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SHORT-TERM IMPACT OF MERGERS AND ACQUISITIONS ON FINANCIAL  
PERFORMANCE IN GERMANY

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**Abstract:** This paper examines the impact of mergers and acquisitions on the financial performance of German public companies in 2018. Due to different findings and no valuable evidence on German M&A, this paper compares the performance of public acquirers one year before and after an acquisition in Germany. Especially focusing on the impacts on acquirers that are SMEs, did several mergers within 2018 or invested in a different industry. This paper provides evidence of M&A effects on buyers' perspectives, as they see no substantial positive impact after a transaction but rather on Earnings per Share and Book to Market ratio.

**Keywords:** corporate finance, M&A, impact, Germany

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## 1. INTRODUCTION

Various motives lead to mergers and acquisitions (M&A). Besides strategic benefits, transaction actors wish to increase both their success and performance figures, resulting in improved competitiveness. In the past, multiple M&A transactions led to successful mergers. However, history has also shown that there have been several M&A failures. A successful merger depends on the complex interaction of internal and external factors.

The German economy is known for its Small- and Medium-sized Enterprises (SMEs). German SMEs stand out for their exceptional crisis resistance and outspoken adaptability to demand shifts (German Savings Banks and Giro Association (DSGV), 2022). Therefore, SMEs are investigated in this paper. But 1) how are German SMEs affected by M&A transactions? 2) Are there other effects if companies do several mergers in one year? 3) What happens to the financial performance if the acquirer expands its business in a different industry?

This paper focuses on the effect of an M&A transaction on the buyers' financial performance after one year and tackles the questions mentioned above.

Multiple studies evaluated the impact of M&A on an acquirer's financial performance.<sup>1</sup> The findings show the complex nature of M&A. Additionally, contradictory literature exists. While some paper states a positive influence on acquirers' performance, other papers analyzed solely negative impacts.

Besides interview-based approaches, there are two main approaches measuring M&A effects. The first is a stock-based approach. Event studies, an empirical analysis of how events affect the stock price of a corporation, are used to measure this approach. Occurrence studies can provide crucial details regarding how a stock price is likely to respond to a specific event.

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<sup>1</sup> e.g. Bruner, 2001; Mager & Meyer-Fackler, 2017; Martynova & Renneboog, 2006; Tang, 2015; and others. More papers are stated in the Literature Review.

Martynova and Renneboog (2006) examined the stock prices of M&A transactions in Europe and found that various characteristics of takeovers have a significant impact on the estimated shareholder wealth effect. The kind of takeover offer has a significant influence on the short-term wealth implications for the target company's shareholders, with hostile takeovers causing significantly bigger price reactions than smaller transactions. Abnormal returns are bigger in bids having a UK target than in bids featuring a target in Continental Europe (Martynova & Renneboog, 2006).

Secondly, accounting-based approaches explore the effects on ratios, growth indicators, and operating cash flow. Thus, synergies or the performance effect through combining ratios can be evaluated. Pervan et al. (2015) supervised ROA, ROE, and profit margin on Croatian M&A. They stated that the profitability of the companies before and after the merger did not differ significantly (Pervan et al., 2015).

Those two research papers revealed different evidence on M&A effects. Bruner (2001) concluded more than 800 M&A-effect-related papers and observed their findings. On the one hand, he states that 60-70% of all M&A transactions do not pay off if the impacted buyer defines "pay" as material and significant abnormal value. On the other side, the opportunity costs of investors are at least compensated. Further, two-thirds of studies prove value creation (Bruner, 2001).

Even though takeover activity has been enormously high in the past, studies about the German M&A market are currently rare and less analyzed. Studies of M&A impact on corporates in Germany are unavailable. Besides, one study conducted by Mager & Meyer-Fackler (2017)

stated that mergers did not have any negative abnormal long-term performance between 1981-2010 in Germany. There are no other currently published papers on M&A effects in Germany<sup>2</sup>. Germany is different with respect to other European countries, Asia, and the U.S.

For instance, in the US, many hostile takeovers occur, and China has an entirely different legal as well as cultural system than Western states. Thus, the M&A conditions are completely different from country to country. A Huge difference from other countries is that Germany has a strong middle class characterized by many SMEs.

Companies with up to 249 employees or annual sales of no more than EUR 50m are classified as SMEs. More than 99% of all companies in Germany are SMEs. They provide more than half of all jobs and generate every second Euro in the value creation process. Moreover, 3.5 existing SMEs generate EUR 207bn of export revenue (BVMW e.V. Bundesverband, 2022).

Unlike the US, the German economy is not known for hostile takeovers. Most entities are family businesses, where the succession plan is provided within the family. Furthermore, cultural and legal aspects play an essential role in the prosperity of an economy. Thus, I assume M&A effects on acquirers in Germany should differ from other countries.

Due to ambivalent statements across countries as well as different analysis approaches, it is not clear whether M&A activity has a positive or negative impact on the buyer after the transaction. Additionally, less research exists on M&A's impact on German acquirers.

This analysis captures the German M&A market by analyzing the effect of M&A due to an accounting-based approach by examining financial ratios like ROS, ROE, and others (see methodology). Due to the high number of SMEs in Germany, 1) the post-merger financial performance of SMEs is captured. Furthermore, 2) the effect of the number of mergers within

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<sup>2</sup>This statement is formulated to the best of my knowledge and access to academic papers.

one year, as well as 3) the effect of a merger in a different industry on financial performance indicators are evaluated in this analysis.

This study measures the post-transaction impact (one year after the transaction) on buyers' performance in the short term.

The data set includes only those transactions that met the following criteria:

1. Committed between German public acquirer and German target.
2. Completed in the time interval of 01/01/2018 and 31/12/2018.
3. Data on both parties is available before and after the transaction is made.
4. At least 50% of the target company's shares were purchased.

I collected 101 transactions. Due to the selection requirements, 77 transactions are evaluated in this paper. In the case of several mergers in 2018 by the same company, the acquirer is only conducted once.

