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Abstract

This thesis examines the impact of Environmental, Social, and Governance (ESG) factors on shareholder value using a large sample of mergers and acquisitions (M&A) deals in the US. Our findings indicate a significant negative relationship between ESG and acquirer firm value around the announcement date. In addition, Governance pillar (G) of ESG is found as the primary contributor to this negative relationship. These results align with shareholder expense theory, indicating that ESG considerations impose costs on acquiring firms in the short term. However, the long-term relationship between ESG and firm value remains inadequately understood due to the absence of a statistically significant coefficient in this research.

Key Words: Environmental, Social and Governance (ESG), shareholder expense theory, Mergers and Acquisitions (M&A), Cumulative Abnormal Return (CAR), firm value

CONTENTS

LIST OF TABLES

1 Introduction and Motivation

In recent years, there has been substantial global development in the field of Environmental, Social, and Governance (ESG) as societal focus on sustainability intensifies. An overwhelming majority of S&P 500 companies, exceeding 90%, now disclose their ESG performance through sustainability or corporate responsibility reports. Moreover, as of 2018, over 1900 financial institutions, collectively managing assets worth approximately 90 trillion USD, had committed to the United Nations Principles for Responsible Investment (UN PRI) (UN PRI, 2018). In addition, a recent study conducted by Pastor, Stambaugh, and Taylor (2023) observed that institutions, after becoming signatories of the UN PRI, demonstrated a greater inclination towards green investments compared to brown investments.

Despite the growing attention on ESG performance, the relationship between ESG factors and corporate financial performance is a subject of ongoing debate within academic circles. One perspective argues that the information on ESG factors is already incorporated into stock prices, implying that future stock returns may be low. Scholars who hold this view suggest that investors who are genuinely concerned about ESG should consider investing in "brown" stocks. They argue that by exercising their control rights on changing a company's policies, investors could influence its long-term cost of capital (Berk and van Binsbergen, 2021). On the other hand, contrasting evidence has been presented by other scholars, such as Gillan, Koch, and Starks in 2021, suggesting that the market may underprice ESG stocks. According to this viewpoint, ESG factors may not be fully reflected in stock prices, leading to potential future increases in prices and returns for ESG stocks. These conflicting perspectives highlight the ongoing academic discourse surrounding the relationship between ESG and financial performance and further research is needed to gain a deeper understanding of such relationship.

To contribute to the ongoing debate, this research study aims to enhance people’s understanding of the impact of ESG factors on firm value under mergers and acquisitions (M&A) structure. By delving deeper into this topic, we aim to provide a more comprehensive understanding of the implications of ESG considerations for investors, companies, and the broader financial market.

The selection of the M&A framework for our study is motivated by two primary reasons. Firstly, M&A are complex and significant investment decisions for corporations, with potential outcomes that can be both positive and negative, depending on various factors. Therefore, it is crucial to identify the key determinants that influence the success of M&A transactions, benefiting deal participants and investors. As the importance of ESG considerations continues to grow, their incorporation into M&A decisions has gained prominence. However, the existing literature on the relationship between ESG and M&A performance remains limited. Secondly, by focusing on M&A announcement returns, the endogeneity issues arising from the reverse causality as commonly reported in previous studies (McWilliams and Siegel, 2000; Jiao, 2010) can be largely addressed. This is due to the nature of M&A transactions, which is typically an unexpected event (Deng, Kang and Low, 2013), making it less likely for the M&A event announcement to influence ESG score one year prior.

The data for M&A transaction details and ESG scores for both acquirer and target companies are retrieved from the Refinitiv Eikon database. Five filters in the database are used to limit the size of the deal sample before merging it with stock and financial information collected from the Center for Research in Security Prices (CRSP) and the Compustat databases, respectively. It leads to a final sample encompassing 2,887 completed M&A deals in the US between 2003 and 2019.

Considering the growing emphasis on sustainability within companies, it is anticipated that M&A activities involving acquirers or targets with favorable ESG scores will be positively received by the market. In view of this, we establish our hypotheses. The first hypothesis postulates a positive relationship between acquirer ESG score and M&A short-term performance, proxy by cumulative abnormal return (CAR) around the announcement date. The second hypothesis proposes that all three pillar scores are positively associated with M&A performance around the announcement date. The third one assumes that acquirer CAR around the announcement date is positively affected by target ESG scores. Furthermore, we formulate the last hypothesis which posits a positive relationship between acquirer's ESG scores and post-event stock performance in the long term to get more comprehensive understanding.

To examine the hypotheses related to M&A short-term performance, we conduct several Ordinary Least Squares (OLS) regression models. In each regression model, the CAR with different time window, namely CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5), are employed as the dependent variable, representing the acquirer's M&A performance around the deal announcement date. We included control variables related to deal characteristics (deal size, deal payment method, deal attitude, cross-border status, diversification strategy, and whether the target was publicly or privately owned) and firm characteristics (firm size, free cash flow, leverage, previous market-adjusted return, and Tobin's q). Furthermore, industry and year fixed effects were incorporated to capture the unobserved heterogeneity across different industries and years. To investigate the relationship between acquirer ESG score and M&A long-term performance, we construct the equal-weighted portfolio of acquirers that just complete an M&A deal between 2003 and 2019 with the prespecified holding periods. Then, the OLS regressions are conducted on the four factors from the Fama and French (1992, 1993) and Carhart (1997) model.

Our empirical analysis reveals that the ESG combined score of acquirers has a statistically significant negative effect on their short-term return, but a statistically insignificant positive effect on their long-term return. Notably, the negative impact on short-term return is primarily driven by the Governance (G) pillar of the ESG combined score. Acquiring a target with disclosed ESG gives the acquirer a higher announcement abnormal return compared to acquiring a target without available ESG score. Additionally, our results also imply that the market rewards acquirers that engage in the acquisition of targets with lower ESG scores.

Several tests examine the robustness of our findings in addition. The first test aims to address the potential endogeneity bias arising from omitted unobservable variables and self-selection bias using a two-stage least squares regression model (2SLS) with two instrumental variables: a blue state dummy and religion rank[1]. The second test replaces acquirer ESG score with a dummy variable (1 when the acquirer ESG score is above the median ESG score of the full sample, 0 otherwise) to investigate the first hypothesis. Finally, we re-estimate all the main regressions

[1] The blue state dummy is 1 if the headquarters of acquirer is in a blue state (Democratic state), 0 otherwise. The religion rank indicates how religious the state where acquirer headquarters is located among 51 states in the US. The detailed definitions and specific list of two instruments are reported in Table 4.2.3 Panel A and Appendix B, respectively.

by using the sample excluding financial industry related firms, as financial firms often exhibit unique operation patterns, and the financial indicators should be interpreted differently. Results in this section remain consistent with our original findings, providing further support for our conclusions.

This thesis makes several contributions to the existing literature on the relationship between ESG performance and firm value. Firstly, our analysis is based on a sample of 2,887 completed M&A transactions in the US from 2003 to 2019, providing deals in more recent years and considerable observations. Secondly, the prior research mostly explores the association between ESG performance and M&A deal premiums for the target, while this thesis investigates whether acquirers can benefit in M&A deals based on their ESG performance. Lastly, we examine the causal association between ESG performance and firm value within the context of an unexpected event, M&A, thereby alleviating concerns associated with endogeneity that frequently caused by reverse causation. This study also sheds light on the specific impact of each pillar score on firm value under the M&A structure which contributes to a more comprehensive understanding of the effect of ESG on firm value.

Our thesis is structured as follows. We first review the important literature from different aspects on related topics in Section 2. Section 3 outlines the formulation of hypotheses and provides detailed empirical methodologies employed. Section 4 includes the sample construction and summary statistics. Section 5 presents the results and analysis of the main tests. Section 6 addresses the endogeneity issue and contains several robustness tests. Section 7, we summarize the whole thesis, draw conclusions, and outline the limitations inherent in our study.

2 Literature Review and Theory

2.1 ESG and Firm Value

The relationship between ESG factors and firm value or financial performance has garnered considerable interest in academic discourse. Existing literature, as what is said in the work by Gillan, Koch, and Starks (2021), has generated substantial debate regarding this relationship. Some scholars stand for shareholder expense theory, and they argue that ESG activities may be attributed to agency problems, whereby managers prioritize their own interests over those of the shareholders. In their study, Di Giuli and Kostovetsky (2014) examine the consequences of corporate social responsibility (CSR) policy changes on firm value, institutional investor holdings, and future operating performance, measured by return on assets. Their findings reveal a negative correlation between the expansion of CSR policies and firm performance. Another investigation by Masulis and Reza (2015) employs the methodology developed by Faulkender and Wang (2006). Their research demonstrates that an increase in corporate giving leads to a substantial decrease in firm value. Furthermore, they utilize the 2003 dividend tax cut as a natural experiment and observe a significant decline in corporate giving following this Tax Reform Act, which has a great connection with CEO wealth. Notably, the effect is more pronounced when CEO ownership increases, lending support to the notion that CEOs prioritize their personal benefit rather than that of the shareholders.

Contrarily, some scholars stand for stakeholder value maximization theory and hold the view that a positive relationship exists between ESG factors and firm value, suggesting that ESG activities can contribute to enhancing firm value. Lins, Servaes, and Tamayo (2017) conduct a study utilizing data from the MSCI ESG Stats database to investigate the performance of 1,673 non-financial firms with CSR scores. Their findings indicate that firms with high CSR scores exhibit greater profitability, growth, and sales per employee compared to those with low CSR scores. Similarly, Albuquerque, Koskinen, and Zhang (2019) employ firm-level CSR data from MSCI's ESG Research database, focusing on a sample of US companies from 2003 to 2015. Through panel regressions incorporating time and industry fixed effects, as well as control variables known to influence systemic risk, they discover a positive relationship between CSR and firm value. These studies

provide evidence supporting the notion that ESG activities can generate value for firms, thereby challenging the argument that ESG actions solely stem from agency problems or self-interest.

Indeed, within the perspective that ESG activities can create value, there exist differences in findings and interpretations among studies. While some research supports that ESG has already been incorporated into stock price and lower stock return will go forward, other studies present contrasting evidence. Lins, Servaes, and Tamayo (2017) examine the relationship between CSR/ESG and firm performance before, during, and after a crisis. Their model demonstrates that CSR/ESG has a positive impact only during times of crisis. This finding suggests that the value created by CSR/ESG may be more prominent and beneficial only in challenging economic conditions. Additionally, certain studies agree on the positive effect of CSR/ESG on firm value but argue that stocks with high ESG ratings are often mispriced. These studies suggest that such mispricing presents an opportunity for investors to earn higher returns in the future. Edmans (2011), for instance, constructs a value-weighted portfolio comprised of the 100 best companies to work for in America from 1984 to 2009. The results reveal that this portfolio earns a 2.1% return, indicating that the market does not fully value the intangible aspects that contribute to firm value. These divergent findings highlight the complexities involved in understanding the relationship between ESG/CSR and firm value, underscoring the need for further research and analysis to gain a comprehensive understanding of these dynamics.

This thesis aims to contribute to the ongoing debate on the conflicting perspectives regarding the impact of ESG on firm value. To achieve this, we employ a large sample size with a significant number of M&A deals and utilize announcement abnormal return as a measure of value creation or destruction. By doing so, we are able to mitigate concerns related to endogeneity and obtain more reliable and robust results. Additionally, we investigate the impact of individual pillar scores on firm value by examining their associations, whether positive or negative, with abnormal return around the announcement date.

2.2 Merges and Acquisitions (M&A)

A comprehensive review of existing literature reveals numerous factors that have been identified as potential influences on M&A performance. These factors can be categorized into two aspects: firm characteristics and deal characteristics.

Regarding deal characteristics, Gorton, Kahl, and Rosen (2009) find that larger acquirers tend to overpay for their acquisitions, leading to a decline in firm value. This is attributed to the presence of agency problems, particularly because larger firms may have less cohesive boards and more arrogant managers. Moeller, Schlingemann, and Stulz (2004) support this finding and also note that smaller acquirers experience higher abnormal returns in acquisitions. Additionally, they observe that privately held target firms tend to yield superior performance for acquirers, as these firms are more inclined to sell their businesses for reasons such as raising capital or exiting the market. The financing structure of an acquisition is also found to be important, as highlighted by Harford and Uysal (2014). Their analysis shows a positive relationship between cash payment and acquirer firm performance, indicating that using cash payment signals confidence to the market, while issuing equity may send a negative signal.

The attitude displayed during an acquisition, whether hostile or friendly, is found to impact acquirer firm performance. Leeth and Borg (2000) reveal a negative relationship between hostile attitudes and performance, as they can generate reputational damage for the acquiring firm. Cross-border acquisitions are associated with lower announcement returns compared to domestic mergers, which is attributed to higher information asymmetry and cultural conflicts (Moeller and Schlingemann, 2005). Moreover, industrial relatedness is found to have a positive impact on acquisition returns, as it reduces the challenges associated with managing unfamiliar industries within a short timeframe (Anand and Singh, 1997). In high-tech sectors, mergers between high-tech firms that create synergistic effects through resource and technology integration receive more positive market reactions (Kohers and Kohers, 2000).

Turning to acquirer firms' characteristics, Servaes (1991) demonstrates that companies with higher Tobin's q ratios achieve greater total returns, as they are perceived as well-managed and rewarded by the financial market. Firms with high

levels of free cash flow are more likely to engage in value-destroying acquisitions (Dogru, Hanks, Mody, Suess and Sirakaya-Turk, 2020; Harford, Humphery-Jenner and Powell, 2012; Masulis, Wang and Xie, 2007; Oler, 2008). This can be explained by debt agreements established in the absence of cash flow can serve as a monitoring mechanism for shareholders, mitigating agency problems (Servaes, 1991). Higher leverage at the time of the announcement is associated with negative abnormal returns, as the market views higher leverage as providing tax shield advantages and effective management discipline (Krishnan and Yakimenko, 2022).

Furthermore, Bouwman, Fuller, and Nain (2009) find that acquirers engaging in acquisitions during high-valuation markets experience higher announcement returns but lower long-term abnormal stock and operating performance compared to those acquiring during low-valuation markets. This pattern is attributed to managerial herding behavior during stock market booms.

It is noteworthy that there is a scarcity of literature examining the impact of ESG on M&A performance in the existing M&A research landscape. We mitigate the potential bias arising from omitted variables by including the aforementioned factors as control variables in our analysis. This enables us to investigate the influence of ESG on M&A performance. Our empirical findings contribute to the existing literature by providing empirical evidence of the impact of ESG scores on M&A performance.

2.3 ESG and M&A

The relationship between ESG factors and firm value is a subject of significant debate and warrants further investigation. However, before studying this relationship, it is crucial to address the issue of reverse causality between ESG and firm value, as highlighted by Bénabou and Tirole (2010). They argue that firms with greater value or performance have the capacity to allocate resources to ESG/CSR activities. These firms adopt CSR initiatives to strengthen their market position and enhance long-term profitability. For instance, CSR activities can be utilized to restrict competitors' actions and increase their production costs. In the context of studying the relationship between ESG and firm value in M&A situations, temporarily setting aside this reverse causality issue is justified. M&A transactions

are characterized by high uncertainty and analyzing announcement returns can help mitigate the reverse causality problem (Deng, Kang, and Low, 2013).

