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Value Creation in Green M&As:

Investigating The Role of ESG Dimensions in Mergers and Acquisitions

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ABSTRACT

This paper aims to investigate the role of corporate sustainability performance in mergers and acquisitions (M&As), considering acquiring- and target- firm's overall ESG scores, individual E, S, G dimensions, and sectoral aspects. The study renders a sample of 153 M&A announcements involving 288 unique firms in the United States over 2013-2021, following a traditional event study method. The findings demonstrated limited influence of acquiror's and target's overall ESG scores on acquiror announcement returns yet found ESG-oriented investments create value. Moreover, treating ESG pillars separately are emphasized as the individual dimensions were relatively more informative. Acquirors' governance score was found to mildly destroy shareholder value, whereas the targets' social score positively generates shareholder value. Moreover, bids for targets possessing superior social performance with respect to the acquiring firm induced positive announcement returns, and relatively more so in socially sensitive sectors. The interpretations were robust to changes in asset pricing models, although the robustness tests highlight the concerns of inconsistencies amongst ESG data providers. Taken together, the paper contributes to the discussion rendering sustainable finance and suggests avenues for further investigation to derive higher-level conclusions.

Keywords: CAR, CSR, ESG, Event study, Mergers and acquisitions, Sustainable finance

JEL Classification: G10, G14, G30, G34, Q00

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Chapter 1 Introduction

Over the past decade, the notion of corporate environmental, social, and governance (ESG) responsibilities has become a key area of focus for stakeholders (Norman & Toms, 2022). In 2011, less than 20% of the companies listed on the S&P 500 index reported ESG performance. Ten years later, 95% provided publicly available, detailed ESG information (Hynes & Falk, 2021). Although ESG often entails ambiguous definitions, the concept broadly refers to sustainability practices, providing a quantifiable measure of corporate social responsibility (Lee, 2021). According to Bloomberg Intelligence (2021), the integration of ESG criteria in investment decisions surpassed a market value of $35 trillion in 2021 and is expected to reach $53 trillion by the year 2025, representing more than one-third of the projected total assets under management. In the light of firms facing mounting pressure from investors and institutions to comply with environmental, social, and other regulations, stakeholder theory argues that improved ESG performance enhances the market value and long-term survival of a company (Yu et al., 2018). Consequently, the framework is shaping the landscape for corporations, and managers are expected to incorporate ESG aspects into investment decisions, such as mergers and acquisitions (Halper et al., 2021).

Mergers and acquisitions (M&As) constitute major strategic decisions for firms, which significantly affect shareholder and stakeholder value (Tampakoudis et al., 2021). However, M&A deals are not inherently successful due to difficulties in evaluating and integrating target firms. Notably, ESG disclosures and related performance can mitigate such barriers, serving as a mechanism to reduce information asymmetry and firm-specific risk, ultimately affecting the value creation arising from the transaction (Gomes & Marsat, 2018). Accordingly, a global survey by McKinsey finds that 83% of C-suite leaders and investment professionals include ESG factors in decision-making processes and expect them to become increasingly critical in M&A procedures. The survey also indicates that acquirors are willing to pay a 10 percent premium for a firm that demonstrates strong ESG credentials over an equivalent target with a negative record, supporting the notion of ESG performance positively influencing aspects of value creation upon M&As (Delevingne et al., 2020).

Although academic literature on ESG-related topics has been growing consistently over the past years, there is “surprisingly little” evidence on the impact of ESG in an M&A context (Barros et al., 2022). Furthermore, the lack of commonality in the applied concepts and undertaken perspectives provides space for further investigation (Clark & Viehs, 2014). Hence, this paper aims to contribute to the discussion by employing an event study to analyse the relationship between ESG dimensions and value creation surrounding M&A announcements. The study applies acquirors’ abnormal stock price performance to proxy value creation arising from the transaction (Andrade et al., 2021). Announcement returns are utilized in this context to alleviate the reverse causality problem previously documented in

studies of the impact of ESG on firm value, as stock price reactions are a relatively exogenous measure in such an event study application (Deng et al., 2013). As a result, this paper aims to explore the following research question:

"To what extent does ESG performance affect acquiror abnormal returns surrounding M&A announcements?"

Consequently, the perspective of the acquiring firm is undertaken as it represents the surviving entity upon deal completion, reflecting potential future benefits that are expected to accrue from ESG performance (Feng, 2021). Nevertheless, both parties' ESG scores are considered as literature depicts contrasting evidence on which entity, the acquiror or the target, influences abnormal returns. Therefore, this study aims to provide new evidence to the discussion of sustainable finance and fill gaps identified in the existing literature.

1.1 Contributions

Firstly, most related studies focus solely on the acquiror's ESG performance and its effect on the acquiring firm's abnormal returns. Therefore, the influence of the target firm's sustainability practices is relatively ambiguous. Nevertheless, Tampakoudis and Anagnostopoulou (2020) demonstrate that target firms' ESG scores positively influence that of the acquiring firm subsequent to an M&A deal and value creation for acquiror shareholders. As a result, the targets' performance directly influences the scope of the investigation, thus both entity's ESG performances are analysed. Secondly, many of the studies are relatively outdated exemplified by the application of precursing measures to current ESG metrics such as social environmental performance (Aktas et al., 2011) or corporate social responsibility measures (Deng et al., 2013). Therefore, the validity of studies is uncertain as the relevance and perception of ESG ratings have changed drastically over the past years (Wong et al., 2019). Thirdly, a reoccurring direction for future research acknowledged in literature is the deconstruction of ESG ratings into its individual pillars, environmental (E), social (S), and governance (G). Previous studies apply firms overall or average pillar scores, yet aggregation of the individual components appears suboptimal for the scope of the analysis as the pillars have different effects on the market value of a company (Torre et al., 2020). Therefore, ESG dimensions are separated to capture different perspectives of the impact of sustainability practices, providing insights into what ESG information is valued by stakeholders in an M&A (Barros et al., 2022). In light of treating the pillars separately, sectoral differences are considered as the effect of ESG pillars on stock prices differs by sector sensitivity with respect to the perceived risk (Giese et al., 2021). Therefore, acquiring firms identified to be operating in sensitive sectors are treated independently from the remaining sample. As a result, four avenues of contributions are identified, shedding light on how and when acquiror shareholders value ESG performance in the context of M&As.

The methodology serves as a contingency to previous literature in the field of ESG and M&A, where authors have previously demonstrated the significance of firm's ESG performance on abnormal announcement returns. However, the related studies neglect differences in pillars, hence amongst sectors. The contribution of this paper relative to comparable existing studies is found in *Appendix 1*. By applying a sample of 153 M&A deals involving 288 unique firms in the United States over the period 2013-2021, the event study analysis offers relatively new evidence using up-to-date overall- and individual pillar- ESG scores. In addition, four sub-questions are investigated. First, the extent to which acquirors' ESG scores affect acquiror abnormal returns is explored. Second, the analysis investigates the effect of targets' ESG performance on acquiror abnormal returns. Third, the effect of acquiring a target with superior ESG performance is analysed. Lastly, distinctions of sector sensitivity are made to investigate the relative effects of pillars.

The findings of this research indicate that neither acquiror nor target firms' overall ESG performance influences acquiror announcement returns, contrasting several related findings that support shareholder- or stakeholder- theory. Rather, the evidence favors the notion that capital markets do not recognize the relevance of a firm's sustainable performance in an M&A context (Meckl & Theuerkorn, 2015; Fatemi et al., 2017). By contrast, there is support for the resource-based view and associated learning opportunities, as bids for target firms possessing superior ESG performance than that of the acquiror were positively valued markets, similar to findings by Chen et al. (2022). Notably, the application of treating E, S, G pillars separately is emphasized as the individual dimensions were relatively more informative, highlighting which information was valued in acquiror announcement returns (Barros et al., 2022). Acquirors' governance score was found to mildly destroy shareholder value, whereas the targets' social score positively generates shareholder value. Moreover, bids for targets possessing superior social performance with respect to the acquiring firm induced positive announcement returns, and relatively more so in socially sensitive sectors. The interpretations were robust to changes in asset pricing models, deeming simple risk-adjustment approaches such as the market model to be efficient in the applied short-term event study (Brown & Warner, 1980). By contrast, the robustness section highlights discrepancies and inconsistencies amongst ESG data providers as results are driven by the selection of rating agencies, thus impeding any higher-level conclusions (Brooks & Oikonomou, 2018).

The remainder of this paper is organised in the following sections. Section 2 summarizes the theoretical framework and related academic literature, ultimately shaping the hypotheses with respect to the research questions. Thereafter, a detailed explanation of the sample and data collection is provided in Section 3. Subsequently, section 4 depicts the methodology, describing the event study procedure and the empirical models. In Section 5, results are discussed and interpreted relative to the hypotheses. Finally, Section 6 offers the main conclusions of the paper, limitations of the study, and ultimately provides avenues for future research.

Chapter 2 Literature Review

The following section aims to provide a comprehensive review of the development of ESG metrics and academic literature concerning ESG, firm performance, and M&A activity. Accordingly, existing gaps in research are identified. Relevant theories, models, and findings are discussed, ultimately shaping the hypotheses intended to answer the research questions.

2.1 Development of ESG

The concept of Corporate Social Responsibility (CSR) was first introduced by Howard Bowen in the 1950s. Bowen advocated business ethics and responsibilities of corporations to societal stakeholders, defined as "the obligations to pursue those policies, … decisions, … actions, that are desirable in terms of the objectives and values of our society" (Bowen, 2013). Thereafter, the discourse of corporate responsibilities has evolved to address environmental issues through an integrated approach referred to as the "triple bottom line," incorporating the economic, environmental, and social dimensions of an enterprise. Despite ambiguous definitions of CSR, the core notion renders aligning firm behaviour with societal outcomes while addressing the expectations of shareholders and stakeholders (Lee, 2021).

The practice of CSR has grown exponentially and represents the global business norm in the 21st century, as an increasing number of firms and investors are incorporating sustainability practice issues into investment decisions (Barros et al., 2022). While CSR commitments serve as insights into company values and internal culture, they are generally self-regulated and can vary widely. Thus, in the interest of external actors and investors, sustainability ratings have emerged, assessing firms on environmental, social, and governance (ESG) criteria. ESG ratings evaluate the sustainability practices within a company, providing a quantifiable measure that informs investors about the risks and ethics of the firm (Chu, 2021). CSR and ESG are generally related concepts, whereby CSR is commonly acknowledged as the precursor to ESG. Hence, literature, to some extent, applies the terminology interchangeably. Both terms refer to the social responsibilities of business, whereby CSR holds businesses accountable for their societal commitments, and ESG helps measure such efforts (Hung, 2021).

ESG was first introduced in 2006 by the United Nations Principle for Responsible Investment (UN PRI), a network of institutional investors dedicated to promoting the integration of ESG issues into investment practices (UN PRI, 2021). Amid public- and private- sector initiatives to reach the objectives of the Sustainable Development Goals (SDGs), ESG disclosures have experienced sharp growth in informing stakeholders of the firm's contributions. Accordingly, ESG ratings are being increasingly utilized in assessments, covering more than 80% of the global market capitalization (OECD, 2021). Firms are evaluated and rated by various third-party providers on their environmental, social, and governance performance, whereby weighting schemes constitute an overall ESG score. As a result,

rankings assess an organization's resilience to the non-financial risks involved with the three pillars, which stakeholders are increasingly relying on to benchmark firms' progress (Huber & Comstock, 2017).

The pillars represent the three main areas that companies are expected to report in. Firstly, the Environmental pillar (E) integrates metrics regarding climate change, waste management, and pollution, among others. Secondly, the Social pillar (S) renders how companies manage human rights, labour standards, and routine issues of health and safety, among others. Thirdly, the main issues under the Governance pillar (G) are shareholder rights, board diversity, compensation structures, and anti-corruption practices, to mention a few. Coinciding with increased demand and scrutiny regarding ESG-related disclosures, the framework has become synonymous with reporting, despite the absence of a global standard (UN PRI, 2021). Nevertheless, a severe limitation in the legitimacy of information is the fact that rating agencies rely on voluntary transparency by corporations, resulting in unstandardized sustainability reports. As ESG data gathering is derived from self-reporting by the firms in question, such practice can easily lead to bias, subjectivity, and manipulation. In a recent paper by Bams and van der Kroft (2022), the authors demonstrate that firms have an incentive to inflate their ESG ratings by selectively disclosing sustainable performance. Similarly, the inflated ESG performance is likely undetected due to agency problems and monitoring costs, and some even suspect ESG rating agencies collude with firms (Clementino & Perkins, 2020).

The assessment by rating agencies is based on company publications, government data, media, questionnaires, and other stakeholders. However, rating methods vary greatly among data providers due to specific mechanisms in defining ESG scores. Thus, the sheer variety and discrepancies amongst metrics create inconsistencies, undermining their reliability as scores from different providers produce conflicting results (Kotsantonis & Serafeim, 2019). Consequently, problems arise as the same firm may receive widely different ratings by the agencies, causing a diffused signal. Berg et al. (2019) depict a disagreement in ESG evaluations primarily due to heterogenous weighting schemes and underlying indicators. Correlations of overall firm ESG scores range from 0.4-0.7 among the six largest rating agencies. Therefore, the authors recommend dissecting ESG ratings into (sub)pillars and incorporating several data providers to improve the validity of the analysis.

2.2 Relationship between ESG and firm performance

In light of the growing recognition of corporate sustainability practices, academic research investigating the relationship between ESG performance and firm value creation has constantly been growing, with the primary goal to explore whether higher ESG quality can deliver higher long-term shareholder value. As the rationale for improving ESG scores are not directly apparent in financial statements, a trade-off

exists between short-term profit maximization and long-term value creation, stemming from the framework of shareholder- and stakeholder- theory (Zumente & Bistrova, 2021).

Engaging in social responsibility activities often involves incurring costs as it may require, for example, investments in environmentally friendly equipment, stricter quality controls, and adopting new routines. Additionally, disclosing ESG-related information incurs costs associated with data collection, communication, and audit. On the other hand, future economic benefits are expected to accrue to sustain the business by, for example, improving stakeholder relations, firm reputation, and access to capital. Hence, the costs are often short-term in nature, whilst benefits materialize in the long term (Branco & Rodrigues, 2006).

Shareholder theory advocates that firms should be exclusively devoted to their shareholders, as the "social responsibility of business is to increase its profits…" (Friedman, 1970). Therefore, CSR activities are viewed as additional costs due to agency problems caused by managers seeking to pursue personal interests at the expense of shareholders. Hence, CSR is expected to have a negative effect on corporate performance. By contrast, stakeholder theory describes a business as a set of relationships between parties that have a stake in the firm's activities. Thus, firms are responsible to all stakeholders that are impacted by corporate actions, such as employees, customers, suppliers, regulatory institutions, local communities, and shareholders (Freeman, 1984). Proponents of stakeholder theory argue that behaving ethically improves corporate performance. Hence acting in the interest of all stakeholders ultimately aligns with the objectives of shareholders. Accordingly, the adoption of the ESG framework arguably serves both ultimate beneficiaries by addressing the financial goals of shareholders and benefitting the broader network of stakeholders (Zumente & Bistrova, 2021).

A meta-analysis by Friede et al. (2015) covered more than 2,000 empirical papers in the field, which concluded that approximately 90% of the studies found a non-negative relationship. Firm performance was defined using accounting-, market-, and/or operational- measures, whereby the majority of papers reported a modestly positive relationship. Similarly, Clark and Viehs (2014) demonstrate that circa 88% of the studies revealed a positive financial impact of higher sustainability. However, Brooks and Oikonomou (2018) argue that the diversity and variability stemming from the scope of investigation limit any higher-level conclusions. The authors claim that studies are incomparable due to differing definitions and formulations of both corporate sustainability performance and financial performance. Moreover, the relevance of sustainability practices and related rating metrics applied in the studies have developed over time, suggesting that inferences from earlier studies with decades-long history cannot be compared to recent findings. Accordingly, Whelan et al. (2021) analysed more than 1,000 research papers published between 2015-2020, investigating the relationship between ESG and financial performance. Due to varying research frameworks and definitions, studies were separated by the scope

of financial performance. Results demonstrated that 57% (6%) of studies find a positive (negative) correlation between ESG and corporate financial performance, measured by ROE, ROA, and/or stock performance.

Consequently, the factors found to be impacted by ESG appear to correspond to the definition of shareholder value creation, suggesting an inter-relatedness between proponents of shareholder- and stakeholder- theory. Thus, improved sustainability initiatives not only perform better on the environment and society-related factors but also ensure shareholder returns. Hence, studies indicate that "it pays off to do good", suggesting that the trade-off introduced by the contrasting theories appears redundant in recent years (Zumente & Bistrova, 2021).

The aggregated empirical evidence demonstrates the sign and strength of the relationship between ESG performance and the firm's financial bottom line. Yet, much of the difficulty surrounding the topic arises from the lack of a detailed understanding of how corporate responsibility issues *can* affect drivers of value (Brooks & Oikonomou, 2018). Hence, the channels through which ESG ratings affect value represent an under-researched field. According to the resource-based view (RBV), the firm exists as a pool of resources whereby performance is determined by the existence of firm-specific resources that are valuable, rare, inimitable, and non-substitutable (Barney, 1991). The resources are the means through which firms accomplish their activities, including tangible- (physical and financial) and intangible- (intellectual property, goodwill, organizational, reputational) assets. Intangible resources and capabilities are costly to develop and difficult to imitate, hence representing a primary source of competitive advantage. Thus, ESG initiatives provide internal and external benefits for firms related to long-term value creation and can provide an avenue for sustained competitive advantage by improving, for example, know-how, employee attraction and retention, corporate culture, and corporate reputation (Branco & Rodrigues, 2006).

In addition to the value-creating aspects of ESG, initiatives have been documented to provide risk-mitigating benefits and facilitate capital attraction. It has been argued that environmental externalities impose particular (reputational, financial, or litigation) risks on corporations. Hence, "firms that engage in misconduct incur costly penalties from stakeholders", ultimately affecting their default risk (Bauer & Hann, 2010). Consequently, firms are encouraged to improve ESG elements and corresponding ratings due to the effects on asset prices, securing capital, and corporate policies (Berg et al., 2019). Following a sample of 1,996 listed firms across 47 countries, Yu et al. (2019) conclude that ESG disclosures reduce information asymmetries and idiosyncratic risk, which in turn facilitates capital attraction and positively affects the market value of a firm.

Accordingly, in a sample of 2,200 bond issues in the United States, Bauer and Hann (2010) demonstrate a significantly negative relationship between robust environmental practices and firm loan spread. Hence, firms with superior environmental management experience lower costs of debt. Similar evidence exists in terms of equity capital, whereby El Ghoul et al. (2011) reveal that listed firms in the United States with improved CSR performance exhibit lower costs of equity.

2.3 Announcement returns in (Green) M&As

Merger and acquisition announcements constitute a major strategic decision for firms and significantly affect the interests of both shareholders and stakeholders, as all actors involved in the integration process are impacted by the investment (Tampakoudis et al., 2021). Despite the importance of capability transfers that are realized in takeovers, the role of sustainability practices and their effect in the market for corporate control has received relatively limited attention in academia (Barros et al., 2022). Nevertheless, ESG is becoming increasingly critical in M&A processes by shaping assessments of strategic fit, as a firm's stance on ESG matters is indicative of its culture and future growth prospects. Hence, companies are following the footsteps of investors by integrating ESG considerations into core aspects of deal-making (Brownstein & Carmen, 2022).

Following a matched sample methodology of 608 deals worldwide over the period 2003-2014, results revealed that the target firm's ESG performance is positively associated with the likelihood of becoming an M&A target (Gomes, 2019). Similarly, an analysis of 1,556 deals in the United States demonstrates that firms with more aligned CSR policies are more likely to merge, complete deals, enjoy synergies, and improve long-run performance (Bereskin et al., 2018). Therefore, evidence suggests that ESG plays a critical role in M&A deals, positively influencing the outcome of the transaction. Accordingly, Gomes and Marsat (2018) demonstrate that acquirors positively value the target's sustainability performance as it reflects higher goodwill and lowers firm-specific risk. Hence, target firm's ESG scores are positively related to bid premiums due to the reduction of information asymmetries. Taken together, markets are expected to react positively to ESG initiatives by acquirors with respect to the resource-based view, as the target firm's ESG presents valuable assets that are expected to accrue to the acquiring firm by positively influencing acquirors performance, reputation, and perception (Feng, 2021).

In light of M&A deals, event studies are applied to assess the economic impact for the acquiror's- and target's- shareholders, whereby the cumulative abnormal return (CAR) over the event window, measured by the difference between the realized return and the expected return in the absence of the event, is employed as a gauge for expected value creation arising from the deal (Andrade et al., 2001). A full list of the relevant event studies exploring announcement returns can be found in *Table 1*, depicting the methodologies and findings with respect to various event windows, whereby the brackets denote the number of trading days considered prior- and post- announcement date.

Table 1: Literature matrix event studies

Author(s) (Publication year)	Period	Sample	Region	Method	Controls	Results	
						Acquiror	Target
Andrade et al., (2001)	1973-1998	3,688	United States	Market model	Firm size, equity financing, deal size, operating performance	CAR [-1,1] = 0.70% CAR [-20, Close] = -3.80%	CAR [-1,1] = 16.0% CAR [-20, Close] = 24.0%
Campa and Hernando (2004)	1992-2000	262	European Union	Market model	Firm size, cross-border, industry relatedness, relative size, regulated industry, hostile bid	CAR [-1,1] = 0.44% CAR [-30,1] = 1.35%	CAR [-1,1] = 3.93% CAR [-30,1] = 8.85%
Aktas et al. (2011)*	1997-2007	106	Worldwide	Market model	Payment method, cross-border, industry relatedness, deal size, relative size, Heckman's lambda	CAR [-1,1] = -1.16%	CAR [-1,1] = 9.60%
Deng et al. (2013)*	1992-2007	1,556	United States	Market model	Firm size, industry relatedness, hostile bid, public status, payment method, high tech, deal size, Tobins Q, free cash flow, leverage	CAR [-1,1] = -0.21% CAR [-2,2] = -0.12% CAR [-5,5] = -0.45%	
Yilmaz and Tanyeri (2016)	1992-2011	263,461	Worldwide	Market model	Firm size, deal type, public status, deal outcome, country	CAR [-1,1] = 1.40%	CAR [-1,1] = 6.90%
Fatemi et al. (2017)*	2000-2014	243	Japan	Market model	Firm size, leverage, Tobins Q, relative size, payment method, industry relatedness	CAR [-1,1] = 1.55% CAR [-5,5] = 0.33%	CAR [-1,1] = 8.09% CAR [-5,5] = 12.02%
Krishnamurti et al. (2019)*	2000-2016	776	Australia	Market model	Firm size, cash holding, leverage, Tobins Q, board size, CEO duality, independent directors, payment method, relative size, industry relatedness, cross-border	CAR [-1,1] = 2.34% CAR [-1,1] = 2.67%	
Yen and Andre (2019)*	2008-2014	1,986	Emerging markets	Market model	Firm size, cross-border, payment method, hostile bid, industry relatedness, relative size, ROA, leverage, free cash flow	CAR [-2,2] = 0.36%	

Chen et al. (2022)*	1995-2014	574	United States	Market model	Firm size, leverage, ROA, Tobins Q, payment method, industry relatedness, relative size	CAR [-2,2] = -0.71%	CAR [-2,2] = 23.77%
Zhang et al. (2022)*	2002-2012	1,310	Developed markets	Market model	Firm size, Tobins Q, R&D expenditure, capital expenditure, leverage, HH1 index, age, relative size	CAR [-1,1] = 0.05% CAR [-2,2] = 0.14% CAR [-3,3] = 0.06% CAR [-5,5] = 0.24%	

This table summarizes relevant empirical studies exploring announcement returns surrounding M&As. The table displays the time period considered, number of M&A deals in the sample, the region of the sample, the applied asset pricing model, the control variables accounted for, and the acquiror and target (if appropriate) announcement returns over the event window of interest. Papers marked with an asterisk '*' consider aspects of ESG performance related to abnormal returns.

Event studies demonstrate that takeover deals create value on average, with the lion's share of gains accruing to the target firm's shareholders. In a sample of 3,688 completed deals in the United States over the period 1973-1998, the average three-day abnormal return for target and acquiror shareholders were 16% and -0.7%, respectively (Andrade et al., 2001). The magnitude of abnormal returns drifts further in their respective directions in the longer event window, measured from 20 days prior to the announcement and ending at the close of the merger. However, differences in firm characteristics and financing methods induce dissimilar market reactions due to principal-agent issues. For example, issuing equity signals management belief of overvalued shares hence prompting a more negative abnormal return relative to cash bids. Therefore, arising market reactions may vary significantly.

In an analysis of M&A studies in developed markets, Campa and Hernando (2004) find evenly distributed evidence between those demonstrating negative acquiror abnormal returns and studies reporting null or slightly positive acquiror abnormal returns, ranging from -5% to +7% in short-term event windows. Nevertheless, the consensus is that acquiror shareholders are not winners relative to target shareholders in M&A transactions (Andrade et al., 2001; Campa & Hernando, 2004). However, the notion of value destruction for acquiring firm's shareholders has changed in recent years. Since 2010, the proportion of deals followed by a decline in acquiror share price fell to a low of 45%, compared to the historical average of 58%, suggesting that acquirors are becoming increasingly selective (Cogman, 2014). Thus, the magnitude and direction of acquiror CARs may differ from those previously reported in the literature. Accordingly, Yilmaz and Tanyeri (2016) found a significantly positive three-day average acquiror abnormal return of 1.4% following an extensive study covering 263,461 deals worldwide.

