Merger Announcements, Financial Performance and Stock Price: A Test of Market Efficiency

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Can investors earn above-normal risk-adjusted returns by acting on public information defined by merger announcements? This study tests the effect of a sample of 14 merger announcements on stock price returns using the risk-adjusted event-study methodology. Results show that an investor is not able to make above-normal risk-adjusted returns on the announcement of mergers in support of semi-strong form market efficiency. Merger announcements stimulate significant positive returns around the merger announcement. Results show market over- and under-reaction around the merger announcement well documented in the behavioral finance literature. The evidence shows a significant stock price return reaction up to 1 day prior to the announcement consistent with the existence of insider trading (Ross and others, 2016). Do mergers strengthen companies' financial performance? Results show that mergers are not value-increasing based on the pre-post-merger financial performance in support of the agency problem where large firm use excess free cash flow to get "bigger" not "better" by going shopping for other firms. In such cases, the firm's merger maximizes size, not stockholder wealth, the goal of the firm.

Keywords: market efficiency, financial performance, mergers, announcement

INTRODUCTION

The current business environment is very dynamic due to factors such as globalization, recession, and technological developments. These factors affect the operation of companies in different industries. A strategy some companies use to mitigate undiversifiable risk is to pursue mergers and acquisitions. A merger is a type of acquisition where the target company is combined with the acquirer forming a legal entity to improve its operations. Another strategy that companies might use to become more efficient involves spin-offs. A spin-off is a type of divestiture where the divested unit becomes an independent company, perhaps an IPO, instead of being sold to a third party, separating the company into a parent and the spun-off entity. Decisions on the merger and spin-off arrangements need to be taken thoughtfully since they could influence the acquirer firm's financial performance and stockholder wealth. The goal of the firm is to maximize stockholder wealth through positive investment and financing decisions. Many times, large firms make poor merger and acquisition investment decisions making the firm "bigger" not "better". These poor decisions are a function of excessive free cash flow and the agency problem (Ross, Westerfield, Jaffe, and Jordan 2016). Using a sample of 14 recent mergers, the purpose of this study is to utilize the standard

event-study methodology in the finance literature to test the semi-strong efficient market hypothesis by examining the effect that merger announcements have on the firms' risk-adjusted stock price returns. Furthermore, this study analyzes the acquiring firms' financial performance before and after the mergers to discern any synergy benefits of the investment decision that might contribute to the maximization of stockholder wealth.

LITERATURE REVIEW

According to finance theory, the goal of the firm is to maximize the value of the firm as defined by stockholder wealth through optimal investment and financing decisions. Specifically, every company seeks to grow and outpace its competitors to maximize stock price. There are two ways to achieve growth: through organic growth increasing output, and enhancing sales internally through inorganic or external growth by increasing output by acquiring new businesses through mergers and acquisitions. Growth through mergers and acquisitions is the most common one in mature industries because it faces less risk than organic growth. Thus, the last two decades have been known as the mergers and acquisitions waves. This process known as corporate restructuring includes changes in ownership, business mix, assets mix, and alliances to increase the shareholders' value.

Market Efficiency

According to Fama (1970), market efficiency is defined in three forms: weak form, semi-strong form, and strong form efficiency. The weak form market efficiency hypothesis claims it is impossible for investors to earn above-normal risk-adjusted returns by acting on all historical information (Fama, 1970; Jensen 1978). If the market is weak form efficient, then the market moves like a drunk man where his next step is unrelated to his last step in support of the random walk theory. Many random walk tests support weak form efficiency and claim that historical trends are useless in predicting future stock price movement (Fama, 1965; Beaver, 1981; Levy, 1967, Fama and Blume, 1966; Fama et. Als, 1969; Tung and Marsden, 1998).

The next level of market efficiency is the semi-strong form hypothesis, which states investors can not earn excess returns by acting on all public information (Fama, 1970; Jensen, 1978; Bacon and Greis, 2008; Bacon and Spradlin, 2019; Bacon and Howell, 2020; Bacon and Hutchinson, 2021). Thus, investors should not be able to earn above-normal returns on the public announcement of a merger because the market reacts too fast to all public information.