Due to the trisection of my research, the main findings are:

- 1)  $ROS_{\text{post-merger}}$  of SMEs in Germany are smaller than larger entities. At the same time, Earnings per Share (EPS) and Book to Market (BtM) values increased after the merger.
- 2) As well as in the first findings regarding the SMEs, more mergers in one year led to significantly slightly higher EPS and BtM.
- 3) Whereas  $ROS_{\text{post-merger}}$  for SMEs declines,  $ROS_{\text{post-merger}}$  increases for companies that invested in a different industry. Further findings and explanatory statements are implied in Chapter 6.

In line with my results, I support the statement that limited financial improvements or even a better competitive standing are reached after M&A activities (Hitt et al., 2001; King et al., 2004). Additionally, as already examined by Tang (2015), this paper evaluated no significant changes before and after the transactions in Return on Assets (ROA).

All in all, this paper creates new evidence by proving that the EPS and BtM ratio increases whether a company is an SME or a company is doing more than one merger within a year. Knowing that 99% of German companies are Small and Middle Entities (BVMW e.V. Bundesverband, 2022), future academic papers can take up this thought and examine even more in the field of German SMEs. Additionally, long-term effects can also be investigated because there is less research on the German M&A market (see 2. Literature Review).

In the following sections of this study, I present the Literature Review in relation to the subject of M&A effects. The third topic presents the dataset and the method applied in this study. Chapter 4 derives *Hypothesis 1-3*. The summary of the data is depicted in section 5, and the findings of the *Regression 1-3* are shown afterward. Finally, my main results are noted in the Conclusion.

## **2. LITERATURE REVIEW**

There is disagreement on whether M&A deals increase or decrease value. Although it is crucial, defining and carrying out value creation measurement is challenging. As a result, previous studies produced contradictory results since they used a variety of perspectives and methodologies. Due to methodological problems, empirical research may not be able to accurately measure the benefits of M&As (Brothers et al., 1998; Lubatkin, 1983).

The difficulty in defining a M&A transaction's performance stems from its complexity. On the one hand, a transaction has an impact on several stakeholders, including employees, clients, and suppliers, as well as shareholders, debt holders, and management. On the other hand, based on the strategic goal of the organization, various performance indicators should be used. The accounting-based approach and the stock-based approach are the two approaches most

frequently used to gauge M&A performance. Both approaches measure financial performance, but the variables used in the methodology are different.

### *Performance measurements*

The accounting-based approach can be divided into three groups: ratios, growth indicators, and operating cash flow (Thanos & Papadakis, 2021). This strategy has benefits, such as the ability to take synergies into account or a more thorough understanding of the performance effect through combining ratios. However, this strategy has two limitations: it cannot consider performance factors that are not quantifiable in financial statements, and it does not account for changes in risk.

The stock-market-based approach is measured by calculating the impact on shareholders' returns following the announcement of the transaction or the abnormal return caused by the market's response to new information. The degree to which each stock's actual return deviates from its anticipated normal return is referred to as its "abnormal return" (MacKinlay, 1997). The primary advantage of this strategy is the accurate measurement of the shift in shareholder wealth following the disclosure of the event (Kothari et al., 2006).

Additionally, this assessment is prospective since stock prices need to reflect the present value of anticipated future cash flows (Bruner, 2004). Consequently, the fundamental premise of this approach is market efficiency. Stock price movements on the day of the announcement can be used as a proxy for forecasted future deal profitability or, at the very least, investors' sentiment. These presumptions are, nevertheless, frequently viewed as the first restrictions. Investor expectations have an impact on the market's response.

Furthermore, it is debatable whether typical investors act rationally and whether investors have access to all the information necessary to forecast the outcome of a transaction. Empirical studies demonstrate how price variations are also accounted for by investor momentum

techniques, financial market volatility, and the market's propensity to "follow the herd" (Chan et al., 1996; Graham, 1999; Shiller, 1990; Statman, 2017).

Rather than serving as a measurement of a deal's success, Zollo and Meier (2008) see short-term volatility in a company's stock price as a collective wager on the result of the transaction. Finally, due to extra complicating factors, stock-market measurements are inappropriate when a deal primarily focuses on long-term strategic objectives (Brown & Warner, 1980; Das & Kapil, 2012).

One of the most crucial research techniques in this area has been the event study methodology, which examines stock market responses to M&A announcements and evaluates the profitability of those transactions (MacKinlay, 1997; McWilliams & Siegel, 1997).

The influence of the event is examined during a given event window. Because confusing events are more likely to occur in extended event windows, a short-time event window is typically used (Brown & Warner, 1980).

Furthermore, managers are encouraged to enhance the short-term return, so the measurement is susceptible to managerial self-interest. Finally, the event study approach analyses anomalous returns and is not a reliable proxy for performance measurement because it cannot clearly identify the pathways of M&A gains (Barraclough et al., 2013).

This study is based on an accounting-based approach because several performance indicators affect post-merger performance. A stock-based analysis does not consider indicators like ROS, ROA or ROE. Further, stock prices could be distorted because investors place bets on how the deal will turn out, leading to short-term volatility.

### *Influence of M&A activities*

Mager and Meyer Fackler (2017) studied 338 transactions between 1981-2010 in Germany, concluding different stages in the development of the German M&A market.

The long-term effects of these three decades were investigated by three years of abnormal returns with the help of buy-and-hold abnormal returns and Carhart's four-factor model. Scientists stated no significant negative abnormal buy-and-hold returns for the total sample (Mager & Meyer-Fackler, 2017).

Including all mergers and acquisitions in the Philippines from 2006-2010, Tang (2015) observed the influence on financial indicators. Regarding the motives of the transactions, Tang pointed out that M&A transactions are mainly driven to achieve synergies and economies of scale. Moreover, he argued that traditional measurement methods (e.g., ROA, ROS, etc.) could adequately evaluate the impact of M&A. The research results showed a significant decline in ROA after M&A transactions and no significant changes before and after the transactions in abnormal return on assets (Tang, 2015).

The largest and most significant transactions between 2014-2016 in BRICS countries were investigated by Kinatader, Fabich, and Wagner (2017). They finished their cost-effectiveness study of mergers and acquisitions and concluded that cash flow from operations has improved since the completion of the M&A (Kinatader et al., 2017).

