

# “The effect of Mergers and Acquisitions in the short-term operating performance”

Master Accounting, Auditing and Control

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## Abstract

Mergers and acquisitions (M&A) are a regular occurrence and the takeover amounts are increasingly out of reach. Previous research has not yet shown whether the M&A has a positive effect on the financial performance amount, because previous research has drawn conflicting conclusions. For this reason, in this study I investigate the short-term effect of an M&A transaction on a company's financial performance, based on ROE and stock price. For this purpose, this research used data on the ROE and stock price of the companies in the sample. To define an effect of the M&A transaction on this financial performance, the regressions include a variable of interest which represents the period of measuring. If financial performance is measured in ROE, the transaction has a negative effect. If the performance is measured in the stock price, there's an positive effect. However, the coefficients in both regressions are not significant, so there is not enough statistical evidence that the M&A transaction has a positive or negative effect on the company's financial performance.

**Key words:** Mergers, Acquisitions, HHI-index, Dealvalue, Return on Equity, Stock price

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## 1. Introduction

The total volume of merger and acquisition (M&A) transactions in the US rose to a record high in 2021. In fact, the volume increased to 2.9 trillion dollars in 2021 compared to 2020, when the volume was 1.9 trillion dollars (up 55%). The share in total volume in the world rose from less than 50% in 2020 to almost 60% in 2021. Despite the record volume of transactions in 2021, experts expect the volume in 2022 to surpass that of 2021. The Russian invasion of Ukraine appeared to dampen the volume. However, it appears that the long-term impact of such a crisis on the overall volume of U.S. mergers and acquisitions in 2022 and beyond remains to be seen. In the field of mergers and acquisitions, new trends have emerged in America in 2022 that could be of interest to potential investors, namely private equity deals, COVID-19 and related exceptions, regulatory scrutiny, auction jumping and Ukraine related sanctions (Wolters Kluwers, 2022). Several major M&A transactions were completed or announced in 2022 as well.

The most recent example known worldwide concerns the takeover of Twitter by Elon Musk. Elon Musk paid 44 billion dollar and his reign is immediately visible. Elon Musk immediately fired the current top of the company and implemented a reorganization. After a few days, the next reign of Elon Musk came out, namely having to pay for the blue tick which famous and influential people used to have. Musk wants Twitter to be a warm and welcoming social media platform for everyone. In addition, Twitter is set to become the most respected media platform in the world for advertisers. However, these major measures by Twitter's new administrator do not bring the desired results in the short term. For example, he recently revealed that Twitter has fallen in value enormously in recent times. For example, Elon Musk paid about \$ 44 billion for the company in 2022 and announced at the end of March 2023 that the company was still worth about \$ 20 billion. He made this known in an email to Twitter employees, which was initially intended to inform them about a new stock compensation program. He warned that Twitter is in a precarious financial position and that at some point it would only take four months for the money to run out. The 'radical changes' he made shortly after his takeover were therefore necessary to avoid bankruptcy and streamline operations. M&A transactions take place commonly because investors see opportunities with the company to accelerate economic growth, for example through synergies, increasing market power or spreading risk (CFI, 2022). Due to the major organizational changes, general purposes of M&A's and future changes, journalists doubt whether Musk is the destroyer or the savior of Twitter. Does an M&A transaction therefore have the desired positive impact on the company?

But what is the real effect of a merger or acquisition on a company? As discussed above, the volume of M&A transactions has only increased in recent years, but does this also mean positive consequences for the companies involved in the transactions? For example, previous research into cross border mergers and acquisition of Chinese firms has shown that the

announcement of a merger or acquisitions can already lead to an increase in the stock price (Tao et al, 2017). In addition, Havelkorn, Zenner and Shivdasani (2005) have investigated the short-term effect of a merger or acquisition on the performance of a company. Their research also found evidence that a 'right' merger or acquisition transaction can create substantial value for the acquirer. A quarter of the transactions examined lead to a change in profit of more than 5% and an eighth even to more than 10% in the short term. Several of the transactions examined on the other hand, produced disappointing results. In contrast to other research, the research by Vlamos (2020) has yielded different results. He wrote in his paper on the long-term effect of a merger or acquisition on operating performance. The study of Vlamos (2020) examined 288 mergers and acquisitions that took place in the US in the period between 2003 and 2014. It cannot be concluded from the results of this study that mergers and acquisitions automatically lead to improved business results. In addition, this study also found that corporate takeovers do not produce worse results.

Another study from Cioli et. al (2020), examined the effect of the M&A transaction on both the bidder and the target. For this study, we looked at the results from that study in terms of the target. For example, they examined Italian target companies in the period 2006-2013 by comparing the three years after the transaction with the year before the transaction. They found no significant changes in the performance of the targets in the post-transaction periods compared to the pre-transaction period. The study did find that the targets' leverage in the post-transaction periods was higher than in the pre-transaction period, or in other words that the debt-to-equity ratio increased. Will these results also come from a study into the short-term effect of mergers and acquisitions on operating performance? Or do mergers and acquisitions have a very positive effect on a company's operating performance in the short term? To investigate this, the following research question was formulated:

*What is the effect of a merger or acquisition on the short-term performance?*

This research is scientifically relevant because previous research has not shown what real effect mergers and acquisitions have on the short-term operating performance of a company. Previous research has mainly examined the effect on the stock price or the effect in the long term, for example the research of Vlamos (2020) and Martynova, Oosting and Renneboog (2006). In addition, various studies write conflicting results, making this study highly relevant from a scientific point of view. As mentioned in the introduction, from the results of Vlamos (2020) it cannot be concluded that mergers and acquisitions automatically lead to better performing. Thereby, the study by Cioli et. al (2020) did not see any significant change in the performance of Italian companies in their sample. They used in their study the year before the transaction and the three years after the transaction. In contradiction, Martynova, Oosting and Renneboog (2006) found that large transactions result in better performing. In addition, this study of the financial performance of the company only used a period of three quarters

before and after the transaction on a number of occasions. This study therefore provides insight into the effect in the short term.

