ESG Rating Improvements Through Mergers and Acquisitions: Do Low ESG-Rated Firms Strategically Acquire Their High ESG Rated Peers?

Shahmeer Naveed

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Signed by the final examining committee:

Professor Ravi Mateti — Chair

Professor Ravi Mateti — Examiner

Professor Saifullah — Examiner

Professor Thomas Walker — Thesis Supervisor(s)

Thesis Supervisor(s)

Approved by
Dr Erkan Yonder Chair of Department or Graduate Program Director

Dr. Anne-Marie Croteau Dean of Faculty

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Shahmeer Naveed

Abstract

This paper examines the role of ESG ratings in a merger and acquisition (M&A) context. It attempts to answer two research questions: 1) whether mergers and acquisitions help improve the ESG performance of poorly ESG-rated acquiring companies that acquire target firms with a higher ESG ratings, and 2) whether the market places a premium on the acquisition of high ESG-rated firms. To test the related hypothesis, for our first research question, we consider the three ESG pillars (environmental, social and governance performance) along with the ESG combined score and the ESG controversies score and examine the impact of a given M&A deal on ESG-ratings one year after the acquisition, in line with prior research that shows that ESG rating changes take time to be incorporated within the acquiring firm. We find mixed results: only certain ESG rating factors change after an acquisition, whereas others do not. For the second part, we estimate two types of regressions; one that focuses on deal premium and how it relates to the ESG ratings differential between the acquiring firm and the target firm, and one that relates the cumulative abnormal returns (CARs) to the ESG ratings differential. In the first regression, we find significant evidence of the deal premium being positively impacted by the ESG ratings differential, while the second regression shows that the ESG ratings differential does not necessarily lead to higher CARs for acquiring firms.

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Chapter 1: Introduction

The term ESG, which stands for environmental, social and governance, was coined in 2005 and had been growing steadily in popularity until recently, when it became the topic of political controversy in the United States due to the legal challenges of ESG-focused investment strategies raised by the Republican Party. The initial popularity of ESG focused investments can be attributed to several factors, including rising awareness of sustainability, cultural changes that have led mostly younger people to focus on responsible investing, a surge in the number of papers/reports outlining the benefits of ESG investing, including studies that document that ESG investing tends to outperform even during the crisis, and other situational factors, including the war in Ukraine and other geopolitical, economic, and societal developments. Figure 1 shows a simple depiction of the rise in the popularity of ESG investing, based on Google Search trends.

Insert Figure 1 here

Consequently, financial institutions, regulators, and investors increased their focus on ESG investing, and organizations have started to allocate more resources across ESG friendly industries, geographies, and companies. According to a report published by Mckinsey, more than 90 percent of S&P 500 constituents and approximately 70 percent of Russell 1000 companies publish ESG reports in some form or another (Pérez, 2022). Moreover, regulators around the globe have either made reporting ESG elements mandatory or are actively considering such requirements (e.g., in the United States, the Securities and Exchange Commission (SEC) formed the Sustainability Accounting Standard Board, SASB, which outlines, standards for companies to disclose their ESG practices). Investments into sustainable funds have been seen to rise, even during a time when the rate of new investments has been falling (assets under management in sustainable funds rose from $5billion in 2018 to $20 billion in 2020 and then nearly $70 billion in 2021) (Pérez, 2022). This growing importance of ESG can further be emphasized upon the statistics provided by Bloomberg, according to which ESG assets (investments selected based on Environmental, Social and Governance factors) now account for a third of the total assets under management (Bloomberg, 2022).

Although the importance of ESG investing is undeniable, there has been a lot of criticism by analysts as well. Some analysts believe that ESGs are not desirable and are a deviation from the primary duties of businesses which are, according to Milton Friedman, to “make as much

money as possible conforming to the basic rules of society" (Orlitzky, 2015) Moreover, analysts debate the use of ESG ratings and how important they are in offering valuable insights for the future financial performance of companies, particularly when different score providers use different and mutually inconsistent methodologies. Nonetheless, this debate has been countered by a significant amount of research that has proven that the adoption of ESG-focused strategies by organizations results in an improved reputation (Maaloul, 2023), increased consumer trust, and better financial performance. (Amiraslani, 2023)

This study aims to add new insights to this debate by examining the importance of ESG ratings with regard to major corporate investment decisions, namely mergers and acquisitions. Recent research exploring ESG ratings as a factor in M&A transactions has observed that it is a major focus of attention for a lot of acquiring firms. By exploring both the strategic incentives for acquiring firms to target high ESG rated firms (and the market reaction thereto), our study allows us to offer new capital market-driven insights regarding whether ESGs are redundant.

There exists an abundant body of literature concerning the M&A market, with studies focusing on merger waves (Town, 1992), the impact of cultural differences on M&A performance (Bauer, 2016), the effect of cross border M&As (Xie, 2017), the integration of firms following M&As, and the impact of M&A on various stakeholders. However, recently there has been a notable shift in the research focus toward firms engaged in M&A deals, with a particular emphasis on their ESG scores. This interest extends to how stakeholders perceive their sustainable actions, making a significant shift in corporate behavior. As per Gillan (2021) and Piñeiro-Chousa (2021), sustainability and CSR are essential in considering the motivation behind the success of M&As as perceived by investors. Therefore, drawing motivation from this, our study adopts a unique approach, in contrast with previous papers, to examine ESG within the M&A framework, as both are important components of external growth corporate strategy. Both ESG and M&A enable firms to expand into new markets, access resources, and enhance efficiency, thereby creating corporate value and, consequently, improving their corporate performance.

We analyze merger and acquisition transactions that occurred in the United States, with a focus on deals completed between 2006 and 2022. Our concentration on the U.S. market is motivated by two primary reasons. First, given its status as one of the most advanced economies

in the world, increased consideration has been given to ESG factors in the U.S. as opposed to other markets. This is especially advantageous when considering M&A deals because it allows us to consider the relative importance of ESG factors amongst many others considered during the M&A decision making process. Second, our study aims to build on that of Iaonnis Tampakoudis and Evgenia (2020), which conducted a similar analysis using data from the European market. We consider a similar analysis in the U.S. market to be beneficial as it allows us to discern observable trends between markets.

We use ESG scores provided by Thomson/Refinitiv in order to perform our analysis. Our final sample consists of 62 M&A deals, for which all types of ESG scores, along with the control variables used in this study, were available for both the targets and acquirors.

In order to broaden the scope of our study and more substantially determine the role of ESGs compared to other facts that affect M&A decision making and results, our study considers a multitude of factors that relate to ESGs and M&As. We begin by investigating whether M&As can act as a catalyst for improving the ESG performance of the acquiring firm. To assess this, we conduct a multiple OLS regression, yielding mixed results. We find that some individual ESG scores were not immediately affected; rather, changes could be observed one year after the M&A deal, while other deals had no impact at all. Subsequently, we examine how the ESG ratings of the target firms impact the deal premium in an M&A transaction, using another OLS regression. This demonstrates the extent to which firms acquire ESG ratings during a M&A deal. We observe a positive relationship between the deal premium and the ESG rating of the acquiring firm. Lastly, we conduct an event study and a regression analysis to determine whether the ESG performance of the acquiring firm is affected by the its cumulative abnormal returns. For the event study, we examine three different scenarios, the results of which will be discussed in detail later in this papers methodology. Regarding the regression models, we observe that neither the ESG score, the ESG combined score, nor the ESG controversies score explain the impact on the CARs of the acquiring firm. We discuss the pertinance of these results based on the limitations of this study mentioned in the conclusion.

The subsequent chapters discuss the antecedents of ESG performance variables as utilized in prior M&A studies, along with the methodologies employed to measure their results in other research papers. This eventually aids us in formulating the main hypothesis for our

study. Further, chapter 3 of this paper discusses the database employed in our study, describes our final sample, and lists the variables to be used for analysis. Chapter 4 will delve into the methodology of the regression models formed and the event study, the results of which will be discussed in Chapter 5. Finally, Chapter 6 emphasizes the limitations of our study. Addressing these limitations could potentially improve results in future studies and conclude the paper.