The highest level of efficiency is the strong form efficiency hypothesis which suggests that the market reacts so fast to all information, both public and private, that no one can earn above-normal risk-adjusted returns by acting on any type of information (Fama, 1970). If true, it claims that illegal insider trading on private information concerning a future merger announcement would not produce above-normal risk-adjusted returns. In this case, the market reacts to an event even before the information becomes public. For this to happen, investors must act on inside information, which is illegal, buying the stock before the information goes public and still not making above-normal returns.

However, in reality, there is not much evidence to support strong form efficiency (Rozeff and Zaman, 1988; Bacon and Greis, 2008; Bacon and Cannon, 2018; Bacon and Spradlin, 2019; Bacon and Howell, 2020; Bacon and Hutchinson, 2021; Mayers and Raab, 1977). The focus of this study is on semi-strong efficiency and tests the public announcements of mergers. If the market is semi-strong form efficient, then investors are unable to earn an above-normal risk-adjusted return by reacting to public information as defined by merger announcements. At what level of efficiency does the market react to the public announcement of mergers? Does the market react at the weak, semi-strong, or strong form level market efficiency? By analyzing the market reaction, this study examines how quickly the market reacts to the public announcement of mergers. (Bacon & Greis, 2008; Bacon and Cannon, 2018; Bacon and Spradlin, 2019; Bacon and Hutchinson, 2020; Bacon and Howell, 2021)

Mergers and Acquisitions

What parties are interested in mergers and acquisitions? These stakeholders are the owners of the business firms including shareholders; investment bankers responsible for managing mergers; lawyers who provide advisory services to parties involved; regulatory authorities who are concerned about operations and safety of the market; and academicians who want to understand the effects of mergers.

What are the effects mergers and acquisitions have on the performance of firms? The efficiency theory sees mergers and acquisitions as powerful instruments to receive rewards of cooperative energy, stating that they are carried out to achieve synergy, thereby benefiting shareholders (Wadhwa and Syamala, 2015). According to this theory, three types of synergy can be realized through mergers and spin-offs: managerial, financial, and operational. Managerial synergies result in bringing down capital expenses. Financial synergy is accomplished through establishing an internal capital market giving an advantage to the company. Operational synergies can stem from combining operations to lower costs created by individual units. This theory claims that mergers and spin-offs are done to benefit both the acquirer and target, or the parent and the spun-off entity through financial, operational, and managerial synergies.

The market power theory proposes that synergies offer the firm positive and private advantages to help increase market share or monopoly power. Horizontal mergers are a focal perspective while considering the connection between takeovers and expanded market control (Eckbo and Wier, 1985). Flat mergers lower the number of autonomous providers in the industry. The lower the costs and higher the productivity, the better strength the entity has. This hypothesis states that the merger between two contenders will positively affect every single other provider in the industry. This theory offers a foundation explaining the benefits the industry can get from horizontal mergers. Vertical mergers can also increase market power by reducing the dependence on external suppliers.

The theory of corporate control justifies why mergers and spin-offs must create value. This hypothesis was first proposed by Manne in 1965. This theory is useful to see how mergers and spin-offs in the United States have had an effect on the financial performance of these companies. Therefore, this theory suggests mergers and spin-offs are inevitable in companies where management performs poorly, and it suggests a positive relationship between acquisitions and financial performance (Weitzel and McCarthy, 2009).

The theory of managerial hubris explains why mergers and spin-offs occur even if the current market value of the target firm reflects its true value. This happens when a company unlocks the hidden value of a struggling company by acquiring it because they believe its potential is better than what it was before (Roll, 1986). Acquirers are overly optimistic in evaluating potential synergies, which can lead to an overpriced purchase compared to its real economic value. In this case, mergers result in poor performance since acquirers overestimated the value of the target firm.