Rather than Mager and Meyer Fackler (2017), this research focuses more on the accounting-based analysis of the German M&A market, providing novel evidence of the latest German M&A activity. Moreover, Tang (2015) (focusing on Philippines financial institutions) and Kinatader et al. (2017) (focusing on BRICS M&A activity) drove an accounting-based analysis. In contrast, Kinatader et al. (2017) state a positive influence, and Tang (2015) examines a significant decline in post-merger ROA. This study uses an empirical study validating Tang's

argument that traditional measurement methods (e.g., ROA, ROS, etc.) could adequately evaluate the impact of M&A.

Besides the influence of factors like financing method, Uhlenbruck, Hughes-Morgan, and Hitt (2016) examined accounting distortion and operating efficiency of 859 transactions between 2014-2016. The main finding was that company's post-share prices were lower for equity-financed transactions than for cash-financed transactions. Regarding the overall impact of M&A activity on economic performance indicators, researchers found significant improvements in experimental parameters after corporate transactions compared to the industry average (Uhlenbruck et al., 2016). Once an acquisition is completed, the acquiring firm may achieve an advanced competitive position (Hitt et al., 2001).

King et al. (2004) did a meta-analysis, examining 93 empirical studies with 852 effect sizes. As a result, transactions did not end up in financial outperformance; somewhat limited financial improvements were figured out (King et al., 2004).

Regarding Uhlenbrock et al. (2016), a different peer group needs to be implemented in the regression. Rather than evaluating cash- and equity-financed transactions, this paper is based on three stages:

I evaluate the post-merger financial performance (one year after the transaction) of 1) SMEs, 2) companies with one merger and more mergers within one year, and 3) organizations that invested in a different industry or not.

By investigating 53 horizontal transactions of European and U.S. companies in manufacturing industries between 1988-1992, Capron (1999) contemplated cost-based and resource-based synergies. Firstly, the researchers stated that cost-based synergies are not easy to reach after the transaction and generally need operational changes in the business, leading to cost-cutting and downsizing. Secondly, due to this rationalization, the target company faces organizational

disruption than the acquirer. Thirdly, because of organizational changes on the target, the acquirers need to finance the changes first to enhance the second step.

They resulted in a deteriorated financial performance of the acquirers after the merger (Capron et al., 1999).

In contrast, Bruner (2001) examined 120 scientific studies and 12 informal surveys regarding M&A and concluded the publication of its findings in “Does M&A pay?”. Whereas returns to target firms were relatively significantly positive, the acquirers announced negative returns in 22 studies, but in 32 studies, buyer firms reported positive. Additionally, most studies investigated a positive return for the combined companies. From the financial performance perspective, just four reports reported a significantly positive influence (Bruner, 2001).

Based on Hitt et al. (2001) and King et al. (2004), I would suggest higher financial performance outcomes post-merger for companies that did more than one merger and companies that invested in another industry. While Bruner (2001) expresses that less positive post-merger effects were examined and Capron (1999) states a decline in financial performance in his analysis, the overall outcome of the regression cannot be predicted based on previous literature.

### **3. DATA AND METHODOLOGY**

#### *Data selection*

This study used the research databases Zephyr and Capital IQ to construct an M&A sample. Only domestic transactions of Germany in 2018 are used, where the acquirers are public companies. To investigate the financial performance changes after M&A activities, financial KPIs are provided from 2017 to 2019.

The cleaned sample consists of 101 transactions of 77 companies and includes:

1. Name of acquirer and target
2. The sector of acquirer and target
3. Deal type
4. Method of payment (if applicable)
5. The deal value of the transaction (if applicable)
6. Return on Assets of the acquirer (ROA)
7. Return on Equity of the acquirer (ROE)
8. Return on Sales of the acquirer (ROS)
9. Return on Capital of the acquirer (ROC)
10. Earnings per share of the acquirer (EPS)
11. Book to Market value of the acquirer (BtM)
12. Debt to Equity ratio of the acquirer (DtE)
13. Size category according to (BVMW) classification by revenue:

SMEs  $\leq$  EUR 50m and large entities  $>$  EUR 50m

All deals were announced between 01/01/2018 and 31/12/2018. The deal size varies from EUR 0.34m and EUR 2.05bn; 80 completed deals did not report a deal value.

The chosen method to examine the analysis is the regression analysis. The regressions were conducted with 77 different German public companies. To guarantee a qualified analysis, corporates who did more than one merger in 2018 were only conducted once.

Further, companies that could not provide points 6.-14. (as mentioned above) were not used in the following regressions.

The study is anticipated to provide additional evidence for earlier studies comparing the financial performance of firms before and after mergers. In Addition, this study differs from earlier studies in that it only looks at German corporates, primarily focusing on the 1) post-merger financial performance of SMEs. Moreover, 2) the effect of the number of mergers within a year, as well as 3) the invested industry is examined. The regression was constructed using financial performance indicators rather than event studies because several performance indicators that affect post-merger performance, e.g. ROS, ROA, or ROE, are not considered in a stock-based analysis.

### *Models*

All models capture the financial effect of the M&A activities of the buyer, not the target.

The first model examines the relationship between the pre-and post-merger financial indicators. Pre-merger captures the year before the transaction happened (2017), and post-merger is 2019, the year after the overtake.

To quantify whether M&A activity has a positive influence on financial performance or not, ROS, ROE, ROA, ROC, DtE, BtM, and EPS were chosen. The selection of financial indicators to study is one of the most essential elements of research. This paper examines accounting statement indicators of companies that have been researched in works on related subjects and will be utilized as the basis for this investigation (Cornett M. M. et al., 2006; Kalra R., 2013; Tang, 2015).

