SCHOOL OF
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Does Sustainability Matter?

Analysis of the Impact of Corporate Sustainability on Financial Markets in the Context of Acquisitions

by

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Abstract

The concept of sustainable investing has gained importance in recent years, considering the growing share of sustainable investments compared to the total volume of global investments. The rise of sustainable investment has not only led to changes on the part of investors, but also to changes of a strategic nature on the part of companies. In this context, Green Mergers and Acquisitions represent a new strategic tool, whereby companies selectively acquire target companies with excellent sustainability standards. This study therefore examines the extent to which the concept of corporate sustainability is valued in the financial markets through green mergers and acquisitions by investigating whether such acquisitions generate short-term shareholder wealth. Furthermore, the study examines which, if any, of the three sustainability dimensions, captured in the ESG framework, exert the greatest influence on shareholder wealth. The study is based on a quantitative approach, is deductive in nature and is based on the event study methodology. In addition, OLS multiple linear regression models were used to examine the relationship between the level of corporate sustainability of the target companies and the cumulative abnormal return. The results of the study reveal an existing correlation between the level of corporate sustainability of target companies and the shareholder wealth of the acquirers' shareholders. Furthermore, the results reveal that only the social dimension of the ESG framework has a significant positive impact on shareholder wealth, whereas the remaining two dimensions do not have a significant impact.

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List of Abbreviations

AR	Abnormal Return
BJ	Bera-Jarque
BLUE	Best Linear Unbiased Estimators
CSR	Corporate Social Responsibility
CAR	Cumulative Abnormal Return
DW	Durbin-Watson
ENV	Environment
ESG	Environmental, Social, and Governance
EU	European Union
Gretl	Gnu Regression, Econometrics and Time-series Library
GOV	Governance
GMA	Green Mergers and Acquisitions
IVA	Intangible Value Assessment
M&A	Mergers and Acquisitions
OLS	Ordinary Least Square
RE	Refintiv Eikon
ROA	Return on Assets
SOC	Social
SIC	Standard Industrial Classification
TBL	Triple Bottom Line
UK	United Kingdom
UN	United Nations
US	United States

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1. Introduction

1.1. Background

Fueled by the advancing climate change and a multitude of corporate scandals, the investment behavior among investors and companies has changed in recent years (Losse & Geissdoerfer, 2021). The change in behavior becomes evident when looking at the volume of *sustainable investments* (Global Sustainable Investment Alliance, 2021). While in 2016 sustainable investments accounted for 27.9 percent of the global total, by 2020 sustainable investments represented 35.9 percent of global assets under management (Global Sustainable Investment Alliance, 2021). Sustainable investment refers to an investment approach that incorporates *environmental, social and governance* [ESG] considerations (Global Sustainable Investment Alliance, 2021). The foundation of such investments are companies that demonstrate superior sustainable corporate behaviour and thus represent investment opportunities for sustainable investors (Global Sustainable Investment Alliance, 2021). Within the concept of sustainable investing, a variety of investment strategies have emerged over the past decades (Renneboog, Ter Horst, & Zhang, 2008). Most often, these strategies rely on non-financial information provided by companies to report on their sustainable activities (Billio, Costola, Hristova, Latino, & Pelizzon, 2020). In this context, ESG ratings take a central role, as they attempt to analyze the flood of non-financial information and summarize it in a single, easy-to-understand rating that enables investors and companies to make sustainable investment decisions (Billio et al., 2020).

The growth in the sustainable investment segment influences a wide range of strategic decisions on the part of companies. Among these strategic decisions, *Green Mergers and Acquisitions* [GMA] represent an opportunity to promote sustainable investment alongside external growth (Zhao & Jia, 2022). GMA is a form of *Mergers and Acquisitions* [M&A] in which acquiring companies place particular emphasis on *Corporate Social Responsibility* [CSR] and related ESG factors on the side of the target company as well as during the whole M&A process (Salvi, Petruzzella, & Giakoumelou, 2018). Compared to other strategic decisions, GMAs enable the rapid adoption and integration of clean technologies (Li, Chaohua, Dbouk, & Zhao, 2021) and convey to stakeholders a sustainable and socially responsible attitude of the acquiring company (Zhao & Jia, 2022). Heavy polluting Chinese companies, for example, try to escape government-imposed fines and closures through GMAs (Li, Xu, McIver, Wu, & Pan, 2020).

Thus, promoting external growth, reducing risks and improving the company's public image, among other things, constitute the main drivers of GMA (Salvi, Petruzzella, & Giakoumelou, 2018).

1.2. Problematization

A review of the existing academic literature conducted by Talan and Sharma (2019) covering 213 research papers from 1989 to 2018 revealed a research gap regarding "the impact of ESG rankings on the financial performance of an organization" (Talan & Sharma, 2019, p. 11), which forms the foundation of this study. Considered separately, both sustainable investments and M&A have already been extensively covered in the academic literature (Halpern, 1983; Capron & Pistre, 2002; Godfrey, 2005; Zollo & Meier, 2008; Godfrey, Merrill, & Hansen, 2009). Within the scope of sustainability related literature, empirical studies of sustainable investments have produced diverging results. While, for example, many scholars demonstrate that sustainable investment funds perform better than non-sustainable investment alternatives (Barnett & Salomon, 2006; Weber, Mansfeld, & Schirrmann 2010; Derwall, Guenster, Bauer, & Koedijk, 2005), others arrive at contradictory results. Among those, Bauer, Koedijk, and Otten (2005) report that the returns of sustainable investment funds in the U.S. and the U.K. are equal to the returns of traditional funds. Renneboog, Ter Horst, and Zhang (2008) further claim that sustainable investment funds in the U.S., the U.K., and many European and Asian countries deliver inferior results compared to domestic benchmarks.

M&A, on the other hand, have been discussed mainly in the scope of corporate finance literature and have received much less attention in the sustainability related literature (Rohra & Chawla, 2015). Many of the studies conducted focus on the impact of M&A on the performance of both the target and the acquiring firm (Piesse, Lee, Lin, & Kuo, 2006; Calipha, Tarba, & Brock, 2010). The existing literature attributes a positive impact of M&A transactions on target firms (Piesse et al., 2006). More specifically, M&A lead to an enrichment of the target company's shareholders, as acquiring companies often pay more than the current market value of the company (Jensen & Ruback, 1983). Datta, Pinches, and Narayanan (1992) further specify that the wealth of shareholders, operationalized as the Prediction Error, of the target company increases, while shareholders of the acquiring company face a reduction in their share wealth (Jarrell, Brickley and Netter, 1988; Jensen and Ruback, 1983). An examination of the theoretical and empirical literature leads Datta, Pinches, and Narayanan (1992) to five factors that form a basis for explaining the differences in the formation of shareholder wealth between

target and acquiring firms. These factors include changes in regulatory nature, the number of bidding firms, the approaches of the bidders (e.g., merger vs tender offer), the method of payment (e.g., shares vs cash) and the nature of the M&A transaction (e.g., conglomerate vs non-conglomerate) (Datta, Pinches, and Narayanan, 1992). Other factors, such as corporate sustainability and its impact on M&A, have not been investigated with sufficient frequency according to the authors (Gomes, 2019; Datta, Pinches, & Narayanan, 1992)

Although the results of many studies diverge, the current state of research has revealed that considered in isolation topics related to sustainable investing and closely related corporate sustainable behaviour, as well as M&A, have been extensively studied. At the same time, an understudied area was uncovered that lies at the intersection of the corporate finance and sustainability literature, see Figure 1. To date, few studies have been conducted on the impact of GMA on value creation for the acquiring firm's shareholders, highlighting a need for further studies examining this relationship (see Aktas, De Bodt, & Cousin, 2011; Deng, Kang, & Low, 2013; Zhang, Li, & Zhang, 2019; Shi, Yu, & Li, 2022).

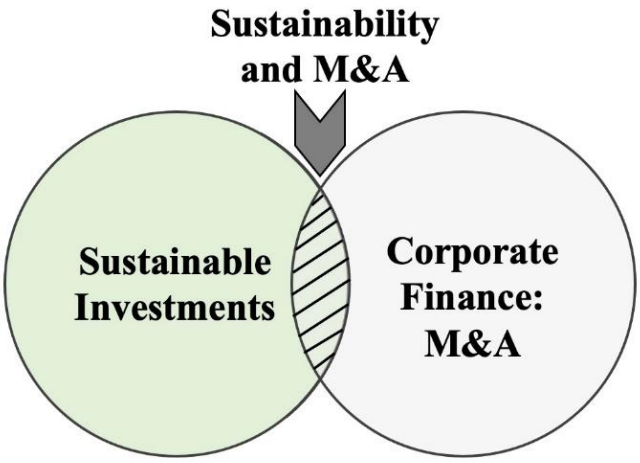


Figure 1: Positioning of the Research Gap in the Academic Literature

Similar to the empirical results, theoretical views differ with regard to value creation through sustainable corporate behavior. On the one hand, proponents of the S*takeholder Value Maximization View* claim that sustainable corporate efforts positively impact value creation for a broad range of stakeholders including shareholders (Coase, 1937; Alchian & Demsetz, 1972; Jensen & Meckling, 1976; Cornell & Shapiro, 1987; Hill & Jones, 1992). Accordingly, a better alignment with stakeholders' interests increases their willingness to provide the company with the resources it needs, which in turn contributes to the company's long-term profitability (Coase, 1937; Alchian & Demsetz, 1972; Jensen & Meckling, 1976; Cornell & Shapiro, 1987; Hill & Jones, 1992). This perspective is consistent with stakeholder theory and the theory of the firm, which state that a company is a network of contracts between multiple stakeholders, whereby the various stakeholders provide the company with needed resources in return for contractually agreed-upon considerations (Coase, 1937; Alchian & Demsetz, 1972; Jensen & Meckling, 1976; Cornell & Shapiro, 1987; Hill & Jones, 1992).

Contrary to the stakeholder value maximization view stands the *Shareholder Expense View* (Deng, Kang, & Low, 2013). According to this theoretical perspective, companies act sustainably to satisfy certain stakeholder interests at the expense of shareholders (Friedman, 1970; 2007). If, for example, a company implements processes and technologies to reduce environmental impact that exceed minimum legal standards, the Shareholder Expense View holds that this is done to the benefit of certain stakeholders but at the expense of shareholders (Deng, Kang, & Low, 2013). Provided that the implemented processes and technologies serve solely to reduce environmental impact and do not increase efficiency or earnings (Deng, Kang, & Low, 2013).

1.3. Purpose Statement and Research Question

In light of the diverging empirical and theoretical perspectives on the value creation of corporate sustainability, this study attempts to provide more clarity on the relationship between sustainable corporate behaviour and its impact on a firm's financial performance, measured in shareholder value creation in the context of acquisitions. To investigate this relationship, the following research question has been developed:

How does value creation for shareholders of acquiring firms differ depending on the extent of the target firm's sustainable activities?

1.4. Scope and Limitations

This study focuses on a sample of 151 domestic and cross-border M&A transactions conducted by listed acquiring firms located in the United States [US] or the European Union [EU] for the period from Jan. 1, 2010, to Dec. 31, 2021. The focus is on acquisitions where the acquiring company had no shareholding before the takeover and owns 100% of the target company afterwards. All transactions exclusively include target companies that achieved a positive result prior to the acquisition. The study is limited to transactions where deal-related data is available from the database Zephyr by Bureau van Dijk and ESG-related, stock price-related and index-related data from Thomson Reuters Refinitiv Eikon [RE]. A more detailed discussion of the scope and limitations is provided in Chapter 3.

1.5. Target Group

This study is of interest to practitioners on both sides of an acquisition. Practitioners on the acquirer side may be able to anticipate the impact of an M&A transaction on their own

shareholders depending on the extent of the target company's sustainability efforts. As result of this, companies are enabled to better manage the expectations of their shareholders accordingly. Practitioners on the target company side can develop a better sense of the importance of sustainability efforts in the context of potential acquisitions. In addition, M&A consultants can use the information to provide better advise to clients in the light of the increasing importance of sustainable investments.

2. Literature Review and Hypotheses

This chapter presents relevant theories with regard to sustainable corporate behavior, the rationale behind M&A, and financial market theories. Furthermore, a review of relevant literature with regard to the relationship between corporate sustainable behavior and shareholder wealth in the context of M&A will be conducted. The theoretical frameworks presented as well as the literature review form the basis for the hypothesis development.

2.1. Corporate Sustainability

2.1.1. Definitions and Related Concepts

Due to the multitude of definitions of sustainability and the accompanying disagreements regarding the meaning of sustainability, it is important to generate awareness and understanding of the different existing definitions. It is not intended to place one concept above others, but simply to draw attention to the various factors that determine sustainable corporate behavior.

The term sustainability was first coined by a United Nations [UN] report published in 1987 (Chandler, 2020). Within the context of the report, *sustainable development*, a synonym for sustainability, is defined as follows:

> *Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987, p. 8)*

A definition in line with the one coined by the UN, but more tailored to the corporate context, is provided by Landrum and Edwards (2009) as they define *sustainable business*:

> *[...] as one that operates in the interest of all current stakeholders in a manner that ensures the long-term health and survival of the business and its associated economic, social, and environmental systems (Landrum & Edwards, 2009, p. 4)*

As both definitions illustrate, the overarching objective of the sustainability concept is the responsible utilization of natural resources (Hristov & Chirico, 2019). The second definition takes particular account of a company's stakeholders and thus highlights their importance within the framework of sustainability (Chandler, 2020; Landrum & Edwards, 2009).

Corporate sustainability is often associated with the concept of CSR (Chandler, 2020). With regard to the relationship between sustainability and *strategic CSR*, the two concepts differ in that sustainability, as outlined in the above definitions, focuses mainly on environmental aspects

and is thus a subpart of strategic CSR. In addition to environmental aspects, strategic CSR refers to all aspects affected by the totality of the company's activities and thus represents a more holistic perspective (Chandler, 2020). Carroll (2000) further specifies CSR as a means of addressing the legal, ethical, philanthropic, as well as economic expectations placed on a company by its stakeholders.

Compared to the definition of sustainability coined by the UN, Amos and Uniamikogbo (2016) expand the concept of sustainability to include the economic and social dimensions in addition to the environmental dimension and relate it to the concept of the *Triple Bottom Line* [TBL]. Thus, according to Amos and Uniamikogbo (2016), the concept of sustainability aims to generate social quality and improve the economy while considering and reducing the corporate impact on the environment. As a result, Amos and Uniamikogbo (2016) consider the TBL to be the foundation for companies' reporting on their sustainable behavior.

In addition to the concepts of CSR and TBL, the *ESG framework* represents another concept related to corporate sustainability (Li, Wang, Sueyoshi, & Wang, 2021). Similar to the TBL, this framework associates three dimensions with sustainability: environmental, social, and governance (UN, 2004; Li et al., 2021). The ESG framework is particularly drawn upon in the spheres of financial markets as a determinant concept of corporate sustainability (Atkins, 2020; Li et al., 2021). Related to this is the increasing popularity of ESG ratings, which are intended to inform financial market participants and other stakeholder groups about the sustainable behavior of companies (Atkins, 2020).

2.1.2. Motivations for Corporate Sustainability

In order to better understand the reasoning behind sustainable corporate behavior, it is important to outline the theory-based arguments in favor of and in opposition to sustainability in a corporate context (Myers, 2020). There are many reasons for sustainable corporate behavior. According to Chandler (2020), the main drivers include climate change, business resilience, natural capital, and stakeholders. In the following, the focus will be placed on the motivations related to a company's stakeholders because, as indicated by Landrum and Edwards' (2009) definition of sustainability, they play an important role in the context of corporate sustainability. Furthermore, stakeholders have also been considered by related studies as the basis for examining the impact of sustainable corporate behavior on shareholder wealth (see Aktas, De Bodt, & Cousin, 2011; Deng, Kang, & Low, 2013). As technological progress, increased communication and prosperity shift the balance of power in favour of stakeholders, their

importance is increasing significantly in the current second phase of globalisation (Chandler, 2020). At the same time, stakeholders have a bilateral responsibility alongside companies in the context of the sustainability-related concept of CSR (Chandler, 2020). While companies are responsible for addressing the needs and interests of their stakeholders, it is the responsibility of stakeholders to hold companies accountable for their actions (Chandler, 2020).

Stakeholder Perspective

Freeman's (1983) *stakeholder theory* provides a useful starting point for a better understanding of stakeholders in the corporate context. According to the theory, a company must take into account the interests of all those affected by the company's decisions and actions. This includes the entire supply chain of a company, the customers, the employees, the shareholders, the communities in which a company is active, as well as the interests of the environment and the government (Tricker, 2019). The resulting responsible corporate behavior represents the price that society demands for the privilege of corporate formation and the limited liability of shareholders (Tricker, 2019). Stakeholder thinking therefore deals with values and beliefs regarding an appropriate relationship between companies, individuals, institutions and the environment (Tricker, 2019). Thus, stakeholder theory in itself does not represent a theory that allows for any predictions (Tricker, 2019).

However, predictions can be derived with regard to the combination of stakeholder theory and other theoretical approaches. Particularly in the context of sustainability, two opposing theoretical perspectives have emerged within the academic community (Deng, Kang, & Low 2013). Proponents of the Stakeholder Value Maximization View claim that sustainable corporate behavior benefits all stakeholders, including shareholders. On the other hand, opponents of this perspective believe that sustainable corporate behavior is practiced for the benefit and pacification of only a few stakeholders and at the expense of shareholders, resulting in the Shareholder Expense View (Deng, Kang, & Low, 2013).

Stakeholder Value Maximization View

According to the Stakeholder Value Maximization View, sustainable corporate behavior improves the relationship between a company and its stakeholders as a result of the company’s active consideration of stakeholder demands (Chandler, 2020). This in turn is perceived positively by stakeholders and increases their willingness to provide the company with the resources it needs (Chandler, 2020). As increased resource availability enhances a company’s competitiveness, corporate sustainable behaviour leads to a positive impact on shareholder

wealth according to proponents of this perspective (Deng, Kang, & Low, 2013). The stakeholder value maximization perspective is partly based on the theory of the firm, which was largely coined by Coase (1937) and Alchian and Demsetz (1972). According to the theory, a firm represents a network of explicit and implicit contractual ties between a variety of stakeholders (Coase, 1937; Alchian & Demsetz, 1972; Chandler, 2020). Each stakeholder provides resources to the firm in exchange for contractually agreed claims (e.g., employees provide their labor in exchange for salary) (Coase, 1937; Alchian & Demsetz, 1972). Compliance with these contracts is significantly influenced by the behavior of the company (Deng, Kang & Low, 2013). A company that takes these relationships seriously and respects them, as companies with high sustainable standards are said to do, can expect similar behavior from its contractual partners in return (Deng, Kang, & Low, 2013). The reasoning that establishes the link between sustainable corporate behavior and corporate performance using the stakeholder approach as well as the theory of the firm provides rationales for sustainable corporate action and suggests that such behavior contributes to shareholder value creation (Deng, Kang, & Low, 2013; Freeman, 1983; Coase, 1937; Alchian & Demsetz, 1972).

Shareholder Expense View

In contrast to the aforementioned perspective stands the Shareholder Expense View. This perspective can be traced back to the assertions of Friedman (1970), who claimed that the sole objective of a company is to maximize shareholder value. According to this view, corporate expenditures related to sustainable and social investments that are not related to compliance with minimum legal standards and do not generate additional revenue or lead to an increase in efficiency create costs that are borne by shareholders in the form of reduced shareholder wealth (Friedman, 1970; Deng, Kang, & Low, 2013). Depending on the ownership structure of a company and the importance of its shareholders, the Shareholder Expense View may provide an argument in opposition to sustainable corporate behavior and suggests that such behavior contributes to the reduction of shareholder wealth (Deng, Kang, & Low, 2013).

2.1.3. Corporate Sustainability and Shareholder Wealth

Similar to the theory-based motives in favour of and in opposition to corporate sustainable behavior, there are opposing views within the academic society concerning the relationship between corporate sustainability and shareholder wealth (Becchetti, Ciciretti, Hasan, & Kobeissi, 2012). One of the main arguments for why sustainable corporate behaviour reduces shareholder wealth is that sustainable corporate activities are usually associated with higher

costs (Becchetti et al., 2012). Performing similar activities in a non-sustainable way is often associated with lower costs for companies (Becchetti et al., 2012). Thus, sustainable corporate behaviour symbolises a paradigm shift from maximising shareholder wealth to satisfying a broader group of stakeholders (Becchetti et al., 2012). As a result of the high costs and change in corporate focus away from shareholders and towards stakeholders, the market value and associated wealth of shareholders suffers (Becchetti et al., 2012).

In contrast to this view is the assumption that sustainable corporate behaviour leads to an increase in market value and the associated shareholder wealth. This view is justified by the increased productivity of employees as a result of salary-related and non-salary-related benefits that employees of particularly sustainable and socially responsible companies receive (Becchetti et al., 2012). The productivity enhancing effect has been empirically proven in the academic literature (Yellen, 1984; Shapiro & Stiglitz, 1984; Akerlof, 1982). Furthermore, sustainable and socially responsible companies are said to have a much higher intrinsic motivation among their employees than other companies that do not act in a sustainable and socially responsible manner (Frey & Oberholzer-Gee, 1997; Kreps, 1997; Ryan, Koestner, & Deci, 1991). In addition to increased efficiency, a higher level of intrinsic motivation leads to an increased willingness of the workforce to accept lower wages, which in turn contributes to the profitability of a company (Frey & Oberholzer-Gee, 1997; Kreps, 1997; Ryan, Koestner, & Deci, 1991). Thus, sustainable and socially responsible corporate behaviour is a way to increase productivity and reduce costs by aligning corporate goals with employee motivation (Becchetti et al., 2012).

Another argument for the value-enhancing effect comes from Freeman (1984), who sees sustainable corporate behaviour as a tool to reduce transaction costs and as a strategic option to avoid costly conflicts with stakeholders. Furthermore, according to this view, a reputational shield is built up that mitigates the negative effects of potential corporate misconduct (Becchetti et al., 2012). Finally, sustainable companies enjoy the support and encouragement of ethical consumers and investors, which has a positive impact on the market value of companies given the sustainability megatrend (Becker-Olsen, Cudmore, & Hill, 2006; Shea, 2010; Becchetti et al., 2012). This argument is supported by a comprehensive literature review conducted by Friede, Busch and Bassen (2015). In their study, the authors analyse the results of 2200 studies examining the relationship between ESG dimensions and corporate financial performance. The study shows that about 90% of the studies conducted in this context find a non-negative relationship between ESG criteria and financial performance. The majority of the studies

demonstrate a positive relationship. With regard to the individual environmental, social and governance factors, the study reveals an equally positive relationship between the individual ESG pillars and the financial performance of companies (Friede, Busch, & Bassen, 2015).

