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COVID-19's Impact on the European M&A Environment

A study about acquirers' short-term performance

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Abstract

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Key words: Abnormal Returns, Cumulative Abnormal Returns (CARs), COVID-19, Merger and Acquisitions (M&As), bidders/acquirers, targets.

Purpose: The main purpose of this study is to examine how the short-term performance of European acquirers, following M&A announcements, has been affected by the COVID-19 pandemic. In addition, this study also aims to examine how diversifying M&As have been affected, and whether acquirers' firm value demonstrated a positive relationship with CARs during the pandemic.

Methodology: This study applies a quantitative approach using a deductive method. An event study methodology was used to obtain acquirers CARs. Thereafter, a regression analysis studied its relationship with the selected event variables of interest.

Theoretical perspective: A literature review covering relevant financial concepts, combined with previous empirical studies analyzing acquirers performance in association with M&As, constituted the theoretical framework of this study.

Empirical foundation: The sample consisted of 918 M&As announced between 2016-01-01 and 2020-12-31. All transactions solely involved European companies, where all acquiring firms were publicly traded. The empirical data was extracted from Zephyr and Datastream.

Conclusion: M&As announced between 2016 and 2020 demonstrated significantly positive effects on acquiring firms shareholder wealth. Announcements made before COVID-19 yielded positive CARs, statistically significant at a 1%-level for both the short (3 days) and long (11days) event windows, at 0.586 percent and 1.459 percent respectively. On the contrary, announcements made during the pandemic demonstrated insignificantly negative returns. However, due to low statistical significance in the regression analysis, this study fails to properly demonstrate which factors contributed to this effect.

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1. INTRODUCTION

Section 1 provides a brief background concerning the topic of this study. Then, the problem discussion elaborates on why the topic was considered important to address, followed by a presentation of this study's purpose and research questions. Conclusively, an explanation about the overall disposition of study is provided.

1.1 Background

In December of 2019 people in Wuhan City, China, started to fall ill from some sort of pneumonia with an unknown etiology cause (WHO, 2020). Soon after, what became known as the COVID-19 virus, started to spread throughout the whole world. The first case reported in Europe appeared on the 24th of January 2020, in France (ECDC, 2021). Soon after, the virus took root in more countries, and the pandemic was inevitable. As a result, wide-spread fear and uncertainty triggered a global economic crisis. During the first quarter of 2020 the MSCI All Country World Index (ACWI)¹ experienced a decline of more than 30% in less than one month, illustrating a wide pessimism among investors towards future outlooks of the market. In response to COVID-19, both the European Union (EU) and governments in European countries deployed unprecedented policy interventions to mitigate the economic downturn caused by the pandemic.

What separates the effects induced by COVID-19 from the previous financial crisis is its multifaceted impact on different sectors. In a study investigating how the pandemic has affected industries within the European region, companies most extensively affected by COVID-19 operate in sectors heavily dependent on human interaction and tourism (for example aerospace, cultural, hotels, restaurants etc., de Vet, et al., 2021). Furthermore, sectors characterized by reliance on international value chains were also significantly impacted, since the global movements of goods became significantly hampered in the wake of COVID-19's initial impact. In Europe, according to the IMF (2020), small and medium sized enterprises (SMEs) have generally suffered most from

¹ The MSCI All-Country World Index (ACWI) includes large and mid-cap representation from 23 developed markets and 27 emerging markets, covering approximately 85% of the global investable equity opportunity set (MSCI ACWI, 2021).

COVID-19 as they are frequently common in contact-intensive sectors. In addition, public policies aimed to mitigate the economic downturn caused by COVID-19 have thus far ended up benefitting large companies to a greater extent. Interestingly, however, is that the pandemic has simultaneously accelerated digitalization on a societal level, thus generally benefiting company's operating in digital sectors.

Given the dispersive effects on sectors entailed by the pandemic, combined with abundant liquidity in financial markets and remarkably low interest rates, current macroeconomic circumstances in Europe have never been observed before (IMF, 2020). A new economic climate brought on by the virus has led to many speculations regarding the actual effect of COVID-19 on the stock markets. Undoubtedly, new patterns and relationships amongst the actors within each market may have appeared. It invites new studies, as the knowledge gap has developed and what has been previously known or assumed regarding the behavior of stock markets may have changed and needs to be explored once again. A common subject within the literature of corporate finance is that of mergers and acquisitions (M&As). M&As are often affected by the overall financial climate on the stock markets. Given the new climate, M&As behavior has undoubtedly changed as well. Investigating how it has affected the European M&A environment, especially acquiring firms utilizing M&As as part of their corporate strategy, could therefore help bridge current knowledge gaps.

M&As has for a long period of time constitute crucial corporate activities, utilized to enhance growth, and improve organizational competitive strengths. Unlike most other strategic options available, successful M&As possess the opportunity to significantly improve the growth probabilities of acquiring firms (Gaughan, 2007). Historically, the frequency of M&A activity has occurred in waves of varying intensity (Town, 1992; Ahern and Harford, 2013), but has over the last decades experienced significant growth in both the number of deals and transaction value. Between the years of 1990 and 2019 the aggregated value of transactions within the European M&A market grew from approximately 255 billion to 991 billion USD (IMMA, 2021), illustrating

the growing tendency among European companies to execute M&A transactions as part of corporate restructuring strategies.

M&As are motivated by the proposed synergistic gains arising from the merging entities (Chatterjee, 1986). How M&As affected acquiring firms returns are influenced by many different variables, a fact that has over time received considerable academic attention (see for example Kaplan & Weisbach, 1992; Bae et al., 2002; Moeller, Schlingemann and Stultz, 2004; Danbolt and Maciver, 2012; Jansen et al., 2013; Tampakoudis, et al., 2021). So far, however, very little is known about what effect COVID-19 has induced on the relationship between M&As and acquirers' performance.

1.2 Problem Discussion

The initial impact of COVID-19 on the world economy was at a scale never experienced before in recent history. All industries have been affected in one way or another, giving rise to the argument of COVID-19 being the latest out of several economic and financial crises causing a great recession. In 2020, the negative impact of the pandemic on financial markets were, initially, at a greater scale than that of the great recession. However, at year end, most of the larger stock markets had managed to turn the negative trend around, and obtain remarkably high returns (IMF, 2020). Some may argue this to be due to the extensive financial stimulus packages that were distributed by most countries' governments, towards their industries and respective companies. Nonetheless, it is safe to assume that COVID-19 is a rather unusual phenomenon, and its repercussions are yet to be fully explored. The long-term consequences of the COVID-19 pandemic are difficult to analyze, given that, at the writing of this text, most countries are still preoccupied with vaccinating the public and generally deal with the virus. Therefore, exploring the long-term implications of the virus are not yet reliably possible. However, one may start to analyze the direct and short-term implications of a virus that has affected the entire globe.

Moreover, the literature of M&As are both extensive and diverse. Generally, the research question that has been generously investigated by academics regards whether M&As, as a restructuring

strategy, are able to generate and create shareholder value for the investors. Articles such as Moeller, Schlingemann and Stultz (2004) and Bhagat et al. (2005), Bouwman et al. (2009), Wang and Xie (2009), and Ahn et al. (2010) all report conflicting evidence that suggest either positive, negative, or insignificant results. Therefore, it is fair to say that the literature is still split on the question of whether M&As ensure increased shareholder wealth. The results also differ depending on which side of the M&A transaction you study, namely the bidder (i.e., acquirer) or the target. Mulherin et al. (2017) manages to conclude in their literature review that on average, targets appear to gain from M&As, while for bidders the results are greatly divided and dependent. Furthermore, there is one further distinction one can make when studying the performance of bidders and targets. That is studying short-term or long-term performance. Generally, by performance one refers to abnormal returns and it is argued that shareholder wealth is increased if positive returns are obtained and decreased if bidder or target yield negative abnormal returns. Factors that impact these abnormal returns are often studied using regression analysis. For short-term performance, cumulative abnormal returns (CARs) are often applied as dependent variable in the regression analysis, and factors such as whether the M&A is related or diversified (see Renneboog and Vansteenkiste, 2019), local or a cross-border deal (see Eckbo and Thorburn, 2000), method of payment for the M&A (see Travlos, 1987) and bidders and targets' firm size (see Jansen, Sanning and Stuart, 2013) are often used as either independent or control variables.

As mentioned above, the literature has already extensively studied CARs earned from M&As and its impact on shareholder wealth, generally. However, given the global impact of COVID-19 on the world's financial and corporate markets, it is strange that there exist few studies today that incorporate present research of M&As and apply it to the subject. Tampakoudis, et al. (2021) study is unique in that it investigates U.S bidders and targets' CARs during COVID-19 but specifically whether ESG investments have led to increased or decreased shareholder wealth during the pandemic, as compared to before. We believe that there still remain many unanswered questions regarding COVID-19's effect on the market of M&As. For example, is it reasonable to assume that larger bidders, that are less financially constrained, have fared better during the harsh economic climate brought by the virus, regarding CARs? Moreover, has COVID-19 changed the effect or the relationship of the factors that are often used as independent variables to explain CARs

earned from M&As? Lastly, and most notably, have the pandemic resulted in bidders achieving better or worse CARs, and subsequently increased or decreased shareholder value? According to Tampakoudis, et al. (2021), abnormal returns was, on average, better for bidders during COVID-19, as compared to before. However, these findings are exclusive to the U.S market of M&As. What would the result be if one were to study another region often cited in the literature, namely Europe? The governments of Europe have also extensively offered their industries and companies aid during the outbreak of COVID-19, in the form of financial stimulus packages (IMF, 2021). Furthermore, albeit not as impressive, the European stock markets have also portrayed a rapid growth throughout just one year, like that of the U.S (ibid). Therefore, it is of interest to analyse whether the results of Tampakoudis, et al. (2021) also might be applied to that of European bidders.

To contribute to the literature of M&As, we supply a study that investigates the effect of COVID-19 as we deem it to be a highly relevant subject and contribution for those who wish to learn more about the impact of the latest global financial crisis. Moreover, to differentiate our sample from that of Tampakoudis, et al. (2021), we study the effect of COVID-19 using a large sample of 918 European M&As. Since IMF (2020) reports that SMEs have feared the worst during COVID-19, while larger firms might have gained, we specifically study the CARs obtained by bidders for a period of before and during the pandemic, to investigate the short-term performance and, subsequently, the impact on shareholder wealth. Our findings may thus, also be of interest to investors of the European stock market, that stands to possibly gain an informational advantage out of the findings of this thesis.

1.3 Purpose and Research Question

The main purpose of this study is to examine how the short-term performance of European acquirers, following M&A announcements, has been affected by the COVID-19 pandemic. In addition, this study also aims to examine if the relationship of diversified M&As have been affected, and whether acquirers' firm value have shown a positive relationship with CARs during the pandemic. To do so, this study sought to obtain data which could address the topics of interest stated below:

1. In what way have acquirers' CARs following M&A announcements been affected by COVID-19?
2. Has the relationship of diversified M&As been affected by COVID-19?
3. Did acquirers' CARs demonstrate a positive relationship with firm size during COVID-19?

1.4 Disposition

The disposition of this thesis is as follows. In section **2**, the authors present an extensive literature review regarding the subject and the general theories and hypotheses that have been attributable towards explaining the behavior of M&As. This is followed by section **3**, where we present previous empirical evidence regarding the performance of bidders in M&As as well as the factors that are argued to affect this performance. Section **3** ends with a presentation of the three hypotheses of this thesis. In section **4** we discuss the methodology applied for the study, as well as a description of the sample data and a first presentation of our variables used for the event study and following regression analysis. Section **5** displays the results along with an analysis of the event study and regression analysis. An interpretation of the results and its implications on our hypotheses are also present in this section. In section **6** we present a discussion of the findings as well as a proposal for future research. Lastly, in section **7** we conclude this study and summarize the results and discussion.

2. LITERATURE REVIEW

Section 2 constitutes the theoretical foundation of this study. The literature review aims to present relevant theoretical concepts and definitions that are necessary to grasp to understand the arguments presented in the following sections.

2.1 Definitions of Mergers and Acquisitions

Mergers and acquisitions (henceforth written as “M&As”) constitute an important corporate activity and have received extensive academic attention. Each terminological component, “merger” and “acquisition”, have slightly different meanings but will be used interchangeably throughout this paper.

An acquisition occurs when a purchasing company uses a combination of securities and cash to obtain control over 50% of another company’s (henceforth the “target”) outstanding shares (Junni & Teerikangas, 2019). In a merger deal, however, companies combine and form one entity. Typically, one entity ceases to exist officially following the transaction, preceded by a transfer of assets and liabilities to the other party (Gaughan, 2007). The major difference between a merger and acquisition is therefore that an acquisition is not necessarily accompanied by entities ceasing to exist officially, or the quest of establishing equal ownership.

2.2 Motives for M&As

There are several factors which motivate M&A activities. Successful M&As have the potential to increase acquirers’ growth probability significantly and have for long been utilized to enhance companies’ competitive strengths (Porter, 1987). In addition to organic growth M&As offers alternative expansion opportunities for acquiring firms, motivated by arising synergies and benefits from merging different entities. The concept of synergies originally stems from natural sciences, meaning that two elements work more efficiently together than they do on their own (Mee, 1965). In a corporate context, the terminology has a similar meaning, but instead revolves around economic motives emerging from improved efficiency (Trautwein, 1990).

There are different synergetic motives underpinning M&As. Financial synergies implies that merging entities could improve firm value through cost-based synergies, or enhanced revenue drivers (Chatterjee, 1986). Combining complementary assets, procedures, and knowledge to achieve cost-reductions, or increasing sales, are common examples of financial motives (Junni & Teerikangas, 2019). Moreover, even though rarely communicated in M&A announcements, strategic motives constitute another important driver of M&A activity. According to Bower (2001), strategic M&As are proposed to mitigate overcapacity in industries through consolidation, improve market power, extend product portfolios, or substitute R&D development. Both financial and strategic synergies are typically considered to be rational motives for M&As. Several empirical studies have, however, found that rational motives (i.e., improving shareholder wealth) is not always the fundamental driver argument of M&A transactions. Instead, irrational managerial motives are sometimes the fundamental force in M&A transactions (Chatterjee, 1986; Trautwein, 1990; Rhodes-Kropf & Viswanathan, 2004). Aspects such as managerial-hubris and empire-building occasionally constitute eminent M&A motives. These aspects are more thoroughly examined in section 2.3.

2.3 Agency Theory

Agency theory elaborates on incentive deviations between the board of directors and company shareholders, that affects firms' decision making negatively. Such deviations result in the occurrence of "agency costs", a phenomenon that reduces firm value (Jensen & Meckling, 1976). In the context of M&As, agency costs occur when managers pursue acquisitions that primarily stem from self-serving motives rather than increasing shareholders' wealth, which affects the M&A outcome negatively (Gaughan, 2007). Hence, managers sacrifice shareholders' wealth to enhance self-serving objectives.

2.3.1 Empire Building

Empire building explains why financial and non-financial managerial benefits could dictate certain firms' M&A decisions. Managerial compensation is often connected to firm size, or the amount of assets under management, why many managers have outspoken incentives of enlarging their organization. Several studies have presented empirical evidence of managers growing their

company out of optimal proportions through M&As, whilst receiving extensive compensation doing so (Shleifer & Vishny, 1986; Harford & Li, 2007). Thus, irrespective of the M&A outcome, agents sometimes substitute shareholders' wealth for personal financial gains. Other common irrational motives among board of directors are the desire to manage larger organizations, or make headlines following announcements of large deals (Harford & Li, 2007). Companies therefore occasionally pursue M&A transactions without sufficiently thorough due diligence, thus jeopardizing shareholder wealth in the process. Empire building, therefore, risks causing M&As with negative net acquisition values, affecting shareholder wealth negatively (Gaughan, 2007).

2.3.2 Managerial-Hubris Hypothesis

Managerial-hubris is believed to motivate excessive takeover premiums due to a skewed managerial belief in the possibility of incorporating synergies through M&As. Roll (1986) initiated the hypothesis by displaying empirical indications of acquirers using elusive synergies to overstate the economic value of corporate combinations, resulting in excessive takeover premiums. Several empirical studies have since presented evidence supporting this theory. Hayward and Hambrick (1997) found that the size of takeover premiums is highly associated with managerial-hubris. Raj and Forsyth (2003) investigated the performance of acquirers likely to suffer from such managerial-hubris and found that they perform significantly worse compared to well-managed companies following M&A announcements. Therefore, M&As stemming from excessive managerial self-confidence is likely to result in agency costs reducing shareholder wealth. Moreover, Haleblan et al. (2006) showed that companies' prior experiences of acquisitions, and prior M&A performances, is positively correlated with the likelihood of subsequent acquisitions, implying that managers gain confidence from positive M&A experiences and use it to motivate future deals. Something that is not always a rational choice.