Do mergers and acquisitions bring about improved financial performance from the pre to the post-merger period as measured by return on assets, current ratio, operating margin, and debt-to-equity ratio? The effect of mergers and acquisitions on the firm's financial performance could either be value-increasing or value-decreasing depending upon the pre-post-merger financial performance. Was the merger or acquisition a result of the agency problem where large firms get "bigger" not "better" by going shopping with excess free cash flow? In such cases, the firm's merger maximizes size, not stockholder wealth, which is the goal of the firm. (Bacon & Greis, 2008; Bacon and Cannon, 2018; Bacon and Spradlin, 2019; Bacon and Hutchinson, 2020; Bacon and Howell, 2021)

METHODOLOGY

This study tests for semi-strong form market efficiency using the standard risk-adjusted event-study methodology in the finance literature. A sample of 14 firms' risk-adjusted stock returns was analyzed around the merger announcement dates published on imaa-instituteorg.com. The stock price and financial performance data for each firm were obtained. Data was observed on a daily basis for each company one month before the merger announcement and one month after. In order to test for semi-strong form market efficiency in response to merger announcements, stock returns around the merger announcements were analyzed. Table 1 describes the study sample of mergers.

TABLE 1
DESCRIPTION OF THE SAMPLE

Announcement Date	Year of the merger	Acquirer Name	Target Name
June 9, 2019	2019	United Technologies Corp	Raytheon Co
December 14, 2017	2019	Walt Disney Co	21st Century Fox Inc
October 22, 2016	2016	AT&T Inc	Time Warner Inc
January 3, 2019	2019	Bristol-Myers Squibb Co	Celgene Corp
March 8, 2018	2018	Cigna Corp	Express Scripts Holding
December 3, 2017	2018	CVS Health Corp	Aetna Inc
September 1, 2017	2017	The Dow Chemical Co	DuPont
June 25, 2019	2019	AbbVie Inc	Allergan PLC
September 14, 2016	2016	Bayer AG	Monsanto Co
May 26, 2015	2015	Charter Communications Inc	Time Warner Cable Inc
March 25, 2015	2015	Hj Heinz Co	Kraft Foods Group Inc
November 11, 2015	2016	Anheuser-Busch Inbev	SAB Miller
April 8, 2015	2016	Royal Dutch	BG Group
December 20, 2016	2018	Linde AG	Praxair

The study presents the following hypotheses:

$H1_0$: *The risk-adjusted rate of return of the stock price of the sample firms is not significantly positively affected by the merger on the announcement date.*

$H1_1$: *The risk-adjusted rate of return of the stock price of the sample firms is significantly positively affected by the merger on the announcement date.*

$H2_0$: *The risk-adjusted rate of return of the stock price of the sample firms is not significantly positively affected by the merger around the announcement date as defined by the event period.*

$H2_1$: *The risk-adjusted rate of return of the stock price of the sample firms is significantly positively affected by the merger around the announcement date as defined by the event period.*

For this study, all the stock return information for both samples was collected from Yahoo! Finance; historical data, such as the return of the S&P 500 over the event period, were also collected from Yahoo! Finance. The date of the merger announcement represents day 0 in the analysis. The final analysis was conducted by:

1. Obtaining the historical stock prices of the sample of firms and S&P 500 Index for the event-study duration of -180 days to +30 days. The event period is defined as day -30 to +30, with day 0 being the date of the merger announcement.
2. Holding period returns of the S&P 500 Index (R_M), and the sample firms (R) was calculated for each day of the study using the following formula:

$$\textbf{Current Daily Return} = \frac{\text{(current day close price - previous day close price)}}{\text{previous day close price}}$$

3. Using the holding period returns, a regression analysis was performed for the sample with the actual daily return for each company set as the dependent variable and regressing it on the corresponding S&P 500 Index, the independent variable. The regression was performed over the pre-event period (day -180 to -30) to obtain the intercept, alpha, and the standardized coefficient, beta, for each firm. Table 2 below shows alphas and betas for each firm.
4. To calculate the expected returns, the risk-adjusted method (market model) was used. The expected returns for each stock, for each day of the event period, were calculated using the formula:

$$\mathbf{E(R)= alpha + Beta\ (R_m)}$$

5. Then, the excess return was calculated as:

$$\mathbf{ER= actual\ return - E(R)}$$

6. Average Excess Returns were found for each day by averaging the Excess Returns for each firm on a given day.

$$\mathbf{AER= Sum\ of\ Excess\ Returns/n}$$

N= number of sample firms

7. In addition, cumulative AER was calculated by adding the AERs for each day of the event period, days -30 to +30.
8. For the event period, graphs of AER and CAER were plotted to show their movement over time. Graph 1 below displays the Average Excess Returns plotted against time. Graph 2 depicts the Cumulative Average Excess Returns plotted against time.