2.2. Mergers and Acquisitions

2.2.1. Definition of Green Mergers and Acquisitions

Focusing on a strategic tool in the context of corporate sustainability, M&A represent a strategic opportunity for companies to achieve multiple goals simultaneously, such as expanding market share, achieving synergies and renewing the business model (Meglio, 2020). Although the terms merger and acquisition are frequently used together, there is a clear difference between a merger and an acquisition. An acquisition, often also referred to as a takeover, generally occurs when the acquiring company gains control over more than 50% of the target's equity, whereas a merger involves the creation of a new legal entity from two formerly separate entities (Piesse et al., 2006). Due to the increasing importance of sustainability in the corporate environment, the motives for M&A have evolved in recent years (Niemczyk, Sus, Borowski, Jasinski, & Jasinska, 2022). Especially in countries with increasingly stringent environmental regulations, M&A offer the opportunity to acquire environmentally friendly technologies, resources or know-how in order to meet legal requirements (Lu, 2021). In this context, the term GMA refers to M&A aimed at acquiring environmentally friendly resources (Lu, 2021). Pan, Liu, Qiu, and Shen (2019) further specify GMA as a type of M&A in which environmental aspects shape the entire transaction process, from the selection of the target company to the closing of the deal. The theoretical motivations behind M&A transactions are diverse (Piesse et al., 2006). As GMA are directly related to the concept of corporate sustainability, which in turn is significantly shaped by the influence of stakeholders, the concept of GMA will be considered in the context of stakeholders and the legitimacy they confer on companies (Zhao & Jia, 2022).

2.2.2. Motivations for Green Mergers and Acquisitions

In the context of GMA, legitimacy theory provides a rationale for such strategic decisions. Legitimacy theory is based on the assumption of a social contract between companies and society (Weber, 1968; Suchman, 1995). Under this contract, companies are expected to comply with the values and beliefs of stakeholders and society (Weber, 1968; Suchman, 1995). With regard to the legitimacy of companies, three different types of legitimacy are distinguished. Institutional or regulatory legitimacy demands that companies comply with applicable rules and laws while normative legitimacy demands that a company's products and services conform to

social and ethical norms. Finally, culture-based cognitive legitimacy demands that companies meet societal expectations (Michael, 2004). According to the theory, a lack of any of the three types of legitimacy causes companies to have difficulty in obtaining resources (Li et al., 2020; Meyer and Scott, 1983).

In this context, apart from the previously mentioned economic benefits, GMA offers the opportunity for companies to deal with legitimacy crises and environmental pressure (Li, Xub, McIver, Wua, & Pana, 2020). Thus, it represents a strategic tool to gain recognition and trust from stakeholders (Li et al., 2020). According to Zhao and Jia (2022), one of the reasons companies pursue GMA strategies is to prove to society that the sustainable values communicated by the company stand in line with its corporate actions. In this way, companies send a signal to society, which is perceived positively by society and in return is rewarded with the conferral of legitimacy (Zhao & Jia, 2022). However, GMA can also be used as a symbolic act to deceive stakeholders and society. According to the legitimacy theory, these actions, perceived as greenwashing, lead to a withdrawal of legitimacy from stakeholders and society, which results in criticism and negative evaluations and endangers the long-term profitability of a company (Zhao & Jia, 2022). In addition to the increased difficulty in obtaining resources, the corporate brand and reputation also suffer from greenwashing (Zhao & Jia, 2022).

2.2.3. Mergers and Acquisitions and Shareholder Wealth

As mentioned before, the objective of an M&A transaction, besides legitimacy concessions from stakeholders, is to create synergies, expand company size, increase market share, improve profitability and increase shareholder wealth. However, with regard to the latter objective, a large number of studies reveal that shareholders of acquiring firms either experience normal, unchanged returns or suffer significant losses following the transaction announcement (Alexandridis, Petmezas, & Travlos, 2010).

The main reason for this observation is due to the intense competition associated with M&A transactions (Mandelker, 1974; Asquith, 1983). Intense competition leads to aggressive bids and high premiums, which in turn offset the economic benefits of the acquisition. Especially in developed markets, such as the US and the United Kingdom [UK], competition is particularly high and acquirers' profits are low or negative (Alexandridis, Petmezas, & Travlos, 2010). This effect is exacerbated in the context of GMA. Gomes and Marsat (2018) reveal that corporate sustainability is positively associated with M&A premiums. This means that the higher the level of the target's corporate sustainability, the higher the bid premium to be paid by the acquirer

(Gomes & Marsat, 2018). Different types of effects on shareholder wealth can also be observed with regard to the type of acquisition. For example, Schumann and Stoner (1988) claim that no positive *Abnormal Returns* [AR] can be generated in friendly acquisitions because managers are not replaced and organisational structures are barely changed, and the combined firms therefore continue to operate almost unchanged (Schumann & Stoner, 1988; Carper, 1990). In the context of hostile acquisitions, on the other hand, Schumann and Stoner (1988) see the possibility of generating ARs because large-scale strategic changes accompany a hostile acquisition (Schumann and Stoner, 1988).

2.3. Financial Markets

2.3.1. The Efficient Market Hypothesis

The Theory of Efficient Markets addresses the question of whether prices at any time are a complete and accurate reflection of the available information (Fama, 1970). With regard to financial markets, whose main function is the allocation of ownership rights to shares of capital, stock prices ideally represent signals that enable the allocation of resources (Fama, 1970). With regard to the efficiency level, a distinction is made between three different forms (Fama, 1970) First, the *weak form* of an efficient market describes markets whose prices reflect only historical information. This form does not allow any prediction of future prices (Fama, 1970). Second, the *semi-strong form* draws not only on historical data but also on current information that is publicly available. This form of the market allows for immediate price changes in response to the publication of new information (Fama, 1970). Third, the *strong form* takes into account all the aforementioned information as well as insider information and private knowledge in price formation (Fama, 1970). With respect to stock prices, Fama (1970) claims that they are a complete and accurate reflection of all available information only if three conditions are met. First, there are no transaction costs associated with stock trading. Second, all publicly available information is freely accessible to all market participants. And finally, all market participants agree on the relevance of the available information for price formation (Fama, 1970).

2.3.2. Signaling Theory

Signaling Theory addresses the implicit transmission of information between two or more parties (Kreps & Sobel, 1994). The theory is based on the assumption that due to certain conditions the exchange of information through direct communication is not possible (Kreps & Sobel, 1994). For this reason, one of the parties exchanging information must perform other actions that provide the receiving party with the information without direct communication

(Kreps & Sobel, 1994). The implicit transmission of information in this context can take place, for instance, through the pricing of products and services (Kreps & Sobel, 1994). For example, a company that is able to produce a product relatively cheaply signals this ability to the competition by charging low prices (Milgrom & Roberts, 1982). Transferring signalling theory into the context of GMA, companies can, for example, signal their sustainable corporate orientation to shareholders and other stakeholders through GMA. Financial market participants, in turn, can signal their attitude towards sustainability through increased purchases of shares in sustainable companies.

2.4. Development of Hypotheses

As mentioned in previous chapters a multitude of studies within the corporate finance literature examine various factors exerting an influence on the wealth of the acquiring firm's shareholders. However, in the context of this study another factor is added and investigated: the corporate sustainability of target companies.

From the perspective of the Stakeholder Value Maximisation View, the acquisition of a target company with a high level of corporate sustainability should have a positive impact on all stakeholders, including shareholders. From a legitimacy perspective, such a GMA transaction should lead to an increased level of recognition and trust from stakeholders, making it easier for the company to obtain needed resources. If the capital market exhibits at least semi-strong characteristics, meaning that the information regarding the corporate sustainability level of the target company as well as the forthcoming GMA transaction is freely available to the general public, a positive signal should be observed from the capital markets according to the signaling theory. On the other side, acquisitions of companies with a low level of corporate sustainability should lead to opposite results.

Leaving the theoretical spheres and turning the focus to the existing literature and related studies, it can be observed that a large number of studies have been conducted examining the general impact of corporate sustainability on value creation. A much smaller number of studies, however, have examined this relationship in the context of M&A. Table 1 provides an overview of the studies that have been conducted in this field.

Table 1: Previous Research Focusing on Corporate Sustainability and Value Creation

Author (Date)	Period	Region	*N* in Study	Independent Variable	Dependent Variable	Finding
Aktas, N., De Bodt, E., Cousin, J. (2011)	1997 to 2007	Inter-national	106	Target's Intangible Value Assessment (IVA) provided by Innovest Strategic Value Advisor	Acquirer's CAR	Stock market rewards acquirers for acquisitions of socially and environmentally responsible targets.
Deng, X, Kang, J., Low, B.S. (2013)	1992 to 2007	United States	1,556	Acquirer's CSR score derived from KLD database	Acquirer's CAR	Mergers by high CSR acquirers lead to higher CARs compared with mergers by low CSR acquirers.
Salvi, A., Petruzzella, F., Giakoumelou, A. (2018)	2000 to 2016	Europe and North America	84	Target's Green Sector (text search in Zephyr Bureau van Dijk database)	Acquirer's ROA	GMA transactions exert a positive impact on acquirer's post-acquisition performance.
Zhang, F., Li, M., Zhang, M. (2019)	2010 to 2017	China	141	Acquirer's CSR score derived from Hexun Finance database	Acquirer's CAR	Chinese market participants value low-CSR acquirers more than high-CSR acquirers.
Li, K., He, C., Dbouk, W., Zhao, K. (2021)	2007 to 2018	China	2,224	Target's CSR score derived from China Stock Market & Accounting Research (CSMAR) database	Difference in target's book value	Target companies with high CSR performance yield higher acquisition valuations.
Shi, J., Yu, C., Li, Y. (2022)	2010 to 2018	China	409	Acquirer's ratio of charitable donations to total assets derived from CSMAR database	Acquirer's CAR	U-shaped relation between CSR level and CAR, meaning that compared with medium-CSR acquirer's, bidders with either extremely high or low CSR levels realize higher CARs.

The overarching objective of the studies listed in Table 1 is to investigate the relationship between corporate sustainability and value creation in the context of M&A. Nevertheless, the studies differ in terms of the underlying theories, parties investigated, used independent and dependent variables, and the results obtained. Beside the common overarching objective, another common feature of all studies is the measure of shareholder wealth used. Four out of six studies use the *Cumulative Abnormal Return* [CAR] as a measure of the change in shareholder wealth, see Appendix 1. An *Abnormal Return* [AR] is a return that deviates from the return expected under normal circumstances (Barone, 2021). The CAR is therefore the sum of all ARs (Barone, 2021). ARs are often triggered by special events, such as the announcement of a merger or acquisition transaction (Barone, 2021). Salvi, Petruzella and Giakoumelou's (2018) measure of Return on Assets [ROA], on the other hand, is a financial ratio that provides information on the profitability of a company in relation to its assets (Hargrave, 2022).

With regard to the findings and their justifications, a rather heterogeneous picture emerges. Aktas, De Bodt, and Cousin (2011) conclude that the target company's corporate sustainability level is positively related to the acquiring company's shareholder wealth. Aktas, De Bodt, and Cousin (2011) assume that the positive relationship is due to a learning process initiated by the acquisition of sustainable targets. Accordingly, acquirers learn from the sustainable practices and experiences of the target companies, which in turn has a positive impact on shareholder wealth (Aktas, De Bodt, & Cousin, 2011).

Regarding the impact of acquirers' corporate sustainability, Deng, Kang, and Low (2013) conclude that M&A by high CSR acquirers lead to higher stock returns for acquirers than M&A transactions by low CSR acquirers. Furthermore, Deng, Kang, and Low (2013) find that the long-term stock performance of high CSR acquirers outperforms that of low CSR acquirers, leading the authors to conclude that the market does not directly price in the benefits of CSR (Deng, Kang, & Low, 2013).

Salvi, Petruzzella, and Giakoumelou (2018) find that M&A with companies from green sectors lead to improved firm performance, measured in ROA, following the M&A transaction. The rationale for this observation is that by taking over green target companies, acquiring companies can improve their reputation and increase financial performance by gaining non-imitable capabilities that lead to a competitive advantage (Barney, 1991; Porter & Kramer, 2006; Salvi, Petruzzella, & Giakoumelou, 2018). A company's improved reputation gives it the ability to better withstand negative events, as a kind of moral capital has been built up through GMA, which in turn reduces the impact of such events (Godfrey 2005; Godfrey, Merrill, & Hansen, 2009).

In a comparison of high-, medium- and low-CSR groups, Zhang, Li, and Zhang (2019) found for the Chinese market that investors value low-CSR acquirers better than high-CSR acquirers. The authors explain this result with a perceived lack of interest in CSR and corporate sustainability and an increased focus on short-term speculation in the Chinese market (Zhang, Li, & Zhang, 2019). Further findings with regard to the Chinese market are provided by Li et al. (2021), who reveal three overarching conclusions. First, target companies with a high level of corporate sustainability can achieve higher acquisition evaluations, especially if the acquiring company also has high CSR standards. Second, acquirers with high sustainability standards prefer equity payments, whereas target companies with high CSR levels prefer cash payments. And finally, high sustainability standards increase the success rate of M&A transactions. Thus,

the study by Li et al. (2021) paints a different picture of the Chinese market, a picture of a market that values CSR (Li et al., 2021).

A rudimentary link between the studies by Zhang, Li, and Zhang (2019) and Li et al. (2021) can be established through the study by Shi, Yu, and Li (2022). According to the authors, the trajectory of the impact of corporate sustainability on CAR resembles the shape of a U in relation to the Chinese market. Shi, Yu, and Li (2022) find higher CARs for both low-CSR acquirers and high-CSR acquirers compared to medium-CSR acquirers. Based on the results, Shi, Yu, and Li (2022) conclude that companies that invest relatively little in CSR conserve resources and thus remain competitive, whereas companies with high CSR investments profit from lower agency and adverse selection costs. However, this study does not explain why Zhang, Li, and Zhang (2019) find only one side of the U-shaped relationship, the increased CARs of the low-CSR group, and thus leaves space for further research.

Taking into consideration the theoretical perspectives as well as the empirical results obtained from the existing literature, the following hypotheses are formulated:

H1: The acquisition of target companies with a high degree of corporate sustainability is positively related to the shareholder wealth of the acquiring company's shareholders.

H2: The acquisition of target companies with a low degree of corporate sustainability is negatively related to the shareholder wealth of the acquiring company's shareholders.

In addition, a previous study by Gomes (2019) shows that the three ESG dimensions of environmental, social and corporate governance of acquiring companies have a similar positive effect on M&A. However, the study by Gomes (2019) did not capture the impact of the ESG scores of the target companies, indicating a gap. This leads to the final hypothesis, which focuses on the ESG pillar scores of the target companies:

H3: When acquiring target companies, the individual ESG pillars exert an equally positive effect on the shareholder wealth of the acquirer's shareholders.

3. Methodology

This chapter outlines the methodological approach of the study covering the data collection process, the models used as well as the underlying assumptions. It further explains the rationale for the chosen methodological approach including a reflection on the shortcomings of the methodology used.

3.1. Research Approach

With regard to the research approach, a distinction is made between three different approaches (Creswell & Creswell, 2018). First, qualitative research approaches are characterised by open-ended questions and answers. Second, quantitative approaches are characterised by closed-ended questions and answers. A simplified differentiation is often made in that qualitative studies use words whereas quantitative studies make use of numbers (Bell, Bryman, & Harley, 2019). Lastly, mixed methods approaches are a combination of the two approaches mentioned above. It is important not to regard the three approaches as strictly separate categories, but rather as a continuum, according to which studies tend to be more quantitative or qualitative. Bell, Bryman, and Harley (2019) further differentiate between the different approaches by claiming that quantitative approaches aim to scientifically understand reality in an objective manner. Qualitative approaches, on the other hand, aim to provide a subjective, rather than objective, explanation of certain phenomena according to the authors (Bell, Bryman, & Harley, 2019).

In order to adequately answer the research question, a quantitative approach was chosen for this study. According to Creswell and Creswell (2018), a quantitative approach allows for the testing of theories by investigating the relationship between different variables. In contrast to qualitative studies, which aim to consolidate the divergent perspectives of different individuals into a non-numerical data set, quantitative approaches aim to generate an objective rationale for social phenomena based on numerical data sets (Creswell & Creswell, 2018). Therefore, for the purpose of this study, a quantitative approach was chosen to generate an objective and unambiguous explanation of the relationship between sustainable corporate behaviour and shareholder wealth.

With regard to the relationship between theory and research, a distinction can be made between a deductive and an inductive approach (Bell, Bryman, & Harley, 2019). A deductive approach involves researchers developing hypotheses based on the state of knowledge and existing theories in a particular domain (Bell, Bryman, & Harley, 2019). Based on the existing

knowledge and theories, researchers develop predictions related to possible outcomes, thereby testing the validity of the existing models and theories (Bell, Bryman, & Harley, 2019). Inductive approaches, on the other hand, are characterised by the development of new theories based on empirical observations (Bell, Bryman, & Harley, 2019). Based on the results obtained, which cannot be explained with already existing theories, researchers develop new frameworks or expand existing theories (Bell, Bryman, & Harley, 2019). As this study is based on various theories related to stakeholders and the hypotheses were developed based on theoretical frameworks, this study follows a deductive approach (Bell, Bryman, & Harley, 2019).

3.2. Research Design

In addition to the chosen research approach, the design of the study and the way it is conducted also play an important role. In this context, the research design describes the nature of the inquiry and provides a link between the research approach and the method used for data collection and analysis (Creswell & Creswell, 2018; Saunders, Lewis, & Thornhill, 2019). Generally, in the context of quantitative research, a distinction can be made between the overarching concepts of experimental and non-experimental research designs (Mertler, 2016).

Non-experimental research designs include a range of techniques in which no manipulation or modification of the variables under investigation takes place (Mertler, 2016). This means that the variables are measured as they naturally occur without any intervention by the researcher (Mertler, 2016). Sub-types of the group of non-experimental research designs include descriptive research, correlational research and causal-comparative research (Mertler, 2016). Experimental research designs, on the other hand, involve a series of techniques in which the researcher makes various manipulations and changes to variables and examines their effects on the participants in a study (Mertler, 2016). Because of the manipulation and modifiability of conditions, experimental research designs represent one of the most insightful research approaches (Mertler, 2016). Within experimental research designs, a distinction can be made between pre-experimental, quasi-experimental, true experimental and single-subject research designs (Mertler, 2016).

The objective of this study is to investigate the significance of the target company's sustainable corporate behaviour with respect to the shareholder wealth of the acquiring company's shareholders. As the independent variables used as a proxy for sustainable corporate behaviour are neither manipulated nor modified by the researchers, this study exhibits the characteristics of a non-experimental research design (Mertler, 2016). Within the category of non-

experimental research designs, this study further bears characteristics of correlational as well as causal-comparative research designs (Mertler, 2016). Correlational studies aim to discover and, if possible, measure relationships between two or more variables (Mertler, 2016). From the researchers' point of view, the term relationship means that the status of one variable allows associations to be drawn about the status of another variable (Mertler, 2016). It is important to note, however, that correlational studies do not allow conclusions to be drawn with regard to causality (Mertler, 2016). The results of such studies only indicate an existing link between two or more variables, but do not establish causal relationships (Mertler, 2016). Causal-comparative research designs are similar to correlational research designs, but extend this concept by investigating causality (Mertler, 2016). In other words, within this study design, researchers try to explain the discovered associations and determine the triggers of the interactions (Mertler, 2016). By dividing the sample into groups with different levels of sustainability, as illustrated in Appendix 2, this study attempts to establish a causal relationship between corporate sustainability and shareholder wealth. The correlational features of the study are consequently extended by causal-comparative features and thus allow for a comprehensive investigation of the relationship between corporate sustainability and shareholder wealth in the context of GMA.

3.3. Measuring Sustainability and Shareholder Wealth

Building on the research approach and the research design, data must be collected that represent approximations of the components to be investigated, namely corporate sustainability and shareholder wealth, and that can be used to investigate the hypotheses set out in Chapter 2.

3.3.1. Measuring Corporate Sustainability

A review of related studies mentioned in Section 2.4 reveals different approaches in terms of quantifying corporate sustainability, see Table 1. Most of the studies listed in Table 1 focus on CSR-related indicators (Deng, Kang & Low, 2013; Zhang, Li & Zhang, 2019; Li et al, 2021; Shi, Yu, & Li, 2022) with the exception of two studies (Aktas, De Bodt, & Cousin, 2011; Salvi, Petruzzella, & Giakoumelou (2018)). For instance, Aktas, De Bodt, and Cousin (2011) refer to Innovest Strategic Value Advisor's Intangible Value Assessment [IVA] as a measure of a company's ability to manage environmental and social risks, while Salvi, Petruzzella, and Giakoumelou (2018) refer to the target company's industry specification.

Although both variables are related to the concept of CSR, the authors try to broaden the focus of their studies by choosing independent variables that are not explicitly referring to the CSR concept but rather to sustainable and socially responsible corporate behaviour in general. The

rationale for using the sector declaration in the context of Salvi, Petruzzella, and Giakoumelou's (2018) study is based on the assumption that companies from a green sector have a stronger stakeholder orientation than companies from other, non-green sectors, and thus exhibit superior sustainable and social behavior (Salvi, Petruzzella, & Giakoumelou, 2018). However, this assumption represents a weakness of the study, as companies in a green sector are not per se also companies with high standards in terms of corporate sustainable behavior. While the products and services may be green, this does not mean that the treatment of employees, communities and other stakeholders is superior (Chandler, 2020).

Of the remaining studies that focus more narrowly on CSR, Deng, Kang, and Low (2013) and Shi, Yu, and Li (2022) stand out further from the other studies in terms of the independent variables used. Both studies use CSR metrics calculated by themselves rather than data provided and calculated by third parties. While Deng, Kang, and Low (2013) only introduce minimal econometrical changes to enable the comparability of different CSR scores over several years, Shi, Yu, and Li (2022) calculate the ratio of charitable donations to a company's total assets as a proxy of a firm's CSR level. The latter approach, in turn, reduces the informative value with regard to the examination of the impact of corporate sustainability on shareholder wealth, as charitable donations only constitute a subpart of socially responsible corporate behaviour (Chandler, 2020). For example, companies may donate large sums of money but at the same time perform poorly with regard to their relationships with employees, communities and other stakeholders (Chandler, 2020). According to the approach of Shi, Yu, and Li (2022), such companies would still receive a good sustainability evaluation.

Given that the related studies predominantly use CSR-related indicators, this study will focus more on ESG-related indicators, as these have been neglected due to the heavy focus on CSR as a proxy for corporate sustainability. Thus, for the purposes of this study, the degree of corporate sustainability is approximated by ESG scores, a synonym for ESG ratings and ESG rankings. Against this background, the following section will present different views expressed within the academic community with regard to ESG ratings.

