

2019

M&A Performance: Market's Initial Reaction as an Unbiased Indicator of Post-acquisition Performance

Nikolaos Papageorgiou

Recommended Citation

Papageorgiou, Nikolaos, "M&A Performance: Market's Initial Reaction as an Unbiased Indicator of Post-acquisition Performance" (2019). *CMC Senior Theses*. 2140.
https://scholarship.claremont.edu/cmc_theses/2140

This Open Access Senior Thesis is brought to you by Scholarship@Claremont. It has been accepted for inclusion in this collection by an authorized administrator. For more information, please contact scholarship@cuc.claremont.edu.

Claremont McKenna College

**M&A Performance: Market's Initial Reaction as an Unbiased
Indicator of Post-acquisition Performance**

submitted to
Professor Murat Binay

by
Nikolaos Papageorgiou

for
Senior Thesis
Spring 2019
April 30, 2019

Abstract

This paper investigates the reliability of the stock market's initial reaction to M&A announcements as a predictor of actual post-acquisition performance. The two prevailing methods for evaluating M&A performance are event studies (stock market-based measures) and accounting-based measures. The present study combines these two performance evaluation approaches in a single empirical examination. Both the post-merger buy-and-hold abnormal returns and changes in ROA are used as actual post-acquisition performance variables. The acquirer's cumulative abnormal return (CAR) around the announcement is used as the market predictor variable. An econometric model is employed to test the predictive power of the announcement-period CAR on the actual performance variables using a sample of 3,208 acquisitions by U.S. public companies from 2010 to 2014. This paper's main contribution lies both in its methodology and its findings: on the one hand, long-term market and accounting variables are used as dependent variables measuring post-acquisition performance. On the other hand, this paper finds that short-term CAR is not a good predictor of subsequent M&A performance. The results suggest that the acquirer's prior M&A experience is a positive predictor of post-acquisition performance.

Contents

Acknowledgments	v
Glossary	vi
1. Introduction	1
2. Literature Review	5
3. Data and Methodology	10
3.1 Data	10
3.2 Summary Statistics	12
3.3 Empirical Specification	13
4. Empirical Results	16
4.1 Regression of BHAR on CAR	16
4.2 Regression of Δ ROA on CAR	19
5. Concluding Remarks	21
Illustrations	23
References	31

Acknowledgments

I would like to express my deepest gratitude to Professor Binay for his mentorship and continued encouragement over the last three years. This thesis would not be possible without him. I can't thank you enough for everything Professor.

I would also like to thank my friends for their company, emotional support, and always being there for me.

Lastly, I would like to thank my family for their unconditional love and support. I never would have made it here without you.

Glossary

BHAR	Buy-and-hold abnormal return (BHAR) is the difference between the realized buy-and-hold return and the normal buy-and-hold return.
CAR	Cumulative abnormal return (CAR) is the total of all abnormal returns. CAR is usually calculated over a small window of time.
EBITDA	Earnings before interest, tax, depreciation and amortization (EBITDA) is a measure of a company's operating performance.
EPS	Earnings per share (EPS) is the value of a company's profit per outstanding share of common stock. It is a profitability indicator.
M&A	Mergers and acquisitions (M&A) refers to the consolidation of two companies. The term encompasses various transactions, including mergers, acquisitions, and tender offers.
P/B	The price-to-book (P/B) ratio is used to compare a company's current market price to its book value.
P/E	The price/earnings (P/E) ratio is used for valuing companies and to find out whether they are overvalued or undervalued.
ROA	Return on assets (ROA) shows the percentage of profit a company earns in relation to its overall resources.
ROE	Return on equity (ROE) is a measure of financial performance / how effectively management is using assets to create profits.

Chapter 1

Introduction

Mergers and acquisitions¹ (M&A) have always been a popular business strategy for growth. In 2018, the total deal value of completed M&A deals in North America and Europe saw a 6.3% increase year-on-year reaching \$3.6 trillion, as shown in Figure 1. In North America alone, M&A activity recorded its fourth consecutive year with a total deal value over \$3 trillion, as illustrated in Figure 2. Still, there is ample empirical evidence suggesting that, contrary to its popularity, M&A does not always bring shareholder value. In fact, recent studies indicate that 53% of all M&A deals fail and are value-destroying (Cartwright and Schoenberg 2006; Marks 2011). This paradoxical situation has generated considerable interest among academics. Prior research has thoroughly investigated M&A performance (Pettway and Trifts 1985; Petmezas 2009; Changqi and Ningling 2010; Okpanachi 2010; Hankir et al. 2011; Selcuk and Yilmaz 2011) applying market-based returns and accounting variables to measure performance. Most studies have focused on explaining the variation in M&A performance based on different company characteristics. However, there has been little discussion about the relationship between the market's initial reaction to a merger announcement and the actual post-merger performance. This information can be particularly valuable to investors who can then make asset allocation decisions accordingly and potentially profit in the cases when the market's judgment about the merger success is wrong.

¹ In this paper, the terms merger and acquisition are used interchangeably.

This paper investigates the reliability of the market's initial reaction to M&A announcements as a predictor of post-acquisition performance. The success or failure of M&A deals to meet expectations depends to a great extent on how success and failure are defined. Despite the extensive research that exists on the topic, M&A performance remains a theoretically complex construct lacking a single, universal definition. To produce a definition for M&A success, the following two key elements need to be addressed: the performance approach and the time horizon. The two main approaches for gauging M&A performance are the stock market-based and the accounting-based approaches, with the former being employed by most empirical studies (Selcuk and Yilmaz 2011; Das and Kapil 2012). Still, there is no consensus among scholars regarding which of the two approaches is a better measure of actual M&A performance. To maintain consistency with the two bodies of literature, this study uses both market returns and accounting measures to define actual acquisition performance. In addition to this, short-term window event studies, which use abnormal returns around the announcement as the dependent variable, have been the most frequently used performance evaluation method in current research. However, announcement-period abnormal returns are not used to gauge M&A performance in this paper, but they are used as the market's judgment of acquisition success instead. In summary, this study classifies M&A deals as successful if there is (1) a realized positive three-year buy-and-hold-abnormal return (BHAR) or (2) a positive change in return on assets (ROA) for the bidder. ROA is identified as one of the most superior measures of operational success by the literature. BHAR is described as the success from an investment point of view.

A multiple linear regression model is employed to test the predictive power of the market's initial judgment to the post-acquisition performance, which is measured by the BHAR and the change in ROA, as discussed above. Cumulative abnormal returns (CAR) for the acquiring company around the announcement day are used as the market predictor variable. The first regression model follows the market-based approach, using the post-acquisition three-year BHAR as the dependent (actual performance) variable. The second model follows the accounting-based approach, using the percentage change in ROA (3rd year post vs. 3rd year pre-acquisition) as the actual performance variable. Using a sample of 3,208 domestic acquisitions by U.S. public companies from 2010 to 2014, this investigation finds consistent results from both regressions suggesting that the stock market over or under-reacts to M&A announcements. In other words, the market's initial reaction will be either too positively or too negatively. This finding is consistent with the investor overconfidence hypothesis, which states that the market tends to overestimate future performance. The results of this empirical study also show that the acquiring company's experience in completing M&A deals has a positive and significant effect on post-acquisition performance.