Aktas et al. (2011) conducted one of the first studies exploring the relationship between ESG performance and abnormal returns in M&As. By analysing 106 deals over the period 1997-2007, the resulting three-day average abnormal return was -1.16% and 9.60% for acquirors and targets, respectively. Hence, results broadly align with early evidence of value destruction for acquiror shareholders. However, when applying social and environmental ratings, acquiror abnormal returns were positively associated with acquiror and target firms' socially responsible investment (SRI) performance. More precisely, a one unit increase in the target's rating generated an abnormal gain of 0.9% for acquirors. Furthermore, when dividing the sample into firms with relatively high and low SRI performance, high SRI acquirors enjoy higher abnormal returns, and the acquisition of targets with high SRI generates significantly higher announcement abnormal returns for acquirors. Thus, results indicate that investors positively value the social and environmental practices of both acquirors and targets.

By contrast, Deng et al. (2013) argue that the positive relationship between sustainability performance and acquiror abnormal returns is driven by acquirors' CSR ratings, not those of target firms. The authors

depict a negative average abnormal return on average, although acquirors with relatively high CSR scores generated 0.55% significantly higher cumulative abnormal return. Hence, the authors conclude that shareholders value acquiror CSR due to facilitated integration processes and improved relationships with target stakeholders. However, caution should be taken when discrediting the target's CSR score, as the coefficient was negative but marginally insignificant. Although the aforementioned studies pioneered this field of research, the findings may not hold in recent times. The relevance and perception of ESG have changed drastically over the past years, coinciding with improved rating practices (Wong et al., 2019). Therefore, decades-long samples applying predecessor metrics such as SRI (Aktas et al., 2011) and CSR (Deng et al., 2013) may be questionable in a recent context.

Zhang et al. (2022) studied 1,310 M&A cases in developed markets. The authors found that when acquirors improve ESG performance by 1%, the cumulative abnormal return increases by 1.86% in a three-day event window, with significantly positive coefficients robust to longer event windows. Similar to Deng et al. (2013), the authors attribute their findings to stakeholder theory, whereby high-performing ESG acquirors are more likely to act in the best interests of stakeholders, hence incur fewer losses in stock market returns. Likewise, in a sample of 776 deals by Australian acquirors, Krishnamurti et al. (2019) find that bidders with enhanced ESG performance earn significantly positive CAR following an ordinary least squares specification and a two-stage least squares specification, which is applied due to concerns of endogeneity in the model. The authors conclude that sustainable practices by acquirors have a beneficial impact on shareholder value creation, and the interpretations are robust to endogeneity issues. By contrast, Fatemi et al. (2017) find that the acquiror's ESG performance has no explanatory power on announcement returns in a sample of 243 M&As in Japan. Nevertheless, as the majority of evidence favors a positive effect of acquiror ESG scores, the first hypothesis renders:

H_1: *Acquiring firms' ESG performance positively influence acquiror abnormal returns*

The empirical evidence for the target's sustainability scores on acquiror abnormal performance is relatively more ambiguous. The aforementioned studies by Aktas et al. (2011) and Deng et al. (2013) produced contrasting results, whereby the former (latter) depicts a significantly positive (negative) relationship. In a sample of 588 deals worldwide over the period 2003-2014, Gomes and Marsat (2018) find that target's ESG performance reduces information asymmetry and target-specific risk. However, such benefits induce higher bid premiums for acquirors, thus is expected to have a negative effect on acquiror abnormal returns. On the other hand, the resource-based view suggests that ESG commitments of target firms present valuable intangible assets that accrue to acquirors by positively influencing ESG performance, reputation, and perception (Feng, 2021). Likewise, the target's pre-transaction ESG performance should positively influence acquiror value as a result of the value-creating- and risk-mitigating- benefits that arise from improved ESG practices (Bauer & Hann, 2010; Yu et al., 2019).

Accordingly, Tampakoudis and Anagnostopoulou (2020) conclude that ESG-conscious targets represent a value-enhancing strategy for acquirors, as acquirors post-transaction ESG performance and market value are positively related to the target's ESG score. As abnormal stock price performance surrounding the deal announcement proxies future expected value creation arising from the transaction, the second hypothesis reads:

H_2: *Target firms' ESG performance positively influence acquiror abnormal returns*

Taken together, if target firms' ESG performance improves that of the acquiror, which in turn benefits long-term growth, capital attraction, firm capabilities, and market value, investors are expected to positively value M&A initiatives involving target firms with superior ESG scores, regardless of the acquiring firm's pre-transaction ESG performance. In a sample of 574 deals in the United States, Chen et al. (2022) conclude that markets reward acquirors when they make ESG-oriented investments. Acquiring a target with superior ESG performance results in a significantly higher five-day abnormal return of 1.99%. Hence, the authors infer that the greater the target's CSR performance relative to the acquiror, the greater the acquiror gains. Consequently, the third hypothesis is derived:

H_3: *Acquisitions of target firms with superior ESG performance positively influence acquiror abnormal returns*

2.4 Research gaps

Although a handful of previous studies measure the impact of sustainability practices on abnormal returns, the significance of individual pillar scores is commonly neglected and rather acknowledged as a direction for future research. Nevertheless, disaggregating ESG dimensions capture different perspectives of the impact on M&As, and how sustainable actions are perceived by stakeholders (Barros et al., 2022). In the absence of studies investigating ESG pillar scores directly in M&As, papers investigating the relationship between pillars and stock prices indicate what information investors value, hence describing potential differences in abnormal returns. However, caution must be taken as ESG disclosures are generally associated with improved ESG performance as well as firm performance (Brooks & Oikonomou, 2018). Consequently, there exists a potential reverse causality problem of ESG performance improving profitability, hence stock returns and vice versa, whereby greater stock returns permit the allocation of more resources to the matter (Yu et al., 2018). Notably, the relevance of disclosures and associated performance differs for investors subject to the informational content represented in the three components of ESG scores (Fatemi et al., 2018).

Torre et al. (2020) investigate how the ESG drivers affect returns for stocks listed on the Eurostoxx50 over the period 2010-2018. The authors perform a two-step methodology by first conducting a panel

data analysis to identify a causal relationship between stock returns and ESG and second, performing a multiple linear regression to assess the effect of individual pillars on the returns for each firm in the sample. To alleviate reverse causality concerns, the authors adopted lagged values of quarterly ESG scores. The lagged values are employed to alleviate serial correlation and endogeneity in the explanatory variables, yet the causality tests did not detect any kind of relation among lagged values and returns for any of the firms in the sample. Moreover, their findings demonstrate a weak impact of overall ESG ratings on returns, although a significant correlation was found between individual pillars and stock returns with variations among sectors primarily in environmental and social dimensions depending on the extent to which ESG investments are relevant for company profitability. Hence, the authors emphasize the importance of differences amongst pillars as well as sectoral distinctions, as the potential benefit to a shareholder of an acquiring company depends on how sensitive the stock is to the ESG information (Torre et al., 2020).

In light of differences existing in the effect of the individual pillars, Giese et al. (2021) analyze over 1,600 stocks listed on the MSCI World Index from 2006 to 2019. The authors demonstrate that the governance pillar proved the most significant impact on financial variables across all sectors, as corporate governance performance is most directly linked to short-term risks. An improved pillar score indicates better management practices and results in higher future performance (Barko et al., 2021). Accordingly, in the meta-study by Clark and Viehs (2014), the authors conclude that there is a clear positive effect of corporate governance on future profitability and corresponding stock market performance. Literature depicts that well-governed firms perform better than poorly governed counterparts, with long-short portfolio strategies delivering risk-adjusted annual abnormal returns of 8.5% to 15%. As the governance score reflects transparency, accountability, and sound business practices, a higher rating arguably indicates facilitated integration processes and mitigate conflicts of interests involved in M&As (Monteiro et al., 2021). Hence, the acquiror- and target- firm's governance performance is expected to have a positive impact on acquiror abnormal returns when analyzing the entire sample. In contrast to the environmental or social dimension of ESG, whereby the effect is relatively more ambiguous due to sectoral differences, wider conclusions can be drawn regarding the governance pillar, as superior governance quality leads to improved financial performance because shareholders value robust corporate governance (Clark & Viehs, 2014). By applying this evidence to the hypotheses previously presented, the fourth hypothesis renders:

H_{4A}: *Acquiring firms' governance performance positively influence acquiror abnormal returns*

H_{4B}: *Target firms' governance performance positively influence acquiror abnormal returns*

H_{4C}: *Acquisitions of target firms with superior governance performance positively influence acquiror abnormal returns*

The importance of environmental (E) and social (S) dimensions of ESG vary, subject to what extent sectors are exposed to the information represented by the pillars, i.e., the effect on firm profitability (Torre et al., 2020; Giese et al., 2021). The effect of corporate environmental performance on firm financial performance has been widely documented whereby the majority of studies find that the better a corporation's environmental performance, the better its financial performance, regardless of the applied measurement, i.e., environmental ratings, carbon emissions, etc. (Clark & Viehs, 2014). Similarly, the social dimension of ESG generally has a positive influence on corporate financial performance, although the evidence is relatively more limited. Edmans (2011) analyzes the relationship between employee satisfaction and stock returns. Following a value-weighted portfolio of the 100 top-ranked employers in the United States, the portfolio earned 3.5% annual risk-adjusted abnormal returns over the period 1984-2009 and 2.1% above industry benchmarks. However, critics argue that the findings are due to reverse causality, whereby corporate social behavior of firms causes improved financial performance and vice versa. In response, Edmans (2011) claims that the application of stock returns as a measure of financial performance, and particularly abnormal stock returns, mitigates such concerns. As a result, improved environmental and/or social performance are expected to positively influence acquiror abnormal returns.

Giese et al. (2021) find that E and S scores are relatively more pronounced in industries that require such risk management, in which tangible events may have an immediate impact on corporate profitability or stock prices. Accordingly, stakeholder theory advocates improvements in such dimensions reduce informational asymmetry and mitigates perceived risk, resulting in greater confidence levels by investors, particularly given the close scrutinization of such sectors. Similarly, Garcia et al. (2017) define sensitive sectors as those subject to systemic social taboos, moral debates, and political pressures, and those more likely to cause social and environmental damage, i.e., are under more scrutiny. The authors demonstrate that firms most exposed to ESG risks have the greatest incentive to invest in ESG performance to avoid conflicts of interest. Therefore, companies are expected to attach a higher weighting to specific ESG factors they consider to be of the highest risk to their business. Hence shareholders plausibly value the firm's reputation and capabilities in such areas relatively more. Accordingly, following a sample of 375 firms listed in the United States, Cai et al. (2012) find that an increase in the CSR measure corresponds to a 9% increase in firm value from the sample average for that firms operating in industries under high scrutinization. Therefore, the environmental and social pillar is expected to positively influence abnormal announcement returns relatively more in sectors that are more exposed to such dimensions.

By contrast, Miralles-Quiros et al. (2018) investigate the effect of the pillars on the stock prices of firms listed in Brazil. The results demonstrate that the market does not significantly value all individual ESG pillars but rather positively values dimensions that are not directly related to the firm's productive activity. Hence, social and governance practices were significantly positive in environmentally sensitive industries, i.e., those with an important environmental impact, such as oil, gas, chemicals, mining, etc. The authors argue that shareholders in sensitive industries are especially concerned about these practices, but they are already reflected in the share prices. Therefore, unanticipated performance in other dimensions generates significant added value. However, it is debatable to what extent Brazilian firms are representative for a sample in the United States given the existing geographical differences, whereby the former lags behind (Hynes et al., 2021). Therefore, social and governance dimensions may be positively valued due to limited pre-existing frameworks in Brazil, which plausibly does not hold in the applied sample. Despite contrasting evidence for which pillars explain value creation in sensitive sectors, the fifth hypothesis are constructed on the basis of the evidence for developed markets. Consequently, environmental and social performance are expected to positively influence M&A performance relatively more in sensitive industries, where the risk is perceived as high:

H_{5A}: *Acquiring firms' environmental (social) performance positively influence acquiror abnormal returns relatively more in environmentally (socially) sensitive sectors*

H_{5B}: *Target firms' environmental (social) performance positively influence acquiror abnormal returns relatively more in environmentally (socially) sensitive sectors*

Furthermore, the resource-based view suggests that acquiring a target with superior ESG performance can mitigate the relevant risk and improve sustainability practices of acquirors, subsequently improving the ESG score and firm value (Chen et al., 2022). Given that firms in sensitive sectors undergo greater scrutiny, they are expected to be more concerned about stakeholder views. Following an analysis of 3,941 deals in 41 countries and 12 economic sectors, Barros et al. (2022) find that the improvement in acquiror ESG performance following a deal holds across all pillars. Therefore, acquisitions of target firms possessing superior performance with respect to the risk dimension associated with the acquiror's operations are expected to be relatively more positively valued. Accordingly, the final hypothesis is as follows:

H_{5C}: *Acquisitions of target firms with superior environmental (social) performance positively influence acquiror abnormal returns relatively more in environmentally (socially) sensitive sectors*

Chapter 3 Data

The following chapter is divided into three sections. First, a detailed explanation of the applied data sources and sampling procedure is provided. Second, the variables employed in the empirical models are described. Third, this chapter is concluded by depicting descriptive statistics of the variables and their respective correlations.

3.1 Database and sample selection

The sample comprises 153 M&A announcements in the United States over the period January 2013 to December 2021. According to Harford (2005), each merger wave is unique and should be treated distinctively due to differences in economic motivation, valuations, and returns. Similarly, investor sentiment is an important determinant of the announcement reaction and differs across waves due to ambiguous underlying fundamentals in the market (Rosen, 2006). Consequently, the sample encompasses solely the ongoing seventh merger wave, characterized by a hot credit and stock market following the recovery of the financial crisis. Importantly, the merger wave coincides with an upward trend of ESG reporting in the United States, as 72% of the companies listed on the S&P500 provided sustainability reports in 2013, compared to less than 20% in 2011 (Peterson, 2019). Thus, a recent sample is adopted in spite of capturing improved reliability of ESG scoring measures.

Similarly, the quality of ESG disclosures undermines the scope of the study, whereby the United States ranks highly on an international scale due to strong standards of mandatory compliance and legislation (Wilkins et al., 2019). Hence, solely firms incorporated in the United States (US) are considered to pave the way for more reliable ESG ratings of the firms and avoid large discrepancies in the quality of ESG data. Additionally, the US represents an informationally efficient and liquid market, reducing noise in acquiror stock market prices and the risk of thin trading, which is particularly important for short-term event studies (Risso, 2009; Massa & Xu, 2013).

In light of the quality of ESG information, the lack of global reporting standards represents a limitation in the field as data providers adopt different rating processes. Consequently, the variety and inconsistency of data limit generalizability (Kotsantonis & Serafeim, 2019). Nevertheless, investors, institutions, and other stakeholders consistently rely on these rating agencies to assess firms' ESG performance (Huber & Comstock, 2017). Accordingly, ESG scores represent the quantitative measure of corporate sustainability in academic research, whereby Refinitiv (formerly Thomson Reuters) is the most extensively used database in recent years (Barros et al., 2022).

According to a survey involving 300 sustainability practitioners ranking the credibility and usefulness of various ESG providers, ratings from Sustainalytics is the preferred choice for investors. However,

due to data accessibility, the Refinitiv database presents the best option as it possesses the highest correlation with Sustainalytics across all pillars (ranging from 0.71 to 0.78) and an R-squared of 95.5% in terms of rating, scope, measurement, and weight terms (Wong et al., 2019). As a result, the core investigation utilizes ESG data from Refinitiv due to its accessible raw data and thorough coverage of firms in the United States. Nevertheless, the findings are accommodated by ESG scores from MSCI in robustness tests, as incorporating additional data providers improves the validity of the findings (Berg et al., 2019).

Refinitiv offers one of the most comprehensive databases in the industry, providing raw ESG data for more than 80% of the global market. The ratings cover both public and private companies across 630+ ESG metrics. These are grouped into ten categories which constitute the individual pillar scores (E, S, and G) and are weighted by industry relevance to derive the overall ESG score, reflecting the company's ESG performance (*Appendix 2*). The measures range from 0 (worst) to 100 (best) and are updated on a weekly basis, yet a definitive score is provided at the end of each fiscal year based on disclosures by the company (Refinitiv, 2021).

The Refinitiv database was also utilized to identify relevant mergers and acquisitions, facilitating data-matching processes. Refinitiv provides complete coverage of global M&A transactions and represents a primary source for practitioners such as investment banks, hedge funds, and educational institutions. The database contains more than 1.2 million deals, featuring more than 1,000 data elements concerning transaction details and firm information (Refinitiv, 2020). Following the recognition of fitting M&A deals, readily accessible ESG data was matched with the acquiring and target firm.

To identify M&A transactions, six criteria were initially applied to obtain a gross sample. Subsequently, additional criteria that are important for the methodology were employed. Firstly, only M&A announcements during the period 2013-2021 were considered. The sample considers both mergers and acquisitions transactions as the bidding firm will obtain the targets' resources upon completion, and any partial sales are excluded (Yilmaz & Tanyeri, 2016). Secondly, the acquiror and target firm must be incorporated in the United States. Consequently, solely domestic transactions are included as cross-border deals have more uncertain elements affecting announcement returns (House et al., 2002). Additionally, the relevance of ESG and rating standards differ across geographies, potentially distorting the scope of investigation if foreign firms were considered (Belsom, 2021). Thirdly, the acquiring firm must be publicly listed to obtain relevant stock prices for calculating abnormal returns. Fourth, only completed and unconditional deals were included, as announcements that possess a high probability of failure are traded at a discount, misrepresenting stock market reactions (Sudarsanam, 2003). Fifth, the acquiror is required to control less than 50 percent of the target prior to the announcement and 100 percent post-transaction. Similar to previous studies, this criterion ensures that the deals in the sample

result in changes in control (Deng et al., 2013). Finally, the deal size must be greater than one million USD to reduce the risk of external noise surrounding small transactions (Gregory, 1997).

Furthermore, all finance-related deals were excluded due to the highly regulated nature of the industry. Hence, arising abnormal returns are not comparable to other industries (Sorenson & Yesiltas, 2012). As a result, the gross sample consists of 6,117 deals. Thereafter, the remaining observations were matched with readily available ESG- and financial- data for both parties from the most recent fiscal year-end, reducing the sample to 161 deals. Thus, an underlying assumption of the study is that the firm's reported financial ratios and sustainability performance are representative at the time of the bid. Conclusively, a number of transactions were removed for methodological purposes whereby internal transactions and overlapping events from the same acquiror were omitted from the sample. These restrictions result in 155 transactions.

Similar to previous studies, matching M&A observations with relevant ESG scores for both involved parties substantially reduces the sample size due to data availability (Aktas et al., 2011; Deng et al., 2013; Tampakoudis & Anagnostopoulou, 2020). Thus, caution should be taken as a smaller sample size may limit the generalizability of the findings. Notably, the matching process highlights the absence of ESG disclosures and corresponding ratings for private firms as merely 2 of the 155 observations were non-listed targets (1.29%). Hence, the availability of ESG data is skewed towards publicly listed firms. Consequently, private targets were dropped as the nature of such deals differ from those of public acquisitions, potentially introducing a bias to abnormal returns (Faccio et al., 2006). Likewise, the reliability of the ESG ratings for the two private targets was questionable as the data points were outliers, hence could bias the scope of the investigation. Following the selection criteria and matching process reported in *Table 2*, 153 M&A deals were identified involving 288 unique firms.

Table 2: Sampling procedure

Criteria	**Number of deals**
Announcement date: 01/01/2013-31/12/2021	485,205
Acquiror and target nation: United States	95,771
Acquiror status: Public	83,930
Deal status: Completed, Unconditional	17,027
Acquiror control pre-announcement: <50%	16,867
Acquiror control post-transaction: 100%	14,902
Deal size: >$1 million USD	7,738
Exclude: Financial sector (SIC 60-67)	6,117
ESG data: Acquiror and target	172
Financial data: Acquiror and target	161
Exclude: Internal transactions and overlapping events	155
Total	153

This table demonstrates the Refinitiv output report and corresponding number of deals.

3.2 Variable definitions

3.2.1 Dependent and independent variables

To address the research questions of the paper, the acquiring firm's abnormal return over the event windows represents the dependent variables. The abnormal returns are measured by short-term cumulative abnormal returns (CAR), in accordance with the event study procedure by MacKinlay (1997). A thorough explanation of CAR and the methodology is found in *Chapter 4.1*.

The total ESG score and individual pillar scores of the acquiror and target firm constitute the independent variables in this study. Refinitiv (2021) provides a definite ESG score after the end of each fiscal year, hence the most relevant performance score prior to the M&A is applied to the firm. Moreover, dummy variables are constructed to distinguish bids where the target firm possesses higher scores than the acquiror prior to the transaction, representing superior performance. Similarly, dummies are applied to acquirors operating in environmental and socially sensitive sectors, in spite of constructing interaction terms. The table below presents the full list of the dependent and independent variables applied in this study (*Table 3*).

In order to investigate the effects of sensitive sectors, acquiring firms were separated by risk profiles, whereby ESG practices pose a greater threat to the firm's operations and profitability (Giese et al., 2021). Sectoral ESG risks were derived from S&P Global Corporate Sustainability Assessment (CSA), reflecting analysts' assessments on future risks and opportunities for a wide range of industries (Wilkins et al., 2019). S&P Global CSA has become a reference tool for companies and investors to evaluate sustainability performance, serving as the underlying benchmark for several sustainability indices in the United States. Accordingly, CSA tops global rankings in terms of value and use for global considerations with respect to ESG metrics (Stein et al., 2022). The sectoral ratings rate environmental and social exposures on a scale of 1 to 6, with a score closer to 1 (6) representing relatively low (high) sector risk. For example, the oil and gas sector (SIC codes 1300-1389) scores 6 and 5 for environmental and social risk, respectively. Hence, acquirors are separated by sectors with a risk rating greater than 4, resulting in dummy variables for sector sensitivity with respect to the related ESG risk. A list of sensitive sectors and the number of corresponding acquirors in the sample can be found in *Appendix 3*.

Table 3: List of dependent and independent variables

Variable	Symbol	Definition
Dependent		
Acquiror CAR (-1,1)	CAR [-1,1]	Acquiring firm's cumulative abnormal return over a three-day event window
Acquiror CAR (-5,5)	CAR [-5,5]	Acquiring firm's cumulative abnormal return over an eleven-day event window
Acquiror CAR (-10,10)	CAR [-10,10]	Acquiring firm's cumulative abnormal return over a twenty one-day event window
Independent		
Acquiror (Target) E score	A(T)_Env	Acquiring (Target) firm's Environmental score
Acquiror (Target) S score	A(T)_Soc	Acquiring (Target) firm's Social score
Acquiror (Target) G score	A(T)_Gov	Acquiring (Target) firm's Governance score
Acquiror (Target) ESG score	A(T)_ESG	Acquiring (Target) firm's total ESG score
Acquiror E sensitive sector	E_Sensitive	Dummy for Acquiring firm if operating in an environmentally sensitive sector
Acquiror S sensitive sector	S_Sensitive	Dummy for Acquiring firm if operating in a socially sensitive sector
Superior E score	T>A_Env	Dummy if Target possesses a higher Environmental score than the Acquiror
Superior S score	T>A_Soc	Dummy if Target possesses a higher Social score than the Acquiror
Superior G score	T>A_Gov	Dummy if Target possesses a higher Governance score than the Acquiror
Superior ESG score	T>A_ESG	Dummy if Target possesses a higher total ESG score than the Acquiror

This table defines the variables of interest and the corresponding abbreviated symbol employed in the models. A and T denote the acquiror and target firm, respectively.

3.2.2 Control variables

In examining M&A announcement returns, empirical evidence demonstrates the influence of various firm- and deal- characteristics. Hence, a set of variables are controlled for, following the convention in literature (*Table 1*). The considered firm-specific bidder and target attributes are firm size, leverage, Tobin's Q, and return on assets, motivated by Chen et al. (2022). The idiosyncratic characteristics are measured at the end of the most recent fiscal year prior to the announcement, similar to the ESG scores. Furthermore, the deal-specific control variables include deal value, relative deal size, method of payment, and the industry-relatedness of the deal. The full list of control variables, corresponding definitions, and the expected relationship with the dependent variable are presented in *Table 4*.

Loderer and Martin (1990) find that the target firm's size is negatively related to acquiror announcement returns due to the tendency of acquiring firms' to overestimate synergies and, subsequently overpaying for larger targets. Therefore, targets' size is expected to negatively influence CAR. Similarly, Moeller et al. (2004) demonstrate that larger acquirors pay higher premiums, hence destroying shareholder value due to a negative relationship between the size of acquiring firms and acquiror announcement returns. The abnormal return associated with acquisition announcements for small acquiror firms exceeds that of large firms by approximately 2%. Consequently, the size of both firms (target and acquiror) is expected to have a negative effect on the dependent variable, measured by the natural logarithm of the firm's total assets.

Furthermore, firm size represents an important control variable for endogeneity in the explanatory variables, i.e., ESG ratings. Drempetic et al. (2020) demonstrate a size bias in ESG performance,

whereby larger firms are likely to have greater ESG scores due to the expenditure of capital. The authors argue that larger firms devote more resources to ESG disclosures, hence receive better ratings for being more cooperative. On the contrary, Gregory (2022) concludes that a few outliers are driving the positive relationship between size and ESG scores, and the overall effect disappears and can even become negative when controlling for outliers and industries. Despite contrasting evidence, both studies depict a relationship between firm size and ESG performance. Thus, including firm size in the regression equation mitigates the relationship of a potential size bias in ESG scores.

Jensen (1989) argues that firms with excess free cash flows are more likely to engage in value-destroying deals due to managers engaging in empire-building behaviour. Therefore, higher levels of leverage reduce the ability to pursue such endeavours by reducing the degree of available free cash flows. Hence, acquiror leverage is expected to have a positive impact on acquiror abnormal returns. By contrast, a high leverage ratio is the primary cause of financial distress for firms (Andrade & Kaplan, 1998). Thus, a target's indebtedness is expected to have a negative effect on acquiror CAR. By contrast, Flannery and Rangan (2006) demonstrate that acquirors observe targets' capital structures, hence targets are identified in spite of moving towards a specific leverage ratio. Therefore, the effect of the target firm's leverage is subject to the acquiror's pre-transaction level and the obtained post-transaction leverage ratio. Hence, the direction of the influence of target's leverage on acquiror abnormal returns depends on the relation to the acquirors leverage and therefore is relatively ambiguous, although it is included in the analysis for control purposes. Following Chen et al. (2022), firm leverage is calculated for the acquiring and target firm by dividing the book value of debt by the market value of assets.