2.3.3 Network Effects

Managerial M&A decisions have also been shown to absorb influence from intra-industrial tendencies. Companies tend to imitate acquisitional behavior currently present in its surrounding

network. Competing companies have historically imitated each other's selection process of M&A targets, despite it being strategically and financially irrational (Baum et al., 2000). Moreover, pressure from companies' networks to depict themselves as legitimate acquirers has historically resulted in increased levels of M&A activity (Haleblian et al., 2006). Why exogenous aspects also affect managerial M&A decisions. In times of favorable economic conditions, combined with high levels of managerial confidence, such circumstances have previously initiated industry wide urges of M&A activity, also known as “merger-waves” (Gort, 1969; Gugler et al., 2012).

2.4 Merger Waves

Over time the number of M&A deals has displayed cyclical characteristics and occurred in so-called merger waves (Gort, 1969; Gugler et al., 2012; Ahern and Harford, 2013). Town (1992) synthesizes empirical contributions from several academic papers and displays the occurrence of multiple minor and major waves during the 20th century. More recently, it also occurred during the years leading up to the financial crisis in 2007–2008 (Alexandridis et al., 2011). However, existing research has not reached consensus regarding the underlying driving forces of merger waves. Currently there are two theoretical frameworks used for describing the phenomena. These are the “neoclassical” and “behavioral” theoretical frameworks.

2.4.1 Neoclassical View of Merger Waves

The neoclassical point of view implies that unexpected industry shocks initiate clustering M&A activities. These shocks for example stem from technological innovations, changing regulatory environment or new industry profitability expectations (Mitchell & Mulherin, 1996). The neoclassical theory has historically received criticism for lacking an explanation about why high acquiring-firms generally display high market values during merger waves (Marcum et al., 2015). Therefore, a more recent interpretation of the theory includes that industry shocks need to be accompanied by sufficient macro-level capital liquidity in order to initiate proper waves (Harford, 2005; Alexandridis et al., 2011). Rhodes-Kropf and Viswanathan (2004) found that merger waves

showed correlations with high market valuations, and thus argued that company's stock valuations have a fundamental impact on mergers.

2.4.2 Behavioral View of Merger Waves

The behavioral view of merger waves proposes that corporate managers play a central role in the occurrence of the phenomena. In times of equity market booms, company value dispersion tends to arise, and certain organizations become overvalued. According to Shleifer and Vishny (2003), managers often seek to maximize shareholders by exploiting temporarily favourable valuations to acquire companies that presumably possess a fairer valuation. Moreover, corporate managers often have long-term profitability strategies, but are willing to exploit favorable valuations to enhance their long-term objectives (Gugler et al., 2012). Therefore, managers have historically used favorable valuations to acquire actual assets through M&A transactions (Gaughan, 2007). During financial booms M&A announcements that normally would affect acquirers' share price negatively, instead receive modest if not positive, share price responses (Gugler et al., 2012). Thus, favourable equity market conditions pose opportunities for growth-seeking managers to undertake more M&A activities without being severely punished by the market.

2.5 Information Asymmetry and Efficient Market Hypothesis

In a perfect market, all participants have access to the same information, but the flow of information is seldom symmetrical among participants in capital markets (Miller and Rock, 1985). Most often management has access to more information than shareholders, investors, or other external stakeholders (Fields et al., 2001). Such information asymmetry causes valuation disagreements of underlying assets that triggers economical transactions, like M&As, as a result (Kim and Verrecchia, 1991). If the information gap is too big, on the other hand, market efficiency is hampered, and transaction costs increase (Zhao, 2012).

Today there is no consensus amongst practitioners, or academics, about exactly how information asymmetry affects the efficiency of capital markets. However, Fama's (1965; 1970) contributions regarding the efficient market hypothesis (EMH) is still considered to be a theoretical cornerstone for this continuous discussion. EMH assumes new information is priced directly by the market, why stocks should always trade at fair value. In theory, it should therefore be impossible to

outperform the market according to EMH. Since that perception rarely align with reality, Fama defined three levels of market efficiency: weak, semi-strong and strong. Although there are currently divided opinions about EMH's reliability (Ikenberry, Lakonishok and Vermaelen, 1995; Loughran and Ritter, 1995), it still fulfills an important function when analysing the empirical results. This study assumes that a semi-strong market efficiency prevails, meaning that all historical and public information is reflected in the stock price (Fama, 1970).

3. EMPIRICS OF ACQUIRERS' SHORT-TERM PERFORMANCE

Section 3 presents previous empirical research that has studied the short-term performance of acquiring firms and each event variable of interest. Thereafter follows a summary about how previous economic crises have affected M&As. Ultimately, based on the literature review and previous empirical findings, this study's hypotheses development is presented.

3.1 The Short-Term Performance of Acquiring Firms

Shareholders increase their wealth when abnormal returns are obtained. The wealth effect of M&As have been frequently studied within the literature of corporate finance. Shareholders of the acquiring firm or bidder are shown to both gain and lose slightly in the short-term perspective (Mulherin, et al., 2017). While generally, a total gain is recorded, the literature regarding the performance of the acquiring firm's shares is split. For example, applying an event study approach, Golubov et al. (2012) present slightly positive yet insignificant abnormal returns for a sample of 4803 firms in the U.S, between 1996-2009. However, with a sample consisting of 1207 U.S firms, Ahn et al. (2010) manage to observe negative abnormal returns of roughly -1 percent, that are highly significant. Moreover, Bouwman et al. (2009), Wang and Xie (2009) and Graham et al. (2002) present negative abnormal returns for firms in the U.S, that are statistically significant. Bhagat et al. (2005) find positive abnormal returns for the acquiring firms' shares in the U.S, however, their findings are not significant. With a sample of 12 023 U.S firms between the years of 1980-2001, Moeller, Schlingemann and Stultz (2004) presents positive abnormal returns for bidders that are highly significant in the short-term. These articles differ somewhat in design and methodology, but all follow an event study approach to obtain the results.

Determining the short-term performance of acquiring firms' shares are not exclusively analysed within the U.S. For example, Ushijima (2010) studies a sample of 7 814 Japanese firms during a period between 1994-2005. The author finds highly statistically significant positive abnormal returns among the sample of 1.3 percent (Ushijima, 2010). Conn et al. (2005) and Danbolt (2004) both study the short-term performance of U.K acquirers and find impressive significant positive abnormal returns of 18.76 and 20.64 percent respectively. Furthermore, significant, positive abnormal returns are also present among Korean firms as demonstrated in Bae et al. (2002). The

author studies a sample of 107 firms between the years of 1981-1997. The study also analyses the results after excluding financial firms and concludes even better yet slightly less significant abnormal returns for non-financial companies (Bae et al., 2002). Evidently, different factors help explain the differences in result for the articles. In the next section, we disclose some common variables and proposed explanations for the short-term performance of the acquiring firm's shares.

3.2 Factors that Affect the Wealth of the Acquiring Firms' Shareholders

Throughout the years, several theories have been proposed to explain both the short- and long-term performance of acquiring firms. According to shareholder theory, the main objective of any public firm is to adhere to the owners' interests and make profitable decisions that increase shareholder wealth (Friedman, 1970 and Jensen, 2001). Furthermore, Sirower and Sahni (2006) claims that investors need compelling evidence that timely performance gains will materialize. While often seen as a fast route to obtain growth, M&As often require full payment upfront, putting investors who are at an information disadvantage, to sometimes question management's expertise when their investments are at risk. Moreover, Sirower and Sahni (2006) argue that stock prices of both acquirer and target already reflect the expected performance improvements. To beat expectations, acquirers must be able to convince investors of the deal and its potential synergies. A difficult task that may explain the underperformance found among bidders in the short run.

Given the complicated nature of any M&A deal, several factors are incorporated in each contract, affecting the overall value of the transaction. These are believed to influence short-run performance and may be perceived either favourably or unfavourably by the shareholders, consequently altering their wealth and value. Sirower and Sahni (2006) and Renneboog and Vansteenkiste (2019) presents detailed literature overviews that summarizes some of the theories behind acquiring firms' performance after a M&A transaction and the underlying factors affecting shareholders' value. Among some, Renneboog and Vansteenkiste (2019) argues that greater relatedness between acquirer and target firm, appears to generate better performance. Analysing the effect of relatedness (i.e., lack of diversification) on the post-performance of M&As are a common theme within the literature. The theory states that an acquiring and target firm included in a M&A transaction, that operates within the same industry or sector (i.e., related), creates higher

shareholder value compared to unrelated firms. For example, Salter and Weinhold (1979) argue that core skills can transfer between related firms, consequently creating synergies and increased wealth to shareholders. The size of the acquiring firm is also believed to affect shareholder value. Moeller, Schlingemann and Stultz (2004) writes that smaller acquirers manage to create more value as compared to larger acquirers, since the subsequent deals are likely to be smaller and the targets are more probable to be a private actor. Contradictory, Jansen, Sanning and Stuart (2013) claims that the empirical findings are still in dispute but conclude that generally, larger acquiring firms obtain higher abnormal returns.

Furthermore, Renneboog and Vansteenkiste (2019) propose that the method of payment for the M&A transaction also influences the performance of the acquiring firm and subsequently shareholders' wealth. The original theory stems from Myers and Majluf (1984) proposition regarding issuing of shares. According to the authors, the issuing of new shares acts as a signal towards the market that the firm is currently overvalued and thus, a negative reaction ensues (Myers and Majluf, 1984). This has later been adapted into the theory of M&As, where Travlos (1987) argues that equity-stake offers transfers the wealth from shareholders to bondholders, causing the underlying share of the acquiring firm to fall.

Lastly, it is common to distinguish between local and cross-border M&A deals, as they appear to alter the shareholder value differently. According to some, cross-border deals tend to reduce the value and wealth of the acquiring firm's shareholders (see for example Kaplan and Weisbach, 1992; Eckbo and Thorburn, 2000 and Aw and Chatterjee, 2004). However, when studying the EU, Mangold and Lippok (2008) found that cross-border M&As incur positive abnormal returns for the acquiring firm's shares. To give an enhanced understanding of local vs. cross-border deals' effect on the value of the acquiring firm's shares, and the other previously mentioned factors, the next subsection aims to give a more detailed view of each variable within the scope of this text.

3.2.1 Related or Diversified M&As

By diversifying, acquiring firms limit or exclude the potential of shared operations and skills, resulting in the destruction of shareholder value (Gaughan, 2007). Author Flanagan (1996) studies

a sample of 737 U.S mergers, between the period of 1972-1990, and find evidence in support of that transactions between related businesses (determined by the four-digit SIC code of each company) appear to culminate into higher positive abnormal returns for acquiring firms' shares, compared to unrelated mergers. Conducting a similar study, Morck, Shleifer and Vishny (1990) find evidence that suggests that diversification among M&As induces the market to react negatively, and subsequently destroys shareholder value for the acquiring firm. However, Akbulut and Matsusaka (2010) studies a larger sample of 4 764 U.S mergers, between the period of 1950-2006 and finds that the combined shareholder value for diversified M&As, of both acquirer and target, surpasses that of related ones. These positive returns are however shown to decline after 1980 (Akbulut and Matsusaka, 2010). Furthermore, some research implies that "relatedness" or "diversification", has no effect on shareholder value (see Chatterjee, 1986; Lubatkin and O'Neill, 1988 and Matsusaka, 1993). The theory of diversification has been previously linked to agency theory, where the manager gains conducting diversified M&As, at shareholders' expense (Morck, Shleifer and Vishny, 1990). For example, diversified or unrelated mergers are believed to decrease the employment risk for the managers (Amihud and Lev, 1981) and subsequently increase the managers' salaries (Kroll, Simmons and Wright, 1989). Moreover, if markets were efficient, they should be able to properly price announced M&As. In theory, related mergers should therefore induce higher returns for both acquirer and target, but research is yet to support this (Flanagan, 1996).

3.2.2 Relative Firm Size in M&As

Larger firms are believed by some to perform worse than smaller firms involved in a M&A (see Moeller, Schlingemann and Stultz, 2004). Consequently, shareholder value of larger acquirers is therefore more likely to decrease. This argument originates from corporate governance- and agency theories (e.g., managerial overconfidence and serial acquirers) which suggests that managers of larger acquirers may be incentivised by other factors than maximizing shareholders' wealth. Moreover, a smaller firm with less capital is often regarded to be more cautious with their M&As. This allows them to focus on transactions that are within their market of where they possess more knowledge, which enhances the value of the deals and subsequently, shareholders' wealth. According to DePamphilis (2010), larger firms do not utilize this to the same extent.

Additionally, Loderer and Martin (1990) study 5 172 domestic acquisitions within the U.S, between the years 1966-1984 and find evidence that suggest that larger bidders pay too high of a premium, which consequently reduces shareholder value.

In contrast, authors Fuller, Netter and Stegemoller (2002) find evidence that suggests the opposite, in that deals of larger targets, on average, obtain higher abnormal returns and greater shareholder wealth. Using a sample of 3 135 U.S takeovers, between a ten-year period (1990-2000), they argue that larger acquiring firms have greater bargaining power and may integrate their targets in the organisation at a lower cost, resulting in deals of greater value, enhancing shareholders' wealth. Finally, as previously mentioned, Jansen, Sanning and Stuart (2013) writes that although the literature is split regarding whether relative firm size increases or decreases shareholder return, most findings suggest that larger firms, generally, earn positive abnormal returns.

3.2.3 Method of Payment in M&A Deals

Given that the choice directly affects the stock price of both bidder and target, it is common to analyse what method of payment has been applied when studying the abnormal returns post M&A. Generally, cash-bids as compared to equity-stakes, generate better value for the bidding firm in a M&A (Renneboog and Vansteenkiste, 2019). It is argued that the two methods invite different reactions from the market. For example, if they believe their company is overvalued, managers often prefer stock-based transactions in M&As, which typically sends a negative signal towards the market who reacts accordingly (Myers and Majluf, 1984). Moreover, in their study of 1 361 European M&As, during the period of 1993-2001, Martynova and Renneboog (2009) argue that, on average, M&A deals consisting mostly of equity payments increases the investment risk which in turn negatively affect the acquiring firm's share value. As mentioned previously, Travlos (1987) argues that the wealth transfer from shareholder to bondholder that occurs with equity-based deals, naturally decreases the value of shareholders for the bidding firm. Additionally, the author also demonstrates that solely cash-based payments within M&As are often correlated with higher abnormal returns for the bidding firm (Travlos, 1987). However, Goergen and Renneboog (2004) find opposing results in their study of the European region of 228 mergers, for the period of 1993-2000. Their findings suggest that shareholders of the bidding firm typically favour all equity-

cash-bids and receive a greater wealth effect with equity-based transactions (Goergen and Renneboog, 2004).

3.2.4 Local vs. Cross-Border M&As

The attractiveness of cross-border M&As typically stem from the increased market share bidding firms can acquire in foreign markets. Global firms can offer their shareholders international benefits and diversification opportunities on their underlying investment, which encompasses an added firm value for firms acting internationally (Morck and Yeung 1992). If international markets were to be truly efficient, no differences among abnormal returns for either bidders or targets should appear (Harris and Ravenscraft, 1991). However, a perfect integrated international market is often an unrealistic assumption. Therefore, it is believed by some that cross-border M&As ensure positive abnormal returns and add shareholder value. Furthermore, the market tends to look more favourably on cross-border deals rather than domestic, evident in the positive abnormal returns presented in Morck and Yeung (1992). Kaplan and Weisbach (1992) study the post-performance of 282 acquisitions during the period of 1971-1987 and find that the shareholder wealth tends to decrease for bidders but increase for targets when evaluating domestic M&As. Danbolt and Maciver (2012) analyse M&As into and out of the UK, with a sample consisting of 535 firms during the period 1980 to 2008. The authors find evidence that suggests both bidders and targets gain upon cross-border deals as compared to domestic M&As, although the results for targets are both stronger and greater (Danbolt and Maciver, 2012).

In contrast, Eckbo and Thorburn (2000) study the large sample of 7 559 U.S to Canada M&As, between the years 1964-1982, and present superior and significant positive abnormal returns for domestic M&As. Although U.S bidders' returns are almost indistinguishable from zero, Canadian firms perform significantly better. The authors fail to properly explain why this difference among the two countries occurs within the scope of their study (Eckbo and Thorburn, 2000). Furthermore, Aw and Chatterjee (2004) present negative abnormal returns associated with cross-border M&As, using a sample of 79 UK acquisitions between 1991-1996.

3.3 M&As and Economic Crises

The outbreak of COVID-19 and the ensuing global pandemic has caused the financial markets to be in disarray. It is the latest, out of several, financial crises. Our objective with this thesis is to examine the effect of COVID-19 on the global M&A market, and its subsequent effect on wealth for shareholders of the bidding firm. The study of M&As in relation to financial crises has been documented before. Mitchell and Mulherin (1996), investigate industry patterns within M&As, during the fourth merger wave observed in the 1980s. Their sample consists of 1 064 U.S firms, across 51 different industries, between the years 1982 to 1989. The authors find that industry shocks (defined as “any factor, whether expected or unexpected, that alters the industry structure”) are directly related to industry patterns and the number of M&A transactions recorded (Mitchell and Mulherin, 1996). For example, an industry experiencing sales shocks, with large increases (or decreases) in sales, significantly increases (decreases) M&A activity. Furthermore, employment shocks, as in large boosts in employment, correlates positively and significantly with increased M&A activity (Mitchell and Mulherin, 1996). Furthermore, Martynova and Renneboog (2009) conclude that merger waves occur when the economic and political environment are favourable, during market booms and when credit supply is abundant. Interestingly, the five observed merger waves between 1903-2001 end with the inception of stock market crashes (Martynova and Renneboog, 2009).