This paper's main contribution lies both in its methodology and its findings: on the one hand, long-term market and accounting variables are used as dependent variables measuring post-acquisition performance. Very few studies use both these variables as measures of acquisition performance (Cording et al. 2010). Most studies employ announcement-period returns as the acquisition performance variable. However, the present study utilizes announcement-period returns as an independent variable measuring the market's initial reaction. The primary rationale behind utilizing long-term data (three

years post-acquisition) is to capture the ultimate consequences of the acquisition, once the corporate integration procedures are over and the stock market has gone beyond the initial phase of “newly merged” companies. In such a way, applied evidence is more robust and indicates the final result of the M&A, whether it has indeed managed to influence financial results or market value after the M&A event has left the epicenter of attention. On the other hand, this paper finds that the stock market initially overreacts to M&A announcements. On an accounting basis, the analysis fails to find any statistically significant relationship between CAR at the announcement and changes in ROA after the acquisition. Evidence shows that the most significant and robust variable in the success of M&As from both the market and the accounting point of view is the buyer’s experience.

The rest of this paper is organized as follows. Section 2 reviews existing literature on M&A performance. Section 3 provides a description of the data collection process, presents summary statistics, and describes the methodology followed. Section 4 presents the findings and interpretations of the parameters of interest. Section 5 concludes by discussing the implications of the results and proposes avenues for future research.

Chapter 2

Literature Review

Measuring and explaining the wealth effects of mergers and acquisitions (M&A) has attracted substantial interest in the finance literature. While M&A continues to be a popular growth strategy for companies, research suggests that such corporate actions do not always create value for the acquiring firm. Cartwright and Schoenberg (2006) mention that the failure rate is approximately 50%. On the other hand, the shareholders of acquired firms almost always enjoy substantial and positive short-term gains as a result of a merger (Fisher 1983; Agrawal and Jaffe 2000).

There is great variation on the definition of M&A performance and its measurement (Zollo and Meier 2008; Marks and Mirvis 2011; Wang and Moini 2012). The existing literature suggests that there are two main approaches on evaluating the performance of M&A: the stock market-based approach and the accounting-based approach (Cording et al. 2010; Selcuk and Yilmaz 2011; Wang and Moini 2012).

Zollo and Meier (2008) analyze 88 empirical studies between 1970 and 2006 on a quest to determine the measurement approach used in most of the empirical studies. They identify five commonly used approaches for evaluating M&A performance: (1) event studies (stock market-based measures) both in the short run and long run; (2) accounting-based measures; (3) managers' subjective assessments; (4) expert informants' assessment; (5) divestiture. The majority of studies used either the short-term window event study

method or long-term accounting measures. Similarly, Cording et al. (2010) report that 92% of the empirical studies which they review used event study and accounting-based methods.

The announcement-effect event study method is the prevailing method for evaluating M&A performance in empirical research (Pettway and Trifts 1985; Moeller et al. 2004; Petmezas 2009; Cording et al. 2010; Hankir et al. 2011). This market-based approach utilizes short-run abnormal returns around the announcement day to measure acquisition performance. Event studies are based on the premise of the efficient market hypothesis, which states that stock prices are an unbiased and rational reflection of the true firm value. Several authors have expressed doubts about this assumption, arguing that sometimes investors might not have access to all necessary information to act rationally. According to Selcuk and Yilmaz (2011), a drawback of this approach is that changes in market valuations at the time of a merger could reflect other factors and not only the benefits of an efficiently operating market. The authors also question the reliability of short-term event studies because the longer-term results are of greater importance, but changes in performance as a result of the acquisition may not materialize immediately.

Accounting-based studies analyze accounting data to assess the wealth effects of mergers by testing for changes in the profitability of the involved firms. Specifically, studies that take this approach compare profitability measures before and after the M&A using parametric tests. Pre-tax cash flows and net income adjusted for size (divided by assets, sales, and equity) and industry trends are usually used as measures of profitability. One of the drawbacks of the accounting-based approach is that it relies on the assumption that companies' published accounts are a true reflection of their financial position. Still,

companies can use creative accounting techniques, which can consequently affect the effectiveness of the accounting-based approach (Dickerson, Gibson, and Tsakalotos 1997).

In a systematic review of past empirical studies on M&A performance, Das and Kapil (2012) categorized and grouped the most frequently used accounting and market measures of M&A performance. Some of the accounting measures include asset turnover, pre-tax operating margin, ROA, ROE, and sales growth. According to Das and Kapil (2012), profit level is a poor measure of performance due to the direct relationship with company size. Still, the authors report that in one of the studies, there was a significant improvement in the median profit level over a longer period after the acquisition compared to that of companies who did not engage in an acquisition (Das and Kapil 2012). Under market measures, Das and Kapil (2012) report that the acquirer's long-term market performance (measured with BHAR), the acquirer's short-term CAR, and the alpha from Fama-French's three-factor model are all widely used as explanatory variables of M&A performance in empirical research. Other objective measures of M&A performance include the age of the firm, capital expenditure rate, deal value, and market share. Lastly, the authors state that the book to market ratio was found to be statistically significant as an explanatory variable to the acquirer's long-term market return.

According to Mueller (1977), return on equity is commonly used as a performance measure in accounting-based empirical studies. Moreover, the success of a merger, from the point of view of the acquiring firm's shareholders, is related to the premium paid by the acquiring firm. Specifically, the lower the premium, the higher the probability that the acquirer's shareholder gain from the acquisition. Fisher (1983) argues that gains to shareholders do not necessarily imply efficiency gains. Examination of stock returns for a

relatively brief period after a merger shows the market's unbiased prediction of the effects of the merger and not the actual effects.

Empirical M&A research suggests that some of the variables that can impact returns for acquiring firms include the method of payment, the acquirer's book to market ratio, and size and type of target. Specifically, Loughran and Vijh (1997) show that cash payments systematically outperform stock payments. Rau and Vermaelen (1998) indicate that value acquirers outperform glamour acquirers. Moeller et al. (2004) find that small acquirers tend to perform better than large acquirers. Rhodes-Kropf and Viswanathan (2004) indicate empirically that misvaluations in the stock market is a driver of M&A activity. A fundamental assumption in such studies is that markets are inefficient and, hence, some firms are valued incorrectly. Moreover, it is assumed that managers act rationally and can recognize misvalued firms as potential opportunities to make a profit.