Tobins Q is defined as the ratio of the market value of assets over the book value of assets, reflecting the quality of a firm under existing management (Lang et al., 1989). Literature depicts conflicting evidence on the relationship with acquiror abnormal returns. Lang et al. (1989) find that CAR increases (decreases) with acquiror's (target's) Tobins Q, whereas Moeller et al. (2004) realize a negative relationship between acquiror's Tobins Q and abnormal returns. Despite ambiguous findings, Tobins Q is controlled for to ensure that results are not driven by management quality (Deng et al., 2013).

Andrade et al. (2001) demonstrate that pre-merger profitability significantly positively affects the post-merger operating performance. Thus, the authors argue that the effect is consistent with the combined wealth creation reflected in merger announcements. Similarly, Masulis et al. (2007) find a significant influence of pre-merger operating performance measured by ROA, whereby more profitable bidders generate greater announcement returns. Therefore, this study adopts ROA as a proxy for profitability to control for a positive effect on announcement returns, measured as the ratio of operating income before depreciation scaled by the book value of assets (Masulis et al., 2007; Chen et al., 2022). Similar to firm size, including a measure of profitability mitigates endogeneity in the ESG scores. Flammer

(2015) and Yu et al. (2018) find evidence supporting the notion that profitable firms are more transparent in ESG reporting due to the ability to devote more resources to the matter. Relatedly, ESG disclosures positively influence ESG ratings (Brooks & Oikonomou, 2018). Therefore, profitability is expected to be positively related to ESG ratings. Hence, the inclusion of ROA in the regression model removes any correlation between profitability and ESG scores.

Regarding the deal-specific control variables, deal size denotes the natural logarithm of the deal value, defined as the total value of the consideration paid by the bidder (Aktas et al., 2011). Similar to the notion of value destruction related to firm size, larger transaction values incur greater losses for acquiring companies due to tendencies of managerial overconfidence and overpaying (Loderer & Martin, 1990; Moeller et al., 2005). Hence, the absolute deal value is expected to have a negative effect on acquiror abnormal returns. However, the relationship changes when the size of the deals is normalized by the firm market value (Moeller et al., 2005). Thus, the relative deal value, calculated as the ratio of reported deal value over the acquiror's market value, is predicted to positively influence acquiror abnormal returns.

A consensus in literature is that the means of payments result in significantly different reactions to merger bids. Myers and Majluf (1984) argue that issuing equity signals managerial beliefs of overvalued stock. Hence, stock-financed mergers can be viewed as two simultaneous transactions, a merger and equity issue. Andrade et al. (2001) found takeovers financed with some degree of equity financing results in a three-day abnormal return of -1.5%, relative to 0.4% for acquirors who abstain from using equity. Thus, a dummy variable is constructed for solely cash bids, which is expected to have a positive effect on acquiror abnormal returns.

The final dummy variable renders industry relatedness. Evidence is inconclusive regarding the effect of diversifying deals, i.e., when the target and bidder are in dissimilar industries. Diversification can impede successful integration processes by acquiring assets that are unfit, hence destroying acquiror shareholder value (Morck et al., 1990). On the other hand, diversification can reduce firm risk and does not necessarily result in lower firm value due to acquiring targets at a "diversification discount" (Campa & Kedia, 2002). Thus, the predicted effect of industry relatedness is ambiguous. Lastly, the sample does not involve hostile bids, although controlled for, as hostility generally induces 3-5% lower announcement returns than its friendly counterpart (Goergen & Renneboog, 2004). In addition to the control variables, industry- and year- dummies are included to capture systematic differences such as macroeconomic characteristics that may influence CAR (Andrade et al., 2001). The dummies are employed to capture unobserved heterogeneities across entities which are otherwise caught by the error term, potentially causing biased results (Brooks, 2019). Thus, the influences of announcing an M&A deal in a particular industry or year are overcome by the inclusion of dummies.

Table 4: List of control variables

Variable	Symbol	Definition	Expected Sign
Firm-specific controls	*Firm controls*		
Firm size	A(T)_Size	Natural logarithm of the firms' total assets	-
Leverage	A(T)_Lev	Ratio of book value of debt and market value of assets	+ (?)
Tobins Q	A(T)_Tobin	Ratio of market value of assets over book value of assets	?
Return on assets	A(T)_ROA	Ratio of operating income before depreciation scaled by the book value of assets	+
Deal-specific controls	*Deal controls*		
Deal value	Deal value	Natural logarithm of the total consideration paid, excluding fees and expenses	-
Relative deal value	Relative deal	Reported deal value over acquiror market value	+
Cash	Cash	Dummy if Acquiror pays purely with cash	+
Industry relatedness	Related	Dummy if Acquiror and Target are in related industries (same two-digit SIC)	?
Fixed effects	*Fixed effects*		
Industry dummies	Industry	Dummy for Acquiror macro-industry (two-digit SIC)	
Year dummies	Year	Dummy for Acquiror announcement year	

This table defines the control variables, the corresponding abbreviated symbol employed in the models, and the expected sign of the coefficients. A and T denote the acquiring and target firm, respectively.

3.3 Descriptive statistics and correlations

Table 5 depicts the sample distribution by announcement year and acquiror industry. The number of deals increases more or less monotonically until 2019, before declining upon the onset of the Covid-19 pandemic and rebounding thereafter. The majority of sample deals are concentrated in the most recent years (i.e., 69.93% of the deals were announced during 2018-2021), emphasizing the trend of increased ESG reporting by firms. Furthermore, most acquirors operate in the manufacturing (43.14%) and services (19.61%) industry, although the quantity of deals is widely distributed across the years.

Table 5: Sample distribution by announcement year and acquiror industry

Year	Mining and Construction (10-17)	Manufacturing (20-39)	Transportation, Communications, Electricity, Gas (40-49)	Wholesale and Retail Trade (50-59)	Services (70-89)	Total	Proportion
2013	0	1	1	1	1	4	2.61%
2014	0	2	1	1	1	5	3.27%
2015	0	4	1	0	0	5	3.27%
2016	0	8	2	3	2	15	9.80%
2017	0	8	1	3	5	17	11.11%
2018	4	14	4	3	5	30	19.61%
2019	6	8	2	5	7	28	18.30%
2020	6	9	2	2	1	20	13.07%
2021	2	12	1	6	8	29	18.95%
Total	18	66	15	24	30	153	100.00%
Proportion	11.76%	43.14%	9.80%	15.69%	19.61%	100.00%	

This table displays the final sample of acquiring firms by year and industry classification using the respective 2-digit Primary Standard Industrial Classification (SIC) code.

A summary of the descriptive statistics of the variables used in the study is shown in *Table 6*. The continuous variables (cumulative abnormal returns) are winsorized at the top and bottom 1% level to minimize the influence of extreme outliers. Hence, such observations are replaced by the 1st and 99th percentile values to reduce the effect of possibly spurious outliers. This is common practice when dealing with stock returns (CAR), as just a few extreme outlier observations can bias inferences (Leone et al., 2019). Notably, most other variables are de-trended by computing the natural logarithm or a ratio to avoid misspecification in the models and spurious regressions (Brooks, 2019).

Panel A of *Table 6* demonstrates that the mean acquiror cumulative abnormal return is mildly negative, ranging from -1.4% to -2.1% in the three-day and twenty-one-day event window, respectively. Hence, evidence supports the notion of value destruction for acquiror shareholders surrounding M&A deals. Similar to Campa and Hernando (2004), CARs are widely dispersed across all three windows, depicted by the minimum and maximum values. Moreover, the magnitude of the announcement returns drift as the event window is extended, as the minimum (maximum) CAR in the three-day window is -12.12% (9.10%) compared to -18.42% (15.91%) over the twenty-one-day window. Similarly, the standard deviation increases with longer event windows, suggesting additional noise in acquiror stock market prices (Massa & Xu, 2013).

Additionally, the cumulative abnormal returns experience a non-normal distribution indicated by the skewness and kurtosis values different from 0 and 3, respectively. The skewness varies from slightly negatively skewed in the three-day event window to positively skewed in the eleven and twenty-one-day windows. Hence, the former (latter) indicate that negative (positive) returns are more pronounced than their counterpart. Moreover, the kurtosis values less than 3 imply that the peak is lower, and the tails are thinner than that of normal distribution, suggesting fewer probability of extreme abnormal returns (Brooks, 2019). This finding could be a result of the winsorization process by removing extreme values. With respect to the explanatory variables, the ESG scores for acquiring firms are higher than those for target firms across all pillars. Acquirors possess a mean (median) total ESG score of 62.353 (65.431), whereas the corresponding score for targets was 35.134 (32.785), supporting the notion of a size bias in ESG performance as the acquirors in the sample are larger (Drempetic et al., 2020). Furthermore, 13.73% of all targets possess greater total ESG scores than the acquiror at the time of bid offer, and 29.40% (52.30%) of acquirors are identified to operate in environmentally (socially) sensitive sectors.

Panel B of *Table 6* reports the descriptive statistics for the control variables. Not surprisingly, acquirors are larger in size (log) and more profitable (ROA) than target firms. The mean debt ratio of 33.1% and 30.9% for acquirors and targets, respectively, indicates a relatively healthy financial position for the

sampled firms (Krishnamurti et al., 2019). Moreover, targets, on average, possess slightly higher Tobin's Q, suggesting relatively higher market valuations, possibly due to greater growth prospects.

As for deal characteristics, the deal values range from 3.853 to 11.282 (log), and the bids amounted to 36.71% of the acquirors market value on average as depicted by the relative deal size. Additionally, 37.33% of the deals were solely cash-based offers and the majority of bids, 83.01%, were in related industries, i.e., horizontal M&As.

Table 6: Descriptive statistics

Variable	n	Mean	Std.	Min.	Median	Max.	Skewness	Kurtosis
Panel A:								
Dependent								
CAR -1,1	153	-0.014	0.054	-0.121	-0.012	0.091	-0.072	2.735
CAR -5,5	153	-0.016	0.075	-0.158	-0.019	0.135	0.123	2.660
CAR -10,10	153	-0.021	0.085	-0.184	-0.021	0.159	0.039	2.809
Independent								
A_Env	153	57.083	23.836	14.960	61.430	90.480	-0.274	1.779
A_Soc	153	66.993	21.879	23.801	71.353	96.220	-0.448	2.019
A_Gov	153	71.129	19.006	24.725	76.589	93.561	-1.042	3.313
A_ESG	153	62.353	19.267	28.525	65.431	89.155	-0.333	1.832
E_Sensitive	153	0.294	0.457	0.000	0.000	1.000	0.527	1.278
S_Sensitive	153	0.523	0.501	0.000	1.000	1.000	-0.197	1.039
T_Env	153	28.947	18.531	3.377	26.463	70.295	0.544	2.486
T_Soc	153	40.729	18.589	14.168	37.754	78.373	0.406	2.243
T_Gov	153	46.974	23.499	6.585	49.981	84.872	-0.110	1.860
T_ESG	153	35.134	16.614	10.411	32.785	69.549	0.510	2.403
T>A_Env	153	0.150	0.359	0.000	0.000	1.000	1.957	4.829
T>A_Soc	153	0.137	0.345	0.000	0.000	1.000	2.108	5.445
T>A_Gov	153	0.196	0.398	0.000	0.000	1.000	1.531	3.344
T>A_ESG	153	0.137	0.345	0.000	0.000	1.000	2.108	5.445
Panel B:								
Firm controls								
A_Size	153	9.338	1.605	5.811	9.259	12.907	0.109	2.364
A_Lev	153	0.331	0.150	0.046	0.320	0.583	-0.091	2.204
A_Tobin	153	1.806	1.375	0.427	1.476	5.834	1.694	5.386
A_ROA	153	0.055	0.061	-0.093	0.055	0.166	-0.541	3.446
T_Size	153	7.466	1.507	3.042	7.553	11.094	-0.206	2.917
T_Lev	153	0.309	0.223	0.000	0.308	0.787	0.234	2.302
T_Tobin	153	1.897	1.730	0.253	1.214	6.594	1.405	4.043
T_ROA	153	-0.020	0.152	-0.435	0.022	0.180	-1.482	4.630
Deal controls								
Deal value	153	8.100	1.334	3.853	7.869	11.282	-0.084	2.872
Relative deal	153	0.367	0.324	0.014	0.287	1.115	0.933	2.896
Cash	153	0.373	0.485	0.000	0.000	1.000	0.527	1.278
Related	153	0.830	0.377	0.000	1.000	1.000	-1.758	4.089

This table reports the descriptive statistics (mean, standard deviation, minimum, median, maximum, skewness, and kurtosis) of the variables employed in the study.

Table 7 depicts the Pearson correlation coefficients for all variables used in the study. The value lies in the interval -1 and +1, indicating the strength of the linear relationship between the two variables. If the

correlation exceeds +0.7 or -0.7, caution should be taken as the series move closely together and may cause multicollinearity, reducing the robustness of the findings (Brooks, 2019). Accordingly, such correlations are highlighted in bold in the table and will be treated cautiously. Unsurprisingly, the CARs possess significantly highly positive correlations, as the longer windows incorporate the shorter windows. However, the dependent variables are treated separately, thus do not pose a threat to the validity of the model. Moreover, the E, S, and G pillar scores for acquirors and targets are positively correlated with their total ESG score, plausibly due to the fact that the overall score is merely a linear combination of the pillars. Therefore, the firm's pillars and the overall score must be separated in the regression models to avoid multicollinearity. Additionally, target size (log) and deal value (log) are significantly positively correlated (0.703), suggesting that the value of total consideration offered increases with the size of the target firm. As a result, the latter will be dropped to avoid multicollinearity.

Most other correlations do not indicate any serious problems with the models, although there are instances of modest collinearity (exceeding +0.5 or -0.5). Notably, the dummy variables for superior target ESG performance with respect to the pillars are significantly mildly positively correlated with one another. Hence, when the target outperforms the acquiror in one dimension, it commonly outperforms in other dimensions. Furthermore, there is a significantly positive correlation between acquiror and target's ESG scores, suggesting firms with similar CSR policies are more likely to merge (Bereskin et al., 2018).

Table 7: Pearson correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) CAR -1,1	1.000													
(2) CAR -5,5	**0.751*** **	1.000												
(3) CAR -10,10	0.583***	**0.812*** **	1.000											
(4) A_Env	0.017	0.034	-0.038	1.000										
(5) A_Soc	0.031	0.018	-0.037	0.607***	1.000									
(6) A_Gov	-0.227**	-0.149*	-0.138*	0.581***	0.600***	1.000								
(7) A_ESG	-0.010	0.009	-0.057	**0.863*** **	**0.927*** **	**0.771*** **	1.000							
(8) E_Sensitive	-0.096	0.015	0.058	0.094	-0.004	0.174**	0.076	1.000						
(9) S_Sensitive	0.060	0.099	0.114	-0.084	-0.104	-0.084	-0.094	0.427***	1.000					
(10) T_Env	0.012	-0.017	-0.031	0.172**	0.182**	0.143*	0.159**	-0.043	-0.124	1.000				
(11) T_Soc	0.122	0.058	0.014	0.229***	0.292***	0.132	0.227***	-0.161**	-0.156*	0.566***	1.000			
(12) T_Gov	-0.054	-0.098	-0.057	0.129	0.149*	0.171**	0.154*	0.024	-0.140*	0.513***	0.486***	1.000		
(13) T_ESG	0.033	-0.012	-0.027	0.251***	0.291***	0.190**	0.261***	-0.047	-0.113	**0.705*** **	**0.846*** **	**0.791*** **	1.000	
(14) T>A_Env	0.015	-0.043	-0.053	-0.480***	-0.297***	-0.250***	-0.340***	-0.135*	-0.060	0.417***	0.132	0.129	0.175**	1.000
(15) T>A_Soc	0.197**	0.167**	0.125	-0.372***	-0.390***	-0.323***	-0.421***	-0.111	-0.097	0.207**	0.384***	0.103	0.252***	0.364***
(16) T>A_Gov	0.212***	0.065	0.097	-0.340***	-0.256***	-0.525***	-0.390***	-0.142*	-0.082	0.133*	0.206***	0.426***	0.290***	0.253***
(17) T>A_ESG	0.118	-0.045	-0.006	-0.410***	-0.420***	-0.484***	-0.490***	-0.072	-0.097	0.218***	0.240***	0.218***	0.236***	0.470***
(18) A_Size	0.114	0.139*	0.091	0.538***	0.584***	0.365***	0.601***	-0.012	-0.024	0.192**	0.248***	0.061	0.235***	-0.238***
(19) A_Lev	0.009	0.009	0.008	0.035	0.062	0.009	0.043	-0.076	-0.164**	-0.096	-0.010	-0.031	-0.058	0.033
(20) A_Tobin	0.045	-0.042	-0.106	-0.013	0.114	-0.003	0.064	-0.195**	0.057	0.133	0.115	-0.028	0.077	0.137*
(21) A_ROA	-0.030	0.028	-0.079	0.239***	0.187**	0.249***	0.240***	-0.063	-0.086	0.021	0.025	-0.011	0.054	-0.100
(22) T_Size	-0.151*	-0.046	-0.009	0.292***	0.183***	0.273***	0.247***	0.108	0.029	0.265***	0.365***	0.236***	0.404	-0.073
(23) T_Lev	-0.138*	-0.165**	-0.118	0.035	-0.023	0.135*	0.070	-0.074	-0.130	0.014	0.085	0.021	0.076	0.048
(24) T_Tobin	0.069	0.017	-0.050	0.116	0.235***	-0.018	0.132	-0.128	-0.049	0.069	0.014	-0.089	-0.055	-0.019
(25) T_ROA	-0.174**	-0.072	-0.054	-0.038	-0.115	0.047	-0.053	0.110	0.085	-0.049	-0.018	0.026	0.058	-0.034
(26) Deal value	-0.073	-0.033	-0.061	0.422***	0.398***	0.322***	0.415***	-0.025	-0.054	0.355***	0.478***	0.222***	0.457***	-0.079
(27) Relative deal	-0.205**	-0.160**	-0.073	-0.277***	-0.314***	-0.146*	-0.337***	0.042	-0.033	0.053	0.087	0.088	0.086	0.089
(28) Cash	0.211***	0.124	0.040	0.169**	0.239***	-0.010	0.178**	-0.007	-0.035	0.061	0.039	-0.010	0.024	0.016
(29) Related	0.134*	0.087	0.108	0.164**	0.115	0.110	0.124	0.169**	0.010	0.000	0.090	0.079	0.102	-0.102

	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
(15)	1.000														
(16)	0.329***	1.000													
(17)	0.558***	0.568***	1.000												
(18)	-0.121	-0.216***	-0.142*	1.000											
(19)	0.104	0.078	0.053	0.051	1.000										
(20)	-0.114	-0.012	-0.113	-0.139*	-0.192**	1.000									
(21)	-0.065	-0.193**	-0.153*	0.130	-0.050	0.206**	1.000								
(22)	0.069	-0.085	0.028	0.341***	0.014	-0.145*	0.065	1.000							
(23)	0.184**	-0.110	0.042	0.000	0.195**	-0.232***	0.049	0.319***	1.000						
(24)	-0.153*	-0.023	-0.118	0.157*	-0.039	0.380***	0.023	-0.474***	-0.477***	1.000					
(25)	0.052	-0.140*	-0.053	-0.105	-0.064	0.022	0.120	0.445***	0.176**	-0.332***	1.000				
(26)	0.016	-0.075	-0.006	0.527***	-0.038	0.176**	0.218***	**0.703***	0.004	0.172**	0.232***	1.000			
(27)	0.231***	0.191**	0.212***	-0.494***	0.040	-0.194**	-0.048	0.317***	0.132	-0.261***	0.237***	0.154*	1.000		
(28)	0.007	0.028	0.086	0.310***	0.026	0.181**	0.361***	-0.284***	-0.297***	0.294***	-0.205**	0.002	-0.446***	1.000	
(29)	-0.022	-0.040	-0.022	0.118	0.089	-0.126	-0.117	0.033	0.025	-0.003	-0.126	0.099	0.046	0.025	1.000

This table reports the calculated correlations between all of the variables employed in the study. The Pearson coefficients are tested for significance and the values in bold indicate caution. The asterisks *, **, *** denotes a p-value less than 0.10, 0.05, 0.01, respectively.

Chapter 4 Methodology

This chapter presents the research methodology applied to address the research questions and hypotheses of the paper. Initially, the event study procedure is explained, motivated by MacKinlay (1997). Thereafter, the empirical models are specified and related to the hypotheses, resulting in the coefficients of interest. Finally, statistical tests are performed for each model to ensure a robust model specification.

4.1 Event study

The data consists of 153 separate events involving 288 different firms, whereby each observation is attributed an estimation window and event window. The impact of the M&A announcement is measured using acquiring firms' stock price data over short-horizon event windows. Thus, an underlying assumption involves market efficiency, i.e., that security prices should immediately reflect the newly available information (Fama, 1970). Thus, emphasizing the importance of rational and liquid stock markets, supporting the notion of merely including acquirors in the United States (Massa & Xu, 2013). The event study renders comparing the actual realized returns on the occurrence of the announcement with the expected returns in the absence of the event (Brown & Warner, 1980). Hence, any difference results in abnormal returns, serving as a proxy for expected value creation (Andrade et al., 2001).

The initial task involves defining the event of interest and the corresponding period under examination, i.e., the event window. The date of the M&A announcement represents the event day, denoted t_0. Thereafter, researchers have a discretionary choice when deciding the length of the window, spanning from t_1 (pre-announcement) to t_2 (post-announcement), as it is customary to include a minimum of one day post-event to capture any effects occurring after market closing (MacKinlay, 1997). Following an analysis of various event study methods, Kothari and Warner (2007) conclude that short-horizon tests are most effective in detecting abnormal performance. Errors in abnormal performance due to incorrect risk adjustment are mitigated relative to long-horizon (monthly or yearly) tests. Additionally, longer tests are highly susceptible to joint-test problems and have relatively low explanatory power, impeding economic interpretations hence inferences "require extreme caution". Likewise, Andrade et al. (2001) argue that shorter event windows are the most statistically reliable methods to gauge the value implications of M&A announcements, whereby a three-day window is commonly used, i.e., including one day before and after the announcement denoted [-1, 1].

Motivated by their findings, this analysis adopts three different event windows, including a three-day, eleven-day, and twenty-one-day event window. For example, the eleven-day window involves five trading days prior to the announcement (t_1) and five trading days post-announcement (t_2), denoted as [-5, 5]. Similar to previous studies (*Table 1*), a three- and eleven-day event window is adopted.

Additionally, a longer event window in an attempt to account for market inefficiencies by relaxing the assumption of perfectly efficient markets, particularly as markets do not fully value the benefits of sustainability practices immediately (Deng et al., 2013). Consequently, potential information leakages prior to the announcement and/or delayed price corrections post-announcement are captured. As a result, three event windows are investigated, abbreviated [-1, 1], [-5, 5], and [-10, 10].

In order to measure abnormal performance surrounding the event window, the 'normal' or 'expected' performance in the absence of the event must be specified. Similar to previous studies, the market model is adopted using 200 trading days prior to the event (*Table 1*). Brown and Warner (1980) conclude that simple risk-adjustment approaches such as the market model are powerful in detecting abnormal performance relative to more sophisticated models, particularly for shorter tests utilizing daily data whereby incomplete descriptions of asset pricing are less of a concern.

The market return is derived from Kenneth French Data Library (2022), whereby the applied benchmark represents a value-weighted return of the Nasdaq, NYSE, and AMEX indices, covering the entire sample of acquirors as 35% and 65% were listed on the NYSE and Nasdaq, respectively. Thus, the portion of returns related to market variations is removed, improving the explanatory power of the model relative to the constant mean return model (MacKinlay, 1997). As a result, expected returns were estimated as following:

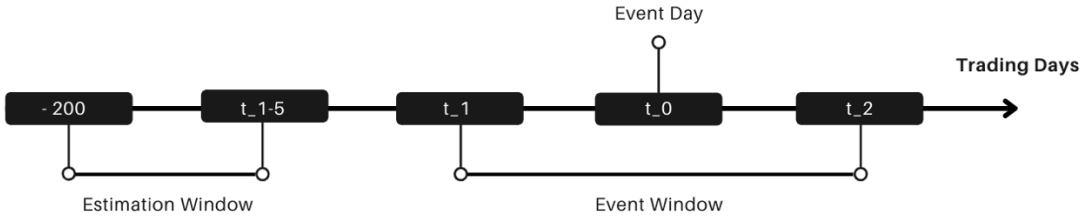
$$E(R_{it}) = \hat{a} + \hat{\beta} R_{mt} + \varepsilon_{it} \qquad (1)$$

Where $E(R_{it})$ and R_{mt} denotes the daily expected return of firm *i* and the market portfolio *m* on trading day *t*, respectively, and ε_{it} exhibits the error term. The alpha ($\hat{a}$) and beta ($\hat{\beta}$) coefficients are parameters of the market model, representing the intercept and the systematic risk of the security, respectively. Notably, the returns are expressed in nominal terms as opposed to excess or real returns, which are commonly applied when utilizing weekly or monthly data. Furthermore, an underlying assumption of the model's linear specification is joint normality of asset returns (MacKinlay, 1997). Although evidence exists surrounding the non-normality of daily return data, it has "no obvious impact on event studies" as OLS market model methodologies are well-specified in terms of statistical significance (Brown & Warner, 1985).

