



# Handelshøyskolen BI

## GRA 19703 Master Thesis

Thesis Master of Science 100% - W

### Predefinert informasjon

<b>Startdato:</b>	09-01-2023 09:00 CET	<b>Termin:</b>	202310
<b>Sluttdato:</b>	03-07-2023 12:00 CEST	<b>Vurderingsform:</b>	Norsk 6-trinns skala (A-F)
<b>Eksamensform:</b>	T		
<b>Flowkode:</b>	202310  11184  IN00  W  T		
<b>Intern sensor:</b>	(Anonymisert)		

### Deltaker

Navn: Pedro Henrique Silva Albuquerque og Martin Aasen Law

### Informasjon fra deltaker

Tittel \*: How Mergers and Acquisitions Created Value During the COVID-19 Pandemic - Empirical Evidence from the U.S. TMT Industry

Navn på veileder \*: Salvatore Miglietta

Inneholder besvarelsen konfidensielt materiale?: Nei

Kan besvarelsen offentliggjøres?: Ja

### Gruppe

Gruppenavn: (Anonymisert)

Gruppenummer: 311

Andre medlemmer i gruppen:

# **How Mergers and Acquisitions Created Value During the COVID-19 Pandemic - Empirical Evidence from the U.S. TMT Industry**

GRA 19703 Master Thesis  
Supervisor - Salvatore Miglietta

Master of Science in Business - Major in Finance  
and  
Master of Science in Finance

Oslo, July 3<sup>rd</sup>, 2023

## **ABSTRACT**

The COVID-19 pandemic had a significant impact on the U.S. market, including merger and acquisition (M&A) activity. This thesis aims to identify potential factors influencing M&A success and also examines the long-term performance of U.S. acquirers in the Technology, Media, and Telecommunications (TMT) sector during the pandemic. Based on a sample of 65 M&As conducted in 2019, our analysis reveals statistically insignificant negative abnormal returns for acquiring companies when using the buy-and-hold abnormal return (BHAR) method for one year. The study also reveals weak correlations between BHARs and the selected independent variables, indicating limited direct associations between acquirer's BHARs and the determinants usually considered as important predictors of abnormal returns.

*This thesis is a part of the MSc programme at BI Norwegian Business School. The school takes no responsibility for the methods used, results found, or conclusions drawn.*

## **Acknowledgements**

We would like to thank Salvatore Miglietta and Øyvind Norli for providing critical insights, timely feedback, and valuable guidance throughout the writing process.

## Contents

<i>List of abbreviations</i> .....	<i>II</i>
<i>List of Figures</i> .....	<i>III</i>
<i>List of Tables</i> .....	<i>IV</i>
<b>1 Introduction</b> .....	<b>1</b>
1.1. Question to investigate .....	2
1.2. Relevance and interests .....	3
<b>2 Literature Review</b> .....	<b>4</b>
2.1. M&As in the TMT sector .....	4
2.2 Theoretical framework.....	5
2.3 Motives for M&As.....	6
2.4 Determinants of abnormal returns.....	8
2.4.1 Diversification.....	9
2.4.2 Firm size.....	9
2.4.3 Method of payment.....	10
2.4.4 Geography.....	10
2.5 The long-term impact of M&A on value creation .....	11
<b>3 Hypotheses</b> .....	<b>13</b>
3.1 Hypotheses development.....	13
<b>4 Methodology</b> .....	<b>17</b>
4.2 Buy-and-Hold Abnormal Return.....	18
4.2.1 Significance test.....	19
<b>5 Data and Preliminary Analysis</b> .....	<b>21</b>
5.1 Preliminary analysis .....	21
5.2 Regression analysis.....	22
5.2.1 Selection of independent variable.....	23
5.3 Descriptive and summary statistics .....	24
<b>6 Results and Main Analysis</b> .....	<b>26</b>
6.1 Overall effects.....	26
6.2 Person Correlation Matrix .....	28
<b>7 Conclusion</b> .....	<b>32</b>
<b>8 References</b> .....	<b>33</b>
<b>9 Appendix</b> .....	<b>40</b>

## **List of abbreviations**

BHAR: Buy-and-Hold Abnormal Return

CAR: Cumulative Abnormal Return

EMH: Efficient Market Hypothesis

ESG: Environmental, Social, and Governance

GVC: Global Value Chain

H0: Null Hypotheses

H1: Alternative Hypotheses

IPO: Initial Public Offering

ISIN: International Securities Identification Number

M&A: Mergers and Acquisitions

NAICS: North American Industry Classification System

NYSE: New York Stock Exchange

OLS: Ordinary Least Squares

Q1: First Quarter

TMT: Technology, Media, and Telecommunications

WHO: World Health Organization

## List of Figures

Figure 1: Acquirer BHARs across 502 trading days.....	28
---	----

## List of Tables

Table 1: Sample selection .....	17
Table 2: Summary Statistics of BHAR by Variable .....	25
Table 3: Conventional t-test .....	27
Table 4: Bootstrapped t-test (Lyon et al. (1999)).....	28
Table 5: Pearson Correlation Matrix .....	30

# 1 Introduction

The COVID-19 virus was discovered in December of 2019 in Wuhan, China. The virus was very contagious and attempts to contain it failed, allowing it to spread to other areas of Asia and the rest of the world. The World Health Organization (WHO) declared a pandemic in March 2020. As the COVID-19 virus spread throughout the world, global markets were severely impacted both in terms of supply and demand. From the supply side, industries were affected by lockdowns, mobility restrictions, production stoppages, disruptions of global value chains (GVCs), and uncertainty about short-term prospects. From the demand side, the most significant impact came with the reduction in domestic consumption as income decreased significantly, and foreign demand declined amid a global trade slowdown (United Nations, 2021).

Just before the pandemic, the global equity indices experienced historical peaks. However, in March 2020, the MSCI World, S&P 500, and STOXX Europe 600 indices all dropped between 30% and 35%. Meanwhile, volatility increased remarkably, with the VIX index reaching 83%, a level last seen after the Lehman Brothers collapse in 2008 (Kengelbach et al., 2020). Investors holding risky assets experienced large losses and companies were uncertain about making initial public offerings (IPO) to raise money as COVID-19 changed the markets drastically. Despite the rapid fall in equity value and mergers and acquisitions (M&A) activity following the start of the pandemic, M&A activity has since seen a massive increase, both in terms of quantity and deal value. The number of transactions grew from 5,630 in 2020 to 8,354 in 2021, while M&A deal value increased from \$514.0 billion to \$941.1 billion in the same period (Seiler, 2022). While M&A has been an important strategy for a long time, the recent rise in M&A activity and value has made it an increasingly interesting topic on which to conduct further research.

We decided to focus on the U.S. technology, media, and telecommunication (TMT) sector due to the recent and rapid growth in M&A activity during the period following the pandemic (Seiler, 2022). This is significant as the TMT sector, accounting for an estimated 31% of the S&P500 in 2018 (Valetkevitch, 2018), plays a significant role in shaping the overall market trends and investor sentiments. It is a sector characterized by rapid innovation and consolidation as technology changes



the way we live, and digital transformation continues to evolve as businesses adapt to the post-pandemic environment and position themselves to remain competitive. Prior to the pandemic, M&A was seen as an important part of a firm's strategy to grow its business as acquiring firms can promote growth and generate revenue by meeting demand in new markets, and strengthening their position in existing markets. We aim to expand the current body of literature by employing established methods within a novel context. The impact of COVID-19 on the relationship between M&As and acquirers' performance, particularly in the TMT sector, is still largely unexplored, creating a substantial gap in knowledge and paving the way for extensive research.

### **1.1. Question to investigate**

There is much evidence to suggest that most M&As are not successful in generating value for the acquiring company and most of the value created goes to the seller (Christofferson et al., 2004), we want to investigate if this is true for the TMT M&As that occurred from January 2019 to December 2019. The research question of this study is therefore, "Have mergers and acquisitions in the technology, media, and telecommunication (TMT) sector in the United States created value during the COVID-19 pandemic?". The value created is a relative measure as we compare abnormal returns of acquiring firms to those of non-merging firms. We used Zephyr, Orbis, and Refinitiv for extracting data from the M&A deals and the acquirer's stock prices. For addressing our research question, we used the buy-and-hold abnormal return (BHAR) approach to identify the value creation.

The pandemic led to supply and demand shocks and policy responses as governments and central banks around the world implemented fiscal stimulus measures and monetary policy interventions such as interest rate cuts. Societal and technological shocks also occurred as the pandemic led to a widespread shift to remote work, companies responded by the rapid adoption of new technologies to enable remote work, such as video conferencing and cloud-based collaboration tools. The pandemic affected different industries in different ways. For example, while the travel and hospitality industry has been hit hard by lockdowns and travel restrictions, the technology industry has experienced growth as more people could work remotely. Companies also sought to adapt to the new realities of remote work and online transactions through increased adoption of new technologies such as

artificial intelligence, automation, and blockchain (Seiler, 2022). These technologies hold the potential to streamline the process, mitigate risk, and enhance strategic decision-making, possibly resulting in the potential for abnormal returns (DePamphilis, 2022). Theories that could support our hypothesis that the pandemic could have affected BHARs of acquirers include the misvaluation hypothesis. The misvaluation hypothesis suggests that the market may misvalue a company's assets, leading to a gap between the company's market value and its intrinsic value. The market may have misvalued companies due to the rapid changes that occurred during the pandemic, leading to opportunities for value creation through M&A (Shleifer & Vishny, 2003).