Moreover, Cleary and Hossain (2020) study the postcrisis performance of acquirers and targets in M&As, after the great recession of 2007-2009. With data collected from 2003 to 2012, and a sample consisting of 3 581 successful public M&As, the authors compare the performance before and after the financial crisis and conclude that postcrisis M&As are superior in enhancing value, both in the short- and long term (Cleary and Hossain, 2020). They attribute this to the decline in overall financial availability, caused by the crisis, generating an increase in external financial constraints. This created a tougher environment for both acquirers and targets, suitable for larger bidders that were less financially constrained and damaging for smaller and more constrained targets (ibid). Consequently, bidders could acquire targets at more affordable prices relative to the intrinsic value, compared to the pre-crisis period (Cleary and Hossain, 2020).

Regarding COVID-19, the corporate finance literature is yet to fully explore the impact and consequences of the pandemic on the market of M&As. As previously mentioned, few articles study the direct effect of the virus in M&A activity. Tampakoudis, et al., (2021) study the effect of ESG performance on shareholders' wealth within M&As, during the COVID-19 pandemic. With a sample size of 889 U.S completed M&As, between the period of 2018-2020, the authors find that ESG investment (i.e., M&As that are supposed to result in a more sustainable business) had a statistically significant and negative effect on shareholder wealth throughout the whole sample period (Tampakoudis, et al., 2021). During the beginning of the pandemic, this effect appears to be stronger which indicates that the cost of investing in ESG activities exceeds any potential gain in an environment of economic distress (ibid). Furthermore, the result suggests that acquirers, on average, improved their ability to obtain value-enhancing M&As, in the form of increased shareholder wealth, during the COVID-19 pandemic (Tampakoudis, et al., 2021). As far as we are aware, these results are the only so far to measure the effect COVID-19 has had on shareholder wealth, within the study of M&As. It serves as a highly relevant observation to the purpose of this study, and a contribution towards the hypotheses' development of the next subsection.

3.4 Hypotheses Development

The objective of this study is to study the relationship between shareholder wealth gained from M&As, and the COVID-19 pandemic. More specifically, this text analyses the difference (if any) that may be measured and directly related to the period of a global pandemic within the study of M&As. Regarding the empirical findings, this thesis has set out three hypotheses. The purpose of the hypotheses is to determine if acquirers have been able to improve the performance during the ongoing pandemic, compared to before, and how the virus has impacted the market of M&As. While previous articles have studied similar samples, applying similar methods, our sole focus on the financial effects of a never-before-seen event invites a new perspective.

The rationale behind our first hypothesis follows the findings of Tampakoudis, et al., (2021), in that abnormal returns and subsequently, shareholder wealth of acquiring firms will have improved during the COVID-19 pandemic, as compared to before. The motivation for this prediction stems

in the argument made by Cleary and Hossain (2020), in that the tougher financial climate caused by the virus, will favor large bidders, enabling them to acquire targets at cheaper prices. Consequently, we believe this will improve abnormal returns for the acquiring firms still involved in M&As during the pandemic.

Hypothesis 1 - The shareholder wealth of acquirers has improved during the COVID-19 pandemic, apparent by improved positive abnormal returns.

Our second hypothesis connects to an independent variable applied in the regression, namely *Diversification* (see section 4 below). If the results suggest that abnormal returns did increase during the pandemic and that large bidders were to gain in M&A transactions, due to targets getting acquired at cheaper values, it is reasonable to assume diversified M&As are more prevalent than before COVID-19. Namely, given the chance to acquire more targets, large bidders will. The rationale behind this assumption is backed by corporate governance theories, such as empire building and the managerial hubris hypothesis (see subsection 2.3.1 and 2.3.2). Therefore, we assume that M&As characterised by being diversified has contributed positively towards bidders' abnormal returns during the pandemic.²

Hypothesis 2 - Diversification in M&A transactions has led to positive abnormal returns for bidders due to the economic climate caused by the COVID-19 pandemic.

Previous empirical findings suggest that large acquiring firms, on average, can earn positive abnormal returns through M&As (Jansen et al., 2013). What splits previous research is if smaller acquirers outperform larger ones (Loderer and Martin, 1990; Fuller et al., 2002; Moeller, Schlingemann and Stultz, 2004; DePamphilis, 2010). During COVID-19 small and medium sized enterprises (SMEs) have been more negatively affected compared to large companies. According

² Hypotheses 2 implies that firms involved in M&A transactions and characterised as being diversified during the pandemic will have improved shareholder wealth by achieving better abnormal returns. The prediction is somewhat contradictory to current literature, which often claim that diversified M&As obtain worse abnormal returns than related one (see Morck, Shleifer and Vishny, 1990; Flanagan, 1996 and Gaughan, 2007). However, given the specific circumstances of the COVID-19 pandemic, we suggest a new economic climate will invite new findings regarding the subject of diversification within M&As.

to IMF (2020) this stems from the fact that SMEs are more common in contact-intensive sectors, but also that public policies aimed to mitigate the economic impact of COVID-19 ended up benefitting large companies to a greater extent. Thus, during COVID-19 large acquirers are assumed to demonstrate increased abnormal returns.

Hypothesis 3 - Acquirers abnormal returns demonstrate a positive relationship with firm size during COVID-19.

4. METHOD

Section 4 aims to assign accountability for, and simplify the replicability of, the research approach applied in this study. Initially, the components constituting the research design are defined, followed by an explanation about the data collection process and the event study methodology. Then, the regression analysis and its associated assumptions are presented. Finally, a brief discussion regarding this study's reliability and validity is provided.

4.1 Research Design

In this study a quantitative methodology using a deductive approach was used. The deductive approach derives hypotheses from a theoretical framework and subsequently tests it using appropriate empirical data (Saunders et al., 2019). Compared to other methods, like the inductive approach, a deductive method emphasizes applications of control to ensure reliability and validity. Another big advantage of using a deductive method in a quantitative study is its highly structured approach (Ibid). Illustrating operationalisation of concepts, in detail, helps clarify the research methodology, thus promoting an understanding of the relationship between the variables included.

In this study two major components constituted the research design. To assess acquirers' abnormal returns surrounding M&A announcements an event study methodology approach was used. Then, a regression analysis was used to study the relationship between acquirers' abnormal returns and the selected event variables of interest. Section 4.3 and 4.4 aims to systematically elaborate on how the event study and regression analysis was conducted. Applied research design is supported by previous empirical studies which have carefully analyzed acquirers' performance surrounding M&As (see for example Travlos, 1987; Moeller, Schlingemann and Stultz, 2004; Danbolt and Maciver, 2012; Jansen et al., 2013).

4.2 Data Collection

To obtain reliable results a large data sample was gathered.³ The sample was gathered using the research database Zephyr. Zephyr synthesizes information about M&A transactions from all around the world into a comprehensive database. Zephyr provides users with information about financial data, company characteristics and M&As' transaction information. Several empirical papers analysing acquires short-term performance surrounding M&As use Zephyr as their main database (for example von Eije and Wiegerinck, 2010; Bollaert and Delanghe, 2015). Therefore, Zephyr was a reliable source of data.

In practice, the sample was gathered using a combination of Zephyr's selection criterias. To capture COVID-19's impact on the intra-European M&A environment, whilst including pre-pandemic conditions, the sample period extends between 2016-01-01 and 2020-31-12. The sample only includes transactions defined as mergers or acquisitions, why no deal defined as management buy-outs, minority stakes, demergers or reconstruction was included. Like previous empirical studies analysing how methods of payment impact bidding firms' market value, the sample consists of deals involving cash- or equity-bids (Myers and Majluf, 1984; Martynova and Renneboog, 2008). To obtain a more extensive understanding of COVID-19's impact on the European M&A environment, acquirers and targets from all European countries were included. Moreover, no sectors were therefore excluded from the sample. To capture how the origin of targets affected acquirers, both cross-border and domestic deals were included. Since the event study and regression analysis required information about bidding firms' historical returns only publicly traded acquirers could be included. Given the combination of selection criterias a sample of 1 154 M&A transactions constituted the sample. In summary, Table 4.2 below demonstrates all selection criterias used in Zephyr to obtain the sample.

³ After a discussion with our mentor Håkan Jankensgård, it was unanimously agreed that the larger the sample the better, if it does not compromise the data collecting process. Therefore, we have not engaged in creating too many restrictions regarding collecting of the data more than it being limited to the Euro-area.

Table 4.2 Data sample selection criteria

Each number refers to one of Zephyr’s selection criteria. Given each level of applied selection criteria the number of available observations (i.e., M&A deals) are presented in the “Search result” column.

Search criteria	Search result
1. World Region: Euro-Area (Acquiror AND Target)	431 757
2. Methods of payment: Cash, Shares	118 096
3. Deal type: Acquisitions, Merger	26 675
4. Time period: on and after 01/01/2016 up and including 31/12/2020	2 479
5. Major sectors: Primary Sector (agriculture, mining, etc.), Food, beverages, tobacco, Wholesale & retail trade, Hotels & restaurants, Transport, Post and telecommunications, Banks, Insurance companies, Other services, Public administration and defence, Education, Health, Textiles, wearing apparel, leather, Wood, cork, paper, Publishing, printing, Chemicals, rubber, plastics, non-metallic products, Metals & metal products, Machinery, equipment, furniture, recycling, Gas, Water, Electricity, Construction (Acquiror OR Target OR Vendor)	2 478
6. Listed / Unlisted / Delisted companies: Listed acquiror	1 154
M&A transactions	1 154

In addition to Zephyr, data about each acquirers’ historical returns was extracted from Datastream (DS). The data from DS was used in the event study calculations more thoroughly explained in section 4.3. DS’s credibility has been evaluated in different research articles (Ozgun and Porter, 2006; Rui, 2012), and found both reliable and useful due to its comprehensive coverage of financial data. Therefore, the data exported from DS is considered a reliable source of data.

All data was then exported into Stata, an integrated statistical software program. All calculations conducted for the event study and regression analysis were done in Stata. The big advantage of Stata is its ability to effectively carry out analyses involving large amounts of data and display the results in a very descriptive manner.

4.3 Introducing the Event Study Methodology

Event studies have been extensively used in academia to assess how an easily identifiable event, like an M&A announcement, impacts companies stock performance (MacKinlay, 1997; Kothari & Warner, 2006). In this study, the event study aims to isolate bidding firms' short-term returns surrounding their M&A announcements. If abnormal returns would arise in association with the transaction, the announcement is interpreted as the source of those abnormal fluctuations (Kothari & Warner, 2006). A prerequisite for the event study methodology is Fama's (1965; 1970) EMH concept if the market can continuously price new information effectively and unbiased. Assuming that a semi-strong market efficiency is prevailing, the event study can assess how acquirers' shareholder wealth is affected by M&A announcements. Moreover, it potentially allows for distinguishing how COVID-19 has impacted acquirers' short-term returns compared to before the pandemic.

This event study follows a sequence of steps advocated by MacKinlay (1997) to obtain reliable results. In the following subsections the event study timeline is defined (4.3.1), methods for estimating normal returns (4.3.2), and abnormal returns are explained (4.3.3). Ultimately, the final choice of event study variables is motivated (4.3.4).

4.3.1 Event Study Timeline

The specific day of each M&A announcement is entitled event day (τ_0), around which the event study revolves. Preceding the announcement is the estimation window. The estimation window aims to estimate a certain company's expected returns in the absence of the M&A announcement (Kothari & Warner, 2006). Common practice in previous empirical finance research has been to use an estimation interval of 120 days that extends between 130 and ten days [τ_{-130} , τ_{-10}] prior to the event day (MacKinlay, 1997). Once the estimation window has computed each stock's normal returns, the event window is able to distinguish abnormal price movements by comparing it to the actual outcome.

This study applies two event windows. One event window extending between $[\tau_{-1}, \tau_{+1}]$, and one between $[\tau_{-5}, \tau_{+5}]$. The shorter window has been predominantly used in previous studies scrutinizing acquirers' short-term performance following M&As (see for example Kaplan & Weisbach, 1992; Moeller et al., 2004; Danbolt & Maciver, 2012). However, complementing it with a longer event window enables potential information leakage in advance to be intercepted (MacKinlay, 1997). Information leakage could potentially affect stock returns significantly, whilst hampering fluctuations during the event day, why it is crucial to account for. Including a post-announcement period enables investors to digest the information communicated, hence adjust their stock valuations, why EMH assumptions are less stressed (Kothari & Warner, 2006). Solely applying a narrow event window therefore risks missing significant abnormal returns. The estimation and event windows should not overlap since result reliability is affected negatively (MacKinlay, 1997), why there is a detectible gap between them in figure 4.3.1.

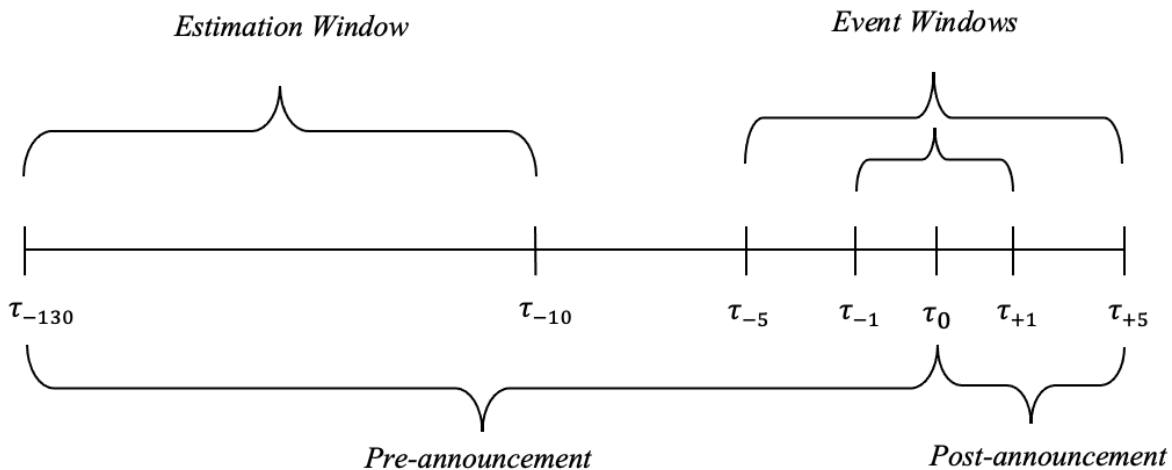


Figure 4.3.1: Event Study Timeline

Even though event studies previously have been used for assessing companies' long-term returns, this study solely aims to investigate bidding firms' short-term returns. The approach is motivated by two separate factors. Firstly, given COVID-19's very recent impact on financial markets, current possibilities of adequately assessing acquirers' long-term performance are limited. Such methodology has more potential in the wake of the pandemic when COVID-19's long-term effects have become more eminent. Secondly, studies using longer event windows (i.e., 20 days or more)

have received repeated criticism since attributing abnormal fluctuations to a certain event becomes much more challenging (Ryngaert & Netter, 1990; Tuch & O’Sullivan, 2007). Longer event windows therefore impose an increased risk of additional events affecting stock prices. Therefore, only two shorter event windows were used.

4.3.2 Estimating Normal Returns

Assessing a company’s normal returns could be done using various methods. According to MacKinlay (1997) the available approaches could be grouped into two main categories. One category of statistical models that analyses assets behaviour without depending on any economic arguments. The other category, the economic models, combines statistical models with assumptions regarding investors behaviour. The economic models discussed in this section are the capital asset pricing model (CAPM) and the three-factor model. Followed by two statistical models, namely the constant mean return model, and the market model.

4.3.2.1 The Capital Asset Pricing Model (CAPM)

Probably the most notorious model for assessing a company’s normal return is the capital asset pricing model (CAPM). CAPM has experienced extensive usage within the investment society, but also in academia, practically during the decades following its initial formulation in the 1960’s (Rossi, 2016). CAPM illustrates the relationship between expected return $E(R_{i\tau})$ and the systematic market risk for security i during period τ (Sharp, 1964; Lintner, 1965). It does so by synthesizing the risk-free rate of return $R_{f\tau}$, security beta β_i , market risk premium $R_{m\tau} - R_{f\tau}$, into the following function.

$$E(R_{i\tau}) = R_{f\tau} + \beta_i(R_{m\tau} - R_{f\tau}) + \varepsilon_{i\tau}$$

Over time, however, several empirical studies have scrutinized CAPM’s capability to correctly determine stocks’ expected returns but found it significantly inadequate to achieve its purpose (Bhandari 1988; Fama & French, 1992;). In general, the most eminent criticism towards the single-factor CAPM model emphasizes that beta cannot alone depict the excess risk-return correctly.