Traditionally, acquirers have often faced challenges in generating profits in M&A deals due to various obstacles, including agency problems where managers may prioritize empire-building overpaying unreasonably high premiums. The motivations behind managers' M&A activities, whether driven by personal compensation or aligned with shareholders' interests, represent an aspect of corporate governance. Exploring the impact of governance mechanisms, measured by the governance pillar (G) of ESG, on acquisition performance allows examination of an area that has received limited attention in the existing literature (Haleblian, Devers, McNamara, Carpenter and Davison, 2009). Additionally, by controlling for other factors that may influence acquirers' M&A performance, future research can shed light on how ESG factors, societal considerations, and environmental concerns affect acquirers' performance in M&A transactions.

The closest study to our thesis is the work conducted by Deng, Kang, and Low (2013). They examine M&A deals in the US market between 1992 and 2007. In comparison, our thesis extends the time frame by focusing on M&A deals in the US market from 2003 to 2019, aiming to investigate whether the findings observed in their paper still hold true in the present context. While they utilized CSR as a measurement of sustainability, we employ the ESG score from the Refinitiv Eikon database as a proxy for a company's sustainability. This ESG score captures over 630 indicators of a company's sustainability dimensions. Another distinction lies in the scope of our analysis. While they focused solely on M&A deals within the US market, our study includes cross-border deals with US acquirers. This broader scope provides a more comprehensive perspective and general results regarding the ESG effect on M&A performance. Furthermore, they incorporated industry fixed effects and year fixed effects into their regression models to account for industry-specific factors and temporal variations. In our analysis, we introduce an intersection term by multiplying industry and year, serving to mitigate potential heterogeneity between high and low ESG firms across different industries and time periods.

In summary, our thesis builds upon the work of Deng, Kang, and Low (2013) by extending the time frame, broadening the concept of sustainability to include ESG

factors, expanding the geographical focus, and incorporating cross fixed effects. These enhancements contribute to a more comprehensive examination of the relationship between ESG and M&A performance.

3 Hypotheses and Methodology

3.1 Hypotheses

Before delving into the methodology employed for the analysis, it is crucial to provide an overview of the hypotheses underpinning our study. Our investigation primarily centers around two key dimensions: the impact of ESG factors on short-term performance in M&A, as well as their influence on long-term M&A performance. Within the short-term realm, we delve further into three subcategories to provide a more comprehensive examination of the ESG effect on short-term performance.

3.1.1 H1a: Acquirer ESG score positively impacts M&A performance around the announcement date

The first null hypothesis asserts that the ESG score of the acquirer positively impacts the acquirer firm performance around the M&A announcement date. We expect that the ESG score will have a positive impact on firm performance around the M&A announcement date. There are several reasons behind this. Firstly, high ESG companies are often perceived as more responsible and sustainable, which can enhance their reputation among investors and stakeholders. This positive reputation can lead to increased investor confidence and interest, resulting in higher returns during M&A announcements. Secondly, high ESG companies may have easier access to capital and favorable financing terms due to their positive ESG track record. This access to capital can support the successful execution of the M&A transaction and contribute to higher returns. Thirdly, high ESG companies tend to exhibit better risk management practices and regulatory compliance, which can reduce the perceived risk and uncertainty associated with the M&A transaction. This reduced risk perception can attract investors and positively impact on the company's return during the announcements.

3.1.2 H1b: All three individual pillar scores positively impact acquirer firm performance around the announcement date

The second null hypothesis asserts that all three individual pillar scores have a positive impact on acquirer firm performance around the announcement date. In addition to the overall ESG score, Refinitiv provides individual scores for each

pillar of the ESG score, namely, E score for environmental pillar, S score for social pillar and G score for governance pillar, allowing for further investigation into the potential effects of each component on the acquirer's financial performance. For the environment pillar, environmental sustainability practices, such as reducing carbon emissions, improving energy efficiency, or implementing eco-friendly initiatives, can enhance a company's reputation and attractiveness to investors. For the social pillar, positive social practices, such as fair treatment of employees, community engagement, and diversity and inclusion initiatives, can enhance employee morale and productivity. Companies with strong social performance often have better employee retention rates, fostering a skilled and motivated workforce, which can positively impact operational efficiency and ultimately contribute to higher acquirer firm performance. For the governance pillar, good corporate governance practices, including transparent decision-making, strong board oversight, and effective risk management, can enhance investor confidence and reduce agency conflicts. Companies with robust governance structures are perceived as being better equipped to manage risks and make informed decisions, which can increase investor trust and positively influence acquirer firm performance during M&A announcements.

3.1.3 H1c: Target ESG score positively impacts acquirer firm performance around the announcement date

The third null hypothesis is that target ESG score has a positive impact on acquirer firm performance around the announcement date. There are several reasons behind this hypothesis. Firstly, target companies with strong ESG performance are often perceived as responsible and sustainable businesses. By acquiring such a company, the acquirer can enhance its own reputation and brand image. This can generate positive market sentiment and investor confidence, leading to higher returns around the announcement date. Secondly, investors increasingly consider ESG factors when making investment decisions. Acquiring a target with high ESG performance aligns with the growing demand for socially responsible investments. As a result, the acquirer becomes more appealing to ESG-focused investors, potentially attracting a larger investor base and driving up the stock price around the announcement date. Thirdly, target companies with strong ESG performance tend to exhibit better risk management practices and long-term value creation strategies. By acquiring a target with a focus on ESG, the acquirer can mitigate risks associated

with environmental and social issues, regulatory changes, and reputation damage. The market perceives these acquisitions as value-enhancing and rewards the acquirer with higher returns.

3.1.4 H2: Acquirer ESG score positively impacts M&A performance in the long term

The second null hypothesis posits that the ESG score of the acquirer positively influences the long-term performance of M&A transactions. Our rationale is grounded in the belief that companies prioritizing sustainability considerations not only strive to benefit their shareholders but also recognize the importance of stakeholders such as employees, customers, potential investors, and the broader society. This commitment to sustainable practices is expected to result in improved long-term performance. Eccles, Ioannou, and Serafeim (2014) find that companies with robust CSR practices are more likely to establish stakeholder engagement processes, adopt a long-term orientation, and exhibit greater measurement and disclosure of nonfinancial information. These factors contribute to superior long-term performance for such firms, both in terms of stock market performance and accounting metrics.

3.2 Methodology

In this subsection, we will elucidate the methodology employed to assess each hypothesis.

3.2.1 H1a

The model used to test H1a is as follows:

$$CAR(t-k,t+k) = \alpha + \beta_1 Acq_{ESG_i} + \beta_2 Acq_{characteristics} + \beta_3 Deal_{characteristics} + \sigma_t + \delta_j + \varepsilon_i \quad (1-1)$$

Where t is M&A announcement date, t = 1, 2 and 5, σ_t is year fixed effect, δ_j is industry fixed effect.

In addition, we modify the main model by using cross-fixed effect, simply $\sigma_t * \delta_j$, aim to control for some unobserved heterogeneity across groups and mitigate omitted variable bias. The model used is as follows:

$$CAR(t-k,t+k) = \alpha + \beta_1 Acq_{ESG_i} + \beta_2 Acq_{characteristics} + \beta_3 Deal_{characteristics} + \sigma_t * \delta_j + \varepsilon_i \quad (1-2)$$

We use Refinitiv ESG score as a metric for gauging a company's sustainability performance. To capture the immediate impact of M&A activities on the acquirer's stock market performance, we employ Cumulative Abnormal Return (CAR) as announcement return.[2] CAR reflects investors' response to the announcement of an acquisition, based on present expectations about the future cash flow of a combined firm (Haleblian, Devers, McNamara, Carpenter, and Davison, 2009). Employing a regression model, we examine the relationship between its sustainability performance and the extent of the effects of M&A activities on the acquirer's stock market performance. As we discuss in literature part, we incorporate acquirer-specific characteristics (firm size, leverage, free cash flow, Tobin's q, and previous market-adjusted returns) and deal-specific characteristics (deal size, hostile takeover indicator, high-tech industry indicator, diversifying M&A indicator, public target indicator, private target indicator, all-cash deal indicator, and stock deal indicator). Besides, we incorporate industry fixed effect and time fixed effect in our regression model. We provide a more detailed definition for all variables in Table 4.2.3.

Different from the variables used in the work of Deng, Kang, and Low (2013), we introduce an additional dummy variable called "Cross border." This variable takes a value of one if the target and acquirer are located in the same country, and 0 otherwise. To control for potential confounding factors and alternative explanations, we introduce the Cross-border variable as a control variable. This decision is informed by the study conducted by Danbolt and Maciver (2012), which reveals that cross-border transactions exhibit a stronger association with higher shareholder gains when compared to domestic acquisitions.

For the explanatory variables and control variables, we set the data disclosed one year prior to the announcement date. This time was set prior to the event date because we aimed to investigate the market response to M&A activity information,

[2] We provide more details about defining and calculating CAR in Subsection 4.2.1: Cumulative abnormal return (CAR).

considering that investors typically have access to annual financial information only up to one year before the announcement year. With the exception of the previous market return variable, which requires a specific calculation, we source all other variables from the Refinitiv Eikon and Compustat databases. As for the previous market return, we accumulate the market's return based on 200 trading days of data, concluding 10 days prior to the announcement date. This approach allows us to capture the market's performance in the immediate period preceding the announcement.

3.2.2 H1b

The model used to test H1b is as follows:

$$CAR(t-k,t+k) = \alpha + \beta_1 Acq_{Environmental_i} + \beta_2 Acq_{Social_i} + \beta_3 Acq_{Governance_i} + \beta_4 Acq_{characteristics} + \beta_5 Deal_{characteristics} + \sigma_t * \delta_j + \varepsilon_i \quad (2-1)$$

Where t is M&A announcement date, k = 1, 2 and 5, σ_t is year fixed effect, δ_j is industry fixed effect.

In the H1b main analysis, we employ a methodology like that of H1a. However, we make a modification to the explanatory variable, shifting from the overall ESG score to examining each individual pillar within the ESG score. This adjustment allows us to investigate the specific impact of each component of ESG on the acquirer's performance.

Furthermore, we introduce an interaction term in the equation 2-1 as a comparison, namely the multiplication of the S score variable (representing the social component of ESG) and the Cross-border variable, as shown in the following.

$$CAR(t-k,t+k) = \alpha + \beta_1 Acq_{Environmental_i} + \beta_2 Acq_{Social_i} + \beta_3 Acq_{Governance_i} + \beta_4 Cross\_border + \beta_5 Acq_{Social_i} * Cross\_border + \beta_6 Acq_{characteristics} + \beta_7 Deal_{characteristics} + \sigma_t * \delta_j + \varepsilon_i \quad (2-2)$$

This interaction term aims to explore the influence of different cultural contexts on the relationship between social factors and M&A performance. To support the rationale behind incorporating this interaction term, we refer to the study by Gomes and Marsat (2018). Their research experiment demonstrates that the positive incremental impact of social performance is significant primarily in cross-border deals. They conclude that social performance holds particular significance in international transactions, which inherently involve higher levels of uncertainty and complexity. Therefore, our objective is to examine whether, in an international context, the effect of social performance on M&A performance demonstrates a substantial increase. If the relationship is positive, it will indicate that companies are encouraged to prioritize social and cultural impacts when engaging in international M&A activities, given their potential influence on outcomes.

3.2.3 H1c

The model used to test H1c is as follows:

$$\begin{aligned} CAR(t-k,t+k) &= \alpha_1 + (\alpha_2 - \alpha_1)Dummy\_Tar + \beta_1 Dummy\_Tar * Tar_{ESG_i} \\ &+\beta_2 Acq_{characteristics} + \beta_3 Deal_{characteristics} \\ &+\sigma_t * \delta_j + \varepsilon_i \end{aligned} \quad (3-1)$$

Where t is M&A announcement date, k = 1, 2 and 5, σ_t is year fixed effect, δ_j is industry fixed effect.

In addition, we add acquirer ESG score as explanatory variable into the main model for H1c and re-estimate as a comparison.

$$\begin{aligned} CAR(t-k,t+k) &= \alpha_1 + (\alpha_2 - \alpha_1)Dummy_{Tar} + \beta_1 Acq_{ESG_i} \\ &+\beta_2 Dummy\_Tar * Tar_{ESG_i} \\ &+\beta_3 Acq_{characteristics} + \beta_4 Deal_{characteristics} \\ &+\sigma_t * \delta_j + \varepsilon_i \end{aligned} \quad (3-2)$$

In this analysis, we extend the previous models used by incorporating a target dummy variable to address the limited availability of target ESG scores in our sample, which consists of only 45 deals. We follow the Dummy Variable Adjustment (DVA) approach proposed by Cohen (1975) to handle missing data in

regression analysis. The target dummy variable takes a value of one if a target has an ESG score available and zero otherwise. This dummy variable combines two separate regressions, one for cases where the target ESG score is missing (when the dummy equals to 0) and another for cases where it is not missing (when the dummy equals to 1), presenting them in a unified regression model. According to Allison (2022), estimating a single estimate for both groups reduces standard errors compared to separate estimation.

It is important to note that this approach was adopted because in our study, the absence of target ESG score data in the Refinitiv Eikon database does not signify "missing" data, but rather indicates that the subset of the sample consisting of targets without ESG scores simply does not possess applicable ESG scores. Allison suggests that missing data can be properly addressed when the variable does not apply or have meaning for a specific subset of the sample.

However, we are uncertain whether the absence of target ESG data from the Refinitiv Eikon database is due to non-disclosure by the targets or the failure of Refinitiv Eikon to include the relevant data in their database. If the latter is the case, the use of DVA may not be appropriate, as neither of the two situations necessary for applying DVA would be satisfied. Therefore, caution must be exercised when using this method.

By employing this approach, we retain all available information and avoid excluding observations from our regression model. Our final sample consists of 2887 deals, significantly larger than the original dataset of only 45 deals with target ESG scores. In summary, the inclusion of the target's ESG dummy variable enables us to examine the impact of the target's sustainability performance on M&A outcomes while incorporating all available information in our analysis.

3.2.4 H2

In H2, we study long-term post-event stock returns using the calendar-time approach recommended by Fama (1998). By following Moeller, Schlingemann and Stulz (2004), for each calendar month, we form an equal-weighted portfolio of firms that just completed a M&A deal between 2003 and 2019, and the holding period is 1 year, 2 years and 3 years relative to the deal completion month.

Moreover, we rebalance the portfolio by dropping the firms which have reached the end of the holding period and adding the firms which just completed a new deal. The return of the acquirer portfolio for each calendar month is obtained by averaging the corresponding monthly returns for each firm in the portfolio. We repeat this portfolio constructing process using a full deal sample and subsamples of acquirer with high ESG score and low ESG score respectively for prespecified holding period. The time-series of portfolio excess returns of specific holding period is then regressed on the four factors from the Fama and French (1992, 1993) and Carhart (1997) model, as following.

$$R_{p,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_f) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t + \varepsilon_t \quad (4)$$

The dependent variable $R_{p,t} - R_{f,t}$ is excess return of acquirer portfolio for calendar month. The independent variable $R_{m,t} - R_f$ is market excess return, SMB_t is the size factor, HML_t is the book-to-market factor and UMD_t is the momentum factor. The intercept α is the average monthly abnormal return for the sample.

We examine the effect of acquirer ESG score on long-term stock return by looking at the intercept α. Moreover, we form a long-short portfolio, more specifically, longing the high ESG acquirers and shorting low ESG acquirers at the same time, to examine whether this portfolio can generate positive returns. If α is positive and significant for the portfolio with zero cost, our hypothesis will prove that a good ESG score is positive with acquirer abnormal return in the long-term.

3.3 Validity

In this subsection, we aim to address two important issues related to multicollinearity and heteroskedasticity of our analysis.