## **1.2. Relevance and interests**

The topic of the thesis is highly relevant as companies are spending increasing amounts on M&A, especially TMT firms (Seiler, 2022). Studying this topic is particularly important in the TMT sector where the pace of technological change and competition is high, and the long-term value of an acquisition takes time to materialize (Hassan & Alhenawi, 2022). Additionally, M&As often involve high premiums and significant investment, making it important to study their long-term impact on value creation (McKinsey and Company et al., 2020). Given the importance of the TMT sector to the overall economy and the increasing frequency of M&A activity in this space, understanding the drivers and outcomes of these deals can provide valuable insights into broader trends in the economy and financial markets. By measuring 1-year performance, observed through BHARs, we can observe whether shareholder wealth increased or decreased. This can be useful and applicable in real-world situations, empirical evidence suggesting that the pandemic has led to larger M&As becoming profitable might influence firms to alter their future strategies. We anticipate that our findings will bolster certain arguments while undermining others, thereby making a valuable empirical contribution.

## **2 Literature Review**

This chapter covers the theoretical background and prior empirical studies on the subject of M&A and seeks to explain the definitions of M&A, its importance in the industry and setting, as well as the motivations behind them. To place in context the contribution of our thesis, we briefly discuss other articles and theses covering similar topics.

### **2.1. M&As in the TMT sector**

The TMT sector is a rapidly evolving industry characterized by innovation, disruptive technologies, and changing consumer behaviors. It encompasses a wide range of companies involved in the development, production and distribution of technology, media content, and communication services. M&As have been prominent in shaping the TMT industry, from the largest-ever acquisition, the 1999 takeover of Mannesmann by Vodafone Airtouch plc. (Kumar, 2019), to the 2022 acquisition of Activision Blizzard by Microsoft (Datta, 2022). M&A activity in the TMT sector during the pandemic was partly driven by an abundance of liquidity due to government stimulus programs and historically low interest rates. This created favorable conditions for deal activity. The pandemic also accelerated the adoption of technology, leading to increased demand for digitization, content, and cybersecurity. This drove many deals as companies sought to meet the evolving needs of the digital landscape (Seiler, 2022). However, M&A in the TMT sector comes with challenges. Various factors, such as U.S. antitrust and data privacy laws, European anti-monopoly regulations, increasing environmental, social, and governance (ESG) requirements, and tensions with China have the potential to hinder M&A activity. Heightened scrutiny surrounding Big Tech, data privacy, and ESG considerations emphasizes the need for dealmakers to carefully consider the regulatory landscape in their strategic decision-making processes, adding complexity to M&A activities in the TMT sector (Jaber & Spiegel, 2023).

According to Koller, Goedhart, and Wessels (McKinsey and Company et al., 2020), the most prosperous acquirers approach each deal with well-defined and precise value creation concepts. On the other hand, less successful deals often stem from vague strategic rationales such as pursuing international expansion, filling portfolio gaps, or diversifying the portfolio without clear substantiation (McKinsey and Company et al., 2020). As for the TMT sector, while there have been studies on

M&A in those industries (Ferris & Park, 2001; Jope et al., 2010; Park et al., 2002) there has been lacking research into the long-term performance of acquiring firms, especially in the context of economic crisis.

## **2.2 Theoretical framework**

M&As make up an important part of the economy as it provides a quick way for companies to reallocate resources, creating value for investors and the economy more broadly (McKinsey and Company et al., 2020). Value creation is the fundamental objective of M&A deals as M&A deals are made to bring about synergistic benefits that drive revenue growth, cost efficiencies, and strategic positioning, resulting in higher returns for shareholders (Gupta et al., 2021). Another source of value creation is the impact on market power, as M&As can reduce competition and provide the acquiring company with a competitive advantage (Bruner, 2004). Conversely, value destruction can occur when the expected synergies fail to materialize, resulting in suboptimal outcomes for both the acquiring and target companies (Walker, 2020). This can occur due to agency conflict between shareholders and management, (Harford et al., 2012), and overpayment by acquirers. The Hubris hypothesis proposed by Roll (1986) offers an explanation for overpayment, suggesting that management overestimates their abilities, leading to overbidding and the winner's curse phenomenon.

The theoretical framework also considers the efficient market hypothesis (EMH), EMH suggests that financial markets are efficient and incorporate all publicly available information, including announcements of M&As, into asset prices (Fama, 1970). From an M&A perspective, this implies that market participants have access to and process relevant information regarding the merger, impacting stock prices. In the weak form of EMH, stock prices reflect all historical price information. In the semi-strong form, stock prices adjust immediately to publicly available information, indicating that the market efficiently incorporates such information. The strong form includes both public and insider information, suggesting that the market reflects all information about the firm, even that which is not publicly available (Fama, 1970). The EMH predicts that abnormal returns are unlikely to persist as market participants quickly adjust to new information (Altin, 2015). Assessing whether market efficiency is the cause of this phenomenon involves the

challenge of the joint hypothesis problem, which states that market efficiency itself cannot be directly tested (Fama, 1991).

Information asymmetry theory posits that parties involved in an M&A deal may possess differing levels of information, creating information asymmetry. As a result of the internal information and expertise that managers possess within a firm, there naturally exists an imbalance of information between insiders and external investors (Myers and Majluf, 1984). This information imbalance can affect negotiation power, transaction terms, and the ability to accurately value the target firm. Two important characteristics of many M&A deals are the acquiring company's potential difficulties in evaluating the value of the target company's resources and the necessity for both parties to agree on a price. The presence of information asymmetry between the acquirer and the target can lead to deals failing, and when deals are completed, acquirers often tend to overpay for the target company (McKinsey and Company et al., 2020).

Merger waves are periods of increased M&A activity and provide an important context for understanding M&A activity. While the causes of a merger wave can be complex, they are often linked to broader economic and market trends and changes in regulatory environments and technological innovations. The impact of merger waves on companies and industries can be significant, from increased market power and efficiencies to layoffs and reduced competition. The causes behind the surge in M&As beginning in the latter half of 2020 and continuing through 2021, especially in the TMT sector, have been widely discussed even before the start of the pandemic (Wiley, 2020). The cyclical nature of M&As may suggest interdependence among abnormal returns across firms, posing a potential challenge to the assumption of independent observations in event studies.

### **2.3 Motives for M&As**

Because the topic of this thesis is the effects of the COVID-19 pandemic on M&A, it is pertinent to discuss the motives behind M&As and the theory and literature that seeks to explain the motivations of the acquirer. Prior to the pandemic, M&A was seen as an important part of a firm's strategy to grow its business. This has only become more true in the years since the pandemic began, evident by global M&A deal value reaching all-time highs of \$5.9 trillion in 2021 (Bain & Company et al.,

2022). Prior studies have identified numerous motives and rationales for businesses to engage in M&A, with a focus on enhancing the acquirers' competitive advantage through strategies such as diversification and synergies. M&A transactions are seen as a means to drive growth and generate revenue by tapping into new markets and reinforcing the acquirers' position in existing markets. These synergies can be classified based on their effects on revenues, costs, and financial factors.

M&As can lead to synergies that enhance a firm's competitive strengths, achieved through the more efficient utilization of resources and the creation of value beyond that of the individual firms (Trautwein, 1990; Lubatkin, 1983). Revenue synergies can arise from the growth and increased revenue resulting from meeting new demand, for example by acquiring high-growth firms that can contribute to the acquirer's overall profitability. Acquisitions can enable companies to expand by introducing new products, leveraging new technologies, and entering new markets domestically or internationally. Another strategic goal of M&A is vertical integration, where companies aim to control the entire supply chain, reducing risks associated with dependency on external suppliers. Vertical and horizontal integration strategies allow companies to expand their supply chain, distribution line, or market share by acquiring competitors. M&A transactions also offer efficiency gains by eliminating overlapping tasks and reducing redundant costs (Berk & DeMarzo, 2020).

Cost synergies are achieved by reducing costs that the individual firms could not achieve independently. This is accomplished through economies of scale, combining production processes, streamlining organizational structures, and sharing technologies and patents. Economies of scale allow for increased production and lower marginal costs, and by expanding their operations, companies can take advantage of efficiencies that come with larger sizes and achieve cost savings. Additionally, mergers and acquisitions provide an opportunity to acquire new expertise that the acquiring company lacks or cannot develop internally. This expertise can contribute to improved performance and competitive advantage. Furthermore, acquiring unprofitable businesses can help offset operating losses and provide tax benefits. Diversification through M&A can reduce operational risk by spreading investments across different sectors or markets. M&As can also remove excess capacity from the industry through consolidation, create market access for

the target's products, acquire skills or technologies more quickly or at a lower cost than they could be built in-house, and more (Berk & DeMarzo, 2020).

Finally, M&A can also lead to monopoly gains by increasing the acquiring company's market power, weakening competitors, and potentially allowing for greater control over pricing and market dynamics (Berk & DeMarzo, 2020). Financial synergies stemming from the combined firm's enhanced bargaining power can lead to lower borrowing costs and a reduced cost of capital. Larger firms can negotiate better loan terms, resulting in lower interest costs for the merged entity. Additionally, diversifying investments by acquiring companies in different industries can reduce systematic risk improving financial synergies (Trautwein, 1990). Despite the many possible benefits gained from M&As, the resulting value generated in such transactions varies greatly between firms (McKinsey and Company et al., 2020).

Market timing is a significant motive that can lead to value-decreasing M&A transactions. Shleifer and Vishny (2003) propose a model in which overvalued acquirers leverage their stock to acquire relatively undervalued targets, even if both firms are potentially overvalued. According to their theory, acquisitions are driven by stock market dynamics. Dong et al. (2006) support the market timing hypothesis by finding that, on average, acquirers are more highly overvalued compared to their targets. Furthermore, they observe that high-valuation acquirers are more inclined to use stock as the payment method. It is worth noting that acquisitions by overvalued acquirers are often followed by lower post-merger abnormal returns, providing empirical support for the market timing perspective. Despite extensive studies, research on merger motives remains largely inconclusive as coexisting value-increasing and value-decreasing motives make it difficult to get a clear picture of what influences M&A activity (Nguyen et al., 2012).

## **2.4 Determinants of abnormal returns**

Prior research predominantly focuses on estimating abnormal returns in event studies as a means to evaluate the success of mergers and acquisitions. Short-horizon event study announcement returns that occur in the immediate aftermath of an announcement, while this paper studies long-term abnormal returns. Numerous factors can potentially impact abnormal returns, some factors discussed in the



following section include diversification, firm size, method of payment, and geography.