Chapter 2: Literature Review

Ever since the term ESG was first coined in a report titled "Who Cares Wins" in the UN Environment Program, Finance Initiative (2004), the concept has garnered significant attention in scholarly discourse. A copious amount of literature has emerged addressing the term's potential impact on diverse firms and organizations across various financial scenarios. However, there has been limited literature on ESGs in the context of mergers and acquisitions. Existing literature that mentions both M&A and ESG has meticulously dissected each aspect individually. This includes: 1) the effect of M&A on the ESG performance/rating of the acquiring or target firms 2) investigating the importance of ESG to the acquiror firm. 3) the impact of ESG performance on the short- and long-term performance of the acquiring firm. However, in our study, we amalgamate the first two critical decisions and provide a detailed explanation for both.

Reasons/Motivations for looking at ESG Ratings in Merger and Acquisitions

1) The effect of M&A transactions on acquiror ESG ratings/performance

The primary motivation for this study stems from the fact that in contemporary literature, there has been a huge focus, both directly and indirectly, on whether the ESG rating of acquiring firms following the acquisition of target firms. A study closely related to our research approach was conducted by Iaonnis Tampakoudis and Evgenia (2020) within the European markets. They discuss the multifaceted reasons that encourage firms to engage in M&A activities, highlighting value creation and access to corporate resources as the main drivers. However, since M&As mainly create value through the long-term transfer of capabilities, which requires the integration of organizational structures and corporate cultures, it is important to explore the relationship between target ESG performance in the pre-merger stage and acquiror performance in the post-merger stage. To test this, Iaonnis and Evgenia perform a regression analysis and determine that the relative target/acquiror ESG performance has a positive effect on the change in acquiror pre-

merger and post-merger performance at the 1% level. The results of their paper are also in line with the Aktas (2011) learning effect, which shows that the environmental and social performance of acquirors increases following the acquisition of a high ESG-rated target.

A study by Barros (2022) also complements existing studies by examining a far broader sample, which spans 41 countries and 12 economic sectors. The study goes further by conducting an in-depth analysis to ascertain whether M&A operations have an impact on the three ESG pillars of the acquiring firm. Barros (2022) study is crucial for two reasons. Primarily, this study is in line with other studies whereby the ESG scores are deconstructed into each of its three pillars (environment, social, and governance) to capture different perspectives on the impact of M&As. Besides this, looking at so many countries provide a clearer view, comparing the ESG scores of firms within different countries. Thus, with the regression they perform, it is observed that a year following the completion of the M&A deal, we get to see an increase in the ESG performance of the acquiring firm. (Barros, 2022) Therefore, while performing our own study, we also incorporate two major learnings from this study, i.e., to look at each individual ESG rating (Environmental, Governance and Social Score) on its own and also to observe ESG ratings one year after the deal is completed since it takes time for the ESG effect to become apparent.

Another paper published by Urfe and Mads (2021) presents a hypothesis similar to the aforementioned papers, suggesting that targets or acquirors improve their ESG score when merging with an acquiror or target possessing a higher score. Their hypothesis extends to suggest that targets or acquirors improve their score relatively more when merging with a target or acquiror having a higher score compared to deals with a smaller score differential. Precisely, the findings of the paper show that acquirors on average increase their score by 7.1 points by merging with a score of 25 points or more. The results Urfe and Mads (2021) obtain support Berchicci's (2012) learning effect that the transfer of ESG capabilities between transaction parties is indeed possible. Moreover, a higher ESG performance might create additional synergies that might not be captured in their score, potentially undermining the effects of M&A. From this perspective, our aim is to assess whether the ESG score of the target company exceeds that of the acquiror prior to the completion of the M&A deal.

2) How does the market value target ESG ratings in M&A deals?

According to the literature mentioned above, ESG performance is considered an important factor in most M&A deals. In recent times, this aspect has become a component of greater concern for many acquirors, as it is believed to greatly impact the company's corporate reputation. To fully grasp this concept, it is essential to know the two most prevalent motives for M&A, which have been extensively discussed by Urfe and Mads (2021). These are the synergy hypothesis and corporate control hypothesis.

According to the synergy hypothesis, managers try to capture value for shareholders through different synergies. Therefore, all kinds of synergies, i.e., financial gains, diversification, and product market synergies, must be incorporated into the acquisition premium. (Motis, 2007) Incorporating strong ESG performance into the equation can significantly help enhance these synergies. This impact would be particularly valuable for acquirors who are willing to pay a higher premium for such firms. (Díaz Díaz, 2013) Furthermore, alignment in cultural, ethical, and governance-related matters is crucial for synergy and integration. (Ficery, 2007) In summary, ESG factors can serve as a strong indicator of compatibility between the acquiror and the target.

According to the corporate control hypothesis, the disciplinary effect created by the equity market on underperforming managers is referred to as the market for the corporate control hypothesis. (Manne, 1965) In this view, inefficient management practices are reflected in the company's stock price. (Urfe & Mads, 2021) Hence, once acquirors identify such inefficiencies, they may acquire the company and replace the management. Consequently, we anticipate that the deal premium will be higher when the target has poor management. This hypothesis is particularly relevant in the context of management and governance mechanisms, a major component of the ESG score. Our study extends this perspective since it examines the ESG controversies score, which assesses corporate reputation, another crucial aspect for acquiring firms to evaluate before engaging in M&A deals. However, the outcomes of this corporate control hypothesis remain ambiguous, as the ESG factor might, in some cases, also erode shareholder value.

Existing literature that observes the impact of ESG performance on the acquiror firm in M&A deals also focuses on how deal premium is affected. According to Urfe and Mads (2021),

acquiring firms certainly value the ESG component. Utilizing an OLS regression, they establish a positive relationship between ESG performance and the deal premium in an M&A transaction. In addition to studying the impact on the deal premium, our study approaches the same problem from a different angle. Specifically, our study observes the CARs of the acquiring firm after the completion of the M&A deal.

In addition to these, other papers addressing the benefit to the acquiror firm specifically mention the impact of a strong ESG performance on the long-term stock performance of the acquiring company. A paper published by the Stockholm School of Business (Kuntz, 2021) conducted a pooled OLS regression, regressing monthly abnormal returns for all stocks on the dummy variable, indicating long term M&A. They observe that a one-point increase in the target ESG score affects the long term abnormal acquiror return by 0.0002%. A similar study was conducted by Caiazza, Galloppo, and Paimanova (2021), where the authors ran tests to examine the role of sustainability performance after merger and acquisition deals in both the short run and the long run. According to their findings, companies with high sustainability tend to achieve positive long-term post-merger performance. Both of these papers, in addition to the ones mentioned earlier, provide strong motivation for the acquiring firms to give greater weight to ESG ratings when conducting an M&A deal.

Hypothesis

The objective of this study is to investigate the underlying rationale behind mergers and acquisitions and discuss whether engaging in a M&A could serve as a strategy for poorly ESG-rated acquiror firms to enhance their ESG ratings, which will in turn improve their financial performance and corporate reputation in the long run. To achieve this, we will analyze deals from both the acquiror and the target's perspectives and conduct a series of tests.

Before detailing our hypothesis, it is important to note that our study considers not only the ESG score and its individual E, S, and G components, but also attempts to look at the ESG combined score and ESG controversies score. The ESG combined score differs from The ESG score in that the latter is a relative sum of category weights that vary per industry for environmental and social categories and the former provides a rounded and comprehensive scoring of a company's ESG performance based on reported information related to the ESG pillars, with an overlay of ESG controversies captured by negative media stories. (LSEG, 2021)

Likewise, the ESG controversies score is also essential since it is calculated based on 23 ESG controversy topics. (LSEG, 2021) In the event of a scandal involving the firm, the ESG combined score and impact of that event might still be seen in the following year, if there are new developments related to negative events. Additionally, the ESG controversies score also considers firm size, as large firms tend to attract more media attention than smaller firms. (LSEG, 2021)

Initially, we analyze M&A data to assess the impact of ESG ratings, including individual environmental, social, and pillar scores, as well as the ESG combined score and ESG controversies score following the completion of the M&A deal. We then conduct a second test to quantify the impact that ESG ratings have on the premium paid during the M&A deal. Finally, we conduct a test to determine whether or not the ESG Score, ESG Combined Score, and the ESG Controversies Score impact the cumulative abnormal returns (CARs) of the acquiring firm.