Regarding the social relevance, one should bear in mind the fact that companies often think carefully and take ample time to make the decision whether to enter a merger or acquisition. All aspects are thoroughly researched and discussed. This includes organizational restructuring and the expected operational performance shortly after the merger or acquisition. What matters most to investors is what return on investment (ROI) they can expect. If that is too low, they will consider whether the investment is a good plan for the future or whether investing in another company or project can bring a higher ROI. In this research, the short-term effect of mergers and acquisition is discussed, so that companies can prepare even better for this.

By studying the Return on Equity (ROE) and the stock price in the three quarters before and after the M&A transaction of the targets in that transaction, this study examined the short-term effect of that transaction on the financial performance of the company. company investigated. This study used this period to provide an extension of previous research. For example, previous research examined the years before and after the transaction or one period before compared to three periods after the transaction. A sample of 108 successful transactions in the period from 2012 to 2015 in the US was used in the study. Multivariate regression analysis was used in this study, since the same regression was used to calculate both dependent variables. Thus, the regression contains the variable of interest for the period in which the measurement was made. This is a dummy variable with a value of 0 if measured in a period before the transaction and 1 for a period after the transaction. In addition to the measurement period, there are also other variables that can influence the improvement or deterioration of the company's financial performance, so we control for the concentration of the company's industry, measured with the HHI index, the size of the deal, represented by the amount paid by the acquirer, and the size of the target, measured by multiplying the amount paid by the percentage of shares acquired. Because of the different ranges of values of the variables in this research, the Logarithm-function has been used for the two dependent variables, ROE and the stock price, the control variable Companyvalue and the independent variable Dealvalue. The results from this study show no significant change in post-transaction performance compared to the periods before the transactions. In fact, for both regressions in this study, it was found out that the dummy variable for period designation does not have a significant value. As a result, this research can't conduct a clear conclusion whether the M&A transaction has a positive or negative effect on the financial performance of the company.

The second chapter discusses theory on previously researched issues about M&As. The results from these studies are compared with each other, after which the hypotheses are formulated. Subsequently, it is discussed how the data was obtained and how this data is used in answering the research question. The methodology of the research is explained here. After discussing the data and methodology, the results of the research are discussed and assessed. Finally, in the first part of the conclusion and discussion, the answers to the hypotheses and research question are discussed. The second part indicates what was lacking in this study and what recommendations are made for further research.

## 2. Literature review and hypothesis

### 2.1. The effect of the M&A-transaction on short-term ROE

The first part of the research in this thesis researches the effect of the M&A transaction on short term financial performance, where financial performance is measured in the ROE. This research stems from previous research into the long-term performance of a company after a merger or acquisition. For instance, Martynova, Oosting and Renneboog (2006) investigated the long-term effect of a merger or acquisition on the operating performance of European companies with a sample of 155 acquisitions in Europe. Their research showed that mergers or acquisitions of relatively large targets lead to better performance, while those of small targets lead to decreasing performance. In this research only large US mergers and acquisitions are investigated, so it is expected that there will be a positive relationship. In addition, it was previously mentioned about a rising stock price with an announcement of a merger or acquisition. In their research, Kabir and Roosenboom (2003) examined the relationship between the stock price and the short-term performance of a company. This research investigated the share price reaction in 79 stock public offers by Dutch listed companies between January 1984 and December 1995. Their research has shown that when the stock price falls, the operating performance also decreases, which can be reversed in if the stock price rises, the operating performance will also increase. ROE is used to express the company's performance in figures. Kristiana (2022) writes in her article about the use of ROE as a performance measure. According to her, ROE describes the financial success of the company. The higher the ROE ratio, the more likely investors will invest in the company. Tangen (2003) also wrote in his article about different ratios to be used for performance measurement. He named ROE as a good ratio to show how the company is performing to the investor. The ratio shows how much investors get for their investment. The results from the studies for the long-term effect of the M&A are used in formulating hypothesis 1 to indicate the expectation of the effect in the short term. Combining the above studies and looking at those findings, it is expected for this study that the M&A transaction has a positive impact on the ROE of the company acquired.