TABLE 2
ALPHA AND BETA FOR EACH FIRM

Firm	Alpha	Beta
Raytheon	-0,001365613	0,597607397
Disney	0,001034379	0,539267904
AT&T	-0,002430633	0,36385575
Bristol-Myers Squibb Co	-0,000799855	1,082608435
Cigna Corp	-0,003399535	0,55094537
CVS Health Corp	-0,000645301	2,240651915
The Dow Chemical Co	0,012347993	1,972732205
AbbVie Inc	-0,006696189	1,945717541
Bayer AG	-0,002185967	0,858966401
Charter Communications Inc	-0,001726351	-0,127938191
Hj Heinz Co	0,009600375	-1,659704937
Anheuser-Busch Inbev	0,002038572	0,582886846
Royal Dutch	0,001679359	0,777510519
Linde AG	-0,000814176	0,961114404

If the merger increases the value of the firm and thereby stockholder wealth, it follows that the merger should produce positive financial performance from before to after the combination due to synergies that explain the increase in value of the newly merged firm. This analysis focused on financial ratios that determine if the financial performance of the companies that merge improves. The selected variables from

the literature (Rani, Surendra, and Jain, 2015) were tested for the same sample of 14 firms that merged recently. Data was observed for each acquisition. The study used trend analysis to determine how the selected ratios: return on assets, current ratio, operating margin, and debt-to-equity ratio, are affected by acquisitions. Data collected for the ratios represent the percentage change for each company year over year. The data was divided into four periods, the year when the merger takes place was considered Year 0. The four periods were the following: From Year -2 to Year -1, from Year -1 to Year 0, from Year 0 to Year 1, and from Year 1 to Year 2. Once the percentage change from year to year was calculated for each company, a trend analysis was produced using a scatter plot graph to observe the tendency line for each ratio throughout the years. The financial performance study presents the following hypotheses:

$H1_0$: *A merger does not affect positively or negatively the financial performance of a company.*

$H1_1$: *A merger positively affects the financial performance of a company.*

$H1_2$: *A merger negatively affects the financial performance of a company.*

QUANTITATIVE AND TEST RESULTS

Market Efficiency

Did the market actually react to the information embedded in the merger announcement? Was the information surrounding the event significant? If the information surrounding the event was significant and contributed to a change in the stock price in either direction, negative or positive, there would be a substantial difference between the Actual Average Daily Returns (Day -30 to Day +30) and the Expected Average Daily Returns (Day -30 to +30). In order to test for a significant difference between the Actual Average Daily Returns and the Expected Average Daily Returns for the sample of mergers, a paired sample t-test was conducted. For the sample of mergers, the paired sample t-test provided evidence, at the 5% significance level, that there was a difference between the Actual Average Daily Returns and the risk-adjusted Average Expected Daily Returns. These results support the hypothesis for mergers $H2_1$: the risk-adjusted rate of return of the stock price of the sample firms is significantly positively affected by the merger around the announcement date as defined by the event period. Because a market reaction was observed and there was significant evidence that the information surrounding the event date for the mergers impacted stock price, this supports the proposition that the market does react to the announcements of the mergers. (Bacon & Greis, 2008; Bacon and Cannon, 2018; Bacon and Spradlin, 2019; Bacon and Hutchinson, 2020; Bacon and Howell, 2021).

In addition, it is important to test the stock price reaction to the merger announcement to determine the level of efficiency of the market response. Did the market display weak, semi-strong, or strong form market efficiency? By analyzing the market reaction, it was possible to conclude how quickly the market reacted to the announcement of the merger. The main factor in examining market efficiency is testing to see if the Average Excess Return (AER) and the Cumulative Average Excess Return (CAER) for the sample of mergers are significantly different from zero and the other factor is observing a graphical relationship between time and AER or CAER (Graphs 1, 2). T-tests of both AER and CAER for the sample of mergers indicated that the means were different from zero at the 5% significance level. Observation of Graph 2 (CAER) highlights the significant positive reaction of the risk-adjusted returns of the sample stocks up to 1 day before the merger announcement was made. Graph 2 shows that the announcements of mergers significantly positively affected the firm's stock price up to 1 day before day 0, the announcement date for the merger. This supports the null hypothesis for merger $H1_0$: The risk-adjusted rate of return of the stock price of the sample firms is not significantly positively affected by the merger on the announcement date. Consequently, an investor would not be able to make an above-normal return if they were to act on the announcement of a merger. Before the announcement date, the stock price had already adjusted to the news of the merger announcement. Semi-strong form market efficiency is supported, meaning the market reflects

