ERASMUS UNIVERSITEIT ROTTERDAM

ERASMUS SCHOOL OF ECONOMICS

BACHELOR THESIS

THE IMPACT OF MERGERS ON PROFITABILITY

ABSTRACT. Few studies have assessed the impact of mergers on the financial performance of the acquirer. This research paper analyses the impact of mergers on the profitability of the acquirer company using an ordinary least squares regression based on thirty-nine mergers during 2010-2020. The regression includes firm specific and macroeconomic variables that influence profitability in terms of return on assets. The findings suggest that there is a significant and negative relationship between mergers and profitability but no clear relationship with the macroenvironment for the investigated companies. However, when the industries are examined separately, only the healthcare sector shows a significant and negative effect of mergers on profitability and the other industry sectors do not. This indicates that mergers do not always improve financial performance contrarily to the main belief.

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1

Table of contents

Introduction

In the last couple of years, the number of mergers and acquisitions (M&A) has reached an all-time high according to the Harvard Business Review (Kenny, 2020). There are several reasons why firms choose to engage in M&A, one of the most important reasons is synergies. According to Napier (1989), mergers can be used to expand into new markets, gain technical expertise, and allocate capital. Another driving force for the increase of M&A activity is globalization, Ali-Yrkkö (2002) shows that the number of international deals has grown threefold from 1990 to 2000. This number continues to grow as cross-border M&A has hit a new all-time high in 2021 surpassing 2 trillion dollars according to Refinitiv, one of the world's largest providers of financial markets data.

Although there are extremely successful mergers that have taken place in the past such as Exxon and Mobil in 1998, the Harvard Business Review states a failure rate of 70 to 90 percent of all M&A activity (Kenny, 2020). Since M&A can generate immense amounts of value for the whole economy, it is essential to do research on the impact that mergers have on the financial performance of those companies. The relationship between mergers and financial performance has been a popular topic among economic researchers and many academic studies are aimed at examining these effects.

In this research paper, the effect of mergers on profitability will be investigated using an OLS regression containing data for 39 companies based in the United States, Europe, and Russia.

This study aims to answer the following two research questions:

1. *What is the impact of mergers on the return of assets of the investigated companies?*
2. *In which industry sector is the merger effect on the return of assets the strongest?*

First, the data and methodology will be described. After that, the results of the OLS regression implemented in the software STATA will be analyzed and discussed. Lastly, the conclusion will be set out followed by recommendations for future research. The scientific and societal relevance of this research is that it combines firm-specific variables and macroeconomic variables to investigate the effect of mergers on companies' profitability. This paper will build forth on the regression by Rashid and Naeem (2017) by incorporating macroenvironment variables in the regression and by focusing on the western market.

3

Literature Review

Gugler, Mueller, Yurtoglu, and Zulehner (2003) used panel data to assess the effect of mergers on profitability and concluded that 56.7% of all mergers around the world result in higher than projected profits indicating a positive effect. However, they also mentioned that when looking at the number of sales, the same fraction of mergers resulted in lower projected sales in the post-acquisition years. Because of the difference in results, they emphasized the importance of the dependent variable. When using profitability as the outcome variable, they concluded that a merger has a positive impact on financial performance. However, if financial performance is defined as the number of sales that are generated, mergers go from being a success to a failure.

Ooghe, Laere, and Langhe (2006) found that acquisitions have a negative impact on the acquirer's profitability and used return on assets as one of their profitability measures. Additionally, they pointed out that the profitability of the acquirer is the highest one year prior to the acquisition but that they were not able to maintain it in the post-acquisition years. According to them, possible explanations for this effect are mean reversion and managerial control loss problems. Singh and Mogla (2010) used a paired sample t-test to assess the difference in performance between the pre- and post-merger period as a profitability analysis of acquiring companies. They found that 55% of the companies experienced a decline in profitability mostly due to poor asset utilization.

According to Healy, Palepu, and Ruback (1992), merged firms experience significant improvements in operating cash flow following a merger and this is caused by a relative increase in asset productivity compared to their industries. Their sample consists of the 50 largest mergers of US public industrial firms that merged in the period 1979 to 1984. They pointed out that those improvements were especially strong when the merging firms were from overlapping businesses. This is an intuitive finding as one of the most important reasons for M&A is synergies, in this case resulting from supply chain efficiencies and the manufacturing of complementary products. In addition, a positive relationship was also found between operating cash flow and abnormal stock returns. In other words, positive expectations about the future of the merged entity are a significant portion of the equity revaluations of the merging firms (Healy et al., 1992).