## 2.2. The effect of the M&A transaction on the short-term stock price.

The second part of the research in this thesis uses another dependent variable to describe the company's financial performance. This part uses the change in the short-term stock price to measure the effect of the M&A transaction on the financial performance. As discussed earlier, the announcement of a merger or acquisition already has a positive influence on the stock price. The expectations of potential investors improve and as a result they will enter a company more quickly and buy shares. This finding emerged from the study by Tao et al. (2017) in which they examined 165 M&A transactions in the period January 2000 to December 2012 in which the acquiring firm is based in China. Panayides and Gong (2002) also investigated the effect of an announcement of a merger or acquisition on the stock price, but specifically in the maritime sector. Their study used a relatively small sample from 1995 to 1999 because of data availability. In fact, they used only four liner companies. These companies in this sector are in fact the only listed companies that had to deal with M&A activities during the period used. Nevertheless, their research also showed that an announcement of a merger or acquisition has a positive influence on the stock price. The paper by Harrison et al. (2005) also examined market reaction in the short term after the transaction. In the study, they used a sample of 2,543 acquisitions which showed that the short-term reaction of the market changed positively after the M&A transaction. The paper by Kabir and Roosenboom (2003) which has already been used in the theoretical section on the effect on ROE is also of interest in the explanation of the stock price. Indeed, they saw as a finding that the M&A transaction has a positive reaction to the change in stock price. This is in line with the other studies. In combination with the above studies and the expectation that the stock price will rise in the short term after an announcement because more investors will invest when the company is performing better, for this study is also expected that the M&A transaction has a positive impact on the stock price.

## 2.3. The deal value and the effect on the financial performance

The third part of the study describes the effect of a controlling variable on change of the financial performance of the acquired company in the periods after the M&A transaction. In this study, the deal value of the M&A transaction is used as a control variable. Thus, it describes to what extent deal value enhances and weakens the effect of the M&A transaction on financial performance. Previous research from Tidbury et al. (2021) investigate the moderating effect of the deal size on board faultlines, which reflect intrinsic divisions of board members into relatively homogeneous subgroups. This study finds that strong faultlines have a negative effect on the financial performance of the company after the M&A in long- but not in short-term. In their main research they tested the positive or negative effect of the deal size on the association between board faultlines and the financial performance in the periods after the M&A. That paper found that the effect of board faultline strength on long-term acquisition outcomes is weaker for larger acquisition deals than smaller acquisition deals. These results can be read that deal size has a positive effect on financial performance after an M&A,



expressed in the paper by Tidbury et al. (2021) as weakening the association between board faultlines and financial performance after an M&A. That paper suggests that this only applies in the long-term, but for this study, the result is used for the short-term.

Previous research on these three components of this study describes the hypotheses that have been stated for research. Thus, for this research, we believe that the M&A transaction has a positive impact on financial performance. In this research, financial performance is measured by ROE and stock price. Thus, the first hypotheses of this research are formulated as follows:

*Hypothesis 1: The merger or acquisition has a positive effect on the short-term ROE.*

*Hypothesis 2: The merger or acquisition has a positive effect on the short-term stock price.*

We also saw that the value of the deal has a positive on the target firm's financial performance in the transaction. Therefore, the third hypothesis was constructed as follows:

*Hypothesis 3: The deal value of the M&A transaction has a positive effect on the short-term financial performance.*

### 3. Data & Methodology

#### 3.1. Sample

For this research, database Zephyr, which has been made available by Erasmus University, is used in the first stage. This database contains information about the acquirer, vendor and the target in the transactions. By choosing a certain period and geographical area, the transactions can be displayed. For this research, US-based listed target companies which are partly or whole acquired in the period of 2012 until 2015 are investigated. This period was chosen because the credit crisis started in the summer of 2007, reached its peak in 2008 and did not end until 2011. Other papers studied for this thesis have in many cases used a different period, for example by studying figures in years during the financial crisis. To measure the actual effect of the M&A transaction on financial performance, without the influence of the financial crisis, the four years after the crisis were therefore chosen in this study. Compustat was used to find the financial information of the companies in the relevant periods. Combining the information from Zephyr and Compustat facilitated the database used for the regressions. The two databases are combined by taking the company's ticker as the unique variable. The company's ticker represents the letter code of the company on the stock exchange and thus is specific by company. By examining the figures of the companies in the period after the merger or acquisition, the three hypotheses are answered in order to be able to answer the main question. Due to previous research and the availability of the data in Zephyr, short term is used for the first three quarters before and after the transaction.

### 3.2. Methodology

The effect of the transaction on the short-term performance of the company is examined by comparing the performance in the three quarters before and after the transaction. In order to determine this effect, a dummy variable was added to the regressions showing the period to which the figures relate, namely before or after the M&A transaction. This way of investigating the effect of an M&A transaction has been used previously in the paper by Cioli et al. (2020). This study examined the effect of a cross-border M&A transaction on the financial performance of Italian companies, by adding the dummy variable for the period. This research method was also used in the study by Siegel and Simons (2010) in which they investigated the effect of an M&A transaction on various aspects. One of those aspects was the financial performance of the company in question. In this study, a dummy variable was also added to indicate a specific time period. Because the research of Cioli et. Al (2020) investigated the company's short-term performance and because of the availability of the data in Zephyr, the three quarters before and after the transaction are compared in this study. As discussed in the hypotheses, performance is expressed in ROE and stock price. ROE is calculated by dividing Net Income with Average Shareholder Equity. The Compustat database was used, among other things, to obtain the financial information of the targets in the M&A transaction. Information was obtained from Compustat to calculate the ROE in the three quarters before and after the transaction. In addition, the stock price was obtained via Yahoo. The information about the M&A transaction via Zephyr, the ROE via Compustat and the stock price via Yahoo together form the database for this study. As discussed earlier in this study, the deal value variable is used differently in this study for the first two hypotheses than in the third hypothesis. Since the third hypothesis describes the effect of deal value on financial performance of company, deal value is identified as variable of interest and thus not as control variable. Also discussed earlier, previous research found that the larger the size of the deal, the weaker the association between board faultlines and the financial performance. For this study it is expected that a positive relationship can also be seen in the short term, so the addition of this control variable will provide improved results. Because of the range of the values, the Logarithm-function is applied to show the percentage change in ROE and stock price if deal value increases with one percent.