Consequently, the expected return of each acquiror was estimated by employing the market model over 200 trading days prior to the event day and ending 5 days prior to t_1, hence excluding the event window to prevent any confounding influences on the normal performance (MacKinlay, 1997). As a result, the estimation window renders [-200, $t_{1\text{-}5}$]. Accordingly, the length of the estimation window of almost one

full trading year is assumed to be sufficient to obtain precise estimates. Importantly, any overlapping observations by serial acquirors were excluded in the sampling procedure as the estimation window should not include another event (M&A announcement). The entire timeline of the event study is depicted in *Figure 1*.

Figure 1: Timeline event study



This figure provides a visual of the estimation window and event window applied in the event study. The estimation window starts 200 trading days prior to the event day (t_0) and ends 5 trading days prior to the start of the event window (t_1). The event window incorporates the event day (t_0), ranging from t_1 to t_2.

Subsequent to obtaining the expected returns estimated by equation 1, abnormal returns were calculated as following:

$$AR_{it} = R_{it} - E(R_{it}) \qquad (2)$$

Where AR_{it} represents the abnormal return determined by the difference between the actual realized return (R_{it}) and the expected return ($E(R_{it})$), for firm *i* on trading day *t*.

As single event observations are relatively uninformative due to variation in returns across the days within the event window, the abnormal returns for each security are aggregated over the event window to facilitate overall inferences (MacKinlay, 1997). Consequently, each daily abnormal return over the event window is summed to derive the firm-specific cumulative abnormal return for each acquiror,

$$CAR(t_1, t_2)_{it} = \sum_{t_1}^{t_2} AR_{it} \qquad (3)$$

The CAR_i denotes the cumulative abnormal returns for firm *i* over the event window t_1 to t_2, derived by the summation of abnormal returns (AR_{it}) from equation 2. As a result, CAR_{it} represents the dependent variable of interest, reflecting the unanticipated security holder wealth changes around the event window (Brown & Warner, 1980). An underlying assumption of the dependent variable is that each event is independently distributed and does not overlap across securities i.e., the abnormal returns across securities are uncorrelated. If the measures of abnormal returns in the cross-section of firms are

independent and identically distributed, the distribution of the average abnormal return measure converges to normality as the sample size increases, supported by the central limit theorem. Thus, normal distribution suggests that the test statistic follows a Student's *t*-distribution (Barber & Lyon, 1997). As a result, the significance of CAR_{iT} is determined as follows:

$$t_{CAR_{it}} = \frac{CAR_{it}}{S.E._{it}} \qquad (4)$$

Where CAR_{it} is derived from equation 3 and the denominator denotes the associated standard deviations of abnormal returns during the event window.

4.2 Model specifications

The cumulative abnormal return and its corresponding t-statistic is utilized to test the hypotheses, depicted by equation 3 and 4, respectively. The dependent variable represents three event windows [-1,1; -5,5; -10,10], depicting three separate OLS regressions for each model.

4.2.1 Overall scores

To test the first hypothesis that acquiring firms ESG performance positively influence cumulative abnormal returns, the acquiror's total ESG score is regressed onto the announcement return over the event window:

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 A_{ESG\,it} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \qquad (5)$$

Where $CAR(t_1, t_2)_{it}$ depicts the cumulative abnormal return over the event window for deal *i* at announcement date *t*, alpha ($\hat{a}$) denotes the intercept, $A_{ESG\,it}$ represents the bidding firm's total ESG score, *Firm controls*$_{it}$ render the acquiring- and target- firm's size, leverage, Tobin's Q, and ROA. *Deal controls*$_{it}$ includes the relative deal value, solely cash bids, and industry relatedness. Hence, the total consideration paid (deal value in logs) is excluded due to significantly high correlation with the target firm's size (*Table 7*). Additionally, dummies are included to account for variation amongst industries (*Industry*) and years (*Year*). Finally, ε_{it} incorporates the error term. Previous studies have depicted a positive relationship between acquiror ESG performance and acquiror abnormal returns, hence $\hat{\beta}_1$ is expected to be positive following a one-sided t-test (Aktas et al., 2011; Deng et al., 2013; Krishnamurti et al., 2019; Zhang et al., 2022).

Furthermore, the second hypothesis predicts target firms ESG performance positively influencing acquiror abnormal returns. The prediction is tested by replacing the acquiring firm's ESG score from the previous model with the target's score:

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 T_{ESG\,it} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \qquad (6)$$

Where $T_{ESG\,it}$ represents the target firm's total ESG score for deal *i* at announcement date *t*, and the rest of the model is interpreted in the same manner as above. Previous studies demonstrate that improved sustainability practices by target firms increase the likelihood of deal completion, arising synergies, and long-term performance, as well as providing potential intangible assets that accrue to acquirors (Tampakoudis & Anagnostopoulou, 2020; Feng, 2021). As a result, the second hypothesis expects $\hat{\beta}_1$ to be positively related to acquiror CAR_{it}, upon a one-sided t-test.

The third hypothesis predicts acquisitions of target firms with superior ESG performance to positively influence acquiror abnormal returns, as Chen et al. (2022) find that markets reward acquirors when undertaking ESG-oriented investments. To test for this effect, a dummy variable is constructed for target's possessing superior ESG performance relative to the acquiror, with the reference group of a target with an inferior score at the time of the bid. The equation below depicts the regression equation:

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 T > A_{ESG\,it} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \qquad (7)$$

Where $T > A_{ESG\,it}$ represents the dummy variable for targets with superior total ESG scores relative to the acquiring firm for deal *i* at time *t*, and the remaining variables are interpreted as previously. Consequently, hypothesis 3 predicts $\hat{\beta}_1$ to positively influence acquiror cumulative abnormal returns following a one-sided t-test.

4.2.2 Pillar scores

The second set of regression models capture different perspectives on the effect of ESG on M&A by disaggregating the overall ESG score by its' individual pillars, hence providing insight into what information is valued by investors (Barros et al., 2022). Accordingly, the ESG variable of the previous models is replaced by pillar scores whilst excluding the total ESG score due to multicollinearity. Thus, the models are constructed by employing the E (*Env*), S (*Soc*), and G (*Gov*) scores of the acquiror and target firm. Consequently, the reasoning of the aforementioned hypotheses is extended to the application of pillar scores.

The fourth hypothesis ($H_{4A,B,C}$) predicts the governance pillar to positively influence acquiror abnormal returns as improved governance generates shareholder value (Clarks & Viehs, 2014). By contrast, the effects of E- and S- performance are not captured when grouping all of the abnormal returns due to sectoral differences. The hypothesis are investigated by applying the models below:

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 A_{Env_{it}} + \hat{\beta}_2 A_{Soc_{it}} + \hat{\beta}_3 A_{Gov_{it}} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \quad (8)$$

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 T_{Env_{it}} + \hat{\beta}_2 T_{Soc_{it}} + \hat{\beta}_3 T_{Gov_{it}} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \quad (9)$$

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 T > A_{Env_{it}} + \hat{\beta}_2 T > A_{Soc_{it}} + \hat{\beta}_3 T > A_{Gov_{it}} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \quad (10)$$

Where $A(T)_{Env_{it}}$, $A(T)_{Soc_{it}}$, and $A(T)_{Gov_{it}}$ denote the acquiring (target) firm's environmental, social, and governance performance for deal *i* at announcement date *t*, respectively in equations 8 and 9. Additionally, the $T > A_{jit}$ notation in equation 10 represents a dummy if the target possesses superior performance relative to the acquiror with respect to the ESG dimension (*j*), whereby the reference group represents a target firm with an inferior pillar score. The remaining variables control variables and fixed effects are perceived as in the previous models.

Hypothesis 4 renders the firm's governance (*Gov*) score to positively influence acquiror cumulative abnormal returns as it has the most significant financial impact across all sectors (Giese et al., 2021). Hence, one-sided t-tests are performed, where hypothesis 4A predicts positive estimates of $\hat{\beta}_3$ in equation 8. Similarly, hypothesis 4B predicts targets governance score, $\hat{\beta}_3$, to positively influence cumulative abnormal returns in equation 9. Likewise, hypothesis 4C predicts that a superior governance performance ($\hat{\beta}_3$) positively influence the dependent variable in equation 10.

In light of sectoral differences in the effects of environmental and social dimensions of the ESG score, the final set of models tests the fifth hypothesis by dividing the sample by sector sensitivity. Thus, dummy variables are applied to acquirors identified to operate in environmentally (*E_Sensitive*) or socially (*S_Sensitive*) sensitive sectors, with the reference group consisting of relatively insensitive acquirors. Consequently, interaction terms are created by combining the firm's environmental and social pillar score with the dummy for sensitive sectors:

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 A_{Env_{it}} + \hat{\beta}_2 A_{Soc_{it}} + \hat{\beta}_3 A_{Gov_{it}} + \hat{\beta}_4 A_{Env} * E\_Sensitive_{it} + \hat{\beta}_5 A_{Soc} * S\_Sensitive_{it} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \quad (11)$$

Where $A_{Env} * E\_Sensitive_{it}$ and $A_{Soc} * S\_Sensitive_{it}$ represents the acquiring firm's environmental and social scores when operating in an environmentally or socially sensitive sector for deal *i* at announcement date *t*, respectively. The remaining variables represent the firm and deal controls as well as the industry and year dummies previously explained, accommodated by the error term (ε_{it}). The acquiring firm's pillar scores are then replaced by that of the target, following a similar interpretation:

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 T_{Env_{it}} + \hat{\beta}_2 T_{Soc_{it}} + \hat{\beta}_3 T_{Gov_{it}} + \hat{\beta}_4 T_{Env} * E\_Sensitive_{it} + \hat{\beta}_5 T_{Soc} * S\_Sensitive_{it} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \quad (12)$$

Where $T_{Env} * E\_Sensitive_{it}$ and $T_{Soc} * S\_Sensitive_{it}$ represents the target firm's environmental and social performance when the acquiror operates in an environmentally or socially sensitive sector, respectively. Firm performance in environmental (*Env*) and social (*Soc*) dimensions of ESG are more pronounced in sectors that require such risk management due to greater exposures, whereby tangible events have a direct impact on profitability (Torre et al., 2020; Giese et al., 2021). Therefore, shareholders are expected to value sustainable initiatives more in sectors where such measures influence profitability and risk, compared to relatively insensitive sectors. Hypothesis 5A predicts that the acquiror's environmental (social) performance in sensitive sectors, depicted by $\hat{\beta}_4$ ($\hat{\beta}_5$) in equation 11, to positively influences acquiror announcement returns following one-sided t-tests. A similar prediction for hypothesis 5B concerns the target's environmental (social) scores, $\hat{\beta}_4$ ($\hat{\beta}_5$) in equation 12.

The final model extends equation 10 concerning superior performance by applying the sensitive sector dummies to the model. Therefore, interaction terms between two binary variables are constructed by combining target's superior pillar performance with acquiror's operating in an environmentally or socially sensitive sectors:

$$CAR(t_1, t_2)_{it} = \hat{\alpha}_0 + \hat{\beta}_1 T > A_{Env_{it}} + \hat{\beta}_2 T > A_{Soc_{it}} + \hat{\beta}_3 T > A_{Gov_{it}} + \hat{\beta}_4 T > A_{Env} * E\_Sensitive_{it} + \hat{\beta}_5 T > A_{Soc} * S\_Sensitive_{it} + \hat{\beta}_i Firm\ controls_{it} + \hat{\beta}_i Deal\ controls_{it} + Industry + Year + \varepsilon_{it} \quad (13)$$

Where $T > A_{Env} * E\_Sensitive_{it}$ and $T > A_{Soc} * S\_Sensitive_{it}$ represent deals for targets possessing superior environmental or social pillar scores for deal *i* at the time of the bid *t* and the acquiror operates

in an environmentally or socially sensitive sector, respectively. Consequently, the reference group of an acquisition for a firm with inferior performance in a relatively insensitive sector. The remainder of the model is interpreted as before. In light of markets rewarding ESG-oriented investments (Chen et al., 2022), acquiring targets with superior performance directly related to the sectoral risk is expected to have a positive impact on abnormal returns. Hence, positive coefficients for $\hat{\beta}_4$ and $\hat{\beta}_5$ are predicted upon one-sided t-tests. A full list of the null and alternative hypotheses, statistical tests, and the corresponding empirical notation can be found in *Appendix 4*.

4.3 Cross-sectional analysis

The dataset consists of 153 observations to investigate the association between the M&A announcement and acquiror abnormal returns. Despite the presence of serial acquirors (11.76% of sample) who possess more than one announcement event during the sample period, the observations do not constitute a panel dataset as each individual acquiror has a mean announcement of 1.1. Thus, the absence of entity-specific time-series observations impedes any applications of panel data (e.g., fixed or random effects) specifications. Although most studies of M&A comprise cross-sectional data due to single-wave observations, De Bodt et al. (2019) raise the concern of merely modest levels of explanatory power following cross-sectional analyses as repetitive acquisitions create a panel data structure. The authors investigate the possibility of serial acquirors data requiring fixed effects specifications. However, following a sample of 12,707 M&A deals whereby almost 60% of the acquirors engaged in more than one transaction, findings suggest weak evidence that fixed effects models explain heterogeneity amongst acquiror CARs. Taken together, cross-sectional regressions are performed of the abnormal returns on the characteristics of interest (MacKinlay, 1997). Similar to previous studies, the coefficient estimates are obtained from Ordinary Least Squares (OLS) regressions and standard errors are clustered at the firm level (MacKinlay, 1997; Deng et al., 2013; Chen et al., 2022; Zhang et al., 2022).

Accordingly, all models were accommodated by diagnostic tests to ensure that OLS assumptions hold. In light of cross-sectional entities with more than one observation, the assumption of no autocorrelation was threatened, i.e., the covariance between error terms is zero. Therefore, Breusch-Godfrey tests were conducted via a joint test of the relationship between the error term and several of its lagged values, testing autocorrelation up to the r^{th} order (Brooks, 2019). The test statistics did not exceed the critical value when applying a five percent threshold, hence fail to reject the null of no serial correlation. Moreover, in light of applying daily returns in the calculations for CAR, Brown and Warner (1985) depict substantial increases in security's variances surrounding the event day. Hence, the variance of error terms may be dynamic and the assumption of homoskedasticity could be invalid, causing an overestimation of standard errors, thus, misleading inferences of the coefficient estimates. Following Breusch-Pagan tests for the models, the null hypothesis was rejected, indicating that the residuals are heterogeneously distributed and demonstrate a dynamic variance. As a result, robust standard error

estimates were applied by clustering at the firm level. Furthermore, concerns regarding modest multicollinearity in the Pearson correlation matrix (*Table 7*) were alleviated by conducting VIF tests for each model. The VIF test provides an estimate of the extent to which the variance of a parameter increases due to regressors being correlated (Brooks, 2019). By applying a tolerance value of 10, multicollinearity deemed relatively negligible as all means and unique values did not exceed the threshold.

Lastly, to make valid inferences about the population parameters, error terms should be normally distributed whereas financial data typically is not (Brooks, 2019). The descriptive statistics (*Table 6*) demonstrated indications of slight non-normal distributions i.e., deviations from skewness and kurtosis equal to 0 and 3, respectively. However, the kurtosis does not exceed 10 in any variable, therefore should be relatively negligible. Similarly, variables were converted into natural logarithmic and ratios in spite of achieving normal distribution. Additionally, aberrant observations in the continuous variables (CAR) were winsorized at an earlier stage at the 1st and 99th percentile, normalizing the distribution to some extent. Nevertheless, Bera-Jarque tests were conducted under the null hypothesis of normality in the models. The resulting p-values failed to reject the null, thus residuals were deemed to be relatively symmetric and mesokurtic (Brooks, 2019).

One concern regarding the examination of the relationship between ESG and corporate financial performance is endogeneity bias. The OLS assumption renders that regressors are uncorrelated with the dependent variable's error term, hence all of the independent variables are assumed to be exogenous. Therefore, estimators are biased and inconsistent if a two-way relation exists, obstructing statistical testing (Brooks, 2019). From an economic viewpoint, the impact of sustainability initiatives is reflected in company financial figures sooner or later, thus modeling errors impede inferences regarding the relationship, particularly when analyzing the relation between ESG and profits, growth, sales, etc. (Soytas et al., 2019). Therefore, similar to Aktas et al. (2011), Deng et al. (2013), and Chen et al. (2022) who claim that the direction of the causation is ambiguous, the problem is partially alleviated by the application of an event study, as M&As are largely unanticipated occurrences (Brown & Warner, 1980). Hence, the calculations of abnormal stock price performance are a relatively exogenous measure. Additionally, endogeneity is primarily an issue for sustainability- and financial- performance of the same firm (Aktas et al., 2011). Therefore, most part of the study focusses on the target's ESG performance in relation to the announcement reaction for acquiring firms, i.e., two separate entities. However, one cannot exclude the fact that endogeneity may potentially exist when analyzing acquiror ESG scores. Nevertheless, Krishnamurti et al. (2019) conclude that findings are robust to controls for endogeneity concerns, as results are similar to those of an OLS estimation following a 2-stage Least Squares regression model to address reverse causality issues in acquiror CSR performance and abnormal returns.

Chapter 5 Results

This chapter presents the empirical results from the quantitative analyses. Accordingly, the findings following the OLS regressions are discussed and related to the hypotheses. The chapter is concluded with robustness tests, investigating whether the key results change after using different input parameters regarding asset pricing models and ESG ratings.

Table 8 displays the output concerning the initial set of models utilizing overall ESG scores, whereby acquiror (column 1), target (column 2), and superior target (column 3) total ESG scores from Refinitiv are regressed onto the market model cumulative abnormal returns over different event windows, whilst controlling for various firm- and deal- characteristics as well as the inclusion of industry- and year-dummies. The adjusted R-squared ranges from 5.37% to 7.69% over the different specifications, higher than that by Zhang et al. (2022) who apply overall ESG scores from Refinitiv, but lower than the OLS regressions by Aktas et al., (2011) and Deng et al., (2013) who utilize alternative CSR measures. Notably, the explanatory power of the various models in CAR [-1,1] are greater than the counterpart for longer event windows, CAR [-5,5] and CAR [-10,10]. As the adjusted R-squared declines, the explanatory power of the models diminishes, attributable to additional noise in stock prices over longer measures (Kothari & Warner, 2007). Thus, evidence suggests the United States is a relatively efficient market in terms of security pricing.

The first hypothesis investigates the relationship between acquiror's overall ESG scores and announcement returns, predicting a positive coefficient. The various event windows depict a negative coefficient ranging from -0.0001 to -0.0004, supporting the shareholder view that CSR engagement represent additional costs at the expense of shareholders (Friedman, 1970). However, the coefficients are statistically insignificant across the event windows thus, such interpretations are not supported. Similarly, the estimates are close to null and therefore lack economic significance. As a result, the null hypothesis cannot be rejected, and the effect of acquiror's ESG performance on announcement returns is indifferent from zero. Accordingly, the findings support those of Fatemi et al. (2017), concluding that shareholders of acquiring firms experience no significant wealth effects, contrasting that of previous studies (Aktas et al., 2011; Deng et al., 2013; Krishnamurti et al., 2019).

The second hypothesis predicts a positive relationship between target firm's overall ESG scores and acquiror announcement returns, as ESG commitments of targets present value-enhancing capabilities that accrue to acquirors upon deal completion, positively influencing the firm's market value (Bauer & Hann, 2010; Yu et al., 2019). The output depicts a positive coefficient of 0.0001 (three-day window) and 0.0002 (eleven- and twenty-one-day window), supporting the notion of ESG-conscious targets positively influencing value creation (Tampakoudis & Anagnostoupoulou, 2020). However, the

interpretations lack economic- and statistical- significance as the estimates and corresponding t-statistics are small. Similar to above, there is insufficient evidence to reject the null hypothesis, thus the influence of target firm's overall ESG performance on acquiror abnormal returns is indifferent from zero.

The low adjusted R-squared values and insignificant independent variables (A_ESG and T_ESG) indicate that the firm's overall ESG scores have a limited correlation with cumulative abnormal returns and do not explain much of the variability in the models. Hence, the findings contrast several previous studies, despite facilitating the rejection rule following the application of a one-tailed test. Furthermore, concerns of multicollinearity are relatively dismissible as the explanatory power would be low and the majority of coefficients would be statistically significant in such case (Brooks, 2019). The most fundamental explanation to the findings is that capital markets do not recognize value-enhancing implications of sustainable performance in an M&A context (Meckl & Theuerkorn, 2015). Similarly, Yen and Andre (2019) demonstrate that neither stakeholder nor shareholder theory can explain the effects of CSR, and market reactions in M&As rather depend on a more complex cost-benefit analysis of investors.

Alternatively, the sample suffers from a limited number of observations whereby the selected firms (where all disclose ESG) possess robust ESG performance and therefore is not valued by investors to the extent to incur abnormal returns compared to other firms in the entire population, due to endogeneity (Gomes, 2019). However, the ESG scores for both acquirors and target range widely and therefore arguably provide sufficient cross-sectional variation (*Table 6*). On the other hand, overall ESG scores from Refinitiv may be a poor measure of sustainability performance, whereby the effects are not captured due to clustering the individual pillar scores and the sample as a whole.

By contrast, the coefficients concerning acquisitions of a target possessing relatively superior ESG scores to the acquiror at the time of bid are positive and statistically significant at the ten percent level, depicted by columns 3. Consequently, the findings support the third hypothesis, and the null is rejected. If the target outperforms the acquiror in terms of ESG performance at the time of the bid, it induces a 0.0056% [CAR -1,1], 0.0119% [CAR -5,5], and 0.0181% [CAR -10,10] higher cumulative abnormal return for acquiror shareholders relative to a bid for a target with an inferior ESG score. Analogously, if the target possesses an inferior score, i.e., the acquiror has a superior score at time of bid, the coefficients are inversed, representing a negative cumulative abnormal return over the event windows (Brooks, 2019). Therefore, evidence reinforces the resource-based view and learning opportunities concerning valuable capabilities accruing to the acquiring firm. Similar to the findings by Chen et al. (2022), markets appear to reward acquirors when making ESG-oriented investments. Notably, despite a constant direction for the coefficients of the explanatory variables across the various models, the

magnitude of the dummy variable estimates (T>A_ESG) increases with the length of the event window, supporting the idea that markets react slowly in valuing the benefits of sustainability practices (Deng et al., 2013). Therefore, other firm- and deal- characteristics may be driving the effect on cumulative abnormal returns in shorter time frames, for example industry relatedness (Related) which is significantly positive in CAR [-1,1] and CAR [-5,5], but not at the longer event window.

In light of the control variables, all firm-specific attributes are statistically insignificant except the target's leverage ratio. The estimates are negative and statistically significant at the five percent level in the models for CAR [-1,1] and CAR [-5,5]. Therefore, evidence suggests a higher indebtedness of the target firm represents a higher risk for financial distress, thus has a negative effect on acquiror announcement returns (Andrade & Kaplan, 1998). For the remaining firm controls, inferences are inconclusive due to statistical insignificance. Nevertheless, acquiror size, Tobin's Q, and ROA negatively affect announcement returns. Likewise, target's Tobin's Q and ROA negatively affect CAR, whereas target's size demonstrates a positive coefficient.

Similarly, the deal-specific control variables are largely insignificant, whereby the relative deal value negatively influence acquiror cumulative abnormal returns. By contrast, cash bids positively influence announcement returns however coefficients are statistically indifferent from zero. The aforementioned industry relatedness is positive and significant for the three-day and eleven-day models, providing evidence for facilitated integration processes when operating in the same industry (Morck et al., 1990). However, this effect is not demonstrated in CAR [-10,10], although the coefficient remains positive.