all publicly available information. (Bacon & Greis, 2008; Bacon and Cannon, 2018; Bacon and Spradlin, 2019; Bacon and Hutchinson, 2020; Bacon and Howell, 2021).

In addition, in the CAER graph, there is a slight negative movement on day +1, then a positive movement on day+ 5 through +12, followed by a return to normal day +15 in support of the typical over-reaction and a return to normal in the market efficiency literature (Ross, Westerfield, Jaffe, and Jordan 2016). Consistent with the behavioral finance literature, these movements suggest that the market overreacted to the merger announcement followed by an adjustment to normality. (Bacon & Greis, 2008; Bacon and Cannon, 2018; Bacon and Spradlin, 2019; Bacon and Hutchinson, 2020; Bacon and Howell, 2021).

FIGURE 1
AVERAGE EXCESS RETURN (AER)

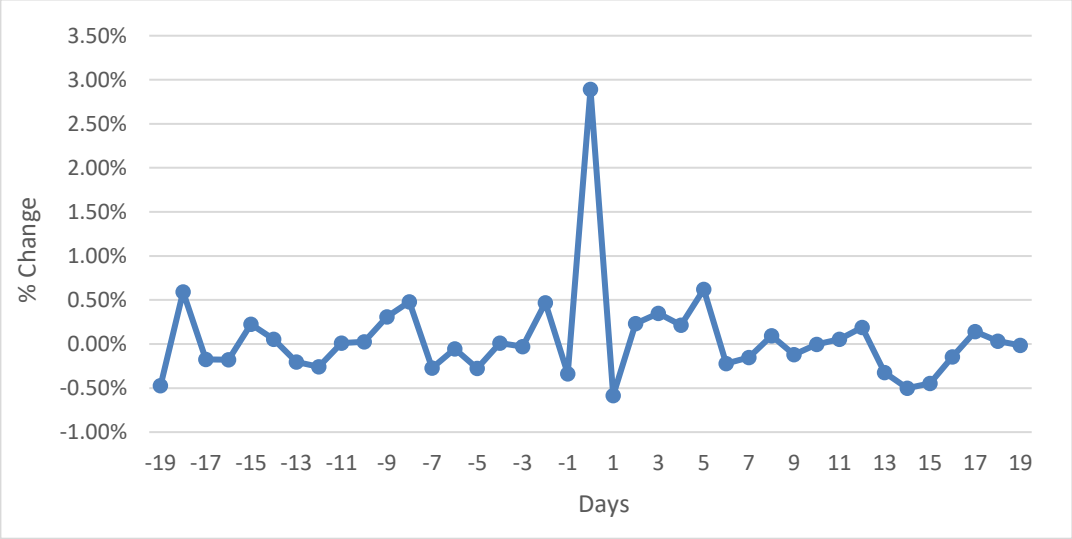
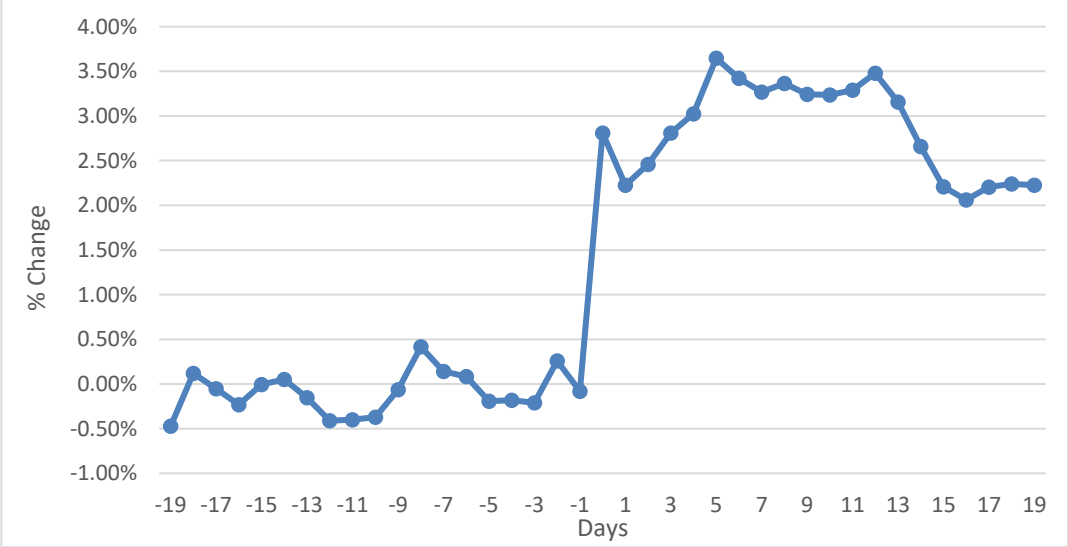