#### **2.4.1 Diversification**

The relatedness of the acquiring company is a commonly examined determinant in M&A research. Renneboog and Vansteenkiste (2019) argue that a higher level of relatedness between the acquiring and target firms tends to generate better performance. Rhodes-Kropf and Robinson (2008) attribute this to the acquirer's higher likelihood of possessing the necessary skills and resources for operating and integrating the target firm. Supporting this argument, Akbulut and Matsusaka (2010), studying a large sample of 4,764 U.S. mergers from 1950 to 2006, found that the combined shareholder value of diversified M&As, involving both the acquirer and target, exceeds that of related mergers. On the other hand, agency theory would suggest managers benefit from conducting diversified M&As at the expense of shareholders, this is supported by studies suggesting that diversification in M&As leads to negative market reactions and the destruction of shareholder value for acquiring firms (Morck et al., 1990). Other studies suggest diversification has no effect (Chatterjee, 1986) and despite potential reasons why related mergers could lead to higher returns for acquirer and target firms, empirical research has yet to consistently support this notion (Flanagan, 1996).

#### **2.4.2 Firm size**

Researchers are divided on whether relative firm size increases or decreases shareholder returns (Jansen et al., 2013). There is a belief among some researchers that larger firms involved in M&A transactions tend to perform worse than smaller firms (S. B. Moeller et al., 2004). This is often attributed to corporate governance and agency theories, which suggest that managers of larger acquirers may have incentives other than maximizing shareholders' wealth, such as managerial overconfidence or a focus on serial acquisitions, meaning larger deals could be value-destroying because acquirers overpay due to overconfident managers (Roll, 1986). However, there are contrasting findings in the literature. Fuller, Netter, and Stegemoller (2002), studying a sample of 3,135 U.S. takeovers from 1990 to 2000, find evidence suggesting that deals involving larger targets tend to achieve higher abnormal returns and create greater shareholder wealth. They argue that larger acquiring firms have greater bargaining power and can integrate their targets into



the organization at a lower cost, resulting in enhanced shareholders' wealth. Jansen, Sanning and Stuart (2013) note that while the literature is divided on whether relative firm size affects returns, most studies indicate that larger firms generally outperform smaller firms (Fama & French, 1995).

#### **2.4.3 Method of payment**

There have been many studies investigating whether methods of payment and financing in M&A deals influence abnormal returns. One hypothesis states that stock-based payments may signal overvaluation of the acquiring company's stock, leading to lower abnormal returns, while cash payments tend to yield higher abnormal returns due to reduced information asymmetry. This has been supported by research by Myers and Majluf (1984), who suggest that if managers believe their company is overvalued, they often prefer stock-based transactions, which can send a negative signal to the market, resulting in corresponding reactions. Comparatively, M&As with stock payments are expected to result in lower abnormal returns than those with cash payments, which could be attributed to information asymmetry (Hansen, 1987). Additionally, the choice between cash and stock payments affects the tax implications for target shareholders, which can impact deal premiums and overall returns (Betton et al., 2008).

#### **2.4.4 Geography**

Cross-border M&As introduce unique challenges and considerations as the differences in accounting standards, shareholder protection, and cultural factors between the acquirer and target countries can impact abnormal returns (Bris et al., 2008). According to a study conducted by Schlingemann and Moeller (2002), cross-border M&As were associated with a negative diversification effect, indicating that such deals tended to result in value destruction. Conversely, Eckbo and Thorburn (2000) conducted a study on a large sample of 7,559 mergers and acquisitions between the United States and Canada and found that following the announcement, domestic acquirers experience significant positive abnormal returns, whereas cross-border acquirers do not observe any abnormal returns that are significantly different from zero.

## **2.5 The long-term impact of M&A on value creation**

There have been several long-term studies on abnormal returns, differing in terms of data, methodology, and period, resulting in various findings. Loughran & Vijh's (1997) study, analyzed 947 U.S. acquisitions between 1970-1989 using the BHAR method with a five-year event window. To address the uneven distribution of the acquisition sample across size and book-to-market factors, they adjusted their benchmark by employing a matching procedure that paired acquirers with control firms based on their required rate of return. The results revealed that the acquirers' average five-year buy-and-hold return was 81.2%, compared to 97.1% for their matching firms. This translated to an average abnormal return of -15.9%, which was statistically significant, indicating that M&As in this context were value-destroying. Similar results were found by Moeller et al. (2003), who conducted a study on a sample of 12,023 U.S. M&As from 1980 to 2001, employing both the calendar-time and event-time methods. They examined a three-year investigation period and matched event firms with control firms based on the market value of assets and book-to-market ratios, and revealed a significant abnormal return of -16.02%.

A 2005 study by Robert F. Bruner found that only one of 11 studies on long-term mergers resulted in positive abnormal returns for the acquirer. However, not all studies are able to find statistically significant negative abnormal returns. Mitchell & Stafford (2000) examined 2,193 U.S. acquisitions from 1958 to 1993 using both the BHAR and calendar-time portfolio methods to estimate abnormal returns over a three-year horizon. They constructed a benchmark using market capitalization and book-to-market ratios of non-event firms. The study provided evidence of negligible long-term abnormal returns when accounting for the positive cross-correlation, supporting the null hypothesis of zero mean abnormal returns. In general, the results indicate that M&As have either a negative impact on acquirers or no significant impact at all.

Several explanations have been proposed to account for this underperformance. From a behavioral perspective, it is argued that the market gradually corrects its previous overvaluation of the merged firms' shares over time (Shleifer & Vishny, 2003). It also assumes that synergies resulting from the transactions are transferred to the target through high premiums (McKinsey and Company et al., 2020), and

that due to the typical size disparity between buyers and targets in mergers, even if the monetary gains from the merger were evenly distributed, the percentage gain for the acquirer would be relatively smaller compared to that of the target (Bruner, 2004). Lastly, it is suggested that the underperformance may be attributed to the econometric methodology itself (Betton et al., 2008), where the returns may not be adequately adjusted for risk.

One recent study covering the topic of the pandemic and its effects on M&A, is the 2021 research paper "The effect of ESG on value creation from mergers and acquisitions. What changed during the COVID-19 pandemic?" by Tampakoudis et al., (2021), focusing specifically on the effect of ESG on value creation. The study found that, on average, bidders experienced improved abnormal returns during the COVID-19 period compared to the pre-pandemic period. Some major differences between Tampakoudis et al., (2021) and our study includes differences in event windows as our study will be focusing on long-term effects rather than short-term effects, as well as focusing on the TMT sector. By conducting this research we aim to provide valuable insights into the post-pandemic market and contribute to the existing research by investigating whether TMT M&As have been successful in creating value for the acquirer during the pandemic.

### **3 Hypotheses**

This chapter covers the hypothesis development of the thesis. The hypotheses outlined in this chapter are based on the literature review provided in the preceding chapter, and serve as the basis for addressing the research question previously defined. As previous studies have analyzed similar samples applying many of the same methods as in our study, we seek to differentiate our study and contribute to the current knowledge by focusing on the effects of the once-in-a-lifetime event that was the COVID-19 pandemic. The hypotheses presented in this section will be examined and explained, followed by a formal definition of each hypothesis.

#### **3.1 Hypotheses development**

There is much evidence to suggest that most acquisitions are not successful in generating value for the acquiring company in the long term. Academics and researchers have extensively studied whether acquisitions create value, primarily focusing on the stock price reaction to acquisition announcements. These studies often give more weight to large acquisitions, making it difficult to assess the market's view on smaller acquisitions, which constitute a significant majority of deals. Nevertheless, research has shown that acquisitions do create value for both the acquiring and acquired companies' shareholders combined. McKinsey's analysis of 1,770 acquisitions between 1999 and 2013 revealed an average increase in the combined value of approximately 5.8 percent (Cogman, 2014). This suggests that acquisitions generally contribute value to the economy through synergies in cost and revenue (McKinsey and Company et al., 2020). It also indicated that the shareholders of the target company benefit significantly from large acquisitions, as they typically receive substantial premiums over the preannouncement market price of their stock, meaning most of the value created goes to the seller (McKinsey and Company et al., 2020). These results are based on studies completed before the pandemic, so we will therefore investigate if the results still hold for the TMT M&As that occurred during the pandemic.

During the pandemic, we believe there is a possibility of positive abnormal returns in M&A activity, as indicated by Tampakoudis et al. (2021). Several theories can help explain the potential for positive abnormal returns during periods of economic downturn or market uncertainty, for instance, there may be favorable opportunities

for acquirers to achieve positive abnormal returns by acquiring assets or companies at discounted prices. Companies facing financial distress or market challenges may be more open to considering acquisition offers that they would not have considered under normal economic conditions. Acquirers with strong financial positions and strategic objectives would be well-positioned to capitalize on these opportunities and acquire undervalued assets or companies, potentially leading to positive abnormal returns.

There is also the concept of creative destruction, proposed by economist Joseph Schumpeter (1950), which suggests that during times of economic disruption or crisis, such as the COVID-19 pandemic, there is an opportunity for innovative and adaptive firms to emerge stronger. This theory implies that companies that pursue acquisitions during challenging times can position themselves for future success. The technology industry serves as a prominent illustration of creative destruction in action. Continuously evolving technologies and software products emerge, supplanting older counterparts and causing disruption within established markets. As for the media sector, the advent of streaming services such as Netflix and HBO has disrupted the conventional landscape of the media and entertainment sector, resulting in the decline of cable TV and traditional movie theaters. These streaming platforms are now further revolutionizing the industry by investing in the creation of their own exclusive content, thereby reinventing the entertainment experience once again (The Investopedia Team & Mansa, 2022). Firms that failed to capitalize on the streaming revolution, such as Blockbuster, went bankrupt.