With regard to ESG ratings, views diverge in the academic community. Among the most frequently highlighted shortcomings of ESG ratings is the disparity that exists between the rating results of different providers (Sindreu & Kent, 2018). While credit ratings from different rating agencies are relatively consistent, many scholars criticize that ESG ratings vary widely between vendors (Sindreu & Kent, 2018). With regard to the extent of divergence, Christensen, Serafeim, and Sikochi (2022) find that differences between ESG ratings increase with the

amount of non-financial information a company publishes. The less information a company provides, the smaller the differences in the various ESG ratings (Christensen, Serafeim, & Sikochi, 2022). This observation is justified by the increasing number of interpretation and analysis options for a larger mass of information (Christensen, Serafeim, & Sikochi, 2022). The less information is available, the lower the possibilities for divergent interpretation and analysis by the different vendors (Christensen, Serafeim, & Sikochi, 2022).

Drempetic, Klein, and Zwergel (2019) analyze the differences in ESG rating outcomes from a different perspective. Instead of considering the degree of non-financial information provided, the authors base their analysis on firm size, measured by market capitalization. The results of the study reveal that firm size exerts a significant influence on ESG rating outcome. Furthermore, they argue that large companies often allocate more resources to ESG data disclosure. More resources on the corporate side lead to more ESG data available, with more ESG data leading to a better rating score (Drempetic, Klein, & Zwergel, 2019).

Despite the shortcomings outlined earlier, ESG rating agencies have evolved into a key reference for academia, companies and financial markets due to their unique expertise in the field of corporate sustainability (Escrig-Olmedo, Fernandez-Izqzierdo, Ferrero-Ferrero, Rivera-Lirio, and Munoz-Torres, 2019). Escrig-Olmedo et al. (2019) credit the ESG rating industry with improving performance over the past decades. Through a period of ESG vendor consolidation from 2008 to 2018 and the accompanying introduction of new rating models, ESG ratings have become more accurate and robust in recent years (Escrig-Olmedo et al., 2019). The consolidation process has allowed the industry to develop more holistic corporate sustainability rating methodologies through M&A with specialised firms (Escrig-Olmedo et al., 2019). Although each rating agency still uses its own rating methodologies, all agencies consider three common aspects that represent minimal standardisation within the industry: the three overarching categories of environmental, social and governance (Escrig-Olmedo et al., 2019).

3.3.2. Measuring of Shareholder Wealth

Stock prices ideally reflect the fundamental value that the market determines by discounting shareholders expected cumulative dividends. Assuming that the market acts rationally and is fully informed, stock prices in an efficient market change in response to incoming news (Beccetti, Ciciretti, Hasan, and Kobeissi, 2012).

M&A transactions are characterised by the fact that they take place over a longer period of time (Datta, Pinches, & Narayanan, 1992). Negotiations can take place well in advance of the public announcement and the closing of the transaction can take place some time afterwards (Datta, Pinches, & Narayanan, 1992). Although the negotiations are conducted in strict secrecy, information may leak out before the transaction is officially announced (Datta, Pinches, & Narayanan, 1992). However, the market is mainly influenced by the public announcement, as studies show, with changes in shareholder wealth before the announcement and around the date of the transaction closing being insignificant (Asquith, 1983; Dodd, 1980). Different studies on mergers and acquisitions and their impact on shareholder wealth have come to different conclusions (Datta, Pinches, & Narayanan, 1992; Piesse et al., 2006). The divergent results could be due to the lack of agreement on which variables to use to determine value creation (Datta, Pinches, & Narayanan, 1992; Piesse et al., 2006). This lack of agreement must therefore be thoroughly considered when selecting an appropriate variable to measure the impact on shareholder wealth (Datta, Pinches, & Narayanan, 1992; Piesse et al., 2006).

The variables used can be divided into market-based and accounting-based measures (Salvi, Petruzzella, & Giakoumelou, 2018). A review of the related studies mentioned in Chapter 2.4 reveals a more consistent picture with regard to the dependent variables used in the context of GMA. Aktas, De Bodt, and Cousin (2011), Deng, Kang, and Low (2013), Zhang et al. (2019) and Shi, Yu, and Li (2022) use the CAR of the acquiring company to determine the impact of corporate sustainability on shareholder wealth, see Appendix 1. Only Salvi, Petruzzella, and Giakoumelou (2018) and Li et al. (2021) determine value creation by means of changes in the Return on Assets [ROA] of the acquiring company (Salvi, Petruzzella, & Giakoumelou, 2018) and the difference in the book value of the target company (Li et al., 2021). For the purpose of this study, CAR, a market-based measure, is used as a proxy for the impact on value creation for the shareholders of the acquiring firm, since, according to efficient market theory, share prices contain market adjustments related to firms' management and risk-taking activities and thus can be perceived as signals from an important stakeholder group: the shareholders (Halpern, 1983). This in turn should provide insights into the market's appreciation of corporate sustainability. Against this background, this study is in line with the majority of related studies with regard to the dependent variable used, the CAR.

3.4. Data, Sources and Collection Process

3.4.1. Data and Data Sources

In order to collect the data mentioned in chapter 3.3, two main databases were used in the scope of this study: Bureau van Dijk's Zephyr database and Thomson Reuters' Refinitiv Eikon [RE] database. A comprehensive overview of all data collected and their origins can be found in Appendix 3. In the following, the focus will be placed on the respective databases and the most important information collected.

Zephyr is one of the most comprehensive transaction databases and, with its preparation of information on around 1.8 million deals worldwide (Bureau van Dijk, 2022), provides an optimal basis for the research conducted within the scope of this study. Transaction information collected through Zephyr included, for example, the date of the rumor and announcement of the acquisition. These data were used as the basis for a *dummy variable* indicating whether or not there were rumors of a deal in advance. A dummy variable can take only one of two values (0 or 1) and is used to efficiently capture the effect of different components in statistical models (Brooks, 2014). In the context of this study, a value of 1 means that there were no rumors of an acquisition, and a value of 0 means that rumors of an acquisition leaked out before the company actually announced the acquisition. The division of the categorical variables into two groups allows the analysis of the categorical variable in statistical models (Brooks, 2014). Other dummy variables based on Zephyr data include: Standard Industrial Classification Codes [SIC] (primary and secondary), location of acquiring firm, location of target firm, Financing with Leverage, Payment with Cash, and Payment with Shares. *Independent variables* collected via Zephyr include: Deal Value, Target's Operating Income, Target's Total Assets before the transaction, Bid Premium on the Announcement Day, and Bid Premium on the Rumor Day. The independent variable of ESG score and its components is not preserved in the scope of data provided by Zephyr and therefore had to be obtained from another database.

As mentioned before, the main independent variable could not be provided by the Zephyr database, which means that another database had to be considered. ESG information is provided by many different institutes and databases such as Sustainalytics, MSCI, Thomson Reuters' RE, Bloomberg and many others. The ESG information from Thomson Reuters' RE database was mainly selected for reasons of accessibility, as other quantifiable ESG metrics, such as the MSCI ESG Rating and Sustainalytics, were not accessible. RE is available through the Linc Lab at Lund University School of Economics and Management and is also easy to use with

Excel. In addition, Bloomberg ESG ratings mainly refer to the extent of disclosure and therefore do not represent an optimal approximation of corporate sustainability (Bloomberg, 2020), while RE captures both ESG performance and ESG transparency of companies (Refinitiv, n.d.B). Among ESG information providers, the RE database is one of the largest ESG content collections in the world (Thomson Reuters, 2018). RE ESG scores are based on over 450 data points collected and carefully standardized, using benchmarks and weightings to ensure comparability across companies, regardless of the industry or country in which they are located (Thomson Reuters, 2018; Refinitiv, n.d.B). RE ESG ratings are typically updated every year and all data go through multiple steps to ensure an accurate external assessment of each company's ESG performance (Thomson Reuters, 2018). Based on the information collected for this study, this appears to be the first study of its kind using ESG scores from Thomson Reuters' RE database as a proxy for corporate sustainability in the context of acquisitions. In addition, by using RE ESG scores, this study contributes to the research gap mentioned in Chapter 1.2 regarding the impact of ESG rankings on a company's financial performance.

The Thomson Reuters RE ESG score, which ranges from 0 to 100, provides a general assessment of companies' sustainability performance and the degree of transparency they exhibit (Refinitiv, n.d.B). The information on Refinitiv's website (n.d.B) illustrates how the different quartiles of the 100 available ESG points capture the four levels of corporate ESG performance and, additionally, transparency:

$0 < X \leq 25$ points: Poor performance and insufficient level of transparency.

$25 < X \leq 50$ points: Satisfactory performance and moderate level of transparency.

$50 < X \leq 75$ points: Good performance and above average level of transparency.

$75 < X \leq 100$ points: Excellent performance and high level of transparency.

The three different pillars included in the Total ESG Score are divided into 10 different categories (Thomson Reuters, 2018), see Figure 2. First, the environmental pillar score is divided into *Resource Use*, *Emissions*, and *Innovation*. Thereby, the environmental score measures the impact a company has on living and non-living natural systems including airspace, water, and land, as well as entire ecosystems (Refinitiv, n.d.B). Thus, the value of the environmental pillar reflects how well a company avoids environmental risks and exploits environmental opportunities to create long-term shareholder value (Refinitiv, n.d.B). Second, the social pillar includes four overarching groups: *Workforce*, *Human Rights*, *Community*, and *Product Responsibility*. Thereby, the social score measures a company's ability to build trust in

its relationships with its employees, customers, and the community (Refinitiv, n.d.B). Thus, the social pillar reflects a company's reputation and the legitimacy it enjoys in society (Refinitiv, n.d.B). Both are important factors in terms of creating shareholder wealth (Refinitiv, n.d.B). Finally, the governance pillar consists of the following three categories: *Management, CSR Strategy,* and *Shareholders*. The governance score is designed to evaluate a company's systems and processes to ensure that a company acts in the best interest of its long-term shareholders (Refinitiv, n.d.B). In doing so, this pillar reflects the use of control and incentive mechanisms (Refinitiv, n.d.B). The ten different categories are weighted by the number of indicators associated with each category (Thomson Reuters, 2018), see weighting in Figure 2.

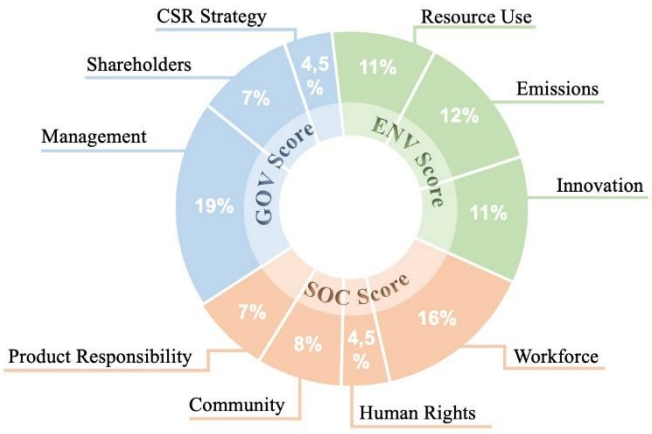


Figure 2: Categories Included Within the Different ESG Scores

In addition, the RE database was used to collect the data needed for the dependent variable CAR, in the form of closing prices and index-related information. Many other databases, except the aforementioned Zephyr database, offer this type of data both for free or for a fee, such as Bloomberg or Yahoo Finance. However, the data on closing prices of stocks and indices in these databases do not differ among the various providers, as they only reflect the actual fluctuations in the stock market. As the RE was already employed for the collection of ESG data, simplicity was the main reason for the continuous utilization of RE to collect data for the dependent variable CAR. With regard to stock market data, RE is backed by approximately 150,000 sources, covers 99 percent of the world's stock market capitalization today, and has more than 65 years of information (Refinitiv, n.d.A). Furthermore, RE is an open technology solution designed for professionals in the financial markets (Refinitiv, n.d.B).

3.4.2. Data Selection Criteria

To achieve a certain degree of homogeneity within the sample and thus comparability, various selection criteria were defined for processing the information obtained via the databases described in chapter 3.4.1. Homogeneity and comparability are of essence especially with regard to the possibility to draw conclusions derived from the obtained results. The defined selection criteria, in turn, affect the filtering process that finally results in the underlying sample

used for this study. The data referred to in the previous chapter had to meet the criteria mentioned below in order to be used within this study. A fundamental requirement was that the acquiring companies must be listed on the stock exchange, since in the absence of a listing, a reaction of the financial market with regard to the CAR could not be investigated. Further selection criteria refer to:

- **The geographic markets** considered in this study. In this context, the US and EU markets were chosen as the geographic selection criteria because both regions are at a similar stage of development and are more advanced in terms of sustainability than other parts of the world. However, there are differences between Europe and the US in terms of for example culture.
- **The time period** in which the transaction falls, which in the context of this study was defined as the period between 01.01.2010 and 31.12.2021. In particular, this period was chosen to provide the most recent possible insight into the status of the relationship between corporate sustainability and shareholder wealth, as related studies mentioned in Table 1 already cover periods in the past. Within this period, however, numerous macroeconomic events occurred, such as the Covid 19 pandemic, which could have a distorting effect.
- **The deal value**, which in the context of this study had to be at least 1 million euros, which corresponds to the selection criteria of other related studies (see studies included in Appendix 1).
- **The target companies**, which in the context of this study had to exhibit a positive turnover in the run-up to the transactions.
- **The ownership structure** of the targets before and after the transaction. First, the acquiring companies were not allowed to hold shares in the target companies in the run-up to the transactions. Second, after the transaction, the acquiring companies had to hold 100% of the shares in the target company.

Adherence to these criteria ensured a certain degree of comparability within the sample. The process of data filtering based on the above criteria is illustrated in Table 2. The final two steps of the data filtering process show how the sample was reduced due to missing data, which will be discussed later in Chapter 3.6. A list of all these deals is provided in Appendix 2.

Table 2: The Data Filtering Process

Steps	Database	Criteria	Number of acquisitions			Description
			US	EU	Total	
1	Zephyr	Time Period	233,465	495,431	728,896	2010-01-01 to 2021-12-31
2	Zephyr	Public Companies	46,917	287,679	334,596	The acquiring firm must be public
3	Zephyr	Deal type	87,259	123,222	210,481	Acquisitions
4	Zephyr	Ownership	23,374	84,178	107,552	Not owning any shares before and then acquiring 100 per cent
5	Zephyr	Deal value	1,651	1,671	3,322	Above 1 million Euro
6	Zephyr	Deal status	930	738	1,307	Announced or completed
7	Zephyr	Pre-deal target revenue	559	377	936	Positive Pre-deal target revenue
8	Eikon	Available Score for all three parts of the ESG Score	126	44	170	Total ESG Score, Environmental Score, Social Score and Governmental Score
9	Eikon	Available stock and index data	109	42	151	Closing price for entire estimation and event window

3.4.3. Descriptive Sample Data

The selection criteria described in Section 3.4.2 resulted in a final sample of 151 transactions following the performance of the data filtering process. Detailed information about the sample, such as mean, standard deviation, maximum and minimum values of the independent variables of the transactions, are presented in Table 3 below.

Table 3: Sample Information Regarding the Mean, Standard Deviation, Maximum and Minimum Values

	Total ESG Score[1]	***ENV Score[1]***	***SOC Score[1]***	***GOC Score[1]***	***Deal Value[2]***	***Target Operating Revenue[2]***	***Target Total Assets[2]***	***Bid Premium Rumor[3]***	***Bid Premium Announcemt[3]***
Mean	40,39	29,33	42,55	46,97	7,377,263	4,319,604	7,583,938	0,29	0,21
Standard deviation	18,15	24,57	20,62	22,10	10,795,905	23,708,975	19,603,948	0,33	0,17
Minimum	10,44	0,36	4,19	3,98	21,609	488	116,371	-0,72	-0,02
Maximum	84,08	93,13	93,84	89,23	66,798,280	290,296,912	210,123,121	2,37	0,60

1 = ESG Scores on scale between 0 and 100

2 = Deal Value, Target Operating Revenue and Target Total Assets in thousand Euros

3 =Bid Premiums in per cent

The additional transaction-related data collected as a basis for the dummy variables reveal that the sample contains more domestic than cross-border transactions, implying that most bidders acquired a company in their domestic market rather than abroad. Regarding the public announcement of transactions, the sample shows that in 58 per cent of the cases no rumors about the upcoming transaction reached the public before the day of the announcement, while in 42 per cent of the cases information was leaked before the transaction was officially announced. Further information on how the deal was financed (leverage/debt and/or equity) on the part of the acquirers, as well as the payment method (cash and/or shares) used and industry-related characteristics, are provided in Table 4.

Table 4: Sample Information Regarding Region of Transaction, Rumours, Industry Affiliation, and Financing Details

	Domestic	***No Rumor***	***Same Industry***	***Similar industries***	***Financing Leverage***	***Pay Cash***	***Pay Shares***
Number of deals:	126	87	89	113	53	111	89
per cent of total:	83 %	58 %	59 %	75 %	35 %	74 %	59 %

Through a correlation matrix, presented in Appendix 4, correlations between both dummy variables and independent variables were detected. The different ESG pillars of the targets are correlated with each other and with the Total ESG Score (between ≈ 0.3 to ≈ 0.85). Similarly, Deal Value is correlated with the various ESG scores (≈ 0.4, except for the GOV Score). The Target Total Assets are highly correlated with Deal Value and Target Operating Revenue. The Bid Premiums of Rumor Date and Announcement Date are also highly correlated. The No Rumor-dummy variable is correlated with Deal Value, Target Total Assets, and Bid Premium of Announcement Day. The dummy variable for Paying With Shares is correlated with Bid Premium on Rumor Data and Financing With Leverage.

With regard to the number of acquisitions that took place in the period studied and met the criteria mentioned in the previous chapter, it can be observed that this number increased, see Figure 3. While there were only seven acquisitions meeting the selection criteria of this study in 2010, this number increased to 17 by 2020. In 2021, there is an even larger increase to a total of 28 acquisitions. This increase can be attributed either to the fact that more companies have received Thomson Reuters RE ESG scores in recent years or to the fact that the number of acquisitions has generally increased over the years.

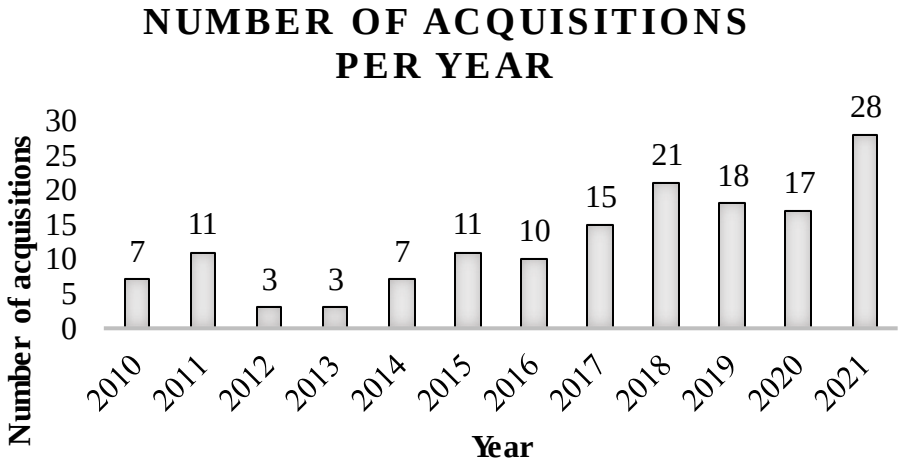


Figure 3: Number of Acquisitions per Year

With respect to the industry affiliation of the acquiring companies involved, it should be noted that no industries were intentionally excluded for the purposes of this study. The number of acquirers within each industry sector based on collected SIC codes is shown in Figure 4. Note that Figure 4 only shows the acquirer's primary industry and not the secondary industries. In the context of other studies of M&A, a variety of different industries have been considered, either individually or in combination. Often the financial sector is explicitly excluded in the composition of the sample. However, the exclusion of the financial sector, including the finance, insurance, and real estate sectors, where many M&A take place, would result in the risk of losing important information. This was avoided in this study by including the financial sector, as it plays an important role in society and in the context of the sustainability trend in general. Regarding the industry-related characteristics of the sample, it should be noted that the sample contains mainly manufacturing companies (≈ 43 per cent), followed by the financial sector (≈ 19 per cent). Furthermore, the Agriculture and Public Administration sectors are not represented in the sample at all, while the Construction, Wholesale Trade and Retail Trade sectors are relatively weakly represented with 3 to 5 deals each.

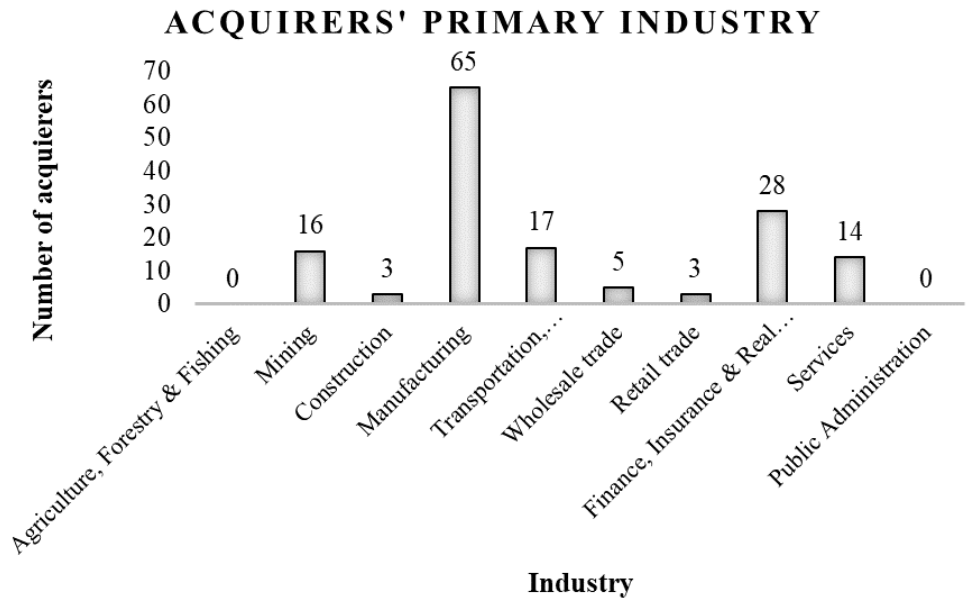


Figure 4: Acquirers' Primary Industry

The histogram in Figure 5 illustrates the distribution of deals included in the sample based on the target companies' Total ESG Scores on the rating scale ranging from 0 to 100. The distribution of the target company's Total ESG Score shows that the sample's ESG scores are left-skewed, as the median and average of the data sample are below 50. This distribution implies that in 39 deals (≈ 26 per cent), the acquired target company exhibits a poor ESG performance and an insufficient level of transparency, compared to about 6 deals (≈ 4 per cent) with excellent performance and high level of transparency. The remaining sample of 106 deals (≈ 70 per cent) with scores falling between 25 to 75 contains both satisfactory to good performance and moderate to above average levels of transparency.