Table 8: Baseline model overall scores

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_ESG	-0.0001			-0.0003			-0.0004		
	(-0.38)			(-0.57)			(-0.67)		
T_ESG		0.0001			0.0002			0.0002	
		(0.09)			(0.38)			(0.40)	
T>A_ESG			0.0056*			0.0119*			0.0181**
			(1.73)			(1.66)			(2.12)
Firm controls									
A_Size	-0.0028	-0.0037	-0.0034	-0.0003	-0.0024	-0.0035	-0.0044	-0.0017	-0.0009
	(-0.47)	(-0.67)	(-0.63)	(-0.03)	(-0.28)	(-0.41)	(-0.43)	(-0.18)	(-0.10)
A_Lev	0.0010	0.0002	0.0005	0.0324	0.0299	0.0302	0.0423	0.0393	0.0400
	(0.03)	(0.01)	(0.02)	(0.69)	(0.63)	(0.64)	(0.83)	(0.76)	(0.78)
A_Tobin	-0.0014	-0.0016	-0.0015	-0.0072	-0.0075	-0.0082	-0.0073	-0.0078	-0.0084
	(-0.30)	(-0.35)	(-0.34)	(-1.01)	(-1.07)	(-1.22)	(-0.89)	(-0.95)	(-1.06)
A_ROA	-0.0533	-0.0602	-0.0522	-0.0499	-0.0336	-0.0092	-0.0495	-0.0707	-0.0863
	(-0.63)	(-0.71)	(-0.64)	(-0.40)	(-0.26)	(-0.07)	(-0.28)	(-0.40)	(-0.47)
T_Size	0.0047	0.0047	0.0043	0.0080	0.0089	0.0087	0.0037	0.0045	0.0039
	(0.77)	(0.81)	(0.48)	(0.89)	(0.98)	(0.99)	(0.37)	(0.45)	(0.39)
T_Lev	-0.0302**	-0.0300**	-0.7100**	-0.0785**	-0.0772**	-0.0749*	-0.0690*	-0.0676*	-0.0666*
	(-2.25)	(-2.22)	(-2.27)	(-2.07)	(-1.97)	(-1.90)	(-1.72)	(-1.84)	(-1.93)
T_Tobin	-0.0025	-0.0025	0.0025	-0.0043	-0.0042	-0.0044	-0.0065	-0.0063	-0.0065
	(-0.75)	(-0.74)	(-0.73)	(-0.86)	(-0.83)	(-0.87)	(-0.98)	(-0.97)	(-0.98)
T_ROA	0.0357	0.0346	0.0330	0.0057	0.0069	0.0046	0.0139	0.0159	0.0153
	(0.87)	(0.84)	(0.83)	(0.10)	(0.12)	(0.08)	(0.20)	(0.23)	(0.22)
Deal controls									
Relative deal	-0.0368	-0.0357	-0.0370	-0.0559	-0.0532	-0.0498	-0.0252	-0.0218	-0.0197
	(-1.27)	(-1.24)	(-1.24)	(-1.34)	(-1.30)	(-1.20)	(-0.55)	(-0.48)	(-0.43)
Cash	0.0068	0.0077	0.0059	0.0154	0.0131	0.0078	0.0156	0.0126	0.0093
	(0.52)	(0.59)	(0.43)	(0.45)	(0.65)	(0.37)	(0.64)	(0.52)	(0.36)
Related	0.0281**	0.0276**	0.0278**	0.0290**	0.0283**	0.0266**	0.0304	0.0294	0.0279
	(2.32)	(2.29)	(2.29)	(2.55)	(2.56)	(2.43)	(1.44)	(1.44)	(1.33)
Constant	-0.0008	0.0012	0.0012	-0.0151	-0.0129	-0.0087	-0.0477	-0.0441	-0.0398
	(-0.02)	(0.03)	(0.03)	(-0.22)	(-0.19)	(-0.13)	(-0.65)	(-0.59)	(-0.54)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	7.69%	7.57%	7.67%	6.14%	6.33%	6.91%	5.37%	5.69%	5.64%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the market model and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target overall ESG scores, following the regression equations presented by

equation 5, 6, and 7, respectively. The notation A (T) renders the acquiror (target) firm. A_ESG represents the acquiror firm's overall ESG score, T_ESG denotes the target firm's overall ESG score, and T>A ESG is a dummy variable for target firm's possessing superior overall ESG scores relative to the acquiror at the time of bid. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Table 9 depicts the output exploring the fourth hypothesis ($H_{4A,B,C}$) concerning disaggregation of the overall ESG score into its individual dimensions. Similar to above, the event windows are treated separately whereby columns 1, 2, and 3 demonstrate the effect of the acquiror's, target's, and superior pillar scores on acquiror cumulative abnormal returns, respectively. The same set of control variables and year- and industry- dummies are utilized. Remarkably, employing the pillars generates greater explanatory power across all model specifications relative to applying overall ESG scores (*Table 8*), measured by the adjusted R-squared. This emphasizes the idea that differences exist in sensitivity amongst acquirors with respect to specific E, S, G dimensions, which are not captured when aggregating the scores (Barros et al., 2022). However, the explanatory power still remains low, ranging from 6.06% to 12.03%, hence captures a limited amount of the variability of cumulative abnormal returns about their mean values across the sample (Brooks, 2019). Similar to the previous output, the adjusted R-squared measure diminishes with the length of the event window, possibly due to additional noise in acquiror stock prices (Kothari & Warner, 2007). Furthermore, the model specifications including superior target performance relative to the acquiror (column 3), possess the relatively greatest explanatory power and estimates across the event windows.

Column 1 of each event window measures the effect of acquiror environmental (A_Env), social (A_Soc), and governance (A_Gov) scores on abnormal performance. The coefficients for environmental and social performance are positive but statistically insignificant across all event windows, hence the effect on cumulative abnormal returns are inconclusive. By contrast, corporate governance demonstrates a significantly (mildly) negative effect on acquiror announcement returns, ranging from -0.0007 to -0.0012, at the five and ten percent level, respectively. Therefore, the negative effect of acquiror ESG (A_ESG in *Table 8*) appears to be driven by the governance score. Accordingly, a one-point increase of the acquiror's governance score in Refinitiv's ESG metrics decreases event CAR by -0.0007, -0.0012, and -0.0011 percent in the three-day, eleven-day, and twenty-one-day event window respectively, ceteris paribus. Accordingly, the coefficients present statistical significance in the model yet limited economic significance as the magnitudes are close to zero. With respect to hypothesis 4A, the evidence is insufficient to reject the null. As predicted, the governance score is statistically significant when analyzing the entire sample, in contrast to the environmental and social pillar (Giese et al., 2021). However, contrary to the expectation, the estimates display the opposite direction. A possible explanation for the null (mildly negative) effect on acquiror cumulative abnormal returns is that firms in the United States possess relatively strong governance performance at a global level, thus is not valued to the extent to incur abnormal performance by shareholders as it is a pre-requisite for businesses.

Furthermore, the second column demonstrates the effect of target firms' pillar scores on acquiror abnormal performance. Similar to above, the pillars lack economic significance as the estimates are

close to null. Nevertheless, the target's environmental and social score are positively related to acquiror CAR, whereby merely the latter is statistically significant at the five percent level across the event windows. Thus, a one-point increase in target's social performance measured by Refinitiv's ESG metrics increases acquiror's event CAR by 0.0005 (three-day and eleven-day window) and 0.0006 (twenty-one-day window) percent, ceteris paribus. By contrast, the governance scores possess a slightly negative but insignificant effect on acquiror announcement returns, hence evidence is insufficient to reject the null hypothesis 4B.

Taken together, the social pillar arguably drives the mildly positive estimate of target overall ESG scores (T_ESG) in *Table 8*. A possible explanation for the statistical significance of the social pillar is that the sample consists of acquirors primarily operating in socially sensitive sectors (52.30% of the sample, *Table 6*), which is investigated in the final (fifth) hypothesis. Hence, bids for targets with sound performance with respect to the dimension most directly related to the sector of acquiror operations is positively valued by shareholders due to potential learning opportunities following the reasoning of the resource-based view (Garcia et al., 2017). Alternatively, the social dimension may reflect facilitated integration processes and/or markets view the target's social dimension the easiest to rectify and integrate into the new (combined) entity upon deal completion. Similarly, the social pillar of ESG has received growing attention during the Covid-19 pandemic, whereby companies that have treated their staff and suppliers well have likely improved reputations and gained more business (Bell, 2021). Therefore, announcements during the years of the pandemic (32.02% of the sample reported in *Table 5*) may be driving the findings.

Lastly, the third columns investigate the effect of acquiring target firms with superior pillar scores relative to the acquiror, at the time of the bid. Overall, the coefficients demonstrate substantially greater influence on cumulative abnormal returns compared to the stand-alone pillars, indicated by the magnitudes. Accordingly, it appears that the interaction between both firm's ESG performance generates relatively more explanatory power, suggesting a dynamic relationship whether firms have more similarities/diversities in sustainability practices (Bereskin et al., 2018). Nevertheless, the directions for all of the estimates are positive, supporting the notion of markets rewarding ESG-oriented investments and learning opportunities arising from the target firm (Chen et al., 2022). Hence, acquiring a target with superior performance with respect to the pillar outperforms bids for a firm with inferior pillar scores, i.e., when acquirors possess superior performance. However, solely the social dimension is statistically significant below a ten percent threshold, whereby a bid for such a target increases announcement returns by 0.0339%, 0.0580%, and 0.0439% across the three event windows, relative to a bid for a target with inferior social scores. Hence, supporting the resource-based view that acquirors can learn from target's social performance, characterized by organization's management of labor standards, human rights, and more (UN PRI, 2021). Nevertheless, evidence is insufficient to reject

hypothesis 4C, depicted by the statistical insignificance of the governance pillar. Thus, there is no difference between acquiring a target with superior and inferior governance performance relative to the acquiror.

As a whole, target's social pillar demonstrates significant value creation for acquiror shareholders, possibly due to learning capabilities, facilitated integration and rectification, and/or the recent developments in what corporate practices are valued by investors. On the other hand, there is no evidence of value creation for bids for target firms possessing superior environmental or governance performance compared to a bid for a firm with inferior scores in such dimensions. As discussed above, the sample of firms domiciled in the United States may already possess strong governance standards, therefore do not induce any abnormal reaction as it is a pre-requisite for businesses. Alternatively, M&As typically lead to changes in board compositions whereby only a limited number of directors from the target continue to serve post-deal and therefore target's governance may not be valued (Lajoux, 2015). A similar interpretation may apply for the environmental dimension or that improvements in such practices are difficult to integrate into the combined entity due to costly investments and/or substantially different business operations. Bereskin et al. (2018) depict that firms are more likely to merge and enjoy synergies when sustainability practices are aligned. Therefore, differences in environmental and corporate governance standards may impede integration processes whereas the social dimension is easily addressable.

Alternatively, there is not a sufficient quantity of acquirors in environmentally sensitive sectors in the sample to capture environmental considerations to the same extent as for example, socially sensitive acquirors. Another interpretation is that the acquirors in the sample possess substantially better mean environmental performance (57.083) than targets (28.947), representing the largest gap amongst E, S, G performance between the two entities (*Table 6*). Therefore, the learning opportunities may be limited as the greatest environment score observed among the target firms in the sample is 70.295, substantially lower than in other dimensions. Consequently, the potential synergies and long-term value creation diminishes in this aspect.

Similar to the interpretation of the control variables in *Table 8*, the direction and magnitudes of the estimates are relatively unchanged. This is likely due to the fact that the overall ESG variable is merely a linear combination of the pillars, hence induces similar effects. By contrast, some of the coefficients that were statistically significant across the different specifications are no longer significant. Similar to the table above, solely target's leverage ratio and industry relatedness are statistically significant at a ten percent level, following the same interpretations as previously reported.

Table 9: Baseline model pillar scores

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_Env	0.0004			0.0003			0.0005		
	(1.05)			(0.62)			(0.07)		
A_Soc	0.0001			0.0003			0.0005		
	(0.19)			(0.47)			(0.62)		
A_Gov	-0.0007*			-0.0012**			-0.0011*		
	(-1.95)			(-2.26)			(-1.84)		
T_Env		0.0004			0.0004			0.0007	
		(0.10)			(0.07)			(0.11)	
T_Soc		0.0005**			0.0005**			0.0006**	
		(2.28)			(2.13)			(2.44)	
T_Gov		-0.0003			-0.0003			-0.0005	
		(-1.23)			(-1.20)			(-0.61)	
T>A_Env			0.0155			0.0212			0.0167
			(0.84)			(0.79)			(0.56)
T>A_Soc			0.0339**			0.0580**			0.0439*
			(2.51)			(2.48)			(1.73)
T>A_Gov			0.0120			0.0116			0.0110
			(0.86)			(0.13)			(0.47)
Firm controls									
A_Size	-0.0036	-0.0046	-0.0031	-0.0007	-0.0036	-0.0025	-0.0044	-0.0010	-0.0023
	(-0.59)	(-0.85)	(-0.59)	(-0.08)	(-0.41)	(-0.29)	(-0.44)	(-0.11)	(-0.23)
A_Lev	0.0010	0.0006	0.0051	0.0271	0.0292	0.0266	0.0349	0.0402	0.0343
	(0.03)	(0.02)	(0.17)	(0.59)	(0.63)	(0.60)	(0.71)	(0.78)	(0.71)
A_Tobin	-0.0008	-0.0023	-0.0007	-0.0065	-0.0084	-0.0061	-0.0074	-0.0084	-0.0069
	(-0.17)	(-0.51)	(-0.15)	(-0.91)	(-1.16)	(-0.88)	(-0.93)	(-1.01)	(-0.88)
A_ROA	-0.0188	-0.0368	-0.0302	-0.1225	-0.0614	-0.0623	-0.0276	-0.0556	-0.0337
	(-0.22)	(0.66)	(-0.38)	(0.99)	(0.47)	(0.53)	(0.15)	(-0.31)	(-0.19)
T_Size	0.0036	0.0024	0.0037	0.0061	0.0062	0.0071	0.0018	0.0027	0.0023
	(0.6)	(0.39)	(0.63)	(0.67)	(0.65)	(0.79)	(0.18)	(0.25)	(0.22)
T_Lev	-0.0288	-0.0392	-0.0341	-0.0777**	-0.0888**	-0.0915**	-0.0700	-0.0743	-0.0761*
	(-1.21)	(-1.62)	(-1.49)	(-2.18)	(-2.19)	(-2.40)	(-1.57)	(-1.52)	(-1.66)
T_Tobin	-0.0036	-0.0029	-0.0025	-0.0062	-0.0045	-0.0045	-0.0083	-0.0066	-0.0065
	(-1.06)	(-0.84)	(-0.78)	(-1.16)	(-0.85)	(-0.91)	(-1.24)	(-0.97)	(-0.97)
T_ROA	0.0296	0.0347	0.0290	0.0161	0.0048	0.0050	0.0249	0.0154	0.0222
	(0.75)	(0.86)	(0.76)	(0.28)	(0.08)	(0.09)	(0.36)	(0.22)	(0.33)

Deal controls									
Relative deal	-0.0332	-0.0376	-0.0471	-0.0498	-0.0555	-0.0689	-0.0190	-0.0234	-0.0361
	(-1.15)	(-1.27)	(-1.57)	(-1.19)	(-1.31)	(-1.59)	(-0.40)	(-0.50)	(-0.74)
Cash	0.0047	0.0070	0.0018	0.0206	0.0135	0.0212	0.0215	0.0131	0.0205
	(0.35)	(0.53)	(0.13)	(1.03)	(0.65)	(1.00)	(0.87)	(0.53)	(0.82)
Related	0.0260**	0.0258**	0.0285**	0.0265	0.0260	0.0288*	0.0288	0.0281	0.0301
	(2.27)	(2.12)	(2.51)	(1.51)	(1.41)	(1.65)	(1.4)	(1.35)	(1.47)
Constant	0.0275	0.0232	-0.0004	0.0254	0.0166	-0.0093	-0.0165	-0.0274	-0.0437
	(0.61)	(0.56)	(-0.01)	(0.37)	(0.24)	(-0.13)	(-0.21)	(-0.36)	(-0.56)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	11.00%	10.46%	12.03%	8.65%	6.46%	8.71%	6.06%	6.30%	7.15%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the market model and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target environment, social, and governance pillar scores, following the regression equations presented by equation 8, 9, and 10, respectively.. The notation A (T) renders the acquiror (target) firm. A(T)_Env represents the acquiror (target) firm's environmental score, A(T)_Soc denotes the acquiror (target) firm's social score, and A(T)_Gov denotes the acquiror (target) firm's governance score. T>A_Env, T>A_Soc, and T>A_Gov are binary variables for target firms who possess superior environmental, social, and governance scores relative to the acquiror, respectively, at the time of bid. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

The following output investigates the last hypothesis ($H_{5A,B,C}$) by extending the models from above via the inclusion of an interaction term for acquirors identified to operate in sensitive sectors and the corresponding sensitive pillar score over the various event windows. The adjusted R-squared displayed in *Table 10* ranges from 5.38% to 11.88% across the model specifications. Hence, the measure declined compared to those in *Table 9* despite additional variables. The measure diminishes as adjusted R-squared considers the loss of degrees of freedom associated with extending the model, thus the explanatory power following the interaction terms does not offset the inclusion of an extra variable (Brooks, 2019). Despite the interaction terms (sensitive sectors) not contributing to explanation of variability of cumulative abnormal returns, it provides valuable insight for which shareholders value ESG initiatives. As the models in the table below do not introduce any information which is not already captured in *Table 9*, since the interaction terms simply split the existing analysis by sector sensitivity, many of the directions and magnitudes of the variables are similar to those reported above. Therefore, the coefficients are interpreted in the same manner as before, particularly those of the control variables.

Nevertheless, columns 1 depicts the effect of acquiror pillar scores on announcement returns. Similar to *Table 9*, merely the governance score is statistically significant (slightly negative) when applying a ten percent threshold, although remains economically insignificant following a coefficient close to null. The interpretation follows the same as previously provided, that strong firm governance may be a pre-requisite in the United States, thus does not incur any abnormal value creation. With respect to hypothesis 5A, the coefficients of the interaction terms of environmental and social pillars and their respective sensitive sectors are positive but statistically insignificant. Therefore, evidence suggests there is no difference in the effect of acquiring firm's environmental and social score on cumulative abnormal returns between sensitive and insensitive sectors. Consequently, there is insufficient evidence to reject the null hypothesis as the coefficients are statistically indifferent from zero.

Column 2 investigates the relationship between the target firm's pillar scores and acquiror cumulative abnormal returns, whereby solely the social score is again mildly positively significant at a ten percent level. Notably, the coefficient of the target's pillar score with respect to the sensitive sector is negative (positive) for acquirors operating in an environmentally (socially) sensitive sector although statistically insignificant and close to null. Therefore, there is no observable difference in the effect of target's environmental nor social pillar in sensitive and insensitive industries on acquiror abnormal performance. Hence, evidence fails to reject the null hypothesis 5B. Notably, the negative direction of the estimates suggest shareholders in environmentally sensitive sectors may value other dimensions of the transaction. Similar to Miralles-Quiros et al. (2018), evidence suggests that markets may positively value other ESG practices by firms in environmentally sensitive industries. However, the coefficients lack statistical- and economic- insignificance, therefore the findings of Miralles-Quiros et al. (2018) cannot be empirically supported.

The third columns present the output for acquiring targets who possess a greater pillar score relative to the acquiror at the time of bid. As in *Table 9*, all of the coefficients are positive, hence acquiror shareholders appear to value ESG initiatives (Chen et al., 2022). However, acquiring a target with superior social scores is no longer statistically significant, whilst the interaction term with socially sensitive sectors is significantly positive at the five and ten percent level in the eleven-day, and three-day and twenty-one-day window, respectively. The finding suggests that socially sensitive acquirors were driving the effect previously observed, plausibly due to the majority of the sample (52.30%) identified to operate in such sectors (*Table 6*). Consequently, there is evidence for capital markets rewarding ESG investments in socially sensitive sectors. Accordingly, acquiring a target with superior social scores in a socially sensitive sector induces a 0.0482% [CAR -1,1], 0.0886% [CAR -5,5], and 0.0777% [CAR -10,190 higher cumulative abnormal return relative to insensitive sectors, ceteris paribus. Therefore, the finding suggests that markets value risk mitigation with respect to the risk factor where the firms are under particular scrutiny, i.e., social practices (Cai et al., 2012; Garcia et al., 2017; Giese et al., 2021). Alternatively, there is no such interpretation, and the result is driven by the social pillar being particularly important during the Covid-19 crisis as almost one-third of the deals were announced during this period.

On the contrary, the interaction term for environmentally sensitive acquirors produces large but statistically insignificant coefficients over the event windows. The finding could be due to quirks in Refinitiv's ESG methodology, alternatively markets view the environmental risk difficult to rectify and address, thus there is no observable difference between environmentally sensitive and insensitive acquirors in the sample. Given that the environmental pillar measures climate change, pollution, emissions, etc. which is heavily driven by regulations and substantial operational changes, thus may be difficult to influence. Alternatively, shareholders of acquirors in environmentally sensitive sectors may value other dimensions (Miralles-Quiros et al., 2018). Nevertheless, there is insufficient evidence to reject the null hypothesis 5C concerning acquisitions in sensitive sectors as merely the socially sensitive interaction term was statistically significant.

Table 10: Baseline model pillar scores in sensitive sectors

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_Env	0.0004			0.0004			0.0004		
	(1.01)			(0.66)			(0.61)		
A_Soc	0.0001			0.0004			0.0005		
	(0.26)			(0.57)			(0.66)		
A_Gov	-0.0007*			-0.0012**			-0.0011*		
	(-1.83)			(-2.15)			(-1.78)		
A_Env*E_Sens	0.0002			0.0002			0.0002		
	(0.52)			(0.43)			(0.42)		
A_Soc*S_Sens	0.0001			0.0002			0.0002		
	(0.81)			(0.85)			(0.53)		
T_Env		0.0002			0.0002			0.0002	
		(0.69)			(0.37)			(0.34)	
T_Soc		0.0005*			0.0005*			0.0002*	
		(1.67)			(1.83)			(1.74)	
T_Gov		-0.0003			-0.0005			-0.0003	
		(-1.26)			(-1.21)			(-0.61)	
T_Env*E_Sens		-0.0006			-0.0005			-0.0004	
		(-1.24)			(-0.64)			(-0.49)	
T_Soc*S_Sens		0.0002			0.0001			0.0001	
		(0.61)			(0.22)			(0.14)	
T>A_Env			0.0032			0.0038			0.0100
			(1.06)			(0.13)			(0.27)
T>A_Soc			0.0260			0.0235			0.0145
			(1.18)			(0.86)			(0.49)
T>A_Gov			0.0122			0.0027			0.0144
			(0.84)			(0.13)			(0.62)
T>A_Env*E_Sens			0.0396			0.0615			0.0578
			(1.09)			(1.26)			(1.51)
T>A_Soc*S_Sens			0.0482*			0.0886**			0.0777*
			(1.75)			(2.23)			(1.68)
Firm controls									
A_Size	-0.0038	-0.0046	-0.0025	-0.0015	-0.0037	-0.0023	-0.0042	-0.0009	-0.0019
	(-0.61)	(-0.82)	(-0.45)	(-0.17)	(-0.41)	(-0.25)	(-0.40)	(-0.10)	(-0.19)
A_Lev	0.0012	0.0010	0.0055	0.0269	0.0290	0.0303	0.0345	0.0400	0.0387
	(0.04)	(0.03)	(0.18)	(0.58)	(0.61)	(0.65)	(0.69)	(0.76)	(0.76)
A_Tobin	-0.0001	-0.0038	-0.0016	-0.0057	-0.0095	-0.0075	-0.0065	-0.0093	-0.0076
	(-0.02)	(-0.82)	(-0.36)	(-0.82)	(-1.32)	(-1.13)	(-0.82)	(-1.10)	(-0.97)
A_ROA	0.0274	0.0147	0.0149	0.1111	0.0786	0.1132	0.0161	0.0414	0.0063
	(0.31)	(0.17)	(0.18)	(0.85)	(0.57)	(0.93)	(0.09)	(0.23)	(0.04)

T_Size	0.0034	0.0026	0.0044	0.0058	0.0063	0.0087	0.0016	0.0028	0.0034
	(0.57)	(0.42)	(0.75)	(0.63)	(0.66)	(0.97)	(0.16)	(0.25)	(0.33)
T_Lev	-0.0265	-0.0415*	-0.0369	-0.0738*	-0.0906*	-0.0923*	-0.0671	-0.0758	-0.0742
	(-1.11)	(-1.68)	(-1.57)	(-2.02)	(-2.20)	(-2.47)	(-1.49)	(-1.52)	(-1.61)
T_Tobin	-0.0037	-0.0022	-0.0025	-0.0063	-0.0040	-0.0047	-0.0085	-0.0061	-0.0067
	(-1.07)	(-0.61)	(-0.75)	(-1.16)	(-0.74)	(-0.95)	(-1.25)	(-0.89)	(-1.02)
T_ROA	0.0308	0.0240	0.0304	0.0167	0.0137	-0.0094	0.0229	0.0229	0.0080
	(0.75)	(0.62)	(0.77)	(0.29)	(0.24)	(-0.17)	(0.32)	(0.32)	(0.12)
Deal controls									
Relative deal	-0.0345	-0.0373	-0.0478	-0.0521	-0.0555	-0.0683	-0.0207	-0.0235	-0.0347
	(-1.17)	(-1.23)	(-1.61)	(-1.22)	(-1.27)	(-1.57)	(-0.43)	(-0.49)	(-0.72)
Cash	0.0062	0.0043	0.0004	0.0187	0.0158	0.0241	0.0195	0.0150	-0.0215
	(0.44)	(0.31)	(0.03)	(0.92)	(0.72)	(1.20)	(0.77)	(0.58)	(-0.87)
Related	0.0263*	0.0274*	0.0300*	0.0271	0.0275	0.0264	0.0292	0.0295	0.0261
	(2.29)	(2.21)	(2.59)	(1.51)	(1.46)	(1.47)	(1.41)	(1.37)	(1.23)
Constant	0.0292	0.0180	-0.0090	0.0307	0.0123	-0.0127	-0.0149	-0.0268	-0.0301
	(0.62)	(0.42)	(-0.21)	(0.43)	(0.18)	(-0.19)	(-0.18)	(-0.42)	(-0.48)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	8.94%	8.59%	11.88%	5.72%	5.39%	5.38%	5.52%	6.17%	5.92%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the market model and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target environment, social, and governance pillar scores, following the regression equations presented by equation 8, 9, and 10, respectively.. The notation A (T) renders the acquiror (target) firm. A(T)_Env represents the acquiror (target) firm's environmental score, A(T)_Soc denotes the acquiror (target) firm's social score, and A(T)_Gov denotes the acquiror (target) firm's governance score. T>A_Env, T>A_Soc, and T>A_Gov are binary variables for target firms who possess superior environmental, social, and governance scores relative to the acquiror, respectively, at the time of bid. The interaction terms involving E_Sens (S_Sens) represent a binary variable for acquirors operating in environmentally (socially) sensitive sectors. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

5.1 Robustness tests

To investigate the robustness of the findings, the baseline study is reproduced using a three- and four-factor model, as well as applying ESG data from MSCI. The results are replicated to control for discrepancies across asset pricing models, in spite of mitigate potential biases in the estimation of abnormal returns and applying another source of ESG ratings to increase validity of the findings (Berg et al., 2019).

The acquiror cumulative abnormal returns were recalculated using the Fama-French three-factor model and Carhart four-factor model, although applying the same benchmark as previously done for comparison purposes. The three-factor model extends the market model by including a size and value factor, as research indicates that such risk factors influence security prices (Fama & French, 1992). The size (value) anomaly suggests anomaly suggests small (high book-to-market ratio) firms to earn higher risk-adjusted returns relative to their counterpart. Furthermore, the Carhart four-factor model is also applied as Kyei-Mensah (2011) demonstrate that the acquiring firm's abnormal returns obtained under the market- and three-factor- model directly contrasted those of the four-factor model, when investigating a sample of M&As in the United States. The four-factor model further extends the aforementioned asset pricing model by adding a fourth risk factor due to observed momentum anomalies (Carhart, 1997). The anomaly states that stocks that have performed well in the recent past (winners) will outperform their counterpart (losers) in the near future (Jegadeesh & Titman, 1993). Thus, the three-factor and four-factor models are adopted to account for such influences in the calculated cumulative abnormal returns, as size, value, and momentum stocks are presumably present in the sampled acquirors.