Furthermore, its linear relationship also often incorrectly depicts securities expected returns (Roll, 2016).

4.3.2.2 The Three-Factor Model

To counteract CAPM's shortcomings, thus improving its credibility, Fama and French (1996) developed a multifactor version of CAPM called the three-factor model. By incorporating firm size (SMB) and book-to-market (HML) return variables into the original function, the multifactor CAPM version captures many previous average-return anomalies. Thus, a significant improvement compared to the original single-factor CAPM model (Fama & French, 1996).

$$E(R_{i\tau}) - R_{f\tau} = \beta_i[E(R_{m\tau}) - R_{f\tau}] + s_iE(SMB_{\tau}) + h_iE(HML_{\tau}) + \varepsilon_{i\tau}$$

Even though the multivariable CAPM formula is more sophisticated than the original one it has received criticism for also imposing unrealistic factor assumptions. Loughran (1997) demonstrates empirical evidence that refutes previous assumptions regarding the explanatory power of the HML variable. It implies that HML has low predictive credibility for assessing stocks expected returns. Furthermore, the empirical findings suggest that the linear assumptions regarding SMB and HML are unlikely to persist over time. CAPMs outlined shortcomings are often perceived as constraining normal return models, why its occurrence in event studies has decreased over time (MacKinlay, 1997). More commonly used in event studies are the statistical models following below (Kothari & Warner, 2006).

4.3.2.3 The Constant Mean Return Model

Unlike the economic models, typically best suited for homogenous samples, both the constant mean return model and market model are better suited for samples with varying characteristics (i.e., companies from various countries, industries, sizes, etc.) which is the case in this paper (MacKinlay, 1997). The constant mean return model estimates a stocks normal return follows the equitation illustrated below.

$$R_{i\tau} = \mu_i + \zeta_{i\tau}$$

where

$$E(\zeta_{i\tau}) = 0 \text{ and } var(\zeta_{i\tau}) = \sigma_{\zeta_{i\tau}}^2$$

$R_{i\tau}$ is the return on security i during period τ and $\zeta_{i\tau}$ the distribution term for security i during period τ with an expected value of zero and variance $\sigma_{\zeta_{i\tau}}^2$. The constant mean return model is often considered easy to use, posting quite accurate results when comparing it to the market model.

4.3.2.4 The Market Model

The most common approach, however, used for computing normal returns in event studies is the market model (Mackinlay, 1997; Kothari and Warner, 2006). The market model has been used in similar empirical studies that assess bidding firms' abnormal returns in association with M&A announcements (see for example Kaplan & Weisbach, 1992; Moeller et al., 2004; Danbolt & Maciver, 2012). The market model relates the return of a stock to that of the market portfolio using a linear relationship, assuming joint normality of returns (MacKinlay, 1997):

$$R_{i\tau} = \alpha_i + \beta_i R_{m\tau} + \varepsilon_{i\tau}$$

where

$$E(\varepsilon_{i\tau}) = 0 \text{ and } var(\varepsilon_{i\tau}) = \sigma_{\varepsilon_i}^2$$

In which $R_{i\tau}$ and $R_{m\tau}$ is the respective return stock i and the market portfolio m during period τ . β_i constitute beta for stock i and α_i the intercept coefficient. $\varepsilon_{i\tau}$ is the zero mean disturbance term assumed equal to 0.

4.3.3 Abnormal Returns

Once normal returns have been computed the abnormal returns could be distinguished. Abnormal returns measures how each stock's actual return deviates from its computed normal return throughout the event window (MacKinlay, 1997).

$$AR_{i\tau} = R_{i\tau} - E(R_{i\tau}|X_{\tau})$$

Where $AR_{i\tau}$, $R_{i\tau}$ and $E(R_{i\tau}|X_{\tau})$ represents the abnormal, actual, and estimated return for stock i during period τ . The computed normal return estimation is represented by X_{τ} .

4.3.3.1 The Buy-and-Hold Abnormal Return (BHAR) Approach

To derive useful information from the whole event window abnormal returns must then be aggregated. Achieving that could be done using two methods. Either the buy-and-hold abnormal return model (BHAR) or the cumulative abnormal return (CAR) approach. BHAR resembles investors' average returns from holding a security over a predetermined period. BHAR is best suited for assessing stocks' long-term performances following an event of interest (Kothari & Warner, 2006). One major disadvantage with BHAR is that it uses longer event windows. BHAR therefore invites unwanted events to affect returns significantly, a risk that only increases with time. Given that BHAR is best suited for assessing events long-term impact on returns leaves little usage of it in this study.

4.3.3.2 The Cumulative Abnormal Returns (CAR) Approach

Unlike BHAR, the CAR approach has been frequently used in similar studies assessing acquirers' short-term returns in connection to M&A activity (see Moeller et al., 2004; Danbolt & Maciver, 2012; Jansen et al., 2013). Using CAR is therefore a preferable option to achieve the purpose of this study. The method aggregates individual securities abnormal returns from the first (τ_1) to the last day (τ_2) of the event window, illustrated by the equation below.

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau}$$

4.3.3.3 Cumulative Average Abnormal Return (CAAR)

Since this study uses a large sample of M&A deals CAR is inadequate to provide a broader insight of how the entire sample performed. The cumulative average abnormal returns (CAAR) were therefore used for representing acquirers' short-term returns following before and during Covid-19 separately.

since it aggregates the average abnormal returns for the whole sample, using the equation below.

$$CAAR(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} AAR_t$$

4.3.3.4 Significance Test

To facilitate if the abnormal returns are statistically significant a t-test were conducted. In accordance with MacKinlay (1997) the null hypothesis (H_0) assumes that the M&A announcements have no impact on CAR during the event window. However, if the t-test generates significant results H_0 is rejected, thus the alternative hypothesis (H_1) is true meaning M&A announcements significantly influence acquirers' CAR.

$$\theta_1 = \frac{CAR(\tau_1, \tau_2)}{var(CAR(\tau_1, \tau_2))^{1/2}}$$

Where θ_1 equals the t-value and $var(CAR(\tau_1, \tau_2))^{1/2}$ the variance for CAR throughout the event window.

4.3.4 Choice of Event Study Approach

Computing company's normal returns could be accomplished using several different approaches. However, in accordance with previous studies scrutinizing bidding firms' short-term returns surrounding M&A announcements this paper applied the market model methodology for assessing stocks normal returns (Kaplan & Weisbach, 1992; Moeller et al., 2004; Danbolt & Maciver, 2012). The methodological approach also advocated by Mackinlay (1997). Representing the assumed market portfolio in the market model was the MSCI Europe Index⁴. Given MSCI Europe Index comprehensive representation of European equities it was assumed to constitute a fair representation of the European equity market portfolio.

⁴ The MSCI Europe Index captures large and mid-cap companies' representations across 15 Developed Markets countries in Europe. The index covers approximately 85% of the free float-adjusted market capitalization across the European developed market equity universe. (MSCI, 2021)

Assessing acquirers' short-term returns promotes the usage of CAR. Compared to BHAR, more focused on long-term returns, CAR has been most frequently applied in previous empirical research scrutinizing acquirers' short-term performance in association with M&As. Therefore, CAR was used for aggregating acquirers' abnormal returns. Moreover, CAR also constitutes the dependent variable in the regression models used for analyzing each hypothesis.

4.4. Regression Analysis

To investigate the relationship between the dependent variable CAR, and the event variables of interest a regression analysis was applied. A regression model was computed using an ordinary least square (OLS) method, a common methodology in research using event studies to assess the dependent variable (MacKinlay, 1997). In addition to the dependent and independent variable, three control variables were included (see subsection 4.4.2).

4.4.1 Independent Variable

Independent variables are used to help explain what contributes or limits the values obtained by the dependent variable in a regression model. They help explain patterns that allow for some statistical predictability regarding what factors may explain certain behaviors of the dependent variable. In this study a dummy variable determining whether a M&A was characterised as related or diversified, firm size and a dummy variable for COVID-19 was used as independent variables. These are the variables most relevant to the research topics and hypotheses of this thesis. The first independent variable aims to display how diversified M&As influence acquirers' CARs, while the second regarding firm size, determines the relationship of bidders' size to its corresponding obtained CAR. Lastly, the dummy variable for COVID-19 is used to divide the sample between M&As carried out before and during the pandemic and allow us to observe if the COVID-19 has caused any significant effect on bidders' CARs.

4.4.1.1 COVID-19

Defining what is the start off COVID-19 constitutes an important assessment in this study. It determines what is defined as the pre-pandemic phase and what is not. Even though the virus originally began to spread in China during December of 2019 (WHO, 2020), the initial shock which paralyzed global markets first occurred a couple of weeks later. COVID-19's impact on European equity markets is illustrated below in Figure 4.1.

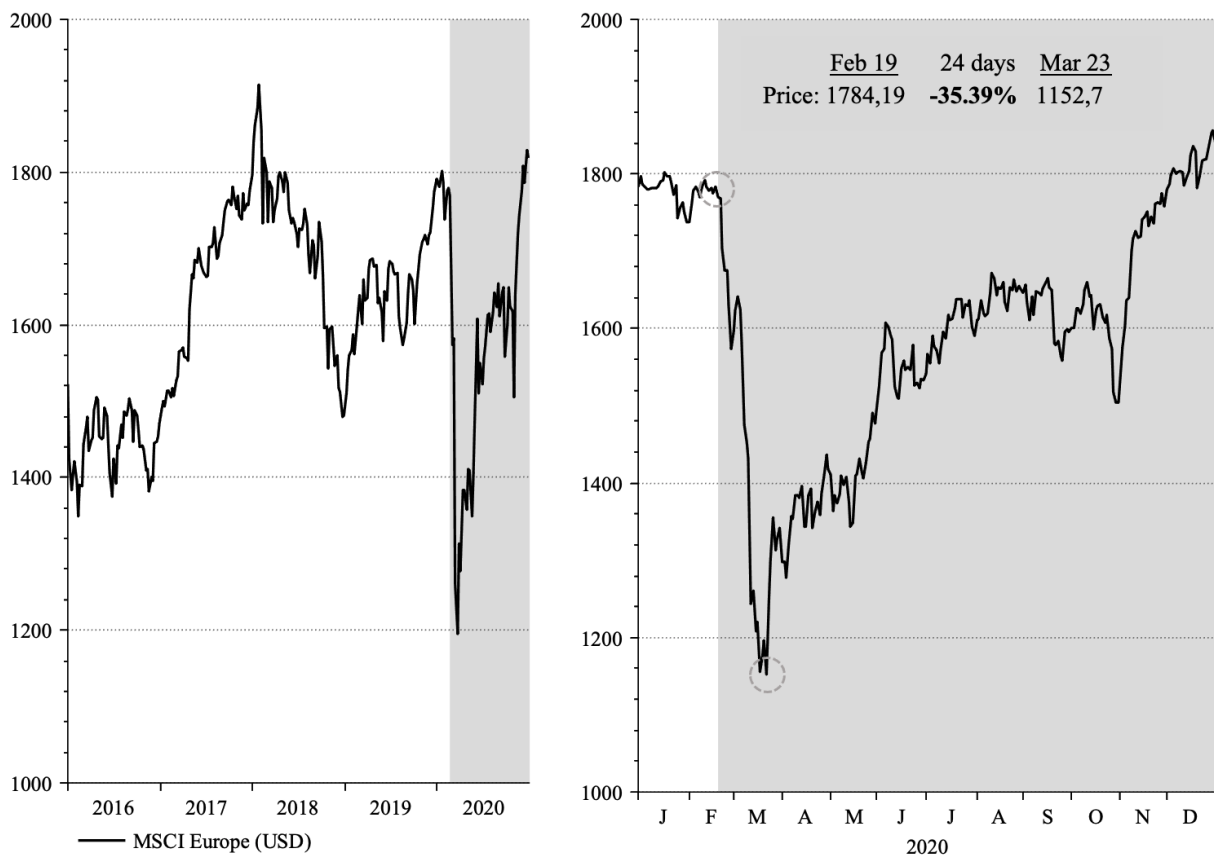


Figure 4.1: Daily Index Performance. (Source: Refinitiv Datastream)

The figure shows that MSCI Europe⁵ experienced a downturn of more than 35% in about a month following the 19th of February. It was therefore assumed that the pre-pandemic phase (i.e., before COVID-19's impact on financial markets became eminently visible) lasted up until the 19th of February in 2020. However, there is no perfect assessment of when COVID-19 started. Prior to the significant decline initiated in February companies could already have factored in COVID-19's potential risk. Something contradicting that phenomenon is the extensive and rapid decline identified in figure 4.1 It suggests that both investors and companies were not expecting the consequences of the pandemic, thus forced to act very quickly.

Thus, this study assumed that M&A transactions announced before the 20th of February in 2020 occurred during the pre-pandemic phase, illustrated by the white areas in each line graph of Figure

⁵ The MSCI Europe Index captures large- and mid-cap companies' representations across 15 Developed Markets countries in Europe. The index covers approximately 85% of the free float-adjusted market capitalization across the European developed market equity universe. (MSCI, 2021)

4.1. On the contrary, announcements made on the 20th of February and onwards were assumed to occur during the pandemic, illustrated by the grey areas. A dummy variable in the regression was assigned the value of 0 if the announcement occurred in the pre-pandemic phase, and the value of 1 if it was announced during the pandemic.

4.4.1.2 Diversification

Hypothesis 2 assumes that diversifying M&As have yielded positive CAR for acquirers due to the economic climate caused by COVID-19's. Sectors under heavy pressure could potentially invite investments from companies in thriving sectors since they constitute attractive targets. An assumption supported by merger wave theories, arguing that acquirers has historically exploited favorable valuation to acquire less fort targets (Gugler et al., 2012; Ahern & Harford, 2013). Cross-sectoral M&A opportunities may therefore be greater than ever before. Thus, unlike many previous empirical findings, diversifying M&As is expected to positively affect acquirers' CARs.

To intercept such potential tendencies a dummy variable was used in the regression model. The variable obtained a value of 1 if both the acquirer and target operated within the same industry. On the contrary, if the involved parties did not operate in related sectors, the variable was given a value of 0. Defining each company's sector affiliation was done using US SIC codes extracted from Zephyr.

4.4.1.3 Relative Firm Size

Regarding hypothesis 3, we apply a third independent variable for firm size. Most empirical findings suggest that large acquiring firms, on average, can earn positive abnormal returns through M&As (Jansen et al., 2013). What splits previous research is if smaller companies outperform large bidders. Some suggest large companies possess better bargaining power and lower overall costs (Fuller et al., 2002), whilst others have demonstrated that agency costs are more frequently eminent among large bidders (Loderer and Martin, 1990; Moeller, Schlingemann and Stultz, 2004;

DePamphilis, 2010), why it is hard to derive a definitive conclusion of the relationship between firm size and abnormal returns.

According to IMF (2020), SMEs have been more negatively affected by COVID-19, compared to large companies. This stems from the fact that SMEs are more common in contact-intensive sectors, whilst also benefiting less from economic support interventions. Therefore, unlike many previous studies, a positive relationship between firm size and CAR is expected. As large deals are often associated with the relative size of the involved firms within a M&A, the determinant of our independent variable Firmsize, will be that of the deal value in thousands of EUR. The choice of applying associating deal size to the variable of firm size was decided after data had been collected from Zephyr. Unfortunately, other potential factors for explaining firm size (e.g., firm sales or total assets of bidder) had inadequate or complete lack of data that, we argue, would severely limit our sample size, and consequently damage this study. While not ideal, we argue deal size may serve as an adequate contender for determining firm size within the scope of this study. A similar association is found in Loderer and Martin (1990), where big deals are linked to larger acquirers.

Finally, for the regression analysis we apply the logarithmic deal value as the Firmsize variable. The logarithmic value of the deal size is commonly incorporated as a control variable when performing regression analysis post-event study of M&As (see Faccio, McConnell and Stolin, 2006).

4.4.2 Control Variables

Control variables are used for testing if additional elements of the event influence the dependent variable. Based on the empirical research covered in section 3, variables most frequently used in the literature and considered the most important to include, were added to the regression. Control variables constitute important components of the regression since they are used for enhancing its

reliability. The following subsections will elaborate more thoroughly on each control variable applied in the regression models.

4.4.2.1 Cross-border and Domestic M&As

Some empirical research has presented evidence for cross-border M&As generating greater abnormal returns than domestic transactions (Morck and Yeung, 1992; Danbolt and Maciver, 2012), whilst other have found the opposite to be true (Eckbo and Thorburn, 2000; Aw and Chatterjee, 2004) In Europe some countries are heavily dependent on tourism and contact intensive-sectors, while others are more dependent on industries or exportation of commodities for example. Therefore, COVID-19's impact probably varies depending on the underlying drivers of each country's economy. Moreover, the pandemic's dispersive impact on countries most likely creates more opportunities than normal for companies to execute value-adding cross-border M&As. That is why cross-border M&As are expected to influence acquirers CARs positively during the pandemic. To control for its potential impact a dummy variable was computed. The dummy variable was assigned the value of 1 if the target were domestic, and the value of 0 if the target is located abroad with regards to the bidding firm. Something that was done using country codes extracted from Zephyr.