3.3.1 Multicollinearity

One concern is multicollinearity, which occurs when there is a high correlation between independent variables. It is known that multicollinearity issues reduce the precision of the estimated coefficients, and further weaken the statistical power of the regression models. To assess the presence of multicollinearity, we employ the variance inflation factor (VIF), calculated by taking an independent variable and regressing it against all other independent variables, as the equation below.

$$VIF_j = \frac{1}{\left(1-R_j^2\right)} \quad (5)$$

It is a highly discussed topic what size VIF must be to cause issues, but it is known that the smaller the better. A generally perceived cut-off level of VIF is 10 (Wooldridge, 2015, p.86). We test all our main variables in all our models and none of them exceeds a VIF of 10. We therefore conclude that multicollinearity is less of a concern in our study.

3.3.2 Heteroskedasticity and clustering

The homoskedasticity assumption in a multiple regression model posits that the variance of the error term, given the explanatory variables, remains constant. However, when this assumption is violated, heteroskedasticity occurs. Unlike the omission of a relevant variable, heteroskedasticity does not introduce bias or inconsistency into the ordinary least squares (OLS) estimators of coefficients. However, it does render OLS no longer the Best Linear Unbiased Estimators (BLUE). Consequently, the standard errors become inaccurate.

To test for the presence of heteroskedasticity in our model, we employ the Breusch-Pagan test. A small p-value resulting from this test indicates the presence of heteroskedasticity, and we need to make corrective measures. In such cases, we utilize White's heteroskedasticity consistent covariance approach (1980) to address this issue and obtain robust standard errors.

Additionally, it is important to consider that firms within the same industry may possess comparable characteristics and encounter industry-specific factors that can impact the dependent variable. To address this, clustering the standard errors at the industry level accounts for the diversity among industries and yields more reliable estimates that are applicable to a wider array of firms and industries. [3]

All the t-statistics reported in Section 5 are based on standard errors adjusted for heteroskedasticity and for industry clustering.

[3] Abadie, Athey, Imbens and Wooldridge (2017) explained that when there is clustering in the sample or clustering in the assignment, researchers should adjust the standard errors for clustering.

4 Data, Sample and Summary Statistics

This section focuses on two primary aspects: the procedure of collecting data to form the sample of M&A deals, and the definitions of the variables utilized in the analysis, including both dependent and independent variables.

4.1 Sample Construction

The sample of M&A deals is constructed by retrieving data from the Refinitiv Eikon database and merging it with stock return and financial information sourced from the CRSP and the Compustat database. The initial sample comprises all completed M&A transactions involving a public acquirer headquartered in the US between January 1, 2003, and December 31, 2019, resulting in a total of 49,841 deals. The final sample is derived after applying five specific filters:

(1) The acquirer is not in a macro industry named government and agency.
(2) The disclosed transaction value is greater than 1 million.
(3) The acquirer is acquiring 50% or more of the target.
(4) The combined ESG score and individual pillar scores for the acquirer before the M&A announcement date are available from Refinitiv Eikon database.
(5) The stock returns and financial information of the acquiring firms are available from CRSP and the Compustat database, respectively.

This leads to the final sample of 2,887 successful deals by 902 firms. Furthermore, we divide our deal sample into two subsamples according to the median of acquirer's ESG score in final sample, namely, subsample A with high ESG scores and subsample B with low ESG scores.

Panel A of Table 4.1 shows the process of sample constructing process. Panel B of Table 4.1 presents the distribution of our deal sample according to deal announcement year and acquirer industry. We define acquirer industry by the first two digits of its primary SIC (Standard Industrial Classification) code. Most of the acquiring firms perform in the manufacturing industry (46.90%), service industry (19.08%) and finance, insurance, and real estate (15.48%).[4] The sample shows an

[4] As a robustness test, we exclude finance, insurance, and real estate acquirer firms and re-estimate the main analysis in Subsection 6.2.2 Finance industry exclusion analysis.

increase in the number of deals starting from 2010. It remains roughly stable before 2009 and increases after 2009, except it slumps to the lowest points in 2014 but rebounds very soon until it reaches the peak level in 2018. Our study aligns closely with the work of Deng, Kang, and Low (2013), who primarily focus on samples from the manufacturing (57.2%) and service industries (24.6%), same as our study. Additionally, Thomson Reuters and S&P Capital IQ conduct a survey on the number of M&A deals in North America (IMAA, 2023) which exhibits a comparable trend to our findings. [5]

Table 4.1 Panel A: Sample selection and construction

Panel A shows the process of constructing the deal sample. We report the main filters we used and how many deals are left after applying each filter.

Panel A: Sample constructing process	
Filter	Number of deals
Completed M&A deals between 2003 and 2019 and the acquirer is publicly traded with a headquarters located in the US.	49841
Remove the deal that acquirer macro industry is government and agency.	49831
Deal value is disclosed on Refinitiv Eikon and equal or greater than 1 million USD.	24441
The acquirer holds a stake of the target from below 50% to above 50% after the deal.	21758
The acquirer ESG score, and pillar scores are available before the deal announcement date on Refinitiv Eikon.	5290
The acquirer stock price and financial information are available on CRSP and Compustat, respectively.	2887

Table 4.1 Panel B: Sample distribution by industry and year

Panel B is a summary of our deal sample distribution according to acquirer industry and the deal announcement year. We use the Standard Industrial Classification (SIC) of acquirer to define which industry it belongs to.

Panel B: Sample distribution by year and industry										
Year	Acquirer Industry (Divisions of SIC codes) [6]									
	Agriculture, Forestry, and Fishing (01-09)	Mining (10-14)	Construction (15-17)	Manufacturing (20-39)	Transportation and Public Utilities (40-49)	Wholesale Trade (50-51)	Retail Trade (52-59)	Finance, Insurance and Real Estate (60-67)	Service (70-89)	Total
2003	1	10	2	71	7	1	5	7	28	132
2004	0	15	0	91	6	4	3	8	26	153
2005	2	14	0	106	6	1	5	23	32	189
2006	0	2	0	23	2	5	0	2	14	48
2007	0	14	0	85	5	4	2	17	28	155
2008	0	15	2	58	12	2	5	4	28	126

(Table continued next page)

[5] IMAA (https://imaa-institute.org/mergers-and-acquisitions-statistics/) provide the up-to-date data for M&A.

[6] There are 10 divisions according to the list of divisions of SIC codes (https://siccode.com/page/structure-of-sic-codes/).

2009	0	1	0	18	3	1	1	0	14	38
2010	1	12	3	111	15	5	3	28	29	207
2011	0	2	0	33	3	3	1	5	8	55
2012	0	11	1	126	16	7	8	39	30	238
2013	0	6	2	74	11	7	4	27	31	162
2014	0	2	1	19	2	1	0	2	10	37
2015	0	2	1	26	0	3	5	2	9	48
2016	1	23	7	150	20	12	7	50	48	318
2017	0	11	7	161	27	9	18	118	72	423
2018	1	18	7	174	33	16	5	98	100	452
2019	0	3	0	28	7	4	3	17	44	106
Total	6	161	33	1354	175	85	75	447	551	2887

4.2 Variable Description

In our analysis, the main dependent variable and independent variable are the acquirer's cumulative abnormal return (CAR) around the deal announcement date and the firm's ESG scores, respectively.

4.2.1 Cumulative abnormal return (CAR)

The main dependent variable in our analysis is CAR, as the proxy of M&A announcement return. To calculate the CAR, we adopt a methodology that combines approaches outlined in the studies by Masulis, Wang, and Xie (2007) and Bradley, Desai, and Kim (1988). In addition, we use the market model to calculate the cumulative abnormal return. In the market model, we assume that the return follows a single-factor market model as follows.

$$R_{it} = \alpha_i + \beta_i \cdot R_{mt} + \varepsilon_{it} \qquad (6-1)$$

Where $R_{it}$is the return of the stock of observation i (e.g, firm) on day t, $R_{mt}$is the return of the reference market on day t, $\varepsilon_{it}$is the error term (a random variable) with expectation zero and finite variance. It is assumed that $\varepsilon_{it}$is uncorrelated to the market return R_{mt} and firm return R_{jt} with i≠j, and error items are not autocorrelated.

Firstly, based on the market model, we conduct a regression analysis using a company's daily returns and the market's daily returns, with the CRSP value-

weighted return serving as a proxy for the market return.[7] The regression is performed using 200 trading days' worth of data, concluding 10 days prior to the announcement date. Using the coefficients α_i and $\beta_i$derived from the regression model, we estimate the returns for the five days preceding the announcement date, the announcement date itself, and the five days following the announcement date. During this estimation process, we continue to employ the CRSP value-weighted return as the market return. The actual returns are then subtracted from the estimated returns to calculate the abnormal returns for each day.
The abnormal return is then calculated as follows:

$$AR_{it} = R_{it} - \widehat{R_{it}} = R_{it} - (\alpha_i + \beta_i \cdot R_{mt}) \qquad (6-2)$$

For the CAR (-1,1), representing the cumulative abnormal return from one day before the announcement date to one day after it, we aggregated the abnormal returns. It is calculated as follows:

$$CAR_i(-1,1) = \Sigma AR_{it} \qquad (6-3)$$

where t includes one day before the announcement date till one day after the announcement date, for the observation i .

This range is chosen to account for potential information leakage that may occur prior to the official public announcement. Considering the varying speeds at which information spreads, we extend our analysis beyond CAR (-1,1) to capture a broader timeframe. We compute CAR (-2,2) and CAR (-5,5) to encompass a wider window and account for potential delayed market reactions or prolonged information dissemination. The reason why we use short window is to minimize "noise" from other potentially confounding variables.

4.2.2 ESG scores

We utilize the firm-level combined ESG score obtained from the Refinitiv Eikon database to assess a company's sustainable performance. Refinitiv Eikon is widely recognized as one of the leading ESG rating providers, offering extensive ESG

[7] We use vwretd variable in CRSP database to collect the value-weighted return.

databases in the industry (Refinitiv, 2020). This database has been providing ESG data since 2002, with ongoing coverage expansion. Currently, it includes ESG data for 12,500 companies globally (Refinitiv, 2022). The Refinitiv ESG data is extensively employed in both academic research and the industry, including major asset managers such as BlackRock, who rely on it for managing ESG-related investment risks.

The Refinitiv ESG score incorporates more than 630 firm-level ESG measures, organized into 10 main ESG categories under the pillars of Environmental, Social, and Corporate Governance. These categories are further aggregated to combined ESG score and individual pillar scores, using category-specific weights, which vary across industries for the environmental and social categories but remain consistent for the governance category.

Table 4.2.2 presents the distribution of acquirer ESG scores based on industry and year. To examine the short-term effect, we employ firm-level ESG scores as a measure of firms' sustainable performance in Subsections 3.2.1 and 3.2.3. Additionally, in Subsection 3.2.2, we conduct a more detailed analysis by considering the individual pillar scores of the acquirer firms.

Table 4.2.2: Acquirer ESG score distribution by industry and year

This table presents the mean and the standard deviation (SD) of acquirer ESG score classified by industry and year. The cell is empty when there is no deal announced that year. The cell for SD is NA when there is only one deal announced.

Year	Acquirer industry (Division of SIC codes)																	
	Agriculture, Forestry, and Fishing (01-09)		Mining (10-14)		Construction (15-17)		Manufacturing (20-39)		Transportation and Public Utilities (40-49)		Wholesale Trade (50-51)		Retail Trade (52-59)		Finance, Insurance, and Real Estate (60-67)		Service (70-89)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2003	31.85	NA	20.79	20.59	12.27	8.89	32.48	10.21	25.75	8.51	15.21	NA	31.65	13.97	24.30	9.91	24.43	14.07
2004			27.72	25.46			32.60	3.73	26.01	9.83	23.78	2.52	16.81	3.85	27.23	12.40	24.90	13.89
2005	46.91	0	24.74	16.78			35.23	13.68	36.01	15.93	26.91	NA	24.75	14.19	29.62	9.34	31.95	13.43
2006			12.66	0.00			45.72	17.01	17.37	4.45	21.45	0.00			20.49	0.00	32.03	12.11
2007			37.04	21.99			37.34	4.02	38.47	12.18	29.03	12.14	26.29	4.49	32.48	10.67	34.52	15.92
2008			28.99	21.95	19.68	0.00	39.81	13.65	45.18	13.59	34.99	14.31	54.28	26.28	52.82	0.00	41.58	20.49
2009			25.09	NA			47.57	16.45	55.73	10.95	22.37	NA	34.18	NA			38.62	17.20

(Table continued next page)

2010	16.59	NA	29.57	16.67	24.86	2.57	45.22	14.71	40.26	22.12	41.61	15.01	67.78	29.71	36.16	10.21	38.62	16.73
2011			52.64	41.08			37.49	15.52	22.82	12.80	37.79	14.85	60.40	NA	35.05	3.73	44.28	23.18
2012			48.30	34.60	28.88	NA	49.02	16.32	40.28	22.67	37.97	15.13	51.71	28.16	39.88	13.68	39.66	19.08
2013			28.80	14.66	25.09	1.08	47.03	10.21	43.08	26.32	32.37	14.52	61.54	27.97	44.91	17.01	38.37	19.91
2014			39.83	16.64	30.14	NA	36.37	3.73	34.48	0.00	54.95	NA			28.89	4.02	38.65	25.68
2015			68.71	19.95	29.57	NA	35.20	13.68			40.28	6.91	59.07	29.68	33.49	13.65	41.10	19.34
2016	86.31	NA	32.01	14.11	47.98	29.35	43.31	17.01	34.07	23.86	44.28	17.44	42.27	27.37	31.54	16.45	36.00	17.45
2017			44.11	14.01	27.48	10.55	42.54	4.02	39.91	21.41	38.19	15.64	42.61	24.85	30.76	14.71	35.32	14.07
2018	24.66	NA	31.42	16.66	30.96	7.58	44.92	13.65	43.16	22.55	32.62	18.80	52.70	32.00	33.95	15.52	38.56	17.91
2019			29.98	19.49			34.38	16.45	37.86	13.46	32.01	22.35	48.75	13.34	32.35	16.32	34.66	17.30

4.2.3 Other variables

We follow Deng, Kang and Low (2013) when we construct our model to examine the effect of firm's sustainable performance on M&A performance. The control variables include firm-specific characteristics (firm size, free cash flow, leverage, previous market-adjusted returns, and Tobin's q) and deal-specific characteristics (all-cash deal dummy, cross-border dummy, diversifying M&A dummy, high-tech dummy, hostile dummy, private target dummy and public target dummy, relative deal size, and stock deal dummy). Panel A of Table 4.2.3 contains detailed definitions, formulas, and data sources for the variables. Panel B of Table 4.2.3 presents the summary statistics for the full sample.

Table 4.2.3 Panel A: Variable definitions and source

Panel A is a detailed description of the construction of all the variables and their sources.