In relation to the three tests, our hypothesis suggests that an acquiring firm with a low ESG rating is likely to experience an improvement in its rating following the completion of a M&A deal with a target possessing a higher ESG rating. This expectation stems from existing literature on M&As, which indicates that such deals result in synergies that benefit the acquiring firm. Furthermore, we anticipate that acquiring firms place importance on ESG consideration in M&A negotiations, potentially leading them to offer a higher premium for targets with stronger ESG credentials, as suggested by previous studies. Lastly, we hypothesize that ESG ratings will impact the CARs since, in developed economies like the US, significant importance is given to the ESG score or rating. Based on these dynamics, we summarize the hypothesis as follows:

H1: Firms acquiring target companies with higher ESG scores experience an increase in their own ESG scores following the acquisition

H2: Acquiring firms pay a higher premium for target companies with higher ESG scores compared to those with equal or lower ESG scores

H3: Acquiring firms experience larger positive stock price returns upon announcing the acquisition of a target company with a higher ESG score compared to acquisitions of target firms with an equal or lower ESG score

Chapter 3: Data

To conduct our tests, regression analysis, and event study, we use data sourced from a variety of reliable and relevant sources. Our merger and acquisitions data are extracted from the Securities Data Company (SDC) database for each year from 2006 to 2022. This results in a sample of 973,626 M&A deals. However, our research focuses on U.S. markets, therefore, we only include M&A deals involving U.S. public firms in the analysis. We use data from public firms due to the ease and reliability of data collection compared to private firms. This criterion reduces the sample size to 2,290 M&A observations. For these 2,290 M&A deals, we attempt to ascertain the respective ESG ratings of both the acquiror and the target firms. The ESG ratings encompassed the ESG Score, Environmental Pillar Score, Governance Pillar Score, Social pillar score, ESG Combined Score, and the ESG Controversies Score. All these ESG ratings were extracted from Thomson/Refinitiv.

Insert Table 2 here

Following the merger of ESG ratings with M&A data, our sample consists of 321 M&A observations (named Sample 1 in and presented in Table 2). Subsequently, we collect data for the control variables necessary for the regression analysis, focusing on the one that is relevant to these M&A observations. We control for inflation rate, unemployment rate, GDP growth, return on equity (ROE), return on assets (ROA), firm size, and leverage. We obtain data for all of these variables from Compustat on WRDS. ROE, ROA, GDP growth, and leverages are all calculated using formulas in our dataset. Once data was observed on all of these components, we merged them with the M&A data and the ESG Scores (Sample 1), resulting in our final sample of 62 M&A observations. It is also pertinent to mention here that while extracting the Compustat variables, some of the data might have been omitted as merging of the M&As and ESG ratings data with the control variables is done via Cusips and for many firms the Cusip number changes after the M&A deal is complete.

Alongside table 2, we have included table 3 in our index, displaying the number of M&A transactions across various industries. This addition aims to enhance the interest of researchers and financial market participants. Furthermore, table 4 below mention the descriptive statistics for the total ESG scores, individual ESG ratings, ESG combined score and ESG controversies

score, for both acquiror and target firms, along with deal characteristics and macroeconomic variables (control variables).

Insert Table 3 here

Insert Table 4 here

Chapter 4: Methodology

This section provides a detailed explanation of the tests we conduct to analyze our sample. Initially, we perform regression models to test the first two hypotheses, followed by an event study and regression to elucidate the third hypothesis. Prior to conducting these tests, we construct a correlation matrix to make sure there is no problem of multicollinearity. Table 5 below displays the Pearson correlation coefficient.

Insert Table 5 here

The table indicates a high level of correlation between GDP growth and the inflation rate. Consequently, we include the inflation rate in all the regression models formed below and exclude GDP growth from these models.

Regression Models:

To test the first hypothesis (H1) through a regression model, we initially collect data from WRDS and Compustat for all the variables mentioned in the previous section pertaining to the acquiring firm. For the first hypothesis, we include data on all M&A deals at the time the deal was completed and also for one year after the completion of the M&A deal. For instance, if a deal was finalized in 2006, we collect all the variables for the acquiring firm for the year 2007 as well. This approach allows us to assess whether the ESG scores of the acquiror improved following the acquisition of the target firm.

By adopting this method, our sample size increases to 124 M&A deals. For these observations, we then execute the following regression model:

$$\Delta \text{ in Acquiror Firm Environmental/Governance/Social/Combo/Controv Score} = \beta_0 + \beta_1 \text{ Enviro\_Score Improv Dummy} + \beta_2 \text{ Enviro\_Score Improv Dummy* Similar Firm Size Dummy} + \beta_3 \text{ Governance Score Improv Dummy} + \beta_4 \text{ Governance Score Improv Dummy*Similar}$$

$$\textit{Firm Size Dummy} + \beta_5\ \textit{Social Score Improv Dummy} + \beta_6\ \textit{Social Score Improv Dummy* Similar Firm Size Dummy} + \beta_7\ \textit{ESG Combined Score Improv Dummy} + \beta_8\ \textit{ESG Combined Score Improv Dummy*Similar Firm Size Dummy} + \beta_9\ \textit{ESG Combined Improv Dummy} + \beta_{10}\ \textit{Combined Score Improv Dummy* Similar Firm Size Dummy} + \beta_{11}\ \textit{ESG Controversies Score Improv Dummy} + \beta_{12}\ \textit{ESG Controversies Score Improv Dummy* Similar Firm Size Dummy} + \beta_{13}\ \textit{Cash Deal Dummy} + \beta_{14}\ \textit{Stock Deal Dummy} + \beta_{15}\ \textit{log (Total Assets)}_A + \beta_{16}\ \textit{ROE}_A + \beta_{17}\ \textit{ROA}_A + \beta_{18}\ \textit{Leverage}_A + \beta_{19}\ \textit{Inflation Rate} + \beta_{20}\ \textit{Interest Rate} + \beta_{21}\ \textit{Unemployment Rate} + \varepsilon \quad \textbf{(1)}$$

In this regression analysis, we aim to determine if there is an increase in the acquiror's ESG rating one year after the completion of the M&A deal. For this, we add all those explanatory variables that help us explain the dependent variable. The explanatory variables that are used are as follows: Enviro_Score Improv Dummy, Govern Score Improv Dummy, Social Score Improv Dummy, Combo Score Improv Dummy and the Controv Score Improv Dummy which is listed as 1 if there is an improvement in the Environmental/Governance/Social pillar score and the ESG combined/controversies score one year after the M&A deal is complete, otherwise 0.

Additionally, we also include interaction terms for all these ESG scores dummy variables with a similar firm size dummy. The similar firm size dummy is a dummy variable that takes on the value of 1 if the target firm size is greater than 25% of the acquiror firm size; otherwise, it takes the value 0. When conducting this regression, we divide it into different parts. For instance, if we choose Δ in acquiror firm Environmental pillar score as the dependent variable, we exclude every governance, social, combined and controversies score dummy and interaction dummy. A similar approach is used if we choose the Δ in any acquiror firm pillar variable as the dependent variable.

In a similar manner to test the first hypothesis, we conduct another regression where, instead of including the dummy variables for Environmental pillar score, Governance Score, Social score, ESG Combined score and ESG Controversies score, we include the difference between the target and acquiror score in all of these variables. The changed regression model is as follows:

$$\textit{Δ in Acquiror Firm Environmental/Governance/Social/Combo/Controv Score} = \beta_0 + \beta_1\ \textit{Enviro\_Score}_{T\text{-}A} + \beta_2\ \textit{Enviro\_Score}_{T\text{-}A}\ \textit{* Similar Firm Size Dummy} + \beta_3\ \textit{Governance Score}_{T\text{-}A} +$$

$$\beta_4\ Governance\ Score_{T\text{-}A} * Similar\ Firm\ Size\ Dummy + \beta_5\ Social\ Score_{T\text{-}A} + \beta_6\ Social\ Score_{T\text{-}A} * Similar\ Firm\ Size\ Dummy + \beta_7\ Combined\ Score_{T\text{-}A} + \beta_8\ Combined\ Score_{T\text{-}A} * Similar\ Firm\ Size\ Dummy + \beta_9\ Controversies\ Score_{T\text{-}A} + \beta_{10}\ ESG\ Controversies\ Score_{T\text{-}A} * Similar\ Firm\ Size\ Dummy + \beta_{13}\ Cash\ Deal\ Dummy + \beta_{14}\ Stock\ Deal\ Dummy + \beta_{15}\ Log\ (Total\ Assets)_A + \beta_{16}\ ROE_A + \beta_{17}\ ROA_A + \beta_{18}\ Leverage_A + \beta_{19}\ Inflation\ Rate + \beta_{20}\ Interest\ Rate + \beta_{21}\ Unemployment\ Rate + \varepsilon \quad (2)$$

We run this model in five parts, wherein each regression assesses the impact of the difference in each score on the change in their respective acquiror score, mirroring the approach taken in the previous regression model. Additionally, running this equation is also essential, as it serves as a robustness test for the initial equation. Utilizing the difference in scores provides a more nuanced understanding compared to the dummy variables, offering deeper insights into how ESG scores are influenced by M&A deals.