4.4.2.2 Method of Payment

In general cash-bids generate more CARs for acquirers compared to equity-stake payments (Renneboog and Vansteenkiste, 2019). Moreover, M&A payments primarily consisting of equity-stakes often increases the investment risk. It could signal that managers perceive their company as overvalued and hence seek to exploit the favorable valuation to pay for M&As (Myers and Majluf, 1984; Martynova and Renneboog, 2009). Cash-bids, on the other hand, are often considered less risky and have shown positive correlation with higher abnormal returns for bidding firms (Travlos, 1987). Given the rapid recovery of equity markets, combined with abundant liquidity in financial markets, many companies currently possess high valuations and the ability to obtain cheap financing. However, despite current unprecedented circumstances in European equity markets, the

relationship between method of payment and abnormal returns are not expected to deviate from previous empirical findings. Thus, M&As using cash as the method of payment are expected to present greater and positive CARs compared to transactions using equity. In the regression analysis a dummy variable was computed and given the value of 1 if the method of payment was cash, and 0 if bidding firms used equity to pay for the transaction.

4.5 Regression Models

Below follows the regression models studied in this text as well as a summary of each variable included in the final version of the regression used for assessing the hypotheses formulated in this study. Each variable name, description, definition, and expected impact on acquirers' CARs have been synthesized into Table 5.1. To extensively answer our research topics, we apply a multiple regression analysis with several independent variables, as well as some control variables. Furthermore, to properly judge the effect the COVID-19 pandemic has on the chosen independent variables (and subsequently test Hypothesis 2 and 3), we create two interaction variables.⁶ Depending on the sign of each interaction variable, we may determine what impact COVID-19 has had specifically on firm size and the dummy variable for diversification.

Moreover, the CARs of the bidders, gathered from the event study, are applied as dependent variables. Similar methods have previously been applied within the literature of M&As (see for example Tampakoudis, et al., 2021). However, from the event study, CARs have been gathered by applying an event window of both 3 (t-1 & t+1) and 11 days (t-5 & t+5), leading to two series of CARs. To enhance our regressions, both series of CARs will be used as dependent variables, like the regression analysis of Goergen and Renneboog (2004).

⁶ Other options to study the explicit effect of Covid-19 on our chosen independent variables were to apply a difference-in-difference approach. However, given that these types of approaches are best sorted for panel data, where each observation is studied regularly over a certain period, it was decided to instead make use of interaction variables due to the cross-sectional nature of our sample data. For more on difference-in-difference methods, we invite the reader to explore Wooldridge (2013).

Lastly, our regression will be tested for both series of CARs, with and without our interaction variables, to give a first impression of the data and corresponding relationships between dependent, independent and control variables. In total, we perform six regressions, applying a range of six to seven variables:

1. $CAR_{1,i} = \alpha_{0,i} + \beta_1 D1_{\text{diversification},i} + \beta_2 D2_{\text{dealgeo},i} + \beta_3 D3_{\text{payment},i} + \beta_4 \text{Log Firmsize}_i + \beta_5 D4_{\text{covid-19},i} + \varepsilon_i$ *(Model 1)*
2. $CAR_{1,i} = \alpha_{0,i} + \beta_1 D1_{\text{diversification},i} + \beta_2 D2_{\text{dealgeo},i} + \beta_3 D3_{\text{payment},i} + \beta_4 \text{Log Firmsize}_i + \beta_5 D4_{\text{covid-19},i} + \beta_6 \text{Int } D1 \times D4_i + \varepsilon_i$ *(Model 2)*
3. $CAR_{1,i} = \alpha_{0,i} + \beta_1 D1_{\text{diversification},i} + \beta_2 D2_{\text{dealgeo},i} + \beta_3 D3_{\text{payment},i} + \beta_4 \text{Log Firmsize}_i + \beta_5 D4_{\text{covid-19},i} + \beta_6 \text{Int Log Firmsize} \times D4_i + \varepsilon_i$ *(Model 3)*
4. $CAR_{5,i} = \alpha_{0,i} + \beta_1 D1_{\text{diversification},i} + \beta_2 D2_{\text{dealgeo},i} + \beta_3 D3_{\text{payment},i} + \beta_4 \text{Log Firmsize}_i + \beta_5 D4_{\text{covid-19},i} + \varepsilon_i$ *(Model 4)*
5. $CAR_{5,i} = \alpha_{0,i} + \beta_1 D1_{\text{diversification},i} + \beta_2 D2_{\text{dealgeo},i} + \beta_3 D3_{\text{payment},i} + \beta_4 \text{Log Firmsize}_i + \beta_5 D4_{\text{covid-19},i} + \beta_6 \text{Int } D1 \times D4_i + \varepsilon_i$ *(Model 5)*
6. $CAR_{5,i} = \alpha_{0,i} + \beta_1 D1_{\text{diversification},i} + \beta_2 D2_{\text{dealgeo},i} + \beta_3 D3_{\text{payment},i} + \beta_4 \text{Log Firmsize}_i + \beta_5 D4_{\text{covid-19},i} + \beta_6 \text{Int Log Firmsize} \times D4_i + \varepsilon_i$ *(Model 6)*

where

$CAR_{1,i}$ =	Cumulative abnormal return of M&A i with an event window of 3 days (t-1 & t+1)
$CAR_{5,i}$ =	Cumulative abnormal return of M&A i with an event window of 11 days (t-5 & t+5)
$D1_{\text{diversification},i}$ =	Dummy for if the bidder and target are within the same industry for M&A i (1=diversified M&A, 0=related M&A)
$D2_{\text{dealgeo},i}$ =	Dummy for if bidder and target are from the same country for M&A i (1=cross border M&A, 0=domestic M&A)
$D3_{\text{payment},i}$ =	Method of payment for M&A i (1=M&A paid by cash, 0=M&A paid through shares)
Log Firmsize_i =	Log value of firm size of bidder in M&A i (determined by the value of the deal)
$D4_{\text{covid-19},i}$ =	Dummy if M&A i took place before or during the covid-19 pandemic (1=during, 0=before)
$\text{Int } D1 \times D4_i$ =	Interaction between $D1_{\text{diversification}}$ and $D4_{\text{covid-19}}$ for M&A i (calculated as $D1_{\text{diversification}} \times D4_{\text{covid-19}}$)
$\text{Int Log Firmsize} \times D4_i$ =	Interaction between firm size and $D4_{\text{covid-19}}$ for M&A i (calculated as $\text{Log Firmsize} \times D4_{\text{covid-19}}$)

Table 4.5. Summary of Independent Variables Used in the Regression Models

Description	Variable name	Definition	Expected Impact CAR
Related or diversified M&A	D1_diversification	= Dummy variable assigned a value of 1 if target is in the same industry and 0 otherwise.	Positive
Domestic or cross border M&A	D2_dealgeo	= Dummy variable assigned a value of 1 if target is from the same country as bidder and 0 if not.	Positive
Method of payment, in cash or by shares.	D3_payment	= Dummy variable assigned a value of 1 if payment method of M&A was cash and 0 if the method was equity	Cash = Positive Equity = Negative
Firm size as determined by deal value.	Log Firmsize	= Logarithmic value of the deal value of the M&A, applied to determine the size of the bidder and target.	Positive
M&A before or during the COVID-19 pandemic.	D4_covid-19	=Dummy variable assigned a value of 1 if the M&A transactions took place during the pandemic and 0 if it took place before.	Positive
Interaction variable 1.	Int_D1 x D4	= D1_diversification x D4_covid-19. Interaction variable that measures the impact of the COVID-19 dummy on the diversification dummy, explaining the partial effect of COVID-19 on CARs.	Positive
Interaction variable 2.	Int_Log Firmsize x D4	=Log Firmsize x D4_covid-19. Interaction variable that measures the partial effect of the covid-19 dummy on Log Firmsize, explaining the partial effect of COVID-19 on CARs.	Positive

4.6. Assumptions

When performing multiple regression, there exist certain assumptions that need to hold for your data to be properly analyzed. In Osborne and Waters (2002), the authors present these assumptions as *normality*, *homoskedasticity*, *linearity* and *reliability of measurement*. These will be addressed below.

4.6.1 Normality and the Treatment of Outliers

The normality assumption holds if the regression variables portray normally distributed observations. Outliers, or extreme values of the observations are problematic since they may unjustly affect the coefficients of a multiple regression analysis, leading to unfair or inaccurate interpretations of the relationships presented by the model. A common solution found in the literature is to trim the sample, to avoid any outliers from the mean. Evidently, this causes one major problem - reduction of the studied sample. This method has not been applied to the sample of this text due to it consisting mostly of dummy variables, and therefore, may only possess a value of either 1 or 0. The remaining numeric variables of CAR1, CAR2 and Firmsize have been dealt with differently. First, we use a Winsor-function for the dependent variables of CARs. Instead of trimming extreme values, winsorizing your data makes outliers adopt the same value as a low- and high percentile value of your choice. For this study, we choose to use the Winsor-function to make outliers adopt the values of the 5th- and 95th percentile. Moreover, as previously mentioned, we apply a level-log relationship for our multiple regression, since the logarithmic value for Firmsize is used within the regressions. Logarithmic values are often applied within statistics and have the advantage of transforming the data to normalized values (Bartlett and Kendall, 1946). Using the logarithmic values is frequently applied, especially if the variable only adopts positive values, which the variable for Firmsize does.

4.6.2 Homoskedasticity & Heteroskedasticity

Heteroskedasticity is a statistical problem, breaching the assumptions necessary to an OLS regression model (Wooldridge, 2013). It causes unreliability within regressions and should be

addressed before any regression analysis is performed. Put simply, heteroskedasticity is when the observations of your dependent variable vary significantly across the independent variables, making a regression model unfit in predicting a linear relationship. Luckily, one can test for heteroskedasticity using statistical programs. In Appendix 1, we perform a commonly used White test, in which you can run your regression model and test for homoskedasticity (i.e., the opposite of heteroskedasticity; Wooldridge, 2013). It works similarly to any statistical test that evaluates significance. It assumes a null hypothesis, which assumes homoskedasticity and an alternative hypothesis that assumes heteroskedasticity. In other words, should one receive a significant result in the test, one may reject the null hypothesis, and assume heteroskedasticity holds for the regression. As may be observed in Appendix 1, our White test shows no significance, leading to the decision of us failing to reject the null hypothesis stating homoskedasticity. Therefore, our regression illustrates no evidence that suggests heteroskedasticity and we may advance with our regressions (see Appendix 1).

4.6.3 Linearity

The third assumption demands that there should be a linear relationship between dependent and independent variables. In other words, the population and sample must be able to be described using the following equation:

$$y = \alpha_{0,i} + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \dots + \beta_nx_n + u$$

Where $\beta_1, \beta_2, \beta_3, \dots, \beta_n$ acts as unknown parameters and coefficients and u as the random error term (Wooldridge, 2013). One can control for linearity within the data by plotting standardized residuals and standardized predicted values in a scatter plot. Linearity is obtained when the plot adopts a rectangular shape (Osborne and Waters, 2002). In Appendix 2, we apply the scatter plot for both our dependent variables and may conclude from the figure that the linearity assumption holds for our regression.

4.6.4 Reliability

Reliability refers to this study's approach of collecting data and analyzing data yields consistent findings. According to Saunders, et al. (2019) the reliability of this study would be high if the methodological approach is transparent and possible to replicate, and if similar research designs would yield equivalent results. Using a deductive approach with a high degree of structure is considered to improve reliability since it offers less opportunities for individual interpretations (Ibid), which is why it was applied in this study. To enhance the reliability of this study the research design has been thoroughly explained in this chapter. Moreover, all data were gathered from well-known sources, all of which have been used in previous empirical studies analyzing the M&As. The MSCI Europe Index was also considered to be a reliable proxy for the market portfolio since it is a recognized benchmark for European equities. Finally, no test conducted on the assumptions associated with the regression analyses yielded any result which could question the reliability of this study.

4.7 Validity

Validity concerns if the findings presented in this study really correspond to what it is supposed to investigate (Saunders et al, 2006). To enhance validity, the authors gathered a large sample of M&As without excluding any particular sector nor European country. Using a large sample was considered to alleviate concerns regarding the validity of results. Since the research questions aim to derive general conclusions about European acquirers, and the M&A context in which they operate, using a large sample was considered necessary. Computing regression models using variables that have been applied in previous empirical studies analysing acquirers' short-term returns were also considered to favourable influence result validity.

As previously stated in section 4.3.4, this study solely analyzes acquirer's short-term performance due to current inadequate possibilities of measuring COVID-19's long-term effects. Since the pandemic is still present at the completion of this study, assessing COVID-19's long-term effects possess more potential in future studies. The results of this study are therefore limited to the

episode of COVID-19 that we have undergone thus far. That is why a conclusion regarding COVID-19's impact cannot be obtained yet. The validity of this study is therefore limited to the time frame investigated.

5. RESULT & ANALYSIS

In section 5 the results obtained from the event study and regression analysis are both presented. The results are throughout this section analyzed with regards to the literature review and previous empirical studies that have analyzed the variables of interest.

5.1 Descriptive and summary statistics

Originally the sample consisted of 1 154 observations. However, only 1 035 acquirers had sufficient price information extending over the estimation- and event windows. Then, only 918 transactions provided enough data about transaction value. The final version of this study's sample therefore consisted of 918 M&A transactions.

Table 5.1.1 synthesizes information about the overall characteristics exhibited by the sample of M&A transactions. During 2020 the number of transactions was approximately halved compared to the three years preceding it. Thus, unlike what neoclassical merger wave theorists would have predicted (Harford, 2005; Alexandridis et al., 2011), the financial shock caused by COVID-19 did not initiate a wave of mergers in 2020. In total acquirers demonstrated positive CARs for the sample period, but with a declining tendency. Analyzing the shorter event window implies that acquirers' CARs performed the worst during 2020. Moreover, except for median CARs, the same could be said for the longer event window. Unlike previous years, M&A announcements communicated in 2020 generally tended to yield negative short-term returns for acquirers. Showing that CARs were probably practically low in 2020 relative to other years. Another interesting aspect of Table 5.1.1 is that the longer event window demonstrated much higher standard deviations compared to other years. Thus, CARs surrounding M&A announcements in 2020 were apparently more volatile and tilted towards negative influences on acquirers' shareholder wealth. Important, however, is that these findings are not supported by significance tests and solely aims to depict a descriptive version of aggregated data.

Most M&A transactions were conducted within the Finance and Insurance, Manufacturing, and Service sectors. In general, M&A announcements demonstrated more shareholder wealth creation when measured during the longer event window. The only sector apparently demonstrating negative effects for both event windows was Wholesale trade. On the contrary, Retail trade generated the best CARs on average for both event windows. During the longer event window Agriculture demonstrated extensive negative returns and distinguished itself from other sectors, probably a combination of few transactions influenced by one transaction with extensively negative returns. Interestingly, no obvious difference could be distinguished in Table 5.1.1 between contact-intensive sectors, most eminently affected by the pandemic, and other sectors less dependent on physical interaction. Something that could be expected given COVID-19's different impact on sectors.

One of the most interesting insights gained from Table 5.1.1 is how relative size of acquirers influenced shareholder wealth. Previous empirical findings have presented quite contradictory results regarding the influence of acquirers' relative size on short-term returns (Fuller et al., 2002; Moeller, Schlingemann and Stultz, 2004; DePamphilis, 2010). Interestingly, Table 5.1.1 implies that large firms on average generate the lowest CARs for both event windows. Moreover, acquisitions announced by small companies generate more positive effects on shareholder wealth but are still outperformed by the medium sized enterprises. Therefore, Table 5.1.1 offers no obvious support for hypothesis 3.

Table 5.1.1: Summary Statistics of CAR by Category

This table presents information about how acquirers CAR has been influenced by each category of variables for both event window [,] and [,]. *Mean* and *Median* represents average and median CAR per category and sub-section, *Std.* represents standard deviation, *Min.* and *Max.* stands for the smallest and largest observation. The category *Year* aggregates M&A announcements communicated during each year. The category *Industry* and its sub-categories are based on Zephyr’s selection criterias. *Firm size* refers to the relative size of acquirers and consists of three sub-categories (i.e., small, medium, and large) based on deal value in thousands of EUR. 25% of the smallest companies were assigned the *small* sub-categories, 50% the *medium* one, and the *large* sub-section consisted of the biggest 25%.

