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The impact of M&A announcements on stock prices of the bidding firm - Event study based on German and US-listed firms

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Abstract

The capital market reaction on M&A announcements of the bidding firm is a complex topic, which implies contradictory opinions. Some argue that the market reacts positively to an announcement as synergies and value maximization can be realized. Others argue the other way round as the commitment to M&A can be a manifestation of agency problems or management overconfidence. This empirical study examines the question of the effect of M&A announcements on the stock price of the respective bidding firm. Therefore, the abnormal returns of the announcements are measured using the widely used market- and Fama and French's (1993) 3-factor model. The sample consists of 60 M&A announcement events for the period of 1998 – 2017, whereas 30 firms refer to the German and 30 firms refer to the US market. To test for robustness, we have used parametric and non-parametric test procedures. In accordance with the theory and the prevailing literature, abnormal returns are mostly insignificant. Our comparison of German and US-listed firms revealed that US firms rather realize negative abnormal returns, whereas German firms realize positive abnormal returns. The results hold across variations in models and event windows.

Keywords: M&A, Capital market, Stock price, Bidding firm

1 Introduction

Mergers and acquisitions (M&A) play a very important role in business activities. They present a predominant strategy in entering new markets or expanding distribution channels and eventually growing faster. In general, bidding firms seize this opportunity to mitigate risks, create value through better efficiency, reduce costs through economies of scale and strengthen business by making their operations more synergetic. Announcements of M&A directly affect stock prices of the bidder and have been subject to numerous event studies. The induced market reaction thereby depends on the perceived value creation for the stockholders. Current examples like the takeover of Monsanto by Bayer have raised the question on both the US and German market about Bayer's future profitability. Thus, we contribute to the literature by looking at US and German bidders, examining and comparing the differences in M&A announcements on their respective stock prices.

The study proceeds as follows: Section 2 provides information on the theoretical background of M&A. Section 3 reviews prevailing literature and derives hypotheses out of it. Section 4 describes the data and the empirical methodology. Further the results are presented and interpreted. The study ends with conclusions and limitations (Section 5).

2 Theoretical Foundation

In this theoretical section, we describe theories relevant to M&A. Theories give the framework of why managers engage in transactions. Thereby, the theoretical foundation of M&A from a bidding firm perspective is quite complex, and many theories have explanatory power for engaging in M&A at the same time. Depending on the theoretical context the event took place, the corresponding abnormal returns might be different. We will start with theories speaking for positive abnormal returns and follow-up with theories speaking for negative abnormal returns

Firms can maximize enterprise value by M&A. Realizing synergies is a major driver for M&A as they allow to improve business performance. There are several types of synergies that help to increase shareholder value. Synergies can allow for greater production efficiencies through economies of scale and scope that yield higher profits or decreased capital spending, tax advantages, and concentration of market power (Devos, Palani-Rajan, and Krishnamurthy, 2009). In order to be value-maximizing, the combined cash flow of the bidding and the target firm has to be higher than the stand-alone-value of the bidding firm, whereas the purchasing price has to remain below the net present value of the target firm (Barney, 1988). Unique synergies that can only be realized between the bidding and the target firm (not between other firms and the target) take advantage of particular differences in resource allocations and have greater diversification and value-maximizing potential (Barney, 1988; Harrison et al., 1991). Furthermore, greater management competence, reduction of agency costs through redistribution of organizational capabilities, and avoidance of bankruptcy costs through diversification can be achieved with M&A (Jensen and Ruback, 1983).

Besides realizing synergies mergers can help to clear or reduce inefficiencies in the target firm and help to maximize value in the combined firm. The market for corporate control determines that managers compete for managing corporate resources. A merger in this matter causes a shift in corporate control from the target to the bidding firm. If the management of the target firm is incompetent, it would be terminated in consequence of a successful takeover and replaced by the more competent management team of the bidding firm. Thus, the market for corporate control would reduce inefficiencies and serve as an external control mechanism that limits managerial opportunism. Positive wealth effects for the target firm and the bidding firm are the consequence (Jensen and Ruback, 1983). Thereby, takeovers can help to avoid unpleasant bankruptcies as a consequence of mismanagement (Manne, 1965).