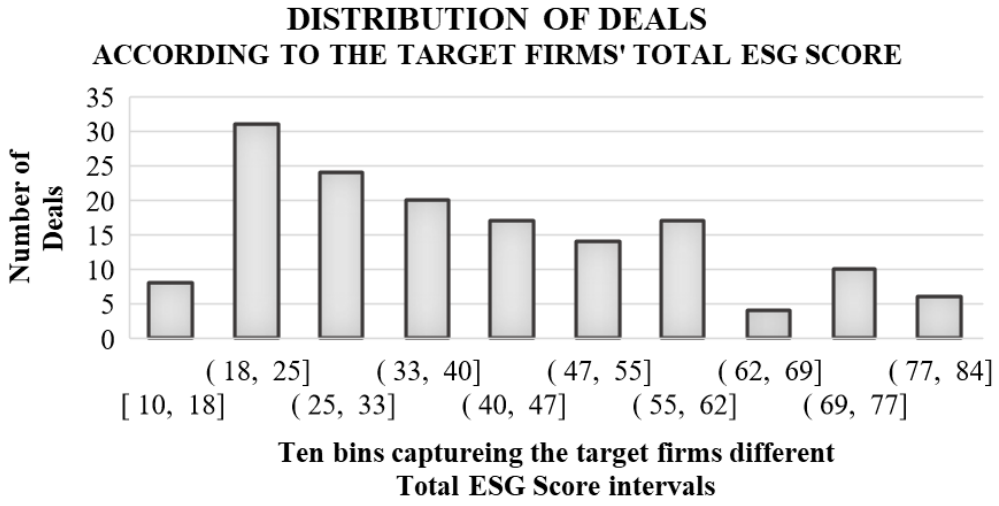


Figure 5: Distribution of Deals According to the Target Firms' Total ESG Score

The distribution of scores with respect to each of the environmental, social, and governance pillars varies for the targets included in the sample, as can be seen from the boxplots in Figure 6. The horizontal lines in the middle of the boxes represent the median of all ratings of the target companies in the respective pillars and divide the sample into two halves of equal size. The X represents the mean of the respective pillar. The lower and upper horizontal lines of the boxes further divide the pillars into quartiles. The whiskers at both ends of the vertical line represent the minimum and maximum values within each pillar. While the averages within all individual pillar scores lie below the threshold of 50, the environmental pillar shows the strongest skewness towards the lower end of the rating scale. In comparison, the distribution of values within the governance pillar resembles a normal distribution to a greater extent since the average and median of the GOV Scores lie close to 50, and the quartiles and whiskers are similarly far apart in both directions. Furthermore, the ENV Scores of the target companies show the greatest dispersion compared to the other scores.

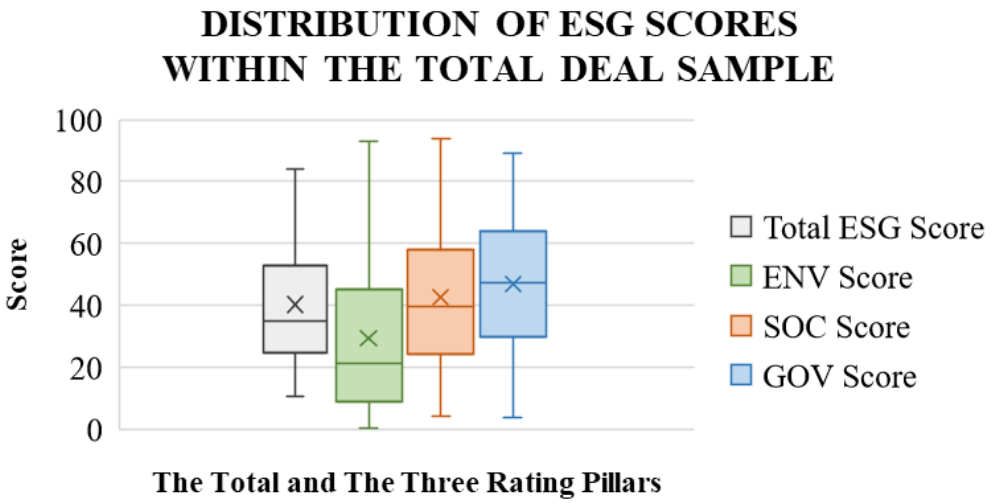


Figure 6: Distribution of ESG Score within the Total Deal Sample

3.5. Data Analysis

In order to answer the first two hypotheses, the entire sample was divided into several groups. Following the division of the sample, an event study with t-tests was conducted to determine whether the stock market actually reacts to announcements of acquisitions and whether the reaction is significantly positive or negative. To answer the last hypothesis, to what extent the different ESG pillars influence the stock market, regression models were used. However, in order to run regression models, certain assumptions and criteria must be met, hence specific

tests had to be performed as the data might have been in need of adjustments. Figure 7 illustrates the data analysis process applied within this study.

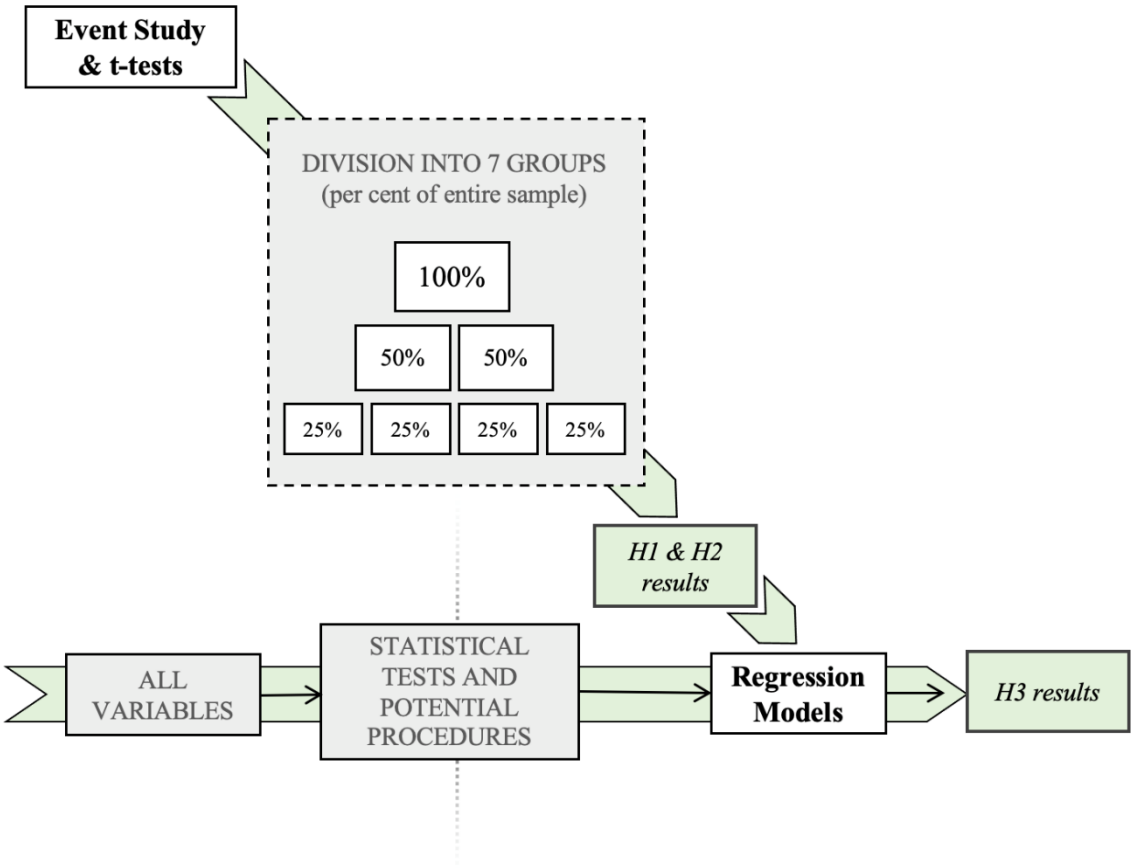


Figure 7: Data Analysis Process

3.5.1. Event Study Methodology

An event study represents a research design used to measure mainly the short-term impact of a specific event which takes place at a certain point of time (Campbell, Lo & MacKinlay, 1997). The method assumes that capital markets are efficient as, otherwise, no impact can be measured. In this context, Brown and Warner (1980) specify event studies as a test of market efficiency. The lower the market efficiency, the lower the significance of event studies. In academia the event study design is widely used not only in finance-related research, but also in other academic fields such as law and economics (Campbell, Lo & MacKinlay, 1997). For example, Fama, Fisher, Jensen and Roll (1969) used the event study design to investigate the effects of information releases on stock prices in the context of stock splits. Furthermore, the impact of quarterly reports, IPOs or M&A announcements on firm value can be measured using event studies (Campbell, Lo & MacKinlay, 1997). More recent studies, especially in the context of GMA, have also used event study designs to examine various effects of GMA (Aktas et al.,

2011; Deng et al., 2013). This illustrates that the methodology used for the purpose of this study is widely accepted and has been used over a long period of time, with the first published event study dating back to 1933 (Campbell, Lo & MacKinlay, 1997).

3.5.1.1. Event Study Outline

The event study was conducted in seven different steps as suggested by Campbell, Lo and MacKinlay (1997):

I. Event Definition:

The first step included the definition of the event under investigation, the event window and the estimation window (Campbell, Lo & MacKinlay, 1997), see Figure 8 for an overview. In the context of this study, the announcement of the acquisition was the event under investigation. The event window covers the period of time during which the effects of the event are observed, in this case the days surrounding the event (Campbell, Lo & MacKinlay, 1997). According to Campbell, Lo and MacKinlay (1997), the event window usually covers two days, the day of the announcement and the following day. An event window that starts on the day of announcement [0] and ends on the day after announcement [T2 = 1] is written as [0,1]. In this study, different event windows were investigated, however, similar to other studies, mainly the recommended event window of [0,1] was used to draw conclusions, see Appendix 1. The estimation window covers a period of time preceding the event window and serves for comparative purposes (Campbell, Lo & MacKinlay, 1997). Previous related studies used about 200 days before the event date to about 10 days before the event, which corresponds to a window of [-200,-10], see Appendix 1. Since information regarding the acquisition could leak out before the announcement day it is beneficial to exclude the 10-day period prior to the public announcement day from the estimation window (Campbell, Lo & MacKinlay, 1997). As a result, for the purposes of this study the estimation window is set to [-200,-10] and the event window to [0,1].

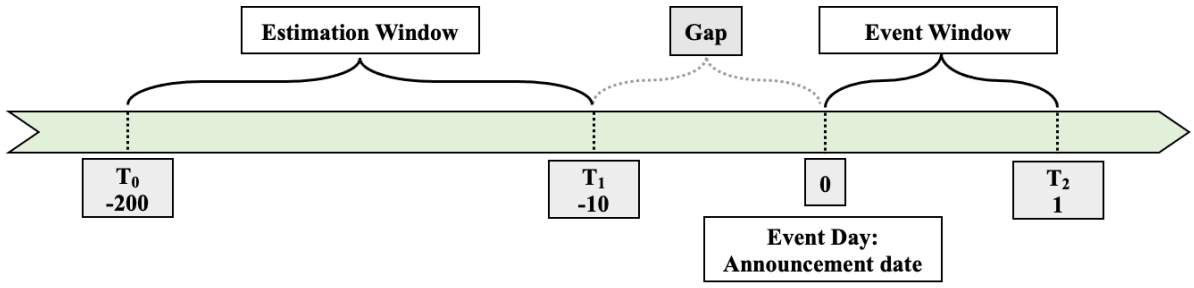


Figure 8: Event Study Timeline (adapted from Campbell, Lo, & MacKinlay, 1997)

II. Selection Criteria

After the determination of the studied event, the selection criteria for the transactions and companies to be examined had to be established (Campbell, Lo & MacKinlay, 1997). The selection criteria for this study can be found in Chapter 3.4.2.

III. Normal and Abnormal Returns

To examine the impact of the transaction announcement on the stock market, ARs and normal returns had to be measured (Campbell, Lo & MacKinlay, 1997). The *Normal Return* indicates what the actual return on the stock market would have been if there had never been an acquisition announcement (Campbell, Lo & MacKinlay, 1997). According to Campbell, Lo and MacKinlay (1997), there are two common ways of calculating normal returns: The *Market Model* and the *Constant Mean Return Model*. The authors describe that the Market Model assumes a linear relationship, while the other model assumes that the mean return is constant, representing the biggest difference between the two models. Stemming from this difference, the Market Model offers some advantages over the Constant Mean Return Model, such as reducing the variance of ARs, leading to a better detection of the true impact of the announcement (Campbell, Lo & MacKinlay, 1997). For this reason, the Market Model was chosen for this study. However, the market model is a single-factor model (Campbell, Lo & MacKinlay, 1997). Yet, it is possible to use multifactor models to further reduce the variation in ARs (Campbell, Lo & MacKinlay, 1997). For example, there is a Four-Factor Market Model that can be used to further reduce the variance, but since this study already includes a large number of stock market indices, the data collection would have been too extensive to carry out in the given time frame, and with a rather small gain in variance reduction.

IV. Estimation Procedure:

After the decision regarding the selection of a suitable model, the Market Model was used for the estimation of normal and abnormal returns (Campbell, Lo & MacKinlay, 1997). In Chapter 3.6.1.2 the Market Model and the estimations are further explained in detail.

V. Testing Procedure:

The results obtained in the estimation procedure were used to generate t-statistic for all sample groups, which were then compared with the corresponding critical value to draw a conclusion on whether the null hypotheses could be rejected or not (Campbell, Lo & MacKinlay, 1997). In Chapter 3.6.1.2 the Market Model and the estimations are further explained in detail.

VI. Empirical Results:

Following the test procedure, conclusions on whether the null hypotheses could be rejected or not were presented in Chapter 4 (Campbell, Lo and MacKinlay; 1997).

VII. Interpretation and Conclusion:

Finally, the empirical results were interpreted and conclusions were derived regarding Hypotheses 1 and 2 (Campbell, Lo and MacKinlay; 1997).

3.5.1.2. Measuring Abnormal, Average Abnormal and Cumulative Returns

The ARs (ε_{it}^{*}) for the stocks of the acquiring companies in the sample were generated for each day of the event window by subtracting the *Normal Returns* ($E[R_{it}]$) from the *Actual Stock Return* (R_{it}), see Equation 1 (Campbell, Lo & MacKinlay, 1997).

$$\varepsilon_{it}^{*} = R_{it} - E[R_{it} \mid X_t] \qquad (1)$$

Normal Returns are the stock returns that could be expected if the announcement of the acquisition would not occur, while the Actual Stock Return is the stock return that occurs as a result of the event taking place (Campbell, Lo & MacKinlay, 1997). The Actual Stock Return can be collected and calculated rather simply, see Equation 13 in Appendix 5. The Normal Returns, however, must be estimated by using the Market Model, see Equation 2, and the parameters generated from the model: a_i and β_i (Campbell, Lo & MacKinlay, 1997).

$$R_{it} = a_i + \beta_i R_{mt} + \epsilon_{it} \qquad (2)$$

The equations for the estimation of a_i and β_i are presented in the appendix, see Equation 15 and 16 in Appendix 5. The *Actual Returns of the Market Portfolios* (R_{mt}) are in the context of this study the different indices on which the acquiring firms' stocks are traded on (Campbell, Lo & MacKinlay, 1997), see Equation 14 in Appendix 5. In short, the R_{mt} and R_{it} were calculated for the entire estimation window [-200,-10] and then the Market Model was used to generate the parameters (a_i and β_i) for each of the acquirers' stocks (a_i and β_i) (Campbell, Lo & MacKinlay, 1997).

The Normal Return was then calculated for each day of the event window by using the Market Model mentioned above. The estimated a_i and β_i generated within the estimation window for each stock was then used together with the Actual Return of the Market Portfolio for the days of the event window to calculate the Normal Returns within the event window (Campbell, Lo

& MacKinlay; 1997). After the Normal Return for each day of the event window had been calculated, the AR could be determined for each day falling within the event window based on Equation 1.

Calculations of CAR for different event windows have been performed to visualize how the stock market reacts over time in the days surrounding the event. The different windows included were [0,0], [0,1], [0,2], [0,3], [0,4], [0,5], [-1,0], [-1,1], [-1,2], [-1,3], [-1,4], and [-1,5]. In order to calculate CAR for a certain event window the ARs within that specific window were aggerated, see Equation 3.

$$CAR = \sum_{i=1}^{n} \varepsilon_{i\tau}^{*} \quad (3)$$

As mentioned earlier, to determine the reaction to specific types of acquisitions, the deals were separated into different groups. For the entire sample as well as for the eight different sub-samples the different *average CARs* [CAARs] were calculated, see Equation 4.

$$CAAR = \frac{1}{N} \sum_{i=1}^{N} CAR_i \quad (4)$$

(adapted from: Campbell, Lo and MacKinlay; 1997).

CAR_i is the cumulative abnormal return for each stock event window and N is the number of deals in the sample. The CAAR, as suggested by Campbell, Lo & MacKinlay (1997) was used for the different t-tests to determine whether the stock market reaction to the announcement was significant or not.

The t-test is a significance test on CAAR in the context of which the null hypothesis H0 assumes that the difference within CAAR means is zero (Campbell, Lo & MacKinlay, 1997), see Equation 5. If the null hypothesis cannot be rejected, it indicates that the stock market does not react to the announcement of the acquisition. However, if the null hypothesis can be rejected, there is a significant reaction on the stock market following the announcement.

$$\frac{CAAR}{\bar{\sigma}} \sim N(0,1) \quad (5)$$

In Equation 5, $\bar{\sigma}$ is the standard deviation of CAAR, which can be calculated with Equation 6 below.

$$\bar{\sigma} = \sqrt{\overline{Var(CAAR}} = \sqrt{\frac{1}{N^2}\sum_{i=1}^{n}(CAR_i - CAAR)^2} \quad (6)$$

If the t-statistic ($\frac{CAAR}{\bar{\sigma}}$) was within the normal distribution of the t-test, which means between the critical values, no significant reaction has occurred on the stock market (Campbell, Lo & MacKinlay, 1997). However, if the t-statistic was lower the negative critical value or higher than the positive critical value, there was a significant negative versus positive reaction in the stock market (Campbell, Lo & MacKinlay, 1997). The results of the t-test were then used to draw conclusions regarding the first and second hypotheses.

3.5.2. OLS Multiple Linear Regression Model

To answer the remaining Hypothesis 3, *Ordinary Least Squares* [OLS] multiple linear regression models were employed (Brooks, 2014). Regression models are used to describe how independent variables such as the different ESG pillars affect the dependent variable, the acquirers' CARs in this study (Brooks, 2014). To show the relationship between the dependent and independent variables, the regression model generates coefficients [β] for each independent variable (Brooks, 2014). These β are not the same as the β used in the Market Model, but are specific to each independent variable used in the regression. The β in the regression indicate how the independent variables affect the dependent variable in terms of a shift in units or in percentage, depending on whether the variables used are logged or not (Brooks, 2014). The OLS multiple linear regression model used in this study can be found in Equation 7 below.

$$CAR_i = \beta_0 + \beta_{ESG}x_{ESGi} + \cdots + \beta_k x_{ki} + e_i \quad (7)$$

In the equation for the regression model, CAR_i is the specific response on each acquirer's share. The term $\beta_{ESG}x_{ESGi}$ captures either the Total ESG Score or one of its three pillars in the regression model and the coefficient β shows the independent variables impact on CAR_i. The other independent and dummy variables mentioned above were also included in the various regression models and are expressed as $\beta_k x_{ki}$ in the equation, where k indicates the different variables. Every regression model has a R^2 value, which captures how well the different variables in the model explain the movement in the dependent variable CAR measured in percentage (Brooks, 2014). Therefore, a higher R^2 value is beneficial to show that a regression model has a good fit (Brooks, 2014).

3.5.2.1. Econometric Software Used

The Gnu Regression, Econometrics and Time-series Library [Gretl], an open-source software package for econometric analysis that is available to everyone (Cottrell & Lucchetti, 2022A), was used in the context of this study. Gretl was developed by Ramu Ramanathan (1939-2013) for his course in econometrics at the University of California San Diego (Cottrell & Lucchetti, 2022A). The software provides a user-friendly interface and is very accurate as an econometric analysis tool, as Gretl has been thoroughly tested against several benchmarks (Cottrell & Lucchetti, 2022B). The software makes it easy to run OLS regression models with multiple variables and to perform the necessary tests for econometric analysis (Cottrell & Lucchetti, 2022B).

3.5.2.2. Multicollinearity

A fundamental requirement for using the OLS estimation method is that the independent variables must not be correlated with each other (Brooks, 2014). If the independent variables are not correlating, they are said to be orthogonal to one another, resulting in regression models were removing one variable does not affect the other variables' coefficients (Brooks, 2014). However, some correlation between the variables will almost always occur (Brooks, 2014). If this correlation is not too high, the regression model will still yield accurate and reliable results (Brooks, 2014). However, if the correlation between the independent variables is too high, this will lead to *multicollinearity* (Brooks, 2014). A distinction can be made between two types of multicollinearities (Brooks, 2014). Perfect multicollinearity occurs when two or more independent variables are not independent but closely related; this is only common when a variable is used twice in a regression model. Near-multicollinearity occurs when two or more independent variables are correlated, not perfectly, but the relationship is not negligible. The risk of near-multicollinearity is therefore much higher than that of perfect multicollinearity (Brooks, 2014). In the case that the dependent variable, which is CAR in the present study, is correlated with one of the independent variables, it is not considered multicollinearity because multicollinearity only refers to the relationship among the different independent variables (Brooks, 2014).

Multicollinearity is quite difficult to examine and test (Brooks, 2014). Brooks (2014) therefore suggests visualising a correlation matrix to detect high correlation values between different independent variables. For example, a correlation of about 0.2 (20 per cent) is not considered influential and therefore not multicollinearity. However, the visualisation method described above is not suitable for detecting multicollinearity when it is caused by the involvement of

three or more variables, such as $x_2 + x_3 \approx x_4$ (Brooks, 2014). When multicollinearity occurs, it can have negative consequences that reduce the quality and validity of the regression analysis. First, multicollinearity can lead to a high R^2 value, which on the one hand is positive because it raises the level of explanation (Brooks, 2014). However, the independent variables will not show a significant relationship with the dependent variable if the high R^2 value is due to multicollinearity. Furthermore, the impact of changes in a regression model with multicollinearity is quite large, so that the coefficients or significance levels of the other variables change drastically when variables are added or removed. Finally, the confidence intervals for the parameters may be too broad as a result of multicollinearity, which in turn may lead to inappropriate significance tests. This makes it difficult to derive conclusions from the regression model. Therefore, a multicollinearity test was conducted as part of this study (Brooks, 2014). Brooks (2014) suggests four ways to address the multicollinearity problem: (i) ignore, (ii) omit one of the collinear variables, (iii) convert the highly correlated variables into a ratio, and finally (iv) increase the size of the data sample. On this basis, a correlation matrix was constructed for the different variables in this study.