Based on these events and theories, we hypothesize that the shareholder wealth of acquiring firms outperformed comparable firms during the COVID-19 pandemic. To test this hypothesis, we distinguish between M&As with event windows ending before and during the pandemic using a dummy variable called “COVID-19”. Applying a regression analysis shows if changes observed in the BHARs are associated with changes in the COVID-19 variable, and can help determine whether the pandemic has had a significant influence on the value creation of acquiring firms.

*Hypothesis 1: Acquirers exhibited superior 1-year returns compared to comparable firms during the COVID-19 pandemic.*

The examination of diversification is a recurring theme in the literature regarding the post-performance of M&As. According to Renneboog and Vansteenkiste (2019) when an acquiring and target firm operating in the same industry or sector engages in an M&A transaction, it creates greater shareholder value compared to transactions involving unrelated firms. This is due to the acquirer's higher likelihood of possessing the necessary skills and resources for operating and integrating the target firm. The pandemic-driven shift in consumer behavior and market trends might have amplified the role of expertise in the post-merger performance of acquiring companies. We therefore, hypothesize that the acquiring firms achieve greater abnormal returns when they acquire target companies operating within the same sector, as they are better able to seize emerging opportunities and navigate dynamic markets. This hypothesis will be tested through an independent variable, "Diversification", which can be isolated using SIC codes to identify the industry of the acquiring company.

*Hypothesis 2: Acquirers achieve greater abnormal returns when acquiring target companies in the same sector during the COVID-19 pandemic.*

There are reasons to believe that larger firms may be better equipped for certain types of crises than smaller firms. This is due to many factors, such as their financial resources, diversification of operations, access to capital markets, established customer base, and stronger brand recognition. Governments also tend to provide support to large firms because failure to do so would have consequences for the broader economy (Seelye et al., 2021). Furthermore, Fuller, Netter, and Stegemoller (2002) argue that larger acquiring firms have greater bargaining power and can integrate their targets into the organization at a lower cost, resulting in more valuable deals and enhanced shareholders' wealth. We therefore, believe that there exists a positive correlation between the size of the firm and the abnormal returns of acquirers. In our study, the independent variable "FirmSize" is determined by the market capitalization of the acquiring firm.

*Hypothesis 3: The COVID-19 pandemic saw a positive relationship between firm size and the abnormal returns of acquirers.*

As discussed in the literature review, stock-based payments may signal overvaluation of the acquiring company's stock, leading to lower abnormal returns, while cash payments tend to yield higher abnormal returns due to reduced information asymmetry. Myers and Majluf (1984) suggest that if managers believe their company is overvalued, they often prefer stock-based transactions, which can send a negative signal to the market, resulting in corresponding reactions. Comparatively, M&As with stock payments are expected to result in lower abnormal returns than those with cash payments, which could be attributed to information asymmetry (Hansen, 1987). Loughran and Vijh (1997) analyzed the long-term abnormal returns of acquiring firms and found that those using stock financing underperform matching firms by 24.2 percent, while cash acquirers outperform matching firms by 18.5 percent over the five-year period following the merger. We therefore, posit that there remains a positive correlation between the payment method during the COVID-19 pandemic and the abnormal returns of acquirers.

*Hypothesis 4: Long-term abnormal returns were higher for cash payments compared to stock payments during the COVID-19 pandemic.*

The pandemic has created unique market conditions and disruptions, which may present strategic opportunities for acquirers to acquire distressed or undervalued companies in foreign markets. While studies conducted by Schlingemann and Moeller (2002) and Eckbo and Thorburn (2000) show cross-border M&As tend to result in either value destruction or no abnormal returns that are significantly different from zero, during the pandemic, as certain industries or regions were more severely impacted than others, cross-border M&A have provided acquirers with a more balanced and resilient portfolio, possibly resulting in more favorable abnormal returns. Therefore, we hypothesize that during the COVID-19 pandemic, there is a positive correlation between cross-border M&A and the abnormal returns of acquirers.

*Hypothesis 5: The COVID-19 pandemic saw Cross-border M&A transactions outperforming domestic transactions.*

## 4 Methodology

### 4.1 Sample and data

The Zephyr database offers comprehensive M&A data with integrated detailed company information. Refinitiv delivers market news, information, and analysis to the financial community. In addition, Orbis was used for research, analysis, and monitoring. All of the databases were used by other researchers and demonstrated good performance when providing the financial information needed. Below, each section refers to a Zephyr criteria, and each of the criteria gives a number of observations. The total amount of M&As is given in the column “Search Result”.

		Step result	Search result
1.	All stock exchange: New York Stock Exchange (NYSE), NASDAQ/NMS (Global Market) ( Acquiror )	57,237	57,237
2.	Geography: United States of America (Acquiror )	383,612	53,589
3.	Activity: NAICS2(51,334) ( Acquiror )	163,365	7,463
4.	Time period: on and after 01/01/2019 and up to and including 31/12/2019 (completed-assumed, announced)	167,232	295
5.	Deal type: Acquisition, Merger	876,102	188

Table 1: Sample selection

In the process of selecting our sample, we limited our analysis to acquirer companies listed on the New York Stock Exchange (NYSE) or NASDAQ as financial data of public firms is more readily available. Secondly, we focused on acquirers operating within the U.S. Thirdly, we selected acquirers involved in the NAICS2 industry sectors of 51 (Information) and 334 (Computer and Electronic Product Manufacturing). Per the research questions, we included M&A transactions that were announced between January 1, 2019, and December 31, 2019. We were



then left with 188 M&A transactions, 122 of which had price data spanning the entire length event window.

Data about each acquirer's ISIN code (International Securities Identification Number) was extracted from Orbis, and data about each acquirer's daily stock prices from January 1, 2019 to December 31, 2021 was extracted from Refinitiv. The data extracted from Refinitiv was used in the event study calculations. After taking 188 M&As from Zephyr, Orbis presented 122 ISIN codes used to extract price data, of which 65 firms had all the necessary data need to compute BHARs.. Finally, we obtained price data of each acquirer from Refinitiv Datastream, which we found to be a reliable and valuable resource due to its extensive coverage of financial data.

#### **4.2 Buy-and-Hold Abnormal Return**

In order to assess whether the event firms exhibit statistically significant abnormal returns, an event study was applied. The event study can indicate whether investors have under-reacted or over-reacted to the M&A, based on the presence of non-zero abnormal returns. An estimation window of one year spanning from  $t-7$  to  $t-365$  was chosen to also capture relevant information that occurred shortly before the announcement day. Barber, Lyon and Tsai (1999) propose using non-event control firms to calculate BHARs. These comparable firms are selected based on specific characteristics such as industry, market capitalization, and book-to-market ratio. The first step is finding a sample of control firms selected on the basis of firm-specific characteristics. We chose 250 comparable tech firms as they matched the samples' characteristics based on industry. We then matched each event firm with the most similar non-event firm based on market cap and book-to-market ratio. All event firms that were included in the sample of comparables were removed.

Following the BHAR approach, abnormal returns are calculated by subtracting the return of non-event firms from the return of the event firms. To control for differences in book-to-market ratio and size, this study uses comparable firms to calculate BHARs. Following the methodology of Eckbo and Norli (2005), a set of exchange-listed TMT firms in the U.S. was chosen, and a subset of firms with market values within 30% of the market value of the event firm was then selected. This subset was then ranked according to book-to-market ratios. The matched firm is the firm with the book-to-market ratio closest to the acquirer's ratio, based on values measured at the end of the year prior to the M&A. We chose to control for

these characteristics as small companies tend to outperform large ones, while value stocks tend to outperform growth stocks (Fama & French, 1995).

By isolating abnormal returns, we can differentiate the effects of the event or factor from broader market fluctuations and other common influences affecting all assets (Brooks, 2014). In recent finance literature, two commonly used methods for testing and measuring abnormal returns have emerged. The Cumulative Abnormal Return (CAR) approach is typically employed to assess short-term announcement effects, while the BHAR approach is commonly used to evaluate long-term abnormal returns (Brooks, 2014).

$$BHR_{it} = \prod_{t=1}^T (1 + r_{it}) - 1$$

In this equation,  $BHR_{it}$  represents the buy-and-hold return for stock  $i$  during period  $t$ , stock  $i$  being an event firm selected from the sample. By subtracting the buy-and-hold return of a matching firm from the event-firm return, we can measure the extent to which a stock's performance deviates from what would be expected during the event window (Brooks, 2014).

$$BHAR_{it} = \left[ \prod_{t=1}^T (1 + r_{it}) - 1 \right] - \left[ \prod_{t=1}^T (1 + E(r_{it})) - 1 \right]$$

Here,  $BHAR_i$  represents the buy-and-hold abnormal return for firm  $i$ . BHAR is estimated by compounding the monthly difference between the expected return of the sample firms and the return of the matching firm.

#### 4.2.1 Significance test

We apply two test statistics to test the null hypothesis that the mean long-run BHAR is zero. Following the approach outlined by MacKinlay (1997), the null hypothesis assumes that M&A announcements have no impact on BHAR during the event window. Conversely, if the t-test yields significant results, the null hypothesis is rejected in favor of the alternative hypothesis, indicating that M&A announcements

significantly influence acquirers' BHAR. The t-value is calculated using the following formula:

$$t_{\overline{BHAR}} = \sqrt{N} * \frac{\overline{BHAR}}{S_{\overline{BHAR}}}$$

Here,  $\overline{BHAR}$  represents the average buy-and-hold abnormal returns during the event window, while  $S_{\overline{BHAR}}$  denotes the standard deviation of the BHAR. Additionally, we also conduct a bootstrap t-test to account for the fact that long-horizon BHARs are positively skewed, leading to negatively biased t-statistics (Barber and Lyon, 1997).

$$t_{sa} = \sqrt{n} \left( S + \frac{1}{3} \hat{\gamma} S^2 + \frac{1}{6n} \hat{\gamma} \right),$$

Here,  $\hat{\gamma}$  is an estimate of the coefficient of skewness and  $\sqrt{n}S$  is the conventional t-statistic of the equation. We draw 1,000 bootstrapped resamples from the original sample, and for each resample, we calculate the t-test as described above.