Panel A: Variable description		
Variable	Definitions	Source
Firm characteristics		
Free cash flow	Operating income before depreciation minus interest expenses – income taxes minus capital Expenditure and then scaled by book value of total assets.	Compustat
Leverage	Book value of debt divided by market value of assets. Book value of debt = long-term debt + debt in current liabilities Market value of assets = total book value of assets - book value of equity + market value of equity	Compustat
Previous market-adjusted return	Acquirer's holding abnormal stock return, estimated by holding return data (200 trading days) ending 10 days before the announcement date. The proxy of market return is value-weighted return from the CRSP.	CRSP

(Table continued next page)

Firm size	Log (market value of equity). Market value equity = outstanding common shares * fiscal annual close price	Compustat
Tobin's q	Market value of assets divided by book value of assets.	Compustat
Deal characteristics		
All cash deal (dummy)	One if the deal is purely financed by cash and zero otherwise.	Refinitiv Eikon
Cross-border (dummy)	One if the headquarters of acquirer and the headquarters of target are located in the same country, zero otherwise.	Refinitiv Eikon
Diversifying (dummy)	One if the acquirer and target firms have different first two-digit SIC code and zero otherwise.	Refinitiv Eikon
High tech (dummy)	One if both the acquirer and target operate in high-tech industries defined by Loughran and Ritter (2004) and zero otherwise.	Refinitiv Eikon
Hostile (dummy)	One if the deal is reported as hostile and zero otherwise.	Refinitiv Eikon
Private target (dummy)	One if the target is privately held and zero otherwise.	Refinitiv Eikon
Public target (dummy)	One if the target is publicly held and zero otherwise.	Refinitiv Eikon
Relative deal size	Deal value reported in the Refinitiv Eikon divided by market value of acquirer equity from the Compustat database.	Refinitiv Eikon & Compustat
Stock deal (dummy)	One if the deal is partially or purely stock-financed and zero otherwise.	Refinitiv Eikon
Instrumental variable		
Blue state (dummy)	One if the headquarters of acquirer is in a Democratic (or blue) state (District of Columbia is included) and zero otherwise. The list of blue states is in Appendix B.	Wikipedia and https://wisevoter.com/state-rankings/red-and-blue-states/
Religion rank	The rank of the state where acquirer's headquarters is located, which is based on the ratio of the number of religious adherents over the total population of the state in 2010. The ranking is in Appendix B.	the Association of Religion Data Archive.
Fama-French and Carhart factors		
$R_{m,t} - R_{f,t}$	Excess market return at time t.	Kenneth R. French data library
SMB_t	The size factor at time t.	Kenneth R. French data library
HML_t	The value factor (or book-to-market factor) at time t.	Kenneth R. French data library
UMD_t	The momentum factor at time t.	Kenneth R. French data library

Table 4.2.3 Panel B: Summary statistics for samples

Panel B is summary statistics for the full sample acquirers. The table contains number of observations (N), mean, standard deviation (SD), minimum (Min), 25% percentile value (P25), 50% percentile value (P50), 75% percentile value (P75) and maximum (Max).

Panel B: Summary statistics								
Variables	Full sample							
	N	Mean	SD	Min	P25	P50	P75	Max
Sustainability variables								

(Table continued next page)

Acquirer ESG score	2887	38.26	19.74	1.67	23.15	34.38	50.45	94.93
E pillar score	2887	22.68	26.99	0.00	0.00	8.79	42.79	95.07
S pillar score	2887	41.01	21.76	0.63	25.09	37.37	54.40	98.01
G pillar score	2887	48.11	22.22	1.05	30.50	48.43	65.89	98.53
Firm characteristics								
Firm size	2887	8.76	1.52	2.88	7.74	8.58	9.65	13.18
Free cash flow	2887	0.04	0.10	-1.19	0.00	0.06	0.09	0.50
Leverage	2887	0.17	0.15	0.00	0.06	0.14	0.26	0.91
Previous market-adjusted return	2887	0.07	0.25	-1.27	-0.07	0.06	0.19	1.99
Tobin's q	2887	2.19	1.29	0.42	1.37	1.78	2.58	11.51
Deal characteristics								
All cash deal (dummy)	2887	0.75	0.43	0.00	0.00	1.00	1.00	1.00
Cross-border (dummy)	2887	0.77	0.42	0.00	1.00	1.00	1.00	1.00
Diversifying (dummy)	2887	0.51	0.50	0.00	0.00	1.00	1.00	1.00
High tech (dummy)	2887	0.20	0.40	0.00	0.00	0.00	0.00	1.00
Hostile (dummy)	2887	0.00	0.03	0.00	0.00	0.00	0.00	1.00
Private target (dummy)	2887	0.17	0.50	0.00	0.00	0.00	0.00	1.00
Public target (dummy)	2887	0.46	0.37	0.00	0.00	0.00	1.00	1.00
Relative deal size	2887	0.11	0.36	0.00	0.01	0.03	0.09	12.23
Stock deal (dummy)	2887	0.13	0.34	0.00	0.00	0.00	0.00	1.00
Instrumental variables								
Blue state (dummy)	2887	0.72	0.45	0.00	0.00	1.00	1.00	1.00
Religion rank	2887	30.99	14.04	2.00	19.00	32.00	41.00	51.00

5 Results and Analysis

In this section, we test our hypotheses (Subsection 3.1), namely short-term announcement return, long-term post-M&A stock return and provide results and discussion.

5.1 H1: Short-term Effect

First, we discuss the results regarding short-term effects within three parts corresponding to three hypotheses.

5.1.1 H1a

To examine the effect of acquirer ESG score on its M&A performance at the announcement date, we conduct univariate tests as well as cross-sectional regression analysis.

Table 5.1.1 Panel A reports the results of univariate tests for the full sample and two subsamples of acquirer. The mean CAR (-1, 1) and CAR (-2, 2) of the full sample as well as low ESG subsample are significantly positive while the mean CAR (-1, 1) and CAR (-2, 2) for high ESG subsample are insignificant. A similar pattern shows in the median CAR (-1, 1) and CAR (-2, 2). In the last two columns of Panel A, it is clear to see that the differences between two subsamples CAR are significant at the 5% level. In other words, the low ESG subsample obtains significantly larger CAR than high ESG subsample on average.

Table 5.1.1 Panel A: Acquirer CAR around announcement date

Panel A reports the CAR for acquirer around announcement date. The abnormal stock return is calculated using the market model, as illustrated with great details in Subsection 4.2.1. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

panel A: Acquirer CAR (percent)								
CAR	Full sample (N = 2887)		Subsample of high ESG: A (N = 1445)		Subsample of low ESG: A (N = 1442)		Test of difference (A-B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CAR (-1, 1)	0.2308**	0.1245***	0.0254	0.0318	0.4367***	0.2855***	-0.4113**	-0.2537*
CAR (-2, 2)	0.1851*	0.2230***	-0.0809	0.0885	0.4517***	0.3424***	-0.5325**	-0.2539*
CAR (-5, 5)	-0.0099	-0.0029	-0.3394**	-0.2880**	0.3202	0.2948**	-0.6596**	-0.5828***

Overall, the results in univariate tests show that acquirer with low ESG are more likely to gain better abnormal return than the acquirer with high ESG around deal

announcement date, which is in line with the shareholder expense view that ESG activities are the cost of shareholders' value and lead to lower M&A announcement return.

To better understand the effect of acquirer ESG score on its short-term M&A performance, we run three multivariate regression tests using the CAR as dependent variable and the acquirer's ESG score as the key explanatory variable. Besides what we mention in Subsection 4.2.3, including acquirer firm characteristics and deal characteristics as control variables, we also control for two-way fixed effect and cross fixed effect include industry and year fixed effect as comparison.

Table 5.1.1 Panel B: OLS regression outcome for H1a

Panel B reports the outcome of multivariate regressions of CAR for acquirer full sample on explanatory variable, namely, acquirer ESG score.

We estimate OLS regression on CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) respectively with the same control variables. In columns (1), (3) and (5), we report the results from regressing the CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) with industry fixed effect and year fixed effect. Columns (2), (4) and (6) report the results with cross fixed effect of industry and year.

All variables are defined in Panel A of Table 4.2.3 with great details. The t-statistics for ordinary least squares (OLS) are based on standard error adjusted for heteroskedasticity and industry clustering adjustment. The standard deviation of acquirer ESG score for full sample is 19.74. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Panel B: OLS regressions						
Variables	CAR (-1.1)		CAR (-2. 2)		CAR (-5. 5)	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.0520	2.3870***	1.9163*	1.9004**	1.1547	-1.4505
	(1.0781)	(2.6862)	(1.8052)	(2.0294)	(0.3800)	(-1.2206)
Acquirer ESG score	-0.0048	-0.0053	-0.0131*	-0.0131*	-0.0268***	-0.0294***
	(-0.7768)	(-0.8565)	(-1.9404)	(-1.9284)	(-3.0670)	(-3.4284)
Acquirer firm characteristics						
Firm size	-0.1916*	-0.1829*	-0.1207	-0.1142	-0.0710	-0.0517
	(-1.9548)	(-1.8532)	(-1.1652)	(-1.0819)	(-0.5650)	(-0.3867)
Free cash flow	0.4504	0.4132	2.1858	2.2373	3.4740**	3.8570*
	(0.2932)	(0.2724)	(1.1720)	(1.2363)	(2.3450)	(1.6978)
leverage	0.5122	0.7629	0.9816	1.2451	2.0813*	2.3969*
	(0.5213)	(0.7655)	(0.9442)	(1.1991)	(1.7170)	(1.8447)
Previous market-adjusted return	-0.6406	-0.6894	-1.8925***	-2.0583***	-5.1182***	-5.3674***
	(-1.1728)	(-1.1883)	(-2.9978)	(-3.1328)	(-9.4440)	(-7.2514)
Tobin's q	-0.1523	-0.1181	-0.2392**	-0.2021*	-0.2183*	-0.1911
	(-1.4185)	(-1.1190)	(-2.1085)	(-1.8064)	(-1.7440)	(-1.3698)
Deal characteristics						
All cash deal (dummy)	-0.0145	-0.0692	-0.2845	-0.3043	-0.4265	-0.3794
	(-0.0463)	(-0.2130)	(-0.8542)	(-0.8802)	(-1.0400)	(-0.8672)
Cross-border(dummy)	0.5812***	0.5241**	0.5898**	0.5847**	0.5243*	0.5142
	(2.7490)	(2.3536)	(2.4302)	(2.3328)	(1.6630)	(1.6434)
Diversifying (dummy)	-0.4422**	-0.4224**	-0.2662	-0.2617	-0.1890	-0.1769
	(-2.0855)	(-1.9947)	(-1.1671)	(-1.1491)	(-0.6610)	(-0.6176)

(Table continued next page)

High tech (dummy)	0.0909	0.1151	0.3116	0.2802	0.3336	0.3108
	(0.3091)	(0.3873)	(0.9989)	(0.8897)	(0.9170)	(0.8648)
Hostile (dummy)	-2.3423***	-3.2568***	-1.0966*	-1.4389	-3.5281	-3.4132*
	(-4.1510)	(-4.1427)	(-1.8245)	(-1.7275)	(-0.7210)	(-1.8133)
Private target (dummy)	-0.2119	-0.2360	-0.2073	-0.3024*	-0.1301	-0.2372
	(-0.8940)	(-1.0236)	(-0.8101)	(-1.2264)	(-0.4420)	(-0.7817)
Public target (dummy)	-1.7763***	-1.7170***	-1.9258***	-1.9222***	-1.8072***	-1.7981***
	(-4.6188)	(-4.4158)	(-4.7640)	(-4.708)	(-4.4780)	(-3.7096)
Relative deal size	1.2302	1.4274	1.5181	1.4361	1.3451***	1.1065
	(0.8004)	(0.8893)	(1.0358)	(0.9620)	(3.3840)	(0.6243)
Stock deal (dummy)	-0.4666	-0.6522	-0.4481	-0.5631	-0.4129	-0.4381
	(-0.7316)	(-0.9179)	(-0.6992)	(-0.7939)	(-0.7550)	(-0.5432)
Fixed effect						
Industry fixed effect	Yes		Yes		Yes	
Industry * Year fixed effect		Yes		Yes		Yes
Observations	2887	2887	2887	2887	2887	2887
Adjusted R^2	0.0296	0.0356	0.0365	0.0554	0.0568	0.0771

The results of the multivariate regression are reported in Table 5.1.1 Panel B. We find that the coefficient estimates of acquirer ESG score are negative for all three cases, and two of them, CAR (-2, 2) and CAR (-5, 5), are statistically significant at the 10% level and 1% level, respectively. The use of two fixed effects has slightly changed on the explanatory variable coefficients, but the model with cross fixed effect has better goodness of fit. Therefore, to better grasp the economic interpretation behind the estimates, we calculate how much CAR will change when one-standard-deviation unit increases on acquirer ESG score in the model with cross fixed effect. We find that one-standard-deviation improvement on acquirer ESG score leads to 0.2586% decrease in CAR (-2, 2) and a 0.5804% decrease in CAR (-5, 5). [8] The negative relationship between CAR and acquirer ESG score is consistent with the findings of univariate tests, which indicates that the acquirers with lower ESG score are more likely to have a higher CAR.

To summarize, the results we obtained from univariate tests and multivariate regressions are consistent that the relationship between acquirer ESG and its firm value is not positive, hence, the null hypothesis is rejected. The findings are in line with shareholder expense theory that ESG activities is not favorable for the firm value.

[8] The standard deviation of acquirer ESG score for full sample is 19.74 and the coefficient of acquirer ESG score is -0.0131 for CAR (-2, 2) and -0.0294 for CAR (-5, 5) as presented. Therefore one-standard deviation increase on acquirer ESG score leads to a decrease of 0.2586% (= 0.0131 * 19.74) and 0.5804% (= 0.0294 * 19.74)

5.1.2 H1b

We investigate the effects of individual pillar scores (environmental, social, and governance) on the acquirer CAR in our regression model. We compare the results of the model without an interaction term of social pillar score and cross-border dummy (columns 1, 3, and 5) to the model that includes the interaction term (columns 2, 4, and 6).

Table 5.1.2 presents the findings of our analysis. The environmental pillar score demonstrates a negative association with CAR, but the effect is not statistically significant. Regarding the social pillar score, it exhibits a significantly positive effect at 10% level on CAR only in the first column. The positive coefficients of the interaction term suggest that the impact of the social pillar score on CAR is amplified for cross-border transactions, but this effect is not statistically significant. Conversely, the governance pillar score is significantly and negatively related to CAR (-1, 1) at the 1% level and to the rest CAR at the 5% level.

We now shift the focus to the model that excludes the interaction term, as it has been demonstrated to be statistically insignificant. In economic terms, a one standard deviation increase in the governance score leads to approximately a 0.2244%, 0.2911%, and 0.3466% decrease in CAR (-1, 1), CAR (-2, 2), and CAR (-5, 5), respectively.

Our findings indicate a negative association between environmental and governance pillar scores and CAR, with only the latter showing statistical significance. The impact of the social pillar score on M&A performance is mixed and significant only in the case of CAR (-1, 1). Therefore, we reject the null hypothesis that all three ESG components have a positive effect on acquirer M&A performance at the announcement date.

Table 5.1.2: OLS regression outcome for H1b

This table reports the outcome of multivariate regression of CAR for acquirer full sample on explanatory variables, namely, three individual pillar scores and an interaction term of social pillar score and cross-border dummy. In columns (1), (3) and (5), we report the results from regressing the CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) on only three individual pillar scores. Columns (2), (4) and (6) include interaction terms in the model.