In the paper by Borodin, Sayabek, Islyam, and Panaedova (2020), they explored the influence of M&A transactions on the financial performance of US and European companies. The results showed that companies that had a positive financial performance before the merger remained profitable after the deals took place. Yet, they found that return on sales deteriorated after the implementation of M&A and that their models do not show M&A having a significant effect on the profitability of these companies.

Ghosh (2001) did not find any evidence that merging firms are able to increase operating cash flow following acquisitions. However, when analyzing the difference between using cash and stock acquisitions and what effect it has on the corporate performance following a merger, operating cash flows do increase significantly when the acquisitions are made in cash. He added that the significant improvement of financial performance after a merger is mostly due to higher sales growth and not cost reduction. In contrast, stock acquisitions do not increase cash flows for merging firms. He mentioned that his results might even indicate a decrease in cash flow margins and sales growth after stock acquisitions, but the empirical evidence for this finding is weak. For his analysis, he used a time period of three years before and after the merger.

Harford (2005) states that it is the importance of capital liquidity that causes aggregate-level merger waves and that this macroeconomic component causes industry merger waves to cluster even if industry shocks do not. In his study, he used an OLS regression to investigate the relationship between mergers in merger waves and outside merger waves and what effect it has on profitability. His finding suggests that mergers inside merger waves produce either equal or better post-merger operating performance, indicating that there is a relationship between macroeconomic variables and merger profitability.

Choi & Jeon (2011) investigated the effect of the macroenvironment on aggregate merger activity and found that the macroeconomic environment plays an important role in determining the trend of aggregate merger activity in the United States. Their findings suggest that real income and stock market conditions are the most important variables for the values of aggregate mergers. As the macroenvironment can influence merger activity and profitability, it can be insightful to include a macroeconomic variable in the OLS regression of this paper.

Data

A merger has considerable cost advantages over the other two forms of take-over, not the least being the ability to use shares rather than cash as the purchasing medium (Manne, 1965). In this research paper, the focus lies on horizontal M&A and no other takeover forms such as vertical or consolidation mergers. Whereas vertical mergers are more aimed at integrating down- and upstream companies to increase operation efficiency, horizontal M&A focuses more on the economies of scale and growing the size of the business.

The companies that have been selected for examining the effect of mergers on profitability are mostly based on the Institute of Mergers, Acquisitions & Alliances (IMAA) along with newspaper coverage. This platform provides a list of mergers and acquisitions and their corresponding deal value. For this research, 39 companies have been selected by first validating the existence of the merger in IMAA and afterward checking the Orbis database whether financial data is available for these mergers. When the merger is mentioned in IMAA and financial data is present in Orbis, it will be included in this research. Mergers between parent companies and subsidiaries are not included.

The Orbis database contains firm-specific data and is from a subsidiary of Moody's analytics company called Bureau van Dijk. The Orbis database provides consolidated annual reports, profitability/structure ratios, balance sheets, and competitor data. Most of the companies investigated in this paper had data from 2012 to 2021 in the Orbis database, and the few that did not have data for this period did have data for another 9-year period (for example 2008 to 2016). Since companies have different years when they pursued M&A, the data was filtered down to every merger event with data ranging from -3 to +3 years. This time period is selected because all the companies had data in Orbis for this time interval and the research is more consistent with a constant time interval.

Considering mega-companies such as Meta Platforms and Amazon make various acquisitions in one year, the 9-year time period will contain many acquisitions. In order to compensate for this and attempt to get the most accurate effect of a merger on profitability, only M&A deals valued at over a billion dollars or the biggest M&A deal are chosen. For instance, Amazon acquired harvest.ai in 2017 for 20 million dollars but in the same year it acquired Whole Foods for 13,7 billion dollars hence only the acquisition of Whole Foods will be considered.

A dummy variable is created to capture the effect of whether there is a significant change in return on assets after the merger. It takes on the value of 0 for the years before the merger takes place and the value of 1 in the year of the merger and the years thereafter. Since the Orbis database provides annual reports at the end of the calendar year, the year of the merger will take on the value 1. The age variable denotes the age of the firm since it has been founded until the year -3 of the merger event. Then, it increases by one year till the year of the merger and stays constant in the +3 years. This time interval has been used before by Ghosh (2001) and Rashid and Naeem (2017) for analyzing the effect of mergers on financial performance. Lastly, there is a dummy variable for each of the industry sectors where the investigated firms are situated.

Next to the variables that have been generated specifically for this analysis, there are firm-specific variables in the Orbis database that are also included. From the Orbis database, data on the debt-to-equity ratio, current ratio, total assets, and return on assets are selected. In the paper by Rashid & Naeem (2017), data were collected from 25 manufacturing companies listed on the Pakistan Stock Exchange. They analyzed the effect of mergers on profitability, leverage, and liquidity by carrying out a regression. For one of their regressions on profitability, return on assets was used as the dependent variable. In this aspect, the essence of our research is similar as the variables and the means of analysis overlap.