The following financial performance indicators are one of the most often used metrics for evaluating the success of M&A deals since they accurately capture the success of deals. In this paper following models are applied:

$$(1a) \text{ ROS}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ ROS}_{i, \text{pre-merger}} + y_0 \text{ SME} + y_1 (\text{ROSSME}) + \varepsilon_{i, t}$$

$$(1b) \text{ ROE}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ ROE}_{i, \text{pre-merger}} + y_0 \text{ SME} + y_1 (\text{ROESME}) + \varepsilon_{i, t}$$

$$(1c) \text{ ROA}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ ROA}_{i, \text{pre-merger}} + y_0 \text{ SME} + y_1 (\text{ROASME}) + \varepsilon_{i, t}$$

$$(1d) \text{ ROC}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ ROC}_{i, \text{pre-merger}} + y_0 \text{ SME} + y_1 (\text{ROCSME}) + \varepsilon_{i, t}$$

$$(1e) \text{ DtE}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ DtE}_{i, \text{pre-merger}} + y_0 \text{ SME} + y_1 (\text{DtESME}) + \varepsilon_{i, t}$$

$$(1f) \text{ BtM}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ BtM}_{i, \text{pre-merger}} + y_0 \text{ SME} + y_1 (\text{BtMSME}) + \varepsilon_{i, t}$$

$$(1g) \text{ EPS}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ EPS}_{i, \text{pre-merger}} + y_0 \text{ SME} + y_1 (\text{EPSSME}) + \varepsilon_{i, t}$$

In the above-stated regression equations, the post-merger financial indicator is the dependent variable, and the pre-merger figure is the independent variable, where  $i$  captures the different acquirers.  $\beta_0$  demonstrates the relationship between the consequences caused by the execution of M&A and the evaluated measure.

The coefficient  $\beta_1$  provides information on whether the financial KPIs increased or decreased from 2017 to 2019. Only the financial performance of the acquirers is measured; therefore, these financial KPIs are taken from the annual statements of the buyers.

The firm size, measured by the revenue, is the control variable. The variable SME is binary and can be either 1 or 0. Regarding the German Federal Association of Small and Middle Entities (BVMW), businesses are characterized as SMEs if their revenue is smaller or equal to EUR 50m. Thus, the dummy SME is stated as follows:

$$\text{SME} \begin{cases} 1 = \text{revenue} \leq \text{EUR } 50\text{m} \\ 0 = \text{revenue} > \text{EUR } 50\text{m} \end{cases}$$

The coefficient  $y_1$  captures the influence of the binary variable (either 1 = SME or 0 = large entity) multiplied by the respective independent variable of each regression.

Secondly, the regressions examine the relationship between financial performance and the number of mergers completed in 2018. The following equations are used:

$$(2a) \text{ ROS}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ ROS}_{i, \text{pre-merger}} + y_0 \text{ NUM} + y_1 (\text{ROSNUM}) + \varepsilon_{i, t}$$

$$(2b) \text{ ROE}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ ROE}_{i, \text{pre-merger}} + y_0 \text{ NUM} + y_1 (\text{ROENUM}) + \varepsilon_{i, t}$$

$$(2c) \text{ ROA}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ ROA}_{i, \text{pre-merger}} + y_0 \text{ NUM} + y_1 (\text{ROANUM}) + \varepsilon_{i, t}$$

$$(2d) \text{ ROC}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ ROC}_{i, \text{pre-merger}} + y_0 \text{ NUM} + y_1 (\text{ROCNUM}) + \varepsilon_{i, t}$$

$$(2e) \text{ DtE}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ DtE}_{i, \text{pre-merger}} + y_0 \text{ NUM} + y_1 (\text{DtENUM}) + \varepsilon_{i, t}$$

$$(2f) \text{ BtM}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ BtM}_{i, \text{pre-merger}} + y_0 \text{ NUM} + y_1 (\text{BtMSME}) + \varepsilon_{i, t}$$

$$(2g) \text{ EPS}_{i, \text{post-merger}} = \beta_0 + \beta_1 \text{ EPS}_{i, \text{pre-merger}} + y_0 \text{ NUM} + y_1 (\text{EPSSME}) + \varepsilon_{i, t}$$

The post-merger financial indicator is the dependent variable, and the pre-merger value is the independent variable, where  $i$  captures the different acquirers. NUM is a binary variable and is either 1 or 0.

$$\text{NUM} \begin{cases} 1 = \text{acquirer did more than one merger in 2018} \\ 0 = \text{acquirer did just one merger in 2018} \end{cases}$$

The coefficient  $y_1$  measures the effect of the binary variable (NUM) and is multiplied by the pre-merger independent variable.

Thirdly, Yaghoubi et al., 2016 stated that mergers have a cyclical pattern and that the ‘success’ of the transaction depends on the industry type and economic activity, as well as other parameters (Wang & Lahr, 2017; Yaghoubi et al., 2016).

Therefore, the third model is set up to evaluate the financial performance and the industry:

$$(3a) ROS_{i, post-merger} = \beta_0 + \beta_1 ROS_{i, pre-merger} + y_0 IND + y_1 (ROSIND) + \varepsilon_{i, t}$$

$$(3b) ROE_{i, post-merger} = \beta_0 + \beta_1 ROE_{i, pre-merger} + y_0 IND + y_1 (ROEIND) + \varepsilon_{i, t}$$

$$(3c) ROA_{i, post-merger} = \beta_0 + \beta_1 ROA_{i, pre-merger} + y_0 IND + y_1 (ROAIND) + \varepsilon_{i, t}$$

$$(3d) ROC_{i, post-merger} = \beta_0 + \beta_1 ROC_{i, pre-merger} + y_0 IND + y_1 (ROCIND) + \varepsilon_{i, t}$$

$$(3e) DtE_{i, post-merger} = \beta_0 + \beta_1 DtE_{i, pre-merger} + y_0 IND + y_1 (DtEIND) + \varepsilon_{i, t}$$

$$(3f) BtM_{i, post-merger} = \beta_0 + \beta_1 BtM_{i, pre-merger} + y_0 IND + y_1 (BtMIND) + \varepsilon_{i, t}$$

$$(3g) EPS_{i, post-merger} = \beta_0 + \beta_1 EPS_{i, pre-merger} + y_0 IND + y_1 (EPSIND) + \varepsilon_{i, t}$$

Different from Yaghoubi et al. (2016), this study analyzed the effect of industry on the post-merger financial indicator by using the binary variable (IND).

$$IND \begin{cases} 1 = \text{acquirer merged with a company in a different industry} \\ 0 = \text{acquirer merged with a company in the same industry} \end{cases}$$

The post-merger financial indicator is the dependent variable, and the pre-merger value is the independent variable, where  $i$  captures the different acquirers. The effect of the independent variable multiplied by the binary variable (IND) is quantified by  $y_1$ .