In addition, this research uses control variables that have been proven in previous research to have an impact on the effect of a transaction. The control variables that are used in this research are the company's industry measured by the HHI index, the value of the company, the dummy variable whether invested with private equity or not, and the company's Debt-to-Equity Leverage. Adding these variables reduces omitted variable bias. These variables will be discussed later in the thesis.

The variables in this study have different ranges of values. For that reason, the Logarithm function has been used. This function uses the percentage change instead of the absolute change. Both dependent variables have been used in the regressions with the Logarithm function, so that a change of one in x results in a percentage change of the corresponding coefficient in y. This applies to the control variables for which the Logarithm function is not used. However, Dealvalue and Companyvalue have values that differ by millions. For that reason, the Logarithm function has also been applied to both. Both are further explained in the explanation of the control variables. Because the values of the dependent variables also have a significantly different range of values, the Logarithm function was also applied for both dependent variables. Thus, the results tell the percent change of the dependent variable when a dependent variable increases by one unit or one percent.

For hypothesis 1, the percentage change in the ROE is examined after the merger or acquisition transactions. In answering this hypothesis, the trend of the performance change, measured in ROE of the company, is compared between the quarters before and after the transaction. As discussed above, a dummy has been added in the regression which has the value of one for the periods after the transaction and zero for the periods before. Thus, the dummy variable in this regression gives the effect of the M&A transaction on financial performance, where performance is measured in ROE. To be able to use the ROE in principle, data is used to calculate the percentage change in ROE. The formula below is used for this, in which the Net Income and Average Shareholders' Equity are divided. The net income is the amount of profit in that period and the equity is the average of the value at the beginning and end of the period.

$$ROE = \frac{Net\ Income}{Average\ Shareholders'\ Equity}$$

Similar to the development of first hypothesis, the change in the stock price was examined. In contrast to hypothesis 1, the dependent variable in the regression concerns the stock price instead of ROE. Thus, again the dummy variable will reflect the effect of the M&A transaction on financial performance, whereby that performance is measured in the percentage change of the stock price.

To answer the third hypothesis, the regressions of hypotheses 1 and 2 are used. This involves looking at the coefficient of the variable Deal Value. In contradiction to the other two hypotheses, the variable of interest for this hypothesis is not the period in which the financial performance of the company is measured but the deal value. A positive value of this coefficient means that an increase in the Deal Value entails a better financial performance. Conversely, a negative value of the coefficient means that an increase in the Deal Value leads to a deterioration of the performance.

### 3.2.1. Control variables

In this research, several control variables are used that describe the effect of the M&A transaction on the short-term performance of the company. Without adding these control variables, the results will not give the correct results and the significance cannot be guaranteed. These control variables are added since these variables are not used to measure their effect on the dependent variables. These variables were kept constant in this study. The following is an explanation of the various control variables of this study.

#### Industry concentration

The first control variable in this study is the variable representing the industry in which the target company operates in the transaction. In this research, a distinction is made between different industries based on the concentration of the industry. Kandzija et al (2014) wrote in their research about the effect of industry concentration on firm performance after the transaction. Their research showed that the lower the concentration of the industry, the more positive the effect is on performance. The concentration of the industry is measured by the Herfindahl-Hirschman Index (HHI). The HHI can have a value from 0 to 10.000. According to the Federal Trade Commission (FTC), a value less than 1.000 means an unconcentrated market. A value between 1.000 and 1.800 means a moderately concentrated market and above 1.800 means concentrated.

#### Size of the target

The second control variable describes that the value of the company being acquired. Previous research found different results regarding the effect of target size on company performance. For example, studies described a positive relationship between target size and financial performance. Indeed, both studies by Martynova et al. (2006) and Linn and Switzer (2001) concluded that financial performance improves if the bidder acquires a target that is larger than the bidder. Despite this, larger targets are likely to be more difficult to change organizationally and will be more expensive because of their bargaining power. Clark and Ofek (1994) also wrote in their thesis about the effect of target size on financial performance. They concluded in line with the last mentioned finding that performance improves if bidders acquire a target that is relatively smaller to them. They explain this as the result of the obstacles a firm would face if they acquired a relatively larger target. The relative size of the targets can have opposite effects. Indeed, synergies and economies of scale can improve the target's financial performance, but it can also worsen that performance. Despite the findings from these studies on the positive and negative effect of relative target size on post-acquisition performance, there are also a large number of empirical studies showing that this effect is negligible (Powell and Stark, 2005). In this study, the size of the target is calculated by dividing the percentage of acquired shares by the deal value. With the same reason as for Deal value, the Logarithm-funtion is applied for the variable Company value to show the percentage change of ROE and stock price if the Company value increases with one percent.

### Leverage

The third control variable describes the leverage of the company being acquired. Leverage refers to the ratio of debt to equity. This ratio thus increases if the foreign equity increases relatively more or decreases less than the equity. Regarding the effect of leverage on the financial performance of the company, similar results have emerged from research. For instance, Ghosh and Jain (2000) found that an increase in leverage around M&A transactions is significantly positively correlated with stock returns. Similar results also emerged from research Kang et al. (2000) and Harford. (1999).