Whereas the current ratio (defined by current assets divided by current liabilities) has already been calculated by the database itself and the total assets can be found in the balance sheet, the debt-to-equity ratio is manually derived from the balance sheet. This is done by subtracting shareholder's equity from total assets and dividing that number by shareholder's equity. The debt-to-equity ratio is defined as the total liabilities divided by the total equity of a company. This ratio is used to evaluate the acquirer's leverage and indicates whether the company relatively uses more debt or equity for financing its business. Lastly, data for the return on assets can also be found in the Orbis database for each of the companies and are matched with their respective year before analyzing in Stata. Orbis calculates the return on assets by dividing total assets from net income. The motivation behind the usage of these three variables is mostly based on the existing literature done by Rashid & Naeem (2017).

For macroeconomic variables, data has been extracted from World Bank. Specifically for this research, the annual world GDP growth in % is included in the regression.

World Development Indicators is the primary collection of development indicators by the World Bank, compiled from officially recognized international sources. It presents the most current and accurate global development data available. The data for annual GDP growth has been looked up in this database for the years 2012 to 2020 and in the few cases where the firms merged in a different time period (2008-2016), the annual GDP % growth is adjusted by using yearly data from this time period.

In the table below, the acquisition of the BP group by Shell PLC is used as an example to illustrate how the dataset visually looks. In total, there are 280 data points suitable for data analysis that consists of 11 columns that represent all the different variables. All the variables are firm-specific except the macro-economic variable, which is often repetitive as almost all the mergers took place in 2016 and 2017.

Year	Acquirer	Target	CR	Assets (x1000)	D/E	Age	Merger dummy	Oil & Energy	GDP growth	ROA
2013	Shell PLC	BP Group	1.11	357,512	0.97	106	0	1	2.84	4.58
2014	Shell PLC	BP Group	1.16	353,116	1.04	107	0	1	3.12	4.21
2015	Shell PLC	BP Group	1.32	340,157	1.07	108	0	1	3.17	0.57
2016	Shell PLC	BP Group	1.17	411,275	1.18	109	1	1	2.83	1.11
2017	Shell PLC	BP Group	1.2	407,097	1.06	109	1	1	3.39	3.19
2018	Shell PLC	BP Group	1.25	399,194	0.97	109	1	1	3.27	5.85
2019	Shell PLC	BP Group	1.16	404,336	1.12	109	1	1	2.6	3.92

Table 1. Shell's acquisition of BG Group for 53 billion dollars in 2016 as an example.

At first glance, it is worth noting that the return on assets in 2015 suffered a huge downfall in return on assets compared to the other years. When looking back at the news coverage for Shell PLC and other companies in the Oil & Energy sector, oil prices fell immensely causing earnings to go down too. Therefore, even though not all the acquirers have experienced such a drastic change in return on assets before the merger, it is important to be aware that it is challenging to take every factor into account that influences return on assets.

Hence why many academic studies can differ in their conclusions due to idiosyncratic news that is different for each company and sector.

Based on the paper by Hoshino & Yeh (2002), two tables are provided that illustrate the (industry) frequency distribution of the mergers. Most of the mergers investigated in this paper happened during 2016-2017, indicating that these years contained the highest number of megamergers in the time period from 2008-2021. Out of these mergers, most of the M&A took place in the technology and healthcare sector.

In addition, the Technology and Healthcare sectors had the highest M&A transaction value as can be seen in Table 2. In the eleven S&P sectors, Information Technology and Healthcare are indeed the number one and two based on market capitalization. This can be a possible explanation for many mergers in these sectors.

Year of merger completion	Number of mergers
2011	1
2014	1
2015	5
2016	16
2017	11
2018	5

Table 2. The frequency distribution of mergers in terms of merger completing year

Industry of the merging firms	Number of mergers
Technology	13
Healthcare	10
Retail	7
Oil & Energy	6
Conglomerate	2
Telecommunications	1

Table 3. The industry frequency distribution for the merging firms

Methodology

The main method to investigate the impact of mergers on profitability that is used in this research is the Ordinary Least Squares (OLS) regression. This regression aims to find parameters such that the error term is minimized, essentially it is equivalent to finding a straight line that fits the data points the best. The OLS method has been used before by Rashid & Naeem (2017) and Borodin et al. (2020) to measure the effect of mergers on financial performance. Regression analysis is preferred to ratio analysis in evaluating merger deals as it allows us to examine the merger effects in presence of other variables in the model that may significantly affect the performance of corporate firms (Rashid and Naeem, 2017).