To test the second hypothesis (H2), we conducted two additional regression models to assess the impact on the deal premium for the M&A involving ESG. The dependent variable in both models will be the deal premium, while the independent variables will be different in each of the models. The deal premium that we take in this equation is the offer price to the target stock price premium – 4 weeks prior to the announcement of the M&A deal. In the first model, independent variables include: ESG Improv Dummy, an interaction term dummy between the ESG Improv and the similar firm size dummy, the deal characteristic (whether it is a cash or stock-based deal), and other control variables. This is represented in the following equation:

$$Deal\ Premium = \beta_0 + \beta_1\ ESG\ Improv\ Dummy + \beta_2\ ESG\ Improv\ Dummy * Similar\ Firm\ Size\ Dummy + \beta_3\ Cash\ Deal\ Dummy + \beta_4\ Stock\ Deal\ Dummy + \beta_5\ Log\ (Total\ Assets)_A + \beta_6\ ROE_A + \beta_7\ ROA_A + \beta_8\ Leverage_A + \beta_9\ Inflation\ Rate + \beta_{10}\ Interest\ Rate + \beta_{11}\ Unemployment\ Rate + \varepsilon \quad (3)$$

For the other regression equation, we modify the model and instead of observing the dummy variables, we include the original scores variables, specifically the difference between the ESG score of the target and the acquiror along with an interaction term between the difference of the ESG target and acquiror score and the similar firm size dummy. The remaining control variables used earlier remain the same. The changed equation is as follows:

$$\textit{Deal Premium} = \beta_0 + \beta_1 \textit{ESG Score}_{T\text{-}A} + \beta_2 \textit{ESG Score}_{T\text{-}A} * \textit{Similar Firm Size Dummy} + \beta_6 \textit{Cash Deal Dummy} + \beta_7 \textit{Stock Deal Dummy} + \beta_8 \textit{Log (Total Assets)}_A + \beta_9 \textit{ROE}_A + \beta_{10} \textit{ROA}_A + \beta_{11} \textit{Leverage}_A + \beta_{12} \textit{Inflation Rate} + \beta_{13} \textit{Interest Rate} + \beta_{14} \textit{Unemployment Rate} + \varepsilon \quad \textbf{(4)}$$

This second regression closely aligns with methodologies employed in previous literature by Tamapakoudis (2020). Therefore, we adopt a similar model suited to our dataset, focusing on the U.S. market.

Event Study:

For the third hypothesis (H3), we perform an event study along with a regression model. This event study allows us to examine how financial markets, in particular the CAR of the acquiring firm, are affected by acquisitions, considering the ESG perspective. Observing abnormal returns is a primary measure used to gauge the unexpected effects of an acquisition on the market. Throughout our study, we utilize the market model AR, with an estimation window of (-46,255) and analyze the results using value-weighted metrics. The output of these results is sourced from Eventus in Wharton Research Data Services (WRDS), and we evaluate the cumulative abnormal returns across multiple event windows to draw conclusions from our sample.

We then calculate the value-weighted cumulative abnormal returns of each acquiring firm and conduct a regression model. The value weighted cumulative abnormal return is used as the dependent variable. This model incorporates three different CAR windows as dependent variables. We conduct the regression using three different approaches, the ESG score, ESG combined score and the ESG controversies score. The independent variables include the ESG score Improv dummy, Similar firm size dummy, the ESG score, Improv Dummy*Similar firm size score dummy, along ac couple of control variables previously mentioned in our hypothesis regression. The regression equation is as follows:

$$\textit{Acquiring Firm CAR} = \beta_0 + \beta_1 \textit{ESG Score Improv Dummy} + \beta_2 \textit{Similar Firm Size Dummy} + \beta_3 \textit{ESG Score Improv Dummy*Similar Firm Size Dummy} + \beta_4 \textit{Cash Deal Dummy} + \beta_5 \textit{Stock Deal Dummy} + \beta_6 \textit{Log (Total Assets)}_A + \beta_7 \textit{ROE}_A + \beta_8 \textit{ROA}_A + \beta_9 \textit{Leverage}_A + \varepsilon \quad \textbf{(5)}$$

We modify the other two regressions by adding the ESG Combo/Controv Improv Score dummy and their interaction terms with the similar firm size dummy variables. The equations are as follows:

$$\textit{Acquiring Firm CAR} = \beta_0 + \beta_1\,\textit{ESG Combo Score Improv Dummy} + \beta_2\,\textit{Similar Firm Size Dummy} + \beta_3\,\textit{ESG Combo Score Improv Dummy*Similar Firm Size Dummy} + \beta_4\,\textit{Cash Deal Dummy} + \beta_5\,\textit{Stock Deal Dummy} + \beta_6\,\textit{Log (Total Assets)}_A + \beta_7\,\textit{ROE}_A + \beta_8\,\textit{ROA}_A + \beta_9\,\textit{Leverage}_A + \varepsilon \quad \textbf{(6)}$$

$$\textit{Acquiring Firm CAR} = \beta_0 + \beta_1\,\textit{ESG Controv Score Improv Dummy} + \beta_2\,\textit{Similar Firm Size Dummy} + \beta_3\,\textit{ESG Controv Score Improv Dummy*Similar Firm Size Dummy} + \beta_4\,\textit{Cash Deal Dummy} + \beta_5\,\textit{Stock Deal Dummy} + \beta_6\,\textit{Log (Total Assets)}_A + \beta_7\,\textit{ROE}_A + \beta_8\,\textit{ROA}_A + \beta_9\,\textit{Leverage}_A + \varepsilon \quad \textbf{(7)}$$

We do not test these equations with respect to individual environmental, governance, and social scores because our focus is to examine the impact on the overall ESG scores. Moreover, conducting separate tests for individual scores would not have been meaningful and could have yielded insignificant results.

Chapter 5: Analysis and Results

In this section, we first present the results of our univariate analysis. Subsequently, we delve into the discussion of our regression model and the event study.

Univariate Analysis

To offer insight into the variables used in our subsequent regression analysis and to allow for comparison of our results with previous studies, we conducted a series of univariate analyses. We employ two sample t-tests to assess the significance of differences in means and Kruskal-Willis median tests to evaluate differences in medians between each set of subsamples. An advantage of using median tests is that it is more robust to outliers and extreme observations. (Walker, 2014) We present our findings in Table 6

Insert Table 6 here

As depicted in the table, we observe two subsamples to assess the representativeness of our data for the study. The table illustrates a substantial number of deals where all kinds of

acquiror ESG ratings exceed those of the target firm's ESG rating. We also conduct the same analysis for the control variables. For the control variables, we also observe that the acquiror firm variables are greater in number than the target firm variables. This observation is essential because in certain M&A deals, if we assume that the target firm is significantly larger than the acquiror firm, the subsequent effects on the acquiror firm may be attributed to the firm size rather than the ESG factors themselves.

Regression models and Event Study Results:

In our initial regression mentioned above, several significant results emerged. The results are detailed in table 7 below.

Insert Table 7 here

In table 7, only the interaction term between the social improv dummy and the similar firm size dummy is significant. It has a coefficient of 0.168 and a p value of 0.005, meaning it is significant at the 10% and 5 % significance levels. This result aligns with expectations, as the social criteria mainly examines the relationship of the firm with its customers, suppliers and employees. These are factors which are easily quantifiable, unlike governance and environmental scores in which the former observes leadership style, executive pay, shareholder management while the latter mainly focuses on sustainability factors. These findings also resonate with those of Barros (2022) which show that the social score of the acquiror firm is impacted after the M&A deal is complete. However, our study diverges from Barros's findings in that our analysis reveals an impact solely on the social dimension, unlike the broader effects observed by Barros (2022) across all ESG domains.