## **5 Data and Preliminary Analysis**

### **5.1 Preliminary analysis**

By analyzing BHARs over a year, stakeholders gain a more accurate understanding of the value generated through the M&A transaction. This long-term perspective is essential for evaluating the effectiveness of the merger strategy and its impact on shareholder wealth over time. One of the key advantages of BHAR is its ability to facilitate comparative analysis and benchmarking across different M&A transactions. By calculating and analyzing BHARs for multiple deals, we can compare the performance of the merged entity against industry peers, providing an objective assessment of value creation. This comparative analysis helps stakeholders gauge the long-term sustainability and competitive advantage generated by the merger.

The market experienced a significant crash in the first quarter (Q1) of 2020 due to the pandemic, as indicated by the NASDAQ Index. However, we could observe positive and steady BHARs for the M&As during the same period. The performance of individual M&A deals is influenced by various deal-specific factors, such as strategic fit, synergies, and the execution of integration plans. Even during a market downturn, if the companies involved in the M&A deals were able to execute their strategies effectively and realize anticipated synergies, it could have led to positive BHARs. Successful integration efforts and value creation initiatives, such as cost savings or market expansion, can outweigh the negative impact of broader market conditions. Besides that, the timing of the M&A deals relative to the market downturn can also explain the positive BHARs.

Some of the analyzed deals were initiated prior to the market decline and had already progressed significantly by the first quarter of 2020. In the same path, negative BHARs could be a reflection of specific challenges faced by the companies involved in the M&A deals. These challenges may include difficulties in achieving anticipated synergies, integration issues, operational disruptions due to the pandemic, or weakened financial performance. M&A deals that encountered significant obstacles or failed to realize the expected benefits may have resulted in negative BHARs. The market turmoil during Q1 of 2020 led to tightened credit markets and reduced access to financing (Gofran et al., 2022). Companies relying

heavily on debt financing to support their M&A transactions may have faced difficulties in securing funding, resulting in negative BHARs. The limited availability of capital and higher borrowing costs may have negatively impacted the financial performance and market perception of these deals. Investors' perceptions and reactions to the pandemic may have resulted in undervaluation or mispricing of certain M&A deals, leading to negative BHARs that do not accurately reflect the intrinsic value of the underlying assets.

The steady BHARs during the studied event window could be attributed to several factors we described before that allowed companies to control their nerves and potentially thrive amidst adversity. Despite the market's significant drop in the first quarter and subsequent recovery in the third quarter, underscores the resilience and adaptability of companies in the TMT sector. The swift response of governments and central banks, the resilience of certain sectors, and the ability of companies to adapt to the changing landscape contributed to the steady BHARs observed. The market recovery in the third quarter further boosted investor sentiment and provided a favorable backdrop for M&A deals executed during that period.

## **5.2 Regression analysis**

The regression model used in this analysis considers BHAR as the dependent variable, while the independent variables are chosen based on the relevant literature discussed in section 2.4. A variable measuring the size of the deals, while not tied to any specific hypothesis, was included to provide additional explanatory power to the regression. To examine the association between the dependent variable BHAR and the event variables of interest, a regression analysis was employed. The regression model was estimated using the ordinary least squares (OLS) method, which is a widely used approach in event study research to evaluate the relationship between variables (MacKinlay, 1997).

$$BHAR_i = \alpha_i + \beta X_i + \varepsilon$$

The function  $BHAR_i$  represents the buy-and-hold abnormal return for firm  $i$ . It is determined by the sum of the intercept  $\alpha_i$ , the coefficient  $\beta$  multiplied by the independent variable  $X_i$ , and the error term  $\varepsilon$ . To comprehensively address our

research objectives, we employ multiple regression analyses with one independent variable using BHARs as the dependent variable in the analyses.

### **5.2.1 Selection of independent variable**

The first hypothesis was studied using a dummy variable to separate between event firms with event windows ending before the pandemic, and during the pandemic. The study considered the pandemic to occur on the 24th of February 2020. Thus, M&As announced more than a year prior to this date are considered to be unaffected by COVID-19, as the 1-year BHAR would not overlap with the pandemic. Conversely, M&As announced after the 24th of February 2019 would have overlapping BHARs and consequently be considered to be affected by COVID-19. This variable enables us to examine whether the pandemic has had a significant effect on the bidders' BHARs. By comparing the BHARs of these two groups, we can assess the potential impact of the pandemic on the performance of M&A deals.

The “Diversification” variable contains the relationship between the acquirers' diversification strategy and their BHARs, and aims to answer hypothesis 2. To distinguish between bidders acquiring target companies in the same sector and bidders diversifying into different sectors, a dummy variable was created using data from Zephyr. The deals in which the target's major sector and the acquirer's major sector were identical were considered related and given a value of 0, while deals involving different sectors were considered diversified and given a value of 1. The “FirmSize” variable examines the impact of firm size on the acquirers' BHARs, measured by market capitalization. The data was taken from Refinitiv and the variable reflects the market value of the firm at the end of 2018. The variable addresses hypothesis 3 and aims to explain whether the COVID-19 pandemic saw a positive relationship between firm size and the abnormal returns of acquirers. “DealSize” was also included as an independent variable, but not tied to any specific hypothesis.

The fourth hypothesis was tested using data from Zephyr regarding the method of payment. The “Payment” variable investigates the relationship between the method of payment used in the transaction (e.g., cash, stock, or a combination) and the resulting BHARs. A dummy variable was constructed by applying the value 1 to

cash payments and 0 to shares, however, most deals did not specify this variable resulting in only 25 observations. The final independent variable, “Geography”, addresses hypothesis 5 and examines how the involvement of different acquirers and target countries influences the acquirers' BHARs. This variable considers the geographical locations of the companies involved in the merger or acquisition and explores whether cross-border deals have an impact on the BHARs. Taking the acquirer country code and target country code from Zephyr, a dummy variable was constructed indicating cross-border acquisitions if the two codes match, and vice versa. Cross-border acquisitions were given a value of 1, while domestic acquisitions were given a value of 0.

### **5.3 Descriptive and summary statistics**

Table 2 summarizes the variables of the overall sample of 122 M&A transactions. In 2020, the average buy-hold abnormal return for the studied period was -0.0789, indicating a negative overall return which aligns with previous research findings indicating long-term BHARs of approximately -7% (Bruner, 2004). However, it is important to note that there was some variation in the returns, with a standard deviation of 0.5396, suggesting that individual deals exhibited differing performance within this time frame. Next, we analyzed the geographic distribution of the M&A deals. The average value of the geography variable was 0.3231, implying that the majority of the deals were concentrated in specific geographic regions within the United States.

We also considered the level of diversification within the M&A deals. The average diversification value was 0.40, suggesting a moderate level of diversification across different business segments or industries within the TMT sector. Besides that, the average payment value was 0.84, indicating that a significant proportion of the deals involved non-cash or alternative forms of payment. Lastly, we considered the impact of the COVID-19 pandemic on the M&A deals within the TMT sector. The average value of the COVID-19 variable was 0.9231, indicating that the majority of the deals were influenced by the pandemic. This is expected as there is a higher occurrence of M&A transactions after February 24th compared to before.

The following table illustrates the impact of each event variable on the acquirers' BHARs during the event windows [-7,365]. The Mean column indicate the average

BHAR by category. The Std. Dev. column represents the standard deviation, while Min. and Max. refer to the smallest and largest observations.

The rows represent the variables. “Geography” represents different countries, while "DealSize" denotes the amount acquired by the buyer. The term "FirmSize" refers to the magnitude or scale of the firm, and "Diversification" refers to deals that involve new revenue streams. The "Payment" category includes cash-bid deals and finally, the “COVID” is set as a dummy variable in the sample.

Variable	Obs	Mean	Std. Dev	Min	Max
BHAR	122	-0.0789	0.5396	-1.9142	1.2993
FirmSize	122	19,800,000,000	39,500,000,000	279,000,000	232,000,000,000
Geography	122	0.3231	0.4713	-	1.0000
DealSize	49	829,290.6000	3,277,222.0000	-	21,400,000.0000
COVID19	122	0.9231	0.2685	-	1.0000
Diversif.	122	0.4000	0.4937	-	1.0000
Payment	35	0.8400	0.3742	-	1.0000

Table 2: Summary Statistics of BHAR by Variable



## 6 Results and Main Analysis

In this section, we present the analysis and interpretation of the results obtained from the conducted tests, which aim to examine our hypotheses. Multiple tests have been performed, with a primary focus on investigating the variation of BHAR in relation to different independent variables. Additionally, tests have been conducted on subsamples to isolate and examine individual effects. We have chosen to investigate these subsamples instead of controlling for variables in multivariate regressions, as our limited sample size may hinder our ability to detect statistically significant effects in the presence of correlated variables of interest. The tests of subsamples produce results that make it easier to interpret the isolated effect.

### 6.1 Overall effects

Table 3 represents the long-term effects of M&As on the BHARs of U.S. acquirers. Throughout the two-year investigation period, the BHARs consistently show a negative trend resulting in a total decline of 7.89%, indicating that M&As in this period were value-destroying. This provides an answer to our research question, “Have mergers and acquisitions in the technology, media, and telecommunication (TMT) sector in the United States created value during the COVID-19 pandemic?”. The results suggest that M&As have not created value during the COVID-19 pandemic, which is inconsistent with Tampakoudis, et al. (2021), who found that abnormal returns were, on average, better for acquirers during the pandemic compared to before. It is however consistent with previous findings in the field of M&A, as mentioned in the previous section.

The t-test results indicate that the mean of the BHARs is estimated to be approximately -0.0789. The standard error of the mean is 0.0669, indicating the level of uncertainty associated with the estimate. The standard deviation of the BHARs is 0.5396, representing the variability of the data around the mean. The 95% confidence interval for the mean BHAR ranges from -0.2126 to 0.0548, suggesting that we can be 95% confident that the true population mean falls within this interval. The t-value is -1.1794, which measures the difference between the estimated mean and the hypothesized mean (0) relative to the variability in the data. In this case, the t-value suggests that the estimated mean is 1.1794 standard errors

away from the hypothesized mean. The degrees of freedom for the t-test is 64, which reflects the sample size minus one.