The OLS regression has several assumptions that need to be considered in order to achieve the maximum explanatory power of the model. The first assumption of OLS is that there is no multicollinearity, which states that independent variables should not be highly correlated otherwise changing one variable will automatically change the other. This will reduce the precision of the coefficients and the statistical power of the model.

To investigate whether there is a correlation between the independent variables used in this regression, a correlation matrix (Table 5, Appendix) has been made using the software STATA. The matrix shows values that measure the degree of the linear relationship between each of the independent variables. These values can take on numbers between -1 and +1, it will take on negative values if the variables move in opposite directions and positive values if they move in the same direction. The larger the absolute value, the stronger the relationship is. The findings suggest that most of the independent variables that are slightly correlated with each other are either weakly negatively or positively correlated. This means that the independent variables can be used as estimators for return on assets without being easily influenced by one another.

In addition to testing for multicollinearity, the data has also been tested for heteroscedasticity using the Breusch-Pagan Test. The OLS linear regression model assumes that the residuals are at equal variance at each value of the predictor variable. When heteroscedasticity is present in the model, OLS estimators are no longer the best linear unbiased estimators which means that the regression predictions will be less precise.

Breusch–Pagan/Cook–Weisberg test for heteroskedasticity	
Assumption: Normal error terms Variable: Fitted values of roa	
H0: Constant variance	
chi2(1) = **2.80**	Prob > chi2 = **0.094**

Table 4. Breusch-Pagan Test on all industries

When the p-value is lower than the significance level of 0.05, the null hypothesis can be rejected and heteroscedasticity is present in the model. According to the results of the Breusch-Pagan test, the p-value is higher than 0.05 indicating that the null hypothesis cannot be rejected, and heteroscedasticity is likely not present in the regression model. This finding is favorable for the model as it increases the reliability of the results obtained by the OLS regression.

To test the dataset containing only healthcare companies for multicollinearity, the same type of correlation matrix is generated (Table 6, Appendix). The results are similar to the first correlation matrix, either the independent variables are weakly negative/positive correlated with each other. Therefore, multicollinearity does not seem to be an issue for healthcare companies as there are no highly correlated independent variables.

However, when carrying out the Breusch-Pagan Test, there seems to be heteroskedasticity present in the healthcare companies' model as the p-value is lower than 0.05 meaning that the variance is not constant. To account for this problem, the regression has been carried out with robust standard errors. These errors tend to provide a more accurate measure of the true standard error of the coefficient, hence more "robust" to heteroskedasticity.

One of the reasons why this research adds value to the existing research is the incorporation of a macroeconomic variable. Since this has not often been done in existing literature, it is useful to plot the return on assets and the annual GDP growth in % and check whether there is a relation between those two variables. Another macroeconomic variable that was used in the research carried out by Choi & Jeon (2011) and had the potential to be included in the OLS regression was the real interest rate. However, after plotting it against return on assets there was no clear relationship to be found. Hence it would not be logical to include it in the regression as it will overfit the model and look for trends that do not exist.

11

As we see below, the spikes and turns of the two variables seem to correspond in the time period from 2008 to 2021. Therefore, it seems worthwhile to include the annual GDP growth % variable in the regression.

Graph 1. ROA and annual GDP growth chart from 2008 to 2021.
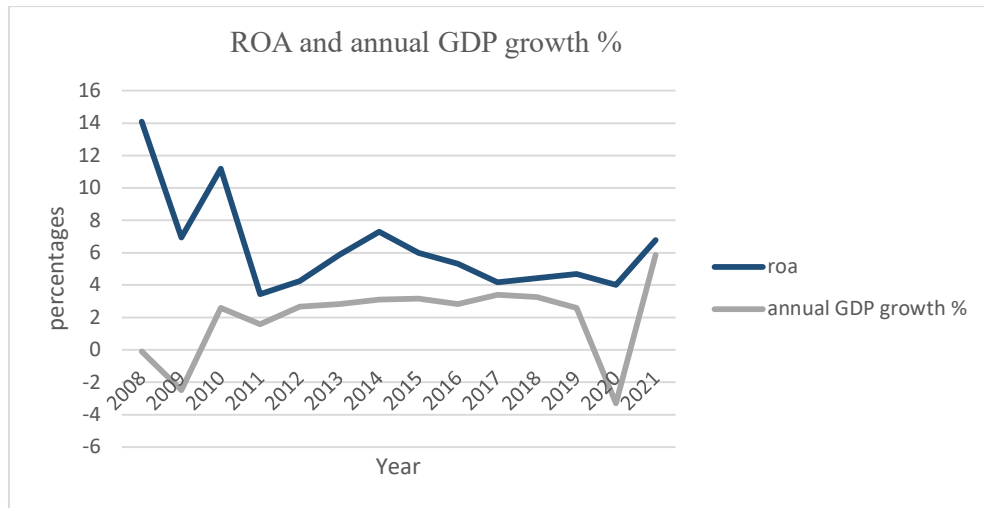
The first regression for testing the first research question, which is the overall effect of a merger on the profitability of the company is defined as:

$$Y_{it}(ROA) = \beta_1 + \beta_2 D_{it} + \beta_3 CR_{it} + \beta_4 DE_{it} + \beta_5 Size_{it} + \beta_6 Age_{it} + \beta_7 GDP_{it}$$
$$+ +\beta_8 Tech + \beta_9 Health + \beta_{10} Retail + \beta_{11} Oil + \beta_{12} Con + \beta_{13} Tele$$
$$+ u_{it}$$

The second regression for testing the second research question, which is testing the relationship of a merger on the profitability of industry-specific companies is defined as:

$$Y_{it}(ROA) = \beta_1 + \beta_2 D_{it} + \beta_3 CR_{it} + \beta_4 DE_{it} + \beta_5 Size_{it} + \beta_6 Age_{it} + \beta_7 GDP_{it} + u_{it}$$

The explanation of the variables is as follows:

Y_{it} = dependent variable (ROA)

β_1 = constant term

D_{it} = dummy (pre-merger period = 0, post-merger period = 1)

CR_{it} = current ratio

DE_{it} = debt-equity ratio

Age_{it} = age variable

$Size_{it}$ = total assets of acquirer

GDP_{it} = GDP annual growth rate

Tech = technology sector dummy

Health = health sector dummy

Retail = retail sector dummy

Oil = oil and energy sector dummy

Con = conglomerate sector dummy

Tele = telecommunications sector dummy

u_{it} = random error

In the first multiple linear regression, there are twelve independent variables, including six dummy variables. The variable of interest is D_{it} as it captures the effect of the event of a merger on the profitability of the acquirer company, especially the sign of the coefficient is crucial as it shows whether the return on assets decreases or increases after the merger. Specifically for this study, the coefficient of the annual GDP growth rate is also of importance as it indicates whether the return on assets and GDP growth move in the same or opposite directions. The dummy variables are introduced to separate the overall effect into separate effects per sector.

In the second multiple linear regression, only companies from the same industry are used for analysis, and therefore no industry dummies are necessary. The data is sorted by ranking the industry dummy variables in ascending order, deleting all the data points where the industry dummy is zero, and repeating this for all the six industry sectors. By inspecting the magnitude of the coefficient D_{it} and its significance, it can be concluded which industry sector takes up most of the merger effect on profitability.

13

Results

After running the regression to examine the effect of mergers on profitability, the coefficients of the variables can be found in the table below. It is important to note that the dummy in column 2 capturing the change in return on assets for the pre- and post-merger event is significant and negative. This indicates that the return on assets for the investigated firms decreases in the post-merger years. This result is in line with the research carried out by Ooghe et al. (2006) and Singh and Mogla (2010) who also found a negative relationship between mergers and profitability.

The current ratio in column 1 has a significant positive effect on the return on assets, this indicates that acquirer companies are similar in all other aspects but one with a higher current ratio than the other is expected to have a higher return on assets. Since current assets make up the total assets and the return on assets is calculated by dividing the total assets from net income, the sign of the coefficient can easily be derived from there. The total assets, leverage, and age variable have an insignificant effect on the return on assets and the coefficients are close to zero. This indicates that for this dataset, there does not seem to be a relationship between these three variables and return on assets.

The GDP annual growth rate in column 3 is positively associated with the return on assets for the acquiring companies, implying that when the annual GDP growth increases in most countries, the return on assets of companies most likely increases too. This finding is intuitive as companies are more likely to benefit from high consumer spending and a growing capital market. However, at the significance level of 5%, this effect was not determined as significant.

Regarding the dummy variables for the industry sector in column 4, we can see that in all the industries there is a decline in return on assets however also no significant effect is found. The largest decrease in return on assets compared to the average across all industries is in the Conglomerate and Telecommunications industries. This is largely due to the sample size being much smaller in these industries, thus adding one company can already change the coefficient by a big margin. The retail and oil & energy sectors have a similar sample size but the return on assets seems to be lower in oil & energy than retail. Similarly, technology and healthcare also have similar sample sizes, but technology firms appear to have a higher average return on assets.

14

Even though these coefficients roughly tell us what the average return on assets across industries for this dataset is, they should not be used as benchmarks. Industries have different asset bases; retail companies might have goodwill as one of their most important assets whereas technology companies value R&D resources much more. Therefore, it is difficult to compare industries by only looking at return on assets.