Under different circumstances, M&A can be value destructive. Agency problems arise when the agent delegates its personal utility maximization to the agent, while respective interests and utilities are not aligned. Non-aligned interests and utilities may lead to agency decisions, which are not in favor of the principal or the firm (Ross, 1973). Furthermore, agency problems are a consequence of information asymmetry between the agent and the principal, which are exploited by the agent to maximize its own utility. Management has control over information and does not or falsely provides them to the shareholders (Jensen and Meckling, 1976; Bosse and Phillips, 2016). In terms of M&A, agency problems arise whenever managers take advantage of the information asymmetry by pursuing transactions that are only meant to enlarge their influence and control over resources rather than for generating shareholder value (Jensen, 1986). Acquisitions referring to “empire building” do not create value which can be distributed among the firms and considering the transaction costs of negotiating and potential coordination, it is likely that there would be an overall economic loss, especially for the bidding firm (Halpern, 1983). Aside from “empire building”, the linkage of management compensation to firm sales creates a potential for opportunistic takeovers. Managers can acquire firms to enlarge the overall sales figures, resulting in increased personal income of the respective manager (Jensen, 1986). Moreover, bad managers perform much worse in M&A than good managers (Morck, Shleifer, and Vishny, 1990). At the same time, bad managers are particularly willing to engage in M&A. They engage in manager-specific deals, which make it hard for shareholders to replace the management. On top of that, these deals allow bad managers to require higher wages and greater resources. To avoid replacement, bad managers are willing to overprice acquisition targets in manager-specific deals simply to retain their jobs, and thereby, destroy value for the shareholders of the bidding firm. This effect is even magnified if the management of the target firm is much more competent than the management of the bidding firm (Shleifer and Vishny, 1989).

Management overconfidence or hubris as a driver for M&A implies a negative capital market reaction. The hubris hypothesis indicates that managers pay too much for acquisition targets. Managers do not abandon acquisition targets whose market price is higher than the net benefit of the transaction (valuation). They do so as they overestimate their own management competence, making them believe that the transaction will somehow turn beneficial for the firm. Thereby, managers are not acting intentionally against the interests of the shareholders (Roll, 1986). Management hubris is a consequence of a self-attribution bias. Managers tend to reflect the firm’s recent performance on themselves making them increasingly overconfident. The same counts for the media praise of the manager and his self-importance. In general, overconfidence causes managers to engage in large deals and to pay price premiums. The greater the confidence of the manager the bigger the transaction as well as the price premium will be (Hayward and Hambrick, 1997). At the same time, overconfident managers are willing to engage more frequently in M&A than rational managers. A successful past merger experience makes managers confident in taking a high number of deals, even though they might be value destructive. This is a consequence of a self-

attribution bias, in which managers reflect the success of the past merger on themselves, making them overconfident and less diligent (Doukas and Petmezas, 2007). Hence, the quality of each merger declines with an increasing number (Billett and Qian, 2008).