FIGURE 2
CUMULATIVE AVERAGE EXCESS RETURN (CAER)



Financial Performance

The market efficiency analysis clearly shows that the merger increases the value of the firm and thereby stockholder wealth. Therefore, it follows that the merger should produce positive financial performance from before to after with the combination enjoying synergies that explain the increase in value of the newly merged firm. This analysis focused on the financial performance of companies merging by analyzing performance financial ratios from before to after the merger. A successful merger should create a stronger company due to the positive impact of synergies in support of **$H1_1$**: A merger positively affects the financial performance of a company. If there is a positive impact, then the return on assets, the current ratio, and the operating margin should improve leaving the debt-to-equity ratio unchanged or decreased. A trend analysis was conducted. The ratio trend analyses shown in Graphs 3, 4, 5, and 6, indicate no significant changes in the ratios that support the claim that the company is better off after a merger. There is a positive change in return on assets during the event period, but there is no significant evidence that merging might be the reason for that to happen since the other ratios barely change.

FIGURE 3
RETURN ON ASSETS TREND DURING THE EVENT PERIOD

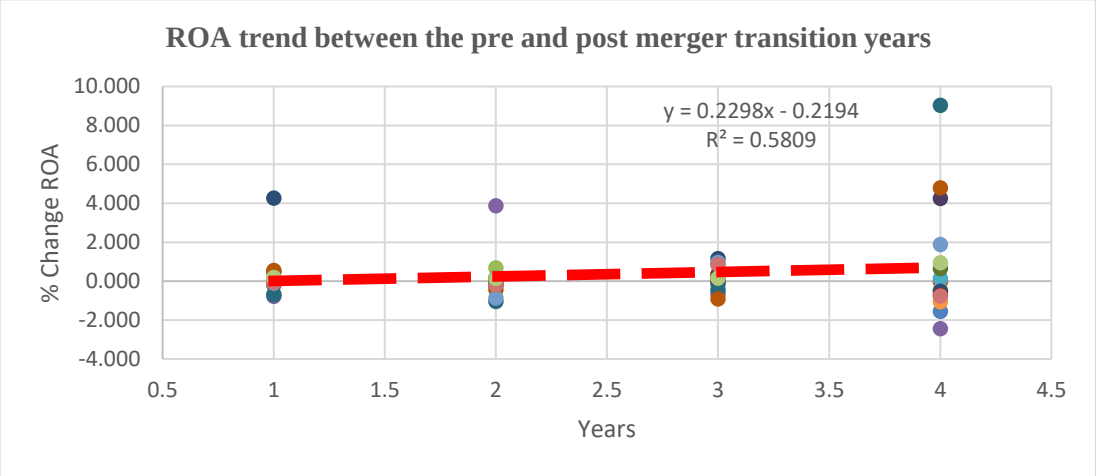


FIGURE 4
CURRENT RATIO TREND DURING THE EVENT PERIOD

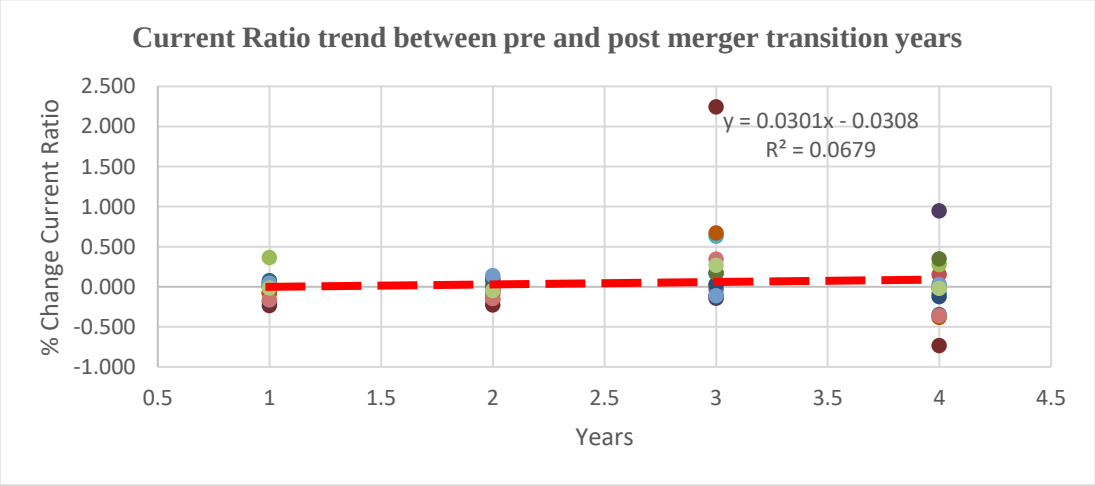


FIGURE 5
DEBT-TO-EQUITY RATIO TREND DURING THE EVENT PERIOD

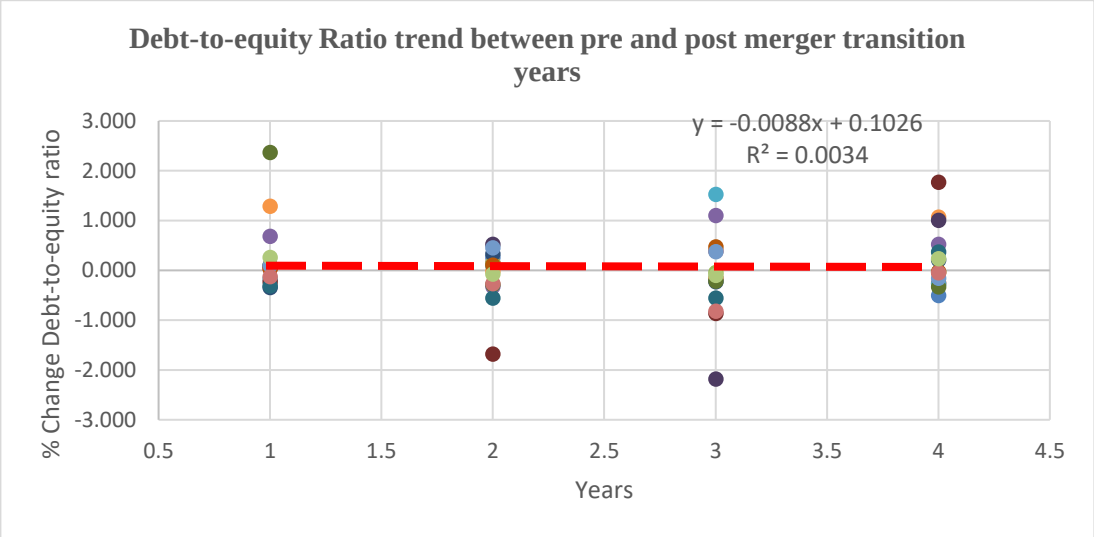
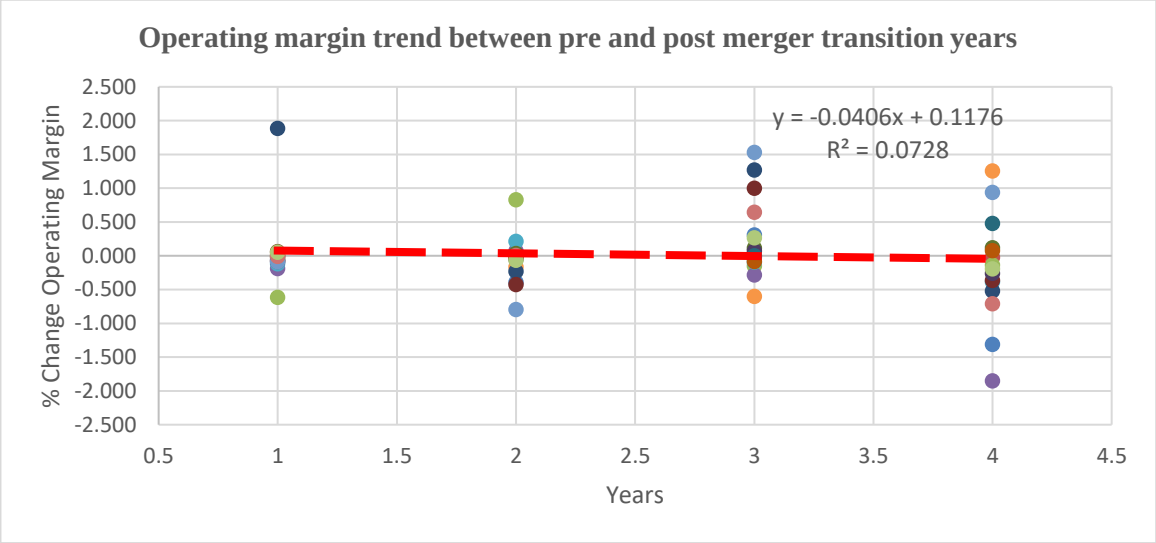