All variables are defined in Panel A of Table 4.2.3 with great details. The t-statistics for ordinary least squares (OLS) are based on standard error adjusted for heteroskedasticity and industry clustering adjustment. The standard deviation of E, S and G pillar score for full sample are 26.99, 21.76, 22.22. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

(Table continued next page)

Variables	CAR (-1. 1)		CAR (-2. 2)		CAR (-5. 5)	
	(1)	(2)	(3)	(4)	(5)	(6)
constant	2.8601***	2.9118***	2.4216**	2.6759**	-1.0021	-0.6026
	(2.9972)	(2.8433)	(2.4181)	(2.5169)	(-0.7878)	(-0.4513)
E	-0.0055	-0.0055	-0.0035	-0.0035	-0.0061	-0.0061
	(-1.0386)	(-1.0392)	(-0.6092)	(-0.6125)	(-0.8455)	(-0.8498)
S	0.0131*	0.0119	0.0055	-0.0002	-0.0046	-0.0136
	(1.9386)	(1.3185)	(0.7415)	(-0.0185)	(-0.4947)	(-0.9845)
G	-0.0101**	-0.0101**	-0.0131**	-0.0133**	-0.0156**	-0.0158**
	(-2.0865)	(-2.0800)	(-2.5004)	(-2.5195)	(-2.2800)	(-2.3118)
S * Cross-border		0.0016		0.0078		0.0122
		(0.1723)		(0.7531)		(0.9124)
Acquirer firm characteristics						
Firm size	-0.2291**	-0.2285**	-0.1647	-0.1619	-0.1059	-0.1016
	(-2.2028)	(-2.1966)	(-1.4861)	(-1.4572)	(-0.7552)	(-0.7218)
Free cash flow	0.5969	0.5921	2.4155	2.3922	3.9509*	3.9143*
	(0.3961)	(0.3925)	(1.3434)	(1.3291)	(1.7389)	(1.7192)
leverage	0.8547	0.8594	1.3066	1.3296	2.4740*	2.5102*
	(0.8592)	(0.8634)	(1.2639)	(1.2850)	(1.9112)	(1.9364)
Previous market-adjusted return	-0.6695	-0.6674	-2.0405***	-2.0302***	-5.3565***	-5.3402***
	(-1.1551)	(-1.1510)	(-3.1119)	(-3.0965)	(-7.2436)	(-7.2208)
Tobin's q	-0.1224	-0.1227	-0.2016*	-0.2032*	-0.1891	-0.1916
	(-1.1519)	(-1.1521)	(-1.7961)	(-1.8052)	(-1.3503)	(-1.3634)
Deal characteristics						
All cash deal (dummy)	-0.0469	-0.0463	-0.2802	-0.2773	-0.3515	-0.3468
	(-0.1444)	(-0.1425)	(-0.8105)	(-0.8016)	(-0.8035)	(-0.7925)
Cross-border(dummy)	0.5224**	0.4568	0.5840**	0.2611	0.5084	0.0011
	(2.3541)	(0.9451)	(2.3340)	(0.4852)	(1.6253)	(0.0016)
Diversifying (dummy)	-0.4387**	-0.4396**	-0.2713	-0.2758	-0.1832	-0.1902
	(-2.0673)	(-2.0726)	(-1.1882)	(-1.2095)	(-0.6387)	(-0.6636)
High tech (dummy)	0.0732	0.0724	0.2415	0.2378	0.2774	0.2716
	(0.2475)	(0.2450)	(0.7697)	(0.7583)	(0.7730)	(0.7575)
Hostile (dummy)	-3.2497***	-3.2437***	-1.4777*	-1.4483*	-3.4216*	-3.3754*
	(-4.0836)	(-4.0895)	(-1.7858)	(-1.7607)	(-1.8080)	(-1.8060)
Private target (dummy)	-0.2847	-0.2859	-0.3431	-0.3489	-0.2699	-0.2791
	(-1.2206)	(-1.2236)	(-1.3790)	(-1.4020)	(-0.8818)	(-0.9118)
Public target (dummy)	-1.7426***	-1.7437***	-1.9437***	-1.9492***	-1.8148***	-1.8234***
	(-4.5086)	(-4.5202)	(-4.7776)	(-4.8004)	(-3.7569)	(-3.7790)
Relative deal size	1.4289	1.4295	1.4422	1.4452	1.1085	1.1132
	(0.8906)	(0.8912)	(0.9661)	(0.9681)	(0.6253)	(0.6281)
Stock deal (dummy)	-0.6381	-0.6380	-0.5525	-0.5520	-0.4243	-0.4235
	(-0.8971)	(-0.8969)	(-0.7781)	(-0.7773)	(-0.5255)	(-0.5245)
Fixed effect						
Industry * Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2887	2887	2887	2887	2887	2887
Adjusted R2	0.0369	0.0366	0.0558	0.0556	0.0761	0.0760

Our findings diverge from the results reported by Gillan, Hartzell, Koch, and Starks (2010), who observe positive relationships between individual pillar performance and returns. We propose two possible explanations for this inconsistency. Firstly,

our analysis covers a more recent time period, spanning from 2003 to 2019, while Gillan, Hartzell, Koch, and Starks (2010) examine data from 1992 to 2007. Secondly, we utilize the Refinitiv ESG score as our measure of ESG performance, whereas they employ KLD scores. Berg, Koelbel, and Rigobon (2022) find the disparity between these two measures. Their research reveals correlations of 0.42, 0.54, 0.22, and -0.05 for the aggregated ESG score, environmental pillar score, social pillar score, and governance pillar score, respectively. These correlations indicate moderate to weak associations between the ESG scores provided by the two agencies.

The negative relationship between governance and cumulative abnormal returns (CAR), our findings align with the conclusions drawn by Chhaochharia and Grinstein (2007). They find that firms with lower compliance with rules tend to exhibit positive abnormal returns, indicating a potential inverse link between governance practices and financial performance.

5.1.3 H1c

According to Aktas, Bolt, and Cousin (2011), there exists a positive relationship between acquirer abnormal returns and the social and environmental performance of the target company. To examine this relationship in our study, we incorporate the target's ESG score as the main explanatory variable in our analysis for H1c. However, it is important to note that our sample is limited to only 45 targets with available ESG scores on Refinitiv Eikon, necessitating the consideration of missing data to mitigate potential bias. To address this issue, we employ the DVA method, which involves introducing a dummy variable to account for the presence or absence of the target's ESG score.

Additionally, drawing on Deng, Kang, and Low (2013), we incorporate both the acquirer's ESG score and the target's ESG dummy variable as key explanatory variables in our regression model. The estimation results are presented in Panel A of Table 5.1.3, specifically in columns (2), (4), and (6).

The coefficients associated with the target ESG dummy variable are positive across all three CAR measures, statistical significance is observed at the 5% level for CAR (-5,5). This suggests that the expected CAR (-5,5) for acquiring a target with an

ESG score is 3.4632% higher compared to acquiring a target without an ESG score. Additionally, the coefficients of the interaction term indicate a negative correlation between the disclosed target's ESG score and CAR, with statistical significance observed solely for CAR (-5,5) at the 5% level.

Furthermore, when the acquirer's ESG variable is included in the model, the coefficients for the target dummy variable and the interaction term exhibit trivial changes. Notably, in columns (4) and (6), we find that the acquirer's ESG score has a significantly negative effect on both CAR (-2, 2) and CAR (-5, 5). In economic terms, a one-standard-deviation increase in the acquirer's ESG score corresponds to a 0.2625% decrease in CAR (-2, 2) and a 0.5863% decrease in CAR (-5, 5). The finding aligns with those presented in Panel B of Table 5.5.1, demonstrating that the acquirer's ESG score has a negative impact on abnormal returns.

Table 5.1.3 Panel A: OLS regression outcome for H1c

This table reports the outcome of multivariate regression of CAR for acquirer full sample on explanatory variables, namely, acquirer ESG score, target ESG dummy variable and interaction term of Target ESG score and Target ESG dummy. We estimate OLS regression on CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) respectively with the same control variables.

All variables are defined in Panel A of Table 4.2.3 with great details. The t-statistics for ordinary least squares (OLS) are based on standard error adjusted for heteroskedasticity and industry clustering adjustment. The standard deviation of acquirer ESG score for full sample is 19.74. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Panel A: OLS regressions for H1c

Variables	CAR (-1.1)		CAR (-2. 2)		CAR (-5. 5)	
	(1)	(2)	(3)	(4)	(5)	(6)
constant	2.5136***	2.3252***	2.3161***	1.8541**	-0.3765	-1.4111
	(2.9577)	(2.5894)	(2.6082)	(1.9712)	(-0.3294)	(-1.1755)
Acquirer ESG		-0.0054		-0.0133*		-0.0297***
		(-0.8725)		(-1.9476)		(-3.4595)
Target ESG score*Target Dummy	-0.0501	-0.0511	-0.0602	-0.0625	-0.0992**	-0.1044**
	(-0.9281)	(-0.9380)	(-1.2285)	(-1.2575)	(-2.1072)	(-2.1522)
Target ESG (dummy)	0.6831	0.7112	1.1853	1.2542	3.4632**	3.6176**
	(0.3477)	(0.3600)	(0.6337)	(0.6639)	(1.9729)	(2.0260)
Acquirer firm characteristics						
Firm size	-0.2196***	-0.1731*	-0.2192***	-0.1052	-0.3037***	-0.0484
	(-2.8339)	(-1.7360)	(-2.6760)	(-0.9917)	(-2.8950)	(-0.3578)
Free cash flow	0.3974	0.4369	2.1517	2.2486	3.5888	3.8057*
	(0.2600)	(0.2865)	(1.1817)	(1.2377)	(1.5659)	(1.6718)
leverage	0.8364	0.7917	1.3714	1.2618	2.5969**	2.3515*
	(0.8349)	(0.7859)	(1.3119)	(1.2039)	(2.0033)	(1.8014)
Previous market-adjusted return	-0.6861	-0.6850	-2.0510***	-2.0482***	-5.3386***	-5.3324***
	(-1.1803)	(-1.1774)	(-3.1118)	(-3.1050)	(-7.2138)	(-7.1849)
Tobin's q	-0.1111	-0.1205	-0.1823	-0.2052*	-0.1464	-0.1979
	(-1.0578)	(-1.1379)	(-1.6415)	(-1.8306)	(-1.0578)	(-1.4153)
Deal characteristics						

(Table continued next page)

All cash deal (dummy)	-0.0722	-0.0816	-0.2944	-0.3175	-0.3418	-0.3935
	(-0.2202)	(-0.2499)	(-0.8448)	(-0.9142)	(-0.7792)	(-0.8990)
Cross-Border (dummy)	0.5061**	0.5121**	0.5562**	0.5709**	0.4620	0.4949
	(2.2597)	(2.2899)	(2.2101)	(2.2711)	(1.4696)	(1.5763)
Diversifying (dummy)	-0.4314**	-0.4268**	-0.2779	-0.2666	-0.2085	-0.1832
	(-2.0416)	(-2.0167)	(-1.2228)	(-1.1714)	(-0.7284)	(-0.6397)
High tech (dummy)	0.0990	0.1143	0.2419	0.2793	0.2260	0.3096
	(0.3343)	(0.3846)	(0.7709)	(0.8870)	(0.6286)	(0.8622)
Hostile (dummy)	-3.2210***	-3.3225***	-1.2341	-1.4830*	-2.7850	-3.3424*
	(-3.9482)	(-4.0492)	(-1.4376)	(-1.7181)	(-1.4802)	(-1.7567)
Private target (dummy)	-0.2316	-0.2316	-0.2988	-0.2988	-0.2383	-0.238
	(-0.9987)	(-0.9988)	(-1.2050)	(-1.2056)	(-0.7803)	4(-0.7816)
Public target (dummy)	-1.6728***	-1.6710***	-1.8986***	-1.8941***	-1.8735***	-1.8636***
	(-4.4970)	(-4.4969)	(-4.7461)	(-4.7423)	(-3.9603)	(-3.9506)
Relative deal size	1.4672	1.4813	1.4462	1.4807	1.0188	1.0960
	(0.8874)	(0.8951)	(0.9408)	(0.9618)	(0.5588)	(0.6004)
Stock deal (dummy)	-0.6328	-0.6472	-0.5297	-0.5650	-0.3940	-0.4732
	(-0.9005)	(-0.9232)	(-0.7537)	(-0.8064)	(-0.4914)	(-0.5924)
Fixed effect						
Industry * Year fixed effect	Yes		Yes		Yes	
Observations	2887	2887	2887	2887	2887	2887
Adjusted R^2	0.0355	0.0354	0.0543	0.0551	0.0738	0.0772

Overall, the target's ESG score contributes to a negative effect, particularly significant in the case of CAR (-5,5). Moreover, we observe that acquiring a target with an available ESG score leads to a higher CAR compared to acquiring a target without such disclosure. Hence, we reject the null hypothesis and suggest that the target's ESG score exerts a negative influence on the acquirer's short-term performance in M&A transactions.

We conduct an additional test by regressing the acquirer's CAR on the disparity between the acquirer's ESG score and the target's ESG score. This analysis utilizes a limited sample of 45 transactions with available target ESG scores from the Refinitiv Eikon database. The results are presented in Table 5.1.3 Panel B.

The findings reveal a significant positive relationship between the ESG score disparity and the acquirer's CAR (-1, 1) at a 1% significance level. This suggests that acquiring targets with lower ESG scores does not result in stock market penalties; instead, the market responds positively to such transactions. This aligns with our prior observations of a negative association between the target's ESG score and the acquirer's short-term abnormal returns.

However, it is important to note that as the time window is extended, the coefficient associated with the disparity diminishes in magnitude and loses statistical significance. Additionally, we acknowledge the limited sample size of 45 observations in this test, which may impact the precision and reliability of the results. Charter (1999) recommends a minimum of 400 observations for reliability studies. Therefore, cautious interpretation of our results is advised.

In summary, the additional test cautiously suggests that firms acquiring targets with lower ESG scores are not penalized by the stock market; rather, the market responds positively. However, the impact of the time window should be considered, as the coefficient for this disparity becomes smaller and less significant over a longer duration. These findings support our previous observations of a negative relationship between the target's ESG score and the acquirer's short-term abnormal returns, providing further evidence for the shareholder expense theory.

Table 5.1.3 Panel B: Additional test outcome for H1c

This table reports the outcome of OLS regression of CAR for small sample of 45 deals in which target ESG score is available on Refinitiv Eikon database on explanatory variables, namely, the difference between acquirer ESG score and target ESG score. We estimate OLS regression on CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) respectively with the same control variables.

All variables are defined in Panel A of Table 4.2.3 with great details. The t-statistics for ordinary least squares (OLS) are based on standard error adjusted for heteroskedasticity and industry clustering adjustment. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Panel B: OLS regressions for additional tests						
Variables	CAR (-1. 1)		CAR (-2. 2)		CAR (-5. 5)	
	coefficient	t-statistics	coefficient	t-statistics	coefficient	t-statistics
Constant	-5.6146	-1.2010	11.2400	1.6698	-18.5410	-1.3608
ESG difference (Acquirer - Target)	0.0736	7.1849***	0.0288	1.2762	0.0081	0.2119
Acquirer firm characteristics						
Firm size	-0.3250	-0.7624	-1.8095	-2.9303*	0.1937	0.1516
Free cash flow	21.5783	8.0800***	34.2804	5.9838**	25.1990	2.5465*
leverage	-5.6588	-3.3463*	-7.3382	-1.6165	-6.0039	-1.0134
Previous market-adjusted return	-0.9150	-0.6239	-9.0866	-2.6943*	-12.5630	-2.3404*
Tobin's q	0.2650	0.7261	0.1008	0.0867	0.2423	0.1665
Deal characteristics						
All cash deal (dummy)	6.3716	6.1206**	4.4311	2.3688.	5.9766	2.1430.
Cross-border(dummy)	1.8690	2.0519.	-2.9291	-1.2956	-0.4010	-0.1168
Diversifying (dummy)	4.1392	9.2277***	6.5767	6.9535***	2.3785	1.4617
High tech (dummy)	2.1866	2.5588.	4.0221	2.3772.	3.8273	1.5308
Relative deal size	7.7600	6.6557**	8.1454	4.1050**	15.2840	4.7172***
Stock deal (dummy)	1.8228	1.6352	1.9892	1.2560	5.6789	2.2374*
Fixed effect						

(Table continued next page)

Industry * Year fixed effect	Yes	Yes	Yes
Observations	45	45	45
Adjusted R^2	0.9336	0.7578	0.5356

In summary, the findings presented in Table 5.1.1, Table 5.1.2, and Table 5.1.3 indicate a negative relationship between the acquirer's ESG score and abnormal return around announcement date, which aligns with the shareholder expense theory when considering the short-term perspective. Additionally, the stock market shows a negative immediate response to M&A announcements involving targets with favorable ESG scores. Therefore, we conclude that ESG factors may have a negative effect on firm value in the short term, providing support for the shareholder expense theory from a short-run perspective.