Management overconfidence implies a variety of direct effects. The "above-average-effect" describes the tendency of individuals to see themselves as "above-average" on characteristics that are socially desirable (Nier, 2004). It describes the bias of many people, which makes them believe that they are more capable than others in doing certain activities. Self-attributed "above-average" managers of firms believe that their firms should do better than other firms, even though there is no rational motivation or reason for this belief. "Above-average" managers are subject to overenthusiasm and excessive optimism, which makes them press their firms to "myopic overexpansion" (Larwood and Whittaker, 1977). Miscalibration is the systematic underestimation of the range of potential outcomes. This is a consequence of managers either overestimating their own abilities or underestimating the volatility of random outcomes. Miscalibrated managers have excessive confidence that their information is accurate. They overestimate the precision of their forecasts and underestimate the variance of risky processes. Corporate decision-making processes are influenced by miscalibration. Investment return predictions (e.g. through M&A) are subject to miscalibration, which undermines the accuracy of it. Accordingly, miscalibrated managers tend to invest more and to generate more debt based on their biased information (Ben-David, Graham, and Harvey, 2013). Finally, overconfident managers have problems in anticipating risks in the valuation of investments. The "WACC fallacy" is a disability of managers to account for the project-specific risk in discount rates. They rather go for a single discount rate for all investment projects. This deficit in considering project-specific risk is particularly hurtful if there is a decision-problem in investing in two alternatives with different risk structures. Through the single discount rate, the less risky project is sanctioned whereas the riskier project is subsidized, resulting in value destruction and a non-optimal usage of capital. The "WACC fallacy" is a consequence of management overconfidence and bounded rationality. Overconfident managers tend to apply simplified methods like "rules of thumb" for important corporate decisions as they overestimate their own abilities (Krueger, Landier, and Thesmar, 2015). Concluded, all patterns of management overconfidence speak for a negative capital market reaction to M&A.

3 Literature Review and Hypothesis Development

In this literature section, we present selected empirical sources for the abnormal returns of bidding firms. Prevailing literature does not find common results for the abnormal returns of M&A announcements, which coincides with the theoretical foundation. The theoretical foundation combined with prevailing literature will then be used to derive hypotheses for our paper.

Abnormal returns (positive and negative) are only realizable for the bidding firm if the transaction comes unexpectedly for the market. As mergers are usually well anticipated by the market, the effect is already priced in the stock of the bidding firm, allowing only for normal returns (Barney, 1988; Capron and Pistre, 2002). However, some empirical studies demonstrated that abnormal returns are possible for the bidding firm, which will be elaborated in the following, starting with positive abnormal returns:

Barney (1988) found out that bidding firms can realize positive abnormal returns if the market for corporate control is imperfect. This implies the existence of private and unique cash flows between the bidding and the target firm, which are furthermore inimitable and unexpected. If the transaction can take advantage of these market imperfections, the bidding firm experiences positive abnormal returns. However, if the assumption of semi-strong capital market efficiency (Fama, 1970) holds, cash flows are publicly known and there are several potential bidding firms, abnormal returns are distributed among all potential bidders and respective firms can only earn normal returns. Capron and Pistre (2002) found out that M&A might create value, but the value distribution to the bidding firm depends on the post-merger resource allocation. By simply taking over the resources of the target firm, bidding firms cannot realize abnormal returns as other potential bidders compete for these returns. However, if the bidding firm transfers its resources to the target firm within the transaction, it can earn positive abnormal returns. Faccio, McConnell, and Stolin, (2006) distinguished between the acquisition of listed and unlisted firms. They discovered that the acquisition of listed firms generates small and insignificant negative average abnormal returns, whereas the acquisition of unlisted firms generates significant positive average abnormal returns. They could rule out potential other effects explaining positive abnormal returns such as methods of payment, information leakage, ownership structure, size and so on and confirm the listing effect. However, they did not find any rational, which could explain the listing effect. Capron and Shen (2007) followed up this discussion and argue that the acquisition of a private firm generates positive abnormal returns as less information on private targets is available, allowing for greater exploitation of privately held information and, by that, greater value creation than the acquisition of public firms. Travlos (1987) has put emphasis on the method of payment for bidding for a firm. He came to the conclusion that bidding firms experience significantly negative abnormal returns if a simple exchange of shares is used for the payment, whereas cash-financing bidding firms can expect significant positive abnormal returns. This finding can be set into the context of signaling as the cash payment signals information of financial power, whereas stock exchange payment reveals information of an undervaluation of bidding firm's stocks. All of these sources

have in common that can be set into the theory of value maximization, which is the predominant approach in M&A based studies.
On the other hand, Malatesta (1983) argues that the immediate and long-run effects of mergers are negative for bidding for firms. He used cumulative abnormal dollar returns as a performance measure to analyze the real cash effect. He found significant negative abnormal dollar returns for bidding for firms and justifies this finding with the notion of "empire building". He concludes that mergers are negative net present value activities for bidding firms.