To ensure robustness in our analysis, we introduce a similar firm size dummy and explore its interaction with ESG ratings. This approach helps mitigate any potential biases stemming from firm size differences. As a result, we observe all the remaining ESG ratings along with the ESG combined score and ESG controversies score are not impacted by their respective improvement dummy even one year after the M&A deal.

Besides, it is noteworthy that unemployment rate effects impact change in Environmental, Social pillar scores and the ESG combo score, but not the ESG controversies score and the Governance pillar score. This is justified, as the controversies score and the

governance score primarily reflects the corporate reputation of the firm and the corporate governance mechanism of the firm and is not a measure that would be affected by the unemployment rate in the US economy.

Additionally, several macroeconomic control variables, such as the cash deal dummy and inflation rate, are found to be significant in certain instances. This finding is expected, as the mode of payment in a M&A deal and external factors such as inflation do have a crucial role for firms in deciding whether or not to pursue ESG related goals.

Furthermore, we conduct another regression for our first hypothesis with a number of changes. This test, as previously mentioned, serves as a robustness test for this hypothesis. For this, we utilize the explanatory variables, i.e., the difference between the ESG scores of the target and the acquiror.

Insert Table 8 here

This table depicts results different from those of the previous regression. As shown, the change in the Environmental pillar score of the acquiring firm is affected by the Enviro Score $_{T-A}$. The coefficient of 0.110 and p value of 0.023 are also significant at the 10% and 5% significance levels. None of the differences in ESG score$_{T-A}$ turn out to be significant in these scenarios. In summary, our paper provides limited evidence that the ESG rating of the acquiring firm is impacted following a M&A deal.

For the second hypothesis, which examines the impact on the deal premium after the completion of the M&A deal, we employ two different regression models as shown in Table 9.

Insert Table 9 here

Deal premium, as previously discussed, serves as an indicator of the importance attributed by the acquiring firm to ESG ratings/factors. The first regression (Model 1) that we conduct includes a dummy variable for ESG improvement along with an interaction term of ESG score Improv dummy*Similar Firm Size Dummy and other control variables. The regression does not yield significant results and only mentions unemployment rate as one of the factors which affects the deal premium.

However, after modifying the regression and incorporating the rating difference between the ESG scores of the target and the acquiror, along with the interaction term between the ESG target and the acquiror leads to meaningful results. In this, we observe that our ESG_{T-A} variable makes an impact on the deal premium, and therefore, this result is consistent with the results of Urfe and Mads (2021). This suggests that the ESG ratings of the target firm are a definite consideration of acquiror firms during a M&A deal.

In the next step, we conduct an event study to examine the CARs of the firm following the completion of the M&A deal. This analysis allows us to identify key factors impacting the CARs of the firm. An event study is important to analyze the effect M&A transactions have on both acquirors and target firms. In our study, and more specifically in this case, it is even more important to conduct an event study to gauge the market reactions by studying the stock prices of the affected firms. Martynova (2008) states that the M&A announcement represents new market information. This means that investors alter their expectations of the firms involved. This adjustment can be observed through abnormal returns in stock prices.

We divide the event study into multiple samples to analyze the following:

1) CARs of the acquiring firm before the event
2) CARs of the acquiring firm around the event
3) CARs of the acquiring firm after the event

The event study is done on multiple event windows with day 0 being the acquisition event date. The results for the event study are presented in table below:

Insert Table 10 here

The first panel A examines the four event windows before the M&A deal took place. The second panel B focuses on the four event windows around the event for the M&A deal while the last panel C analyzes the four event windows after the event of the M&A.

In the table, we initially examine the mean cumulative abnormal returns for the 62 companies. Amongst these observations, we observe that the returns are relatively low before the event and begin to increase from the event window through to the post-event window. For instance, if we take 3 different event windows from teach sample, it is seen that the mean

cumulative abnormal return increases from 0.11% in the (-5, -1) window to 0.67% around the event in the (-1,1) window and 2.65% in the (0,5) after the event window. This points out to the potential synergies generated for the acquiror firm after completion of M&A deal.

Additionally, for all of these event windows we conduct a series of test, amongst which the most important one is the generalized sign z test. In the first panel, we observe the p values for the generalized z sign test and none of them are significant. This means that CARs are not impacted by ESG rating before the event. In the second and the third panel, it can be seen that the p-values for the generalized z sign test are all significant at the 10% significance level. This suggests that ESG ratings might have a role to play around and after the event.

To test whether the ESG ratings might actually have an effect, we need to build further regression models with the CAR event windows as the dependent variable. Amongst the windows, we select one from each panel, the one that would give an accurate depiction of which factors impact the CARs. The CARs selected are (-5, -1) from before the event panel, (-1,1) from around the event panel and (0,5) from after the event panel. We conduct this test thrice, once with the ESG Improvement Dummy, then with the ESG combined score improvement dummy and lastly, with the ESG controversies score improvement dummy.

In table 11 we run it with the ESG Score improvement dummy.

Insert Table 11 here

In the initial column of the first table, we observe that none of the stated variables were able to explain the CARs before the event. Moving to the second column, we observe that only ROA is the significant variable. Subsequently, in the third column, firm size depicted by ln (Total Assets) and Similar firm size dummy are the significant variables at the 10% significance level.

In table 12, we employ the ESG combined score improvement dummy, whereas in table 13, we conduct the regression with the ESG controversies score improvement dummy.

Insert Table 12 here

Insert Table 13 here

In table 12 only the ROA was significant I the “around the event window while the firm size (ln (Total Assets) was the only significant variable in the “after the event “window. In table 13, none of the explanatory variables can explain the cumulative abnormal returns. Thus, none of the ESG ratings or other factors were able to explain the change in the cumulative abnormal return.

Chapter 6: Conclusion

This study examines a sample of mergers and acquisitions that happened between the years 2006 and 2022. We observe that while some ESG ratings are affected after the completion of M&A deals, this impact is not consistent and does not persist in the year that follows the deal, contrary to expectations from past literature. In order to test the robustness of our results, we perform a regression using the difference in the ESG rating of the target and the acquiror also supports that the ESG ratings of the acquiror firm are not significantly affected.

Our results indicate that acquirors do give significant consideration to ESG ratings in M&A deals, as evidenced by the fact that acquiring firms are willing to pay a deal premium for high-rated targets. This aligns with past research, which suggests that there is a deal premium for the ESG ratings. To further validate and enhance these results, future studies could incorporate industry-fixed effects and firm fixed effects into the regression analysis. We chose not to add these to our study to avoid a small sample size that would have resulted in over specification. Our analysis in the last test shows that ESG ratings do not significantly impact the CARs of the acquiring firms around or after the completion of M&A deal. However, expanding the sample size and conducting similar tests across more countries with additional control variables could yield different outcomes, suggesting potential benefits from ESG ratings in these contexts.

Conclusively, the intersection of mergers and acquisitions and ESG is a complex field with a multitude of factors affecting M&A and ESG. Our study aims to address as many of these factors as feasible, making it a valuable study for both future researchers as well as financial market participants. Future research in this area could enhance the robustness of findings and could even go further to address the improvement of ESG ratings impact on the long-term financial performance of the firm, therefore, highlighting the importance of focusing on ESG within every major financial decisions of an organization.