### Private equity

The fourth control variable in this study describes the investor's origin in the target of the transaction. Indeed, in this sample, a number of companies were invested in through private equity (PE). Later discussed, this mainly occurs in the part in the sample with the smaller deal values, the larger the deal value the less the presence of PE funds. The study by Cioli et al (2020) saw as a result that the presence of PE has a positive impact on the financial performance of the company. Despite the fact that PE investments involve some complexities that do not guarantee an increase in financial performance, they see that company efficiency increases with PE funds. This variable takes the value 1 if the acquirer is a PE fund and 0 if it is not.

### 3.2.2. Regressions

To test hypothesis 1 and 2, a multivariate multiple linear regression model is used. This model is used because this model can be especially used with regression with multiple dependent variables. In the research into the first two hypotheses, this is the case with the control variables which are taken in account to measure the effect of the M&A transaction on the short-term performance of the company, and as dependent variable stock price and ROE respectively. Because we use data from Zephyr, all data concerns that of merger and acquisition transactions and there is no need to include a variable that describes whether a transaction takes place. Nevertheless, in order to measure the effect of the M&A transaction on financial performance, the dummy variable is included as the variable of interest of the data from before or after the transaction. This variable contains the value 1 if it contains the period after the transaction and 0 if before the transaction. The  $B_0$  in the regressions represents the intercept for change in performance when the other variables have value 0.

In the regressions, coefficients  $B_1, B_2, B_3, B_4, B_5$  and  $B_6$  show the percentual change in the increase or decrease of the financial performances of the company if the corresponding variable increases with 1 for the variable for which isn't applied the logarithm function. For the variables. for the variables for which the logarithm function is used, the change of 1 means how much the financial performance will change in percentage terms if the variable also increases or decreases by 1%. The variable of interest is shown at the back of these regressions, therefore the coefficient  $B_6$  is the variable of interest. The regressions for hypotheses 1 and 2 are modeled as follows:

### Hypothesis 1

Hypothesis 1 predicts that the M&A transaction has an positive effect on the financial performance of the company, whereby the financial performance is measured in ROE. Accordingly, we estimate the following model:

$$\ln(ROE_{i,t}) = B_0 + B_1 * HHI + B_2 * \ln(Dealvalue) + B_3 * (Companyvalue) + B_4 * Leverage + B_5 * PE + B_6 * After + \varepsilon$$

### Hypothesis 2

Hypothesis 2 predicts that the M&A transaction has an positive effect on the financial performance of the company, whereby the financial performance is measured in the stock price. Accordingly, we estimate the following model:

$$\ln(Stock_{i,t}) = B_0 + B_1 * HHI + B_2 * \ln(Dealvalue) + B_3 * \ln(Companyvalue) + B_4 * Leverage + B_5 * PE + B_6 * After + \varepsilon$$

### Hypothesis 3

In the regressions for hypotheses 1 and 2, the variable deal value acted as the control variable. However, the variable for determining the effect of deal value on financial performance for the third hypothesis is the variable of interest. Therefore, for hypothesis 3  $B_2$  is the variable of interest. The coefficient of this variable will show which effect the deal size has on the short-term financial performance and with this information the third hypothesis will be rejected or not.

## 4. Results

### 4.1. Sample description

The final sample of M&A transactions comprises 108 deals in the United States of America, completed in the period of 2012 through 2015. Per M&A transaction data was used over six different periods, so the study contains 648 observations. Table 1 contains the descriptive statistics of all variables used in this study. The table shows the number of observations, the mean, the standard deviation, the minimum and the maximum and the different quantiles of these variables. Table 1 clearly shows why it was decided to apply the logarithm function for 'Dealvalue', 'Companyvalue', 'ROE' and 'Stockprice'. The range of these values are far apart compared to the others, so that a percentage change gives a more realistic picture.

**Table 1:** Descriptive statistics regression 1 and 2

Statistic	Observations	Mean	St. Dev	Min	Max
HHI	648	302.82	242.71	1	985.80
Dealvalue	648	749,722.60	1,344,774	110,330	12,082,963
Companyvalue	648	15,607,884	40,925,560	783,478	389,658,287
Leverage	648	3.48	5.94	-35.11	60.32
PE	648	0.07	0.26	0	1
After	648	0.50	0.50	0	1
ROE	648	0.03	1.22	-29.35	1.22
Stockprice	648	98.93	466.08	4.81	4,761.85

The table contains all of the variables that are used in regression 1 and 2.

Variables are defined in Appendix A.

The table above does not yet include the quantiles of the different variables in the study. To display those values of the variables, the table below has been added, showing the Q1, Median and Q3 of the variables in a normal distribution. The Min, Mean and Max of the variables are also part of the quantiles, however, we already see them in the table above.

**Table 2:** Quantiles regression 1 and 2

Statistic	Q1	Median	Q3
HHI	150.90	270.50	387.60
Dealvalue	224,122	390,034	711,597
Companyvalue	2,351,314	4,192,668	12,405,849
Leverage	1.34	2.88	4.99
PE	0.00	0.00	0.00
After	0.00	0.50	1.00
ROE	0.03	0.09	0.16
Stockprice	19.35	26.58	38.47

The industry with the largest HHI in this research sample is the 'Hydroelectric power generation' industry, with a value of 935.80. In this sample, Nextera Energy Inc is the only company in this industry. The second largest industry HHI is the 'Industrial sand mining' industry with a value of 930.70. In this sample, US Silica Holdings Inc is the only company active in this industry. From an economic perspective, we can say of these industries that it is here that market concentration is highest and thus competition is lowest. The smallest HHI in this research is that from multiple industry: 'Paperboard mills', 'Storage battery manufacturing', 'Wired telecommunications carriers', 'Automobile manufacturing', 'Credit card issuing' and 'Electronic computer manufacturing'. All these industries have a HHI of 1. Respectively Graphic Packaging Holding Company, Tesla Motors Inc., Crown Castle International Corporation, General Motors Company, Mastercard Inc and Intel Corporation and Apple Inc. are active in these industries. An HHI of 1 means an incredibly low concentration of the market and therefore a lot of competition in that market. There are a lot of similar companies operating in those markets.