Out of this short literature review and the theoretical foundation, we cannot clearly indicate if there are abnormal returns for the bidding firm at the moment of the M&A announcement. Furthermore, whether abnormal returns are positive or negative is subject to event-specific analysis and cannot be determined beforehand. Thus, our null hypothesis is that there are no abnormal returns for the bidding firm, whereas our alternative hypothesis states that there are abnormal returns:

H0: AR = 0 There are no abnormal returns for the bidding firm.

H1: AR ≠ 0 There are abnormal returns for the bidding firm.

4 Data and Methodology

Our study covers a total of 60 events from 60 different bidders between 1998 and 2017. We randomly picked one M&A announcement for each of the German stock index (DAX[1]) and the US stock market index (Dow Jones Industrial Average) components. We include only one announcement per firm to avoid overlapping event windows. This leads to two comparable event studies of two markets containing 30 events and firms each. In accordance with the central limit theorem, the sample size is large enough to assume a normal distribution and to test the null hypothesis.

We collect all information on M&A announcement dates manually using several data sources: Crunchbase, Financial Times, Reuters and Handelsblatt. We set no limitations to the target firms. In case we found several different announcement dates for one specific deal, the earliest announcement date available is used. If this date is on a non-trading day, the first trading day after the announcement date is taken as the event date. Figure 1 summarizes the distribution of the events of M&A deals by year and market. Next, we obtain daily adjusted closing stock prices from Yahoo! Finance to calculate daily stock returns for each firm.

Finally, we acquire market data. As we show in the next section, we first use the market model and later the Fama and French (1993) 3-factor model to estimate expected returns. The first factor of the 3-factor model also serves as a market return benchmark for the market model. Data on each factor come from Kenneth French's website (US data) and the website of Humboldt University of Berlin (German data).

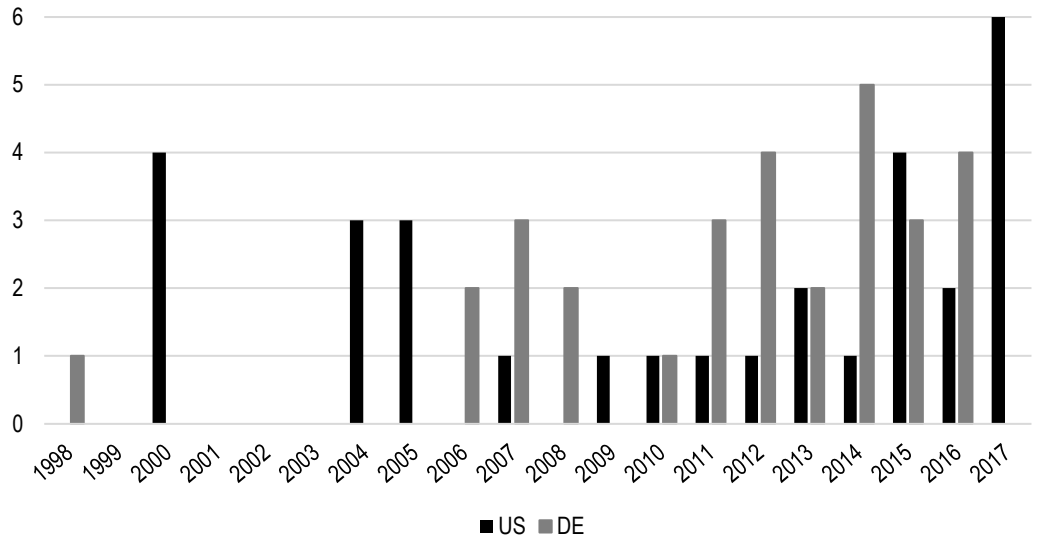
The research period for US firms runs from 2000 to 2017. For German firms, however, the research period runs from 1998 to 2016, since the Fama and French (1993) 3-factor model data is only available until then.
The following section describes the event study methodology that we applied to examine the effects of M&A announcements. Firstly, we conduct the conventional event study approach developed by Brown and Warner (1985) to measure the magnitude of abnormal returns due to M&A announcements. We apply the market model, which relates stock returns to the return of the market portfolio to estimate expected returns and consequently abnormal returns (ARs).