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Appendix

Figure 1: Number of Google Searches for the Term "ESG"

This graph shows the rising number of searches for the term “ESG” every month from 2004 to 2023

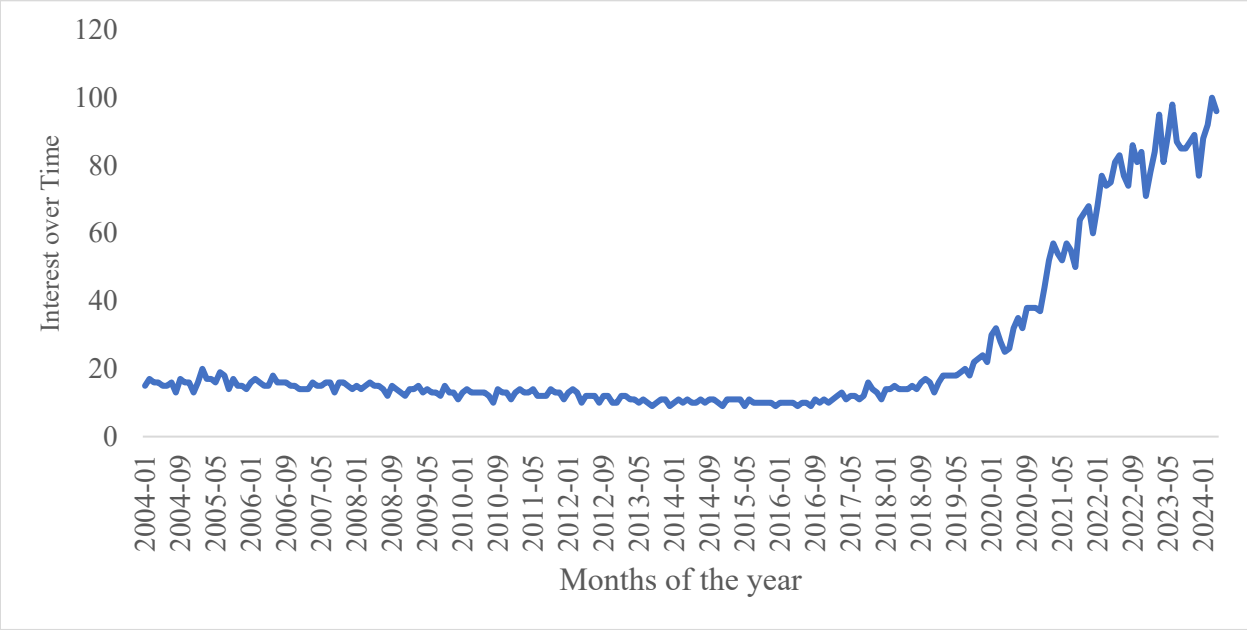

Table 1: Variable Descriptions

The table describes all variables used in the study. The variables are divided into dependent, independent, and control variables.

Variable	Description
Dependent Variables	
Change in Acquiror Enviro Score	Change in acquiror enviro score, calculated by subtracting the acquiror enviro score 1 year after and at time of the M&A deal
Change in Acquiror Govern Score	Measure of the change in acquiror govern score, calculated by subtracting the acquiror govern score 1 year after and at time of the M&A deal
Change in Acquiror Social Score	Measure of the change in acquiror social score, calculated by subtracting the acquiror social score 1 year after and at time of the M&A deal
Change in Acquiror Combo Score	Measure of the change in acquiror combo score, calculated by subtracting the acquiror combo score 1 year after and at time of the M&A deal
Change in Acquiror Controv Score	Measure of the change in acquiror controv score, calculated by subtracting the acquiror controv score 1 year after and at time of the M&A deal
Deal Premium	Measures the premium paid by the acquiror firm during the M&A deal
CAR (-5, -1)	Cumulative abnormal return in event window (-5, -1)
CAR (-1,1)	Cumulative abnormal return in event window (-1,1)
CAR (0,5)	Cumulative abnormal return in event window (0,5)
Independent Variables	
ESG Improv Dummy	Dummy variable for potential ESG improvement in M&A deal, 1 if target firm ESG score is greater than acquiror firm ESG score
Similar Firm Size Dummy	Dummy variable identifying acquiror/target size similarity, 1 if the size of the target firm is between 25% and 200% of the size of the acquiring firm, otherwise 0
ESG Improv Dummy * Similar Firm Size Dummy	Interaction term between the ESG Improv Dummy and Similar Firm Size Dummy
$ESG\ Score_{(T-A)}$	Difference between target firm ESG score and acquiror firm ESG score
$ESG\ Score_{(T-A)}$ * Similar Firm Size Dummy	Interaction term between difference between target firm ESG score and acquiror firm ESG score and the similar firm size dummy
Enviro Improv Dummy	Dummy variable for Enviro score, 1 if target firm Enviro score is greater than acquiror firm Enviro score, otherwise 0

Govern Improv Dummy	Dummy variable for Govern score, 1 if target firm Govern score is greater than acquiror firm Govern score, otherwise 0
Social Improv Dummy	Dummy variable for Social score, 1 if acquiror firm Social score is greater than target firm social score, otherwise 0
ESG Combo Improv Dummy	Dummy variable for ESG Combo score, 1 if target firm Combo score is greater than acquiror firm Combo score, otherwise 0
ESG Controv Improv Dummy	Dummy variable for ESG Controv score, 1 if target firm ESG controv score is greater than acquiror firm ESG controv score, otherwise 0
Enviro Improv Dummy * Similar Firm Size Dummy	Interaction term between dummy variable for Enviro Improv Dummy and Similar firm size dummy
Govern Improv Dummy * Similar Firm Size Dummy	Interaction term between dummy variable for Govern Improv Score and similar firm size dummy
Social Improv Dummy * Similar Firm Size Dummy	Interaction term between dummy variable for Social Improv score and Similar firm size dummy
ESG Combo Improv Dummy * Similar Firm Size Dummy	Interaction term between dummy variable for ESG Combo Improv Dummy and Similar firm size dummy
ESG Controv Improv Dummy * Similar Firm Size Dummy	Interaction term between dummy variable for ESG Controv Improv Score and Similar firm size dummy
$Enviro_{(T-A)}$	Difference between target firm Enviro score and acquiror firm Enviro score
$Enviro_{(T-A)}$ * Similar Firm Size Dummy	Interaction term between difference of Enviro score of the target firm and acquiror firm and Similar firm size dummy
$Govern_{(T-A)}$	Difference between target firm Govern score and acquiror firm Govern score
$Govern_{(T-A)}$ * Similar Firm Size Dummy	Interaction term between difference of govern score of the target firm and acquiror firm and similar firm size dummy
$Social_{(T-A)}$	Difference between target firm social score and acquiror firm social score
$Social_{(T-A)}$ * Similar Firm Size Dummy	Interaction term between difference of social score of the target firm and acquiror firm and similar firm size dummy variable
ESG $Combo_{(T-A)}$	Difference between target firm ESG Combo score and acquiror firm ESG Combo score
ESG $Combined_{(T-A)}$ * Similar Firm Size Dummy	Interaction term between difference of ESG Combo score of the target firm and acquiror firm and similar firm size dummy variable
ESG $Controv_{(T-A)}$	Difference between target firm ESG Controv score and acquiror firm ESG Controv score
ESG $Controv_{(T-A)}$ * Similar Firm Size Dummy	Interaction term between difference of ESG Controv score of the target firm and acquiror firm and similar firm size dummy variable

Control Variables	
Ln (Total Assets)	Measure of firm size, calculated by taking Ln of total assets
Return on Equity (ROE)	Return on equity of the acquiror firm
Return on Assets (ROA)	Return on assets of the acquiror firm
Inflation Rate	Measure of the yearly inflation rate within the US measured at he end of the previous year
Leverage	Measures the leverage of the firm, calculated as the debt/equity ratio for the acquiror firm
Interest Rate	Measure of the yearly interest rates in the US based on 3-month T-bills
Unemployment Rate	Measure of the yearly unemployment rate in the US, measured at the end of the previous year
Stock Deal Dummy	Dummy variable for stock transactions in M&A deals, 1 if payment involves stock, otherwise 0
Cash Deal Dummy	Dummy variable for cash transactions in M&A deal, 1 if payment involves cash, otherwise 0

Table 2: Number of Mergers and Acquisitions and Average Premium Paid

The first column in the table shows the number of M&A transactions every year from 2006 to 2022. The second column of the table shows the number of M&A deals for which we have all the ESG ratings available. We named the second column Sample 1. The third column shows the number of M&A deals for which there is complete data for the ESG ratings and our control variables. The last column shows the average premium paid based on the M&A deals of the third column.