#### 4. HYPOTHESIS DEVELOPMENT

Due to the high number of research on M&A transactions, especially the American M&A market, this paper focuses exclusively on German transactions.

Firstly, the financial performance of acquirers is examined by a regression of pre-and post-merger financial indicators (ROS, ROE, ROA, ROC, DtE, BtM and EPS). Several studies indicate a positive influence on financial performance, like ROS, ROE, and ROA (Cornett M. M. et al., 2006; Kalra R., 2013). Additionally, the purpose of M&A is both economies of scale

and economies of scope. Acquirers do mergers to benefit from increased access to capital, lower costs, or increased bargaining power resulting in value generation and increased competitiveness. Theoretically, if a corporation expands, it is more competitive than smaller entities. Being bigger allows competing for more, which is one of the advantages of economies of scale. Although German SMEs stand out for their exceptional crisis resistance and outspoken adaptability to demand shifts (German Savings Banks and Giro Association (DSGV), 2022), regarding the ability of better financing conditions and more substantial competitive power, larger entities should face better ROS post-merger than smaller entities. Therefore, companies should gain financial performance leading to the following hypothesis:

***Hypothesis 1:** M&A transactions return on lower financial performance for the acquirer after the transaction if the acquirer is a SME*

Secondly, the hypothesis captures whether the number of transactions plays a significant role in the impact on financial performance. However, the acquirer's enterprise value and amount of revenue should grow after the transactions. In addition, if entities do more mergers, they should know how these transactions work, enabling them to guarantee a smooth process. According to that assumption, corporates with higher M&A activity in 2018 should face higher return on sales than those with just one transaction.

***Hypothesis 2:** M&A transactions return on higher financial performance for the acquirer after the transaction if the acquirer did more than one merger in 2018*

Thirdly, if companies diversify their product portfolio, then risk should decrease due to diversification. This is related to economies of scope: A corporation may distribute risk among

its many income streams by having more rather than concentrating on just one. When one income stream declines, another revenue stream may maintain or even increase, reducing the risk to the acquiring firm. Finally, the third hypothesis states:

***Hypothesis 3:** M&A transactions return on higher financial performance for the acquirer after the transaction if it merges with a company of a different industry*

The empirical results of the previously stated *Hypotheses 1-3* are tested in section 6.

## **5. SUMMARY STATISTICS**

This study conducted a regression analysis of financial performance. The different acquirers' sectors are Communication Services and Consumer Discretionary, Financials, Healthcare, Industrials, High Technology, Materials, Real Estate, Retail, and Utilities.

34.65% bought a target in a different industry. The acquiring firms' size (measured by the revenue of 2017) varied from EUR 1.3m to EUR 229.6bn, with the median at EUR 217.8 and an average of EUR 294.4m. As a result, 24.7% were classified as SMEs, and 75.3% as large-sized.<sup>3</sup>

Any business activity needs to measure return on sales to ensure it is effective and contributes to the bottom line. When accounting for factors like operating expenses and all sources of revenue, having a suitable ROS guarantees an organization enough cash flow. If a company is about to face financial difficulties, this number would be negative. An enterprise generates profit if ROS is higher than 0%.

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<sup>3</sup> Limitation: sample size does not reflect the SMEs contribution in Germany. 99% of German companies are SMEs (BVMW e.V. Bundesverband, 2022).

Figures 1 and 2 capture the ROS change between 2017 and 2019 as well as SMEs and large entities, showing that  $ROS_{\text{post-merger}}$  decreases.

Overall, the average ROS declined from 9.0% in 2017 to 4.3% in 2019.

The range from the first quartile (25% mark) to the third quartile (75% mark) is more extensive for SMEs than for large entities. Besides just a few outliers, the data represents a higher ROS of larger entities than SMEs. The pre-merger ROS of large entities was 10.2% (5.5% for SMEs) and the post-merger 7.8% (-6.3%), highlighting that those 19 SMEs underperformed after the merger.

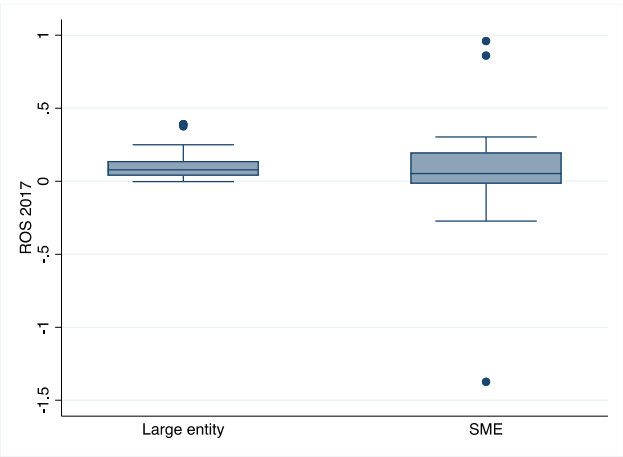


Figure 1: Box charts of  $ROS_{\text{pre-merger}}$  of SMEs and large entities

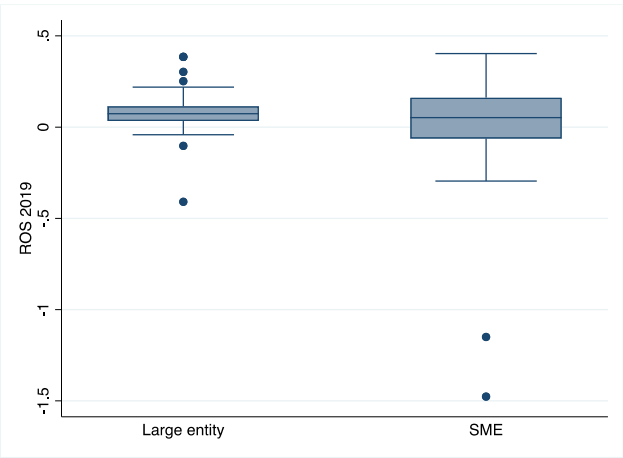


Figure 2: Box charts of  $ROS_{\text{post-merger}}$  of SMEs and large entities

Figure 3 underlines the overall decline of ROS from 2017 to 2019, indicating that businesses in German have a weaker financial profitability after a M&A transaction. This finding is supported by the empirical results in section 6. Few companies show a ROS smaller than zero. Moreover, a good indicator is about 10%, showing that most companies, except for some outliers, are profitable.