The key assumption of this conventional methodology is the rationality in the marketplace and how new information is disclosed and translated into stock prices (Fama et al., 1969). As per this efficient market hypothesis, we expect that any M&A announcement that is new to the market will be reflected instantly and completely in stock prices at the announcement date itself (Jensen and Ruback, 1983).

Secondly, we use the Fama and French (1993) 3-factor model to estimate expected returns and to calculate AR. As suggested by Brown and Warner (1985), we select an estimation window compromising of 100 days [-120, -21], in which no event occurs, since daily return data for the 120 days prior to the event date is sufficient in formulating a benchmark for expected returns.

[1] Two firms have been taken from the MDAX which formerly belonged to the DAX, though.

Figure 1: Event distribution



The figure plots M&A announcements by market and year from 1998 to 2017.

Given the nature of M&A announcements, we initially examine an event window comprising 10 trading days before and 10 trading days after the announcement day [-10, +10] as errors could be made during the publishing process, market reaction could be delayed or publisher's sources could be wrong (Peterson, 1989). Possible insider trading, information leakage or even market anticipation before the announcement date cannot be ruled out as well (Keown and Pinkerton, 1981). In accordance with MacKinlay (1997), we report several cumulative average abnormal returns (CAARs) for different event window lengths to examine the sensitivity of the announcement day and to observe how ARs develop within the event window. We report CAARs for the event window [-10,10] and for the days surrounding the event day [-1,1]. In addition, we report CAARs for a prior-event period [-5, -1] and a post-event period [1,5] to examine possible anticipation of the announcement or a delay of information.

Finally, we apply a two-tailed parametric test and a non-parametric sign test as described in MacKinlay (1997) to test the significance of the different CAARs under the null hypothesis mentioned in section 3. To provide a robustness check to the results of the parametric test, we also follow the methodology proposed by Corrado (1989) and calculate a non-parametric rank test.

For this study, we compare the results of German bidders with those of US bidders. Hence, the adopted event study methodology procedure remains the same for both the US and German market.

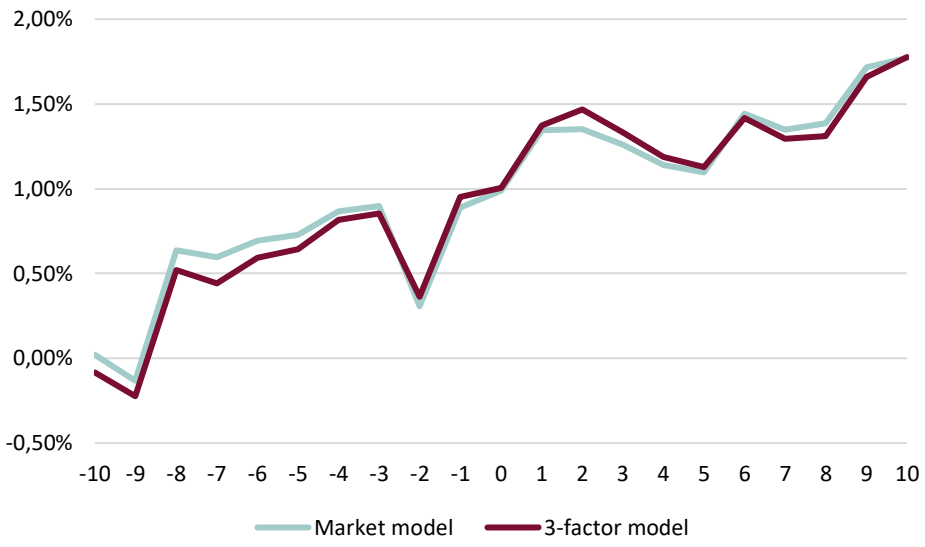
5 Empirical Results

This section is divided into three parts. First, we report the results for German bidders. Second, we report results for US bidders. Lastly, we compare both results and draw conclusions from the different markets.