Year	Number of M&A transactions	Number of M&A's with acquiror and target firm ESG ratings (Sample 1)	Number of M&A's with complete data on ESG ratings & control variables	Average premium paid (calculated for Sample 1)
2006	227	7	1	12.03
2007	208	6	0	34.29
2008	138	6	0	-0.081
2009	127	6	1	29.49
2010	122	2	0	12.30
2011	89	9	1	30.87
2012	117	5	1	43.74
2013	124	10	0	17.75
2014	151	19	1	28.78
2015	155	29	1	27.74
2016	149	38	4	34.51
2017	136	38	6	24.27
2018	156	9	8	20.89
2019	117	34	8	26.04
2020	70	43	4	27.79
2021	117	59	25	33.10
2022	87	1	1	54.77
Total	2,290	321	62	26.95

Table 3: Number of Mergers and Acquisitions per Industry and Average Premium Paid

This table shows the number of M&A transactions per industry classified by the Fama French 12 industry classifications. The first column shows the number of M&A transactions in sample 1 (M&A deals for which we have complete data on ESG ratings). The second column shows the number of M&A deals for which we have complete data on the ESG ratings and the control variables. The last column shows the average premium paid based on the M&A deals in the first column

Industry	Number of M&As with acquiror and target firm ESG ratings (Sample 1)	Number of M&As with complete data on ESG ratings & control variables	Average premium paid (calculated for Sample 1)
Consumer Non-durables	8	2	45.9
Consumer Durables	2	0	11.21
Manufacturing	20	5	51.22
Energy	16	2	32.27
Chemicals and Allied	3	0	39.8
Business Equipment	55	11	50.9
Utilities	17	2	37.3
Shops	22	5	43.7
Health	44	6	52.0
Finance	96	24	34.8
Telecommunication	12	3	39.6
Other	26	2	30.39
Total	321	62	39.09

Table 4: Descriptive Statistics

This table provides descriptive statistics for our sample, organized in four different panels. Panel A provides ESG rating statistics for the acquiring firms. The second panel (Panel B) outlines the ESG rating statistics of the target firms. Panel C describes the deal characteristics (e.g., the percentage of cash to the percentage of stock payments used in a deal. Panel D provides descriptive statistics for our macroeconomic control variables.

Panel A: Acquiring Firm Characteristics

Variables	Mean	Median	Std. Dev.	Minimum	Maximum
ESG Score Rating	0.547	0.545	0.211	0.0938	0.928
ESG Combined Score	0.498	0.487	0.182	0.074	0.873
ESG Controversies Score	0.820	1	0.306	0.0156	1
Environmental Pillar Score	0.431	0.430	0.317	0	0.918
Governance Pillar Score	0.604	0.645	0.2168	0.103	0.953
Social Pillar Score	0.554	0.543	0.217	0.148	0.966

Panel B: Target Firm Characteristics

Variables	Mean	Median	Std. Dev.	Minimum	Maximum
ESG Score Rating	0.344	0.308	0.173	0.0881	0.820
ESG Combined Score	0.323	0.293	0.148	0.088	0.689
ESG Controversies Score	0.872	1	0.259	0.05	1
Environmental Pillar Score	0.172	0.0731	0.224	0	0.890
Governance Pillar Score	0.406	0.375	0.214	0.0474	0.883
Social Pillar Score	0.379	0.312	0.194	0.029	0.884

Panel C: Deal Characteristics

Variables	Mean	Median	Std. Dev.	Minimum	Maximum
Percentage of Cash (% Cash)	36.92	11.94	42.33	0	100
Percentage of Stock (% Stock)	55.85	65.59	43.48	0	100

Panel D: Macroeconomic Variables and Compustat Variables

Variables	Mean	Median	Std. Dev.	Minimum	Maximum
GDP Growth	4.24	4.19	2.85	-1.98	10.65
Unemployment Rate	5.13	5.35	1.351	3.63	9.28
Interest Rate	0.811	0.375	0.969	0.080	4.964
Inflation Rate	3.09	2.44	1.615	-0.356	8.003
Return on Equity (Target)	1.26	1.19	2.205	-5.16	6.45
Return on Assets (Target)	0.58	2.2	15.5	70	25.4
Return on Equity (Acquiror)	5.42	2.71	8.70	-3.91	62.02
Return on Assets (Acquiror)	5.5	3.9	7.7	-17.3	27.0

Table 5: Correlation Matrix

This table contains the Pearson correlation coefficients for all pairwise combinations of our dependent, independent and control variables.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
ESG Score_A	(1)	1.00																									
ESG Score_T	(2)	0.48	1.000																								
Size_A	(3)	0.58	0.292	1.000																							
ROE_A	(4)	0.31	0.031	0.439	1.000																						
ROA_A	(5)	0.36	0.193	0.274	0.250	1.000																					
Leverage_A	(6)	0.13	0.132	0.088	0.037	-0.023	1.000																				
Size_T	(7)	0.17	0.446	0.455	0.048	-0.034	-0.040	1.000																			
ROE_T	(8)	0.15	0.265	0.121	-0.010	0.116	0.034	0.411	1.000																		
ROA_T	(9)	-0.09	0.215	-0.159	0.049	0.021	-0.053	0.516	0.508	1.000																	
Leverage_T	(10)	-0.13	0.121	-0.228	-0.683	0.048	-0.028	-0.037	0.057	0.050	1.000																
Envir Score _A	(11)	0.89	0.421	0.547	0.320	0.328	0.178	0.103	0.154	-0.077	-0.114	1.000															
Envir Score_T	(12)	0.31	0.779	0.150	-0.023	0.176	0.185	0.163	0.235	0.166	0.153	0.415	1.000														
Gover Score_A	(13)	0.81	0.326	0.351	0.288	0.273	0.028	0.049	0.053	-0.036	-0.114	0.573	0.114	1.000													
Gover Score_T	(14)	0.35	0.749	0.135	-0.001	0.087	0.031	0.366	0.188	0.188	0.115	0.274	0.392	0.362	1.000												
Social Score_A	(15)	0.93	0.502	0.608	0.248	0.358	0.154	0.251	0.196	-0.099	-0.112	0.853	0.335	0.597	0.319	1.000											
Social Score_T	(16)	0.46	0.871	0.296	0.079	0.204	0.149	0.449	0.268	0.208	0.052	0.385	0.669	0.253	0.404	0.536	1.000										
ESG Combo Score_A	(17)	0.82	0.384	0.317	0.081	0.308	0.123	0.104	0.175	-0.118	0.033	0.744	0.254	0.660	0.297	0.782	0.386	1.000									
ESG Combo Score_T	(18)	0.41	0.923	0.227	0.067	0.174	0.148	0.405	0.209	0.220	0.125	0.371	0.693	0.288	0.657	0.429	0.846	0.352	1.000								
ESG Controver Score_A	(19)	-0.17	-0.101	-0.287	-0.044	0.158	-0.124	-0.106	0.115	0.100	-0.061	-0.208	-0.119	-0.094	-0.005	-0.168	-0.107	0.098	-0.075	1.000							
ESG Controver Score_T	(20)	-0.34	-0.324	-0.224	0.046	-0.140	0.069	-0.068	-0.059	-0.061	-0.063	-0.292	-0.297	-0.207	-0.209	-0.383	-0.272	-0.239	-0.075	0.171	1.000						
Cash Deal Dummy	(21)	0.11	0.203	-0.003	0.153	0.070	0.018	0.089	0.001	0.186	0.080	0.248	0.222	-0.025	0.236	0.156	0.123	0.089	0.131	-0.049	-0.154	1.000					
Stock Deal Dummy	(22)	-0.09	-0.231	0.020	-0.231	-0.256	0.055	0.105	0.116	-0.111	-0.050	-0.123	-0.158	-0.015	-0.285	-0.164	-0.168	-0.031	-0.197	-0.085	0.093	-0.623	1.000				
GDP Growth	(23)	0.15	0.298	-0.303	0.237	0.250	0.310	-0.364	0.218	-0.414	0.386	0.058	0.314	0.206	0.043	0.183	0.202	0.311	0.309	0.257	-0.017	0.380	-0.754	1.000			
Interest Rate	(24)	0.28	-0.168	0.278	0.063	0.238	-0.337	0.147	0.364	-0.073	0.280	0.219	-0.048	0.300	-0.166	0.328	0.199	0.172	-0.206	-0.168	0.084	-0.416	-0.143	0.227	1.000		
Inflation Rate	(25)	0.22	-0.053	0.104	0.157	0.072	0.134	-0.298	0.184	-0.093	0.139	0.189	0.441	0.121	-0.277	0.329	0.068	0.191	-0.023	-0.022	0.080	0.018	-0.543	0.765	0.323	1.000	
Unemployment Rate	(26)	-0.45	-0.483	-0.049	0.133	-0.131	-0.234	0.036	-0.220	0.488	-0.504	-0.238	-0.045	-0.593	-0.247	-0.378	-0.143	-0.394	-0.249	0.170	0.211	-0.204	0.528	-0.593	-0.595	-0.429	1.000

Table 6: Univariate Analysis

We form subsets of our M&A sample along various dimensions. For each subsample, we report the number of observations N, as well as mean and median. We then employ t-test and Kruskal Wallis tests to test for equality of mean and median CARs between each set of subsamples. The last column reports the p-value for both tests.