The findings for the three-factor model concerning the overall ESG scores, individual pillar scores, and sensitive sectors are displayed in *Appendix 5*, *7*, and *8*, respectively. Similarly, the four-factor model is displayed in *Appendix 8*, *9*, and *10*. Findings depict similar magnitudes and signs of the estimates previously observed, although many of the t-statistics are improved in their respective directions. Furthermore, the increase in explanatory power (adjusted R-squared) is relatively limited, supporting the notion of sufficient explanatory power in short-window event studies (Brown & Warner, 1980). Nevertheless, findings concerning overall ESG scores, merely the binary variable for acquiring a target with superior ESG performance remains statistically significant and positive (three-factor and four-factor models in *Appendix 5* and *8*, respectively). With regards to the models utilizing individual pillar scores, the acquiror's governance score, target's social score, and acquiring a target with superior social performance are statistically significant with the same directions found previously (three-factor and four-factor models in *Appendix 6* and *9*, respectively). Moreover, when dividing the sample by sector sensitivity, the acquiror's and target's pillar scores in sensitive sectors remain statistically

indistinguishable from zero, whereas acquiring targets with superior social performance in socially sensitive sectors is significant (three-factor and four-factor models in *Appendix 7* and *10*, respectively). Therefore, the interpretations provided following the market model are deemed to be relatively robust for changes in the asset pricing model.

The final set of robustness tests investigates inconsistencies among data providers by utilizing a different set of ESG ratings for the same sample of firms (Berg et al., 2019). Similar to previous studies, the ratings were obtained from MSCI (Deng et al., 2013; Bereskin et al., 2018). Thus, the overall ESG- and pillar- scores applied in the baseline study were replaced with the new ratings, and the dummy variables concerning superior target performance were recalculated. Like Refinitiv, MSCI ratings are ranked highly and frequently used amongst investors and practitioners (Wong et al., 2019). Nevertheless, the primary reason for utilizing data from MSCI is due to accessible pillar (E, S, G) scores, which is not common practice across other data providers. The MSCI ESG database delivers historical performance for almost 8,000 companies, based on a seven-step scale from AAA (best) to CCC (worst) (MSCI, 2022). Hence, the scores were converted to a numerical equivalent from 1 to 7. Following the same matching process explained in section 3, the previously applied sample was reduced to 77 deals (153 deals) involving 151 (288) unique firms.

The regression equations were re-estimated using the baseline market model cumulative abnormal returns, whereby the findings for the models concerning overall ESG scores, pillar scores, and sensitive sectors are demonstrated in *Appendix 11*, *12*, and *13*, respectively. The adjusted R-squared are relatively similar to those utilizing Refinitiv's scores, hence the explanatory power remains limited. Nevertheless, coefficients are expected to alter slightly given the low correlations across databases due to different procedures of calculating the scores (Berg et al., 2019).

Following the initial set of models rendering the overall ESG scores (*Appendix 11*), acquiror (target) firm's coefficients remain mildly negative (positive) and statistically insignificant. Notably, the estimate concerning acquiring a target firm with superior overall ESG performance has become statistically insignificant (columns 3). Consequently, the evidence for capital markets rewarding ESG-oriented acquisitions is questionable, challenging the previous findings of hypothesis 3 and Chen et al. (2022). When applying the MSCI ESG ratings, results appear to be more aligned with Meckl and Theuerkorn (2015), inferring that markets do not recognize value-enhancing implications of improved sustainable performance in M&A transactions when analyzing overall ESG scores.

Moreover, target leverage remains significantly negative across various specifications when applying a five percent threshold, suggesting that higher leverage may reflect heightened risk for distress which in turn negatively affects acquiror abnormal returns (Andrade & Kaplan, 1998). Likewise, target's Tobin's

Q remains negative but is now statistically significant across all model specifications, supporting the findings of Lang et al. (1989). Additionally, acquiror size has turned positive and significant in several specifications, contrasting the conclusions of Loderer and Martin (1990) and Moeller et al. (2004). The remaining of the firm- and deal- controls are statistically insignificant and therefore lack interpretations.

Appendix 12 displays the findings with respect to the individual pillar scores. Notably, the magnitudes of the estimates following the use of MSCI data are larger than that of Refinitiv, and the t-statistics are larger in their respective directions (*Table 9*). A potential explanation for the magnitudes of the coefficients may be the scaling method of MSCI (1 to 7), whereby a one-unit change in the score is substantially greater relative to Refinitiv, whereby scores range from 0 to 100. The acquiror's governance score remains negatively related to cumulative abnormal returns, although is now statistically insignificant. By contrast, the acquiror's environmental and social scores now significantly positively affect announcement returns at the five percent level. Therefore, a one-score upgrade in environmental performance increases abnormal returns by 0.0102%, 0.0246%, and 0.0205% over the three-day, eleven-day, and twenty-one-day window (columns 1). On the other hand, the social score is merely significant at CAR [-5,5] and CAR [-10,10], generating a 0.0155% and 0.0160% greater abnormal return when the acquiror increases its social performance. Hence, the eleven-day and twenty-one-day windows recognizes an effect which is not perceived at the shorter time frame.

As in the baseline study, the target firm's social score is significantly positively related to announcement returns. As explained above, the magnitudes are substantially greater relative to those of Refinitiv, whereby a one-score increase in target's social performance increases acquiror cumulative abnormal returns by 0.0075%, 0.0180%, and 0.0181% over the three-day, eleven-day, and twenty-one-day event window, respectively. Similarly, the target's environmental and governance score remain statistically insignificant. Moreover, as in the baseline study, acquiring a target with superior social scores significantly positively influence acquiror announcement returns, generating 0.0344%, 0.0683%, and 0.0691% greater returns over the respective event windows, relative to a target with inferior scores (columns 3). By contrast, the effect is not observed in acquisitions concerning targets with superior environmental nor governance performance, due to statistically insignificant estimates. Hence, interpretations are similar to those of the baseline model. Similarly, the magnitudes and directions of the control variables remain robust.

The final table presented in *Appendix 13* displays the regression output concerning sensitive sectors when applying ESG scores from MSCI. Columns 1 demonstrates similar interpretations as above with respect to the acquiror's individual pillars, whereby environmental and social performance is positive and significant. Similar to the baseline study, the estimates for the interaction terms are statistically

insignificant, hence there is no difference in the effect of environmental and social scores between sensitive and insensitive sectors.

Moreover, columns 2 depict significantly positive estimates at the ten percent level for target's social scores, and for the interaction term concerning socially sensitive sectors, following a similar interpretation as the baseline model. By contrast, the interaction term of target's environment score in environmentally sensitive sectors is now negative and statistically significant at the ten percent level across the eleven-day and twenty-one-day event window. Hence, a one-score increase in target firm's environmental performance in such sectors decreases acquiror announcement returns by -0.0149% and -0.0174%, respectively. As opposed to the baseline model whereby merely the target's score in socially sensitive sectors was statistically significant, the reasoning of previous studies is challenged as target firm's environmental pillar performance negatively influences acquiror announcement returns in environmentally sensitive sectors (Giese et al., 2019; Torre et al., 2020). Therefore, evidence suggests that acquiring firm's shareholders in such sectors not only potentially value other dimensions of ESG relatively more (Miralles-Quiros et al., 2018), but in fact negatively value target's environmental performance. Thus, the resource-based view does not hold in this aspect, possibly due to difficult integration processes. In light of the shareholder perspective, a target firm with solid environmental performance may entail additional costs for the acquiror, potentially requiring large investments in operational processes to reduce the resource usage, pollution, and emissions. Fisher-Vanden and Thorburn (2011) study 117 firms investigating shareholder-wealth effects following an event study of joining voluntary environmental performance initiatives. The authors find a significantly negative stock market reaction to the announcement. Therefore, acquiror shareholders in environmentally sensitive industries may believe that acquiring targets with corporate commitments to reduce emissions conflict with firm value maximization.

This interpretation is supported by the direction and magnitude of the estimates concerning acquisitions of targets with superior environmental performance in environmentally sensitive sectors (columns 3). The coefficients are statistically significant at the ten percent level, whereby the estimates for the interaction term reflects a -0.0569% [CAR -5,5] and -0.1025% [CAR -10,10] lower announcement return than a bid for a target with inferior scores in a relatively insensitive sector. Therefore, such targets may induce costly integration processes and/or substantial investment costs to the acquiring firm. Notably, similar to above, the effect is not observed in the shorter event window potentially due to markets slowly reacting to the new sustainability implications (Deng et al., 2013). On the contrary, estimates for bids for targets with superior social scores in socially sensitive sectors are robust, generating 0.0734, 0.1103, and 0.1414 percent greater abnormal returns over the three-day, eleven-day, and twenty-one-day event window, relative to bids for targets with inferior scores in relatively insensitive sectors.

Chapter 6 Conclusion

The final chapter summarizes the findings of the analysis, offering the main conclusions of the study, acknowledging limitations of the followed procedure, and ultimately suggesting avenues for future research.

This paper aimed to explore the effect of ESG performance on acquiror abnormal returns following merger and acquisition announcements. The integration of ESG considerations in M&As is occurring amongst practitioners and investors at a growing pace (Delevingne et al., 2020). As disclosures of ESG practices and related performance mitigates information asymmetries, enhances capabilities and (in)tangible assets, and improves access to financing amongst other benefits, firm's ESG ratings has an effect on value creation (Bauer & Hann, 2010; Gomes & Marsat, 2018; Yu et al., 2019; Feng, 2021). The consensus in existing literature is that improved sustainability performance (measured via CSR or ESG) positively influences firm performance when analyzing various financial metrics (Clark & Viehs, 2014; Friede et al., 2015; Whelan et al., 2021), although critics argue that the diversity of scopes of investigation limits any higher-level conclusions (Brooks & Oikonomou, 2018). Yet, the extent of the effect is relatively ambiguous in an M&A setting as studies demonstrate contrasting evidence regarding the direction of the influence and which firm's ESG performance is driving the effect. Motivated by recent developments in the realm of ESG, combined with the scarce and ambiguous existing literature in an M&A context, the study intended to contribute to the discussion and fill gaps identified in the field.

The analysis employed a sample of 153 M&A deals involving 288 unique firms in the United States over the period 2013-2021, following a traditional event study methodology motivated by MacKinlay (1997). Consequently, the acquiring firms' cumulative abnormal return over various event windows were applied to proxy for expected value creation (Andrade et al., 2001). Moreover, the study employs relevant ESG ratings from Refinitiv, in contrast to previous papers who utilize precursing (outdated) measures (Aktas et al., 2011; Deng et al., 2013). Accordingly, the ratings were extracted for both parties involved in the transaction, whereas many previous studies focus on solely one of the entities (Fatemi et al., 2017; Yen and Andre et al., 2019; Zhang et al., 2022). Importantly, the ESG ratings were treated as the whole score and separately by its dimensions, which is not common practice in existing literature (*Appendix 1*) despite the fact that individual pillars have different effects on firm value (Torre et al., 2020; Giese et al., 2021; Barros et al., 2022). In light of disaggregating the overall ESG score, the sample was divided into relatively (in)sensitive sectors with respect to the environmental and social pillar, as the influence of the pillars varies subject to the extent to which the information relates to the firm (Miralles-Quiros et al., 2018; Torre et al., 2020; Giese et al., 2021). Finally, extensive robustness tests were conducted by applying alternative asset pricing models to control for inconsistencies in the

calculation of cumulative abnormal returns, as well as applying a different set of ESG scores to investigate discrepancies across databases (Berg et al., 2019). The outcome for each hypothesis is illustrated in *Table 11*, and which interpretations were resilient following the robustness tests.

Table 11: Hypothesis outcomes

Hypothesis	Hypothesis number	Outcome
Acquiror ESG	1	Fail to reject null**
Target ESG	2	Fail to reject null**
Superior ESG	3	Reject null*
Acquiror G	4A	Fail to reject null**
Target G	4B	Fail to reject null**
Superior G	4C	Fail to reject null**
Acquiror E(S) in environmentally (socially) sensitive sectors	5A	Fail to reject null**
Target E(S) in environmentally (socially) sensitive sectors	5B	Fail to reject null**
Superior E(S) in environmentally (socially) sensitive sectors	5C	Fail to reject null**

This table demonstrates the hypothesis and the associated outcome following the quantitative analysis. The asterisks * and ** denote if the outcome of the hypothesis is robust to changes in the asset pricing model and the application of alternative ESG ratings, respectively. The full list of hypotheses is found in *Appendix 4*.

The first hypothesis was derived from stakeholder theory combined with the findings of previous studies related studies, whereby acquiring firms' ESG performance was expected to be positively related to announcement returns (Aktas et al., 2011; Deng et al., 2013; Krishnamurti et al., 2019; Chen et al., 2022; Zhang et al., 2022). The regression output depicts statistically insignificant coefficients close to null across the different event windows. Therefore, there is little evidence supporting the proposition. The second hypothesis predicts a positive relationship between the ESG performance of the target firm and acquiror's abnormal returns as Tampakoudis and Anagnostopoulou (2020) demonstrate that target's pre-transaction ESG score is positively related to the acquiror's post-transaction market value. Relatedly, the resource-based view suggests that ESG commitments of target firms present valuable intangible assets that accrue to acquirors by positively influencing ESG performance, firm reputation and perception, which stakeholders of the acquiror are expected to positive value (Yu et al., 2019; Feng, 2021). However, the findings produced statistically insignificant estimates, indistinguishable from zero over all three event windows, hence the null hypothesis was not rejected. Consequently, findings favor the notion that capital markets do not recognize the sustainable performance in an M&A context, as acquiror nor targets overall ESG scores have any observable effect on value creation in this sample (Meckl & Theuerkorn, 2015; Fatemi et al., 2017). Hence, neither shareholder nor stakeholder theory seems to explain the effects of CSR, and market reactions in M&As rather depend on a more complex cost-benefit analysis of investors (Yen & Andre, 2019).

By contrast, there is empirical evidence supporting the third hypothesis in the baseline investigation. In light of the resource-based view, if valuable firm capabilities accrue to the acquiring firm following a successful deal, which in turn benefits long-term growth, market value, and other factors which improve acquiror's business, then investors are expected to positively value M&A investments involving targets

possessing superior ESG scores, regardless of the acquiring firm's pre-transaction score. Accordingly, Chen et al., (2022) demonstrate that markets significantly positively value ESG investments, resulting in higher acquiror announcement returns. As a result, the third hypothesis predicted positive estimates for the dummy variable representing targets with superior ESG performance than the acquiror at time of bid, which were found to be statistically significant at the ten percent level across the various event windows. Therefore, there is weak but significant evidence for markets positively valuing ESG investments, supporting the notion of the resource-based view and potential learning opportunities. However, further investigation is required to determine if acquisitions of targets with any level of superior performance induces positive abnormal returns, or whether the finding is driven by bids for targets with substantially greater ESG scores. Consequently, a ratio between the two firms scores is required to investigate the interaction between similar/dissimilar sustainability practices, such as in Bereskin et al. (2018).

The aforementioned hypotheses concerned the application of overall ESG scores of the firm(s) in question. However, disaggregation of the ESG dimensions captures different perspectives of the impact on M&As, and how sustainable actions are perceived by stakeholders (Barros et al., 2022). When treating the pillars separately, the influence of environmental and social dimensions is relatively ambiguous as the effect is subject to the applied sample. Nevertheless, the governance pillar has proved the most significant impact on financial variables across all sectors as corporate governance performance is most directly linked to short-term risks (Giese et al., 2021). Accordingly, the fourth hypothesis (4A, 4B, and 4C) follow the same reasoning as the previously introduced hypotheses but predicts the (acquiror, target, and superior performance, respectively) governance score to positively influence acquiror announcement returns. The findings do not support any of the fourth hypothesis and therefore fail to reject the null, primarily due to statistical insignificance. Notably, the acquiror's governance performance was statistically significant across all event windows but mildly negative, hence demonstrated an unexpected direction of the estimates. Perhaps improved governance performance does not induce a positive abnormal return due to the fact that United States possess relatively robust governance standards at a global level, thus is not valued by shareholders as it is a pre-requisite for businesses.

Nevertheless, the application of individual ESG pillars provide insights to what is valued as opposed to utilizing the overall score. The estimates for target's social scores and acquiring a target with superior social performance were statistically significant across the various event windows, both positively affecting acquiror announcement returns. Consequently, the target's social dimension may reflect facilitated integration processes and/or markets view the target's social dimension the easiest to rectify and integrate into the new (combined) entity upon deal completion. Alternatively, the finding is driven by the sample being skewed towards acquirors operating in socially sensitive sectors whereby

acquisitions for targets with sound social performance improves performance for firms domiciled in industries which require such risk management (Giese et al., 2021). Hence, would give further support for potential learning opportunities following the reasoning of the resource-based view, and particularly in sectors of which acquiror operations are related to such aspects.

The final set of hypothesis (5A, 5B, 5C) predicts the effect of firm's environmental (social) performance to be more pronounced in environmentally (socially) sensitive sectors, whereby the information reflected in the pillars is under relatively more scrutiny and is closer tied to firm profitability and operations (Cai et al., 2012; Garcia et al., 2017; Torre et al., 2020; Giese et al., 2021). Thus, acquirors' (5A), targets' (5B), and acquisitions of superior scores (5C) with respect to the dimension was predicted to positively influence acquiror announcement returns relative to firms operating in insensitive sectors, as stakeholders are expected to value the firm's reputation and capabilities in such areas relatively more due to attaching a higher weighting to those specific ESG factors (Garcia et al., 2017). The findings suggest there is no observable difference in the effect of acquirors and targets environmental nor social performance between sensitive or insensitive sectors due to statistically insignificant estimates. Hence, there is no evidence to support hypothesis 5A and 5B. However, acquisitions of targets possessing superior social scores in socially sensitive sectors are rewarded by capital markets, inducing a statistically positive abnormal return for acquiror shareholders. By contrast, the effect is not observed in environmentally sensitive sectors despite large coefficients. Similar to the interpretation above, social dimensions may be easier to integrate with respect to learning processes and therefore improve acquiror operations, whereas environmental aspects are primarily driven by regulatory changes and costly investments. Taken together, there is insufficient evidence supporting hypothesis 5C as solely one of the interaction terms was significantly positive.

As a result, the findings provide little support in favor of the developed hypotheses. Nevertheless, separating the pillars provide insights which are not captured by the overall ESG score. Notably, the coefficients produced greater magnitudes in the longer event windows, CAR [-10, 10], supporting the notion of markets not immediately valuing benefits related to sustainable initiatives (Deng et al., 2013). Thus, ESG performance may positively influence value creation arising from M&As but only in the long-term, requiring a study with longer time horizons (Barros et al., 2022). However, similar to previous studies, the models suffer from low explanatory power (measured by adjusted R-squared) and statistically insignificant coefficients at large (low t-statistics). Hence, firm's ESG performance captures a limited amount of the variability of cumulative abnormal returns about their mean values across the sample and future research is recommended to introduce more explanatory variables and more firms (cross-sectional observations).

The aforementioned conclusions are robust to changes in asset pricing models. Subsequent to recalculating the announcement returns via the Fama-French three-factor model and Carhart four-factor model, the directions and magnitudes of the estimates remain similar to those in the baseline study. Accordingly, the interpretations of the hypotheses persist. However, the application of an alternative ESG source (MSCI) emphasizes the existing limitations in the field, impeding inferences due to the discrepancies and inconsistencies amongst different data providers (Berg et al., 2019; Kotsantonis & Serafeim, 2019). The magnitudes and directions of estimates as well as t-statistics are substantially larger. Therefore, findings suggests that the choice of database undermines the corresponding conclusions, highlighting the difficulties to draw higher-level inferences regarding ESG (Brooks & Oikonomou, 2018). Accordingly, findings from previous related studies which merely utilize one source of ESG ratings may lack external validity (*Appendix 1*).

Notably, the interpretations of the hypothesis provide above remain unaltered except for the evidence in favor of hypothesis 3, as acquiring a target with superior overall ESG scores is not statistically significant. Moreover, acquiror firm's governance pillar is no longer significant whereas the environmental- and social- pillar are now significantly positive at the longer event windows. Nevertheless, the interpretation of shareholders not valuing governance dimensions due to sound existing frameworks in the United States holds. By contrast, target's social performance (in socially sensitive sectors), acquiring targets with superior social scores, and acquisitions of such targets in socially sensitive sectors remain significantly positive, hence the previous inferences are robust to an alternative ESG database. On the other hand, target's environmental score and acquiring targets with superior environmental performance in environmentally sensitive sectors are now both significantly negatively influence acquiror announcement returns. Therefore, the resource-based view does not hold in this aspect as a target firm with solid environmental performance may entail additional costs for the acquiror, potentially requiring large investments in operational processes to reduce the resource usage, pollution, and emissions, or alternative explanations to impeding integration of the firm. Hence, the estimates may reflect costly integration processes and/or substantial investment costs to the acquiring firm. Notably, the effect is not observed in the shorter event window potentially due to markets slowly reacting to the new sustainability implications (Deng et al., 2013).

6.1 Limitations

This work suffers from the following limitations that restrain the generalization of the conclusions. The sample suffers from selection bias as it encompasses solely firms domiciled in the United States. Therefore, the inferences regarding ESG may not hold in other markets whereby other dimensions could influence financial performance differently, as demonstrated by the work of Miralles-Quiros et al. (2018). Relatedly, the significance of ESG performance may differ across geographies, therefore, may not be valued by shareholders to the same extent as in the United States (Wilkins et al., 2019).

Additionally, the sample consists of publicly listed firms, disregarding private businesses due to data limitations. Private companies experience less scrutiny than their publicly listed peers, thus may have less incentive and ability to expend resources on ESG disclosures to obtain ESG ratings from a third-party assessor, as highlighted in the data extraction process. Consequently, inferences cannot be applied to private firms.

Moreover, bidder shareholders earn significantly higher cumulative abnormal returns in developed markets (such as the United States) compared to their emerging counterparts, overstating the announcement returns relative to such a sample (Yilmaz & Tanyeri, 2016). In light of overstating returns, the sample period covers 2013-2021, whereby acquirors have demonstrated to generate greater announcement returns from the year 2010 onwards (Cogman, 2014). Therefore, the findings are biased towards more positive returns compared to a longer time horizon. Additionally, the sample period entails the Covid-19 crisis (from March 20, 2020) whereby announcement returns and implications of ESG may differ to the rest of the sample following an economic downturn. Tampakoudis et al. (2021) demonstrate a significant negative value effect of ESG performance for acquiror shareholders during the crisis. Therefore, the influence of ESG could be negatively overstated in this study as almost one-third of the deals occurred in the years 2020 and 2021 (32.02% in *Table 5*).

Furthermore, the methodology required two strong assumptions. First, the ESG rating and financial data obtained at the end of the most recent fiscal year prior to the announcement was assumed to be representative at the time of bid. Consequently, any substantial changes of the firm characteristics (size, leverage, Tobin's Q, ROA) undergone during the year and/or alterations affecting ESG dimensions were not captured, and the ESG ratings were assumed to fairly reflect the sustainable performance of the firm, despite the risk for green washing. Similarly, risk ratings from S&P Global CSA are assumed to accurately identify sectors to be environmentally or socially sensitive. Second, the nature of an event study assumes that clustering i.e., overlapping cross-sectional event windows, does not affect the covariances of cross-sectional cumulative abnormal returns (MacKinlay, 1997). Therefore, M&A announcements on the same date could be biased as the estimates may be determined by specific market movements. Despite the application of risk-adjusted asset pricing models to capture such influences, one cannot fully exclude the possibility of biases arising due to clustering of events.

Finally, endogeneity is a frequently acknowledged problem in studies relating ESG to corporate financial measures as a two-way relation may be present (Soytas et al., 2019). Although an event study, such as M&A announcements which are assumed to be exogenous, can alleviate the problem, the causal effect of ESG scores may suffer from endogeneity (Aktas et al., 2011; Deng et al., 2013; Chen et al., 2022). The target firm's ESG performance has been documented to positively influence that of the acquiror (Tampakoudis & Anagnostopoulou, 2020; Barros et al., 2022). Therefore, the possibility of

acquirors bidding for a certain target in anticipation of improving its own ESG performance cannot be excluded, which in turn influences financial performance. Consequently, the reversal influence weakens the causal relationship between target's ESG score and acquirors announcement returns (Feng, 2021). Moreover, the sample encompasses solely firms that disclose ESG performance, therefore possess third-party ratings. Hence, the weak statistical evidence of a relationship between the firm's ESG scores and announcement returns produced in the study may be due to the fact that ESG disclosures increase the likelihood of becoming a target, and firms with more similar ESG policies are more likely to merge (Bereskin et al., 2018; Gomes, 2019). Hence, the effect of ESG performance was already anticipated prior to the announcement. Therefore, comparing announcement returns of 'green' deals with 'non-green' counterparts would be an interesting avenue to explore.

6.2 Future research

As a result of the aforementioned limitations, future research is recommended to extend the models by applying additional explanatory variables and adopting a larger sample. Moreover, one can investigate other geographies and time frames to improve the external validity, although caution should be taken as the relevance and accuracy of ESG ratings differ across countries (Belsom, 2021). Furthermore, the findings support the notion of markets rewarding ESG-oriented investments. However, future research is recommended to investigate the extent to which this holds, whether there is a specific threshold of the spread between acquiror- and target- ESG scores required to induce positive abnormal returns. Additionally, further investigation could apply alternative measures of sensitive sectors to ensure that inferences are robust when changing such a parameter. For example, one could adopt risk ratings from RepRisk database to obtain more objective ratings and defining sector sensitivity thereafter, although would require compelling reasons for applying a particular threshold.