Agrawal and Jaffe (2000) claim that, in aggregate, abnormal returns for acquirers in the years following an acquisition are negative or, at best, not statistically different from zero. Conn et al. (2001) find a wide variation in acquisition performance at the firm level. Approximately 35-45% of acquiring firms attain positive returns two to three years after an acquisition, with a standard deviation of 10% around the mean return. Using a sample of 519 UK acquisitions, Sudarsanam and Mahate (2006) find that single hostile bids deliver higher post-acquisition gains (over three years) to acquirer shareholders than friendly, white knight or multiple hostile bidders. In their analysis, the authors also include some firm-specific variables related to corporate governance structures and top management turnover.

Rosen (2006) finds that investors' reactions to the announcement of a merger can be influenced by their overly optimistic beliefs about the prospects of the merger. This, in turn, can lead to merger momentum. In this framework, Baker, Ruback, and Wurgler (2007) document that investor sentiment (optimism) co-exists with managerial hubris. According to Rhodes-Kropf, Robinson, and Viswanathan (2005), merger activity peaks when market valuations are high. The authors also find that deals announced during hot merger markets deliver lower returns than those announced at different times. This finding provides evidence of long-run reversal. Finally, Gugler et al. (2012) report that the amounts of assets acquired are directly proportional while returns to acquirers are inversely proportional to market optimism.

Overall, much literature exists with regard to M&A performance; however, few researchers specifically examine the relationship between the market's initial reaction to a merger announcement and the realized performance of the merger in the long-run. Even less work does so empirically. A possible reason for the lack of literature on this topic is that there is no consensus among researchers regarding what qualifies as a definition and measurement of M&A performance. Additionally, scholars have not been able to make a judgment call about the time horizon to evaluate M&A performance. However, none of these issues imply that such a study is unfeasible. This paper contributes by combining the two most common methods of measuring M&A performance, namely the market and accounting-based approaches, in a single empirical examination.

Chapter 3

Data and Methodology

3.1 Data

A sample of 3,208 domestic acquisitions by U.S. public companies spanning January 1st, 2010 – December 31st, 2014 is used in this analysis.² The sample transactions are obtained from S&P Capital IQ and are selected based on the following criteria: (1) The acquirers must be publicly traded in a U.S. exchange; (2) Both bidding and target firms must be incorporated in the U.S.; (3) The total transaction value is greater than \$USD 1 million; (4) Acquirers are not financial institutions; and (5) Cross-border M&A deals are excluded to avoid contaminating information. The deal value and the number of acquisitions completed by the bidder in the three years prior to the takeover are also sourced from S&P Capital IQ and used as independent variables. Lastly, the acquirers' SIC codes are extracted to classify the M&As in different industries.

A standard event study is conducted to find the cumulative abnormal return (CAR) and the buy-and-hold abnormal return (BHAR) for the acquirers. Abnormal returns are calculated according to the following market-adjusted model, using the Event Study Research Application by WRDS:

$$AR_{it} = R_{it} - R_{mt} \quad (1)$$

² The date range had to be defined to the 2010-2014 period to be within the Capital IQ data download limit.

where R_{it} is the return on company i and R_{mt} is the CRSP value-weighted market return (market beta is assumed to be 1). An estimation window of 120 trading days prior to the event is used with a minimum number of 50 non-missing return observations. According to Brown and Warner (1985), this estimation window is sufficient for generating a benchmark for the calculation of the expected return and residual return variance. Additionally, a gap of 22 trading days (1 month in calendar days) is used between the end of the estimation window and the beginning of the event window, as shown in Figure 1.

Cumulating abnormal returns across time yields CAR, which is calculated for the seven-day (-3, +3) period around the announcement day (day 0) of a takeover. The seven-day CAR for bidders that acquired public and/or private U.S. targets over the 2010-2014 period is used to evaluate the market's initial reaction to the announcement of an M&A. BHAR is the difference between the realized buy-and-hold return and the normal buy-and-hold return, and it is calculated for the three-year period following the acquisition. The three-year BHAR for the acquirer is used to evaluate the actual performance of the M&A.

For each transaction, annual accounting data for the bidder firm was collected for three years prior and three years after the announcement date. Specifically, the acquirers' net income and total assets are acquired from COMPUSTAT to calculate ROA (net income/total assets). Then, the percentage change between the ROA three years before and the ROA three years after the takeover is calculated. The % change in ROA (3rd year post vs. 3rd year pre-acquisition) is the second variable used in this study to evaluate the actual M&A performance. Previous studies suggest that at least two years of post-acquisition data are necessary to evaluate the performance of the M&A as changes may not materialize immediately (Selcuk and Yilmaz 2011). The acquirers' revenue, EBITDA, total market

value, common/ordinary equity, common shares outstanding, and EPS (including extraordinary items) are also collected from COMPUSTAT and used to compute various independent variables.

3.2 Summary Statistics

Table 1 reports summary statistics for the seven-day and three-year returns, as well as for the total deal value and the buyer's experience in M&A deals. The mean seven-day CAR for the acquiring companies in the sample is positive and equals 1.13%. This result can be explained by the investors' sentiment theory, which predicts positive abnormal returns in the short-run. The average value of the M&A transactions in this sample is \$576.91 million. Additionally, the bidders in the sample have an average experience of 4.5 M&A deals over the three years prior to the announcement day of the acquisition under examination.

Table 2 presents summary statistics for accounting/financial data for the acquirers in the sample. Remarkably, average revenue for the bidders grows faster prior to the acquisition (24.01%) compared to after the acquisition (11.12%). The buyers' EBITDA margin is 9.87%, on average, for the three-year period before the M&A but turns negative (-3.31%) for the three-year period after the M&A. Post-acquisition ROA and P/B values are also lower, on average, than pre-acquisition values. Still, the average P/E ratio is higher in the post-acquisition period.

3.3 Empirical Specification

The objective of this paper is to test whether the stock market can predict the actual performance of an acquisition correctly at the announcement day. To test the null hypothesis that the market anticipates the prospects of M&A correctly, the following multiple linear regression model is considered:

$$\text{Actual Performance} = \beta_0 + \beta_1 \text{CAR} + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_9 X_9 + \varepsilon_i \quad (2)$$

where the dependent variable *Actual Performance* is the actual acquisition performance variable, *CAR* is the seven-day cumulative abnormal return for bidders and serves as the market predictor variable, and X_2, X_3, \dots, X_9 are independent variables (see Table 3) that can help explain the actual M&A performance.

A multiple regression model is employed to test the proposed hypothesis. Initially, the dependent (*actual performance*) variable is the three-year post-acquisition BHAR for the acquirer. However, as discussed in section 2, there is another body of literature that evaluates M&A performance using accounting measures instead of security returns. Therefore, to be consistent with the literature, a second regression model is adopted using the % change in ROA (3rd year post vs. 3rd year pre-acquisition) as the dependent variable. ROA is specifically selected as it is one of the most frequently used profitability measures in empirical research. Only the values for the third year prior to and the third year after the takeover are used to calculate the % change in ROA. The reason for not using a three-year average before and after the M&A, for example, is to have enough variation in the dependent variable. Any differences due to the M&A's impact will be more noticeable by having a larger time period between the two values.