3.5.2.3. Linearity

Concerning the relationship between the independent variables and the dependent variable, a distinction can be made between a linear and non-linear relationship. Provided a model is linear, the relationship between the dependent variable and the independent variables (this is called linearity of parameters) can be represented in a straight line within the framework of a regression model (Brooks, 2014). If a model is not linear, it can be transformed by, for example, taking the logarithms of the non-linear variable (Brooks, 2014). Ramsey's (1969) RESET test can be used to determine whether a model should be linear or not (Brooks, 2014). If the test statistic was greater than the critical value, the original form of the model was correct and the null hypothesis of non-linearity was rejected (Brooks, 2014).

3.5.2.4. Underlying Assumptions for the OLS Method

When conducting a classical linear regression model, there are five underlying assumptions that need to be considered (Brooks, 2014). The assumptions are important in order to estimate the coefficients for hypothesis testing in a valid way using the OLS technique (Brooks, 2014). Brooks (2014) elaborates on the five assumptions in detail:

I. The Average of the Errors is Zero

$$E(u_t) = 0 \quad (8)$$

The first assumption mentioned by Brooks (2014) can be ensured by introducing a *constant term* [c] into the regression model. The introduction of c ensures that the average of the errors in the regression models is zero (Brooks, 2014). If the average of the errors is not equal zero, it results in an intercept set to zero leading to biased estimations of the slope coefficients (β) (Brooks, 2014). A biased slope would result in a R^2 value that would be meaningless for explaining the influence of the independent variable on the dependent variable (Brooks, 2014). Therefore, when using Gretl to run the regression, c was always added.

II. The Assumption of Homoscedasticity

$$var(u_t) = \sigma^2 < \infty \quad (9)$$

Homoscedasticity exists when the variance of the errors is constant. If this is not the case, the errors are referred to as *heteroskedastic* (Brooks, 2014). In the presence of heteroscedasticity, the coefficients of the independent variables would still provide unbiased and consistent estimates, but the coefficients would no longer be the *best linear unbiased estimators* [BLUE] of the dependent variable (Brooks, 2014). This would in turn mean that the standard errors of the regression would be incorrect, leading to misleading results in terms of inference (Brooks, 2014). For this reason, homoscedasticity is desirable. Following the implementation of a regression model, this study therefore tested for homoscedasticity. Two different tests can be used to determine whether or not the errors in the models suffer from heteroskedasticity (Brooks, 2014). On the one hand, there is the *Goldfeld-Quandt* (1965) test, which is relatively simple to perform. On the other hand, there is *White's* (1980) test, which is the most widely used test for heteroskedasticity today. White's test makes fewer assumptions about the likely form of heteroskedasticity, if any (Brooks, 2014). In Gretl, White's test is available and provides a p-value. A p-value below 0.05 leads to the rejection of the null hypothesis related to homoscedasticity, indicating that the errors are heteroscedastic (Brooks, 2014). A p-value above 0.05 is therefore desirable (Brooks, 2014).

III. No Autocorrelation

$$cov(u_i, u_j) = 0 \; for \; i \neq j \quad (10)$$

The third assumption requires that the covariance between the error terms of the independent variables is zero both over a time series and cross-sectionally (Brooks, 2014). In other words, *autocorrelation* occurs when the error terms of the different independent variables are correlated with each other (Brooks, 2014). In general, autocorrelation occurs quite frequently both over a time series and in cross-sectional data (Brooks, 2014). When autocorrelation occurs, it leads to similar consequences as the presence of heteroskedasticity (Brooks, 2014). The coefficients are not BLUE for the independent variables in the model (Brooks, 2014). Two available tests exist to examine autocorrelation (Brooks, 2014). The *Durbin-Watson* [DW] test can be used to investigate whether autocorrelation is present, but as it is a fairly simple test, it may not detect autocorrelation in certain circumstances (Brooks, 2014). Compared to other statistical tests (such as t, F or χ^2) that follow a standard statistical distribution, the DW test does not result in a p-value that can be used to reject or not reject the null hypothesis regarding the absence of autocorrelation (Brooks, 2014). Instead, a DW test yields a value between 0 and 4, where: 0 indicates perfect positive autocorrelation, 2 that there is no autocorrelation, and 4 that there is perfect negative autocorrelation (Brooks, 2014). A value close to 2 in a DW test is therefore desirable (Brooks, 2014). In addition, there is the *Breusch-Godfrey* test for the detection of autocorrelation, which represents a more general test for autocorrelation (Brooks, 2014). However, the Breusch-Godfrey test has the disadvantage that there is no clear answer to the question of how to determine certain parts of the equation (Brooks, 2014). On this basis, and since the data used for this study is cross-sectional, only DW tests were used to examine autocorrelation.

IV. The x_t are Non-Stochastic (Exogenous instead of Endogenous)

$$cov(u_t, x_t) = 0 \qquad (11)$$

The fourth assumption, explained by Brooks (2014), states that the independent variables should not be correlated with the error term in the equation of the regression model, with other words they should be exogenous (Brooks, 2014). If this assumption is not met, the independent variables are not consistent, which is, however, a prerequisite for OLS (Brooks, 2014). If this is the case, the regression model will produce biased results that do not capture the true nature of the relationship between the dependent variable and independent variables (Brooks, 2014). To investigate whether this assumption is met or not the Hausman Specification Test can be conducted. If the p-value in the Hausman test is small (less than 0,05) the null hypothesis of the test can be rejected, meaning that the independent variables are exogenous; hence a larger p-value is desirable.

V. The Disturbances are Normally Distributed

$$u_t \sim N(0, \sigma^2) \quad (12)$$

The normality assumption states that disturbances in the regression models are normally distributed, which is necessary to perform both individual and joint hypothesis tests with regression models (Brooks, 2014). However, it is very common for the normality assumption to be rejected in economic and financial modelling due to the nature of the financial data (Brooks, 2014). It can usually be observed that the tails of the distribution are not normally distributed (Brooks, 2014). A normal distribution is not skewed and has a kurtosis coefficient of three (Brooks, 2014).

Among the most commonly used procedures to test for normality is the *Bera-Jarque* [BJ] test (Brooks, 2014). A BJ test is used to test whether the variable suffers from skewness and kurtosis (Brooks, 2014). The BJ test follows the χ^2 distribution and a significant result with a p-value of less than 0.05 means that the distribution of the variable does not follow a normal distribution (Brooks, 2014). In short, the residuals of the model are significantly skewed or leptokurtic/platykurtic (or both) if the BJ test is significant. If it is not, the histogram of the residuals would be bell-shaped like a normal distribution (Brooks, 2014).

If non-normality is detected, the continuation of the study depends on the characteristics of the sample (Brooks, 2014). If the sample size is sufficiently large, a violation of the normality assumption will not affect the results based on the *Central Limit Theorem* [CLM] (Brooks, 2014). "The law of large numbers states that the average of a sample (which is a random variable) converges to the mean of the population (which is fixed), and the central limit theorem states that the sample mean converges to a normal distribution" (Brooks, 2014, p. 210). When using financial data for regression models, it is common for one or two observation points to cause rejection of normality (Brooks, 2014). For this reason, a dummy variable approach can be used to remove these observations (Brooks, 2014). Removing these outliers leads to a reduction in standard errors and RSS, which in turn leads to an increase in R^2, improving the adequacy of the regression model to describe the movement of the dependent variable (CAR in this study) (Brooks, 2014). However, outliers also contain valuable information that is lost when they are excluded (Brooks, 2014). Non-normality in financial data can also be the result of a certain type of heteroskedasticity (ARCH). In this case, it would not be sufficient to remove only the outliers (Brooks, 2014).

With this in mind, *Winsorizing* is a way to reduce the impact of outliers without excluding these data points from the regression model (Frey, 2018). This procedure is performed by using the next highest (in the lower tail) and the next lowest (in the upper tail) as values for the previous extreme outlier values (Frey, 2018). Most commonly, Winsorizing is performed at a 10 to 20 per cent level, meaning that the 10 and 20 per cent lowest and highest values are replaced by the next lowest and next highest values, respectively, that does not fall into the chosen per cent (Frey, 2018). Therefore, when there is non-normality in the variables, Winsorizing is a possible procedure to preserve the data while avoiding a reduction with regard to the degree of freedom by reducing the sample (Frey, 2018). One can also use another technique that simply involves a logarithmic transformation of the independent variable (Brooks, 2014). Both Winsorizing and logarithmic transformations were used in this study, see Appendix 8 for the 48 BJ tests conducted.

3.6. Limitations

3.6.1. Critique of the Methodology and the Data Used

Several critical observations need to be addressed with regard to the methodology and data used within this study. Firstly, the sub-grouping is based solely on the Total ESG Scores of the target companies within the sample and then divided into four equally large sub-samples. The division into groups does not reflect the four different quartiles of the ESG rating scale presented by Thomson Reuters RE. A subdivision of the sample based on the rating scale could therefore lead to divergent results. To examine this, the group with the highest Total ESG Scores was subdivided once more to obtain a group containing the target companies with the best ESG scores, capturing the two highest quartiles of the RE ESG. The additional subdivision included an even smaller subsample of about 20 observations, which is almost too small a sample to draw any meaningful conclusions. Since the further division did not result in a statistically significant stock market response, it is reasonable to assume that a different grouping method would not yield divergent results. Second, the grouping was based only on the overall ESG scores and not on the different ESG pillar scores. Further subdivision according to the individual pillar values could therefore produce divergent results. Further t-tests could be conducted based on grouping within each pillar to examine the effects of the different pillars. However, with this in mind, the regression models will provide insight into the actual impact of the different pillars on the CAR, reducing the need to divide the sample based on all the other pillars. Finally, no data was collected on the ESG scores of the acquirers, which could have

been of interest as it is reasonable to assume that shareholders of an acquirer with a high ESG performance would be more responsive to the acquisition of a target company that has either a higher or lower ESG rating. For example, the grouping could have been based on the ESG ratings of the target companies relative to the ESG rating of the acquiring company.

3.6.2. Missing Data Analysis

The consideration of the selection criterion of available ESG scores for target companies has led to a reduction of the sample size from 936 to 170 deals, see Table 2 in Chapter 3.4.2. This means that 82 per cent of the original sample could not be considered due to missing ESG scores. Perhaps this ratio would have been different if a different database had been utilised. Of the 82 per cent that were excluded from the sample, the majority had a Total ESG Score, a social pillar score and a governance pillar score, but not an environmental pillar score. If the companies without an environmental pillar score had been included, this would have resulted in a larger sample and potentially more reliable results for the Total ESG Score, social pillar score and governance pillar score, but at the cost of a more unreliable result for the environmental pillar score due to regression models with different sample sizes. Furthermore, a number of deals were excluded because the firm names in Zephyr and Eikon did not match, making it difficult to determine whether or not a company was actually the company in question. In this case, it was possible to identify the correct name of the acquiring company and the target company through additional research to find matching ESG values, but still be restrictive so that the risk of including an incorrect ESG rating was low. The issue of different names and tickers of companies in the two databases also arose in the final step of the data filtering process and was handled in a similar way.

3.6.3. Reliability

Reliability means that a study can be repeated or recreated by other researchers with the same results (Bell, Bryman & Harley, 2019). The steps of this study follow a clear outline and the steps, which are explained in great detail following commonly used methods, allow other researchers to conduct the same or a similar study. The data sources and econometric statistical tools are also generally freely available to the public, with the exception of certain parts of the Zephyr and Eikon databases. The exact deals and companies associated with the sampled transactions are listed in the appendix, see Appendix 2, allowing other researchers to explore each deal in depth.

3.6.4. Validity

Validity is about how accurately what is being studied actually measures what happens in the real world, and validity in itself implies reliability (Bell, Bryman & Harley, 2019). Validity can be described from two different perspectives: internal and external (Bell, Bryman & Harley, 2019). First, in the context of this study, the internal perspective refers to how well the independent variables, the different ESG scores, influence the dependent variable, CAR, and to what extent they influence it. To ensure that the study is valid from an internal perspective, methods that are generally accepted in the scientific community were used. There are also similarities with previous studies in terms of methodology, although to our knowledge the exact independent variable used in this study has not yet been used by others. Second, the external perspective refers to how well the study can be used as a generalisation and, in the case of this study, represents how the stock market in general reacts to acquisitions based on the ESG ratings of the target companies. The reduction of the potential sample size to 18 per cent of the original size due to the lack of ESG ratings could affect the generalisation, as other ESG ratings could potentially have filled the gaps, resulting in a larger sample that would have better captured the actual stock market response. However, if other ESG ratings were included, the matter of correlation between the different ratings and also how each ESG rating should have been weighted would be an issue. This in turn would have required more time for data collection. Instead, this study could potentially be used for comparison with other studies conducted over the same period. In addition, there are threats to statistical power, for example, such as insufficient statistical knowledge and violation of assumptions in the statistical models (Creswell & Creswell, 2018). For this reason, the statistical models and assumptions for the above-mentioned regression model are thoroughly tested and with the help of Gretl, possible errors could be avoided (Doughery, 2016).

4. Empirical Results

In this chapter, the results of the study are presented in two sections. First, the results of the event study and the t-tests are presented, which provide answers concerning H1 and H2. Subsequently, the results of the regression models are presented, which form the basis for conclusions regarding H3.

4.1. Results of the T-Test and the Event Study

4.1.1. Results of the T-Test and Significance

First, t-tests were conducted at the total sample level, covering all 151 transactions. The results show significance at a level of 5 to 10 per cent around the days of the announcement. The significant results are negative in nature and illustrate that a stock market reaction to an acquisition announcement can be observed. Below, in Table 5, the change in the CAAR is shown in seven different event windows, all starting on the day of the announcement. See Appendix 6 for further elaboration regarding the calculations for the specific windows.

Table 5: Results of the T-Tests

Window:	*[0,0]*	*[0,1]*	*[0,2]*	*[0,3]*	*[0,4]*	*[0,5]*	*[0,6]*
CAAR:	-0,0102**	-0,0135**	-0,0106*	-0,0103	-0,0136**	-0,0138**	-0,0136*
p-value:	4,31 %	1,81 %	7,88 %	10,73 %	3,48 %	3,57 %	5,18 %

Significance level: *:p<0,1, **:p<0,05, ***:p<0,01

The p-value was lowest for the event window that starts on the day of the announcement and ends on the day after the announcement [0,1]. Therefore, this window was used for the regression models below. T-tests were also conducted for event windows starting the day before the announcement, see Appendix 6. Similarly, these show a significant negative change in the CAAR, suggesting that information that may have been leaked to the public prior to the official announcement of the transaction may have had an impact. Based on the t-test at the total sample level, however, it is not possible to generate answers with regard to hypotheses H1 and H2. A subdivision of the entire sample into several groups is therefore necessary to form the basis for conclusions regarding H1 and H2.

4.1.2. Visualization of the Event Study Results and Grouping Effects

To determine whether or not the first two hypotheses developed in Chapter 2 can be rejected or not, the entire sample was divided into four equal groups based on the ESG Scores of the target

companies. Information regarding the split is presented below, as well as particular companies that stand out in each of the groups. Turning the focus to the average ARs of the acquiring companies' shares, it can be observed that the reaction on the stock market is quite differently around the time of the announcement depending on the respective ESG group, see Figure 9.

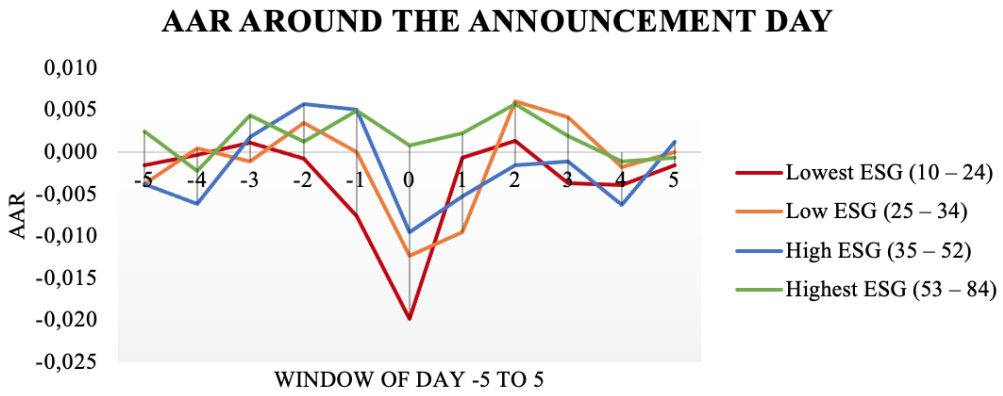


Figure 9: AAR Around Transaction Announcement Date

The visualisation reveals differences in the stock market reaction depending on the ESG score of the target company involved in the acquisition. The average AR for acquisitions of target companies with the highest ESG scores (53 - 84) is positive, while there is a negative market reaction for the other groups with ESG scores below 52. This difference is also evident when looking at the CAAR, which is used as the dependent variable in the event study and regression models. The question is whether this stock market reaction is actually significant or not.

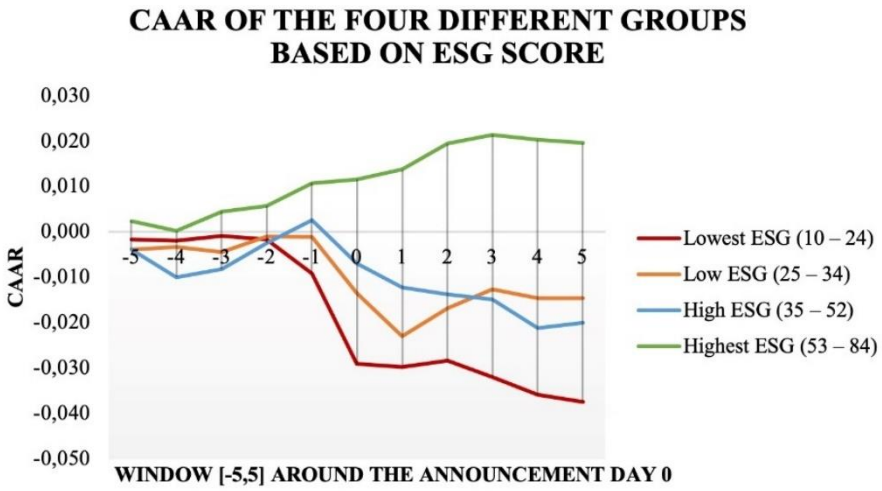
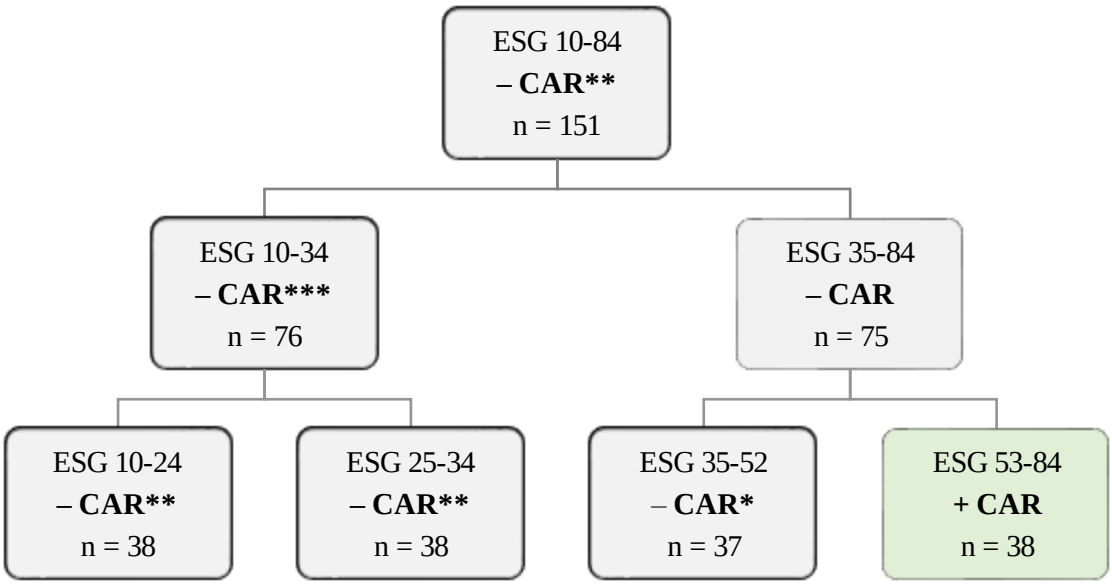


Figure 10: Cumulative Average Abnormal Return

Performing t-tests for each of the four groups yielded several significant results. However, a few results did not show statistical significance, see Appendix 7 for the 72 different t-tests for the different sub-samples and the respective results for each event window tested. The t-tests

for the event window [0,1] are presented in a tree diagram below, see Figure 11. The groups consisting of target companies with lower ESG (10 – 52) scores exhibit a significant negative stock market reaction, whereas the group of target companies with the highest ESG scores (53 – 84) exhibits a positive financial market reaction. However, the latter result is not statistically significant. Further t-tests (not included in Figure 11) were conducted for a smaller high-ESG sample with only 19 observations, but again no significance was found.



Significance level: *:p<0,1, **:p<0,05, ***:p<0,01

Figure 11: T-Test Results of Subdivided Groups

Table 6 below shows the most noteworthy companies within the four groups and the number of deals in each industry. It can be observed that with Johnson & Johnson and Pfizer, two heavyweights of the medical industry are represented on the side of the acquiring companies, which, however, have targeted unequal target companies, measured by their ESG Scores, in the context of acquisitions. Other notable companies include Microsoft Corp. and Amazon, both of which have acquired targets with higher ESG Scores. Ericsson, a Swedish company in the telecommunications sector, acquired a target company with a low ESG score. Focusing on the different sectors, it can be observed that the mining industry mainly acquires companies with lower ESG scores. The manufacturing industry acquires more targets with higher ESG scores, whereas the financial industry acquires companies from all ESG rating groups.

Table 6: Subdivision of the Sample

Lowest ESG Score (10-24)	***Low ESG Score (25-34)***	***High ESG Score (35-52)***	***Highest ESG Score (53-84)***
MINING:			
8	**3**	**0**	**3**
CONSTRUCTION:			
1	**1**	**2**	**1**
MANUFACTURING:			
11 • Johnson & Johnson • Unilever • Ericsson AB	**16** • Cisco Systems	**19** • Pfizer • Intel Corp.	**19** • Nokia • Intel Corp. • Texas Instruments • Ssab • Pfizer
TRANSPORT:			
3	**6**	**3**	**5**
WHOLESALE:			
1	**2**	**0**	**1**
RETAIL TRADE:			
1	**1**	**1**	**1** • Amazon
FINANCE:			
9	**7**	**8**	**4**
SERVICES:			
4	**2**	**4** • Evolution AB	**4** • Microsoft Corp.