Furthermore, future research is recommended to use a dummy variable to separate observations during the Covid-19 crisis, to observe any differences in the effect of ESG during an economic downturn relative to an expansionary period. Finally, one can re-estimate the models by adopting a 2-stage Least Squares regression model as opposed to OLS to control for self-selection bias and alleviate reverse causality issues, following a matching methodology described by Krishnamurti et al. (2019). Alternatively, difference-in-difference specifications can be adopted by comparing firms with robust ESG performance to a weak ESG counterpart.

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APPENDICES

Appendix 1: Contribution to literature

Author(s) (Publication year)	ESG Database	ESG			ESG Entity			Sectors
		Env	Soc	Gov	ESG	Target	Acquiror	
Aktas et al., (2011)	IVA	X	X			X	X	
Deng et al., (2013)	MSCI				X	X	X	
Fatemi et al., (2017)	Thomson Reuters	X	X		X		X	
Krishnamurti et al., (2019)	Thomson Reuters				X	X	X	
Yen and Andre (2019)	Thomson Reuters				X		X	
Chen et al., (2022)	Refinitiv				X	X	X	
Zhang et al., (2022)	Refinitiv				X		X	
This paper	Refinitiv MSCI	X	X	X	X	X	X	X

This table demonstrates the existing gaps in related papers analyzing cumulative abnormal returns, hence the contributions of this study.

Appendix 2: ESG ratings from Refinitiv

Pillar	Category	Metrics
Environmental	Resource use	20
	Emissions	28
	Innovation	20
Social	Workforce	30
	Human rights	8
	Community	14
	Product responsibility	10
Governance	Management	35
	Shareholders	12
	CSR strategy	9
Total		186

This table illustrates the rating metrics applied by Refinitiv (2021). Weighting of metrics vary by industry.

Appendix 3: Sensitive acquirors

Sector	Env. Risk (4+)	Soc. Risk (4+)
Oil & Gas	15	15
Metals & Mining	2	2
Power generation (coal)	4	4
Chemicals	2	2
Technology Hardware and Semiconductor	13	13
Auto and Auto Parts	2	2
Transportation	1	1
Machinery	6	
Consumer Products		12
Telecom		3
Utilities Network		2
Media		1
Leisure		4
Engineering and Construction		8
Technology Software and Services		11
Total	45	80

This table displays the number of sampled firms in sensitive sectors, derived from S&P Global Ratings (Wilkins et al., 2019).

Appendix 4: Hypotheses

Hypothesis	Statistical test	Equation	Notation H_0	Notation H_A
1	One-tailed t-test	5	$H_0: \hat{\beta}_1 \leq 0$	$H_1: \hat{\beta}_1 > 0$
2	One-tailed t-test	6	$H_0: \hat{\beta}_1 \leq 0$	$H_2: \hat{\beta}_1 > 0$
3	One-tailed t-test	7	$H_0: \hat{\beta}_1 \leq 0$	$H_3: \hat{\beta}_1 > 0$
4A	One-tailed t-test	8	$H_0: \hat{\beta}_3 \leq 0$	$H_{4A}: \hat{\beta}_3 > 0$
4B	One-tailed t-test	9	$H_0: \hat{\beta}_3 \leq 0$	$H_{4B}: \hat{\beta}_3 > 0$
4C	One-tailed t-test	10	$H_0: \hat{\beta}_3 \leq 0$	$H_{4C}: \hat{\beta}_3 > 0$
5A	One-tailed t-test	11	$H_0: \hat{\beta}_4(\hat{\beta}_5) \leq 0$	$H_{5A}: \hat{\beta}_4(\hat{\beta}_5) > 0$
5B	One-tailed t-test	12	$H_0: \hat{\beta}_4(\hat{\beta}_5) \leq 0$	$H_{5B}: \hat{\beta}_4(\hat{\beta}_5) > 0$
5C	One-tailed t-test	13	$H_0: \hat{\beta}_4(\hat{\beta}_5) \leq 0$	$H_{5C}: \hat{\beta}_4(\hat{\beta}_5) > 0$

This table displays the hypothesis of interest, the corresponding statistical test, the associated empirical model, and the empirical notation of the null (H_0) and alternative (H_A) hypothesis.

Appendix 5: Fama-French three-factor model overall scores

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_ESG	-0.0002			-0.0004			-0.0003		
	(-0.64)			(-0.80)			(-0.49)		
T_ESG		0.0001			0.0002			0.0004	
		(0.17)			(0.45)			(0.74)	
T>A_ESG			0.0077*			0.0104*			0.0183*
			(1.70)			(1.74)			(1.68)
Firm controls									
A_Size	-0.0025	-0.0040	-0.0035	-0.0026	-0.0055	-0.0062	-0.0001	-0.0017	-0.0029
	(-0.42)	(-0.73)	(-0.66)	(-0.28)	(-0.65)	(-0.73)	(-0.01)	(-0.2)	(-0.33)
A_Lev	0.0008	0.0005	0.0001	0.0228	0.0196	0.0205	0.0334	0.0300	0.0314
	(0.03)	(0.02)	(0.20)	(0.51)	(0.42)	(0.44)	(0.69)	(0.62)	(0.65)
A_Tobin	-0.0025	-0.0029	-0.0027	-0.0073	-0.0078	-0.0084	-0.0039	-0.0039	-0.0049
	(-0.54)	(-0.62)	(-0.61)	(-1.03)	(-1.13)	(-1.25)	(-0.53)	(-0.53)	(-0.69)
A_ROA	-0.0740	-0.0853	-0.0743	-0.0044	-0.0269	-0.0403	-0.1074	-0.1236	-0.1474
	(-0.91)	(-1.03)	(-0.93)	(-0.04)	(-0.21)	(-0.3)	(-0.68)	(-0.78)	(-0.89)
T_Size	0.0041	0.0042	0.0035	0.0091	0.0100	0.0092	0.0062	0.0082	0.0070
	(0.68)	(0.73)	(0.58)	(1.00)	(1.12)	(1.02)	(0.62)	(0.83)	(0.69)
T_Lev	-0.0269	-0.0265	-0.0283	-0.0660*	-0.0645*	-0.0638*	-0.0604	-0.0581	-0.0568
	(-1.17)	(-1.13)	(-1.21)	(-1.73)	(-1.65)	(-1.64)	(-1.30)	(-1.23)	(-1.17)
T_Tobin	-0.0029	-0.0029	-0.0029	-0.0028	-0.0026	-0.0028	-0.0055	-0.0053	-0.0056
	(-0.87)	(-0.85)	(-0.84)	(-0.54)	(-0.51)	(-0.54)	(-0.85)	(-0.83)	(-0.86)
T_ROA	-0.0332	-0.0314	-0.0291	-0.0109	-0.0088	-0.0090	-0.0165	-0.0157	-0.0152
	(-0.82)	(-0.77)	(-0.74)	(-0.2)	(-0.16)	(-0.16)	(-0.24)	(-0.24)	(-0.23)
Deal controls									
Relative deal	-0.0369	-0.0352	-0.0370	-0.0648	-0.0612	-0.0595	-0.0420	-0.0390	-0.0359
	(-1.27)	(-1.21)	(-1.23)	(-1.56)	(-1.5)	(-1.43)	(-0.91)	(-0.85)	(-0.79)
Cash	0.0062	0.0077	0.0053	0.0142	0.0110	0.0082	0.0098	0.0073	0.0023
	(0.48)	(0.6)	(0.39)	(0.7)	(0.54)	(0.39)	(0.41)	(0.3)	(0.09)
Related	0.0291**	0.0283**	0.0286**	0.0295*	0.0284*	0.0270*	0.0307	0.0309	0.0285
	(2.44)	(2.36)	(2.36)	(1.71)	(1.68)	(1.76)	(1.56)	(1.61)	(1.42)
Constant	0.0085	0.0117	0.0123	0.0066	0.0104	0.0149	-0.0354	-0.0370	-0.0293
	(0.2)	(0.27)	(0.29)	(0.1)	(0.16)	(0.22)	(-0.49)	(-0.5)	(-0.4)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	8.18%	7.85%	8.04%	4.05%	4.52%	4.53%	6.52%	6.17%	6.18%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the Fama-French three-factor model and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target overall ESG scores, following the regression equations

presented by equation 5, 6, and 7, respectively. The notation A (T) renders the acquiror (target) firm. A_ESG represents the acquiror firm's overall ESG score, T_ESG denotes the target firm's overall ESG score, and T>A ESG is a dummy variable for target firm's possessing superior overall ESG scores relative to the acquiror at the time of bid. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Appendix 6: Fama-French three-factor model pillar scores

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_Env	0.0004			0.0004			0.0001		
	(1.18)			(0.69)			(0.1)		
A_Soc	0.0000			0.0002			0.0003		
	(0.02)			(0.23)			(0.32)		
A_Gov	-0.0007**			-0.0012**			-0.0008**		
	(-2.02)			(-2.22)			(-2.28)		
T_Env		0.0000			0.0000			0.0001	
		(0.08)			(0.08)			(0.12)	
T_Soc		0.0005*			0.0005**			0.0002**	
		(1.89)			(2.10)			(2.32)	
T_Gov		-0.0003			-0.0004			-0.0003	
		(-1.23)			(-1.17)			(-0.82)	
T>A_Env			0.0175			0.0269			0.0209
			(0.95)			(1.00)			(0.67)
T>A_Soc			0.0329**			0.0593**			0.0451*
			(2.42)			(2.45)			(1.78)
T>A_Gov			0.0120			0.0003			0.0049
			(0.88)			(1.00)			(0.22)
Firm controls									
A_Size	-0.0035	-0.0048	-0.0036	-0.0033	-0.0067	-0.0061	0.0005	-0.0026	-0.0026
	(-0.6)	(-0.9)	(-0.68)	(-0.38)	(-0.78)	(-0.71)	(0.05)	(-0.29)	(-0.28)
A_Lev	0.0009	0.0021	0.0054	0.0184	0.0192	0.0166	0.0290	0.0314	0.0301
	(0.03)	(0.07)	(0.19)	(0.41)	(0.42)	(0.39)	(0.6)	(0.65)	(0.64)
A_Tobin	-0.0018	-0.0035	-0.0019	-0.0066	-0.0087	-0.0061	-0.0037	-0.0047	0.0028
	(-0.42)	(-0.77)	(-0.43)	(-0.93)	(-1.23)	(-0.92)	(-0.51)	(-0.63)	(-0.4)
A_ROA	-0.0427	-0.0634	-0.0585	-0.0586	-0.0008	-0.0028	-0.0540	-0.1090	-0.1113
	(-0.52)	(-0.77)	(-0.76)	(-0.46)	(-0.01)	(-0.02)	(-0.32)	(-0.68)	(-0.7)
T_Size	0.0030	0.0019	0.0031	0.0073	0.0074	0.0081	0.0050	0.0063	0.0058
	(0.51)	(0.32)	(0.54)	(0.79)	(0.78)	(0.91)	(0.5)	(0.6)	(0.57)
T_Lev	-0.0252	-0.0353	-0.0298	-0.0648*	-0.0755*	-0.0775**	-0.0609	-0.0653	-0.0701
	(-1.12)	(-1.51)	(-1.34)	(-1.81)	(-1.85)	(-2.06)	(-1.34)	(-1.32)	(-1.49)
T_Tobin	-0.0040	-0.0032	-0.0029	-0.0045	-0.0029	-0.0030	-0.0067	-0.0055	-0.0058
	(-1.18)	(-0.93)	(-0.9)	(-0.83)	(-0.55)	(-0.61)	(-1.02)	(-0.83)	(-0.9)
T_ROA	-0.0270	-0.0317	-0.0256	-0.0012	-0.0105	-0.0104	-0.0231	-0.0142	-0.0136
	(-0.70)	(-0.79)	(-0.68)	(-0.02)	(-0.19)	(-0.2)	(-0.34)	(-0.21)	(-0.2)
Deal controls									
Relative deal	-0.0330	-0.0367	-0.0465	-0.0586	-0.0634	-0.0775	-0.0380	-0.0407	-0.0510
	(-1.13)	(-1.23)	(-1.54)	(-1.4)	(-1.5)	(-1.8)	(-0.8)	(-0.87)	(-1.05)
Cash	-0.0045	-0.0074	-0.0025	-0.0185	-0.0114	-0.0183	-0.0140	-0.0075	0.0123
	(-0.34)	(-0.56)	(-0.18)	(-0.93)	(-0.55)	(-0.85)	(-0.59)	(-0.31)	(-0.5)

Related	0.0268**	0.0263**	0.0289**	0.0268	0.0261	0.0282	0.0298	0.0293	0.0297
	(2.37)	(2.17)	(2.56)	(1.55)	(1.42)	(1.63)	(1.54)	(1.5)	(1.52)
Constant	0.0393	0.0340	0.0123	0.0482	0.0387	0.0182	-0.0138	-0.0177	-0.0253
	(0.88)	(0.82)	(0.29)	(0.72)	(0.58)	(0.27)	(-0.18)	(-0.24)	(-0.33)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	10.96%	8.75%	11.68%	4.64%	4.62%	4.24%	6.45%	7.73%	5.38%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the Fama-French three-factor and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target environment, social, and governance pillar scores, following the regression equations presented by equation 8, 9, and 10, respectively.. The notation A (T) renders the acquiror (target) firm. A(T)_Env represents the acquiror (target) firm's environmental score, A(T)_Soc denotes the acquiror (target) firm's social score, and A(T)_Gov denotes the acquiror (target) firm's governance score. T>A_Env, T>A_Soc, and T>A_Gov are binary variables for target firms who possess superior environmental, social, and governance scores relative to the acquiror, respectively, at the time of bid. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Appendix 7: Fama-French three-factor model pillar scores in sensitive sectors

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_Env	0.0004			0.0004			0.0001		
	(1.17)			(0.75)			(0.18)		
A_Soc	0.0000			0.0002			0.0004		
	(0.11)			(0.35)			(0.42)		
A_Gov	-0.0007*			-0.0012**			-0.0008**		
	(-1.93)			(-2.13)			(2.23)		
A_Env*E_Sens	0.0001			0.0002			0.0002		
	(0.38)			(0.32)			(0.35)		
A_Soc*S_Sens	0.0001			0.0002			0.0003		
	(0.78)			(0.89)			(0.92)		
T_Env		0.0002			0.0002			0.0003	
		(0.49)			(0.43)			(0.44)	
T_Soc		0.0005*			0.0005**			0.0001*	
		(1.69)			(1.98)			(1.87)	
T_Gov		-0.0003			-0.0005			-0.0004	
		(-1.32)			(-1.18)			(-0.82)	
T_Env*E_Sens		-0.0006			-0.0005			-0.0005	
		(-1.25)			(-0.68)			(-0.62)	
T_Soc*S_Sens		0.0002			0.0001			0.0000	
		(0.58)			(0.14)			(0.07)	
T>A_Env			0.0082			0.0102			0.0138
			(0.39)			(0.34)			(0.36)
T>A_Soc			0.0247			0.0281			0.0197
			(1.36)			(0.94)			(0.62)
T>A_Gov			0.0124			0.0026			0.0020
			(0.87)			(0.12)			(0.09)
T>A_Env*E_Sens			0.0308			0.0588			0.0281
			(0.85)			(1.2)			(0.46)
T>A_Soc*S_Sens			0.0197*			0.0800**			0.0669*
			(1.80)			(1.97)			(1.84)
Firm controls									
A_Size	-0.0040	-0.0049	-0.0032	-0.0044	-0.0068	-0.0058	-0.0007	-0.0027	-0.0029
	(-0.64)	(-0.87)	(-0.58)	(-0.5)	(-0.77)	(-0.66)	(-0.08)	(-0.3)	(-0.31)
A_Lev	0.0011	0.0025	0.0053	0.0184	0.0192	0.0199	0.0290	0.0315	0.0337
	(0.04)	(0.08)	(0.18)	(0.4)	(0.41)	(0.43)	(0.59)	(0.63)	(0.69)
A_Tobin	-0.0013	-0.0049	-0.0026	-0.0059	-0.0098	-0.0075	-0.0029	-0.0057	-0.0035
	(-0.32)	(-1.07)	(-0.6)	(-0.86)	(-1.39)	(-1.15)	(-0.4)	(-0.76)	(-0.5)
A_ROA	-0.0492	-0.0420	-0.0441	0.0497	0.0175	0.0437	-0.0643	-0.0908	-0.0761
	(-0.58)	(-0.5)	(-0.54)	(0.37)	(0.13)	(0.36)	(-0.38)	(-0.55)	(-0.46)
T_Size	0.0028	0.0021	0.0037	0.0069	0.0074	0.0096	0.0046	0.0063	0.0067

	(0.47)	(0.35)	(0.63)	(0.75)	(0.78)	(1.08)	(0.46)	(0.59)	(0.67)
T_Lev	-0.0231	-0.0375	-0.0316	-0.0610*	-0.0775*	-0.0786**	-0.0566	-0.0673	-0.0689
	(-1.02)	(-1.57)	(-1.38)	(-1.66)	(-1.86)	(-2.11)	(-1.23)	(-1.35)	(-1.45)
T_Tobin	-0.0040	-0.0025	-0.0029	-0.0045	-0.0024	-0.0032	-0.0068	-0.0049	-0.0060
	(-1.17)	(-0.71)	(-0.88)	(-0.82)	(-0.43)	(-0.64)	(-1.01)	(-0.72)	(-0.93)
T_ROA	-0.0267	-0.0212	-0.0278	0.0012	-0.0003	-0.0232	0.0255	0.0248	0.0017
	(-0.67)	(-0.53)	(-0.71)	(0.02)	(-0.01)	(-0.45)	(0.36)	(0.35)	(0.02)
Deal controls									
Relative deal	-0.0342	-0.0365	-0.0468	-0.0608	-0.0638	-0.0770*	-0.0405	-0.0413	-0.0500
	(-1.15)	(-1.2)	(-1.56)	(-1.43)	(-1.47)	(-1.8)	(-0.84)	(-0.86)	(-1.05)
Cash	-0.0056	-0.0047	-0.0008	-0.0171	-0.0141	-0.0211	-0.0124	-0.0103	-0.0134
	(-0.4)	(-0.34)	(-0.06)	(-0.83)	(-0.64)	(-1.03)	(-0.51)	(-0.4)	(-0.54)
Related	0.0271**	0.0279**	0.0296**	0.0274	0.0281	0.0263	0.0304	0.0316	0.0265
	(2.38)	(2.25)	(2.56)	(1.55)	(1.5)	(1.48)	(1.55)	(1.57)	(1.32)
Constant	0.0421	0.0421	0.0065	0.0551	0.0337	0.0141	-0.0063	-0.0228	-0.0225
	(0.9)	(0.9)	(0.15)	(0.79)	(0.5)	(0.21)	(-0.08)	(-0.31)	(-0.29)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	9.83%	8.79%	11.07%	5.71%	5.75%	5.26%	7.61%	9.01%	5.29%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the Fama-French three-factor model and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target environment, social, and governance pillar scores, following the regression equations presented by equation 8, 9, and 10, respectively.. The notation A (T) renders the acquiror (target) firm. A(T)_Env represents the acquiror (target) firm's environmental score, A(T)_Soc denotes the acquiror (target) firm's social score, and A(T)_Gov denotes the acquiror (target) firm's governance score. T>A_Env, T>A_Soc, and T>A_Gov are binary variables for target firms who possess superior environmental, social, and governance scores relative to the acquiror, respectively, at the time of bid. The interaction terms involving E_Sens (S_Sens) represent a binary variable for acquirors operating in environmentally (socially) sensitive sectors. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Appendix 8: Carhart four-factor model overall scores

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_ESG	-0.0002			-0.0004			-0.0002		
	(-0.51)			(-0.74)			(-0.32)		
T_ESG		0.0001			0.0002			0.0002	
		(0.06)			(0.30)			(0.31)	
T>A_ESG			0.0062**			0.0120*			0.0239*
			(2.32)			(1.65)			(1.78)
Firm controls									
A_Size	-0.0030	-0.0042	-0.0039	-0.0027	-0.0053	-0.0061	-0.0023	-0.0036	-0.0050
	(-0.52)	(-0.78)	(-0.73)	(-0.29)	(-0.62)	(-0.71)	(-0.24)	(-0.4)	(-0.56)
A_Lev	0.0039	0.0029	0.0033	0.0333	0.0306	0.0310	0.0562	0.0544	0.0544
	(0.13)	(0.1)	(0.11)	(0.71)	(0.64)	(0.64)	(1.09)	(1.05)	(1.06)
A_Tobin	-0.0032	-0.0035	-0.0034	-0.0090	-0.0095	-0.0100	-0.0076	-0.0077	-0.0086
	(-0.69)	(-0.76)	(-0.76)	(-1.28)	(-1.38)	(-1.51)	(-1.06)	(-1.08)	(-1.24)
A_ROA	-0.0777	-0.0867	-0.0780	-0.0206	-0.0411	-0.0571	-0.0887	-0.0991	-0.1318
	(-0.95)	(-1.04)	(-0.97)	(-0.16)	(-0.32)	(-0.43)	(-0.53)	(-0.6)	(-0.77)
T_Size	0.0045	0.0044	0.0040	0.0096	0.0101	0.0098	0.0081	0.0089	0.0092
	(0.75)	(0.78)	(0.67)	(1.06)	(1.13)	(1.11)	(0.82)	(0.89)	(0.94)
T_Lev	-0.0281	-0.0279	-0.0292	-0.0670*	-0.0660*	-0.0646*	-0.0621	-0.0610	-0.0574
	(-1.22)	(-1.19)	(-1.25)	(-1.73)	(-1.67)	(-1.79)	(-1.3)	(-1.25)	(-1.15)
T_Tobin	-0.0030	-0.0029	-0.0029	-0.0026	-0.0024	-0.0026	-0.0046	-0.0045	-0.0047
	(-0.89)	(-0.87)	(-0.87)	(-0.51)	(-0.48)	(-0.51)	(-0.71)	(-0.7)	(-0.73)
T_ROA	-0.0361	-0.0345	-0.0329	-0.0149	-0.0124	-0.0137	-0.0118	-0.0121	-0.0082
	(-0.9)	(-0.85)	(-0.83)	(-0.27)	(-0.23)	(-0.24)	(-0.17)	(-0.17)	(-0.12)
Deal controls									
Relative deal	-0.0386	-0.0373	-0.0387	-0.0666	-0.0634	-0.0611	-0.0493	-0.0475	-0.0427
	(-1.33)	(-1.29)	(-1.29)	(-1.58)	(-1.53)	(-1.45)	(-1.09)	(-1.05)	(-0.96)
Cash	0.0068	0.0080	0.0061	0.0117	0.0089	0.0054	0.0077	0.0061	0.0010
	(0.53)	(0.62)	(0.44)	(0.57)	(0.43)	(0.25)	(0.31)	(0.25)	(0.04)
Related	0.0281	0.0274	0.0277	0.0277	0.0265	0.0252	0.0293	0.0291	0.0271
	(2.37)	(2.31)	(2.31)	(1.54)	(1.51)	(1.39)	(1.44)	(1.46)	(1.31)
Constant	0.0109	0.0138	0.0139	0.0029	0.0074	0.0107	-0.0309	-0.0304	-0.0264
	(0.26)	(0.32)	(0.33)	(0.04)	(0.11)	(0.16)	(-0.41)	(-0.39)	(-0.35)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	8.73%	8.51%	8.64%	5.43%	5.89%	5.74%	4.24%	4.26%	4.58%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the Carhart four-factor model and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target overall ESG scores, following the regression equations

presented by equation 5, 6, and 7, respectively. The notation A (T) renders the acquiror (target) firm. A_ESG represents the acquiror firm's overall ESG score, T_ESG denotes the target firm's overall ESG score, and T>A ESG is a dummy variable for target firm's possessing superior overall ESG scores relative to the acquiror at the time of bid. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Appendix 9: Carhart four-factor model pillar scores

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_Env	0.0004			0.0004			0.0000		
	(1.11)			(0.78)			(-0.06)		
A_Soc	0.0001			0.0000			0.0003		
	(0.10)			(0.04)			(0.31)		
A_Gov	-0.0006*			-0.0010*			-0.0005*		
	(-1.77)			(-1.87)			(-1.81)		
T_Env		0.0000			0.0001			0.0001	
		(0.11)			(0.10)			(0.23)	
T_Soc		0.0005*			0.0005**			0.0003*	
		(1.93)			(2.10)			(1.61)	
T_Gov		-0.0003			-0.0004			-0.0003	
		(-1.14)			(-1.04)			(-0.72)	
T>A_Env			0.0164			0.0276			0.0235
			(0.88)			(1.01)			(0.73)
T>A_Soc			0.0321**			0.0600**			0.0532**
			(2.37)			(2.51)			(2.09)
T>A_Gov			0.0112			0.0036			0.0040
			(0.81)			(0.17)			(-0.17)
Firm controls									
A_Size	-0.0040	-0.0051	-0.0039	-0.0035	-0.0065	-0.0057	-0.0020	-0.0044	-0.0044
	(-0.68)	(-0.95)	(-0.73)	(-0.41)	(-0.74)	(-0.66)	(-0.22)	(-0.49)	(-0.46)
A_Lev	0.0025	0.0011	0.0020	0.0303	0.0303	0.0263	0.0524	0.0559	0.0524
	(0.09)	(0.04)	(0.07)	(0.65)	(0.64)	(0.59)	(1.01)	(1.09)	(1.06)
A_Tobin	-0.0026	-0.0041	-0.0025	-0.0081	-0.0104	-0.0077	-0.0077	-0.0086	-0.0061
	(-0.59)	(-0.9)	(-0.59)	(-1.16)	(-1.48)	(-1.17)	(-1.06)	(-1.18)	(-0.88)
A_ROA	-0.0508	-0.0652	-0.0605	0.0286	-0.0149	-0.0122	-0.0501	-0.0789	0.0822
	(-0.61)	(-0.79)	(-0.78)	(0.22)	(-0.11)	(-0.1)	(-0.28)	(-0.47)	(-0.5)
T_Size	0.0035	0.0022	0.0036	0.0080	0.0075	0.0085	0.0073	0.0067	0.0076
	(0.6)	(0.37)	(0.62)	(0.87)	(0.79)	(0.96)	(0.73)	(0.62)	(0.76)
T_Lev	-0.0265	-0.0364	-0.0313	-0.0654*	-0.0768*	-0.0778**	-0.0629	-0.0695	-0.0736
	(-1.17)	(-1.56)	(-1.4)	(-1.78)	(-1.84)	(-2.01)	(-1.31)	(-1.37)	(-1.55)
T_Tobin	-0.0039	-0.0033	-0.0030	-0.0040	-0.0028	-0.0028	-0.0055	-0.0048	-0.0049
	(-1.17)	(-0.97)	(-0.92)	(-0.75)	(-0.53)	(-0.56)	(-0.84)	(-0.72)	(-0.76)
T_ROA	-0.0307	-0.0345	-0.0295	-0.0068	-0.0136	-0.0124	-0.0168	-0.0117	-0.0080
	(-0.79)	(-0.86)	(-0.78)	(-0.12)	(-0.25)	(-0.24)	(-0.24)	(-0.16)	(-0.12)
Deal controls									
Relative deal	-0.0352	-0.0388	-0.0481*	-0.0611	-0.0656	-0.0804*	-0.0466	-0.0498	-0.0614
	(-1.21)	(-1.3)	(-1.65)	(-1.44)	(-1.53)	(-1.84)	(-1.00)	(-1.08)	(-1.28)
Cash	0.0054	0.0077	0.0029	0.0148	0.0094	0.0166	0.0107	0.0070	0.0121
	(0.41)	(0.58)	(0.21)	(0.73)	(0.44)	(0.76)	(0.44)	(0.28)	(0.48)