The following independent variables, which have been identified by past studies as determinants of the market's perception of an M&A, are considered: buyer's acquisition experience (*BUY_EXP*), total deal value (*VALUE*), three-year average pre-acquisition ROA (*PREACQ_ROA*), three-year average pre-acquisition EBITDA margin (*PREACQ_EBITDA*), three-year average pre-acquisition P/E ratio (*PREACQ_PE*), and three-year average pre-acquisition P/B ratio (*PREACQ_PTB*). Table 3 provides explanations for all of the independent variables used. The following specification is the complete regression model used in the analysis:

$$\begin{aligned}
 \text{Actual Performance} = & \beta_0 + \beta_1 \text{CAR} + \beta_2 \text{BUY_EXP} + \beta_3 \text{VALUE} + \beta_4 \text{PREACQ_ROA} \\
 & + \beta_5 \text{PREACQ_EBITDA} + \beta_6 \text{PREACQ_PE} + \beta_7 \text{PREACQ_PTB} \\
 & + \beta_8 \text{IND} + \beta_9 \text{YEAR} + \varepsilon
 \end{aligned} \tag{3}$$

An efficient market should be looking at some or all of these independent variables, which are publicly available at the announcement day, to evaluate the prospects of an acquisition. For instance, M&A is a popular growth strategy for companies to increase their market share. At the same time, there can be cost reductions due to synergies and efficiencies in the newly combined entity. Hence, the acquirer's average EBITDA margin (as % of total revenue) over the past three years could be used by the market as a predictor for the post-acquisition performance. EBITDA margin is a good measure as it includes both revenue growth and cost reductions. Similarly, ROA is one of the most discussed measures of business performance and can be used to assess the pre-acquisition performance and profitability of the bidder. Moreover, prior literature suggests that the acquirers' P/B ratio is related to announcement returns, as it conveys important information

about pre-acquisition performance and potential future performance. Controlling for the acquirer's past performance by including also reduces the potential of reverse causality.

An industry classification variable (*IND*) is computed using the bidder's Standard Industrial Classification (SIC) code.³ Finally, year dummy variables (*YEAR*) are used to control for the economic environment and to remove any impact of the specific years in the sample (e.g. merger waves). The data in the sample is spanning 2010-2014, and so four dummy variables are generated (*2011*, *2012*, *2013*, and *2014*). This allows for the results to be generalized to any time period and not only the 2010-2014. The GDP growth rate could have also been used to control for the economic environment. However, it cannot be used simultaneously with the year dummy variables due to collinearity.

³ Developed in the U.S. in 1937, SIC coding is a system for classifying the nature of a company's business by a four-digit code (United States Department of Labor). The SIC codes can be grouped into ten broad groups: (1) Agriculture, Forestry and Fishing; (2) Mining; (3) Construction; (4) Manufacturing; (5) Transportation, Communications, Electric, and Gas service; (6) Wholesale Trade; (7) Retail Trade; (8) Finance, Insurance and Real Estate; (9) Services; and (10) Public Administration. For each of these major industry groups, a classification variable is constructed, excluding Finance, Insurance and Real Estate, as the sample does not include acquirers that are financial companies (see selection criteria in section 3.1).

Chapter 4

Empirical Results

Equation (3) is used to run the following multiple regressions, and Ordinary Least Squares (OLS) are used to estimate the coefficients. Tables 4 and 5 provide full regression outputs for the two models using the BHAR and the change in ROA as the dependent variable respectively.

4.1 Regression of BHAR on CAR

In the first regression, the BHAR for the acquirer for the three-year period after the M&A acts as the actual performance variable from Equation (3). Figure 3 graphs a scatter plot of the three-year BHAR on the seven-day CAR for the acquirer. Table 4 reports the regression results, which suggest that BHAR is negatively related to the market's initial reaction at the announcement. Specifically, if CAR increase by one percentage point, the three-year BHAR will be lower by 0.24 percentage points, on average. The negative coefficient indicates that the market is not effective in anticipating M&A performance. The M&A deals that the market is most optimistic about at the announcement actually do worse (in terms of the three-year BHAR) than those the market was less optimistic about. If the market's anticipation about a merger is positive, it is more positive than what ends up happening. Still, this does not imply that returns will be negative, but it does suggest that returns will be lower from what the market expected them to be. If this is a negative reaction, it is going to be less negative. Therefore, the market overreacts to the

announcement of an M&A in either direction. The calculated t-statistic for CAR is -2.25, which makes it statistically significant at the 95% level. This is a signal of market failure and, therefore, we can reject the null hypothesis that the market anticipates the prospects of M&A correctly.

Another noticeable observation is that the buyer's prior experience in conducting M&As (defined as number of deals the buyer did in the three years before the announcement day) has a positive and significant effect on the actual performance of the merger. If the number of M&As conducted by the bidder during the three years prior to the announcement increases by 1, BHAR increases by 0.028 percentage points, on average. In other words, the more experienced the buyer is, the better the returns will be for the three-year period after the takeover and vice versa. Moreover, the t-statistic is 7.44, suggesting that the buyer's experience has a huge significance in explaining excess performance of the M&A.

The coefficients on the dummy variables for 2011 and 2012 are negative, but insignificant. The coefficients for 2013 and 2014 are also negative, but significant at the 95% level as well. If an M&A is conducted in 2013 or 2014, the three-year BHAR (after the M&A) will be lower by 0.23 and 0.17 percentage points respectively. In this study, three years following the M&A are used in calculating the BHAR for the acquirer. Hence, for M&As conducted in 2013 and 2014 the BHAR used extend up to 2016 and 2017, respectively. The overall U.S. stock market did really well during 2016 and 2017, making it harder for individual stocks to beat the market, and so abnormal returns (BHAR) decrease. This could help explain why the coefficients for 2013 and 2014 become statistically significant.

The results also indicate that the three-year post-acquisition BHAR for the acquirer is positively related to the acquirer's pre-announcement price-to-book ratio. If a bidder is highly valued prior to the announcement, the subsequent three-year BHAR is going to be higher. The calculated t-statistic is very significant too. Generally, a high P/B ratio suggests that a company's stock is highly valued. Thus, the higher the P/B ratio, the wealthier a buyer becomes. If a buyer is paying with their stock that is highly valued at the time of the acquisition, it is essentially less expensive for them to make the acquisition. Hence, a higher P/B ratio is going to be associated with higher returns.

Lastly, if the acquirer is in the mining industry group, the BHAR is going to be lower. A possible reason for this result is that the data in the sample includes only U.S. companies, and many production companies have been shifting or transferring their operations to countries with lower production costs. Therefore, it is possible that the negative and statistically significant coefficient on Mining is driven by the companies who have not shifted their production to decrease their costs and experience lower returns for that.

The overall low R-squared value (10.17%) indicates that there is a lot of variability in the dependent variable.