The company with the largest value during the M&A transaction in this research sample is Apple Inc, with a company value of around 390 million euros. The second largest company value during the transaction is that from Intel Corporation, with a company value of around 110 million euro. The smallest company value is that from US Silica Holdings Inc, with a company value of around 800 thousand euros.

The transaction with the largest deal value in this research sample is the acquiring of American International Group Inc in September 2012 with a deal value of more than 12 million euro. The second largest also contains an acquisition of American International Group in December 2012 with a deal value of almost 6 million. The transaction with the smallest deal value is the acquiring of Kosmos Energy LTD in October 2014 with a deal value of 110 thousand euro.

The values of the variable Leverage contain both negative and positive value. The value of this variable is negative if one of the components of the ratio is negative. In this, the total debt will not be negative, because then it is a possession. In this situation, the company's equity is negative due to incurred losses. The companies with the lowest leverage are Catalent Inc. and Sally Beauty Holdings Inc. They have a leverage of -35.11 and -18.95, respectively. The companies with the highest leverage are Blackrock Inc. and Bonanza Creek Energy Inc. They have leverage of 60.32 and 18.62, respectively.



## 4.2. Changes in ROE

Table 3 contains the regression summaries from the regression on the percentage change in ROE in the over the periods before and after the transaction. This information tells us that holding all other variables constant a one unit increase in 'HHI' results in a increase of 0.01 percent in ROE. A one percent increase in 'Companyvalue' also results in an increase of 0.15 percent in ROE. The other variable with a positive relationship with the dependent variable ROE is 'Leverage', namely a one unit increase in 'Leverage' also results in a increase of 0.01 percent in ROE. Therefore, there's a positive relationship between 'HHI', 'Companyvalue' and 'Leverage' and ROE. Unfortunately, no significant value was found for the variable 'Leverage' and thus we can only say about 'HHI' and 'Companyvalue' that they imply a significant positive change on ROE.

In contradiction, a one percent increase in 'Dealvalue' results in a decrease of 0.18 percent in ROE. Therefore, there's is negative relationship between the value of the deal and ROE. As seen in the table, the variable 'PE' also has a negative coefficient. For this variable it means that if the investment is made by a PE funds the ROE will decrease 0.69 percent. Table 3 also shows the coefficient in the regression for ROE of the variable of interest, 'After'. From this regression a coefficient of -0.01 has been obtained. This coefficient means that if 1 is chosen for the dummy variable, the ROE is 0.01 lower than if the variable contains a 0. Since the value 1 for the dummy means the periods after the M&A transaction, in terms of the hypotheses this coefficient means an ROE that is 0.01 lower in the periods after the M&A transaction than in the periods before the transaction. Because of the significancy of the coefficients we can only say about 'PE' that this implies a significant negative change on ROE.

**Table 3: Regression results of ROE**

Variable	Observations	Estimate	Std. Error	T-statistic	P-value
(Intercept)	648	-2.65***	0.62	-4.30	2.06e-05
HHI	648	0.01***	0.01	5.61	3.15-08
Log Companyvalue	648	0.15***	0.04	3.97	8.19e-05
Log Dealvalue	648	-0.18**	0.05	-3.31	0.001
Leverage	648	0.01	0.01	1.24	0.22
PE	648	-0.69***	0.16	-4.13	1.91e-05
After	648	-0.01	0.08	-0.03	0.96

\*\*\*Significant at the 0.01 level

\*\*Significant at the 0.05 level

\*Significant at the 0.10 level

The table contains all of the variables that are used in regression 1. Variables are defined in Appendix A.

In answering hypothesis 1, it should be considered that we were unable to find a significant coefficient for the variable of interest 'After'. In the table, we see a negative coefficient for 'After' that would imply a worsened financial performance of the company, however, due to the insignificance of the coefficient, there is not enough statistical evidence to reject the hypothesis that states there is a positive relationship between the M&A transaction and the financial performance of the company, measured in ROE. In combination with the other coefficients resulting from the regression for ROE, the following regression formula can be stated:

$$\ln(ROE_{i,t}) = -2.65 + 0.01 * \ln(HHI) + 0.15 * \ln(Companyvalue) - 0.18 * \ln(Dealvalue) + 0.01 * Leverage - 0.69 * PE - 0.01 * After + \varepsilon$$

#### 4.3. Changes in Stockprice

Table 4 contains the regression summaries from the regression on Stock price in the periods before and after the transaction. This information tells us that holding all other variables constant a one unit increase in 'HHI' results in a decrease of 0.01 percent in Stockprice. Comparable with this, a one percentage increase in 'Companyvalue' results in a decrease of 0.14 percent in Stockprice. The other variable with a negative coefficient is PE, which describes that if the investment is made by a PE fund, the share price will fall by 0.39 per cent. Therefore, there's a negative relationship between 'HHI' and 'Companyvalue' and the Stockprice. Unfortunately, no significant value was found for the variable 'HHI' and thus we can only say about 'Companyvalue' and 'PE' that they imply a significant negative change on ROE.