ROA	Firm specific variables	Incl. Merger effect	Incl. Macroeconomic variable	Incl. Industry variables
Current Ratio	0.861** (0.232)	0.861** (0.232)	0.861** (0.232)	0.861** (0.232)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Debt-to-equity ratio	0.001 (0.007)	0.001 (0.007)	0.001 (0.007)	0.001 (0.007)
Age variable	0.001 (0.010)	0.001 (0.010)	0.001 (0.010)	0.001 (0.010)
Merger dummy		-2.347** (0.761)	-2.347** (0.761)	-2.347** (0.761)
Annual GDP Growth (World)			0.158 (0.230)	0.158 (0.230)
Technology				-0.319 (2.613)
Healthcare				-1.447 (2.630)
Retail				-0.324 (2.665)
Oil and Energy				-2.512 (2.690)
Conglomerate				-4.490 (2.980)
Telecommunications				-4.146 (3.484)
Constant	5.813* (2.687)	5.813* (2.687)	5.813* (2.687)	5.813* (2.687)
Observations	275.000			
Note	*$p<0.05$, **$p<0.01$			

*Table 4. Multiple Linear Regression with ROA as the dependent variable. Coefficients with a p value<0.05 are denoted with *.*

Until now, the regression is carried out by including all the companies from different sectors. From the results in Table 1, the dummy separating the pre- and post-merger periods has a significant coefficient, but it is not certain if there is only one industry or several industries that cause this effect.

Therefore, it is also useful to examine the separate effect of mergers on profitability per industry sector. To achieve this, sub regressions are carried out by modifying the sample to investigate the effect of the merger on profitability per sector. Another reason to consider the industries separately is that when the residuals of the first regression model are plotted against the predicted values of return on assets, a few outliers can be found.

Graph 2. Scatterplot of expected values of ROA on y-axis and residuals on x-axis.
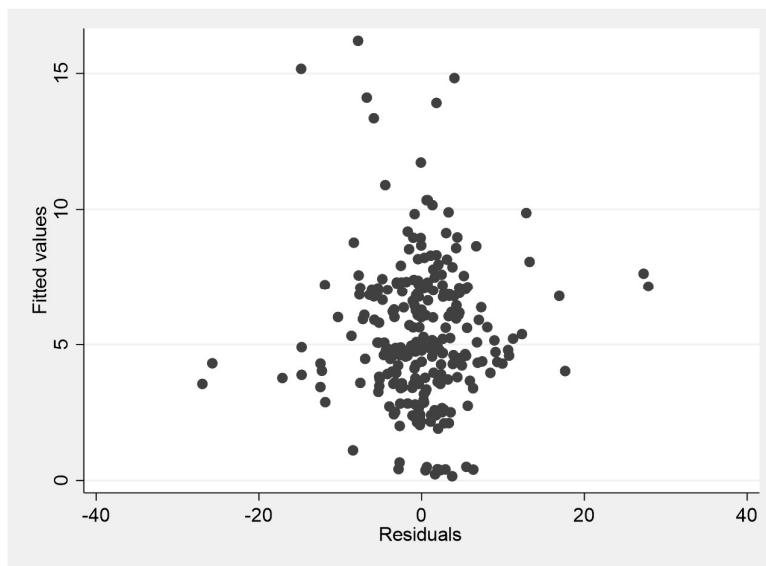
Residuals are the difference between the observed values and the values predicted by the model, also known as the fitted value. When carrying out an OLS regression, the residuals should mostly coincide around zero in this graph as this type of regression aims at minimizing the difference between the observed and the fitted values. On the left and right sides, there are some outliers and when matching these with the companies, most of them appear to be in the healthcare sector.

Because of this finding, the dataset is then adjusted by dropping all the data points for the companies which do not operate in the healthcare sector and running the same regression on healthcare companies.

Apart from the healthcare sector, sub regressions were also carried out in all the other industries. However, for these industries the coefficient of the pre-and post-merger period dummy becomes insignificant. Companies from other industries appear to not experience a significant effect on return on assets following the event of a merger, but only healthcare companies do.

This means that even though healthcare companies have the largest residuals, they also provide the most explanatory power to the model. The first regression was not the "best fit" for healthcare companies as their data points appeared to be the furthest from the line. The only reason the effect of a merger on return on assets was significant is because of the presence of healthcare companies. To come back to the second research question, the strongest effect of mergers on profitability is in the healthcare sector and it is a negative one.