Based on the findings mentioned above, the rejection or acceptance of the first hypothesis can be discussed. The hypothesis states that:

H1: The acquisition of target companies with a high degree of corporate sustainability is positively related to the shareholder wealth of the acquiring company's shareholders

For transactions involving target companies with a Total ESG Score higher than 53, a positive reaction of the financial market can be observed. However, since this effect is not statistically significant, the null hypothesis of the t-test can therefore not be rejected indicating that there is no specific reaction to the announcement of an acquisition of a target firm with higher ESG scores.

In conclusion, the results of this study reveal a significantly negative stock market reaction to the acquisition of target companies with a Total ESG Score lower than 52. Therefore, the null

hypothesis of the t-tests can be rejected meaning that there is a negative significant reaction on the stock market and hence second hypothesis cannot be rejected:

H2: The acquisition of target companies with low levels of corporate sustainability is negatively related to the shareholder wealth of the acquiring company's shareholders.

4.2. Results of the Regression Model

To generate answers related to Hypothesis 3, several regression models were run to ensure the best fit between the regression model used and the test results. The four most essential regression models, based on their high R^2 and compliance with the necessary statistical tests, are presented below, see Table 7:

Table 7: Results of the Regression Model

Regression model:	***Total ESG Score***	***ENV Score***	***SOC Score***	***GOV Score***
ESG Score	0.010	-0.001	0.021**	-0.000
Deal Value	-0.004	-0.002	-0.006	-0.002
No Rumor	-0.008**	-0.008**	-0.009**	-0.008**
Pay with Shares	-0.011***	-0.011***	-0.011***	-0.011***
R^2	9.1 %	8.5 %	11.4 %	8.6 %

Significance level: *:p<0,1, **:p<0,05, ***:p<0,01

As the regression models still show some non-normality for the different column values, the results of the Normality Test are reported in Appendix 8. However, as mentioned earlier, a violation of the normality assumption does not affect the results based on the CLM if the sample size is sufficiently large. The results of the tests for Autocorrelation, Homoscedasticity, Linearity and Endogenous Variables are presented in Appendix 9. These tests yielded reasonable results for the four regression models, with the only exception being the presence of heteroscedasticity within the regression model for the ENV Score. Although heteroscedasticity is present, the independent variables are still unbiased and consistent estimates, which means that the outcome of the regression model can still be significant. For this reason, the coefficients of the ENV Score are not the best linear unbiased estimators of CAR, which should be taken into account in the conclusion.

Running the regression models revealed that of the different ESG pillar scores, only one exerts a significant impact on shareholder wealth. The social pillar has a significant positive impact

on CAR, while the environmental and governance pillars have a negative but non-significant effect. In the context of acquisitions, this means that a 1 per cent increase in the social score of the target company causes a 0.01 x 0.021 increase in the CAR on the part of the acquiring company. In short, the higher the target's social score, the higher the expected CAR on the acquiring company's side.

5. Discussion

This chapter discusses the obtained results of the study and attempts to put them into context with previous related studies in the academic literature. Theoretical considerations will be provided in order to assist in the explanation of the results. Furthermore, this chapter discusses what implications the results have for practitioners.

5.1. Observation of the Stock Market Reaction

To investigate the impact of corporate sustainability on acquiring companies' shareholders' wealth, an observable reaction of the financial markets is a fundamental precondition. The results of the t-test conducted at the total sample level described in section 4.1.1 reveal that a significantly negative stock market reaction to acquisition announcements can be observed. According to signaling theory, this observation first suggests that an information exchange takes place between companies on the one hand and shareholders and investors on the other hand (Kreps & Sobel, 1994). By acquiring target companies with higher or lower ESG scores, acquiring companies transmit signals to the financial market that allow conclusions to be drawn about the sustainability efforts of the acquirers. According to the results of the t-test, this signal is received and reciprocated by financial market participants. However, the negatively directed result suggests that the acquisitions included in the sample were not rewarded but punished by the stock markets with respect to the whole sample.

The fact that a market reaction can be observed indicates that at least a semi-strong market form exists according to the Efficient Market Hypothesis (Fama, 1970). The reaction following the announcement of an acquisition proves that market participants consider not only historical data in their investment decisions, but also current, newly published data, such as the acquisition announcement (Fama, 1970). In addition, there could also be characteristics of a strong market form where insider and private information are also taken into account in price formation. In particular, this could apply to the transactions in the sample for which the rumor date does not correspond to the announcement date.

The subdivision of the entire sample into four subgroups with different ESG scores, which was carried out in a second step, led to diverging t-test results. While the groups of lowest, low and high ESG target companies produced significantly negative results, only the t-test of the highest ESG targets produced a positive result, although this was not statistically significant. The comparison with the related studies presented in Chapter 2.4 allows further conclusions to be

drawn about the possible underlying causes of the observed responses. However, due to the different independent and dependent variables as well as the partly different methodologies used, the comparability of the results obtained in this study with the results of the related studies is limited. Among the related studies, the study conducted by Aktas, De Bodt and Cousin (2011) shows the greatest similarity to the present study, both in terms of the independent and dependent variables used and the methodology applied. The average acquirer CAR of the whole sample determined within the scope of this study is negative (-1.35 per cent) and statistically significant with a p-value on a 0.05 level. Thus, the result is similar to the CAR determined by Aktas, De Bodt, and Cousin (2011) (-1.16 per cent). This initially confirms the general assumption that M&A reduce the shareholder wealth of the acquiring company's shareholders.

As mentioned before, a difference arises with regard to the results obtained following the subdivision of the samples. Similar to this study, Aktas, De Bodt, and Cousin (2011) divide the sample of their study into subgroups. However, Aktas, De Bodt, and Cousin (2011) divide the sample into only two subgroups compared to the four subgroups used in this study. Both the study by Aktas, De Bodt, and Cousin (2011) and this study reveal a negative CAR for the group of targets with low sustainability and social standards. However, when looking at the group of targets with high sustainability standards, Aktas, De Bodt, and Cousin (2011) arrive at a positive CAR, whereas the CAR of this study is negative for the majority of the groups, including the high ESG group. Only the highest ESG group shows a positive CAR. However, due to the lack of statistical significance, the meaningfulness of this result is limited. The differences in the results of the high sustainability group could be attributed to several differences in the respective approaches. On the one hand, the sample of Aktas, De Bodt, and Cousin (2011) includes transactions from all parts of the world whereas this study only includes European and US transactions. The difference in geographic distribution may be important when considering the intensity of M&A competition and the associated bid premiums (Alexandridis, Petmezas, & Travlos, 2010). By including international transactions from many different parts of the world, it is therefore possible that Aktas, De Bodt, and Cousin (2011) include transactions from less competitive regions, which in turn leads to higher CARs. On the other hand, Aktas, De Bodt, and Cousin (2011) subdivide the sample by dividing the rating matrix in the middle. This means that regardless of the number of target companies in both halves, the sample is divided into a group with the ratings AAA to BBB and BB to CCC. In the context of this study, the subdivision was based on the Total ESG Scores achieved by the target companies. Since the majority of the target companies have a rather low ESG score, the sample was first divided into a group of targets with ESG scores [0 to 35] and another group with ESG scores of [35 to 85].

As a result, the subdivision of the sample does not really occur in the middle of the rating scale, which ranges from 0 to 100. Furthermore, the best-rated target company has an ESG score of 85, none of the target companies in the sample achieve a better result. Companies with excellent performance and a high level of transparency in terms of corporate sustainability are therefore scarce within this study.

Considering the results against the background of the diverging theoretical perspectives of the Shareholder Expense View and the Stakeholder Value Maximization View, some kind of continuum can be observed. The results obtained give the impression that acquisitions of thee lowest, low and high ESG target companies are made at the expense of the acquirers' shareholders, as such acquisitions lead to a reduction in shareholder wealth. The extent to which such acquisitions affect stakeholders other than shareholders was not investigated in this study. Therefore, only assumptions can be made in this respect. It can be assumed that the higher the ESG score, the higher the level of corporate sustainability and thus the more stakeholders are satisfied. Above a certain ESG score level, however, the prefix of the results achieved changes from negative to positive. This indicates that above a certain level of corporate sustainability, more stakeholder groups are benefited as in terms of acquirer shareholders, their wealth grows rather than shrinks. The result obtained thus indicates that the costs associated with M&A transactions, caused by intense competition (Alexandridis, Petmezas, & Travlos, 2010) and higher bid premiums for particularly sustainable targets (Gomes & Marsat, 2018), exceed the economic benefits of the acquisition perceived by shareholders up to a certain level of corporate sustainability of the target. However, with increasing corporate sustainability, the financial market attributes a higher economic value to the acquisition, which leads to an increase in the acquirer's shareholder wealth as soon as this inhibition threshold is exceeded.

5.2. Impact of the ESG Pillars on the Stock Market

The correlation found between corporate sustainability and shareholder wealth in the context of M&A transactions was examined in a further step to determine the extent to which ESG dimensions impact shareholder wealth. This was necessary since the results of the t-test only detected an existing relationship, but did not allow any conclusions to be drawn regarding the extent of the relationship. The regression analyses performed for these purposes revealed that only the social pillar of the ESG framework exerts a significant positive influence on shareholder wealth. The environmental and governance pillars do not appear to exert any significant influence on acquirers' shareholder wealth.

With regard to the explanation of the results, a variety of possible interpretations emerge. In the context of signalling theory, the results suggest that the social efforts of target firms in the context of acquisitions are valued higher by financial market participants than the efforts of target firms with respect to the environmental and governance aspects (Fama, 1970). This signal could be attributed to a variety of reasons. One explanation could be the prevailing regulations in the geographic regions included in the sample. With the European Union and the US, the sample includes two similarly developed regions that are considered pioneers in terms of corporate sustainability. In Europe and the US in particular, a large number of new regulations have been issued in recent years that increasingly regulate companies with regard to environmental and governance-related aspects. The increasing amount of regulation with regard to the environmental and governance dimensions may have caused confusion among financial market participants with regard to the adequate valuation of these dimensions. This could lead to investors paying less attention to these dimensions and therefore focusing on the well-known, little changed social dimension. On the other hand, the focus on social aspects could also be a characteristic feature of European and US financial market participants. In this respect, an investigation of the incentives and motives of financial market participants would allow further conclusions to be drawn as to the explanation of the observed result.

Another possible explanation arises from the composition of the sample in terms of domestic and foreign or cross-border transactions. Even though the share of cross-border transactions is low, this share could nevertheless contribute to the result obtained, as the behaviour of companies with regard to society and culture is particularly important in cross-border transactions (Bauer, Matzler, & Wolf, 2016). When a company enters a new country or market through an acquisition, it is particularly important that relations with local society and communities are intact to avoid loss of legitimacy (Bauer, Matzler, & Wolf, 2016). For reasons of legitimacy, the social dimension of corporate sustainability is therefore particularly important in cross-border transactions (Bauer, Matzler, & Wolf, 2016).

Considering the result against the background of the related concepts of corporate sustainability presented in Chapter 2 and their acceptance level within the financial markets, the following impression emerges. With regard to the concept of CSR and the associated dual responsibility for companies and stakeholders, it can be observed that this responsibility is not fully assumed by the stakeholder group of shareholders. The significant positive effect of the social pillar on shareholders' wealth suggests that shareholders of acquiring companies mainly value the social efforts of target companies, whereas environmental and governance aspects do not seem to be

relevant, at least for shareholders of acquiring companies. This in turn suggests that a full acceptance of corporate sustainability is not present in the financial markets. The different directional stock market reactions found in the t-test suggest that awareness of corporate sustainability is present, but that full recognition and consideration of this concept has not yet taken place. Conclusions on an upward or downward trend with regard to the acceptance of corporate sustainability in financial markets cannot be drawn from the results of this study. Rather, this study represents only a snapshot and lends itself to comparison with future similar studies.

Another reason for the results obtained could be the independent variable used for the approximation of corporate sustainability, the ESG scores of the Thomson Reuters RE database. On the one hand, the criticism expressed by Sindreu and Kent (2018) with regard to the low comparability of different ESG ratings could lead to divergent results in similar studies considering ESG ratings from providers other than Thomson Reuters'. In addition, the dependence of ESG ratings on the amount of published information noted by Christensen, Serafeim, and Sikochi (2022) could lead to bias in the results. Since the sampled target companies were not analyzed for the individual level of disclosure of non-financial information, it is possible that the target companies included in the sample differ from each other in this regard and homogeneity is not ensured. Information with regard to the differences in the extent of non-financial information published could not be derived from the RE database. The way in which this characteristic is weighted within the RE ESG scores was also not apparent.

Based on previous studies and the rationale for the GMA, such as achieving more sustainable innovation, the ENV Score should probably have been more important to shareholders. Furthermore, the regression model for the ENV Score suffered from heteroskedasticity, notwithstanding the various solutions tested to obtain homoskedasticity. The problem of heteroskedasticity means that the coefficients are not BLUE and thus do not fully capture the relationship between the ENV Score and the stock market response. Had homoskedasticity been achieved within the sample, this study might have found a different effect related to the environment.

Looking at the individual acquiring companies and the type of targets they have acquired in terms of overall ESG scores, we see that large well-known technology companies such as Amazon and Microsoft have acquired targets in the group with the highest ESG scores. This could be related to the fact that they are well-known B2C companies in which the general public likes to invest. Compared to the previously mentioned companies, the Swedish company

Ericsson, which is mainly active in the B2B sector, invested in a target company in the group with the lowest ESG score. Amazon is a retail company on the one hand, while Microsoft is active in the service industry on the other. The difference between the industries and the type of company (B2B or B2C) could play a role in the stock market's reaction. However, the similar companies Johnson & Johnson and Pfizer are in the same industry and acquire targets with different overall ESG scores, suggesting that the above factors may not matter in the manufacturing industry or that ESG scores are not as important in the market in which they operate.

With regard to the target groups of the conducted study, it may be noted that the obtained results could be related to the industry-related composition of the sample. With almost 43 percent, manufacturing acquirer companies represent the largest industry group, followed by the financial industry with a share of 19 percent of the acquirers included in the sample. Both the t-test and regression model results could be characteristic of the industry. Further studies with other industries would be needed to verify this conjecture. Assuming that the results are not only typical for the manufacturing and financial industries but also for other industries, the following implications for practitioners can be derived. From the perspective of acquiring companies, according to the study results obtained, it is important to pay attention to both the general ESG level of target companies and their social efforts in order to anticipate the impact on their own shareholders and manage their expectations accordingly. For target companies, the more socially responsible the company, the more attractive it becomes as an acquisition target. Depending on their corporate strategy, companies can specifically influence the probability of possible acquisitions. Finally, the study offers added value for practitioners in the management consulting industry. Consultants can provide tailored advice on M&A transactions based on the results obtained in this study, depending on their clients' perceptions and expectations.

Since the independent variables used in this study cannot fully explain the observed stock market reaction, other factors could also be partly responsible for the result obtained. In this regard, Datta, Pinches, and Narayanan (1992) provide further factors such as possible regulatory changes, the number of bidders, the approach of bidders, the payment method, and the nature of the M&A transaction that may exert influence on shareholder wealth. Since only one of these five factors was considered in this study, it remains open to what extent shareholder wealth is influenced by ESG dimensions compared to other factors. Further studies with a larger

number of independent variables would be useful to determine the relationship between the different triggers.

In light of the underlying research gap uncovered by Talan and Sharma (2019) regarding the impact of ESG rankings on corporate financial performance, the following can be derived from the results of this study. In the context of acquisitions in Europe and the US, the results obtained indicate that the extent of corporate sustainability exerts an influence on the wealth of shareholders of acquiring companies. As the level of corporate sustainability increases, the reduction in shareholder wealth appears to decrease until a positive effect on shareholder wealth can be observed above a certain level of corporate sustainability. Thus, it can be assumed that ESG rankings have a similar directional effect on the financial performance of companies.

The trend of increasing sustainable investments described at the beginning can only be partially understood in the context of acquisitions. The 8 percent increase in sustainable investments between 2016 and 2020 would suggest extensive integration and acceptance of the concept of corporate sustainability. However, the fact that only the social dimension of the ESG framework has a significant impact on financial markets suggests that full integration of sustainability concepts and widespread acceptance has not yet been achieved. Thus, sustainability appears to only partially matter within financial markets in the context of acquisitions. However, the direction and speed at which the transformation is taking place cannot be deduced from the results obtained and therefore offers the opportunity for further future studies.

6. Conclusion and Further Research

6.1. Conclusion

Referring to the research question posed at the beginning, to what extent the level of corporate sustainability of target companies has an effect on the wealth of shareholders of acquiring companies, three hypotheses were developed that enabled the investigation of this issue. The results obtained indicate that as the level of corporate sustainability increases, the costs of a takeover and the associated losses to shareholders are offset until they eventually exceed them. In this context, there appears to be a threshold value at around 50 with regard to the ESG scores used, which represents the boundary between reduction and increase in shareholder wealth or between Shareholder Expense and Stakeholder Value Maximization View. The significant influence of the social dimension and the accompanying indicated irrelevance of the environmental and governance dimensions indicate that the entire concept of corporate sustainability has not been fully incorporated within the financial markets.

6.2. Further Research

Future studies could conduct similar research based on ESG ratings from other providers to test the critique regarding the differences between rating providers. In addition, industry-specific studies could be conducted to investigate whether the importance of sustainability varies between different industries. Furthermore, it could be investigated whether the importance of the three different dimensions also depends on the industry. From a qualitative point of view, additional studies could be conducted to investigate the incentives and motivations of investment decision-makers on a qualitative basis in order to verify the possible interpretations of the quantitative results.

References

Akerlof, G.A. (1982). Labour Contracts as Partial Gift Exchange, Quarterly Journal of Economics, Available online: https://www.journals.uchicago.edu/doi/10.1086/342894 [Accessed 12 May 2022]

Aktas, N., De Bodt, E., & Cousin, J. (2011). Do Financial Markets Care About SRI? Evidence from M&A, *Journal of Banking and Finance*, Available online: https://www-sciencedirect-com.ludwig.lub.lu.se/science/article/pii/S037842661000453X ?via per cent3Dihub [Accessed 16 April 2022]

Alchian, A.A. & Demsetz, H. (1972). Production, Information Costs, and Economic Organization, *The American Economic Review*, Available online: http://www.jstor.org/stable/1815199 [Accessed 18 April 2022]

Alexandridis, G., Petmezas, D., & Travlos, N.G. (2010). Gains from Mergers and Acquisitions Around the World: New Evidence, Financial Management, Available online: https://www.jstor.org/stable/40963524 [Accessed 20 May 2022]

Amos, A.O. & Uniamikogbo, E. (2016). Sustainability and Triple Bottom Line: An overview of two interrelated concepts, *Igbinedion University Journal of Accounting*, Available online: https://iuokada.edu.ng/journals/9F2F7F6B56B433D.pdf [Accessed 3 May 2022]

Asquith, P. (1993). Merger Bids, Uncertainty, and Stockholder Returns, *Journal of Financial Economics*, Available online: https://www-sciencedirect-com.ludwig.lub.lu.se/science/article/pii/0304405X83900053?via per cent3Dihub [Accessed 6 May 2022]

Atkins, B. (2020). Demystifying ESG: Its History & Current Status, *Forbes*, Available online: https://www.forbes.com/sites/betsyatkins/2020/06/08/demystifying-esgits-history--current-status/?sh=237f9d632cdd [Accessed 3 May 2022]

Barnett, M.L. & Salomon, R.M. (2006). The Curvilinear Relationship between Social Responsibility and Financial Performance, *Strategic Management Journal*, Available online: https://www.jstor.org/stable/20142399 [Accessed 19 April 2022]

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage, Journal of Management, Available online: https://journals.sagepub.com/doi/10.1177/014920639101700108 [Accessed 2 May 2022]

Barone, A. (2021). Abnormal Return, Available online: https://www.investopedia.com/terms/a/abnormalreturn.asp [Accessed 25 May 2022]

Bauer, R., Koedijk, K., & Otten, R. (2005). International Evidence on Ethical Mutual Fund Performance and Investment Style, *Journal of Banking and Finance*, Available online: https://www-sciencedirect-com.ludwig.lub.lu.se/science/article/pii/S0378426604001372?via per cent3Dihub [Accessed 18 April 2022]

Beccetti, L., Ciciretti, R., Hasan, I., & Kobeissi, N. (2012). Corporate Social Responsibility and Shareholder's Value, *Journal of Business Research*, Available online: https://www.econstor.eu/bitstream/10419/212122/1/bof-rdp2009-001.pdf [Accessed 6 May 2022]

Becker-Olsen, K.L., Cudmore, A.B., & Hill, P.R. (2006). The Impact of Perceived Corporate Social Responsibility on Consumer Behavior, Journal of Business Research, Available online: https://econpapers.repec.org/article/eeejbrese/v_3a59_3ay_3a2006_3ai_3a1_3ap_3a46-53.htm [Accessed 12 May 2022]

Bell, E., Bryman, A., & Harley, B. (2019). Business Research Methods, United Kingdom: Oxford.

Betton, S., Eckbo, B.E., & Thorburn, K.S. (2008). Corporate Acquisitions. In: Eckbo, B.E. (Ed.), Handbook of Corporate Finance, *Empirical Corporate Finance*, vol. 2. North-Holland, Amsterdam.

Billio, M., Costola, M., Hristova, I., Latino, C., & Pelizzon, L. (2020). Inside the ESG Ratings: (Dis)agreement and performance, *Corporate Social Responsibility and Environmental Management*, Available online: https://onlinelibrary-wiley-com.ludwig.lub.lu.se/doi/full/10.1002/csr.2177 [Accessed 26 April 2022]

Brooks, C. (2019). Introductory Econometrics for Finance, 4th edn, Cambridge, Cambridge University Press.