5.2 H2: Long-term Effect

To obtain a more comprehensive understanding, we investigate the impact of acquirer ESG score on its M&A performance from a long-term view.

Table 5.2 reports long-term post-event abnormal stock return of the portfolio of the full sample and two subsamples with different holding periods. In addition, we also present the results of a portfolio that longs the acquirer with high ESG and shorts the acquirer with low ESG.

In Panel A, we can see that the abnormal returns for full sample are not statistically significant, and they are -0.0521, 0.0174 and 0.0638 with holding periods of 1 year, 2 years and 3 years, respectively. The results here are in line with the work of Deng, Kang and Low (2013), who find that the average of long-term abnormal return for the whole sample is statistically indistinguishable from zero. In Panel B and Panel C, we find that the intercept α for high ESG acquirer sample is positive and is negative for low ESG acquirer sample for three holding periods, neither of them is statistically significant though. We interpret the significantly positive coefficient of MKT_t and SMB_t in Panel A, B and C that the long-term effect of ESG on firm value is stronger for firms positively associated with the overall market and with smaller size.

To further measure the economic significance of the difference in long-term stock abnormal return, we form a long-short portfolio that longs acquirer with high ESG score and shorts acquirer with low ESG score in Subsection 3.2. The values of intercept α are 0.1486, 0.1159 and 0.1548 with a holding period of 1 year, 2 years and 3 years, but only the intercept for portfolio with holding period of 3 years is statistically significant at the 10% confidence level. This indicates that investors can gain 0.1548% monthly abnormal return from the long-short portfolio with holding period of 3 years. It is worth noting that only the coefficient of long-short portfolio on CAR (-5, 5) is statistically significant among all 12 cases. As such, the overall findings should be interpreted with caution, given the limited statistical strength observed across the majority of the analyses. These results suggest that the relationships between the variables are not consistently robust and may require further investigation to draw more conclusive inferences.

Table 5.2: OLS regression outcome for H2

This table reports the outcome of calendar-time portfolio analysis of acquirer post-event abnormal stock return.

We form the equal-weighted monthly portfolio for pre-specified holding periods in Subsection 3.2.4. The portfolio abnormal return is estimated as the intercept of Fama-French and Carhart time-series regression. The independent variables are the Fama-French and Carhart factors, namely, market excess return, size factor, book to market factor and momentum factor. Panel A reports the results for the portfolios composed of all acquirers in the full sample. Panel B reports the results for the portfolio composed of the acquirers in high ESG subsample. Panel C reports the results for the portfolio composed of the acquirers in low ESG subsample. Panel D reports the results for the long-short portfolio that longs acquirers with high ESG and shorts acquirers with low ESG.

All variables are defined in Panel A of Table 4.2.3 with great details. They are t-statistics for ordinary least squares (OLS) based on heteroskedasticity robust standard errors. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Variables	12-month portfolio		24-month portfolio		36-month portfolio	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Panel A: Full sample of acquirer portfolios						
α	-0.0521	-0.4738	0.0174	0.1579	0.0638	0.6830
β_{mkt}	1.0404	23.1795***	1.0644	23.7146***	1.0244	43.1870***
β_{SmB}	0.3193	6.5498***	0.3501	7.1831***	0.3919	9.6110***
β_{HmL}	-0.0483	-0.4377	-0.0037	-0.0339	0.0538	1.6710*
β_{UmD}	-0.1238	-2.7749***	-0.1552	-3.4784***	-0.1482	-6.1840***
Observations	216		228		240	
Adjusted R2	0.9132		0.9261		0.9315	
Panel B: subsample of acquirer portfolios with high ESG						
α	0.0173	0.1527	0.0767	0.7540	0.1568	1.5711
β_{mkt}	1.0276	24.0870***	1.0355	32.6942***	1.0001	31.7592***
β_{SmB}	0.2314	4.7459***	0.2238	5.5757***	0.2513	6.1788***
β_{HmL}	-0.0194	-0.1763	-0.0020	-0.0287	0.0822	1.5127
β_{UmD}	-0.1198	-3.5317***	-0.1293	-4.1997***	-0.1237	-4.3343***
Observations	213		225		237	
Adjusted R2	0.9085		0.9288		0.9324	
Panel C: subsample of acquirer portfolios with low ESG						
α	-0.1473	-1.0727	-0.0537	-0.4250	-0.0135	-0.1160

(Table continued next page)

β_{mkt}	1.0501	19.1999***	1.0907	32.7860***	1.0532	35.5560***
β_{SmB}	0.4313	6.1526***	0.4781	8.6660***	0.5322	10.4500***
β_{HmL}	-0.0987	-0.8124	-0.0149	-0.3080	0.0300	0.7470
β_{UmD}	-0.1424	-2.0043**	-0.1831	-5.6700***	-0.1684	-5.6260***
Observations	216		228		240	
Adjusted R^2	0.8719		0.8974		0.9077	
Panel D: Long-short portfolios that longs acquirer with high ESG and shorts acquirer with low ESG						
α	0.1486	1.2326	0.1159	1.1470	0.1548	1.6830*
β_{mkt}	-0.0237	-0.5870	-0.0563	-2.1230**	-0.0539	-2.3190**
β_{SmB}	-0.1999	-2.8695**	-0.2543	-5.7900***	-0.2808	-7.0330***
β_{HmL}	0.0843	1.5566	0.0172	0.4480	0.0558	1.7720*
β_{UmD}	0.0223	0.3870	0.0535	2.0840**	0.0443	1.8890*
Observations	213		225		237	
Adjusted R^2	0.0623		0.2234		0.2631	

In summary, the findings in short-term analysis generally support the shareholder expense theory, as they reveal a negative association between ESG scores and firm value. However, the analysis of long-term effects shows a non-statistically significant positive relation between acquirer ESG score and post-event stock returns.

Several factors contribute to the lack of conclusive findings regarding the relationship between ESG and firm value in M&A transactions. Firstly, there may be endogeneity issues present in our model because of unobservable factors that influence M&A performance. For instance, Haleblian and Finkelstein (1999) find that the relationship between acquisition experience and M&A performance follows a specific pattern. We employ a Two-Stage Least Squares (2SLS) approach in Subsection 6.1 to mitigate the potential endogeneity issue. Secondly, long-term stock returns are influenced by various factors, such as strategic decisions, industry dynamics and macroeconomic conditions. It is essential to consider the limitations of our study. For instance, our tests are not able to exclude such potential influences and prove the long-term performance is driven by M&A announcement, therefore might lead to inconclusive outcomes.

6 Robustness Tests

6.1 Endogeneity Problem

In an ordinary least squares (OLS) model, the presence of correlation between one or more independent variables and the error term indicates the existence of endogeneity issues within the model. Endogeneity problems can arise due to three main reasons: reverse causality, omitted variables, and selection bias.

Deng, Kang, and Low (2013) posit that M&A events are typically unanticipated, which allows the use of returns around M&A announcement date to largely alleviate concerns related to reverse causality when examining the influence of ESG on firm value. Furthermore, as the explanatory variable in our model is the acquirer ESG score determined one year prior to the event announcement year, it is unlikely that the announcement return would have any influence on the ESG score from one year earlier. Consequently, we can infer that reverse causality is of less concern in our study.

In line with Deng, Kang, and Low (2013) and Masulis, Wang, and Xie (2017), who have explored similar research questions, we incorporate an extensive set of control variables (as discussed in Subsection 4.2.3) to mitigate the potential bias arising from omitted variables. Additionally, we employ fixed effects estimation to address the potential bias introduced by time-invariant omitted variables. However, it is important to acknowledge that our model may still be susceptible to endogeneity bias due to the presence of unobservable omitted variables, as highlighted by Roberts and Whited (2013).

The final potential source of endogeneity is selection bias. However, it is worth noting that the Heckman two-step procedure (Heckman, 1979) is typically employed to address bias arising from selection in the dependent variable. In our case, the concern lies with the selection of the explanatory variable, namely the ESG score. As a result, the application of the Heckman two-step procedure is not suitable for addressing this specific selection bias in our study.

To address the endogeneity problem, we perform 2SLS regression analysis for the first main hypothesis (H1a) using two instrumental variables for acquirer ESG score. We select instrumental variables that have been proven to be effective in an earlier similar study done by Deng, Kang and Low (2013), who use religion rank and blue state dummy.

The variable "Religion rank" represents the level of religious devotion in the state where the acquiring company's headquarters is located. This measure ranges from 1 to 51 and is determined by the ratio of religious adherents to the total population in that state in 2010[9]. Angelidis and Ibrahim (2004) have found a positive relationship between the degree of religiousness and the inclination towards CSR activities. Consequently, the religion rank variable meets the relevance requirement for instrumental variables. However, there is no evidence to suggest that this variable significantly affects M&A performance, thus satisfying the exclusion condition for instrumental variables.[10] (Wooldridge, 2016, p.463)

The "blue state dummy" takes the value of one if the acquirer headquarters is located in a Democratic state, and zero otherwise. According to Di Giuli and Kostovesky (2014), firms tend to have higher CSR scores when the founders, CEOs have affiliations with the Democratic Party, and when the headquarters are in states leaning towards the Democratic Party. Therefore, the choice of the blue state dummy as an instrumental variable satisfies the relevance requirement. It is unlikely that the political leaning of the state where the headquarters is situated has a substantial influence on M&A performance, thereby meeting the exclusion condition.

To provide further statistical support for the choice of instruments, we conduct two tests in 2SLS regression, namely, weak instruments test and Sargan overidentification test.[11] In instrumental variable (IV) analysis, it is crucial to

[9] the Association of Religion Data Archive (ARDA) provides religion ranking every decade. We recalculate the religion ranks by averaging data from 2000, 2010 and 2020 for the states which totally cover our sample period. As a robustness test, we also only use 2010 data because it is the middle of our sample period (2003-2019). We find that our results still hold.

[10] An instrumental variable must satisfy two requirements: it must be correlated with the endogenous explanatory variable (instrument relevance) and uncorrelated with the error (instrument exogeneity) (Wooldridge, 2016, p.482).

[11] We use ivreg diagnostics tests command in R.

ensure that the selected instruments are strongly related to the endogenous regressor. Therefore, we aim for a low p-value in order to reject the null hypothesis of the weak instruments test. Additionally, a Sargan overidentification test should be conducted when the number of instrumental variables exceeds the number of coefficients to estimate. The null hypothesis of the Sargan test is that all instruments are equally valid. In our study, we employ two instrumental variables to estimate one endogenous variable. Consequently, it is important to obtain a high p-value and not reject the null hypothesis of the Sargan test in the 2SLS regression.

By incorporating these instrumental variables and conducting these tests, we estimate OLS regressions in Table 5.1.1 Panel B and present the results in Table 6.1. On the first stage, the p-value for weak instruments is smaller than 0.001, rejecting the null hypothesis that the instruments are weak at the 1% level.[12] These tests acknowledge the relevance of our instrumental variables. We fail to reject the null hypothesis of Sargan overidentification test with p-value at 0.6702, 0.8972 and 0.1543, respectively. This suggests that our instrumental variable passed the Sargan overidentification test.

In Table 5.1.1 Panel B, we use OLS regression and get significant coefficients of acquirer ESG at -0.0131 and -0.0294 for CAR (-2, 2) and CAR (-5, 5), respectively. The results of 2SLS model are presented in Table 6.1, the coefficients of acquirer ESG score are statistically significant at -0.1186, -0.1688 and -0.2685 for three CAR. The results for CAR (-2, 2) and CAR (-5, 5) are still held in 2SLS compared with using OLS, while the coefficient of acquirer ESG score for CAR (-1, 1) becomes statistically significant at 10% level when adding the instrumental variables in the model. Overall, these results suggest our results, acquirer ESG scores are negatively associated with CAR, are robust.

Table 6.1: 2SLS outcome for H1a

This table reports the outcome of 2SLS regression of CAR for acquirer full sample on explanatory variable, namely, acquirer ESG score. We estimate the OLS regression for H1a using 2SLS regression.

In the first stage, the dependent variable is acquirer ESG score, and we use two instrumental variables for acquirer ESG estimation, namely, blue state dummy and religion rank. In the second stage, the dependent variable is CAR.

All variables are defined in Panel A of Table 4.2.3 with great details. The standard deviation of acquirer ESG score for full sample is 19.74. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

(Table continued next page)

[12] A generally perceived threshold of F-statistics in the first stage is 10. The F-stats we obtained in the first stage is 18.77.

Variables	2SLS			
	First stage	Second stage		
		CAR (1,1)	CAR (2,2)	CAR (5,5)
Constant	-32.6588**	-1.4551	-3.2289	-9.4709
	(-2.2190)	(-0.2560)	(-0.5270)	(-1.2460)
Acquirer ESG score		-0.1186*	-0.1688**	-0.2685***
		(-1.7610)	(-2.3270)	(-2.9810)
Instrumental variables				
Blue state (dummy)	0.1729			
	(0.2650)			
Religion rank	-0.1103***			
	(-5.1890)			
Acquirer firm characteristics				
Firm size	8.6362***	0.7717	1.1884*	1.9579**
	(40.5460)	(1.3140)	(1.8790)	(2.4940)
Free cash flow	5.5839*	0.9844	2.0587	3.9722**
	(1.7260)	(0.7740)	(1.5030)	(2.3360)
leverage	-7.3706***	-0.1680	-0.2048	0.2980
	(-2.8550)	(-0.1540)	(-0.1740)	(0.2040)
Previous market-adjusted return	0.4035	-0.6085	-1.9761***	-5.2118***
	(0.3350)	(-1.4350)	(-4.3260)	(-9.1940)
Tobin's q	-1.7234***	-0.2642*	-0.3778**	-0.4940**
	(-6.3810)	(-1.6930)	(-2.2480)	(-2.3690)
Deal characteristics				
All cash deal (dummy)		-0.0833	-0.2655	-0.2857
		(-0.2670)	(-0.7890)	(-0.6840)
Cross-border (dummy)		0.4696*	0.4126	0.2853
		(1.9520)	(1.5920)	(0.8870)
Diversifying (dummy)		-0.4129*	-0.3293	-0.2662
		(-1.8740)	(-1.3880)	(-0.9040)
High tech (dummy)		0.0996	0.1863	0.1768
		(0.3600)	(0.6240)	(0.4770)
Hostile (dummy)		-3.5387	-1.8201	-3.7615
		(-0.9580)	(-0.4580)	(-0.7620)
Private target (dummy)		-0.2484	-0.3167	-0.2469
		(-1.0990)	(-1.3010)	(-0.8170)
Public target (dummy)		-1.6631***	-1.6761***	-1.5035***
		(-5.3180)	(-4.9760)	(-3.5960)
Relative deal size		1.3961***	1.3417***	0.9431**
		(4.5410)	(4.0510)	(2.2950)
Stock deal (dummy)		-0.6484	-0.6892	-0.4815
		(-1.5430)	(-1.5230)	(-0.8570)
Fixed effect				
Industry * Year fixed effect	Yes	Yes	Yes	Yes
Observation	2887	2887	2887	2887
Adjusted R^2	0.4558	0.0319	0.0445	0.0647
Instrumental variable tests				
Weak instruments test	$(p = 3.93 * 10^{-08})$***			
Overidentification test		(p = 0.6702)	(p = 0.8972)	(p = 0.1543)

There are two key points to be noted. Firstly, it is essential to recognize that the error term in a regression model is inherently unobservable, rendering it statistically infeasible to directly test the exogeneity assumption. The Sargan overidentification test evaluates the relative validity of instruments rather than their absolute validity.