The cumulative abnormal returns (CARs) for German bidders are depicted in figure 2. On average, the ARs of the bidding firms from Germany show a positive reaction within the reported event windows. Table 1 illustrates the CAARs and t-statistic over the different test periods.

For the German results, we can infer from table 1 that the CAARs (1) calculated with the market model range from 0.11% - 1.77% across the examined event windows. However, we find that CAARs (1) are statistically insignificant for all event windows except for the event window [-1,1], with a statically significant CAAR (1,04%) at 5% level. This suggests that the stock prices may show small positive CAARs over a short period immediately before and after the event but over a longer prior- and post-event window there are no significant ARs. It is difficult to draw any consistent conclusion because the t-statistic rises to 1.58 for the event window [-10,10].

Figure 2: Cumulative abnormal returns for Germany

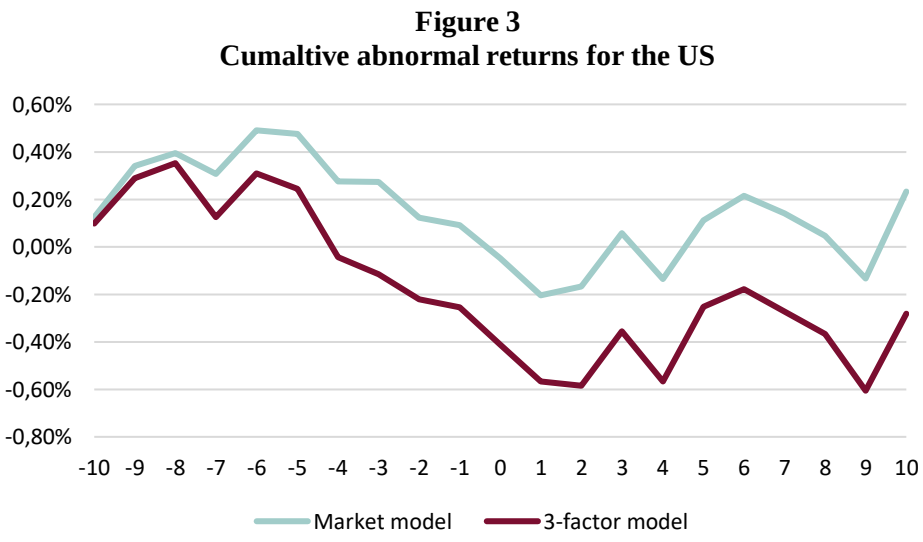


The figure depicts the fluctuation in the CARs of German bidders over the event window [-10,10].

Using the Fama and French (1993) 3-factor model, the CAARs (2) for German bidders react in a similar way and are slightly higher (0,12%-1,78%) except for the event window [-1,1] (1,01%). Hence, the t-statistic for this event window [-1,1] is less significant compared to the market model. The other event windows remain insignificant.

Contrary to the findings of the parametric test, the results of the non-parametric tests, depicted in table 2, show that there are no significant ARs in the event window [-1,1].

Figure 3: Cumulative abnormal returns for the US



The figure presents CARs over the event window [-10,10] of bidding firms from the US.

The CARs for US bidders are depicted in figure 3. On average, the abnormal returns of the bidding firms from the US follow a slightly negative trend.

As can be seen in table 1, half of the reported CAARs (1) for the US bidder calculated by the market model are positive (0.23% in [-10,10] and 0.16% in [1,5]) and half are negative (-0.33% in [-1,1] and -0.41% in [-5,-1]). Fama and French (1993) 3-factor model yields more negative CAARs (3) on average, even changing the algebraic sign for the CAAR in event window [-10,10] (from 0.23% to -0.28%). Despite these results, neither of the CAARs are statistically significant.

Consistent with the findings of the parametric test, the non-parametric tests depicted in table 2 fail to reject the null hypothesis, indicating that there are no significant ARs for US bidders.