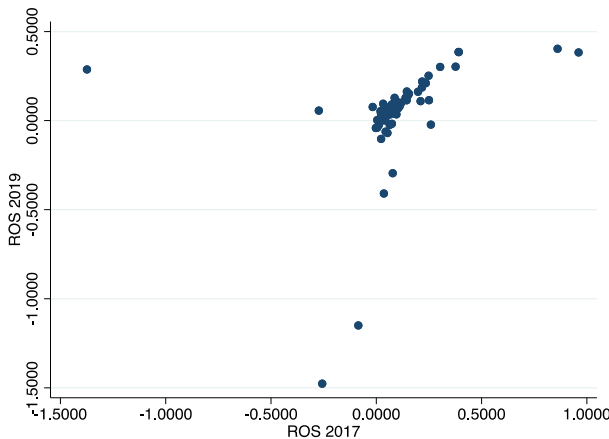


Figure 3: Scatter plot of  $ROS_{pre-merger}$  and  $ROS_{post-merger}$

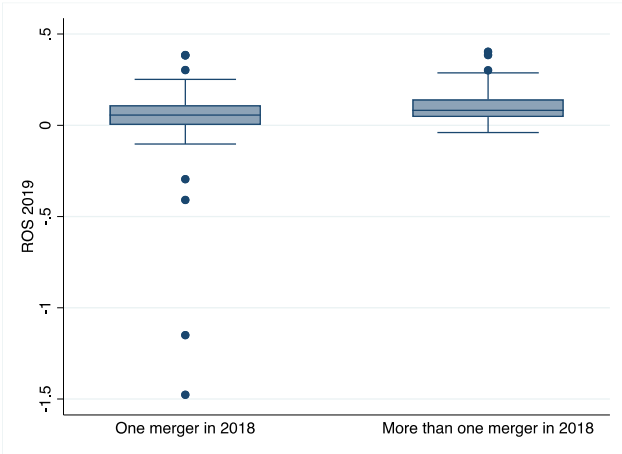


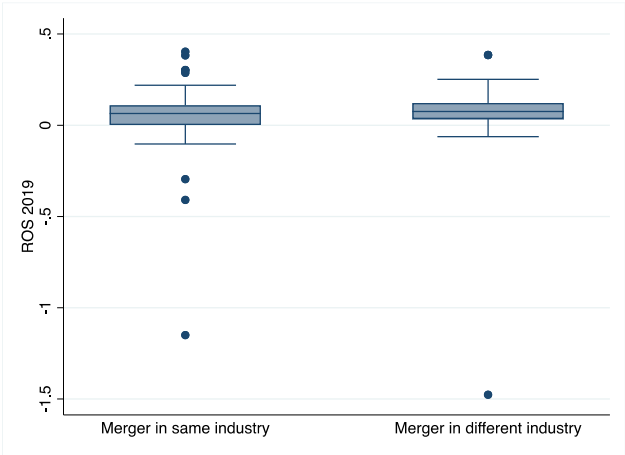
Figure 4: Box charts of  $ROS_{post-merger}$  and number of mergers in 2018

Figure 4 shows the relationship between the number of mergers on the ROS in 2019. Companies provide a decline after the transaction (9.5% in 2017 to 1.7% in 2019) if they only concluded

one transaction in 2018. Companies with more than one merger in 2018 could increase their financial performance (ROS) from 7.3% pre-merger to 12.8% post-merger (see *figure 4*).

In total, 18 companies did more than one merger. 15 companies did two mergers, two companies did three mergers, and one company did six mergers in the observation period.

*Figure 5* captures the  $ROS_{post-merger}$  of companies that acquired a target in the same or different industry as they are acting in.



**Figure 5:** Box charts of  $ROS_{post-merger}$  and related industry

Out of 77 companies, 48 acquired a new enterprise in the same industry. Just 29 were acquired in another industry. If acquirers had a ROS of 8.4% in 2017, their ROS declined by half to 4.2% after the takeover. Moreover, companies that merged with a target from a different industry also show a decline in ROS (10% to 4.4%).

### 6. EMPIRICAL RESULTS

The empirical results (see *Table 1-3* in the Appendix) of the study evaluate the financial performance indicators in relation to 1) firm size, 2) the number of mergers, and 3) industry.

The t-test is a statistical test for assessing hypotheses that use the t-statistic, the values of the t-

distribution, and the degrees of freedom to assess statistical significance. Thus, the t-statistics are given in parentheses in *Table 1-3*.

### *Regression 1*

As a recap, *Hypothesis 1* states that M&A transactions return a lower financial performance for acquirers of SMEs compared to large entities. *Table 1* implies that *Hypothesis 1* can be partially displayed as true.

In general, the financial indicator before the merger significantly positively affects the financial performance after the merger. On average, the ROS 2017 (1a) of large enterprises positively influences the ROS 2019. In contrast, the ROS 2017 negatively influences the ROS 2019 if the corporate is a SME. Holding everything else constant, SMEs have, on average, 0.05 less ROS after a successful merger compared to large entities. The slope coefficient  $y_l$  shows a significant negative influence of ROS 2019 for SMEs.

The same appears by comparing other financial indicators before and after the merger. On average, the (1b) ROE of SMEs after the merger decreases significantly than the ROE of larger companies. The difference is most evident for the financial indicator ROC. The (1b) ROC is, on average, 1.28 lower for SMEs after the merger than for larger enterprises. These findings indicate that, compared to the larger enterprises, SMEs show post-merger financial instability regarding ROS, ROE, and ROC.

Due to statistical insignificance regarding ROA (1c) and DtE ratio (1e), no concrete assumption can be detected.