4.2 Regression of Δ ROA on CAR

The results when using the percentage change in ROA (3rd year post vs. 3rd year pre-acquisition) as the actual performance variable are consistent with those of the first regression. Figure 4 graphs a scatter plot of Δ ROA on the seven-day CAR for acquirers. Table 5 provides full regression results, which seem to favor a negative relationship between CAR, the market predictor variable, and Δ ROA, the actual performance variable. In particular, a one-percentage-point increase in CAR results in a Δ ROA that is 0.77 percentage points lower. The negative coefficient suggests that the market is not effective in anticipating M&A performance since a higher ROA indicates higher profitability, which is desirable and one of the reasons companies choose an M&A strategy. If the bidder enjoys higher CAR around the announcement day, there is going to be a larger negative change in the ROA three years prior to and three years after the acquisition. However, the calculated t-statistic is -0.72, which is not statistically significant at the 95% level, indicating that the market's reaction does not explain what actually happens.

Consistent with the result of the previous regression, the effect of the acquirer's M&A experience on the actual performance of the M&A is positive and significant. Specifically, Δ ROA is positively related to the number of acquisitions that the bidder conducted during the three years prior to the announcement. The calculated t-statistic is 4.02, making the effect of the buyer's experience significant at the 95% level. The findings suggest that if the bidder is more experienced by 1 additional M&A deal from the past, the change in ROA will be 0.062 percentage points larger.

The results also indicate that the change in ROA for the acquirer is positively related to the acquirer's pre-announcement P/E ratio. The calculated t-statistic is significant

too. Generally, a high P/E ratio suggests that investors are expecting higher growth in the future. Therefore, in this regression analysis, a higher P/E before the acquisition predicts a greater change in ROA. In other words, there is going to be growth in profitability.

The R-squared value remained very low (4.45%) suggesting that there is a lot of variability in the dependent variable.

Chapter 5

Concluding Remarks

This empirical exploration provides valuable insights for investors to understand the relationship between announcement day market reaction and post-acquisition performance to make asset allocation decisions accordingly and potentially profit in cases when the market's anticipation is wrong. Overall, the results of this empirical study are consistent with the investor overconfidence hypothesis and indicate that the stock market overreacts at the M&A announcement in either direction (either positively or negatively), and then corrects itself in the long-run. For example, the M&A deals that the market reacts very favorably actually end up not satisfying the market in terms of performance in the long-run. Another noticeable observation is that the experience of the acquirer has a great significance in explaining the excess performance of the M&A.

The findings suggest that the actual long-term M&A performance is more positively related to the buyer's experience rather than the market's initial reaction or anticipation about the merger. The experience of the buyer is a better predictor. Thus, investors who follow a strategy of buying the stock of bidders that the market has reacted positively to the M&A announcement, actually end up worse off. For a one percentage point increase in the short-run CAR, three-year BHAR decrease by 0.24 percentage points.

However, this study has some limitations. First, this analysis applies a linear regression to explain the relationship. Linearity explains only a fraction of the variation, and this is evidenced by the small R-squared value. This issue is left for further research,

possibly through an application of a different econometric model. Second, this approach does not take into consideration agency costs that can affect the outcome. This analysis only examines the results but ignores qualitative factors that could lead to increased costs or reduced results. Further research could take a case by case approach (case-study) to fully understand the different variables that are in play. However, this would require a significantly smaller sample.

Illustrations

FIGURE 1. North American and European M&A Activity

Figure 1 presents the estimated and realized deal value (\$ billion) and deal count in North America and Europe by year for the 2008-2018 period. Data from PitchBook Data, Inc. 2018.

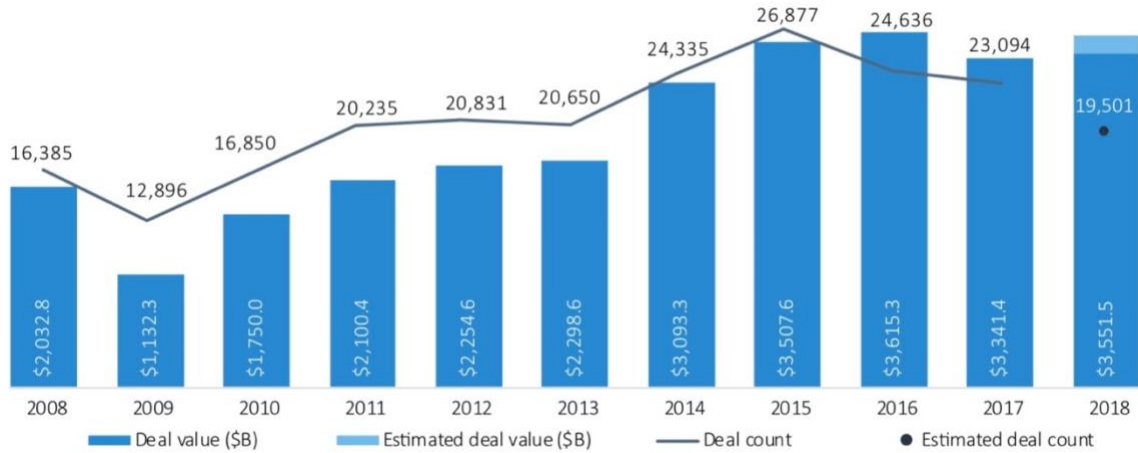


FIGURE 2. North American M&A Activity

Figure 2 displays the total deal value (\$ billion) and deal count in North America by year for the 2008-2018 period. Data from PitchBook Data, Inc. 2018.

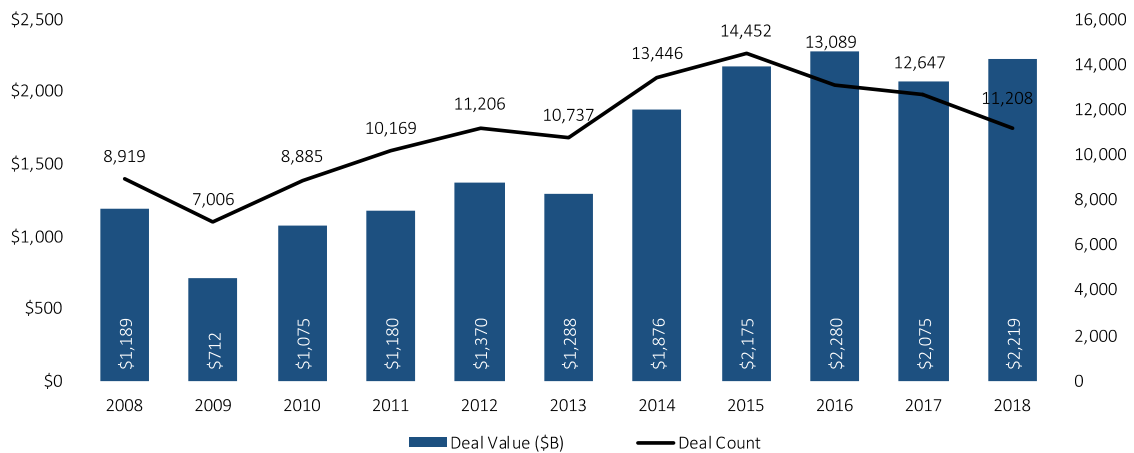


FIGURE 3. Scatter plot of BHAR on CAR

The figure plots the three-year post-acquisition BHAR against the seven-day CAR for acquirers. A fitted line is also displayed through the scatter plot. STATA output; Data from WRDS 2019.