Related	0.0260**	0.0253**	0.0281**	0.0250	0.0244	0.0268	0.0289	0.0278	0.0289
	(2.3)	(2.11)	(2.51)	(1.46)	(1.34)	(1.57)	(1.43)	(1.38)	(1.46)
Constant	0.0385	0.0353	0.0135	0.0425	0.0342	0.0129	-0.0184	-0.0109	-0.0231
	(0.86)	(0.86)	(0.32)	(0.61)	(0.5)	(0.18)	(-0.23)	(-0.14)	(-0.29)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	10.63%	9.37%	11.99%	5.08%	5.08%	5.06%	5.31%	5.42%	5.14%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the Carhart four-factor model and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target environment, social, and governance pillar scores, following the regression equations presented by equation 8, 9, and 10, respectively.. The notation A (T) renders the acquiror (target) firm. A(T)_Env represents the acquiror (target) firm's environmental score, A(T)_Soc denotes the acquiror (target) firm's social score, and A(T)_Gov denotes the acquiror (target) firm's governance score. T>A_Env, T>A_Soc, and T>A_Gov are binary variables for target firms who possess superior environmental, social, and governance scores relative to the acquiror, respectively, at the time of bid. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Appendix 10: Carhart four-factor model pillar scores in sensitive sectors

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_Env	0.0004			0.0005			0.0000		
	(1.11)			(0.89)			(0.08)		
A_Soc	0.0000			0.0001			0.0004		
	(0.09)			(0.18)			(0.42)		
A_Gov	-0.0006*			-0.0010*			-0.0005*		
	(-1.69)			(-1.79)			(-1.78)		
A_Env*E_Sens	0.0001			0.0001			0.0001		
	(0.35)			(0.28)			(0.17)		
A_Soc*S_Sens	0.0001			0.0003			0.0003		
	(0.79)			(1.02)			(0.88)		
T_Env		0.0002			0.0003			0.0004	
		(0.45)			(0.48)			(0.61)	
T_Soc		0.0005			0.0005			0.0003	
		(1.62)			(0.98)			(0.50)	
T_Gov		-0.0003			-0.0004			-0.0003	
		(-1.24)			(-1.06)			(-0.74)	
T_Env*E_Sens		-0.0006			-0.0006			-0.0006	
		(-1.29)			(-0.78)			(-0.82)	
T_Soc*S_Sens		0.0002			0.0001			0.0001	
		(0.67)			(0.22)			(0.26)	
T>A_Env			0.0073			0.0125			0.0162
			(0.35)			(0.41)			(0.41)
T>A_Soc			0.0236			0.0276			0.0245
			(1.32)			(0.93)			(0.75)
T>A_Gov			0.0117			0.0067			0.0007
			(0.82)			(0.31)			(0.03)
T>A_Env*E_Sens			0.0301			0.0542			0.0295
			(0.82)			(1.08)			(0.49)
T>A_Soc*S_Sens			0.0206*			0.0838**			0.0758*
			(1.84)			(2.11)			(1.66)
Firm controls									
A_Size	0.0045	-0.0051	-0.0035	-0.0050	-0.0065	-0.0056	-0.0037	-0.0045	-0.0047
	(-0.73)	(-0.91)	(-0.63)	(-0.57)	(-0.73)	(-0.63)	(-0.37)	(-0.48)	(-0.48)
A_Lev	0.0024	0.0006	0.0018	0.0304	0.0301	0.0300	0.0526	0.0557	0.0566
	(0.08)	(0.02)	(0.06)	(0.65)	(0.63)	(0.64)	(0.99)	(1.06)	(1.08)
A_Tobin	-0.0021	-0.0055	-0.0032	-0.0074	-0.0117	-0.0090	-0.0071	-0.0100	-0.0069
	(-0.5)	(-1.22)	(-0.74)	(-1.1)	(-1.66)	(-1.39)	(-0.98)	(-1.34)	(-0.98)
A_ROA	-0.0569	-0.0431	-0.0459	-0.0202	-0.0065	-0.0352	-0.0564	-0.0546	-0.0429
	(-0.66)	(-0.51)	(-0.56)	(-0.15)	(-0.05)	(-0.28)	(-0.32)	(-0.31)	(-0.25)

T_Size	0.0033	0.0024	0.0041	0.0076	0.0076	0.0099	0.0068	0.0068	0.0087
	(0.56)	(0.41)	(0.72)	(0.83)	(0.8)	(1.13)	(0.68)	(0.63)	(0.88)
T_Lev	-0.0243	-0.0386	-0.0330	-0.0611	-0.0790*	-0.0781**	-0.0588	-0.0721	-0.0719
	(-1.07)	(-1.62)	(-1.43)	(-1.63)	(-1.86)	(-2.04)	(-1.21)	(-1.39)	(-1.49)
T_Tobin	-0.0039	-0.0025	-0.0030	-0.0040	-0.0021	-0.0030	-0.0054	-0.0041	-0.0051
	(-1.15)	(-0.74)	(-0.9)	(-0.74)	(-0.39)	(-0.6)	(-0.81)	(-0.59)	(-0.8)
T_ROA	-0.0301	-0.0241	-0.0319	-0.0029	-0.0021	-0.0263	-0.0218	-0.0245	-0.0056
	(-0.74)	(-0.61)	(-0.82)	(-0.05)	(-0.04)	(-0.5)	(-0.3)	(-0.33)	(-0.08)
Deal controls									
Relative deal	-0.0365	-0.0383	-0.0485	-0.0635	-0.0658	-0.0797	-0.0489	-0.0499	-0.0601
	(-1.23)	(-1.26)	(-1.61)	(-1.48)	(-1.5)	(-1.84)	(-1.03)	(-1.06)	(-1.29)
Cash	0.0064	0.0050	0.0012	0.0136	0.0124	0.0192	0.0099	0.0103	0.0132
	(0.46)	(0.37)	(0.09)	(0.64)	(0.56)	(0.93)	(0.4)	(0.39)	(0.53)
Related	0.0263**	0.0269**	0.0287**	0.0256	0.0265	0.0242	0.0294	0.0301	0.0252
	(2.32)	(2.18)	(2.5)	(1.47)	(1.44)	(1.38)	(1.44)	(1.46)	(1.23)
Constant	0.0417	0.0303	0.0081	0.0512	0.0286	0.0108	-0.0089	-0.0171	-0.0192
	(0.9)	(0.71)	(0.19)	(0.71)	(0.41)	(0.16)	(-0.11)	(-0.22)	(-0.23)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	9.50%	9.52%	11.36%	4.02%	4.01%	4.08%	6.48%	6.39%	6.67%
Observations	153	153	153	153	153	153	153	153	153

This table reports the OLS regression output using the Carhart four-factor model and applying ESG data from the Refinitiv database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target environment, social, and governance pillar scores, following the regression equations presented by equation 8, 9, and 10, respectively.. The notation A (T) renders the acquiror (target) firm. A(T)_Env represents the acquiror (target) firm's environmental score, A(T)_Soc denotes the acquiror (target) firm's social score, and A(T)_Gov denotes the acquiror (target) firm's governance score. T>A_Env, T>A_Soc, and T>A_Gov are binary variables for target firms who possess superior environmental, social, and governance scores relative to the acquiror, respectively, at the time of bid. The interaction terms involving E_Sens (S_Sens) represent a binary variable for acquirors operating in environmentally (socially) sensitive sectors. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Appendix 11: MSCI ratings overall scores

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_ESG	-0.0012			-0.0010			-0.0015		
	(-0.25)			(-0.11)			(-0.17)		
T_ESG		0.0009			0.0006			0.0037	
		(0.18)			(0.08)			(0.44)	
T>A_ESG			0.0199			0.0144			0.0248
			(0.81)			(1.11)			(0.98)
Firm controls									
A_Size	0.0106	0.0115	0.0130*	0.0188	0.0196*	0.0192	0.0189	0.0178	0.0196
	(1.07)	(1.54)	(1.67)	(1.43)	(1.64)	(1.61)	(1.27)	(1.42)	(1.47)
A_Lev	-0.0733	-0.0755	-0.0802	-0.0226	-0.0225	-0.0220	-0.0596	-0.0661	-0.0533
	(-1.18)	(-1.21)	(-1.34)	(-0.23)	(-0.23)	(-0.22)	(-0.6)	(-0.63)	(-0.55)
A_Tobin	0.0066	0.0062	0.0063	0.0033	0.0032	0.0034	0.0058	0.0047	0.0059
	(0.65)	(0.61)	(0.61)	(0.26)	(0.25)	(0.26)	(0.41)	(0.34)	(0.42)
A_ROA	-0.0907	-0.0954	-0.0704	-0.2607	-0.2536	-0.2626	-0.3500	-0.3229	-0.3311
	(-0.41)	(-0.43)	(-0.31)	(-0.97)	(-0.92)	(-0.97)	(-1.07)	(-1.01)	(-1.02)
T_Size	-0.0167	-0.0160	-0.0173	-0.0211	-0.0215	-0.0209	-0.0183	-0.0212	-0.0191
	(-1.19)	(-1.18)	(-1.21)	(-1.08)	(-1.11)	(-1.09)	(-0.89)	(-1.02)	(-0.91)
T_Lev	-0.0649	-0.0617	-0.0694	-0.1641*	-0.1644*	-0.1618*	-0.1988**	-0.2080**	-0.2076**
	(-1.08)	(-0.98)	(-1.13)	(-1.72)	(-1.67)	(-1.66)	(-1.95)	(-1.89)	(-2.00)
T_Tobin	-0.0186**	-0.0178**	-0.0176**	-0.0252**	-0.0252**	-0.0251**	-0.0282**	-0.0304**	-0.0277**
	(-2.53)	(-2.24)	(-2.48)	(-2.34)	(-2.21)	(-2.35)	(-2.27)	(-2.28)	(-2.21)
T_ROA	-0.0242	-0.0264	-0.0161	-0.0019	-0.0007	-0.0039	-0.0866	-0.0950	-0.0973
	(-0.31)	(-0.34)	(-0.2)	(-0.02)	(-0.01)	(-0.04)	(-0.73)	(-0.77)	(-0.78)
Deal controls									
Relative deal	0.0874	0.0860	0.0904	0.1141	0.1137	0.1125	0.1153	0.1182	0.1215
	(1.52)	(1.5)	(1.54)	(1.44)	(1.46)	(1.47)	(1.31)	(1.36)	(1.38)
Cash	0.0105	0.0105	0.0153	0.0074	0.0078	0.0066	0.0139	0.0148	0.0194
	(0.59)	(0.58)	(0.82)	(0.31)	(0.32)	(0.27)	(0.51)	(0.53)	(0.73)
Related	0.0005	0.0027	0.0002	0.0381	0.0384	0.0371	0.0561	0.0628	0.0589
	(0.02)	(0.08)	(0.10)	(0.91)	(0.85)	(0.88)	(1.26)	(1.22)	(1.24)
Constant	0.1833*	0.1772*	0.1489*	0.1326	0.1309	0.1362	0.0191	0.0328	-0.0138
	(1.85)	(1.77)	(1.65)	(0.9)	(0.94)	(0.86)	(0.11)	(0.2)	(-0.08)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	8.94%	8.87%	10.22%	8.29%	8.32%	8.29%	7.03%	7.28%	7.99%
Observations	77	77	77	77	77	77	77	77	77

This table reports the OLS regression output using the market model and applying ESG data from the MSCI database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target overall ESG scores, following the regression equations presented by equation

5, 6, and 7, respectively. The notation A (T) renders the acquiror (target) firm. A_ESG represents the acquiror firm's overall ESG score, T_ESG denotes the target firm's overall ESG score, and T>A ESG is a dummy variable for target firm's possessing superior overall ESG scores relative to the acquiror at the time of bid. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Appendix 12: MSCI ratings pillar scores

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_Env	0.0102**			0.0246***			0.0205**		
	(2.24)			(2.74)			(2.00)		
A_Soc	0.0055			0.0155*			0.0160*		
	(0.73)			(1.82)			(1.67)		
A_Gov	-0.0036			-0.0067			-0.0049		
	(-0.69)			(-0.94)			(-0.61)		
T_Env		-0.0023			-0.0061			-0.0012	
		(-0.36)			(-0.64)			(-0.13)	
T_Soc		0.0075**			0.0180**			0.0181**	
		(2.20)			(2.15)			(2.33)	
T_Gov		-0.0034			-0.0095			-0.0089	
		(-0.96)			(-1.62)			(-1.35)	
T>A_Env			-0.0364			-0.0634			-0.0313
			(-1.21)			(-1.17)			(-0.72)
T>A_Soc			0.0344*			0.0683*			0.0691*
			(1.69)			(1.72)			(1.83)
T>A_Gov			0.0270			0.0153			0.0133
			(0.30)			(0.18)			(0.39)
Firm controls									
A_Size	0.0082	0.0120*	0.0103	0.0123	0.0208*	0.0174	0.0139	0.0192*	0.0170
	(0.85)	(1.69)	(1.22)	(1.00)	(1.78)	(1.55)	(0.95)	(1.81)	(1.29)
A_Lev	-0.0752	-0.0743	-0.0854	-0.0277	-0.0274	-0.0490	-0.0544	-0.0646	-0.0264
	(-1.21)	(-1.15)	(-1.24)	(-0.31)	(-0.29)	(-0.52)	(-0.59)	(-0.68)	(-0.27)
A_Tobin	0.0078	0.0050	0.0070	0.0002	0.0077	0.0021	0.0030	0.0076	0.0037
	(0.79)	(0.51)	(0.66)	(0.01)	(0.6)	(0.16)	(0.22)	(0.56)	(0.25)
A_ROA	-0.0671	-0.1070	-0.0428	-0.2166	-0.3273	-0.1881	-0.3168	-0.3697	-0.3240
	(-0.29)	(-0.47)	(-0.17)	(-0.83)	(-1.18)	(-0.68)	(-1.01)	(-1.15)	(-0.98)
T_Size	-0.0181	-0.0204	-0.0172	-0.0244	-0.0291	-0.0218	-0.0208	-0.0297	-0.0183
	(-1.31)	(-1.45)	(-1.21)	(-1.42)	(-1.6)	(-1.18)	(-1.12)	(-1.47)	(-0.88)
T_Lev	-0.0808	-0.0609	-0.0417	-0.2080**	-0.1525	-0.1268	0.2393**	-0.2018	-0.1910
	(-1.26)	(-0.95)	(-0.65)	(-2.32)	(-1.6)	(-1.24)	(-2.46)	(-1.85)	(-1.76)
T_Tobin	-0.0192**	-0.0177**	-0.0159**	-0.0272**	-0.0225**	-0.0202**	-0.0298**	-0.0285**	-0.0239**
	(-2.34)	(-2.18)	(-2.14)	(-2.31)	(-2.06)	(-2.02)	(-2.32)	(-2.08)	(-1.87)
T_ROA	-0.0058	-0.0235	-0.0192	0.0357	-0.0068	-0.0010	-0.1124	-0.0997	-0.0734
	(-0.06)	(-0.3)	(-0.23)	(0.32)	(-0.07)	(-0.01)	(-0.9)	(-0.78)	(-0.56)
Deal controls									
Relative deal	0.0898	0.0802	0.0709	0.1206	0.0968	0.0839	0.1197	0.1030	0.0916
	(1.60)	(1.36)	(1.23)	(1.51)	(1.24)	(1.12)	(1.47)	(1.17)	(1.09)
Cash	0.0163	0.0070	0.0116	0.0200	0.0026	0.0104	0.0239	0.0082	0.0208

	(0.88)	(0.36)	(0.62)	(0.9)	(0.11)	(0.43)	(0.91)	(0.29)	(0.81)
Related	0.0091	0.0002	0.0038	0.0629	0.0367	0.0473	0.0778	0.0685	0.0657
	(0.29)	(-0.01)	(0.11)	(1.61)	(0.92)	(1.02)	(1.73)	(1.37)	(1.3)
Constant	0.2429**	0.2022**	0.1857*	0.2744*	0.1883	0.1382	0.1339	0.0768	0.0067
	(2.06)	(1.96)	(1.82)	(1.77)	(1.45)	(0.9)	(0.73)	(0.46)	(0.04)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	9.43%	8.07%	9.89%	5.51%	5.03%	5.90%	5.13%	5.82%	5.88%
Observations	77	77	77	77	77	77	77	77	77

This table reports the OLS regression output using the market model and applying ESG data from the MSCI database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target environment, social, and governance pillar scores, following the regression equations presented by equation 8, 9, and 10, respectively.. The notation A (T) renders the acquiror (target) firm. A(T)_Env represents the acquiror (target) firm's environmental score, A(T)_Soc denotes the acquiror (target) firm's social score, and A(T)_Gov denotes the acquiror (target) firm's governance score. T>A_Env, T>A_Soc, and T>A_Gov are binary variables for target firms who possess superior environmental, social, and governance scores relative to the acquiror, respectively, at the time of bid. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.

Appendix 13: MSCI ratings pillar scores in sensitive sectors

	CAR [-1,1]			**CAR [-5,5]**			**CAR [-10,10]**		
	1	2	3	1	2	3	1	2	3
A_Env	0.0136*			0.0323***			0.0259***		
	(1.72)			(3.61)			(2.60)		
A_Soc	0.0068			0.0183*			0.0201*		
	(0.78)			(1.89)			(1.75)		
A_Gov	-0.0046			-0.0090			-0.0061		
	(-0.82)			(-1.23)			(-0.75)		
A_Env*E_Sens	0.0049			0.0109			0.0095		
	(0.87)			(1.14)			(1.08)		
A_Soc*S_Sens	0.0015			0.0032			0.0056		
	(0.39)			(0.65)			(0.92)		
T_Env		-0.0022			-0.0043			-0.0003	
		(-0.33)			(-0.46)			(-0.03)	
T_Soc		0.0068*			0.0151*			0.0140*	
		(1.73)			(1.71)			(1.65)	
T_Gov		-0.0038			-0.0103			-0.0100	
		(-0.98)			(-1.14)			(-1.51)	
T_Env*E_Sens		-0.0138			-0.0149*			-0.0174*	
		(-1.24)			(-1.69)			(-1.89)	
T_Soc*S_Sens		0.0044*			0.0112*			0.0153*	
		(1.68)			(1.81)			(1.80)	
T>A_Env			-0.0133			-0.0386			0.0147
			(-0.14)			(-0.88)			(0.29)
T>A_Soc			0.0312			0.0223			0.0113
			(0.82)			(0.44)			(0.22)
T>A_Gov			0.0115			0.0123			0.0266
			(0.06)			(0.07)			(0.75)
T>A_Env*E_Sens			-0.0670			-0.0569*			-0.1025*
			(-1.11)			(-1.68)			(-1.83)
T>A_Soc*S_Sens			0.0734**			0.1103*			0.1414**
			(2.29)			(1.84)			(2.28)
Firm controls									
A_Size	0.0065*	0.0105	0.0109*	0.0085*	0.0177*	0.0145	0.0127	0.0151*	0.0138
	(1.64)	(1.18)	(1.78)	(1.67)	(1.85)	(1.23)	(0.85)	(1.74)	(1.02)
A_Lev	-0.0796	-0.0775	-0.0839	-0.0376	-0.0256	-0.0480	-0.0490	-0.0684	-0.0284
	(-1.24)	(-1.14)	(-1.18)	(-0.41)	(-0.26)	(-0.52)	(-0.51)	(-0.73)	(-0.29)
A_Tobin	0.0105	0.0087	0.0080	0.0059	0.0034	0.0012	0.0033	0.0025	0.0021
	(0.99)	(0.93)	(0.73)	(0.5)	(0.25)	(0.09)	(0.22)	(0.17)	(0.14)
A_ROA	-0.0518	-0.1105	-0.0393	-0.1832	-0.3265	-0.2091	-0.2659	-0.3672	-0.3479
	(-0.22)	(-0.51)	(-0.15)	(-0.71)	(-1.16)	(-0.73)	(-0.82)	(-1.11)	(-1.05)

T_Size	-0.0188	-0.0180	-0.0151	-0.0260	-0.0211	-0.0168	-0.0213	-0.0186	-0.0112
	(-1.34)	(-1.29)	(-1.11)	(-1.54)	(-1.13)	(-0.95)	(-1.17)	(-0.85)	(-0.58)
T_Lev	-0.0747	-0.0672	-0.0641	-0.1942**	-0.1564*	-0.1254	-0.2286**	-0.2053*	-0.2003*
	(-1.17)	(-1.11)	(-0.95)	(-2.25)	(-1.69)	(-1.21)	(-2.34)	(-1.88)	(-1.64)
T_Tobin	-0.0177**	-0.0153**	-0.0155**	-0.0237**	-0.0178	-0.0190*	-0.0262**	-0.0223*	-0.0223*
	(-2.24)	(-2.02)	(-2.06)	(-1.98)	(-1.62)	(-1.79)	(-1.98)	(-1.66)	(-1.64)
T_ROA	-0.0075	-0.0165	-0.0253	-0.0660	-0.0357	-0.0474	-0.1251	-0.0533	-0.0112
	(-0.08)	(-0.21)	(-0.31)	(-0.65)	(-0.34)	(-0.45)	(-1.00)	(-0.39)	(-0.09)
Deal controls									
Relative deal	0.0981	0.0794	0.0655	0.1391	0.0870	0.0680	0.1354	0.0883	0.0695
	(1.26)	(1.31)	(1.14)	(1.20)	(1.08)	(0.89)	(1.63)	(0.98)	(0.83)
Cash	0.0152	0.0058	0.0159	0.0177	0.0035	0.0188	0.0211	0.0075	0.0332
	(0.81)	(0.31)	(0.85)	(0.83)	(0.14)	(0.81)	(0.81)	(0.26)	(1.4)
Related	0.0078	0.0099	0.0021	0.0597*	0.0308	0.0550	0.0805*	0.0633	0.0723
	(0.25)	(0.34)	(0.06)	(1.71)	(0.8)	(1.16)	(1.83)	(1.33)	(1.34)
Constant	0.2595**	0.1904*	0.1541	0.3128*	0.1442	0.0717	0.1330	0.0144	-0.0901
	(1.99)	(1.68)	(1.52)	(1.91)	(1.03)	(0.50)	(0.71)	(0.08)	(-0.56)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	6.86%	9.86%	8.63%	4.37%	4.83%	4.63%	6.46%	6.22%	5.80%
Observations	77	77	77	77	77	77	77	77	77

This table reports the OLS regression output using the market model and applying ESG data from the MSCI database. CAR [-1,1], CAR [-5,5], and CAR [-10,10] denote the acquiring firm's cumulative abnormal return returns over a three-day, eleven-day, and twenty-one-day event window, respectively, whereby the variable is winsorized at the 1st and 99th percentile. Columns 1, 2, 3 explore the effect of acquiror's, target's, and superior target environment, social, and governance pillar scores, following the regression equations presented by equation 8, 9, and 10, respectively.. The notation A (T) renders the acquiror (target) firm. A(T)_Env represents the acquiror (target) firm's environmental score, A(T)_Soc denotes the acquiror (target) firm's social score, and A(T)_Gov denotes the acquiror (target) firm's governance score. T>A_Env, T>A_Soc, and T>A_Gov are binary variables for target firms who possess superior environmental, social, and governance scores relative to the acquiror, respectively, at the time of bid. The interaction terms involving E_Sens (S_Sens) represent a binary variable for acquirors operating in environmentally (socially) sensitive sectors. A full list of definitions for the explanatory variables can be found in *Table 3*. The firm controls include the firm's size (A(T)_Size) computed as the natural logarithm of the firms' total assets, leverage (A(T)_Lev) calculated by the ratio of book value of debt and market value of assets, Tobins Q (A(T)_Tobin) representing the ratio of market value of assets over the book value of assets, and return on assets (A(T)_ROA) expressed as the ratio of operating income before depreciation scaled by the book value of assets. The deal controls included are the reported deal value over the acquiror's market value (Relative deal), a binary variable if the acquiror pays purely with cash (Cash), and a binary variable if the acquiror and target firm are in the same two-digit SIC industry (Related). Industry and Year represent binary variables for the acquiror two-digit SIC industry and the announcement year of the deal, respectively. A full list of definitions for the control variables are demonstrated in *Table 4*. The coefficients and corresponding t-statistics (in parentheses) are reported for each variable, whereby standard errors are clustered at the firm level. The asterisks *, **, *** denote a significance level of 0.10, 0.05, 0.01, respectively.