By interpreting the results of the second regression from table 5 below, the coefficient of the debt-to-equity ratio in column 1 has changed to a negative and significant coefficient and the coefficient for GDP annual growth rate in column 3 has become negative but remained insignificant. The first finding shows that healthcare firms with higher debt-to-equity ratios, who finance their research with more debt, have a lower return on assets compared to firms that use more equity financing. The second finding might indicate that healthcare companies are not as cyclical as other sectors, meaning that an increase in annual GDP growth does not necessarily mean that the return of assets of healthcare companies is also higher.

ROA	Firm specific variables	Incl. Merger effect	Incl. Macroeconomic variable
Current Ratio	4.138**	4.138**	4.138**
	(1.793)	(1.793)	(1.793)
Total Assets	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Debt-to-equity ratio	-0.410**	-0.410**	-0.410**
	(0.050)	(0.050)	(0.050)

Age variable	0.009 (0.018)	0.009 (0.018)	0.009 (0.018)
Dummy merger		-5.755** (1.886)	-5.755** (1.886)
Annual GDP growth (World)			-0.124 (0.454)
Constant	2.467 (3.059)	2.467 (3.059)	2.467 (3.059)
Observations	67.00		
Note	*p<0.05 **p<0.01		

*Table 5. OLS sub regression on the healthcare sector with ROA as the dependent variable and robust standard errors. Coefficients with a p value<0.05 are denoted with *.*

As seen in Table 5, the absolute value of the coefficient for the merger dummy in column 2 becomes bigger indicating that a merger has negatively impacted the healthcare sector more than the industry average. In the first regression, leverage did not seem to influence return on assets but in the health sector, there is a significant and negative effect found. This indicates that the capital structure of healthcare companies does matter for their profitability.

According to an article published on the S&P Global website, the US health care sector is more vulnerable to a cyclical downturn now than it was in previous recessions (Khan, Peknay, Wong, 2019). They found that leverage levels in the healthcare sector have continued to rise in the last decade and that aggressive capital structures have burdened the balance sheets of healthcare companies. Secondly, they also mentioned that coverage ratios have declined while interest rates remained relatively stable. As interest coverage ratios are calculated by dividing earnings by interest expense, it implies that in the last few years the earnings of healthcare companies have decreased. This result supports the finding that leverage seems to have a significant negative effect on return on assets for healthcare companies.

Discussion

Based on existing literature, there is no definite answer to whether the effect of a merger has a positive or negative effect on the financial performance of the firm. Most of the academic literature on post-merger performance has led to different conclusions as the answer heavily depends on the time period chosen (Ali-Yrkkö, 2002). Another reason why many academic studies reach different conclusions is that they differ in the usage of variables to explain M&A performance. According to Das and Kapil (2012), this large number of multi-disciplinary measures and explanations of M&A performance leads to inconsistency.

Rashid and Naeem (2017) used an OLS regression and found an insignificant but negative impact on return on assets, whereas the variables debt to equity ratio and age had significant negative coefficients. According to them, older firms and firms with higher debt-to-equity ratios have a lower return on assets. The coefficients of the current ratio and total assets showed a significant and positive relationship with return on assets.

When investigating the effect of mergers on profitability in the healthcare sector, the debt-to-equity ratio becomes significant and negative which is in line with the results of Rashid and Naeem (2017), but age and total assets remained insignificant. It might be the case that companies situated in the Western market are already more developed and mature, hence why variables such as age and total assets do not influence the return on assets after a merger as much as in the Pakistani market.

Gugler et al. (2003) approached the relationship between mergers and financial performance from a different perspective. Instead of running a regression, they tried to determine the counterfactual and derive their conclusions from there. To determine whether a merger has increased profits or not, we must predict what the profits of the two merging firms would have been in the absence of the merger (Gugler et al., 2003). They also emphasized that now not only the sign of the coefficient is important but also the exact number of the coefficient. If the merged entity will have a profit of 10%, but the two firms' profits are 20% then the merger is still considered a failure. This is a great advantage of their study as it gives a more accurate image of the magnitude in which financial performance changes after a merger.

In this research paper, only healthcare companies show a significant and negative effect of the merger on profitability. The insight that healthcare companies experience a negative effect of mergers on profitability is unique and not discussed before in previous academic literature. Yet, this does not mean that healthcare companies should not pursue M&A anymore. As a high return on assets is not the only financial measure that healthcare companies should strive for, there are many other social factors that healthcare companies also must be considered.

According to Harris, Ozgen, and Ozcan (2000), it takes time to explore the real effects of mergers on hospital technical performance, and this is mainly due to the long organizational change process. Therefore, it is possible that merger effects on profitability in the healthcare sector take longer to observe than in other industries. This result is also in line with the article of S&P Global by Khan et al. (2019). According to Khan et al. (2019), "the health care industry is increasingly focused on value-based care models and consumerism, leading companies to make significant investments that may take longer to materialize into EBITDA". Even though healthcare companies experience a negative effect in the short term, they might be able to turn the merger into a profitable investment in the long term.