Category	Summary Statistics by category											
	CAR (t-1 & t+1)						CAR (t-5 & t+5)					
	Mean	Median	Std.	Min.	Max.	Observations	Mean	Median	Std.	Min.	Max.	Observations
Year												
2016	1.39	0.81	4.81	-11.30	17.81	59	3.25	1.25	10.48	-22.30	44.06	59
2017	1.06	0.12	4.99	-7.04	40.73	246	2.80	0.88	11.69	-39.31	86.36	246
2018	0.02	0.07	3.73	-12.22	24.72	255	-0.40	-0.61	10.66	-39.49	73.59	255
2019	0.56	0.27	6.27	-20.59	76.61	233	1.68	0.99	10.69	-55.97	77.51	233
2020	-0.04	-0.00	5.80	-18.87	23.63	125	-1.52	0.00	23.23	-204.18	46.33	125
Total	0.52	0.11	5.17	-20.59	76.61	918	1.07	0.33	13.40	-204.18	86.36	918
Industry												
Agriculture	2.41	2.05	1.71	0.63	4.66	5	-40.57	-1.96	91.76	-204.18	12.27	5
Construction	0.00	-0.26	3.98	-10.89	8.37	15	0.61	0.75	14.78	-39.49	33.05	15
Finance, Insurance	0.24	-0.08	4.54	-11.31	34.76	145	-0.434	-0.30	8.08	-15.25	50.50	145
Manufacturing	0.48	0.24	3.78	-16.31	22.21	324	1.70	0.83	10.09	-39.31	73.59	324
Mining	-0.26	0.00	4.35	-10.01	16.38	39	1.14	0.30	15.88	-55.97	46.33	39
Retail Trade	2.83	1.32	8.38	-9.19	26.08	21	8.56	4.21	19.69	-19.31	74.48	21
Services	0.59	0.42	5.22	-20.59	40.73	271	1.31	0.53	13.24	102.52	86.36	271
Transportation	1.34	-0.03	9.51	-5.73	76.61	73	1.94	0.07	10.79	-15.95	77.51	73
Wholesale Trade	-1.42	-0.95	3.95	-15.85	5.63	25	-1.26	-0.13	9.25	-36.96	10.38	25
Total	0.52	0.11	5.17	-20.59	76.61	918	1.07	0.34	13.40	204.18	86.36	918
Firm size												
Small	0.53	0.16	4.30	-10.89	26.08	230	0.77	0.10	10.80	-39.49	74.48	230
Medium	0.67	0.20	5.78	-20.59	76.61	458	1.42	0.54	12.23	-102.52	77.51	458
Large	0.19	-0.03	4.64	-18.87	40.73	230	0.66	0.37	17.42	-204.18	86.36	230
Total	0.52	0.11	5.17	-20.59	76.61	918	1.07	0.33	13.40	-204.18	86.36	918

Table 5.1.2 displays that the amount of diversified M&As are more common than related transactions. However, diversified M&As are generally associated with lower CARs compared to transactions involving companies operating in related sectors. A phenomenon supported by previous empirical findings presented in Vishny (1990) and Flanagan (1996). Diversified M&As also displayed more volatile results compared to related transactions. Thus, the results imply that predicting the outcome of diversified M&As are more challenging.

With regards to the country specific relationship between M&A parties, Table 5.1.2 shows that cross-border deals are the most common. However, even though the difference is not that large, domestic M&As tend to generate higher CARs for acquirers than cross-border transactions.

Contradictive to the empirical findings presented by Morck and Yeung (1992) that indicates that equity markets tend to perceive cross-border deals more favorably. The standard deviation for cross-border transactions were also more extensive during both event windows, suggesting more volatility was associated with cross-border deals.

The distribution between choice of payment method payment is very equal. Unlike many previous empirical studies arguing that cash-bids in general generate better value for bidding firms in M&As (Myers and Majluf, 1984; Renneboog and Vansteenkiste, 2019), Table 5.1.2 does not exhibit characteristics obviously supporting that statement. In fact, payments conducted with cash have been associated with higher volatility throughout both event windows, and thus, assumed to be riskier. However, these findings are not statistically significant and confident conclusions have therefore not been obtained.

Table 5.1.2 presents much useful information about COVID-19's general impact on acquirers' shareholder wealth. Before COVID-19 caused disarray in European equity markets, acquirers demonstrated positive CARs regardless of event window. On the contrary, the opposite effects have been demonstrated thus far during the pandemic. Acquirers' shareholder wealth has generally experienced decreases following M&A announcements. Moreover, higher volatility is also associated with announcements made during COVID-19. Ultimately, unlike what hypothesis 1 assumed to be true, COVID-19's effect on bidding firms' shareholder wealth have not been positive according to Table 5.1.1. These results are contradictory to the empirical findings presented by Tampakoudis et al. (2021), which demonstrates that bidders had a statistically significant and positive effect on shareholder wealth during COVID-19. However, findings presented in Table 5.1.1 are not statistically significant and should not be interpreted as such, but it possesses explanatory power and highlights tendencies exhibited by the sample.

Table 5.1.2: Summary Statistics of CAR by Variable

This table presents how each event variable influences acquirers CAR for event window [,] and [,] are presented. *Mean* and *Median* represents the average and median CAR per category and sub-category, *Std.* represents standard deviation, *Min.* and *Max.* stands for the smallest and largest observation. Sub-category *Related* represents transactions were both parties operated in related sectors and *Diversified* displays deals involving parties operating in non-related sectors, *local* represents domestic deals and *cross-border* foreign deals, *Cash* includes cash-bid deals and *Shares* equity-stake deals, *Pre COVID-19* displays M&As announced before the pandemic (i.e. between 01/01/2016 until 19/02/2020) and *Post COVID-19* deals announced during the pandemic (i.e. 20/02/2020 until 31/02/2020). Each dependent and control variable were derived from the regression model in section 4.5.

Variable	Summary Statistics by variable						Summary Statistics by variable					
	CAR (t-1 & t+1)						CAR (t-5 & t+5)					
	Mean	Median	Std.	Min.	Max.	Observations	Mean	Median	Std.	Min.	Max.	Observations
Related or diversified												
Related	0.50	0.27	3.74	-12.22	24.72	299	1.61	0.96	12.35	-102.52	86.36	299
Diversified	0.53	0.08	5.73	-20.59	76.61	619	0.81	0.05	13.88	-204.18	77.51	619
Total	0.52	0.11	5.17	-20.59	76.61	918	1.07	0.33	13.40	-204.18	86.36	918
Local or cross-border												
Local	0.42	0.13	4.35	-18.87	34.76	296	1.70	0.46	10.50	-39.49	54.83	296
Cross-border	0.56	0.10	5.52	-20.59	76.61	622	0.77	0.31	14.58	-204.18	86.36	622
Total	0.52	0.11	5.17	-20.59	76.61	918	1.07	0.33	13.40	-204.18	86.36	918
Method of Payment												
Cash	0.66	0.08	5.81	-20.59	76.61	515	1.06	0.48	15.72	-204.18	86.36	515
Shares	0.33	0.15	4.20	-16.31	40.73	403	1.08	0.23	9.67	-36.96	46.33	403
Total	0.52	0.11	5.17	-20.59	76.61	918	1.07	0.33	13.40	-204.18	86.36	918
Pre or Post COVID-19												
Pre COVID-19	0.586	0.176	5.028	-20.588	76.608	811	1.459	0.439	10.988	-55.972	86.361	811
Post COVID-19	-0.013	-0.002	6.126	-18.869	23.633	107	-1.892	0.000	24.915	-204.177	46.330	107
Total	0.516	0.111	5.168	-20.588	76.608	918	1.068	0.335	13.400	-204.177	86.361	918

Table 5.1.3 displays an aggregated overview of the descriptive statistics obtained from the event study. The shorter event window presents a mean CAR of 0.516 percent, and a median CAR of 0.111 percent. The theme identified in the shorter event window implies that M&A announcements have had a positive impact on acquirers' shareholder wealth. Results obtained using the longer event window match those of the shorter one since it also implies that M&A announcements generally yielded a positive impact on acquirers' CARs. Mean and median CAR for the longer event window is 1.068 and 0.335 percent, respectively.

Shown in Table 5.1.3, and illustrated by variable *D1_diversification*, 32.6 percent of all M&As involved companies operating within related sectors. Thus, quite surprisingly, diversifying M&As constitute most transactions. Even though previous empirical findings have found diversifying M&As to induce more negative market reactions compared to related M&As (Morck, Shleifer and Vishny, 1990). *D2_dealgeo* shows that 32.2 percent of all transactions involved a domestic target, why many deals involve companies originating from different countries. *D3_payment* illustrates that cash constituted the preferred choice of payment since it accounts for 56.1 percent of all M&As. *Firmsize* shows that the market capitalization of acquirers ranged from approximately 249 and 858 thousand euros. Finally, *D4_covid-19* illustrates that most M&As were conducted before the pandemic and only 11.7 percent were announced during COVID-19.

Table 5.1.3: Descriptive statistics

This table summarizes data about each event window [,] and [,], but also every event variable of interest. *D1_diversification* represents the share of related M&As, *D2_dealgeo* represent the share of domestic transactions, *D3_payment* the proportion of M&As using cash as the method of payment, *Firmsize* represents bidders' firm size in thousands of euros (as determined by deal value), *D4_covid-19* stands for the proportion of deals announced during the pandemic. *Mean* and *Median* represents the average and median CAR per category and sub-category, *Std.* represents standard deviation, *Min.* and *Max.* stands for the smallest and largest observation. Calculations include the whole sample of M&A announcements.

Variable:	Descriptive Statistics						
	CAR (t-1 & t+1)	CAR (t-5 & t+5)	D1 diversification	D2 dealgeo	D3 payment	Firmsize (TEUR)	D4 covid-19
Mean	0.52	1.07	0.33	0.32	0.56	426.67	0.12
Median	0.11	0.34	0.00	0.00	1.00	425.50	0.00
Standard Deviation	5.17	13.40	0.47	0.47	0.50	249.33	0.32
Min.	-20.59	-204.18	0.00	0.00	0.00	1.00	0.00
Max.	76.61	86.36	1.00	1.00	1.00	858.00	1.00
Observations	918	918	918	918	918	918	918

Table 5.1.4 presents descriptive statistics for each independent and control variable of the regression, pre- and during COVID-19. As can be observed, the mean for *D1_diversification* decreases from pre- to during COVID-19, which suggests that related deals became less apparent for the period and diversified M&As more frequent, in line with our assumptions for hypothesis 2. One may make this conclusion given the characteristics of *D1_diversification*, which can only possess a value of either 1(=related M&A) and 0(=diversified). As the total mean for the variable

is less than 0.5, one can conclude that on average, more M&As were classified as diversified as compared to related, during the sample period. By the same logic, local M&As also became more frequent during the pandemic as compared to cross-border deals as Table 5.1.4 illustrates an increase in mean for D2_dealgeo. Moreover, the most prevalent method of payment within M&As in the sample are for both periods cash, indicated by a mean above 0.5 (Table 5.1.4). Lastly, the average firm size for bidders in the sample was lower for the period during COVID-19, relative to before. In other words, the average firm size (or deal value, as is the definition for this text) are roughly 37 TEUR less during the pandemic (Table 5.1.4).

Table 5.1.4: Descriptive statistics pre- and during COVID-19

This table summarizes data about each period of interest for the sample, namely pre- and during COVID-19, for each independent and control variable from the regression. *D1_diversification* represents the share of related M&As, *D2_dealgeo* represents the share of domestic transactions, *D3_payment* the proportion of M&As using cash as the method of payment, *Firmsize* represents bidders' firm size in thousands of euros (as determined by deal value). *Mean* and *Median* represents the average and median per variable, *Std.* represents standard deviation, *Min.* and *Max.* stands for the smallest and largest observation. Calculations include the whole sample of M&A announcements.

Descriptive statistics pre- and during COVID-19				
Pre-COVID-19	D1_diversification	D2_dealgeo	D3_payment	Firmsize (TEUR)
Mean	0.33	0.31	0.57	430.94
Median	0.00	0.00	1.00	433.00
Std.	0.47	0.46	0.50	251.65
Min.	0.00	0.00	0.00	1.00
Max.	1.00	1.00	1.00	858.00
Observations	811	811	811	811
During COVID-19	D1_diversification	D2_dealgeo	D3_payment	Firmsize (TEUR)
Mean	0.31	0.42	0.51	394.36
Median	0.00	0.00	1.00	394.00
Std.	0.46	0.50	0.50	229.45
Min.	0.00	0.00	0.00	12.00
Max.	1.00	1.00	1.00	853.00
Observations	107	107	107	107
Total	D1_diversification	D2_dealgeo	D3_payment	Firmsize (TEUR)
Mean	0.33	0.32	0.56	426.67
Median	0.00	0.00	1.00	425.50
Std.	0.47	0.47	0.50	249.33
Min.	0.00	0.00	0.00	1.00
Max.	1.00	1.00	1.00	858.00
Observations	918	918	918	918

5.2 Results of the Event Study

Table 5.2 provides empirical evidence, statistically significant for both event windows, that M&A announcements generally generated positive CARs for acquiring firms. The shorter event window displayed positive CARs of 0.516 percent and the longer window respectively yielded 1.068 percent. Both were statistically significant at a 1%-level, representing the highest degree of

certainty. The longer event window presents more extensive CARs compared to the shorter one. This probably stems from the fact that the longer event window encapsulates more trading days, hence can absorb more abnormal price movements. However, findings presented in both event windows support that M&As generally have generated increased shareholders wealth during the sample period, which is why the result is very reliable.

Announcements made before COVID-19 demonstrated positive effects on acquirers' shareholder wealth that are statistically significant at a 1%-level. For the short and long event window CARs are 1.459 percent and 0.586 percent, respectively. Reinforcing the fact that M&A announcements generally yield positive effects on acquirers' shareholder wealth. However, the most surprising finding of Table 5.2 is that CARs during the pandemic is negative for acquiring firms. The post-COVID-19 results are not significant but clearly distinguishes itself from the findings shown pre-pandemic. Additional insight that offers no evidence for hypothesis 1 being accurate.

Table 5.2: Results of the Event Study

In this table the results of the event study are aggregated and presented. Both columns named *All, J* and *All, J* refer to how all M&A announcements included in the sample influenced acquirers CAR for each event window. *Pre-COVID, J* and *Pre-COVID, J* represents acquirers' CARs for each event window and M&A announcements communicated before the pandemic (i.e. 01/01/2016 until 02/19/2020). *Post-COVID, J* and *Post-COVID, J* represents acquirers' CARs for announcements communicated during the pandemic (i.e. 20/02/2020 until 31/12/2020). *Constant* represents CAR for all computed columns. Statistical significance is represented by p-values.

Variables	Cumulative Abnormal Returns					
	All (t-1 & t+1)	All (t-5 & t+5)	Pre-covid (t-1 & t+1)	Pre-covid (t-5 & t+5)	Post-covid (t-1 & t+1)	Post-covid (t-5 & t+5)
	CAR	CAR	CAR	CAR	CAR	CAR
Constant	0.516*** (5.168)	1.068*** (13.400)	0.586*** (5.028)	1.459*** (10.988)	-0.013 (6.126)	-1.892 (24.915)
Observations	918	918	811	811	107	107
R-squared	0.000	0.000	0.000	0.000	0.000	0.000

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.3 Regression analysis

In the following section, results from the four multiple regression models are presented. However, before any regressions were applied and studied, a few corrections and adjustments to the data were implemented to reprimand common statistical problems and adhere to the assumptions related to using multiple regression models. Dealing with these was the first step in the regression analysis, to ensure reliable and stable models and refer to the assumptions presented in subsection 4.6. However, one last common statistical problem is yet to be mentioned, namely that of the independent variables being highly correlated with each other (i.e., multicollinearity). The following subsection addresses the problem and the authors method of dealing with it moving forward.

5.3.1 Multicollinearity

Multicollinearity causes biasedness in regression models, making them unfit for accurately predicting linear relationships (Wooldridge, 2013). Author Pallant (2013) encourages one to search for the occurrence of multicollinearity before performing any regression analysis. Generally, it is common practice to test for multicollinearity by performing a Pearson Correlation Matrix that directly observes all correlations between independent variables within the regression model. According to Pallant (2013), a correlation between two independent variables greater than or equal to 0.8 is considered critical and should be reprimanded by dropping one of the variables. Common practice usually sets this critical point at a correlation of 0.7. Nonetheless, in Table 5.3.1, we provide a complete Pearson Correlation Matrix of all independent and control variables applied in our models. Moreover, each correlations' significance is also presented in the form of stars, judged on a level of 1-10% significance. As Table 5.3.1 illustrates, none of the variables observed present correlations that meet the critical points. Therefore, we reject the notion of there existing a problem of multicollinearity among our independent variables and may commence the regression analysis. Table 5.3.1 may be of further interest since it indicates the sign of relationship between each variable, providing a base for the correlations later found in the regression models.