Table 1: Cumulative average abnormal returns and t-statistics

	Market model		**3-factor model**	
Event window	**CAAR**	**Test-statistic**	**CAAR**	**Test-statistic**
	(1)	**(2)**	**(3)**	**(4)**
Germany				
-10 to +10	1.77 %	1.58	1.78 %	1.59
-1 to +1	1.04 %	2.46**	1.01 %	2.41**
-5 to -1	0.20 %	0.36	0.36 %	0.67
+1 to +5	0.11 %	0.20	0.12 %	0.22
US				
-10 to +10	0.23 %	0.20	-0.28 %	-0.24
-1 to +1	-0.33 %	-0.74	-0.35 %	-0.79
-5 to -1	-0.40 %	-0.69	-0.56 %	-0.99
+1 to +5	0.16 %	0.28	0.16 %	0.28

*The table reports bidders' CAARs and associated statistics sorted by model and market for the estimation window [-120, -21]. CAARs and the statistical significance are determined as described in section 4.1. ***, ** and * denote statistical significance at the 1, 5 and 10% level, respectively.*

In accordance with the theoretical framework, the outcomes for the two markets are ambiguous. While the CARs for German bidding firms show a positive reaction throughout the 21-day event window, the negative CARs for US bidders tend to reverse back to zero at the end of the event window [-10,10]. Furthermore, the absolute values of CAARs are slightly higher for Germany. This indicates that market reaction to takeovers in Germany is positive, whereas the takeovers in the US market are not in favor of the stockholders. The single positive significant CAAR in the event window [-1,1] of German bidders suggests that the stockholders support M&A deals as they expect future efficiency of the transaction and thus gain from the M&A activity.

Additionally, the explanatory power of the 3-factor model seems to be better for the US market, which is indicated by the bigger spread between the two models, compared to the German market. Though we find one significant event window and differences in the direction of AR in the markets, we find that all CAARs of bidding firms in both markets are statistically insignificant using the non-parametric tests in the event window [-1,1]. Possible outliers seem to drive the single positive significant CAAR.

Thus, we conclude that there is no informational value created for the stockholders of the bidding firms on neither market at the time surrounding the M&A announcement as they do not earn any sort of AR. This result is in line with the findings of the earlier studies.

Table 2: Non-parametric test statistics

	Market model		3-factor model	
	Sign test	**Rank test**	**Sign test**	**Rank test**
Germany	0,83	0,00	1,00	1,22
US	0,92	-0,71	0,34	-0,22

The table reports test statistics for the sign and rank test for the event window [-1, 1].

6 Conclusion and Limitations

Our research analyzes the impact of M&A announcements on bidder firms' stock returns. The primary objective of this study is to examine and compare possible differences in ARs experienced by German and US-listed firms. We find that the bidding firms on the German market experience positive CAARs around the M&A announcement period, whereas the CAARs of US bidders are slightly negative. At the same time, the contrary price reactions are not statistically significant. The study concludes, as hypothesized, that there are no ARs on bidding firms on the German and US market at the time surrounding the event day.

In the following, the limitations of our study shall be presented. First, there is the possibility of misspecification of the announcement dates. We cannot control for possible insider trading, information leakage or a delay of information in the media. Secondly, our sample size is rather small. The power of the test results can be increased by increasing the sample size (MacKinlay, 1997). Besides, we face a certain clustering of events. As figure 1 indicates, the samples are skewed in favor of recent events for both markets. Although the clustering of data does not alter the results (Brown and Warner, 1985), more homogenous samples would simplify a comparison. Furthermore, our results could be influenced by events during financial crises. As we set no limitations on the target firm, we do not test or control for additional variables. Control variables, e. g. industry or method of payment are not included for complexity reasons.

Since we compare events of DAX and DJIA listed bidders, our results are limited to these two markets and can hardly be transferred to the whole German or US economy. Further research can be conducted, extending our work by using a greater sample size and by controlling for several variables

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