Kumar (2009) focused on the performance of 30 private sector companies that merged in India from 1999 to 2002 and found no significant improvement in corporate performance. According to him, merger decisions do not always have to be aimed at profit maximization but can also be driven by empire building and market consolidation. He also addressed the limitations of financial measures as it might not capture the full impact of mergers on financial performance. Therefore, even though the return on assets significantly decreases for healthcare companies following a merger, it should not be concluded that healthcare mergers are unsuccessful.

Conclusion and Recommendations

For this research, data has been collected for thirty-nine western companies that merged in the years 2010-2020 to investigate the effect of a merger on the profitability of the acquirer company. This was done by implementing an OLS regression with setting profitability, defined as return on assets, as the dependent variable and 12 independent variables mostly based on existing academic literature. In addition to previous research, the market of interest is different, and a macroeconomic variable has been included in the regression. The results show that most of the companies are worse off after the merger in terms of profitability. If industries are examined separately, it turns out that most of the industries do not have a significant relationship between profitability and the event of a merger except the healthcare sector. Therefore, only healthcare companies experience a significant and negative effect on the return of assets following a merger.

Recommendations for future research are to increase the data sample by lengthening the time interval such that more mergers can be concluded. This will also lead to a more equal industry frequency distribution, which increases the reliability of the industry coefficients.

It might also be useful to carry out different tests next to an OLS regression and find out if different tests based on a similar dataset yield the same outcomes. Especially research for developing an optimal method in finding the counterfactual of a merger will be insightful. However, as uncertainty will always play a role here and variables must be estimated, it will always be strenuous to predict the precise path of a world without a merger.

Lastly, more research on potential causes for the success or failure of mergers regarding profitability will also be very useful in addition to the relationship between profitability and mergers. Because even if the relationship between variables can be proven by regressions or other forms of analysis, it remains unclear from many academic studies how companies can improve these variables.

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Appendix

```
             | Curren~o TotalA~s  DEratio Agevar~e Dummyp~d GDPgro~d Techno~y
-------------+----------------------------------------------------------------
CurrentRatio |  1.0000
 TotalAssets | -0.0559   1.0000
     DEratio |  0.0258   0.0014   1.0000
  Agevariable| -0.1986  -0.0271   0.0348   1.0000
Dummyprepo~d | -0.0919   0.1103   0.0423   0.0688   1.0000
GDPgrowtha~d |  0.0653   0.0058  -0.0200  -0.0356  -0.1573   1.0000
  Technology |  0.4057  -0.0787   0.0249  -0.3733  -0.0412  -0.0239   1.0000
  Healthcare | -0.0695  -0.0993   0.0269   0.4295   0.0042  -0.0686  -0.4006
      Retail | -0.1356   0.1565   0.0196   0.0136   0.0413  -0.0505  -0.3196
   OilEnergy | -0.1653   0.1761   0.0032  -0.0317   0.0030   0.1013  -0.2915
Conglomerate | -0.0903  -0.1669   0.0222   0.0784   0.0017   0.0548  -0.1592
Telecommun~s | -0.1329   0.0595  -0.2402  -0.1296   0.0012   0.0383  -0.1111


             | Health~e   Retail OilEne~y Conglo~e Teleco~s
-------------+--------------------------------------------
  Healthcare |  1.0000
      Retail | -0.2659   1.0000
   OilEnergy | -0.2425  -0.1935   1.0000
Conglomerate | -0.1325  -0.1057  -0.0964   1.0000
Telecommun~s | -0.0925  -0.0737  -0.0673  -0.0367   1.0000
```

Table 5. Correlation Matrix of independent variables in the first OLS regression on ROA.

```
             | Curren~o TotalA~s  DEratio Agevar~e Dummyp~d GDPgro~d
-------------+----------------------------------------------------
CurrentRatio |  1.0000
 TotalAssets | -0.1546   1.0000
     DEratio | -0.0272  -0.0320   1.0000
  Agevariable| -0.0545  -0.0413  -0.1055   1.0000
Dummyprepo~d | -0.1751   0.2563   0.2366   0.0192   1.0000
GDPgrowtha~d |  0.2414  -0.1123  -0.0873   0.0199  -0.0932   1.0000
```

Table 6. Correlation Matrix of independent variables in the second OLS regression on ROA.

Breusch–Pagan/Cook–Weisberg test for heteroskedasticity in the healthcare sector	
Assumption: Normal error terms Variable: Fitted values of ROA	
H0: Constant variance	
chi2(1) = **4.26**	Prob > chi2 = **0.039**

Table 7. Breusch-Pagan Test for healthcare companies

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