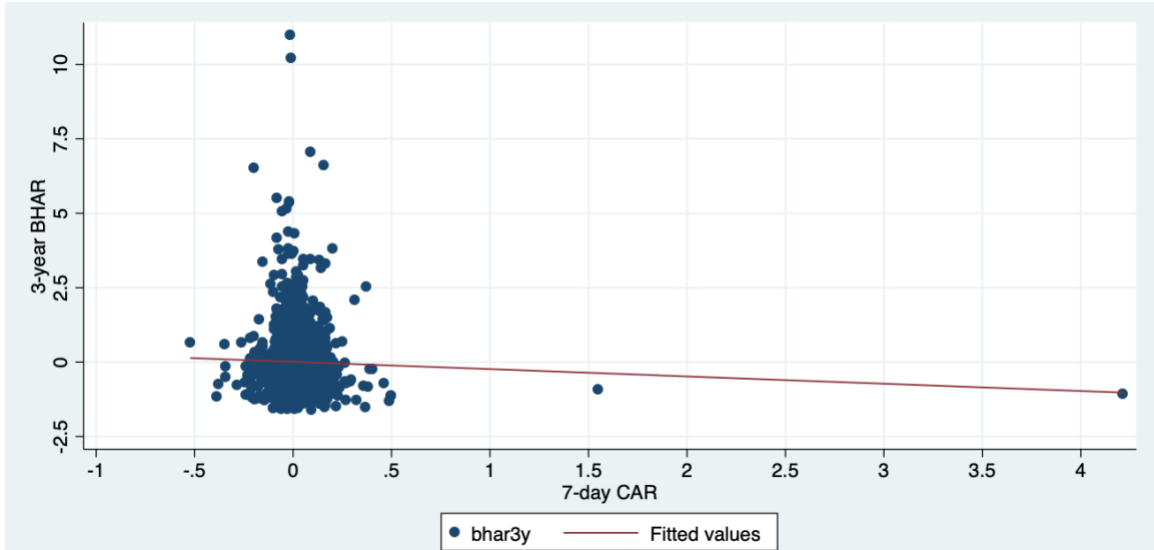


FIGURE 4. Scatter plot of Δ ROA on CAR

Figure 4 plots Δ ROA (3rd year post vs. 3rd year pre-acquisition) against the seven-day CAR for acquirers. A fitted line is also displayed through the scatter plot. STATA output; Data from WRDS 2019.

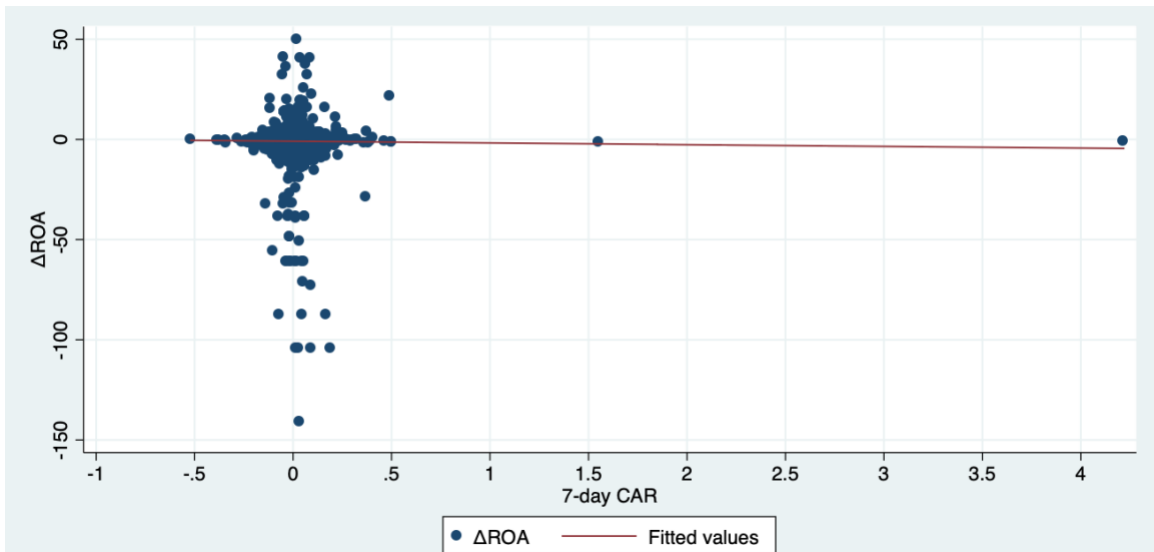


TABLE 1. Summary Statistics – Event Study Returns & Transaction Details

This table presents summary statistics for the 7-day and 3-year CTR, CAR, and BHAR. To calculate the three-year BHAR, there are approximately 756 trading days over three years. Summary statistics for the deal value and buyer experience are also provided. Buyer experience is defined as the number of previous M&A deals closed by the acquirer. Data is from WRDS 2019.

Variable	Mean	Std. Dev	Minimum	Maximum	Count
7-day returns					
CTR (-3 to +3 days)	1.54%	12.23%	-42.11%	511.11%	3,208
CAR (-3 to +3 days)	1.13%	10.36%	-51.94%	421.79%	3,208
BHAR (-3 to +3 days)	1.16%	11.81%	-42.93%	511.13%	3,208
3-year returns					
CTR (+4 to +760 days)	50.50%	86.41%	-99.87%	1,166.67%	3,208
CAR (+4 to +760 days)	1.72%	55.93%	-432.86%	318.61%	3,208
BHAR (+4 to +760 days)	0.90%	83.43%	-161.98%	1,098.03%	3,208
Transaction details					
Deal value	576.91	4,245.10	1.02	127,103.20	3,208
Buyer experience	4.5	5.7	0	73	3,208

TABLE 2. Summary Statistics – Accounting Data

The first half of this table (pg. 26) provides summary statistics for the return on assets (ROA), revenue, EBITDA margin, price-to-earnings (P/E) ratio, and price-to-book (P/B) ratio in the 3rd year prior to the acquisition and in the 3rd year after the acquisition. The second half of the table (pg. 27) provides summary statistics for the pre-acquisition and post-acquisition 3-year average return on assets (ROA), revenue growth, EBITDA margin, price-to-earnings (P/E) ratio, and price-to-book (P/B) ratio. Data is from WRDS 2019.