FIGURE 6
OPERATING MARGIN TREND DURING THE EVENT PERIOD



CONCLUSION

The purpose of this study was to test market efficiency theory by analyzing the effects of a sample of 14 NYSE or NASDAQ traded firms that announced a merger. The standard risk-adjusted event-study methodology in the finance literature was used to test the market efficiency of the 14 firms that recently announced a merger over the time period 2014 to 2019. Evidence shows that investors are unable to gain an above-average return by trading on the date of the merger announcement. Further, the CAER exhibits a significant positive reaction to the risk-adjusted returns of the sample stocks up to 1 day before the merger announcement is made. As in previous studies (Bacon & Greis, 2008; Bacon and Cannon, 2018; Bacon and Spradlin, 2019; Bacon and Hutchinson, 2020; Bacon and Howell, 2021 Fama, 1997; Finnerty, J1976; Givoly and Palmon, 1985; Rozeff and Zaman 1988), the significant positive stock price return reaction for

up to 1 day prior to the announcement, is consistent with the existence of insider trading. Consequently, an investor would not be able to make an above-normal return if they were to act on the announcement of a merger since the stock price will have already adjusted to the news of the merger announcement the previous day or day -1. Semi-strong form market efficiency is supported with the market reflecting all publicly available information.

In addition, the CAER graph shows a slight negative movement on day +1 after the announcement, then a positive movement up to days +5 through +12, followed by a return to normal on day +15 in support of the typical over-reaction and a return to normal in the market efficiency literature (Ross, Westerfield, Jaffe and Jordan 2016). Consistent with the behavioral finance literature, these movements suggest that the market overreacts to the merger announcement followed by an adjustment to normal. (Bacon and Greis, 2008; Bacon and Cannon, 2018; Bacon and Spradlin, 2019; Bacon and Hutchinson, 2020; Bacon and Howell, 2021; Fama, 1997).

Do mergers and acquisitions bring about improved financial performance from the pre- to the post-merger period as measured by the return on assets, current ratio, operating margin, and debt-to-equity ratio? Results of the financial ratio trend analysis over the four-year period (2 years before the merger to 2 years after the merger) do not show a significant improvement suggesting that the merger may not improve the financial performance of a company. Clearly, the effects of the merger may not have surfaced over the limited 4-year time period used in this study, suggesting that a much longer time period analysis is warranted. Evidence on financial performance here suggests that mergers are not value-increasing based on the pre-post-merger financial performance. The merger financial performance in this study points to the agency problem where large firms get "bigger" not "better" by going shopping with excess free cash flow. In such cases the firm's merger maximizes size, not stockholder wealth, the goal of the firm.

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