Based on the t-test results, we evaluate the null hypothesis ( $H_0$ : mean = 0) and consider alternative hypotheses. The p-value associated with the t-value allows us to assess the statistical significance of the results. In this case, the p-value for the one-sided test ( $H_1$ : mean < 0) is 0.1213, indicating that we do not have strong evidence to reject the null hypothesis. Similarly, the p-value for the two-sided test ( $H_1$ : mean  $\neq$  0) is 0.2426, suggesting that there is no significant deviation from the hypothesized mean. Finally, the p-value for the one-sided test ( $H_1$ : mean > 0) is 0.8787, indicating that we lack evidence to support the alternative hypothesis that the mean is greater than zero. Overall, the t-test results suggest that there is no strong evidence to conclude that the mean BHAR significantly deviates from zero.

	<b>Observations</b>	<b>Mean</b>	<b>Stand. error</b>	<b>Stand. Dev.</b>	<b>95% confid. Inter.</b>
<b>BHAR</b>	122	-0.0789	0.0669	0.5395	-0.2126 0.0547

Table 3: Conventional t-test

As discussed in the methodology section, there exist inherent biases associated with the conventional t-test, we therefore also employed the adjustment proposed by Lyon et al. (1999). The bootstrap t-test results indicate that the estimated coefficient is approximately -0.04599. The standard error of the coefficient is 0.04391, reflecting the level of uncertainty associated with the estimate. The z-value is -1.05, which measures the difference between the estimated coefficient and the null hypothesis (coefficient = 0) relative to the standard error. The p-value associated with the z-value is 0.295, indicating that we do not have sufficient evidence to reject the null hypothesis. This suggests that the coefficient is not significantly different from zero at the 0.05 level of significance. The 95% confidence interval for the coefficient ranges from -0.1321 to 0.0401. This interval provides a range of plausible values for the true population coefficient with 95% confidence. In summary, the bootstrap t-test results suggest that there is no significant evidence to conclude that the coefficient significantly deviates from zero.

	<b>Observed coefficient</b>	<b>Bootstrap stand. error</b>	<b>z</b>	<b>P &gt;  z </b>	<b>95% confidence interval</b>
<b>BHAR</b>	-0.0459	0.0439	-1.05	0.295	-0.1320 0.0400

Table 4: Bootstrapped t-test (Lyon et al. (1999))

Analyzing the data presented in Figure 1, it is evident that acquirers' BHARs exhibit a consistent negative trend throughout the entire sample period. The decline in BHARs initiates gradually and intensifies around trading day 70, approximately in the middle of April 2019. This downward trend persists until trading day 350, marking the end of May 2020. However, following this period, there is a slight upward movement in BHARs observed during the remaining 150 trading days.

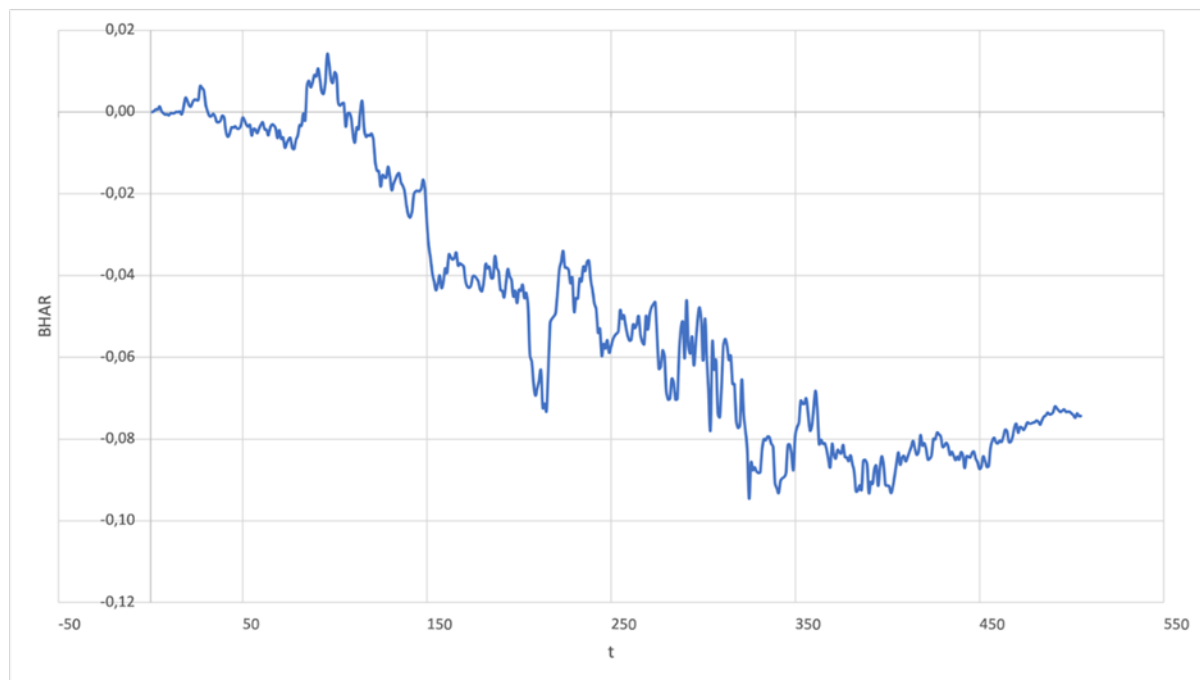


Figure 1: Acquirer BHARs across 502 trading days

## 6.2 Person Correlation Matrix

The correlation analysis below allows for the measurement of the relationship between variables involved in the M&A. A correlation coefficient of 1 represents a perfect positive correlation, -1 represents a perfect negative correlation, and 0 represents no correlation.

Firstly, we observed a weak positive correlation of 0.0508 between “BHAR” and “FirmSize”. Although the correlation is statistically significant due to the sample size, the magnitude of the correlation suggests a relatively weak relationship. This finding indicates that larger firms tend to have slightly higher long-term returns. Additionally, there is a weak negative correlation of -0.1652 between “Geography” and “DealSize”. This correlation coefficient, although statistically significant, indicates a relatively modest relationship. The negative correlation suggests that larger deals may be less common in certain geographic regions. This observation could be influenced by a variety of factors, including regulatory environments, cultural differences, or industry dynamics specific to those regions. It implies that the characteristics and opportunities associated with different geographic locations can impact the size and frequency of mergers and acquisitions, thus influencing long-term returns.

Besides that, “COVID19” shows a weak positive correlation of 0.0993 with “FirmSize”. This statistically significant correlation suggests that the impact of the COVID-19 pandemic on long-term returns may have been more pronounced for larger firms. This finding implies that larger companies may have faced greater challenges or opportunities due to the pandemic, which in turn affected their long-term performance. Conversely, “COVID19” has a weak negative correlation of -0.1287 with “Payment”. This correlation coefficient indicates that companies that made larger payments during the merger or acquisition process may have experienced a relatively lower impact from the pandemic.

“Diversification” exhibits a weak positive correlation of 0.0306 with “BHAR”. This statistically significant but modest correlation suggests that companies with higher levels of diversification may have experienced slightly better long-term returns. However, “Diversif.” also has a weak negative correlation of -0.1408 with “Payment”. This finding implies that diversification efforts may have been associated with lower payment amounts during the transaction. These correlations highlight the complex relationship between diversification strategies and financial outcomes in the context of mergers and acquisitions. Further analysis and consideration of other relevant factors are necessary to fully understand the implications and potential causality of these relationships.

	BHAR	FirmSize	Geograf	DealSize	COVID19	Diver.	Paymt
BHAR	1.0000						
FirmSize	0.0508	1.0000					
	0.6997						
Geography	-0.0840	-0.0055	1.0000				
	0.5057	0.9667					
DealSize	0.0524	0.3211	-0.1652	1.0000			
	0.6786	0.0124	0.1885				
COVID19	-0.0112	0.0993	0.0760	0.0654	1.0000		
	0.9296	0.4503	0.5475	0.6045			
Diversif.	0.0306	0.2384	0.1074	0.0690	-	1.0000	
	0.8085	0.0666	0.3943	0.5849	1.0000		
Payment	-0.1885	-0.1408	0.1905	-0.1853	-0.1287	0.0655	1.0000
	0.3669	0.5019	0.3618	0.3752	0.5398	0.7558	

Table 5: Pearson Correlation Matrix

### 6.3 Determinants for BHARs

The following section presents the findings regarding the influence of various determinants on the acquirer's long-term BHARs. Several regression analyses have been conducted on the 1-year BHARs using five different models, each incorporating the specific independent variables discussed earlier. The regression analyses incorporated 95% confidence intervals to assess the statistical significance of the results (see the regressions in the appendix).

The first regression analysis revealed that the coefficient for the independent variable “COVID19” was -0.0225 (p-value = 0.93), indicating a non-significant relationship with BHAR. This conflicts with our common assumption that the COVID-19 pandemic had a direct impact on abnormal returns. It could also suggest that the variable failed to capture the effect of the pandemic, or that other factors may have overshadowed the influence of COVID-19 on BHAR during the analyzed period. The second regression showed a coefficient of 0.0000 (p-value = 0.5820) for “DealSize”, indicating a non-significant relationship with BHAR. This finding challenges the notion that the size of a deal, in terms of its monetary value or

magnitude, directly translates into abnormal returns. This is not surprising as we did not assume the size of the deal to have a noticeable effect on the BHARs.

The third regression revealed a coefficient of 0.0335 (p-value = 0.8090) for “Diversification”, suggesting a non-significant relationship with BHAR. The commonly held belief that diversifying a firm's portfolio across various assets or markets leads to more favorable abnormal returns is not observable in this case. The fourth regression indicated a coefficient of 0.0000 (p-value = 0.7000) for “FirmSize”, signifying a non-significant relationship with BHAR. This opposes the conventional belief that larger firms, by virtue of their resources or market power, would generate higher abnormal returns.