Bureau van Dijk. (2022). Zephyr, Available online: https://www.bvdinfo.com/en-us/our-products/data/greenfield-investment-and-ma/zephyr [Accessed 3 of May 2022]

Calipha, R., Tarba, S., & Brock, D. (2010). M&A: A review of phases, motives, and success factors, *Advances in M&A*, Available online: https://www-emerald-com.ludwig.lub.lu.se/insight/content/doi/10.1108/S1479-361X(2010)0000009004/full/html [Accessed 25 April 2022]

Campbell, J.Y., Lo, A.W., & MacKinlay, A.C. (1997). The Econometrics of Financial Markets, [e-book], Princeton University Press, Available at: Google Books: books.google.com [Accessed 3 of May 2022]

Capron, L. & Pistre, N. (2002). When Do Acquirers Earn ARs?, *Strategic Management Journal*, Available online: https://onlinelibrary.wiley.com/doi/epdf/10. 1002/smj.262 [Accessed 2 May 2022]

Carper, W. B. (1990). Corporate Acquisitions and Shareholder Wealth: A Review and Exploratory Analysis, Journal of Management, Available online: https://doi.org/10.1177/014920639001600410 [Accessed 25 May 2022]

Carroll, A. B. (2000). Ethical Challenges for Business in the New Millennium: Corporate Social Responsibility and Models of Management Morality, *Business Ethics Quarterly*, Available online: https://doi.org/10.2307/3857692 [Accessed 3 May 2022]

Chandler, D. (2020). Strategic Corporate Social Responsibility: Sustainable Value Creation, 5th edn, Los Angeles: SAGE

Christensen, D.M., Serafeim, G., & Sikochi, A. (2022). Why is Corporate Virtue in the Eye of The Beholder? The case of ESG ratings, *The Accounting Review*, Available online: https://eds-s-ebscohost-com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=5&sid=a26b5af3-cbea-47d7-a83c-c5710718fa69 per cent40redis [Accessed 7 May 2022]

Coase, R.H. (1937). The Nature of the Firm, *Economica*, Available online: https://www.jstor.org/stable/2626876?seq=1 [Accessed 3 May 2022]

Cottrell, A., & Lucchetti, R. (2022A). Gnu Regression, Econometrics and Time-series Library, available online: http://gretl.sourceforge.net/ [Accessed 2 of May 2022]

Cottrell, A., & Lucchetti, R. (2022B). Gretl User's Guide, Available online: http://gretl.sourceforge.net/gretl-help/gretl-guide.pdf [Accessed 2 of May 2022]

Creswell, J. W., & Creswell, J. D. (2018). Research Design (5th ed.). SAGE Publications.

Datta, D.K., Pinches, G.E., & Narayanan, V.K. (1992). Factors Influencing Wealth Creation from M&A: A meta-analysis, *Strategic Management Journal*, Available online: https://www.jstor.org/stable/2486611?seq=1 [Accessed 6 May 2022]

Deng, X., Kang, J., & Low, B.S. (2013). Corporate Social Responsibility and Stakeholder Value Maximization: Evidence from mergers, *Journal of Financial Economics*, Available

online: https://www-sciencedirect-com.ludwig.lub.lu.se/science/article/pii/S0304405X13001384?via per cent3Dihub [Accessed 15 April 2022]

Derwall, J., Guenster, N., Bauer, R., & Koedijk, K. (2005). The Eco-Efficiency Premium Puzzle, *Financial Analysts Journal*, Available online: https://eds.s.ebscohost.com/eds/pdfviewer/pdfviewer?vid=13&sid=a56624b0-bac1-4160-b499-b6efe007fbf1 per cent40redis [Accessed 18 April 2022]

Dodd, P. (1980). Merger Proposals, Management Discretion and Stockholder Wealth, *Journal of Financial Economics*, Available online: https://www-sciencedirect-com.ludwig.lub.lu.se/science/article/pii/0304405X80900148?via per cent3Dihub [Accessed 6 May 2022]

Drempetic, S., Klein, C., & Zwergel, B. (2019). The Influence of Firm Size on the ESG Score: Corporate sustainability ratings under review, *Journal of Business Ethics*, Available online: https://eds-s-ebscohost-com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=9&sid=a26b5af3-cbea-47d7-a83c-c5710718fa69 per cent40redis [Accessed 6 May 2022]

Escrig-Olmedo, E., Fernandez-Izqzierdo, M.A., Ferrero-Ferrero, I., Rivera-Lirio, J.M., & Munoz-Torres, M.J. (2019). Rating the Raters: Evaluating how ESG rating agencies integrate sustainability principles, *Sustainability*, Available online: https://www.mdpi.com/2071-1050/11/3/915 [Accessed 6 May 2022]

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work, *The Journal of Finance*, Available online: http://www.jstor.com/stable/2325486 [Accessed 5 May 2022]

Florian, B., Matzler, K., & Wolf, S. (2016). M&A innovation: The role of integration and cultural differences - A central European targets perspective, International Business Review, vol. 25 , p. 76-86

Freeman, R. E. and Reed, D. L. (1983). Stockholders and Stakeholders: A New Perspective on Corporate Governance, *California Management Review*, 25(3), pp. 88–106. doi: 10.2307/41165018.

Frey, B.B. (2018). Winsorizing. The SAGE Encyclopedia of Educational Research, Measurement and Evaluation, https://dx.doi.org/10.4135/9781506326139.n747 (2022-05-16)

Frey, B.S. & Oberholzer-Gee, F. (1997). The Cost of Price Incentives: An empirical analysis of motivation crowding-out, The American Economic Review, Available online: https://www.jstor.org/stable/2951373?seq=1 [Accessed 16 May 2022]

Friede, G., Busch, T., & Bassen, A. (2015). ESG and Financial Performance: Aggregated evidence from more than 2000 empirical studies, Journal of Sustainable Finance & Investment, Available online: https://www.tandfonline.com/doi/full/10.1080/20430795.2015.1118917?scroll=top&needAccess=true [Accessed 12 May 2022]

Friedman, M. (1970). A Friedman doctrine - The Social Responsibility of Business Is to Increase Its Profits, *The New York Times*, Available online: https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html [Accessed 20 April 2022]

Friedman, M. (2007). The Social Responsibility of Business Is to Increase Its Profits. In: Zimmerli, W.C., Holzinger, M., Richter, K. (eds) Corporate Ethics and Corporate Governance. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-540-70818-6_14

Global Sustainable Investment Alliance (2021). Global Sustainable Investment Review 2020 [pdf], Available online: http://www.gsi-alliance.org/trends-report-2020/ [Accessed 18 April 2022]

Godfrey, P.C., Merrill, C.B., & Hansen, J.M. (2009). The Relationship Between Corporate Social Responsibility and Shareholder Value: An empirical test of the risk management hypothesis, *Strategic Management Journal*, Available online: https://www-jstor-org.ludwig.lub.lu.se/stable/40060271?seq=1 [Accessed 8 May 2022]

Godfrey, P.C. (2005). The Relationship between Corporate Philanthropy and Shareholder Wealth: A risk management perspective, *Academy of Management Review*, Available online: https://eds-s-ebscohost-com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=13&sid=8535f259-5a0b-4f1e-8ff1-b2566a27fe0d per cent40redis [Accessed 8 May 2022]

Gomes, M. (2019). Does CSR Influence M&A Target Choices?, Finance Research Letters , vol. 30, p. 153-159, Available online: https://doi.org/10.1016/j.frl.2018.09.011

Gomes, M. & Marsat, S. (2018). Does CSR Impact Premiums in M&A Transactions?, Finance Research Letters, Available online: https://www.sciencedirect.com/science/article/pii/S1544612317307043 [Accessed 25 May 2022]

Halpern, P. (1983). Corporate Acquisitions: A theory of special cases? A review of event studies applied to acquisitions, *Journal of Finance*, Available online: https://www-jstor-org.ludwig.lub.lu.se/stable/2327962?seq=1 [Accessed 8 May 2022]

Hargrave, M. (2022). Return on Assets, Available online: https://www.investopedia.com /terms/r/returnonassets.asp [Accessed 25 May 2022]

Hill, C. W., & Jones, T. M. (1992). Stakeholder-Agency Theory, Journal of Management Studies, Available online: https://onlinelibrary.wiley.com/doi/10.1111/j.1467-6486.1992.tb00657.x [Accessed 12 May 2022]

Hristov, I. & Chirico, A. (2019). The Role of Sustainability Key Performance Indicators (KPIs) in Implementing Sustainable Strategies, *Sustainability*, Available online: https://doi.org/10.3390/su11205742 [Accessed 3 May 2022]

Jarrell, G.A., Brickley, J.A., & Netter, J.M. (1988). The Market for Corporate Control: The empirical evidence since 1980, *Journal of Economic Perspectives*, Available online: https://eds-s-ebscohost-com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=15&sid =a26b5af3-cbea-47d7-a83c-c5710718fa69 per cent40redis [Accessed 8 May 2022]

Jensen, M.C. & Ruback, R.S. (1983). The Market for Corporate Control: The scientific evidence, *Journal of Financial Economics*, Available online: https://www.sciencedirect.com/science/article/pii/0304405X83900041 [Accessed 2 May 2022]

Jensen, M. & Meckling, W. (1976). Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure, Journal of Financial Economics, Available online: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKE wjU4se7kv73AhVK1BoKHQzVD8kQFnoECAQQAQ&url=https%3A%2F%2Fwww.sfu .ca%2F~wainwrig%2FEcon400%2Fjensen-meckling.pdf&usg=AOvVaw0Mw WP597_pROO qdQL_C5ph [Accessed 12 May 2022]

King, D., Dalton, D., Daily, M. & Covin, J. (2004). Meta Analyses of Post Acquisition Performance: Indications of unidentified moderators, *Strategic Management Journal*, Available online: https://onlinelibrary.wiley.com/doi/epdf/10.1002/smj.371 [Accessed 2 May 2022]

Kreps, D.M., & Sobel, J. (1994). Chapter 25 Signaling, Handbook of Game Theory with Economic Applications, Available online: https://doi.org/10.1016/S1574-0005(05)80057-8 [Accessed 5 May 2022]

Kreps, D.M. (1997). Intrinsic Motivation and Extrinsic Incentives, The American Economic Review, Available online: https://econpapers.repec.org/article/aeaaecrev/v_3a87_3ay_3a1997_3ai_3a2_3ap_3a359-64.htm [Accessed 12 May 2022]

Landrum, N. E. & Edwards, S. (2009). Sustainable Business: An executive's primer. Business Expert Press.

Li, B., Xu, L., McIver, R., Wu, Q., & Pan, A. (2020). GMA, Legitimacy and Risk-Taking: Evidence from China's heavy polluters, *Accounting & Finance*, Available online: https://eds-p-ebscohost-com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=13&sid=0c3d7c9e-b35f-49b6-91cc-2a2bd51af56e per cent40redis [Accessed 2 May 2022]

Li, K., Chaohua, H., Dbouk, W., & Zhao, K. (2021). The Value of CSR in Acquisitions: Evidence from China, *Sustainability*, Available online: https://www.mdpi.com/2071-1050/13/7/3721 [Accessed 2 May 2022]

Li, T.-T., Wang, K., Sueyoshi, T., & Wang, D. D. (2021). ESG: Research Progress and Future Prospects, *Sustainability*, Available online: https://doi.org/10.3390/su132111663 [Accessed 5 May 2022]

Losse, M., & Geissdoerfer, M. (2021). Mapping Socially Responsible Investing: A bibliometric and citation network analysis, *Journal of Cleaner Production*, Available online: https://www-sciencedirect-com.ludwig.lub.lu.se/science/article/pii/S0959652621005965?via per cent3Dihub [Accessed 18 April 2022]

Lu, J. (2021). Can the Green Merger and Acquisition Strategy Improve the Environmental Protection Investment of Listed Company?, *Environmental Impact Assessment Review*, Available online: https://www.sciencedirect.com/science/article/pii/S019592552030353X [Accessed 4 May 2022]

Meglio, O. (2020). Towards More Sustainable M&A Deals: Scholars as Change Agents, *Sustainability*, 12(22), p. 9623. doi: 10.3390/su12229623

Mertler, C. A. (2016). Introduction to educational research.

Meyer, J. W. and Scott, W. R. (1983). Organizational Environments: Ritual and rationality, *Sage*, Available online: https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,uid&db=cat07147a&AN=lub.263675&site=eds-live&scope=site [Accessed 5 May 2022]

Michael, B. (2004). Review of Institutions and Organisations by W. R. Scott, *The Journal of the Operational Research Society*, Available online: http://www.jstor.org/stable/4101836 [Accessed 5 May 2022]

Milgrom, P. & J. Roberts (1982). Limit Pricing and Entry Under Incomplete Information: An equilibrium analysis, *Econometrica*, Available online: https://www-jstor-org.ludwig.lub.lu.se/stable/1912637?seq=1 [Accessed 5 May 2022]

Myers, D.H. (2020). Sustainability in Business: A Financial Economics Analysis, 1st ed., Springer International Publishing, Available online: https://search-ebscohost-com.ludwig.lub.lu.se/login.aspx?direct=true&AuthType=ip,uid&db=cat07147a&AN=lub.6624900&site=eds-live&scope=site [Accessed 3 May 2022]

Niemczyk, J., Sus, A., Borowski, K., Jasinski, B., & Jasinska, K. (2022). The Dominant Motives of M&A in the Energy Sector in Western Europe from the Perspective of the Green Economy, *Energies*, Available online: https://www.mdpi.com/1996-1073/15/3/1065 [Accessed 4 May 2022]

Pan, A.L., Liu, X., Qiu, J.L., & Shen, Y. (2019). Can GMA of Heavy Polluting Enterprises Achieve Substantial Transformation Under the Pressure of Media, *China Industrial Economics*, Abstract only, Available online: http://en.cnki.com.cn/Article_en/ CJFDTotal-GGYY201902011.htm [Accessed 4 May 2022]

Piesse, J., Lee, C.F., Lin, L., & Kuo, H.C. (2006). Merger and Acquisition: Definitions, Motives, and Market Responses [e-book], *Springer*, Available onine: https://search-ebscohost-com.ludwig.lub.lu.se/login.aspx?direct=true&AuthType=ip,uid&db=edsgvr&AN=edsgcl.2593502193&site=eds-live&scope=site [Accessed 4 May 2022]

Renneboog, L., Ter Horst, J., & Zhang, C. (2008). The Price of Ethics and Stakeholder Governance: The performance of socially responsible mutual funds, *Journal of Corporate Finance*, Available online: https://www-sciencedirect-com.ludwig.lub.lu.se/science/article/pii/S0929119908000278?via per cent3Dihub [Accessed 18 April 2022]

Refinitiv. (2022). Refinitiv Eikon, Available online: https://www.refinitiv.com/en/products/eikon-trading-software?utm_content=TR%20Brand%20Product-OTHER-EMEA-G-EN-Exact&utm_medium=cpc&utm_source=google&utm_campaign=596228_PaidSearchTradingandBankingBAU&elqCampaignId=16981&utm_term=thomson%20reuters%20eikon&gclid=Cj0KCQjwhLKUBhDiARIsAMaTLnF6Z47efVO4i7ZUDYaa76HzZoa1mrMkcxpqf9gnIlFpho6XBEESDLsaAhqSEALw_wcB&gclsrc=aw.ds [Accessed 13 of May 2022]

Rohra, N. & Chawla, K. (2015). Motives Behind Mergers and Acquisitions: Theory and Critical Review of Literature, *EPRA International Journal of Economic and Business Review*, Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2759834 [Accessed 10 May 2022]

Ryan, R.M., Koestner, R., & Deci, E.L. (1991). Varied Forms of Persistence: When free-choice behavior is not intrinsically motivated, Motivation and Emotion, Available online: https://selfdeterminationtheory.org/intrinsic-motivation-inventory/ [Accessed 12 May 2022]

Salvi, A., Petruzzella, F., & Giakoumelou, A. (2018). GMA Deals and Bidders' Value Creation: The role of sustainability in post-acquisition performance, *International Business Research*, Available online: https://pdfs.semanticscholar.org/9528/c319f0d4e01a0f1137ad6c0a18754755b5c2.pdf [Accessed 2 May 2022]

Schumann, L. & Stoner, R. (1988). Letters to the Editor, California Management Review, 30 (3): 144-149

Shapiro, C. & Stiglitz, J.E. (1984). Equilibrium Unemployment as a Worker Discipline Device, The American Economic Review, Available online: https://www.jstor.org/stable/1804018?seq=1 [Accessed 12 May 2022]

Shea, L. J. (2010). Using Consumer Perceived Ethicality as a Guideline for Corporate Social Responsibility Strategy: A commentary essay, Journal of Business Research, Available online: https://ideas.repec.org/a/eee/jbrese/v63y2010i3p263-264.html [Accessed 12 May 2022]

Shi, J., Yu, C., & Li, Y. (2022). Beyond Linear: The relationship between corporate social responsibility and market reactions to cross-border M&A, *Emerging Markets Finance and Trade*, Available online: https://eds-s-ebscohost-

com.ludwig.lub.lu.se/eds/pdfviewer/pdfviewer?vid=8&sid=8535f259-5a0b-4f1e-8ff1-b2566a27fe0d per cent40redis [Accessed 8 May 2022]

Sindreu, J. & Kent, S. (2018). Why It's so Hard to Be an ''Ethical'' Investor, *The Wall Street Journal*, Available online: https://www.wsj.com/articles/why-its-so-hard-to-be-an-ethical-investor-1535799601 [Accessed 6 May 2022]

Suchman, M.C. (1995). Managing Legitimacy: Strategic and Institutional Approaches, *The Academy of Management Review*, Available online: https://search-ebscohost-com.ludwig.lub.lu.se/login.aspx?direct=true&AuthType=ip,uid&db=edsjsr&AN=edsjsr.258788&site=eds-live&scope=site [Accessed 4 May 2022]

Talan, G. & Sharma, G. (2019). Doing Well by Doing Good: A Systematic Review and Research Agenda for Sustainable Investment, Sustainability, Available online: https://doi.org/10.3390/su11020353 [Accessed 5 May 2022]

Thomson Reuters. (2018). Thomson Reuters ESG Scores [pdf], S069838/7-18, Available through search online.

Tricker, R. I. (2019). Corporate Governance: Principles, Policies, and Practices, 4th ed.: Oxford University Press.

United Nations [UN] (2004). Who Cares Wins: Connecting financial markets to a changing world, Available online: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiWqc7ChtX3AhXLs6QKHSZGAoMQFnoECAMQAQ&url=https per cent3A per cent2F per cent2Fwww.unepfi.org per cent2Ffileadmin per cent2Fevents per cent2F2004 per cent2Fstocks per cent2Fwho_cares_wins_global_compact_2004.pdf&usg=AOvVaw25KaC7dwtMO5wDkUEKSG_i [Accessed 18 April 2022]

WCED (1987). Our Common Future, Oxford: Oxford University Press

Weber, O., Mansfeld, M., & Schirrmann, E. (2010). The Financial Performance of SRI Funds between 2002 and 2009, *SSRN Electronic Journal*, Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1630502 [Accessed 18 April 2022]

Weber, M. (1968). Economy and Society: An outline of interpretive sociology, *Bedminster Press*, Available online: https://search-ebscohost-com.ludwig.lub.lu.se/login.aspx?direct=true&AuthType=ip,uid&db=cat07147a&AN=lub.762765&site=eds-live&scope=site [Accessed 4 May 2022]

Yellen, J.L. (1984). Efficiency Wage Models of Unemployment, The American Economic Review, Available online: https://www.jstor.org/stable/1816355?seq=1 [Accessed 12 May 2022]

Zhang, F., Li, M., & Zhang, M. (2019). Chinese Financial Market Investors Attitudes toward Corporate Social Responsibility: Evidence from M&A, *Sustainability*, Available online: https://www.mdpi.com/2071-1050/11/9/2615/pdf [Accessed 8 May 2022]

Zhao, X. & Jia, M. (2022). Sincerity or Hypocrisy: Can GMA achieve corporate environmental governance?, *Environmental Science and Pollution Research*, Available online: https://link-springer-com.ludwig.lub.lu.se/article/10.1007/s11356-021-17464-9 [Accessed 2 May 2022]

Zollo, M. & Meier, D. (2008). What is M&A performance?, *The Academy of Management Perspectives*, Available online: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.515.8575&rep=rep1&type=pdf [Accessed 2 May 2022]

Appendix

Appendix 1. ***Related Studies and Obtained Stock Market Reaction Results***

Author (Date)	**Period**	**Estimation window**	***N* in Study**	**Dependent Variable and Event window**
Aktas, N., De Bodt, E., Cousin, J. (2011)	1997 to 2007	[-200,-10]	106	Acquirer's CAR [-1,1]**
Deng, X, Kang, J., Sin Low, B. (2013)	1992 to 2007	[-211,-11]	1,556	Acquirer's CAR [−1, 1]**
Zhang, F., Li, M., Zhang, M. (2019)	2010 to 2017	China [-70,-10]	141	Acquirer's CAR [-5,15]*,**
Shi, J., Yu, C., Li, Y. (2022)	2010 to 2018	[-100,-11]	409	Acquirer's CAR [-2,-2]***

Significance level: *:p<0,1, **:p<0,05, ***:p<0,01

Appendix 2. *Deal Sample Divided Into Four Groups Based on Total ESG Score of Target*

Group: Low Total ESG Score Target Firm			*Group: Lowest Total ESG Score Target Firm*		
Acquirer	**Target**	**Total ESG Score**	**Acquirer**	**Target**	**Total ESG Score**
ABBOTT LABORATORIES INC.	ALERE INC.	32,65	AES CORP.	DPL INC.	17,98
ASML HOLDING NV	HERMES MICROVISION INC.	33,30	ALASKA AIR GROUP INC.	VIRGIN AMERICA INC.	19,40
AT&T INC.	LEAP WIRELESS INTERNATIONAL INC.	25,18	ALBEMARLE CORP.	ROCKWOOD HOLDINGS INC.	15,08
BECTON DICKINSON AND COMPANY	CAREFUSION CORP.	27,45	CALLON PETROLEUM COMPANY	CARRIZO OIL & GAS INC.	23,64
BERKSHIRE HATHAWAY INC.	PRECISION CASTPARTS CORP.	34,13	CAMPBELL SOUP COMPANY	SNYDER'S-LANCE INC.	19,26
BERKSHIRE HATHAWAY INC.	LUBRIZOL CORP.	31,98	DSV A/S	UTI WORLDWIDE INC.	24,61
CATERPILLAR INC.	BUCYRUS INTERNATIONAL INC.	30,10	EXPEDIA INC.	HOMEAWAY INC.	20,41
CISCO SYSTEMS INC.	BROADSOFT INC.	28,16	EXXON MOBIL CORP.	INTEROIL CORP.	12,99
DEVON ENERGY CORP.	WPX ENERGY INC.	34,57	GRIFOLS SA	TALECRIS BIOTHERAPEUTICS HOLDINGS CORP.	19,03
DIAMONDBACK ENERGY INC.	QEP RESOURCES INC.	29,29	HILLENBRAND INC.	MILACRON HOLDINGS CORP.	18,23
DOMINION ENERGY INC.	SCANA CORP.	29,88	HUNTINGTON BANCSHARES INC.	FIRSTMERIT CORP.	18,19
EASTMAN CHEMICAL COMPANY	SOLUTIA INC.	29,18	INDEPENDENT BANK CORP.	BLUE HILLS BANCORP INC.	21,95
ENERGY TRANSFER LP	ENABLE MIDSTREAM PARTNERS LP	31,14	JD SPORTS FASHION PLC	FINISH LINE INC., THE	23,07
FIDELITY NATIONAL INFORMATION SERVICES INC.	WORLDPAY INC.	28,17	JOHNSON & JOHNSON	SYNTHES INC.	23,86
HEWLETT PACKARD ENTERPRISE COMPANY	CRAY INC.	28,29	LENNAR CORP.	CALATLANTIC GROUP INC.	24,85
HOME DEPOT INC., THE	HD SUPPLY HOLDINGS INC.	28,39	LITTELFUSE INC.	IXYS CORP.	17,18
II-VI INC.	FINISAR CORP.	34,65	M&T BANK CORP.	HUDSON CITY BANCORP INC.	24,12
INFINEON TECHNOLOGIES AG	CYPRESS SEMICONDUCTOR CORP.	34,30	MADISON SQUARE GARDEN ENTERTAINMENT CORP.	MSG NETWORKS INC.	24,11
JACK IN THE BOX INC.	DEL TACO RESTAURANTS INC.	33,04	MARKEL CORP.	STATE NATIONAL COMPANIES INC.	17,47
LAKELAND BANCORP INC.	1ST CONSTITUTION BANCORP	25,94	NEWMONT GOLDCORP CORP.	GOLDCORP INC.	22,26