Table 5.3.1. Pearson Correlation Matrix

The table below depicts a Pearson Correlation Matrix of all correlation relationships between both dependent, independent and control variables. The dependent variables are *CAR_1* (cumulative abnormal returns earned by bidders for an event window of 3 days), *CAR_5* (cumulative abnormal returns earned by bidders for an event window of 11 days). The independent and control variables are *D1_diversification* (dummy variable for related vs. diversified M&As, 1=related and 0=diversified), *D2_dealgeo* (dummy variable for local vs. cross-border M&As, 1=local and 0=cross-border), *D3_payment* (dummy variable for method of payment used for the M&A, 1=cash and 0=shares/equity), *Log Firmsize* (Logarithmic value for Firmsize) and *D4_covid-19* (dummy variable that determines whether the M&A took place before or during the pandemic of COVID-19, 1=during and 0=before). Furthermore, correlations that are statistically significant are distinguished by *(statistically significant on a 10% level), *(statistically significant on a 5% level) and *(statistically significant on a 1% level).

Pearson Correlation Matrix							
Variable:	CAR_1	CAR_5	D1_diversification	D2_dealgeo	D3_payment	Log Firmsize	D4_covid-19
CAR_1	1.0000						
CAR_5	0.3655***	1.0000					
D1_diversification	0.0093	0.0279	1.0000				
D2_dealgeo	-0.0048	0.0325	-0.0518	1.0000			
D3_payment	0.0258	-0.0005	-0.0597*	0.0138	1.0000		
Log Firmsize	-0.0507	-0.0064	0.0088	-0.0689**	-0.0140	1.0000	
D4_covid-19	-0.0327	-0.0803**	-0.0134	0.0763**	-0.0412	-0.0126	1.0000

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.3.2 Regression of abnormal returns (t-1 & t+1)

Table 5.3.2 depicts the regression analysis results for Model 1, 2 and 3. These regards, as previously mentioned, cumulative abnormal returns using an event window of 3 days (t-1 & t+1, i.e., variable *CAR_1*). As can be observed, none of the relationships depicted indicate any statistical significance, meaning we are not able to sufficiently present evidence that suggests the COVID-19 pandemic has had any effect on M&As in Europe. Model 1 is our base regression, performed to give an indication of each relationship and sign before coefficient for each variable. To begin with, our diversification dummy suggests that a diversified M&A increases CARs, all else equal, in line with the results of some previous studies (e.g., Akbulut and Matsusaka, 2010), yet contradicting to the result found in most studies (see Morck, Shleifer and Vishny, 1990 and

Flanagan, 1996). However, given the insignificance of the coefficient, we may only conclude from the regression of Model 1 that related or diversified M&A has no effect on abnormal returns and subsequently shareholder wealth (Table 5.3.2). Similar results are presented by Chatterjee (1986), Lubatkin and O’Neill (1988) and Matsusaka (1993). Model 1 further suggests that domestic M&A deals incur a negative impact on CAR₁, as compared to cross-border M&As, keeping all else fixed (Table 5.3.2). Morck and Yeung (1992) and Danbolt and Maciver (2012) find in their respective studies that cross-border deals tend to increase abnormal returns, while using somewhat smaller samples. Eckbo and Thorburn (2000) find, using a significantly larger sample, that domestic M&As tend to earn better positive abnormal returns, which contradicts the sign presented for D2_dealgeo’s coefficient in Model 1. However, what our result indicates foremost is that the relationship between domestic vs. cross-border deals within M&A, appears to have no effect on cumulative abnormal returns. While the sign before the coefficients of D3_payment suggest that M&A deals paid through cash earns higher CAR₁, ceteris paribus, as compared to shares, Model 1 demonstrates no relationship of significance. As with Log Firmsize, the regressions from Model 1 argue that neither independent nor control variables have any statistically significant effect on cumulative abnormal return. The result for the COVID-19 dummy variable, suggests a negative impact on CAR₁, mimicking the results from the event study performed. Like with the event study, we fail to find evidence that supports the notion of M&As occurring during the pandemic have obtained superior abnormal returns, all else equal. In fact, the sign of the coefficient suggests a negative correlation with CAR₁, albeit insignificant.

In Model 2, we include an interaction term that helps explain the partial effect the COVID-19 pandemic has had on CAR₁, in the hope of accepting or rejecting hypothesis 2. The coefficient of D1_diversification now implies the partial effect of diversification if D4_covid-19=0. However, assuming the M&A took place during the pandemic (i.e., D4_covid-19=1), it implies a positive effect of D1_diversification of +0.76 (= -0.120 + 0.880*[1]), keeping all else fixed. Interestingly, if we were to receive significant results from the regressions, our models suggest that related M&As would have a positive impact on CAR₁, as compared to diversified keeping all else fixed,

contradicting our prediction. According to hypothesis 2, we predicted that diversification would have a positive impact on CARs during the pandemic, while Model 2 suggests the opposite outcome. Despite this, we are unable to draw any conclusion from the model, given the insignificance found across the variables. As with Model 1, none of the variables indicate to have a statistically significant effect on CAR₁.

For hypothesis 3, we employ Model 3. Similar and insignificant coefficients are observed for Model 3 as for 1 and 2, meaning we fail to find evidence that support our independent and control variables having an impact on bidders' CARs (Table 5.3.2). The only difference is portrayed by the variable D4_covid-19, where Model 3 suggests a positive relationship with CAR₁, as compared to Model 1 and 2. This change of sign before the coefficient is due to the inclusion of the interaction term Int Log Firmsize x D4, which adopts the negative relationship previously found by the COVID-19 dummy in Model 1 and 2. Given the negative sign of both Log Firmsize and the interaction variable, the interpretation is that larger firms (as determined by deal value) incurs a larger negative effect on CAR₁ during the pandemic as compared to before the virus. Once again, one should reiterate that the results of Models 1, 2 and 3 are not statistically significant according to our regression analysis, so one should be careful drawing any conclusions from the data.

Table 5.3.2. Regression results for Model 1, 2 and 3

The table below depicts the regression results of Model 1, 2 and 3. The dependent variable is *CAR_I* (cumulative abnormal returns earned by bidders for an event window of 3 days, %). The independent and control variables are *D1_diversification* (dummy variable for related vs. diversified M&As, 1=related and 0=diversified), *D2_dealgeo* (dummy variable for local vs. cross-border M&As, 1=local and 0=cross-border), *D3_payment* (dummy variable for method of payment used for the M&A, 1=cash and 0=shares/equity), *Log Firmsize* (Logarithmic value for Firmsize) and *D4_covid-19* (dummy variable that determines whether the M&A took place before or during the pandemic of COVID-19, 1=during and 0=before). Model 2 also uses the interaction term *int_D1 x D4* (measures the interaction between diversification and COVID-19 dummies, *D1_diversification* x *D4_covid-19*). Model 3 applies the interaction term *int_Log Firmsize x D4*, for the relationship between Firmsize and the COVID-19 dummy (*Log Firmsize* x *D4_covid-19*). Furthermore, each coefficients' standard deviations are presented in brackets. Coefficients that are statistically significant are distinguished by *(statistically significant on a 10% level), *(statistically significant on a 5% level) and *(statistically significant on a 1% level). The number of observations for each model, as well as R-squared values are also presented in the table.

Variables	Event Window: t-1 & t+1		
	Model 1 CAR (%)	Model 2 CAR (%)	Model 3 CAR (%)
D1_diversification	-0.021 (0.365)	-0.120 (0.388)	-0.026 (0.366)
D2_dealgeo	-0.140 (0.368)	-0.146 (0.368)	-0.151 (0.368)
D3_payment	0.311 (0.345)	0.316 (0.345)	0.317 (0.345)
Log Firmsize	-0.199 (0.169)	-0.197 (0.169)	-0.165 (0.177)
D4_covid-19	-0.572 (0.534)	-0.844 (0.642)	1.664 (3.418)
int_D1 x D4		0.880 (1.150)	
int_Log Firmsize x D4			-0.391 (0.591)
Constant	1.605 (1.032)	1.622 (1.032)	1.407 (1.075)
Observations	918	918	918
R-squared	0.004	0.005	0.004

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.3.3 Regression of cumulative abnormal returns (t-5 & t+5)

In Table 5.3.3 below, one may observe the regression results for Model 4, 5 and 6. As previously stated, these models apply CARs, using an event window of 11 days (t-5 & t+5), as dependent variables. Applying a larger window allows potentially missed factors that may affect abnormal returns, to be encapsulated in analysis. As a result, our models illustrate rather different relationships as compared to Model 1-3 (Table 5.3.3). Once again, we use Model 4 as a base regression, to obtain a general sense of each independent and control variable, before we include interaction terms. This time, D1_diversification illustrates a positive coefficient, indicating that related M&As produce greater and positive CARs, in line with many of the findings presented in this text (we refer to subsection 3.2.1). The variable D2_dealgeo also switches sign, as compared to Model 1, which indicates that domestic M&As earn better CARs than cross-border deals, all else equal. Variable D3_payment, which differentiates the method of payment for the M&A, suggests that M&As paid in cash earns the bidder negative CARs. Oppositely, Martynova and Renneboog (2009) and Travlos (1987) find contradicting results as compared to ours in their respective studies. However, it is worth emphasizing that their articles find statistically significant results, while we find no evidence that suggests that method of payment for an M&A has any significant effect on cumulative abnormal returns. Furthermore, Model 4 does imply that COVID-19 had a statistically significant negative effect, at a 5% level, on CAR_5. On average, M&As initiated during the pandemic earned the bidder roughly -3.5% less in CARs, ceteris paribus (Table 5.3.3).

For Model 5, the interaction term between our diversification and COVID-19 dummies, is also statistically significant, albeit weakly so at a 10% level. The negative sign of Int D1 x D4, suggests that related M&As performed worse during the pandemic, as compared to before. The total impact on CAR_5 during COVID-19 may be interpreted as: $1.130 - 1.854 * (1) = -0.724$. In other words, bidders involved in related M&As earned on average -0.724 percent less in cumulative abnormal returns during the pandemic as compared to before, keeping all else fixed. Given the interaction term's weak significance and negative impact on D_diversification, we may **accept** our

constructed hypothesis 2, that states bidders engaged in diversified M&As would earn higher abnormal returns during the pandemic. However, due to the weak significance the results only illustrate some evidence that suggest hypothesis 2 to hold.

Lastly, Model 6 also presents a weakly significant interaction term (Table 5.3.3). This time, the effects of COVID-19 are interacted with the variable of Log Firm size. As with Model 5, the addition of the COVID-19 pandemic results in larger bidders earning worse CARs than smaller bidders, all else being equal. This effect may be translated into: $0.165 - 2.591 * (1) = -2.426$. Given the logarithmic nature of Log Firm size, this impact can be interpreted as each additional percentage increase in firm size would earn the bidder, on average, -2.426 percent less in CARs during COVID-19 as compared to before, *ceteris paribus*. Furthermore, the weak significance of the interaction variable allows for some conclusion regarding hypothesis 3. As the interaction measures the impact of COVID-19 on firm size, there is some evidence of larger bidders, on average, earning less in abnormal returns during the pandemic. Therefore, we may **reject** hypothesis 3 that states larger bidders would earn more, on average (see section 3.4). The results thus differ to the conclusions of Cleary and Hossain (2020), who stated that larger bidders gained in the aftermath of the great recession, thanks to a tougher economic climate, better suited for large and financially unconstrained firms, making it possible to obtain targets at cheaper prices. Moreover, while none of the coefficients for the models are statistically significant, it is interesting that only Model 6 obtains a negative constant, possibly due to the relatively large D4_covid-19. It is probable that the COVID-19 dummy incorporates such a large extent of the overall positive impact found in the regression, consequently resulting in a negative constant.

Finally, low R-square values are observed across all models, indicating that the chosen independent and control variables' variance does a poor job (statistically speaking) to explain the variance of CAR_1 and CAR_5. This invites the discussion of whether the models are a good fit for determining what affects cumulative abnormal returns earned among bidders within M&A. However, R-squares like ours are commonly found within the regressions of literature of M&As

(see Kaplan and Weisbach, 1992; Morck and Yeung, 1992). Appendix 3 presents a combined table of all the regression models applied for this study.

Table 5.3.3. Regression results for Model 4, 5 and 6

The table below depicts the regression results of Model 4, 5 and 6. The dependent variable is *CAR_5* (cumulative abnormal returns earned by bidders for an event window of 11 days, %). The independent and control variables are *D1_diversification* (dummy variable for related vs. diversified M&As, 1=related and 0=diversified), *D2_dealgeo* (dummy variable for local vs. cross-border M&As, 1=local and 0=cross-border), *D3_payment* (dummy variable for method of payment used for the M&A, 1=cash and 0=shares/equity), *Log Firmsize* (Logarithmic value for Firmsize) and *D4_covid-19* (dummy variable that determines whether the M&A took place before or during the pandemic of COVID-19, 1=during and 0=before). Model 5 also uses the interaction term *int_D1 x D4* (measures the interaction between diversification and COVID-19 dummies, *D1_diversification* x *D4_covid-19*). Model 6 applies the interaction term *int_Log Firmsize x D4*, for the relationship between Firmsize and the COVID-19 dummy (*Log Firmsize* x *D4_covid-19*). Furthermore, each coefficients' standard deviations are presented in brackets. Coefficients that are statistically significant are distinguished by *(statistically significant on a 10% level), *(statistically significant on a 5% level) and *(statistically significant on a 1% level). The number of observations for each model, as well as R-squared values are also presented in the table.

Variables	Event Window: t-5 & t+5		
	Model 4 CAR (%)	Model 5 CAR (%)	Model 6 CAR (%)
D1_diversification	0.820 (0.945)	1.030 (1.004)	0.784 (0.944)
D2_dealgeo	1.147 (0.951)	1.158 (0.951)	1.077 (0.951)
D3_payment	-0.076 (0.892)	-0.086 (0.893)	-0.038 (0.892)
Log Firmsize	-0.066 (0.437)	-0.071 (0.438)	0.165 (0.458)
D4_covid-19	-3.469** (1.381)	-2.895 (1.661)	11.333 (8.829)
int_D1 x D4		-1.854* (2.976)	
int_Log Firmsize x D4			-2.591* (1.527)
Constant	1.255 (2.669)	1.219 (2.671)	-0.060 (2.777)
Observations	918	918	918
R-squared	0.009	0.009	0.012

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6. DISCUSSION

In section 6, the authors discuss the findings presented in the previous section. The implications of the results are discussed extensively, as well as the believed cause for each finding. The authors apply their knowledge of previous literature within the subject of M&As, and attempt to connect their findings with that of the literature. Theories and hypotheses are, if relevant, attributed to the results to help explain the findings presented by this thesis. Lastly, the authors end this section with proposals for future studies and research within the subject.

6.1 Discussion of Theory

An M&A transaction is considered value-enhancing if the proposed synergies arising from the deal exceeds all associated transaction costs. For example, according to Chatterjee (1986) and Bower (2001), successful M&As most often achieve financial or strategic synergies. Moreover, if investors interpret the M&A announcement as value-enhancing, then the acquiring firm's valuation should undeniably rise. However, unlike before the pandemic, acquirers' CARs demonstrated negative returns during COVID-19. This implies that the market perceived M&A announcements communicated during the pandemic more negatively, thus less able to generate value-enhancing synergies. Even though the event study does not present statistically significant evidence during COVID-19 in Table 5.1.4, it does deviate from pre-pandemic findings. Another interesting tendency shown in the event study is that large firms incur more extensive negative CARs compared to SMEs. Implying that the market has assumed large bidders to be less capable of incorporating proposed synergies compared to SMEs during COVID-19. Thus, hypothesis 3 assuming acquirers CARs to demonstrate a positive relationship with firm size during COVID-19, have not received statistical support.

Potential explanations about why large firms tend to perform worse than SMEs could be derived from agency theories. Managerial compensation is often tied to the amount of assets under management or firm value. Harford and Li (2007) presents empirical evidence illustrating that managers repeatedly have grown their organization out of optimal proportions and received extensive compensation while doing so. In such cases, managers often pursue M&As without sufficient due diligence to assess its potential downside, hence jeopardizing shareholder wealth in the process (Gaughan, 2007). Managerial-hybris therefore often induces elusive synergy

estimations that overstates the potential upside of M&A transactions. According to Raj and Forsyth (2003) acquirers likely to suffer from managerial-hybris performed significantly worse than well-managed companies following M&A announcements. DePamphilis (2010) states that large acquirers in general tend to be less cautious when assessing M&A opportunities, since they are often less restricted by capital funding. Agency costs typically associated with larger companies could potentially offer an explanation about CAR does not show a positive relationship with firm size in our sample.