The fifth regression showed a coefficient of -0.0962 (p-value = 0.506) for “Geography”, implying a non-significant relationship with BHAR. This finding challenges the notion that firms operating in different regions or countries would experience varying abnormal returns due to location-specific factors. The final regression yielded a coefficient of -0.2899 (p-value = 0.367), indicating a non-significant relationship between “Payment” and BHAR. The assumption that the method of payment, such as cash or stock, has a direct influence on abnormal returns is challenged here.

Overall, based on the results of these regression analyses, none of the independent variables (“COVID19”, “DealSize”, “Diversification”, “FirmSize”, “Geography”, “Payment”) showed a statistically significant relationship with BHAR. It is advisable to consider other/more variables and factors to capture the impacts on BHAR to gain a more comprehensive understanding of the relationships.

## **7 Conclusion**

This study examined 65 M&As in the TMT sector in the U.S. during the COVID-19 pandemic. The findings indicate that these M&A deals experienced a buy-hold abnormal return of -7.89%. The negative abnormal return suggests that, on average, the M&A deals in the TMT sector in the U.S. during the COVID-19 pandemic had a negative impact on long-term shareholder value. This indicates that investors faced losses or underperformance following these transactions, consistent with past findings. The COVID-19 pandemic likely played a crucial role in driving the observed negative abnormal returns. The unprecedented global health crisis disrupted various industries, including the technology, media, and telecommunication sectors. These findings highlight the challenges and risks associated with M&A activity during times of significant market disruptions, such as the COVID-19 pandemic. Although our analysis reveals negative abnormal returns for acquiring companies, the t-test results indicate that these returns are not statistically significant. This suggests that there is insufficient evidence to conclude that the mean BHAR significantly deviates from zero.

To address certain considerations regarding this study, it is important to note that our examination of BHARs was specifically focused on the U.S. TMT sector. Therefore, caution should be exercised when attempting to generalize our findings to other sectors. Additionally, it is worth mentioning that listed companies, which were the focus of our analysis, typically represent larger entities, and therefore, the results may not accurately reflect the dynamics of non-listed firms. Lastly, it is crucial to acknowledge that this study may be susceptible to biases related to the calculation of BHARs. Our approach, which involves the use of comparable firms, may not fully account for certain risk factors, potentially introducing some limitations to the analysis.

There are many unexplored aspects relating to the pandemic, and for future research we suggest delving deeper into the specific factors and dynamics that led to the observed negative abnormal returns. Additionally, exploring the impact of industry-specific variables, management decisions, and market conditions on M&A performance during the pandemic could provide further insights into the nuances of this particular sector.

## 8 References

Altin, H. (2015). EFFICIENT MARKET HYPOTHESIS, ABNORMAL RETURN AND ELECTION PERIODS. *European Scientific Journal, ESJ*, 11(34). <https://eujournal.org/index.php/esj/article/view/6726>

Bain & Company, Kumar, S., Galligan, S., Harding, D., & Vorobyov, A. (2022). *Global M&A Report 2022*. Bain & Company. [https://www.bain.com/globalassets/noindex/2022/bain\\_report\\_global\\_m\\_and\\_a-report-2022.pdf](https://www.bain.com/globalassets/noindex/2022/bain_report_global_m_and_a-report-2022.pdf)

Barber, B. M., & Lyon, J. D. (1997). Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics*, 43(3), 341–372. [https://doi.org/10.1016/S0304-405X\(96\)00890-2](https://doi.org/10.1016/S0304-405X(96)00890-2)

Berk, J. B., & DeMarzo, P. M. (2020). *Corporate finance (Fifth edition, global edition)*. Pearson.

Betton, S., Eckbo, B. E., & Thorburn, K. S. (2008). *Corporate Takeovers* (SSRN Scholarly Paper No. 1131033). <https://papers.ssrn.com/abstract=1131033>

Bris, A., Brisley, N., & Cabolis, C. (2008). Adopting better corporate governance: Evidence from cross-border mergers. *Journal of Corporate Finance*, 14(3), 224–240. <https://doi.org/10.1016/j.jcorpfin.2008.03.005>

Brooks, C. (2014). *Introductory econometrics for finance (Third edition)*. Cambridge University Press.

Bruner, R. (2004). Does M&A Pay? A Survey of Evidence for the Decision-maker. *Journal of Applied Finance*, 12.

Chatterjee, S. (1986). Types of synergy and economic value: The impact of acquisitions on merging and rival firms. *Strategic Management Journal*, 7(2), 119–139. <https://doi.org/10.1002/smj.4250070203>



Christofferson, S. A., McNish, R. S., & Sias, D. L. (2004, May 1). Where mergers go wrong. <https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/where-mergers-go-wrong>

Cogman, D. (2014). Global M&A: Fewer deals, better quality. *McKinsey on Finance*; no. 50 (Spring 2014): 23–25.  
<https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/global-m-and-a-fewer-deals-better-quality>

Datta, T. (2022, April 28). Activision Blizzard shareholders approve \$68.7 bln Microsoft deal. Reuters. <https://www.reuters.com/technology/activision-blizzard-shareholders-approve-687-bln-microsoft-deal-2022-04-28/>

DePamphilis, D. M. (2022). *Mergers, acquisitions, and other restructuring activities: An integrated approach to process, tools, cases, and solutions* (Eleventh edition). Academic Press, an imprint of Elsevier.

Dong, M., Hirshleifer, D., Richardson, S., & Teoh, S. H. (2006). Does Investor Misvaluation Drive the Takeover Market? *The Journal of Finance*, 61(2), 725–762.

Eckbo, B. E., & Norli, Ø. (2005). Liquidity risk, leverage and long-run IPO returns. *Journal of Corporate Finance*, 11(1–2), 1–35.  
<https://doi.org/10.1016/j.jcorpfin.2004.02.002>

Eckbo, B. E., & Thorburn, K. S. (2000). Gains to Bidder Firms Revisited: Domestic and Foreign Acquisitions in Canada. *The Journal of Financial and Quantitative Analysis*, 35(1), 1–25. <https://doi.org/10.2307/2676236>

Fama, E. F. (1970). EFFICIENT CAPITAL MARKETS: A REVIEW OF THEORY AND EMPIRICAL WORK\*. *The Journal of Finance*, 25(2), 383–417.  
<https://doi.org/10.1111/j.1540-6261.1970.tb00518.x>

Fama, E. F. (1991). Efficient Capital Markets: II. *The Journal of Finance*, 46(5), 1575–1617. <https://doi.org/10.1111/j.1540-6261.1991.tb04636.x>

Fama, E. F., & French, K. R. (1995). Size and Book-to-Market Factors in Earnings and Returns. *The Journal of Finance*, 50(1), 131–155.  
<https://doi.org/10.1111/j.1540-6261.1995.tb05169.x>

Ferris, S. P., & Park, K. (2001). How Different is the Long-Run Performance of Mergers in the Telecommunications Industry? *SSRN Electronic Journal*.  
<https://doi.org/10.2139/ssrn.262388>

Flanagan, D. J. (1996). Announcements of purely related and purely unrelated mergers and shareholder returns: Reconciling the relatedness paradox. *Journal of Management*, 22(6), 823–835. [https://doi.org/10.1016/S0149-2063\(96\)90038-0](https://doi.org/10.1016/S0149-2063(96)90038-0)

Fuller, K., Netter, J., & Stegemoller, M. (2002). What Do Returns to Acquiring Firms Tell Us? Evidence from Firms That Make Many Acquisitions. *The Journal of Finance*, 57(4), 1763–1793. JSTOR.

Gupta, I., Mishra, N., & Tripathy, N. (2021). The Impact of Merger and Acquisition on Value Creation: An Empirical Evidence. In B. Alareeni, A. Hamdan, & I. Elgedawy (Eds.), *The Importance of New Technologies and Entrepreneurship in Business Development: In The Context of Economic Diversity in Developing Countries* (pp. 1435–1456). Springer International Publishing. [https://doi.org/10.1007/978-3-030-69221-6\\_107](https://doi.org/10.1007/978-3-030-69221-6_107)

Hansen, R. G. (1987). A Theory for the Choice of Exchange Medium in Mergers and Acquisitions. *The Journal of Business*, 60(1), 75–95.

Harford, J., Humphery-Jenner, M., & Powell, R. (2012). The sources of value destruction in acquisitions by entrenched managers. *Journal of Financial Economics*, 106(2), 247–261. <https://doi.org/10.1016/j.jfineco.2012.05.016>

Hassan, M. K., & Alhenawi, Y. (2022). Can information asymmetry explain both the post-merger value and the announcement discount in M&As? *International Review of Economics & Finance*, 77, 222–243.  
<https://doi.org/10.1016/j.iref.2021.09.009>

Jaber, B., & Spiegel, B. (2023, January 2). Global M&A Trends in Technology, Media and Telecommunications: 2023 Outlook. PwC.

<https://www.pwc.com/gx/en/services/deals/trends/telecommunications-media-technology.html>

Jansen, I., Sanning, L., & Stuart, N. (2013). On the relation between the relative size of acquisitions and the wealth of acquiring firms. *Applied Economics Letters*, 20. <https://doi.org/10.1080/13504851.2012.718056>

Jope, F., Schiereck, D., & Zeidler, F. (2010). Value Generation of Mergers and Acquisitions in the Technology, Media and Telecommunications Industry. *Journal of Telecommunications Management*, 2.

Kengelbach, J., Gell, J., Keienburg, G., Degen, D., & Kim, D. (2020, July 17). COVID-19's Impact on Global M&A. BCG Global.