In essence, passing the Sargan test implies that the instruments are either equally valid or equally invalid.

Secondly, although our instrumental variables demonstrate statistical significance in the weak instruments test with a small p-value (smaller than 0.001), the F-statistic obtained in the first stage regression is only 18.77. While this F-statistic surpasses the commonly recognized threshold of 10, it is increasingly argued by scholars that a higher threshold is required to ensure an appropriate estimate in the second stage. For instance, Lee, McCrary, Moreira, and Porter (2022) argue that, in order to attain a level-0.05 second-stage test in a single instrumental variable model, the first-stage F-statistic needs to exceed 104.7, which corresponds to a t-statistic of 10.23. Angrist and Pischke (2009) further emphasize that weak, yet exogenous, instruments tend to yield instrumental variable estimates that are biased towards the corresponding ordinary least squares (OLS) estimates. Therefore, both of these reasons suggest our results through 2SLS should be interpreted with caution.

6.2 Alternative Specification Test for H1a

To check the robustness of our results for H1a, we conduct an alternative test, modified based on equation (1-2) in subsection 3.2.1. We replace the explanatory variable from acquirer ESG score to a dummy variable which is one when acquirer ESG score is above the median ESG score of the full sample, and zero when acquirer ESG score is below the median ESG score of the full sample. The control variables are the same with before and additionally control cross fixed effect of year and industry.[13] The model used is as follows:

$$\begin{aligned} CAR(t-k,t+k) = {} & \alpha + \beta_1 Dummy_{High\_Acq} \\ & + \beta_2 Acq_{characteristics} + \beta_3 Deal_{characteristics} \\ & + \sigma_t * \delta_j + \varepsilon_i \end{aligned} \qquad (1-3)$$

Where t is M&A announcement date, k = 1, 2 and 5, σ_t is year fixed effect, δ_j is industry fixed effect.

[13] In untabulated test, we replace the cross fixed effect with two-way fixed effect of year and industry. The coefficients of acquirer high ESG dummy are still negative and significant at 5% and 1% level for CAR (-2, 2) and CAR (-5, 5).

The robustness test results, shown in Table 6.2.1, demonstrate negative coefficients for the acquirer's high ESG dummy variable across all three cases. Specifically, the coefficients for CAR (-2, 2) and CAR (-5, 5) exhibit statistical significance at the 5% and 1% levels, respectively. These negative coefficients indicate that acquirers with high ESG scores, compared to the reference group (acquirers with low ESG scores in this model), experience lower abnormal returns. In other words, a higher ESG score for the acquirer is associated with a negative correlation with abnormal return, relative to acquirers with lower ESG scores. These findings confirm the robustness of our results in H1a and offer further support for the shareholder expense theory.

Table 6.2: Alternative model outcome for H1a

This table reports the outcome of multivariate regressions of CAR for acquirer full sample on explanatory variable, acquirer ESG dummy. We estimate OLS regression on CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) respectively with the same control variables as in main analysis for H1a.

All variables are defined in Panel A of Table 4.2.3 with great details. The t-statistics for ordinary least squares (OLS) are based on standard error adjusted for heteroskedasticity and industry clustering adjustment. The standard deviation of acquirer ESG score for full sample is 19.74. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Variables	CAR (-1, 1)		CAR (-2, 2)		CAR (-5, 5)	
	coefficient	t-statistics	coefficient	t-statistics	coefficient	t-statistics
Constant	2.3156	2.5367*	1.7553	1.8384*	-1.4740	-1.2260
Acquirer High ESG dummy	-0.2048	-0.9324	-0.4812	-1.9758**	-0.8378	-2.7548***
Acquirer firm characteristics						
Firm size	-0.1945	-2.1774*	-0.1470	-1.5666	-0.1654	-1.4003
Free cash flow	0.4595	0.3033	2.3413	1.2962	3.9898	1.7483*
leverage	0.7521	0.7524	1.2248	1.1764	2.4158	1.8494*
Previous market-adjusted return	-0.6924	-1.1923	-2.0654	-3.1391***	-5.3808	-7.2650***
Tobin's q	-0.1169	-1.1060	-0.1980	-1.7739*	-0.1727	-1.2441
Deal characteristics						
All cash deal (dummy)	-0.0659	-0.2027	-0.2954	-0.8537	-0.3527	-0.8045
Cross-border(dummy)	0.5207	2.3358*	0.5761	2.2977**	0.4919	1.5735
Diversifying (dummy)	-0.4260	-2.0144*	-0.2709	-1.1909	-0.1987	-0.6942
High tech (dummy)	0.0917	0.3082	0.2233	0.7087	0.1933	0.5362
Hostile (dummy)	-3.2550	-4.1323***	-1.4224	-1.7206*	-3.2608	-1.8438*
Private target (dummy)	-0.2403	-1.0408	-0.3125	-1.2659	-0.2548	-0.8394
Public target (dummy)	-1.7208	-4.4193	-1.9314	-4.7225***	-1.8166	-3.7398***
Relative deal size	1.4225	0.8859***	1.4230	0.9521	1.0669	0.6015
Stock deal (dummy)	-0.6413	-0.9010	-0.5358	-0.7537	-0.3733	-0.4620
Fixed effect						
Industry * Year fixed effect	Yes		Yes		Yes	
Observations	2887		2887		2887	
Adjusted R^2	0.0356		0.0555		0.0759	

6.3 Finance Industry Exclusion Analysis

To examine the robustness of our findings, we perform an industry exclusion test by excluding firms and deals from the Finance, Insurance, and Real Estate industry in our main analysis sample, which initially consists of 447 deals. The rationale behind this exclusion is that financial firms often exhibit unique characteristics in their operations, and the financial fundamental data associated with these firms may have distinct implications compared to other industries. Hence, we obtain a revised sample of 2440 deals, involving 794 acquiring firms, excluding the finance industry.

We then proceed to re-estimate the main hypotheses H1a, H1b, H1c and H2 using this revised sample. The results of these re-estimations are presented in Appendix C Table C. By conducting these tests, we aim to assess the robustness of our findings and determine if they remain consistent even when financial industry firms are excluded from the analysis.

In Table C-H1a, the coefficient estimates on the explanatory variable, acquirer ESG score, are -0.0128 and -0.0273 for CAR (-2, 2) and CAR (-5, 5), respectively, both of which are statistically significant. A one-standard-deviation improvement in the acquirer's ESG score corresponds to a 0.2527% decrease in CAR (-2, 2) and a 0.5389% decrease in CAR (-5, 5). Notably, even after excluding finance industry firms from the analysis, the negative relationship between the acquirer's ESG score and CAR remains consistent. This suggests that the inclusion of finance-related firms does not significantly impact the overall conclusions in H1a.

Similarly, the results for H1b still hold in this analysis. The environmental and governance pillar scores have negative effect but only the latter one is statistically significant. In terms of social pillar, the results are mixed and only significant in the first column. The interaction term of social pillar score and cross-border is not significant in all three cases.

The coefficients of explanatory variables lack significance in the CAR (-1, 1). However, the coefficient of the acquirer's ESG score variable shows significance at the 10% level in CAR (-2, 2). The significantly negative coefficients of the acquirer ESG and interaction term in the CAR (-5, 5) imply a negative association between firm ESG performance and short-term abnormal returns. Furthermore, the

coefficient of the target dummy variable suggests that acquiring a target with an available ESG score results in a 3.0578% higher CAR within the (-5, 5) time window compared to acquiring a target without an ESG score.

The discrepancy between the results obtained from the full sample and the sample excluding the finance industry prompts an examination of the influence of the finance industry on the observed outcomes. The insignificance of all 12 tests when excluding the finance industry implies that unique characteristics or dynamics within the finance industry could have affected the previously significant result. Additionally, as stated in Subsection 5.2, it is important to acknowledge that other factors may also impact long-term stock returns, which could contribute to the lack of significance observed in some cases.

The consistent findings suggest a negative short-term association between ESG activities and value. Nevertheless, the long-term implications remain uncertain and warrant additional investigation, accounting for potential confounding factors that could influence long-term stock performance.

7 Conclusion

By examining the association between ESG performance and firm value within the context of M&A, our thesis endeavors to explore two contrasting theoretical perspectives: shareholder value maximization view and stakeholder expense view. The shareholder value maximization view posits that ESG activities represent a burden on shareholders' wealth, whereas the stakeholder expense view suggests that ESG activities contribute to enhanced stakeholder satisfaction, ultimately benefiting shareholders.

Our research findings support the shareholder expense theory, indicating that ESG is perceived as a cost by the market in the short term, as evidenced by outcomes of hypothesis H1 and robustness tests. The negative impact of ESG on M&A performance in the short term may be attributed to the initial investments and expenses associated with integrating ESG practices. Companies adhering to ESG standards may incur additional costs for compliance and reporting, which can be perceived as burdensome by investors and stakeholders focused on immediate financial metrics and returns. Consequently, companies with strong ESG practices may be undervalued in the short term, leading to potential negative effects on stock prices and overall firm value. The long-term effect, however, remains inconclusive, as indicated by the positive but statistically insignificant results for post-event abnormal stock return.

Our study acknowledges several limitations that warrant further exploration in future research. Firstly, our reliance on short windows of CAR as a measurement tool limits our ability to capture the full value creation or destruction throughout the implementation phase of the M&A. To address this, future studies could develop alternative measurement that consider the value generated or eroded during the implementation process while controlling for other influencing factors that may arise during the M&A period. Secondly, narrowing the scope of investigation to specifically examine the long-term relationship between ESG and firm value would be valuable. This could involve excluding the influence of other relevant factors that may affect the long-term performance of acquirers, allowing for a more focused analysis of the impact of ESG considerations. Furthermore, expanding the geographical context of the research to include other markets, such as European or

Asian markets, would enhance the generalizability of the findings. Assessing the relationship between ESG and firm value in different market contexts can provide a broader understanding of the phenomenon. Lastly, it is important to acknowledge the limitations of using an indirect approach to measure a firm's sustainability performance, as we relied on the Refinitiv database. Given the criticism surrounding ESG data provided by Refinitiv recent year (Berg, Fabisik and Sautner, 2020) and the variation in ESG scores across different rating agencies, future researchers should consider developing their own indices or constructing adjusted indices using data from reputable databases to ensure more consistent and reliable results.

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Appendix

Appendix A Correlation Matrix for Main Variables

In this table, we provide the correlation matrix for the main variables we use in our thesis.

Table A: Correlation matrix for main variables

This table reports the main variables in the thesis.

	CAR (-1, 1)	CAR (-2, 2)	CAR (-5, 5)	Acquirer ESG score	Acquirer E score	Acquirer S score	Acquirer G score	Acquirer S score * Cross-border	Target ESG score	Target ESG (dummy)
CAR (-1, 1)	1,00									
CAR (-2, 2)	0,89	1,00								
CAR (-5, 5)	0,70	0,79	1,00							
Acquirer ESG score	-0,05	-0,05	-0,06	1,00						
Acquirer E score	-0,04	-0,03	-0,03	0,85	1,00					
Acquirer S score	-0,03	-0,04	-0,04	0,88	0,71	1,00				
Acquirer G score	-0,05	-0,06	-0,06	0,74	0,46	0,46	1,00			
Acquirer S score * Cross-border	0,01	0,00	-0,01	0,56	0,43	0,64	0,31	1,00		
Target ESG score	-0,05	-0,03	-0,01	0,07	0,09	0,06	0,03	0,02	1,00	
Target ESG (dummy)	-0,05	-0,03	0,00	0,08	0,10	0,06	0,04	0,04	0,90	1,00

Appendix B Instrumental Variables

The specific data for instrumental variables, namely, religion rank and blue state dummy used in 2SLS is reported in this table.

Table B: Instrumental variables in 2SLS

This table reports the instrumental variables used in Subsection 6.1.

The religion rank variable is constructed using data obtained from the Association of Religion Data Archive (ARDA). Rankings for the years 2000, 2010, and 2020 are collected and the average ranking is computed as the final variable, ranging from 1 to 51.

The acquirer's headquarters is in a blue state if Democrats won at least three times in the 2004, 2008, 2012, 2016, and 2020 U.S. presidential elections, and it was not a swing state in those years.

State name	Blue state dummy	Religion Rank	State name	Blue state dummy	Religion Rank	State name	Blue state dummy	Religion Rank
Alabama	0	22	Kentucky	0	28	North Dakota	0	1
Alaska	0	41	Louisiana	0	42	Ohio	0	16
Arizona	0	48	Maine	1	29	Oklahoma	0	14
Arkansas	0	28	Maryland	1	19	Oregon	1	45
California	1	49	Massachusetts	1	39	Pennsylvania	1	8
Colorado	1	39	Michigan	0	31	Rhode Island	1	36
Connecticut	1	23	Minnesota	1	4	South Carolina	0	13
Delaware	1	18	Mississippi	0	20	South Dakota	0	2
District of Columbia	1	7	Missouri	0	25	Tennessee	0	21
Florida	0	41	Montana	0	25	Texas	0	32
Georgia	0	19	Nebraska	0	5	Utah	0	51
Hawaii	1	47	Nevada	0	50	Vermont	1	24
Idaho	0	44	New Hampshire	1	34	Virginia	1	13
Illinois	1	27	New Jersey	1	35	Washington	1	41
Indiana	0	15	New Mexico	1	46	West Virginia	0	6
Iowa	0	3	New York	1	37	Wisconsin	1	10
Kansas	0	9	North Carolina	0	11	Wyoming	0	31

Appendix C Results for Finance Exclusion Analysis

Table C-H1a: Industry exclusion analysis for H1a

Panel A reports the outcome of multivariate regressions of CAR for acquirer full sample excluding finance, insurance, and real estate industry on explanatory variable, namely, acquirer ESG score. We estimate OLS regression on CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) respectively with the same control variables and cross fixed effect of industry and year.