Another interesting finding is that the proportion of diversifying M&As grew during the pandemic. The share of diversifying M&As increased from 67.4 percent pre-pandemic to 69.4 percent during COVID-19, illustrated by Table 5.1.4. As previously stated in hypothesis 2, this reaction was anticipated to occur due to the economic climate caused by COVID-19. These assumptions were derived from merger wave theories presented in section 2.4. Even though a proper merger wave has not been initiated by the pandemic thus far, merger wave theories offer explanations about why the proportion of diversifying M&As increased. According to the behavioral view of merger waves, most corporate managers utilize long-term strategies but are willing to exploit temporary mispricing to enhance their long-term performances (Gugler et al., 2012). In time increasing value dispersion between sectors, tendencies shown during COVID-19 (IMF, 2020), growth-seeking managers could exploit favorable valuations to acquire less fortunate targets. Companies operating in sectors under heavy pressure from COVID-19 could therefore constitute attractive M&A targets. On the contrary, companies active in sectors less negatively impacted by COVID-19 could seek to exploit current value dispersion between. Why the proportion of diversifying M&As could potentially have increased during COVID-19. Interestingly, the proportion of equity-bids increased from 43.2 percent pre-pandemic to 49.5 percent post COVID-19. Given the rapid rebound of European equity markets during the last two quarters of 2020, illustrated by the MSCI Europe index, equity-bids could potentially have constituted an attractive method of payments for companies less adversely affected by the pandemic. Hence, potentially an effective way for

companies possessing a high valuation to acquire targets more stressed by the impact of the pandemic.

Another aspect worth noticing is that the longer event window demonstrates more extensive CARs throughout the event study. Something quite intuitive since it encapsulates more trading days. However, in a perfectly efficient market all information communicated in the M&A announcement would be correctly priced immediately, which is why there should be no noticeable difference between the event windows according to the EMH (Fama, 1970). But, since information flows are seldom symmetrical among market participants (Miller and Rock, 1985), this study assumed that a semi-strong market efficiency was prevailing. An assumption somewhat eroded by the differences shown in CARs for each event window. However, Ikenberry, Lakonishok and Vermaelen (1995) have identified that the market often requires additional time to adjust its initial valuation. Therefore, even though variances between event windows were detected, the results are still considered to possess explanatory power. Supported by the findings presented in Table 5.2. were both event windows illustrated that M&As had a significantly positive impact on CAR before the virus, and a negative but insignificant impact during the pandemic.

6.2 Discussion of the Event Study and Regression Analysis

By the results of the event study, one is not able to statistically conclude that CARs have improved during the COVID-19, as stated by hypothesis 1. Nor are we able to find convincing evidence that proclaims that CARs have worsened during the pandemic, despite being indicative of it, as the results are statistically insignificant. Therefore, we fail to both accept and reject the first hypothesis of this thesis. However, the results do contribute to literature as the event study presents highly statistically significant and positive CARs for bidders, before the outburst (as defined by this text) of COVID-19 and for the entire sample period combined. Although CARs for bidders are greater when an event window of 11 days is applied, both studied definitions of cumulative abnormal returns present positive figures for the period of 2016-2020 in the Europe region. Therefore, our thesis finds evidence of shareholders, generally, improving their wealth in the form of bidders' CAR. Articles such as Danbolt (2004), Conn et al. (2005) and Ushijima (2010), find similar results

of bidders earning positive CARs and subsequently increasing shareholder wealth. In contrast, Graham et al. (2002), Bouwman et al. (2009), Wang and Xie (2009) and Ahn (2010), find conflicting results that indicate negative abnormal returns earned by bidders. Interestingly, the articles that present negative abnormal returns in their respective samples, all analyses the effect within the U.S market of M&As. Generally, throughout the research collecting process of this text, it has been a regular discovery that the U.S M&A market tends to perform opposingly to other regions where similar studies are carried out. It might be that the sophisticated and large U.S market is more efficient than other countries' stock markets, at correctly and quickly price the announcement of M&As. This is speculation, yet an interesting observation that might be worth remarking for future research.

Moreover, our event study fails to statistically confirm the results of Tampakoudis, et al. (2021), who suggest that acquirers generally obtained better CARs during the COVID-19 pandemic, and subsequently improved shareholders' wealth. The sample of this thesis and that of the authors are of similar size, however Tampakoudis, et al. (2021) study the effect within the U.S while this text studies that of the Europe region. This might be due to the presence of SMEs being more prevalent in the Europe region, which IMF (2020) states have, on average, been more negatively affected by COVID-19. Alternatively, it may simply be due to the U.S stock market being quicker to recover from the original price drops caused by the outbreak, as compared to European markets (IMF, 2020).

Model 4 of the regression illustrates that, on average, European bidders have suffered negatively regarding CARs during the pandemic as compared to before. This relationship is somewhat statistically significant but does not explain how the COVID-19 has impacted the market of European M&As. Nor does it explain what factors have specifically caused this negative impact more than that they appear to be present during the pandemic. In the hope of answering this question we constructed hypothesis 2 and 3, and deployed Model 5 and 6. By Model 5, we can accept hypothesis 2, given the weak yet statistically significant coefficient of the interaction term between our diversification and COVID-19 dummies. The results then indicate that COVID-19 had a direct negative impact on the relationship between related M&As and CARs (Table 5.3.3).

As presented in subsection 4.4.1, we believe the economic climate brought by the COVID-19 virus have affected industries differently. Thus, bidders of industries that have fared better during the pandemic will have a direct advantage over targets within industries that have fared worse. Although with weak significance, this consequence may be attributable towards the impact of this thesis first interaction term.

Furthermore, Model 6 presents weak evidence that allows us to reject hypothesis 3, regarding firm size. As stated by the previous paragraph, the economic climate has affected actors within corporate markets differently. We believed that larger bidders would have a similar advantage as presented above during the pandemic, compared to smaller bidders who are more financially constrained. Our prediction was to receive results in the same vein as Cleary and Hossain (2020), who state that larger bidders gain during and after times of financial crises, as their overall financial position is more stable. The results are especially surprising given the report presented by IMF (2020), that states SMEs have been more negatively affected by COVID-19. However, according to Loderer and Martin (1990) and DePamphilis (2010), larger bidders suffer more predominantly from agency costs, represented in lower CARs. It might be that the harsh and unpredictable financial climate brought on by the pandemic has left shareholders skeptical towards new announcements in general. The information gap between shareholders and management might have increased further during COVID-19, increasing distrust among the two sides. Generally, larger public firms attract more shareholders. Therefore, it is plausible that the impact of shareholders of larger bidders being skeptical towards new M&As during a time of general economic uncertainty, have a bigger effect than that of smaller bidders with less shareholders. This may, in turn, accumulate into a more significant negative response towards new M&A announcements, resulting in lower CARs for larger bidders.

Finally, as our regression suffers of low (or none) statistical significance, for most independent and control variables we fail to determine whether factors such as related vs. diversified deals, local vs. cross-border M&As, method of payment or firm size has any effect on the CARs earned by bidders in Europe. While the relationships portrayed by the regressions show signs that both support and oppose previous literature, lack of significance means we cannot make statistically

accurate assumptions regarding what affect bidders' CARs within M&As. In other words, we do not find sufficient evidence to suggest factors tested, within the scope of this text, impact abnormal returns and in effect, affect shareholder wealth. What one may conclude from the results is that there exists statistically significant evidence that imply European bidders managed to earn positive cumulative abnormal returns during the period of 2016-2020. We also find evidence of acquirers CARs being negatively affected by our COVID-19 dummy, but we may not fully know what factors contributed to this impact. These observations are of interest for future research and to those who aim to explore more of the impact the pandemic had on the market of M&As, which will be discussed more extensively in the next subsection.

6.3 Proposal for Future Studies

This thesis is limited to only observe and study the short-term effect of COVID-19 on M&As. For future research we encourage a long-term perspective while evaluating the impact of COVID-19 to properly explore the consequences of the pandemic on the M&A markets. Therefore, a longer time horizon may unveil interesting findings that are not able to be revealed within this study. Despite the weak or complete statistically insignificant findings, we believe that there exist factors that have been radically changed by COVID-19 within the study of M&As. As it stands, some explanatory variables may have been excluded or that the variables of this text are yet to yield statistically significant results that are observable with a short-term perspective. A longer time frame of abnormal returns will, perhaps, enable statistical evidence to emerge, even for the variables within this text.

Lastly, the authors of this paper speculate that differences may be present between the U.S and European markets of M&As, regarding bidders' CARs during COVID-19. The article by Tampakoudis, et al. (2021) demonstrates American bidders earning positive CARs, while the results of this study suggest, but fail to statistically prove, that European bidders earned negative CARs during the pandemic. Future research might want to compare and reflect further regarding these differences and conclude whether the two regions have indeed reacted differently to the virus.

7. CONCLUSION

Section 7 provides a summary of the event study and regression results as well as a conclusion to the discussion from the previous section. It is here the authors ultimately resolve the presented study and thesis.

The objective of this thesis has been to study the impact of COVID-19 on European bidders' CARs, and subsequently shareholder wealth. To do so, the study uses a sample consisting of 918 M&As carried out during the period of 2016-2020. The purpose has been to evaluate differences of earned CAR, before and during the pandemic and try to explain certain changes to the factors normally deployed to measure CAR, through a regression analysis. To obtain bidders' CARs, an event study was carried out, using an event window of 3 (t-1 & t+1) and 11 days (t-5 & t+5). The results presented by the event study suggest that European bidders effectively achieved positive CARs throughout the entire sample period, at a 1% level of significance. Moreover, the event study also presented highly significant positive CARs for bidders for the period before COVID-19 (which has been determined as 20th February 2020), yet negative and statistically insignificant CARs during the pandemic. The CARs presented by the event study were then applied as dependent variables in the regression analysis. For the regression analysis, the authors make use of 6 regression models with a total of five independent and control variables. Additionally, two interaction variables were created to help determine the effect COVID-19 has had on the independent variables. The independent variables used were a dummy variable that determined whether an M&A had been related or diversified (1=related and 0=diversified), the logarithmic value of firm size for each bidder and a dummy variable that determined whether the M&A had taken place before or during the pandemic (1=during and 0=before). Through the interaction variables, the authors manage to find some evidence that suggests COVID-19 to negatively affect related deals and larger bidders in M&As, although the relationships are only weakly significant. Furthermore, the dummy variable for COVID-19 suggests there to be a statistically significant negative effect on European bidders' CARs, but the authors are unable to fully explain what factor may cause this. As for the other control variables, the regression analysis finds no statistically significant evidence that imply that local or cross-border M&As or the method of payment has any

effect on bidders' CARs and, subsequently, shareholders' wealth. This result differs from that of many of the studies performed within the literature of mergers and acquisitions.

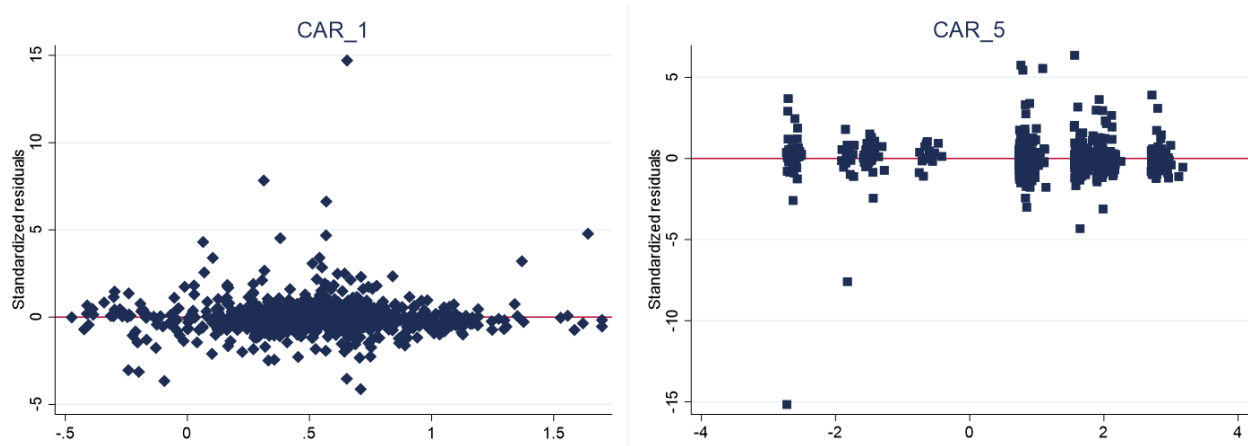
8. APPENDIX

Appendix 1. White Test for homoskedasticity

The following table presents a White Test, performed in Stata, for *homoskedasticity*, *skewness* and *kurtosis*. For *homoskedasticity*, the test is performed by running a regression for each dependent variable (*CAR_1* and *CAR_5*), using the independent and control variables of regression models 1 and 4 (*D1_diversification*, *D2_dealgeo*, *D3_payment*, *Log Firmsize* and *D4_covid-19*). The null hypothesis of the statistical test assumes *homoskedasticity*, while the alternative hypothesis assumes unrestricted *heteroskedasticity*. If one fails to reject the null hypothesis, one must assume the model to suffer from *heteroskedasticity*. Luckily, both our regression obtains such high p-values for *heteroskedasticity*, that we **fail to reject the null**, which assumes *homoskedasticity*.

White Test for homoskedasticity				
Homoskedasticity Test for CAR 1				
White Test	Chi-Squared	Degrees of Freedom	P-value	Decision
Heteroskedasticity	9.72	11	0.5560	Fail to reject
Skewness	21.34	4	0.0003	Reject
Kurtosis	25.17	1	0.0000	Reject
Total	56.23	16	0.0000	-
<i>Ho: homoskedasticity</i>				
<i>Ha: unrestricted heteroskedasticity</i>				
Homoskedasticity Test for CAR 5				
White Test	Chi-Squared	Degrees of Freedom	P-value	Decision
Heteroskedasticity	6.86	11	0.8100	Fail to reject
Skewness	2.84	4	0.5846	Fail to reject
Kurtosis	1.37	1	0.2416	Fail to reject
Total	11.08	16	0.8047	-
<i>Ho: homoskedasticity</i>				
<i>Ha: unrestricted heteroskedasticity</i>				

Appendix 2. Scatter plot of standardized residuals, illustrating linearity.



Appendix 2 depicts two scatter plots of standardized residuals for Model 1 (CAR_1) and 4 (CAR_5). To assume linearity holds for the regression, one would have residuals displaying a rectangular shape pattern, more noticeably portrayed by Model 4 (CAR_5).

Appendix 3. Summary regression results

The table below depicts the regression results of Model 1-6. The dependent variable for Model 1-3 is *CAR_1* (cumulative abnormal returns earned by bidders for an event window of 3 days, %). Dependent variable for Model 4-6 is *CAR_5* (cumulative abnormal returns earned by bidders for an event window of 11 days, %). The independent and control variables are *D1_diversification* (dummy variable for related vs. diversified M&As, 1=related and 0=diversified), *D2_dealgeo* (dummy variable for local vs. cross-border M&As, 1=local and 0=cross-border), *D3_payment* (dummy variable for method of payment used for the M&A, 1=cash and 0=shares/equity), *Log Firmsize* (Logarithmic value for Firmsize) and *D4_covid-19* (dummy variable that determines whether the M&A took place before or during the pandemic of COVID-19, 1=during and 0=before). Model 2 and 5 also uses the interaction term *int_D1 x D4* (measures the interaction between diversification and COVID-19 dummies, *D1_diversification x D4_covid-19*). Models 3 and 6 apply the interaction term *int_Log Firmsize x D4*, for the relationship between Firmsize and the COVID-19 dummy (*Log Firmsize x D4_covid-19*). Furthermore, each coefficients' standard deviations are presented in brackets. Coefficients that are statistically significant are distinguished by *(statistically significant on a 10% level), *(statistically significant on a 5% level) and *(statistically significant on a 1% level). The number of observations for each model, as well as R-squared values are also presented in the table.

Variables	Event Window: t-1 & t+1			Event Window: t-5 & t+5		
	Model 1 CAR (%)	Model 2 CAR (%)	Model 3 CAR (%)	Model 4 CAR (%)	Model 5 CAR (%)	Model 6 CAR (%)
D1_diversification	-0.021 (0.365)	-0.120 (0.388)	-0.026 (0.366)	0.820 (0.945)	1.030 (1.004)	0.784 (0.944)
D2_dealgeo	-0.140 (0.368)	-0.146 (0.368)	-0.151 (0.368)	1.147 (0.951)	1.158 (0.951)	1.077 (0.951)
D3_payment	0.311 (0.345)	0.316 (0.345)	0.317 (0.345)	-0.076 (0.892)	-0.086 (0.893)	-0.038 (0.892)
Log Firmsize	-0.199 (0.169)	-0.197 (0.169)	-0.165 (0.177)	-0.066 (0.437)	-0.071 (0.438)	0.165 (0.458)
D4_covid-19	-0.572 (0.534)	-0.844 (0.642)	1.664 (3.418)	-3.469** (1.381)	-2.895 (1.661)	11.333 (8.829)
int_D1 x D4		0.880 (1.150)			-1.854* (2.976)	
int_Log Firmsize x D4			-0.391 (0.591)			-2.591* (1.527)
Constant	1.605 (1.032)	1.622 (1.032)	1.407 (1.075)	1.255 (2.669)	1.219 (2.671)	-0.060 (2.777)
Observations	918	918	918	918	918	918
R-squared	0.004	0.005	0.004	0.009	0.009	0.012

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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