period of time than the period under the scrutiny. Moreover, the observed performance effects may simply reflect changes in macro-economic events or trends (Malmendier et al., 2014). Models for testing long-run performance have proven to be highly sensitive to changes and to the selected expected return benchmark. This sensitiveness is

likely to explain the controversial results of the previous empirical studies regarding long-term post-merger impact on the acquirers (see, e.g. Mandelker, 1974; Langetieg, 1978; Agrawal et al., 1992; Loderer and Martin, 1992; Mitchell and Stafford, 1997; Rau and Vermaelen, 1998; Savor and Lu, 2009; Malmendier et al,. 2014).

Based on the empirical results reported in this thesis, the acquirers obtaining a target company after a long-lasting merger contest with at least one challenging bidder involved in a bidding war statistically underperform the unsuccessful challenging bidders by a range between 15.18% and 18.11% in the long-term. This underperformance is statically significant at the 10% level when using the calendar-time portfolios and the event-time methodology with market-adjusted buy-and-hold abnormal returns. However, the underperformance is no longer statistically significant when changing the benchmark to average industry returns, yet the direction still indicates acquirer underperformance.

The pattern is similar to the transaction characteristics first found to affect long-term abnormal acquirer return but when the benchmark for normal return is changed to industry return benchmark the results become insignificant. The previous studies, such as the paper of Loughran and Ritter (1995), have shown that long-run event studies are highly sensitive to the selection of normal returns, as any small error in calculations accumulates with the calculation period. Fama (1998 p.285) highlights that the bad model problem in long-term return studies is severe, because "bad model errors in expected returns grow faster with the return horizon than the volatility of returns."

Even though examining the market hypothesis is outside the scope of this thesis, it appears that it does hold, since no consistent long-term abnormal returns are detected. Following the Fama (1998) it could be stated the merger effect is up to pure chance, and the chance of observing underperformance is about as frequent as observing outperformance. According to Fama (1998, p. 284): "most long-term return anomalies can reasonably be attributed to chance".

6 Conclusion

In this thesis I empirically examine whether mergers create or destroy acquirer value by employing a novel methodology similar to the one used by Malmendier et al. (2014) applied to a sample composed of U.S. merger contests including 93 acquirers and unsuccessful bidders. Malmendier et al. (2014) suggest that by examining merger contests it is possible to eliminate or reduce the omitted variable bias by using the contest losers' performance as a counterfactual for how acquirers would have performed in the absence of the merger. Malmendier et al. (2014) reason that it is likely that merger contest winners are more similar to contest losers than they are to the average company in the market. The mergers included in the sample have been completed during the time period between 1985 and 2012. In assessing the long-term value impact, I employ both the event-time and calendar-time methodologies, and the improved benchmarks, contest losers, to detect long-term abnormal returns.

Contrary to the results of Malmendier et al. (2014), I do not find evidence of consistent post-merger acquirer value disruption. However, no long-term value creation is detected either. The reported results are robust across the following transaction characteristics identified by the prior literature: (i) payment method (cash or stock), (ii) industry relatedness (related or unrelated target), (iii) number of bidders, (iv) relative deal size, (v) deal attitude (hostile or friendly), (vi) acquirer size, (vii) acquirers' Tobin's Q, (viii) targets' public status (private or public), and (ix) target size. However, it should be noted that even though the sample size used in this study is larger than that employed by Malmendier et al. (2014), it is still restricted and may have an impact on the results. Accordingly, applying the approach of Malmendier et al. (2014) comes with a cost, as the sample size decreases significantly when exploiting data solely on merger contests.

The findings in this thesis also do not give support to the results of Malmendier et al. (2014) regarding the negative post-merger performance associated with cash-deals. My results are in line with the majority of the previous financial studies, documenting that, on average, cash deals are not value disruptive in terms of long-term abnormal performance. Moreover, I do not find evidence of stock-deals being value disruptive either, which is contrary to what is typically reported in the U.S. studies (see e.g. Asquith, 1983; Huang and Walking, 1987; Loughran and Vijh, 1997; Dong et al., 2006).

To conclude, I do not find any reason why executives should avoid merger and acquisition activities. It also appears that, on average, the payment method does not affect the performance over long-term. Hence, cash- and stock-deals are equally justified and expanding inorganically is a sound strategy among other corporate strategies.

Suggestions for further research

In this study the performance of winners and losers is measured with abnormal stock returns, and thus no private acquirers or challenging private company bidders are included in the sample. Including private companies into the sample could be done by choosing another performance proxy than stock returns, e.g. one could investigate the change in profitability. As a result, all merger contests during the observation period could be taken into account and the issue with small sample size would also be mitigated. With respect to the observation period, it would be interesting to increase it to cover five years, and to check if the results remain unchanged. It could be the case that the three-year post-merger observation period is too short of a time for capturing positive integration synergies, such as revenue and cost synergies.

The findings regarding the calendar-time portfolios are surprising and need further research, as they indicate that there could be an arbitrage opportunity associated with a portfolio that is short in the stocks of merger contest winners and long in the contest losers. However, the calendar-time portfolios are conducted so that only winners and losers that have been engaged in merger contests for at least ten months are included in the sample. Hence, knowing beforehand, at the time of the first bid announcement, whether the contested merger will last a long-period of time is impossible. Based on my results it is unclear, whether the arbitrage opportunity would exist immediately or some time after the merger competition would have ended. It could be that to exploit the arbitrage you would have to know the opportunity beforehand, but answering to this would need further research.

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Appendix A: Terminology and definitions

In this appendix I go through the key terminology and definitions related to mergers and acquisitions and to this thesis.

Acquirer: a company acquiring another company

BHAR: an abbreviation for buy-and-hold abnormal return

Loser: an unsuccessful bidder unable to close the deal with the target, i.e. a loser in a merger contest.

M&A: an abbreviation for mergers and acquisitions.

Merger: strictly speaking, the concept of merger refers to a corporate transaction in which two companies are combined as equals. However, nowadays in most of the studies the concept stands for a general change of control in a company, and therefore I use the concepts of merger, acquisition, and takeover interchangeably.

Merger/ bidding contest: refers to a contest for the control over a target company. In this context, participants in a merger contest have publicly announced their bids and have equal ex-ante chance of winning.

Target: Refers to a company that potential acquirers are bidding for.

White knight: an acquirer that purchases the target on the verge of being taken over by a hostile bidder. In white knight takeovers it is common that the current management stays in place.

Winner: a successful bidder i.e. an acquirer, obtaining a target after winning a merger contest