In contradiction, a one unit increase in 'Dealvalue' results in an increase of 0.12 percent in Stockprice. Therefore, there's a positive relationship between the value of the deal and stock price. The table also shows a positive relationship between 'Leverage' and the stock price. Namely, when the leverage increases with one unit, stock price increases with 0.02 percent. This table also shows the coefficient in the regression for stock price of the variable of interest, 'After'. From this regression a coefficient of 0.12 has been obtained. This coefficient means that if 1 is chosen for the dummy variable, the Stockprice is 0.12 percent higher than if the variable contains a 0. Since the value 1 for the dummy means the periods after the M&A transaction, in terms of the hypotheses this coefficient means an Stockprice that is 0.12 percent higher in the periods after the M&A transaction than in the periods before the transaction. Because of the significancy of the coefficient for 'After' we can only say about 'Dealvalue' and 'Leverage' that these variables imply a significant positive change on ROE.

**Table 3: Regression results of Stockprice**

Stockprice	Observations	Coefficient	Std.error	T-statistic	P-value
(Intercept)	648	3.55***	0.62	5.73	1.51e-08
HHI	648	-0.01**	0.01	-1.34	0.18
Log Companyvalue	648	-0.11***	0.04	-2.96	0.003
Log Dealvalue	648	0.12***	0.05	2.19	0.03
Leverage	648	0.02	0.01	2.71	0.007
PE	648	-0.39	0.15	-2.57	0.01
After	648	0.13	0.08	1.79	0.08

\*\*\*Significant at the 0.01 level

\*\*Significant at the 0.05 level

\*Significant at the 0.10 level

The table contains all of the variables that are used in regression 2. Variables are defined in Appendix A.

Similar to answering hypothesis 1, in answering hypothesis 2, it should be considered that we were unable to find a significant coefficient for the variable of interest 'After'. In the table, we see a negative coefficient for 'After' that would imply a worsened financial performance of the company, however, due to the insignificance of the coefficient, there is not enough statistical evidence to reject the hypothesis that states there is a positive relationship between the M&A transaction and the financial performance of the company, measured in stock price. In combination with the other coefficients resulting from the regression for ROE, the following regression formula can be stated:

$$\begin{aligned} \ln(\text{Stockprice}_{i,t}) &= 3.55 - 0.01 * HHI - 0.11 * \ln(\text{Companyvalue}) + 0.12 \\ &* \ln(\text{Dealvalue}) + 0.02 * \text{Leverage} - 0.39 * PE + 0.13 * \text{After} + \varepsilon \end{aligned}$$

#### 4.4. Deal value and performance

Hypotheses 1 and 2 have been answered in the previous part, but hypothesis 3 could also be answered with the results from both regressions. This hypothesis states that the value of the deal has a positive influence on the financial performance of the company. In order to answer this hypothesis, the coefficient of the deal value in both regressions for ROE and Stockprice has to be looked at. The coefficient of the variable in Tables 3 and 4 respectively shows the effect of the deal value on the ROE and Stockprice of the company. In table 3 we see a significant negative coefficient of 0.18, that states there is statistical evidence to reject this hypothesis. If financial performance is measured in ROE, it can thus be concluded that there is enough statistical evidence that deal value has a negative effect on financial performance.

Although, table 4 shows a significant positive coefficient of 0.12 for the variable of interest, that states there is enough statistical evidence to not reject the hypothesis. If financial performance is measured in stock price, it can thus be concluded that there is enough statistical evidence that deal value has a positive effect on financial performance. With these two opposite but significant values for the variable of interest in both regressions, by looking at the coefficients, it is generally concluded that deal value has a negative effect on the company's financial performance. The significant negative coefficient is more negative than the significant positive coefficient is positive.

## 5. Conclusion & discussion

### 5.1. Discussion

Mergers and Acquisitions during the last decades, due to their significant value, in both economic and strategic effects for corporations, have gained the interest of academics and became the center of numerous empirical studies. Recently, Elon Musk's acquisition of Twitter has got people thinking about its effect on the company. Indeed, Elon Musk himself revealed that the company has halved in value in less than a year. Previous studies have yielded conflicting conclusions, with one seeing a clear positive effect of the M&A-transaction on performance, the other a negative effect, and another finding no positive or negative effect.

This paper examines the short-term effect of the M&A-transaction on a company's financial performance. In order to be able to describe the short-term effect, data relating to the three quarters before and after the M&A-transaction has been used. The data sample includes 108 M&A-transactions from 2012 to 2015 in the United States. All transactions in the sample are paid in cash. The financial performance of the company was measured in this study by measuring the change in ROE and the Stock Price per period. The three quarters before the transaction are compared with the three quarters after the transaction. In order to be able to measure the actual effect of the M&A transaction, a dummy variable has been added as a variable of interest, which contains the value 1 if it concerns a period after the transaction and 0 if before the transaction. The Logarithm function was also used for both dependent variables and control variable Companyvalue and independent variable Dealvalue. With the addition of this function, we show the percentage changes. The main question for this study was therefore formulated as follows: What is the effect of a merger or acquisition on the short-term performance? In addition, three control variables were used in this study, namely industry, measured by the HHI index, the target size, measured by dividing the deal value by the percentage of the share acquired from the seller and the leverage, which reflects how debt relates to equity.