A suitable explanation for this occurrence could be that smaller companies, on the one hand, do not have the financial strength to pay the acquisition costs from their equity, therefore increasing financing costs and thus declining their profit. On the other hand, more expenses like

increased labor or material and energy costs downsize profitability. Concluding, larger enterprises can generate better profits post-merger due to their size and financial abilities.

The empirical study showed a significant positive influence of SMEs on the (1f) Book to Market value and (1g) EPS. On average, the post-merger Book to Market ratio (1f) and EPS (1g) significantly increases in the case of acquiring an SME compared to a large entity. This finding is statistically significant. Resulting that stakeholders of SMEs will get more after a merger than stakeholders of larger entities. Underlined by an adjusted  $R^2$  of regression (1f) and (1g) close to 1, indicating that the independent variable can explain the dependent variable.

While Mager and Meyer-Fackler (2017) did not find significant negative abnormal buy-and-hold returns for their total sample of German M&A transactions, I can provide novel evidence that BtM as well as EPS of SMEs increase after the transaction.

### *Regression 2*

The second empirical study (see *Table 2*) tests *Hypothesis 2*. Under the assumption that the acquirer did more than one merger in 2018, the M&A transactions will positively influence the financial performance after 2018. The empirical results show no sufficient evidence to support the second hypothesis.

The equations ROE(2b), ROC (2d), and DtE (2e) are not significant to analyze.

Doing just more mergers in 2018 has, on average, a negative effect on the ROS and ROA in 2019.

Other effects are found by testing the relationship of the number of mergers on the Book to Market value (2f) and the EPS (2g). On average, performing just one merger positively influences the BtM value. Holding everything else equal, multiple M&A transactions in 2018 negatively affected the ROS in 2019. Interestingly, the slope coefficient  $\gamma_1$  shows an increased positive influence of the BtM for various mergers compared to just one. The same results were

found in the case of evaluating the effect of EPS. An increased Book to Market ratio value means either a higher Book value or a lower market value post-merger. Mergers increase, e.g. the number of assets in the financial report, leading to a higher Book value. Thus, the Book to Market ratio grows. This result could be explained due to synergies, e.g., increased use of information technology would increase operational effectiveness or supply chain efficiencies as well as lower salaries and wages. Besides cost synergies, revenue synergies like cross-selling or reduction of competition are logical conclusions.

### *Regression 3*

Lastly, the third regression (see *Table 3*) depicts the financial performance indicators in correlation to the industry. Due to less significant evidence and different results, *Hypothesis 3* cannot be confirmed.

A statistically significant conclusion can only be made about ROS (3a) and Book to Market value (3f). It can be adopted that ROS increases by 1.9 on average (holding everything else constant) if the company buys a target from a different industry. Thus, profitability rises because of diversification if profitability is measured by ROS. Due to investments in other industries, businesses can access untapped markets, industries, and demographic groups. Diversification results in economies of scale and more effective use of resources and talents.

## **7. CONCLUSION**

The study analyzed 77 public companies headquartered in Germany doing one or more mergers in 2018. The empirical study findings show a significant increase in post-merger ROS if a buyer buys a company in a different industry. Comparing the ROS before and after the merger, results showed a significant decline in smaller organizations. As a result, diversification positively affects return on sales after a merger, whereas smaller entities cannot share the same effect.

Because SMEs probably do not have the financial stability like larger businesses, thus need a longer time to gain profit from the merger.

Regarding *Regression 1*, remarkably is that EPS for SMEs is higher than for large entities. Therefore, shareholders are paid more if they hold shares in SMEs. Furthermore, the Book to Market ratio shows significant improvements in the first two studies, indicating that SMEs and acquirers who invest in other industries have a better BtM ratio.

The findings support my assumption that diversification leads to better performance (*Regression 3*). Not all observed indicators significantly improved, especially the ROS in the first and second regressions.

Acquirers did not end up in financial outperformance. Still, limited financial improvements or even a better competitive standing is reached after M&A activities, supporting Hitt et al. (2001) and King et al. (2004) findings.

Limitations occurred regarding the sample data and the first regression. Since only 25% of the transactions were conducted by SMEs in this regression, but Germany consists of 99% of SMEs, the data is not able to depict an accurate picture of those middle-class businesses in Germany. Further, many impacts of mergers cannot be captured one year after the transaction because the transition phase of an overtake and the development of synergies need time. Therefore, the long-term impact of German M&A, as well as the focus on German SMEs, builds a fundament for future research.

Concluding, the field of M&A is a highly complex market, and country-specific adoptions occur, complicating the prediction of post-merger performance effects.

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## APPENDIX

### A. Tables

**Table 1: Regression 1 (a-g); SME (firm size)**

This table shows the regression results of M&A effects on SMEs. The dummy variable SME is either 0 or 1. Thus, the dummy variable is multiplied by the financial performance indicators ROS, ROE, ROA, ROC, DtE, BtM, and EPS. Variables are defined in the Appendix. Under the output values, t-statistics is shown in parentheses and based on standard errors.

	<b>1a</b>	<b>1b</b>	<b>1c</b>	<b>1d</b>	<b>1e</b>	<b>1f</b>	<b>1g</b>
	<b>ROS 2019</b>	<b>ROE 2019</b>	<b>ROA 2019</b>	<b>ROC 2019</b>	<b>DtE 2019</b>	<b>BtM 2019</b>	<b>EPS 2019</b>
<b>ROS 2017</b>	0.977 (2.87)						
<b>SME</b>	-0.054 (-0.76)	0.114 (1.12)	-0.027 (-1.37)	0.033 (0.91)	-0.712 (-0.79)	-0.045 (-2.11)	-0.401 (-0.33)
<b>ROSSME</b>	-0.732 (-2.03)						
<b>ROE 2017</b>		0.756 (2.67)					
<b>ROESME</b>		-1.108 (-3.33)					
<b>ROA 2017</b>			0.837 (4.53)				
<b>ROASME</b>			-0.372 (-1.26)				
<b>ROC 2017</b>				0.950 (4.81)			
<b>ROCSME</b>				-1.284 (-3.94)			
<b>DtE 2017</b>					0.696 (1.13)		
<b>DtESME</b>					0.697 (1.07)		
<b>BtM 2017</b>						1.004 (337.44)	
<b>BtMSME</b>						0.173 (7.41)	
<b>EPS 2017</b>							0.662 (53.36)
<b>EPSSME</b>							1.193 (4.41)
<b>Constant</b>	-0.021 (-0.46)	-0.106 (-1.55)	-0.009 (-0.69)	-0.029 (-1.30)	0.649 (1.21)	0.034 (3.22)	-0.224 (-0.38)
<b>R2</b>	0.193	0.135	0.345	0.294	0.375	0.999	0.976
<b>adj. R2</b>	0.159	0.099	0.318	0.265	0.349	0.999	0.975
<b>N</b>	77	77	77	77	77	77	77