Variable	Mean	Std. Dev	Minimum	Maximum	Count
3 rd year pre & 3 rd year post-acquisition					
ROA (pre)	2.76%	21.63%	-678.34%	72.24%	3,208
ROA (post)	2.04%	17.50%	-484.40%	282.76%	3,208
ΔROA (post vs. pre)	-89.35%	769.07%	-14,102.02%	4,983.63%	3,208
Revenue (pre)	7,963.90	26,501.88	0.00	425,071.00	3,208
Revenue (post)	10,058.96	30,473.22	0.18	483,521.00	3,208
EBITDA Mgn. (pre)	2.71%	268.06%	-10,822.74%	86.53%	3,208
EBITDA Mgn. (post)	-6.91%	634.26%	-27,075.43%	80.44%	3,208
P/E (pre)	14.61x	99.27x	-1,126.17x	2,024.00x	3,208
P/E (post)	21.69x	180.23x	-2,228.00x	4,854.00x	3,208
P/B (pre)	2.96x	34.41x	-299.91x	923.73x	3,208
P/B (post)	1.35x	39.71x	-1,099.94x	113.38x	3,208

(continued on next page)

TABLE 2. *(continued)*

Variable	Mean	Std. Dev	Minimum	Maximum	Count
	3-year averages (pre & post-acquisition)				
Avg. ROA (pre)	3.79%	13.54%	-298.60%	309.93%	3,208
Avg. ROA (post)	2.52%	12.66%	-308.70%	32.62%	3,208
Avg. Revenue growth (pre)	24.01%	524.35%	-67.91%	2,9476.90%	3,208
Avg. Revenue growth (post)	11.12%	30.38%	-58.78%	999.02%	3,208
Avg. EBITDA Mgn. (pre)	9.87%	110.53%	-3695.17%	77.85%	3,208
Avg. EBITDA Mgn. (post)	-3.31%	464.46%	-18457.12%	75.86%	3,208
Avg. P/E (pre)	13.81x	64.66x	-864.38x	751.67x	3,208
Avg. P/E (post)	17.63x	120.54x	-906.54x	2585.11x	3,208
Avg. P/B (pre)	2.50x	45.03x	-1,343.43x	326.37x	3,208
Avg. P/B (post)	2.32x	20.84x	-512.22x	262.35x	3,208

TABLE 3. Definitions of Independent Variables

Variable	Description
BUY_EXP	Buyer's M&A experience; defined as the number of deals closed by the bidder in the 3 years prior to the announcement day
VALUE	Total value of the M&A transaction (\$ million)
PREACQ_ROA	Pre-acquisition 3-year average ROA
PREACQ_EBITDA	Pre-acquisition 3-year average EBITDA margin (as % of revenue)
PREACQ_PE	Pre-acquisition 3-year average P/E ratio
PREACQ_PTB	Pre-acquisition 3-year average P/B ratio
IND	Industry classification variable constructed using acquirer's SIC code
YEAR	Year dummy variables (2011, 2012, 2013, 2014)

TABLE 4. Regression of three-year BHAR on seven-day CAR

Table 4 reports the results of the regression of Δ ROA (3rd year post vs. 3rd year pre) on the seven-day CAR for acquirers. Buyer experience is defined as the number of previous M&A deals closed by the bidder. The independent variables ROA, EBITDA Mgn., P/E, and P/B are all averages of the three-year period prior to the M&A announcement. Statistical significance is denoted at the 10% level (*), 5% level (**), and 1% level (***). Data is from WRDS 2019.

Variable	Coefficient	Robust Std. Err.	t-Statistic
CAR	-0.24209**	0.1076678	-2.25
Buyer experience	0.0283102***	0.0038032	7.44
Deal value	-2.50e-06	1.76e-06	-1.43
Avg. ROA (pre)	-0.0408824	0.1792862	-0.23
Avg. EBITDA Mgn. (pre)	-0.0092273	0.0227893	-0.40
Avg. P/E (pre)	-0.0001509	0.0001694	-0.89
Avg. P/B (pre)	0.0008838***	0.0001232	7.17
Industry classification			
Construction	0.0561286	0.1940837	0.29
Manufacturing	0.2477237	0.1846736	1.34
Mining	-0.4908884***	0.1890388	-2.60
Retail	-0.0571632	0.2049539	-0.28
Services	0.1082579	0.1871414	0.58
Transportation	0.1789924	0.1901535	0.94
Wholesale	0.1901166	0.1946848	0.98
Nonclassifiable	0.3800955*	0.2272144	1.67
2011 dummy	-0.0401769	0.0497235	-0.81
2012 dummy	-0.0698461	0.0474205	-1.47
2013 dummy	-0.2309112***	0.0414175	-5.58
2014 dummy	-0.1698476***	0.0448351	-3.79
Constant	-0.1567085	0.1892332	-0.83
N	3,208		
R ²	10.17%		
Root MSE	0.79308		

TABLE 5. Regression of Δ ROA on seven-day CAR

Table 5 reports the results of the regression of Δ ROA (3rd year post vs. 3rd year pre) on the seven-day CAR for acquirers. Buyer experience is defined as the number of previous M&A deals closed by the bidder. The independent variables ROA, EBITDA Mgn., P/E, and P/B are all averages of the three-year period prior to the M&A announcement. Statistical significance is denoted at the 10% level (*), 5% level (**), and 1% level (***). Data is from WRDS 2019.

Variable	Coefficient	Robust Std. Err.	t-Statistic
CAR	-0.7650016	1.068248	-0.72
Buyer experience	0.0623204***	0.0154841	4.02
Deal value	-4.11e-07	8.24e-06	-0.05
Avg. ROA (pre)	-0.1230515	0.5155799	-0.24
Avg. EBITDA Mgn. (pre)	-0.1451723*	0.0847706	-1.71
Avg. P/E (pre)	0.0211918***	0.0062423	3.39
Avg. P/B (pre)	-0.0012607	0.0013823	-0.91
Industry classification			
Construction	2.005592	2.541919	0.79
Manufacturing	3.66957	2.585646	1.42
Mining	3.670248	2.734619	1.34
Retail	4.523906*	2.647218	1.71
Services	4.33693*	2.596498	1.67
Transportation	3.610297	2.648802	1.36
Wholesale	4.542653*	2.603826	1.74
Nonclassifiable	4.379181*	2.623981	1.67
2011 dummy	-0.2961485	0.262114	-1.13
2012 dummy	-0.9835885**	0.460728	-2.13
2013 dummy	-1.515295***	0.38256	-3.96
2014 dummy	0.2028355	0.1864491	1.09
Constant	-4.743775*	2.646662	-1.79
N	3,208		
R ²	4.45%		
Root MSE	7.54		