LAM RESEARCH CORP.	NOVELLUS SYSTEMS INC.	34,71	ONTO INNOVATION INC.	RUDOLPH TECHNOLOGIES INC.	24,87
LIBERTY GLOBAL PLC	CABLE & WIRELESS COMMUNICATIONS PLC	30,29	ORACLE CORP.	MICROS SYSTEMS INC.	20,09
MERCK KGAA	VERSUM MATERIALS INC.	28,53	PACIFIC PREMIER BANCORP INC.	OPUS BANK	24,55
MICROCHIP TECHNOLOGY INC.	MICROSEMI CORP.	31,24	PACWEST BANCORP	CU BANCORP	23,68
MICROCHIP TECHNOLOGY INC.	ATMEL CORP.	26,23	PATTERSON-UTI ENERGY INC.	PIONEER ENERGY SERVICES CORP.	23,28
NRG ENERGY INC.	GENON ENERGY INC.	28,16	PDC ENERGY INC.	SRC ENERGY INC.	10,44
PERFORMANCE FOOD GROUP COMPANY INC.	CORE-MARK HOLDING COMPANY INC.	35,01	PINNACLE FINANCIAL PARTNERS INC.	BNC BANCORP	24,43
SCIENCE APPLICATIONS INTERNATIONAL CORP.	ENGILITY HOLDINGS INC.	30,92	SANDY SPRING BANCORP INC.	WASHINGTONFIRST BANKSHARES INC.	23,56
SHERWIN-WILLIAMS COMPANY, THE	VALSPAR CORP.	32,12	SOUTHWESTERN ENERGY COMPANY	MONTAGE RESOURCES CORP.	15,44
SJW GROUP	CONNECTICUT WATER SERVICE INC.	28,48	STRYKER CORP.	K2M GROUP HOLDINGS INC.	23,42
SYNAPTICS INC.	DSP GROUP INC.	34,35	ERICSSON AB	VONAGE HOLDINGS CORP.	20,57
TAYLOR MORRISON HOME CORP.	AV HOMES INC.	33,64	TRANSOCEAN LTD	SONGA OFFSHORE SE	19,49
TRANSDIGM GROUP INC.	ESTERLINE TECHNOLOGIES CORP.	31,27	TRANSOCEAN LTD	OCEAN RIG UDW INC.	13,76
UNION BANKSHARES CORP.	ACCESS NATIONAL CORP.	26,09	UNILEVER PLC	ALBERTO CULVER COMPANY	23,55
VULCAN MATERIALS COMPANY	US CONCRETE INC.	24,99	UNITED BANKSHARES INC.	CAROLINA FINANCIAL CORP.	19,89
WSFS FINANCIAL CORP.	BENEFICIAL BANCORP INC.	34,37	UNITED RENTALS INC.	GENERAL FINANCE CORP.	19,39
WSFS FINANCIAL CORP.	BRYN MAWR BANK CORP.	32,61	UNIVAR (solutions) INC.	NEXEO SOLUTIONS INC.	16,99
ZOETIS INC.	ABAXIS INC.	25,88	WESTLAKE CHEMICAL CORP.	AXIALL CORP.	20,19

Group: High Total ESG Score Target Firm ***Group: Highest Total ESG Score Target Firm***

Acquirer	**Target**	**Total ESG Score**	**Acquirer**	**Target**	**Total ESG Score**
ADVANCED MICRO DEVICES INC.	XILINX INC.	60,84	AMPHENOL CORP.	MTS SYSTEMS CORP.	38,08
AKER SOLUTIONS ASA	KVAERNER ASA	61,78	BANC of CALIFORNIA INC.	PACIFIC MERCANTILE BANCORP	35,78

AMAZON.COM INC.	WHOLE FOODS MARKET INC.	55,82	BANCO BPM SPA	BANCA POPOLARE DI MILANO SCARL	49,65
ANALOG DEVICES INC.	MAXIM INTEGRATED PRODUCTS INC.	70,41	BECTON DICKINSON AND COMPANY	CR BARD INC.	45,27
BAXTER INTERNATIONAL INC.	HILL-ROM HOLDINGS INC.	70,30	CNH INDUSTRIAL NV	RAVEN INDUSTRIES INC.	51,25
BAYER AG	MONSANTO COMPANY	69,38	COLUMBIA BANKING SYSTEM INC.	BANK of COMMERCE HOLDINGS	38,88
BRISTOL-MYERS SQUIBB COMPANY	CELGENE CORP.	72,96	CONOCOPHILLIPS	CONCHO RESOURCES INC.	42,67
CAIXABANK SA	BANKIA SA	80,49	DANAHER CORP.	BECKMAN COULTER INC.	38,84
CENTERPOINT ENERGY INC.	VECTREN CORP.	69,80	DEUTSCHE TELEKOM AG	SPRINT CORP.	52,74
CENTURYLINK INC.	QWEST COMMUNICATIONS INTERNATIONAL INC.	66,47	DIASORIN SPA	LUMINEX CORP.	42,48
CHEVRON CORP.	NOBLE ENERGY INC.	59,64	DOLLAR TREE INC.	FAMILY DOLLAR STORES INC.	44,78
CLEVELAND-CLIFFS INC.	AK STEEL HOLDING CORP.	76,21	ECOLAB INC.	NALCO HOLDING COMPANY	50,32
COUSINS PROPERTIES INC.	PARKWAY PROPERTIES INC.	55,46	EVOLUTION GAMING GROUP AB	NETENT AB	50,42
DUKE ENERGY CORP.	PROGRESS ENERGY INC.	52,85	FIFTH THIRD BANCORP	MB FINANCIAL INC.	41,58
ENDEAVOUR MINING PLC	ENDEAVOUR MINING CORP.	82,93	FIRSTENERGY CORP.	ALLEGHENY ENERGY INC.	35,48
EXELON CORP.	CONSTELLATION ENERGY GROUP INC.	79,75	FNB CORP.	HOWARD BANCORP INC.	40,49
FUTURE PLC	GOCO GROUP PLC	58,37	GOODYEAR TIRE & RUBBER COMPANY	COOPER TIRE & RUBBER COMPANY	40,84
GLOBAL PAYMENTS INC.	TOTAL SYSTEM SERVICES INC.	59,93	GRAHAM HOLDINGS COMPANY	LEAF GROUP LTD	40,30
HERMAN MILLER INC.	KNOLL INC.	60,60	INTEL CORP.	ALTERA CORP.	46,91
HOCHTIEF AG	ABERTIS INFRAESTRUCTURAS SA	58,71	INTERNATIONAL BUSINESS MACHINES CORP.	RED HAT INC.	36,55
INFORMA PLC	UBM PLC	62,33	LIBERTY GLOBAL PLC	VIRGIN MEDIA INC.	45,42
INTEL CORP.	MCAFEE INC.	61,11	M&T BANK CORP.	PEOPLE'S UNITED FINANCIAL INC.	47,53
MERCK KGAA	SIGMA-ALDRICH CORP.	70,31	OCCIDENTAL PETROLEUM CORP.	ANADARKO PETROLEUM CORP.	40,13
MERCK KGAA	MILLIPORE CORP.	56,46	ON SEMICONDUCTOR CORP.	FAIRCHILD SEMICONDUCTOR INTERNATIONAL INC.	50,04
MICROSOFT CORP.	NUANCE COMMUNICATIONS INC.	70,92	PFIZER INC.	HOSPIRA INC.	50,88

NATIONAL EXPRESS GROUP PLC	STAGECOACH GROUP PLC	60,98	POLSKI KONCERN NAFTOWY ORLEN SA	POLSKIE GORNICTWO NAFTOWE I GAZOWNICTWO SA	49,23
NOKIA OYJ	ALCATEL-LUCENT SA	76,78	POLSKI KONCERN NAFTOWY ORLEN SA	ENERGA SA	43,01
NXP SEMICONDUCTORS NV	FREESCALE SEMICONDUCTOR LTD	78,09	PRYSMIAN SPA	GENERAL CABLE CORP.	52,10
PFIZER INC.	ARENA PHARMACEUTICALS INC.	68,35	SAFRAN SA	ZODIAC AEROSPACE SA	45,67
RECKITT BENCKISER GROUP PLC	MEAD JOHNSON NUTRITION COMPANY	56,23	SAMHALLSBYGGNADSBOLAGET I NORDEN AB	HEMFOSA FASTIGHETER AB	44,37
SOLVAY SA	RHODIA SA	84,08	SANOFI-AVENTIS SA	GENZYME CORP.	44,59
SSAB AB	RAUTARUUKKI OYJ	72,53	SOLVAY SA	CYTEC INDUSTRIES INC.	44,79
TEXAS INSTRUMENTS INC.	NATIONAL SEMICONDUCTOR CORP.	54,85	SS&C TECHNOLOGIES HOLDINGS INC.	DST SYSTEMS INC.	44,12
THERMO FISHER SCIENTIFIC INC.	LIFE TECHNOLOGIES CORP.	61,18	SYNTHOMER PLC	OMNOVA SOLUTIONS INC.	35,77
TRUIST FINANCIAL CORP.	SUNTRUST BANKS INC.	63,37	THERMO FISHER SCIENTIFIC INC.	PPD INC.	50,21
WESCO INTERNATIONAL INC.	ANIXTER INTERNATIONAL INC.	58,65	TYSON FOODS INC.	HILLSHIRE BRANDS COMPANY	52,74
WEYERHAEUSER COMPANY	PLUM CREEK TIMBER COMPANY INC.	57,98	UNICAJA BANCO SA	LIBERBANK SA	49,31
WORLDLINE SA	INGENICO GROUP SA	75,49			

Appendix 3. ***Comprehensive Overview Over All Data Collected***

Bureau van Dijk's Zephyr database:

Independent variables:

- Deal Value
- Target's Operating Income
- Target's Total Assets before the transaction
- Bid Premium on the Announcement Day
- Bid Premium on the Rumor Day

Dummy variables:

- No Rumor, based on:
  - Date of the rumor
  - Date of the announcement
- Same Primary Industry, based on:
  - Primary SIC code
- Similar Industries, based on:
  - Secondary SIC code/codes
- Domestic versus Cross-border Acquisitions, based on:
  - Location of acquiring firm
  - Location of target firm
- Financing with Leverage
- Payment with Cash
- Payment with Shares

Thomson Reuters' Refinitiv Eikon:

- Total ESG Score for target company
- ENV Score
- SOC Score
- GOV Score
- Actual return of the stock (R_{it}), based on:
  - Closing Price of stock (P_{it})
- Actual returns of the market portfolios (R_{mt}):
  - Closing Price of index where the stock is traded (P_{mt})

ESG Score	*E Score*	*S Score*	*G Score*	*Deal Value*	*T.op.rev*	*T.tot.assets*	*Bid.Pre.R*	*Bid.Pre.A*	*Domestic*	*No Roumer*	*Same Industry*	*Similar Industry*	*LowESG*	*Leverage*	*Pay Cash*	*Pay Shares*	
1,00	**0,72**	**0,85**	**0,65**	**0,38**	0,25	0,30	0,05	-0,02	-0,01	-0,11	-0,08	-0,11	**-0,85**	0,07	-0,11	-0,03	***ESG Score***
	1,00	**0,57**	0,32	**0,41**	0,25	**0,41**	0,04	-0,05	0,01	-0,10	-0,04	-0,11	**-0,65**	0,08	-0,08	0,03	***E Score***
		1,00	0,28	**0,40**	0,27	**0,33**	0,01	-0,10	-0,08	-0,11	-0,07	-0,08	**-0,72**	0,06	-0,15	-0,029	***S Score***
			1,00	0,16	0,15	0,07	0,07	0,10	0,04	-0,06	-0,03	-0,04	**-0,54**	0,06	0,01	-0,06	***G Score***
				1,00	0,67	**0,68**	0,16	-0,05	-0,15	**-0,33**	-0,05	-0,11	**-0,32**	0,19	0,14	-0,10	***Deal Value***
					1,00	**0,58**	0,12	-0,01	-0,13	-0,24	-0,06	-0,10	-0,17	0,27	0,02	-0,15	***T.op.rev***
						1,00	-0,08	-0,26	0,06	**-0,30**	0,09	0,05	-0,22	-0,04	-0,25	0,23	***T.tot.assets***
							1,00	**0,60**	-0,02	-0,14	-0,06	-0,02	-0,07	0,24	0,39	**-0,39**	***Bid.Pre.R***
								1,00	-0,10	**0,32**	-0,04	0,00	0,02	0,07	0,28	-0,25	***Bid.Pre.A***
									1,00	0,05	-0,01	-0,14	0,06	-0,23	-0,19	0,24	***Domestic***
										1,00	0,05	0,00	0,17	-0,13	-0,09	0,18	***No Roumer***
											1,00	0,69	0,06	-0,03	-0,20	0,29	***Same Industry***
												1,00	0,10	0,01	-0,07	0,11	***Similar Industry***
													1,00	-0,05	0,06	0,01	***LowESG***
														1,00	0,28	**-0,35**	***Leverage***
															1,00	-0,50	***Pay Cash***
																1,00	***Pay Shares***

Appendix. 4 *Correlation Matrix to Detect Multicollinearity*

Gretl indicates a value under 0,16 does not significantly affect the regression models.

A correlation around 0,2 is according to Brooks (2014) acceptable.

Correlation over 0,3 has been marked in bold.

Appendix 5. ***Additional Equations Used in the Market Model***

All equations below are described by Campbell, Lo & MacKinlay (1997).

$$R_{it} = \frac{P_{it} - P_{i(t-1)}}{P_{i(t-1)}} \tag{13}$$

$R_{it} = Actual\ Stock_i\ Return\ for\ time\ period\ t$

$P_{it} = Closing\ Price\ for\ Stock_i\ for\ time\ period\ t$

$$R_{mt} = \frac{P_{mt} - P_{m(t-1)}}{P_{m(t-1)}} \tag{14}$$

$R_{mt} = Actual\ Return\ of\ Stock_i\ for\ time\ period\ t$

$P_{mt} = Closing\ Price\ for\ Stock_i\ for\ time\ period\ t$

$$\widehat{\alpha_\iota} = \widehat{\mu_\iota} - \widehat{\beta_\iota}\widehat{\mu_m} \tag{15}$$

$\widehat{\alpha_\iota}$ = Estimation of Alpha

$$\widehat{\beta_\iota} = \frac{\sum_{t=T_0+1}^{T_1}(R_{it} - \widehat{\mu_\iota})(R_{mt} - \widehat{\mu_m})}{\sum_{t=T_0+1}^{T_1}(R_{mt} - \widehat{\mu_m})^2} \tag{16}$$

$\widehat{\beta_\iota} = Estimation\ of\ Beta$

Appendix 6. ***The Entire Sample's t-tests (N=151) for All Event Windows and the Critical Values***

Event windows starting on the announcement day:

Window:	*[0,0]*	*[0,1]*	*[0,2]*	*[0,3]*	*[0,4]*	*[0,5]*	*[0,6]*
CAAR:	-0,0102	-0,0135	-0,0106	-0,0103	-0,0136	-0,0138	-0,0136
$\sum(CAR-CAAR)^2$	0,5709	0,7268	0,8147	0,9166	0,9247	0,9750	1,0931
Var(CAR)	0,000025	0,000032	0,000036	0,000040	0,000041	0,000043	0,000048
$\bar{\sigma}$ ***of CAAR***	0,0050	0,0056	0,0060	0,0063	0,0064	0,0065	0,0069
T-stat:	-2,04	-2,39	-1,77	-1,62	-2,13	-2,12	-1,96
Significance:	0,05	0,05	0,1		0,05	0,05	0,1
p-value:	4,31%	1,81%	7,88%	10,73%	3,48%	3,57%	5,18%

Event windows starting on the day before the announcement day:

Window:	*[-1,0]*	*[-1,1]*	*[-1,2]*	*[-1,3]*	*[-1,4]*	*[-1,5]*	*[-1,6]*
CAAR:	-0,0096	-0,0129	-0,0100	-0,0097	-0,0130	-0,0132	-0,0130
$\sum(CAR-CAAR)^2$	0,6668	0,8252	0,9232	1,0392	1,0429	1,1111	1,2365
Var(CAR)	0,000029	0,000036	0,000040	0,000046	0,000046	0,000049	0,000054
$\bar{\sigma}$ ***of CAAR***	0,0054	0,0060	0,0064	0,0068	0,0068	0,0070	0,0074
T-stat:	-1,78	-2,14	-1,57	-1,43	-1,92	-1,90	-1,76
Significance:	0,1	0,05			0,1	0,1	0,1
p-value:	7,71%	3,40%	11,85%	15,48%	5,68%	5,94%	8,04%

Critical Values For t-test:

10%	1,66
5%	1,98
1%	2,61

Appendix 7. ***All Sub-Groups t-tests Results for Different Event Windows***

ESG Score:	*10 – 24*	*25 – 34*	**COMBINED** ***10 – 34***	*35 – 52*	*53 – 84*	**COMBINED** ***35 – 84***
[0,0]	**-0,01988****	-0,01236	**-0,01690*****	-0,00956	0,00084	-0,00346
[0,1]	**-0,02050****	**-0,02185****	**-0,02203*****	-0,01486	0,00304	-0,00483
[0,2]	**-0,0191***	-0,01574	**-0,01790****	-0,01639*	0,00873	-0,00318
[0,3]	**-0,02275***	-0,01159	**-0,01779****	-0,01749*	0,01070	-0,00265
[0,4]	**-0,02666****	-0,01342	**-0,02072****	-0,02379**	0,00953	-0,00636
[0,5]	**-0,02817****	-0,01346	**-0,02160****	-0,02255*	0,00884	-0,00597

Significance level: *:p<0,1, **:p<0,05, ***:p<0,01

ESG Score:	*10 – 24*	*25 – 34*	**COMBINED** ***10 – 34***	*35 – 52*	*53 – 84*	**COMBINED** ***35 – 84***
[-1,0]	**-0,02749*****	-0,01239	**-0,02106*****	-0,00451	0,00582	0,00196
[-1,1]	**-0,02811*****	**-0,02188***	**-0,02618*****	-0,00982	0,00802	0,00059
[-1,2]	**-0,02671****	-0,01577	**-0,02206*****	-0,01134	0,01371	0,00224
[-1,3]	**-0,03036****	-0,01162	**-0,02195****	-0,01244	0,01568	0,00277
[-1,4]	**-0,03428*****	-0,01345	**-0,02488*****	-0,01875	0,01451	-0,00094
[-1,5]	**-0,03578*****	-0,01349	**-0,02575*****	-0,0175	0,01382	-0,00056

Significance level: *:p<0,1, **:p<0,05, ***:p<0,01

Appendix 8. ***Test for Normality***

		Log10 and Winsorizing at:				*Winsorizing at:*		
Bera-Jarque Test (p-value)	***Original data***	***0%***	***5%***	***10%***	***20%***	***5%***	***10%***	***20%***
Car[0,1]	823,40 (0,00)	*Cannot be logged (negative values)*				**1,35 (0,51)**		
Esg Score	11,01 (0,00)	**4,41 (0,11)**						
E Score	18,97 (0,00)	16,98 (0,00)	10,91 (0,00)	**9,76*** (0,00)**	13,57 (0,00)	17,84 (0,00)	16,74 (0,00)	16,54 (0,00)
S Score	8,74 (0,01)	13,81 (0,00)	**7,40** (0,02)**	9,98 (0,01)	14,51 (0,00)	10,14 (0,01)	11,51 (0,00)	15,16 (0,00)
G Score	**6,59** (0,04)**	45,36 (0,00)	18,11 (0,00)	13,02 (0,00)	15,80 (0,00)	7,87 (0,02)	10,61 (0,00)	15,18 (0,00)
Deal Value	908,35 (0,00)	**3,01 (0,22)**						
Target Operating Rev	125157 (0,00)	59,70 (0,00)	20,40 (0,00)	14,97*** (0,00)	16,02 (0,00)	171,82 (0,00)	16,67 (0,00)	15,96 (0,00)
Target Total Assets	37610,1 (0,00)	**0,93 (0,63)**						
Bid.Pre R	938,16 (0,00)	*Cannot be logged (negative values)*				8,99** (0,01)	9,59 (0,01)	14,38 (0,00)
Bid.Pre A	60,34 (0,00)	*Cannot be logged (negative values)*				14,01 (0,00)	**11,05*** (0,00)**	14,03 (0,00)

48 Bera-Jarque tests with the p-value in parentheses

Results of Bera-Jarque test above:

CAR[0,1]	→ 5% winsorizing	= normality
ESG Score	→ log10	= normality
E Score	→ log10 and 10% winsorizing	= still non-normality ***
S Score	→ log10 and 5% winsorizing	= still non-normality **
G Score	→ no change	= still non-normality **
Deal value	→ log10	= normality
T oper.rev	→ log10 and 10% winsorizing	= still non-normality ***
T total assets	→ log10	= normality
Bid Pre. R	→ 5% winsorizing	= still non-normality **
Bid Pre. A	→ 10% winsorizing	= still non-normality ***

Appendix 9. ***Test for Autocorrelation, Homoscedasticity and Linearity Within Regression Models***

Regression model:	***Total ESG Score***	***ENV Score***	***SOC Score***	***GOV Score***
ESG Score	0.010	-0.001	0.021**	-0.000
Deal Value	-0.004	-0.002	-0.006	-0.002
No Rumor	-0.008**	-0.008**	-0.009**	-0.008**
Pay with Shares	-0.011***	-0.011***	-0.011***	-0.011***
R^2	9.1 %	8.5 %	11.4 %	8.6 %
	Values to determine significance (DW values and p-values)			
Durbin-Watson:	2.00	2.02	2.02	2.03
White:	0.11	0.01	0.28	0.37
Ramsey's RESET:	0.33	0.33	0.87	0.25
Hausman:	0.74	0.70	0.39	0.25

Significance level: *:p<0,1, **:p<0,05, ***:p<0,01

The four regression models were tested for:

- Autocorrelation with Durbin-Watson test
- Homoscedasticity with White's test
- Linearity with Ramsey's RESET test
- Endogenous variables with the Hausman test