**Table 2: Regression 2 (a-g); Number of mergers in 2018**

The table below examines the regression results of M&A effects on companies that did more than one merger in 2018. The dummy variable NUM is either 0 or 1. Thus, the dummy variable is multiplied by the financial performance indicators ROS, ROE, ROA, ROC, DtE, BtM, and EPS. Variables are defined in the Appendix. Under the output values, t-statistics is shown in parentheses and based on standard errors.

	2a	2b	2c	2d	2e	2f	2g
	ROS 2019	ROE 2019	ROA 2019	ROC 2019	DtE 2019	BtM 2019	EPS 2019
<b>ROS 2017</b>	0.958 (5.32)						
<b>NUM</b>	0.199 (3.19)	-0.195 (-1.34)	0.039 (1.76)	0.022 (0.47)	1.142 (1.14)	-0.036 (-1.15)	-1.541 (-1.01)
<b>ROSNUM</b>	-0.916 (-4.13)						
<b>ROE 2017</b>		-0.076 (-0.48)					
<b>ROENUM</b>		1.022 (1.50)					
<b>ROA 2017</b>			0.988 (5.52)				
<b>ROANUM</b>			-0.670 (-2.17)				
<b>ROC 2017</b>				0.608 (3.03)			
<b>ROCNUM</b>				-0.288 (-0.73)			
<b>DtE 2017</b>					1.347 (6.60)		
<b>DtENUM</b>					-0.790 (-0.77)		
<b>BtM 2017</b>						1.006 (264.27)	
<b>BtMNUM</b>						0.076 (2.11)	
<b>EPS 2017</b>							0.661 (49.63)
<b>EPSNUM</b>							0.389 (2.70)
<b>Constant</b>	-0.074 (-2.22)	0.044 (0.87)	-0.027 (-2.33)	-0.010 (-0.44)	0.027 (0.07)	0.032 (2.37)	-0.178 (-0.28)
<b>R2</b>	0.304	0.031	0.307	0.122	0.376	0.999	0.972
<b>adj. R2</b>	0.276	-0.009	0.279	0.085	0.350	0.999	0.971
<b>N</b>	77	77	77	77	77	77	77

**Table 3: Regression 3 (a-g); Industry**

The last table depicts the regression results of M&A effects on companies that overtook a target from a different industry. The dummy variable IND is either 0 or 1. Thus, the dummy variable is multiplied by the financial performance indicators ROS, ROE, ROA, ROC, DtE, BtM, and EPS. Variables are defined in the Appendix. Under the output values, t-statistics is shown in parentheses and based on standard errors.

	3a ROS 2019	3b ROE 2019	3c ROA 2019	3d ROC 2019	3e DtE 2019	3f BtM 2019	3g EPS 2019
<b>ROS 2017</b>	0.170 (1.62)						
<b>IND</b>	-0.190 (-3.16)	0.059 (0.52)	0.012 (0.56)	0.006 (0.15)	-0.155 (-0.17)	0.048 (2.11)	1.055 (0.87)
<b>ROSIND</b>	1.899 (5.47)						
<b>ROE 2017</b>		-0.147 (-0.84)					
<b>ROEIND</b>		0.346 (0.90)					
<b>ROA 2017</b>			0.737 (3.97)				
<b>ROAIND</b>			0.059 (0.19)				
<b>ROC 2017</b>				0.462 (1.84)			
<b>ROCIND</b>				0.105 (0.30)			
<b>DtE 2017</b>					1.296 (6.25)		
<b>DtEIND</b>					-0.072 (-0.07)		
<b>BtM 2017</b>						1.159 (34.89)	
<b>BtMIND</b>						-0.155 (-4.63)	
<b>EPS 2017</b>							0.847 (5.48)
<b>EPSIND</b>							-0.186 (-1.20)
<b>Constant</b>	0.028 (0.89)	-0.002 (-0.05)	-0.019 (-1.55)	-0.005 (-0.21)	0.294 (0.64)	-0.003 (-0.24)	-0.629 (-0.82)
<b>R2</b>	0.364	0.042	0.273	0.119	0.366	0.999	0.970
<b>adj. R2</b>	0.338	0.003	0.243	0.083	0.340	0.999	0.968
<b>N</b>	77	77	77	77	77	77	77

## **B. Variable specification**

Book to Market ratio (BtM)	Ratio of the Book value to the Market value of a company
Debt to Equity ratio (DtE)	Ratio of the Total Debt to the Total Equity of a company
Earnings per Share (EPS)	Ratio of subtraction of net income and preferred dividends divided by the number of shares outstanding
Return on Assets (ROA)	Ratio of the EBIT and the Total Assets of a company
Return on Capital (ROC)	Ratio of the EBIT and the Total Invested Capital of a company
Return on Equity (ROE)	Ratio of the EBIT and the Total Equity of a company
Return on Sales (ROS)	Ratio of the EBIT and the Total Sales of a company

## C. Abbreviation

bn	billion
BVMW	Bundesverband mittelständische Wirtschaft (German Federal Association of Small and Middle Entities)
DSGV	German Savings Banks and Giro Association
e.g.	exempli gratia (for example)
et al.	et aliae (and others)
EBIT	Earnings Before Interest and Tax (accounting measurement)
EU	European Union
EUR	Euro
KPI	Key Performance Indicator
m	million
M&A	Mergers & Acquisitions
SME	Small and Medium-sized Enterprises
U.S.	United States