All variables are defined in Panel A of Table 4.2.3 with great details. The t-statistics for ordinary least squares (OLS) are based on standard error adjusted for heteroskedasticity and industry clustering adjustment. The standard deviation of acquirer ESG score for full sample is 19.74. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Variables	CAR (-1. 1)		CAR (-2. 2)		CAR (-5. 5)	
	coefficient	t-statistics	coefficient	t-statistics	coefficient	t-statistics
Constant	2.5787	2.4228**	2.1326	1.9641**	-1.0542	-0.7789
Acquirer ESG score	-0.0051	-0.7481	-0.0128	-1.7175*	-0.0273	-2.9154***
Acquirer firm characteristics						
Firm size	-0.2150	-1.7601*	-0.1516	-1.2122	-0.1337	-0.8622
Free cash flow	0.6733	0.4282	2.5094	1.3327	4.0269	1.7419*
leverage	1.0738	0.9033	1.8486	1.4893	3.7300	2.3972**
Previous market-adjusted return	-0.5678	-0.9300	-2.0913	-2.9891***	-5.4744	-7.0277***
Tobin's q	-0.0972	-0.8300	-0.1674	-1.3643	-0.1452	-0.9548
Deal characteristics						
All cash deal (dummy)	-0.1499	-0.4297	-0.4573	-1.2398	-0.6246	-1.3252
Cross-border(dummy)	0.5302	2.1627**	0.5572	2.0454**	0.5353	1.5840
Diversifying (dummy)	-0.4086	-1.8675*	-0.2184	-0.9274	-0.1390	-0.4704
High tech (dummy)	0.1684	0.5441	0.3659	1.1191	0.3913	1.0509
Hostile (dummy)	-3.4357	-2.7833***	-1.4030	-1.1226	-0.9962	-0.6620
Private target (dummy)	-0.2628	-0.8681	-0.3829	-1.2097	-0.3264	-0.8441
Public target (dummy)	-1.6729	-3.6978***	-1.8969	-4.0977***	-1.7001	-3.1487***
Relative deal size	1.9960	0.6201	1.9021	0.6361	0.5982	0.1708
Stock deal (dummy)	-0.7309	-0.7790	-0.7130	-0.7709	-0.3410	-0.3179
Fixed effect						
Industry * Year fixed effect	Yes		Yes		Yes	
Observations	2440		2440		2440	
Adjusted R^2	0.0324		0.0498		0.0731	

Table C-H1b: Industry exclusion analysis for H1b

This table reports the outcome of multivariate regression of CAR for acquirer full sample on explanatory variables, namely, three individual pillar scores and an interaction term of social pillar score and cross-border dummy. In columns (1), (3) and (5), we report the results from regressing the CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) on only three individual pillar scores. Columns (2), (4) and (6) include interaction terms in the model.

All variables are defined in Panel A of Table 4.2.3 with great details. The t-statistics for ordinary least squares (OLS) are based on standard error adjusted for heteroskedasticity and industry clustering adjustment. The standard deviation of E, S and G pillar score for full sample are 26.99, 21.76, 22.22. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Variables	CAR (-1. 1)		CAR (-2. 2)		CAR (-5. 5)	
	(1)	(2)	(3)	(4)	(5)	(6)
constant	3.2842***	3.4303***	2.8926**	3.2030***	-0.4338	0.0011
	(2.9089)	(2.8811)	(2.5076)	(2.6554)	(-0.3013)	(0.0007)
E	-0.0044	-0.0045	-0.0006	-0.0008	-0.0007	-0.0009
	(-0.7484)	(-0.7602)	(-0.0988)	(-0.1222)	(-0.0836)	(-0.1100)
S	0.0161**	0.0128	0.0064	-0.0005	-0.0070	-0.0166
	(2.1568)	(1.3399)	(0.7790)	(-0.0449)	(-0.6794)	(-1.1387)
G	-0.0133**	-0.0134**	-0.0161***	-0.0163***	-0.0162**	-0.0165**
	(-2.4583)	(-2.4625)	(-2.7465)	(-2.7705)	(-2.1351)	(-2.1704)
S * Cross-border		0.0045		0.0096		0.0135
		(0.4769)		(0.8997)		(0.9723)
Acquirer firm characteristics						
Firm size	-0.2869**	-0.2855**	-0.2283*	-0.2255*	-0.2092	-0.2052
	(-2.2430)	(-2.2322)	(-1.7408)	(-1.7158)	(-1.2863)	(-1.2580)
Free cash flow	0.9298	0.9156	2.7514	2.7211	4.1491*	4.1066*
	(0.5951)	(0.5853)	(1.4710)	(1.4532)	(1.7948)	(1.7720)
leverage	1.2367	1.2528	1.9580	1.9923	3.8011**	3.8492**
	(1.0366)	(1.0484)	(1.5766)	(1.6009)	(2.4422)	(2.4671)
Previous market-adjusted return	-0.5309	-0.5246	-2.0617***	-2.0484***	-5.4619***	-5.4432***
	(-0.8714)	(-0.8603)	(-2.9556)	(-2.9370)	(-7.0250)	(-7.0010)
Tobin's q	-0.0957	-0.0967	-0.1586	-0.1608	-0.1324	-0.1355
	(-0.8077)	(-0.8145)	(-1.2827)	(-1.2974)	(-0.8637)	(-0.8810)
Deal characteristics						
All cash deal (dummy)	-0.1255	-0.1227	-0.4332	-0.4271	-0.5995	-0.5910
	(-0.3604)	(-0.3519)	(-1.1743)	(-1.1576)	(-1.2726)	(-1.2539)
Cross-border(dummy)	0.5320**	0.3458	0.5589**	0.1632	0.5301	-0.0243
	(2.1770)	(0.6879)	(2.0550)	(0.2919)	(1.5697)	(-0.0344)
Diversifying (dummy)	-0.4183*	-0.4218*	-0.2189	-0.2263	-0.1363	-0.1466
	(-1.9095)	(-1.9259)	(-0.9271)	(-0.9597)	(-0.4601)	(-0.4951)
High tech (dummy)	0.1218	0.1195	0.3239	0.3190	0.3589	0.3521
	(0.3961)	(0.3888)	(0.9951)	(0.9810)	(0.9663)	(0.9490)
Hostile (dummy)	-3.5658***	-3.5637***	-1.4618	-1.4572	-0.9332	-0.9268
	(-2.9092)	(-2.9162)	(-1.1800)	(-1.1814)	(-0.6232)	(-0.6215)
Private target (dummy)	-0.3214	-0.3254	-0.4277	-0.4360	-0.3535	-0.3652
	(-1.0507)	(-1.0625)	(-1.3409)	(-1.3672)	(-0.9076)	(-0.9379)
Public target (dummy)	-1.7053***	-1.7084***	-1.9230***	-1.9297***	-1.7156***	-1.7250***
	(-3.7939)	(-3.8044)	(-4.1697)	(-4.1889)	(-3.1863)	(-3.2051)
Relative deal size	2.0025	2.0059	1.9144	1.9216	0.6039	0.6141
	(0.6231)	(0.6242)	(0.6410)	(0.6433)	(0.1724)	(0.1753)
Stock deal (dummy)	-0.7351	-0.7341	-0.7198	-0.7179	-0.3367	-0.3339
	(-0.7828)	(-0.7818)	(-0.7781)	(-0.7759)	(-0.3137)	(-0.3111)
Fixed effect						
Industry * Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2440	2440	2440	2440	2440	2440
Adjusted R2	0.0346	0.0342	0.0507	0.0506	0.0721	0.0720

Table C-H1c: Industry exclusion analysis for H1c

Panel B reports the outcome of multivariate regressions of CAR for acquirer full sample excluding finance, insurance, and real estate industry on explanatory variable, namely, acquirer ESG score, target ESG dummy variable and interaction term of Target ESG score and Target ESG dummy. We estimate OLS regression on CAR (-1, 1), CAR (-2, 2) and CAR (-5, 5) respectively with the same control variables and cross fixed effect of year and industry. Columns (1), (3) and (5) report the results without acquirer ESG score as one of the explanatory variables while columns (2), (4) and (6) include acquirer ESG score.

All variables are defined in Panel A of Table 4.2.3 with great details. The t-statistics for ordinary least squares (OLS) are based on standard error adjusted for heteroskedasticity and industry clustering adjustment. The standard deviation of acquirer ESG score for full sample is 19.74. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Variables	CAR (-1.1)		CAR (-2. 2)		CAR (-5. 5)	
	(1)	(2)	(3)	(4)	(5)	(6)
constant	2.6856***	2.4966**	2.5362**	2.0676*	-0.0475	-1.0433
	(2.6093)	(2.2912)	(2.4359)	(1.8729)	(-0.0362)	(-0.7576)
Acquirer ESG score		-0.0052		-0.0130*		-0.0275***
		(-0.7621)		(-1.7356)		(-2.9453)
Target ESG score*Target	-0.0473	-0.0482	-0.0577	-0.0599	-0.0983**	-0.1030**
Dummy	(-0.8758)	(-0.8852)	(-1.1703)	(-1.1983)	(-2.0749)	(-2.1127)
Target ESG (dummy)	0.3617	0.3885	0.8873	0.9537	3.0578*	3.1990*
	(0.1855)	(0.1981)	(0.4761)	(0.5067)	(1.7280)	(1.7794)
Acquirer firm characteristics						
Firm size	-0.2489**	-0.2031	-0.2539**	-0.1404	-0.3677***	-0.1265
	(-2.4812)	(-1.6227)	(-2.5248)	(-1.1034)	(-2.9453)	(-0.8014)
Free cash flow	0.6799	0.7090	2.4597	2.5318	3.8394*	3.9925*
	(0.4300)	(0.4494)	(1.3000)	(1.3410)	(1.6463)	(1.7231)
leverage	1.1719	1.1287	1.9924	1.8851	3.9157**	3.6877**
	(0.9904)	(0.9472)	(1.6062)	(1.5138)	(2.5342)	(2.3686)
Previous market-adjusted return	-0.5702	-0.5673	-2.0915***	-2.0845***	-5.4568***	-5.4420***
	(-0.9318)	(-0.9263)	(-2.9794)	(-2.9666)	(-7.0054)	(-6.9648)
Tobin's q	-0.0900	-0.0991	-0.1478	-0.1703	-0.1045	-0.1523
	(-0.7718)	(-0.8439)	(-1.2126)	(-1.3850)	(-0.6915)	(-0.9988)
Deal characteristics						
All cash deal (dummy)	-0.1576	-0.1665	-0.4523	-0.4743	-0.5948	-0.6414
	(-0.4491)	(-0.4765)	(-1.2179)	(-1.2827)	(-1.2595)	(-1.3618)
Cross-Border (dummy)	0.5106**	0.5165**	0.5271*	0.5417**	0.4829	0.5138
	(2.0634)	(2.0921)	(1.9219)	(1.9785)	(1.4187)	(1.5120)
Diversifying (dummy)	-0.4195*	-0.4155*	-0.2353	-0.2255	-0.1670	-0.1461
	(-1.9225)	(-1.9014)	(-1.0015)	(-0.9583)	(-0.5651)	(-0.4943)
High tech (dummy)	0.1534	0.1673	0.3303	0.3646	0.3164	0.3893
	(0.4972)	(0.5406)	(1.0131)	(1.1153)	(0.8492)	(1.0463)
Hostile (dummy)	-3.4199***	-3.5129***	-1.2270	-1.4576	-0.4627	-0.9526
	(-2.7275)	(-2.7889)	(-0.9679)	(-1.1455)	(-0.3030)	(-0.6241)
Private target (dummy)	-0.2633	-0.2597	-0.3892	-0.3803	-0.3448	-0.3260
	(-0.8682)	(-0.8561)	(-1.2270)	(-1.1990)	(-0.8899)	(-0.8409)
Public target (dummy)	-1.6066***	-1.6045***	-1.8538***	-1.8487***	-1.7499***	-1.7392***
	(-3.6919)	(-3.6911)	(-4.0826)	(-4.0770)	(-3.3056)	(-3.2930)
Relative deal size	2.0302	2.0456	1.9076	1.9457	0.5325	0.6136
	(0.6251)	(0.6292)	(0.6325)	(0.6444)	(0.1509)	(0.1736)
Stock deal (dummy)	-0.6980	-0.7128	-0.6673(-0.7298)	-0.7039	-0.2922	-0.3699
	(-0.7538)	(-0.7704)		(-0.7710)	(-0.2749)	(-0.3486)
Fixed effect						
Industry * Year fixed effect	Yes		Yes		Yes	
Observations	2440		2440		2440	
Adjusted R^2	0.0324	0.0322	0.0488	0.0495	0.0703	0.0730

Table C-H2: Industry exclusion analysis for H2

This table reports the outcome of calendar-time portfolio analysis of acquirer post-event abnormal stock return.

We form the equal-weighted monthly portfolio for pre-specified holding periods in Subsection 3.2.4. The portfolio abnormal return is estimated as the intercept of Fama-French and Carhart time-series regression. The independent variables are the Fama-French and Carhart factors, namely, market excess return, size factor, book to market factor and momentum factor. Panel A reports the results for the portfolios composed of all acquirers in the full sample. Panel B reports the results for the portfolio composed of the acquirers in high ESG subsample. Panel C reports the results for the portfolio composed of the acquirers in low ESG subsample. Panel D reports the results for the long-short portfolio that longs acquirers with high ESG and shorts acquirers with low ESG.

All variables are defined in Panel A of Table 4.2.3 with great details. They are t-statistics for ordinary least squares (OLS) based on heteroskedasticity robust standard errors. *, **, *** denoted significance at 10%, 5% and 1% level, respectively.

Variables	12-month portfolio		24-month portfolio		36-month portfolio	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Panel A: Full sample of acquirer portfolios						
α	-0.0579	-0.5587	0.0007	0.0069	-0.0174	-0.1613
β_{mkt}	1.0654	25.5944***	1.0727	25.7708***	1.0447	25.8483***
β_{SmB}	0.3262	6.9283***	0.3721	7.9042***	0.2263	4.6328***
β_{HmL}	-0.0728	-0.8160	-0.0198	-0.2217	-0.0426	-0.4683
β_{UmD}	-0.1206	-3.3166***	-0.1468	-4.0380***	-0.1161	-3.7508***
Observations	216		228		240	
Adjusted R2	0.9126		0.9228		0.9273	
Panel B: subsample of acquirer portfolios with high ESG						
α	-0.0174	-0.1613	0.0705	0.7489	0.1345	1.4252
β_{mkt}	1.0447	25.8483***	1.0456	37.0761***	1.0015	33.8182***
β_{SmB}	0.2263	4.6328***	0.2342	6.2307***	0.2793	7.5747***
β_{HmL}	-0.0426	-0.4683	-0.0202	-0.3639	0.0651	1.3368
β_{UmD}	-0.1161	-3.7508***	-0.1221	-4.4474***	-0.1215	-5.0137***
Observations	213		225		237	
Adjusted R2	0.9057		0.9324		0.9343	
Panel C: subsample of acquirer portfolios with low ESG						
α	-0.1465	-1.0896	-0.0767	-0.5540	-0.0228	-0.1820
β_{mkt}	1.0842	21.5943***	1.1038	30.3080***	1.0597	33.3020***
β_{SmB}	0.4495	6.3037***	0.5120	8.4760***	0.5676	10.3740***
β_{HmL}	-0.1258	-1.2591	-0.0305	-0.5770	0.0122	0.2830
β_{UmD}	-0.1351	-2.4675**	-0.1738	-4.9160***	-0.1608	-4.9990***
Observations	216		228		240	
Adjusted R^2	0.8669		0.882		0.8966	
Panel D: Long-short portfolios that longs acquirer with high ESG and shorts acquirer with low ESG						
α	0.1128	0.8856	0.1325	1.1020	0.1412	1.3840
β_{mkt}	-0.0408	-1.0637	-0.0593	-1.8820*	-0.0590	-2.2890**
β_{SmB}	-0.2232	-2.9453***	-0.2778	-5.3190***	-0.2883	-6.5100***
β_{HmL}	0.0884	1.5942	0.0147	0.3210	0.0566	1.6190
β_{UmD}	0.0187	0.4388	0.0514	1.6840*	0.0388	1.4930
Observations	213		225		237	
Adjusted R^2	0.0745		0.1868		0.2325	