Due to the investigation of the financial performance, which is measured in ROE and the stock price, two regressions were performed containing the control variables and the variable of

interest. The first regression with dependent variable ROE is performed to answer hypothesis 1, which stated that the M&A transaction has a positive influence on the financial performance of the company, measured in ROE. The second hypothesis with dependent variable Stockprice was also performed to answer hypothesis 2 which stated that the M&A transaction also had a positive influence on the financial performance measured in Stockprice. The influence of the Deal Size on the change in ROE and Stock Price was then used to answer the third hypothesis, which stated that the deal size of the M&A-transaction has a positive effect on the short-term financial performance. Thus, the variable of interest in hypotheses 1 and 2 is the dummy variable for the period and that in hypothesis 3 is the value of the deal.

To answer the first hypothesis, a regression is performed with ROE as the dependent variable and the variable of interest a dummy variable, where this variable has the value 1 for the periods after and 0 for the periods before the transaction. The dummy variable has a negative value, which means that the M&A transaction has a negative effect on the financial performance. Although, the coefficient is not significant which means there is not enough statistical evidence to reject the hypothesis that states there is a positive relationship between the M&A transaction and the financial performance of the company, measured in ROE.

Similar to the first hypothesis, for the second hypothesis, a study was also carried out using a regression containing the dummy variable for the period. However, in the regression for the second hypothesis, the stock price is the dependent variable. In this regression, the dummy variable has a positive value. Although, also similar to hypothesis 1 is the insignificance of the coefficient of the variable of interest for hypothesis 2. This means there is not enough statistical evidence to not reject the hypothesis that states there is a positive relationship between the M&A transaction and the financial performance of the company, measured in stock price.

To answer the third hypothesis, the regressions of the first and second hypotheses were used. In both regressions the deal value was used as a control variable, the coefficient of which is important for answering the third hypothesis. The regressions showed that the deal value had a negative value in the regression for ROE and a positive value in that for the stock price. In the regression for ROE this means that an increase in the deal value has a negative effect on the financial performance and for the regression for the stock price a positive effect. There are significant coefficients for both regressions, so it can be concluded that there is enough statistical evidence to reject the hypothesis if financial performance is measured in ROE and there is enough statistical evidence not to reject the hypothesis if financial performance is measured in ROE. the stock price. To write a general conclusion about the effect of the deal value on the financial performance, it can be concluded on the basis of the coefficients that the deal value has a negative effect on the financial performance. The coefficients are namely -0.18 and 0.12 respectively.

To answer the research question of this thesis, it must be concluded that we have not been able to prove whether the M&A transaction had a positive or negative influence on the financial performance. For both dependent variables, insignificant coefficients were found for the variable of interest. As a result, there is not enough statistical evidence to reject the hypothesis in the regression for ROE where the variable of interest had a negative value. In the regression for the stock price where the variable of interest had a positive value, there is therefore not enough statistical evidence not to reject the hypothesis.

## 5.2. Limitations and recommendations

This study also has limitations on which the recommendations for further research are based. As discussed earlier, this study did not find any significant values for the coefficients of the variable of interest in hypotheses 1 and 2. This may be because a benchmark firm was not considered in this study. This has not been considered in this study because it makes it difficult to find a good benchmark of control. However, we recommend doing this for future research, for example by means of the Difference-In-Difference (DiD) model design to search for significant values.

Also, the sample is relatively small. The main reason for this is the availability of data about M&A transactions in 2012 to 2015 in the US. For future research, we therefore recommend choosing data from companies not only in the US, but, for example, from the whole of North and/or South America. This brings us to the third and final limitation of this study.

Namely, with regard to the data sample, it can also be said that the external validity of the research is questioned. For example, the sample only consists of companies from the United States. For comparison between countries, it may be interesting to also conduct this research in another country. By also doing this research with a sample of companies in another country, the external validity also increases.

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## Appendices

### Appendix A: Definition of the variables

Variable	Definition
HHI	The Herfindahl-Hirschman Index (HHI) is a measure of market concentration and is used to determine market competitiveness. HHI is calculated by squaring the market share of each firm competing in a market and then summing the resulting number. The index can range from 0 to 10,000, with lower values indicating a less concentrated market.
Dealvalue	'Dealvalue' describes the total acquisition price that the acquirer paid paid to the vendor for the acquired share in the target.
Companyvalue	'Companyvalue' describes the company value of the target in the transaction at the time of the acquisition. The company value is calculated by dividing the deal value by the share that have been acquired, so that 'Dealvalue' is calculated to 100%.
After	'After' is a dummy variable. This dummy variable is added to the study to represent the period in which performance was measured. The dummy has a value of 0 if this is a period before the transaction and 1 if the period is after the transaction.
Leverage	'Leverage describes ratio of debt to equity of the target company in the M&A transaction. If debt increases relatively more than equity, leverage increases.
PE	'PE' is a dummy variable. This dummy variable is added to this study to represent whether investments were made through PE or not. The variable has a value of 1 if the transaction in question involved PE funds and 0 if not.
ROE	Return on Equity (ROE) is a variable that measures the company's financial performance. The variable describes the ratio between the net income of a certain period and the equity at that moment. The higher the ROE, the more efficient a company's management is at generating income and growth from its equity financing.
Stockprice	'Stockprice' describes the value of one share of the company at the time of the M&A-transaction. The higher stock price describes a growing and profitable company and shareholders who have confidence in the company's future.