<https://www.bcg.com/publications/2020/covid-impact-global-mergers-and-acquisitions>

Kumar, B. R. (2019). Vodafone Acquisition of Mannesmann. In B. R. Kumar, *Wealth Creation in the World's Largest Mergers and Acquisitions* (pp. 17–29). Springer International Publishing. [https://doi.org/10.1007/978-3-030-02363-8\\_2](https://doi.org/10.1007/978-3-030-02363-8_2)

Loughran, T., & Vijh, A. M. (1997). Do Long-Term Shareholders Benefit From Corporate Acquisitions? *The Journal of Finance*, 52(5), 1765–1790.

<https://doi.org/10.1111/j.1540-6261.1997.tb02741.x>

Lubatkin, M. (1983). Mergers and the Performance of the Acquiring Firm. *The Academy of Management Review*, 8(2), 218. <https://doi.org/10.2307/257748>

Lyon, J. D., Barber, B. M., & Tsai, C.-L. (1999). Improved Methods for Tests of Long-Run Abnormal Stock Returns. *The Journal of Finance*, 54(1), 165–201. JSTOR.

MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, 35(1), 13–39. JSTOR.

Matsusaka, J., & Akbulut, M. (2010). 50+ Years of Diversification Announcements. *The Financial Review*, 45, 231–262.  
<https://doi.org/10.1111/j.1540-6288.2010.00245.x>

McKinsey and Company, Koller, T., Goedhart, M. H., & Wessels, D. (Eds.). (2020). *Valuation: Measuring and managing the value of companies* (Seventh edition). Wiley.

Mitchell, M. L., & Stafford, E. (2000). Managerial Decisions and Long-Term Stock Price Performance. *The Journal of Business*, 73(3), 287–329.  
<https://doi.org/10.1086/209645>

Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (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>

Moeller, S., Schlingemann, F., & Stulz, R. (2003). Do shareholders of acquiring firms gain from acquisitions? (No. w9523; p. w9523). National Bureau of Economic Research. <https://doi.org/10.3386/w9523>

Morck, R., Shleifer, A., & Vishny, R. W. (1990). Do Managerial Objectives Drive Bad Acquisitions? *The Journal of Finance*, 45(1), 31–48.  
<https://doi.org/10.2307/2328808>

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187–221. [https://doi.org/10.1016/0304-405X\(84\)90023-0](https://doi.org/10.1016/0304-405X(84)90023-0)

Nguyen, H., Yung, K., & Sun, Q. (2012). Motives for Mergers and Acquisitions: Ex-Post Market Evidence from the US. *Journal of Business Finance & Accounting*, 39, 1357–1375. <https://doi.org/10.1111/jbfa.12000>

Park, M.-C., Yang, D.-H., Nam, C., & Ha, Y.-W. (2002). Mergers and Acquisitions in the Telecommunications Industry: Myths and Reality. *ETRI Journal*, 24(1), 56–64. <https://doi.org/10.4218/etrij.02.0102.0106>

Renneboog, L., & Vansteenkiste, C. (2019). Failure and success in mergers and acquisitions. *Journal of Corporate Finance*, 58, 650–699. <https://doi.org/10.1016/j.jcorpfin.2019.07.010>

Rhodes-Kropf, M., & Robinson, D. T. (2008). The Market for Mergers and the Boundaries of the Firm. *The Journal of Finance*, 63(3), 1169–1211. <https://doi.org/10.1111/j.1540-6261.2008.01355.x>

Roll, R. (1986). The Hubris Hypothesis of Corporate Takeovers. *The Journal of Business*, 59(2), 197–216. JSTOR.

Schlingemann, F., & Moeller, S. (2002). Are Cross-Border Acquisitions Different from Domestic Acquisitions? Evidence on Stock and Operating Performance for U.S. Acquirers. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.311543>

Schumpeter, J. A. (1950). *Capitalism, socialism and democracy*. Routledge.

Seelye, N., Ziegler, P., & Routh, B. (2021). The Stability of the U.S. Commercial Banks During the COVID-19 Pandemic: Impacts and Implications from Regulator and Management Decisions.

Seiler, C. (2022, February 4). Technology, media, and telecom M&A skyrocketed in 2021. <https://advisory.kpmg.us/articles/2022/tmt-m-a-skyrocket-2021.html>

Shleifer, A., & Vishny, R. W. (2003). Stock market driven acquisitions. *Journal of Financial Economics*, 70(3), 295–311. [https://doi.org/10.1016/S0304-405X\(03\)00211-3](https://doi.org/10.1016/S0304-405X(03)00211-3)

Tampakoudis, I., Noulas, A., Kiosses, N., & Drogalas, G. (2021). The effect of ESG on value creation from mergers and acquisitions. What changed during the COVID-19 pandemic? *Corporate Governance: The International Journal of Business in Society*, 21(6), 1117–1141. <https://doi.org/10.1108/CG-10-2020-0448>

The Investopedia Team, & Mansa, J. (2022, September 30). How Netflix Is Changing the TV Industry. Investopedia.  
<https://www.investopedia.com/articles/investing/060815/how-netflix-changing-tv-industry.asp>

Trautwein, F. (1990). Merger motives and merger prescriptions. *Strategic Management Journal*, 11(4), 283–295. <https://doi.org/10.1002/smj.4250110404>

Valetkevitch, C. (2018, September 24). A close-up of Wall St's new S&P 500 communication services sector. <https://www.reuters.com/article/usa-stocks-gics/a-close-up-of-wall-sts-new-sp-500-communication-services-sector-idUKL2N1W61WT>

Walker, K. (2020, September 29). Merge And Destroy? Forbes.  
<https://www.forbes.com/sites/karenwalker/2020/09/29/merge-and-destroy/>

United Nations (2021). The impact of the pandemic on industries. A conceptual map and key processes. *Inclusive and Sustainable Industrial Development Working Paper Series WP 17 | 2021*.

Wiley, R. (2020, January 28). How Technology Is Driving M&A In TMT And Other Industries. Forbes.  
<https://www.forbes.com/sites/forbestechcouncil/2020/01/28/how-technology-is-driving-ma-in-tmt-and-other-industries/>

## 9 Appendix

### Appendix 1: Regression 1 (COVID-19)

Source	SS	df	MS	Number of obs	=	65
Model	<b>.002329885</b>	<b>1</b>	<b>.002329885</b>	F(1, 63)	=	<b>0.01</b>
Residual	<b>18.6299369</b>	<b>63</b>	<b>.295713285</b>	Prob > F	=	<b>0.9296</b>
				R-squared	=	<b>0.0001</b>
				Adj R-squared	=	<b>-0.0157</b>
Total	<b>18.6322668</b>	<b>64</b>	<b>.291129169</b>	Root MSE	=	<b>.5438</b>

BHAR	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
COVID19	<b>-.0224679</b>	<b>.2531229</b>	<b>-0.09</b>	<b>0.930</b>	<b>-.5282937</b>	<b>.4833578</b>
_cons	<b>-.05819</b>	<b>.2431926</b>	<b>-0.24</b>	<b>0.812</b>	<b>-.5441717</b>	<b>.4277917</b>

### Appendix 2: Regression 2 (Diversification)

Source	SS	df	MS	Number of obs	=	65
Model	<b>.017498785</b>	<b>1</b>	<b>.017498785</b>	F(1, 63)	=	<b>0.06</b>
Residual	<b>18.614768</b>	<b>63</b>	<b>.295472508</b>	Prob > F	=	<b>0.8085</b>
				R-squared	=	<b>0.0009</b>
				Adj R-squared	=	<b>-0.0149</b>
Total	<b>18.6322668</b>	<b>64</b>	<b>.291129169</b>	Root MSE	=	<b>.54357</b>

BHAR	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
Diversification	<b>.033492</b>	<b>.1376247</b>	<b>0.24</b>	<b>0.809</b>	<b>-.2415289</b>	<b>.308513</b>
_cons	<b>-.0923264</b>	<b>.0870415</b>	<b>-1.06</b>	<b>0.293</b>	<b>-.2662649</b>	<b>.0816121</b>

### Appendix 3: Regression 3 (Firm Size)

Source	SS	df	MS	Number of obs	=	60
Model	<b>.036988863</b>	<b>1</b>	<b>.036988863</b>	F(1, 58)	=	<b>0.15</b>
Residual	<b>14.2765388</b>	<b>58</b>	<b>.246147221</b>	Prob > F	=	<b>0.6997</b>
				R-squared	=	<b>0.0026</b>
				Adj R-squared	=	<b>-0.0146</b>
Total	<b>14.3135277</b>	<b>59</b>	<b>.242602164</b>	Root MSE	=	<b>.49613</b>

BHAR	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
FirmSize	<b>6.34e-13</b>	<b>1.64e-12</b>	<b>0.39</b>	<b>0.700</b>	<b>-2.64e-12</b>	<b>3.91e-12</b>
_cons	<b>-.0712039</b>	<b>.0718017</b>	<b>-0.99</b>	<b>0.325</b>	<b>-.2149306</b>	<b>.0725229</b>

Appendix 4: Regression 4 (Method of Payment)

Source	SS	df	MS	Number of obs	=	25
Model	.282539469	1	.282539469	F(1, 23)	=	0.85
Residual	7.67119942	23	.33353041	Prob > F	=	0.3669
				R-squared	=	0.0355
				Adj R-squared	=	-0.0064
Total	7.95373889	24	.331405787	Root MSE	=	.57752

BHAR	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
Payment	-.2899813	.3150635	-0.92	0.367	-.9417397	.3617772
_cons	.1239356	.2887605	0.43	0.672	-.4734109	.7212821

Appendix 5: Regression 5 (Geography)

Source	SS	df	MS	Number of obs	=	65
Model	.131581725	1	.131581725	F(1, 63)	=	0.45
Residual	18.5006851	63	.293661668	Prob > F	=	0.5057
				R-squared	=	0.0071
				Adj R-squared	=	-0.0087
Total	18.6322668	64	.291129169	Root MSE	=	.54191

BHAR	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
Geography	-.0962096	.143729	-0.67	0.506	-.3834291	.1910098
_cons	-.0478465	.0816953	-0.59	0.560	-.2111016	.1154086