References

- Agrawal, Anup and Jeffrey F. Jaffe. 2000. "The Post-Merger Performance Puzzle." In *Advances in Mergers and Acquisitions*. Vol. 1: Emerald Group Publishing Limited.
- Brown, Stephen J. and Jerold B. Warner. 1985. "Using Daily Stock Returns: The Case of Event Studies." *Journal of Financial Economics* 14 (1): 3-31.
[https://doi.org/10.1016/0304-405X\(85\)90042-X](https://doi.org/10.1016/0304-405X(85)90042-X).
- Cartwright, Susan and Richard Schoenberg. 2006. "Thirty Years of Mergers and Acquisitions Research: Recent Advances and Future Opportunities." *British Journal of Management* 17: S1-S5. <https://doi.org/10.1111/j.1467-8551.2006.00475.x>.
- Changqi, Wu and Xie Ningling. 2010. "Determinants of Cross-Border Merger & Acquisition Performance of Chinese Enterprises." *Procedia - Social and Behavioral Sciences* 2 (5): 6896-6905.
<https://doi.org/10.1016/j.sbspro.2010.05.040>.
- Cording, Margaret, Petra Christmann, and Carmen Weigelt. 2010. "Measuring Theoretically Complex Constructs: The Case of Acquisition Performance." *Strategic Organization* 8 (1): 11-41. <https://doi.org/10.1177/1476127009355892>.
- Das, Arindam and Sheeba Kapil. 2012. "Explaining M&A Performance: A Review of Empirical Research." *Journal of Strategy and Management* 5 (3): 284-299.
<https://doi.org/10.1108/17554251211247580>.
- Dickerson, Andrew P., Heather D. Gibson, and Euclid Tsakalotos. 1997. "The Impact of Acquisitions on Company Performance: Evidence from a Large Panel of UK Firms." *Oxford Economic Papers* 49 (3): 344-361.
<https://www.jstor.org/stable/2663598>.
- Fisher, Alan A. and Robert H. Lande. 1983. "Efficiency Considerations in Merger Enforcement." *California Law Review* 71 (6): 1610-1619.
<https://doi.org/10.2307/3480297>.
- Gugler, Klaus, Dennis C. Mueller, Michael Weichselbaumer, and B. Burcin Yurtoglu. 2012. "Market Optimism and Merger Waves." *Managerial and Decision Economics* 33 (3): 159-175. <https://doi.org/10.1002/mde.2542>.
- Hankir, Yassin, Christian Rauch, and Marc P. Ueber. 2011. "Bank M&A: A Market Power Story?" *Journal of Banking & Finance* 35: 2341-2354.

- Lintner, J. (1971). Expectations, Mergers and Equilibrium in Purely Competitive Securities Markets. *The American Economic Review*, 61 (2), 101-111. Retrieved from <http://www.econis.eu/PPNSET?PPN=557581575>.
- Marks, Mitchell Lee and Philip H. Mirvis. 2011. "Merge Ahead: A Research Agenda to Increase Merger and Acquisition Success." *Journal of Business and Psychology* 26 (2): 161-168. <https://doi.org/10.1007/s10869-011-9219-4>.
- Moeller, Sara B., Frederik P. Schlingemann, and René M. Stulz. 2004. "Firm Size and the Gains from Acquisitions." *Journal of Financial Economics* 73 (2): 201-228. <https://doi.org/10.1016/j.jfineco.2003.07.002>.
- Mueller, Dennis C. 1977. "The Effects of Conglomerate Mergers: A Survey of the Empirical Evidence." *Journal of Banking and Finance* 1 (4): 315-347. [https://doi.org/10.1016/0378-4266\(77\)90008-5](https://doi.org/10.1016/0378-4266(77)90008-5).
- Okpanachi, Joshua. 2010. "Comparative Analysis of the Impact of Mergers and Acquisitions on Financial Efficiency of Banks in Nigeria." *Journal of Accounting and Taxation* 3 (1).
- Petmezas, Dimitris. 2009. "What Drives Acquisitions? Market Valuations and Bidder Performance." *Journal of Multinational Financial Management* 19 (1): 54-74. <https://doi.org/10.1016/j.mulfin.2008.05.001>.
- Pettway, Richard H. and Jack W. Trifts. 1985. "Do Banks Overbid when Acquiring Failed Banks?" *Financial Management* 14 (2): 5-15. <http://www.econis.eu/PPNSET?PPN=258980281>.
- PitchBook Data, Inc. 2018. "PitchBook 2018 Annual M&A Report." <https://pitchbook.com/news/reports/2018-annual-ma-report>
- Rhodes-Kropf, Matthew, David T. Robinson, and S. Viswanathan. 2005. "Valuation Waves and Merger Activity: The Empirical Evidence." *Journal of Financial Economics* 77 (3): 561-603. <https://doi.org/10.1016/j.jfineco.2004.06.015>.
- Rhodes-Kropf, Matthew and S. Viswanathan. 2004. "Market Valuation and Merger Waves." *The Journal of Finance* 59 (6): 2685-2718. <https://doi.org/10.1111/j.1540-6261.2004.00713.x>.
- Roll, Richard. 1986. "The Hubris Hypothesis of Corporate Takeovers." *The Journal of Business* 59 (2): 197-216. <http://www.econis.eu/PPNSET?PPN=258890614>.
- Rosen, Richard J. 2006. "Merger Momentum and Investor Sentiment." *The Journal of Business* 79 (2): 987-1017. <https://www.jstor.org/stable/10.1086/499146>.

- Savor, Pavel G. and Qi Lu. 2009. "Do Stock Mergers Create Value for Acquirers?" *The Journal of Finance* 64 (3): 1061-1097.
<http://www.econis.eu/PPNSET?PPN=607949090>.
- Selcuk, Akben E. and A. Altiok-Yilmaz. 2011. "The Impact of Mergers and Acquisitions on Acquirer Performance: Evidence from Turkey." *Business and Economics Journal*: 1-6.
- Sudarsanam, Sudi and Ashraf A. Mahate. 2006. "Are Friendly Acquisitions Too Bad for Shareholders and Managers? Long-Term Value Creation and Top Management Turnover in Hostile and Friendly Acquirers." *British Journal of Management* 17: S7-S30. <https://doi.org/10.1111/j.1467-8551.2006.00476.x>.
- Wharton Research Data Services (WRDS). 2019. "Compustat - Capital IQ from Standard & Poor's." <http://www.whartonwrds.com>.
- Wharton Research Data Services (WRDS). 2019. "Event Study by WRDS." <http://www.whartonwrds.com>.
- United States Department of Labor. 2019. "SIC Division Structure." https://www.osha.gov/pls/imis/sic_manual.html
- Van Melsen, Rutger F. 2017. "M&A Performance through an Operating Measure." Erasmus University Rotterdam.
- Wang, Daojuan and Hamid Moini. 2012. "Performance Assessment of Mergers and Acquisitions: Evidence from Denmark."
- Zollo, Maurizio and Degenhard Meier. 2008. "What is M&A Performance?" *Academy of Management Perspectives* 22 (3): 55-77.
<https://doi.org/10.5465/amp.2008.34587995>.