Subsample 1	N, mean, median	Subsample 2	N, mean, median	Tests of differences means (p-value) medians (p-value)
Panel A: Number of Mergers and Acquisitions in the Sample (N=62)				
ESG Score_A > ESG Score_T	52 0.585 0.597	ESG Score_T > ESG Score_A	10 0.424 0.338	0.990 0.025
Envir Score_A > Envir Score_T	46 0.534 0.573	Envir Score_T > Envir Score_A	14 0.395 0.297	0.852 0.306
Social Score_A > Social Score_T	50 0.581 0.607	Social Score_T> Social Score_A	12 0.560 0.577	0.622 0.845
Gover Score_A > Gover Score_T	48 0.641 0.684	Gover Score_T > Gover Score_A	14 0.476 0.538	0.994 0.007
ESG Combo Score_A > ESG Combo Score_T	49 0.540 0.527	ESG Combo Score_T > ESG Combo Score_A	13 0.425 0.369	0.984 0.040
ESG Controv Score_A > ESG Controv Score_T	47 0.830 0.821	ESG Controv Score_T> ESG Controv Score_A	15 0.946 1	0.985 0.015
Firm Size_A > Firm Size_T	59 4.311 4.305	Firm Size_T > Firm Size_A	3 4.126 4.25	0.797 0.682
ROE_A > ROE_T	49 6.667 4.078	ROE_T > ROE_A	13 2.111 2.091	0.998 0.016
Leverage_A > Leverage_T	38 1.218 0.488	Leverage_T > Leverage_A	24 2.177 0.986	0.150 0.075
ROA_A > ROA_T	48 7.18 5.46	ROA_T > ROA_A	14 6.2 3.5	0.657 0.312

Table 7: Regression Analysis with ESG Improvement Dummies as the Main Independent Variables

This table provides the results for a series of regressions using the lagged 1-year change in the individual ESG component scores and the combined ESG ratings as the dependent variable. The main explanatory variables are dummy variables that indicate whether the target firm has an ESG rating that is higher than the ESG rating of the acquiring firm (dummy = 1) or not (dummy = 0). Coefficients that are significant at the 10% level are bolded.

	Dependent Variables				
	Change in Acquiror Enviro. Score	Change in Acquiror Govern. Score	Change in Acquiror Social Score	Change in Acquiror ESG Combo Score	Change in Acquiror ESG Controv. Score
Independent Variables	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)
Intercept	**-0.360 (0.001)**	-0.075 (0.531)	**-0.199 (0.074)**	-0.133 (0.378)	**0.503 (0.285)**
Enviro Improv Dummy	-0.026 (0.548)	-	-	-	-
Enviro Improv Dummy*Similar Firm Size Dummy	-0.054 (0.440)	-	-	-	-
Govern Improv Dummy	-	-0.045 (0.299)	-	-	-
Govern Improv Dummy*Similar Firm Size Dummy	-	-0.038 (0.458)	-	-	-
Social Improv Dummy	-	-	-0.007 (0.837)	-	-
Social Improv Dummy*Similar Firm Size Dummy	-	-	**0.168 (0.005)**	-	-
ESG_Combo Improv Dummy	-	-	-	-0.019 (0.721)	-
ESG_Combo Improv Dummy*Similar Firm Size Dummy	-	-	-	0.050 (0.518)	-
ESG_Controv Improv Dummy	-	-	-	-	0.357 (0.152)
ESG_Controv Improv Dummy*Similar Firm Size Dummy	-	-	-	-	-0.594 (<0.001)
Cash Deal Dummy	0.034 (0.309)	0.003 (0.927)	0.015 (0.610)	0.006 (0.870)	**-0.320 (0.020)**

Stock Deal Dummy	-0.007 (0.860)	-0.013 (0.732)	-0.002 (0.943)	-0.024 (0.604)	-0.204 (0.191)
Ln (Total Assets) $_A$	0.011 (0.596)	-0.019 (0.345)	-0.014 (0.447)	-0.029 (0.256)	0.028 (0.741)
ROE $_A$	0.001 (0.735)	0.002 (0.363)	0.003 (0.199)	0.004 (0.115)	-0.007 (0.374)
ROA $_A$	-0.055 (0.608)	-0.131 (0.296)	-0.020 (0.825)	-0.063 (0.614)	-0.595 (0.138)
Inflation Rate	**0.015** **(0.100)**	0.011 (0.227)	0.012 (0.140)	0.005 (0.657)	-0.001 (0.972)
Leverage	-0.055 (0.539)	0.000 (0.949)	-0.002 (0.545)	0.001 (0.919)	0.007 (0.660)
Interest Rate	**0.093** **(<0.001)**	**0.068** **(<0.001)**	**0.079** **(<0.001)**	**0.087** **(<0.001)**	**-0.128** **(0.058)**
Unemployment Rate	**0.041** **(0.002)**	0.016 (0.207)	**0.032** **(0.005)**	**0.033** **(0.030)**	-0.012 (0.786)
Adjusted R^2	0.260	0.246	0.265	0.145	0.338
F-Stat	2.952	2.811	2.995	1.938	3.831
Observations	124	124	124	124	124

Table 8: Regression Analysis with ESG Improvement Score as the Main Independent Variables

This table provide the results for a series of regressions using the lagged 1-year change in the individual ESG component scores and the combined ESG ratings as the dependent variable. The main explanatory variables are the differences in the target (T) and acquiring (A) firm ESG scores at the time of the acquisition. Coefficients that are significant at the 10% level are bolded.

	Dependent Variables				
	Change in Acquiror Enviro. Score	Change in Acquiror Govern. Score	Change in Acquiror Social Score	Change in Acquiror ESG Combo Score	Change in Acquiror ESG Controv. Score
Independent Variables	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)
Intercept	**-0.313 (0.010)**	-0.072 (0.550)	-0.124 (0.299)	-0.153 (0.283)	**0.771 (0.142)**
$Enviro_{T-A}$	**0.110 (0.023)**	-	-	-	-
$Enviro_{T-A}$ * Similar Firm Size Dummy	0.031 (0.657)	-	-	-	-
$Governance_{T-A}$	-	-0.089 (0.174)	-	-	-
$Governance_{T-A}$ * Similar Firm Size Dummy	-	-0.075 (0.447)	-	-	-
$Social_{T-A}$	-	-	-0.097 (0.405)	-	-
$Social_{T-A}$ * Similar Firm Size Dummy	-	-	-0.009 (0.897)	-	-
ESG $Combo_{T-A}$	-	-	-	-0.202 (0.025)	-
ESG $Combo_{T-A}$ * Similar Firm Size Dummy	-	-	-	0.107 (0.458)	-
ESG $Controv_{T-A}$	-	-	-	-	-0.531 (0.005)
ESG $Controv_{T-A}$ * Similar Firm Size Dummy	-	-	-	-	0.173 (0.623)
Cash Deal Dummy	0.024 (0.471)	0.008 (0.817)	0.014 (0.680)	0.009 (0.819)	**-0.276 (0.042)**
Stock Deal Dummy	-0.017 (0.663)	-0.012 (0.753)	-0.006 (0.885)	-0.024 (0.605)	-0.069 (0.665)
Ln (Total Assets) $_A$	-0.007 (0.731)	-0.019 (0.380)	-0.018 (0.382)	-0.035 (0.150)	-0.074 (0.393)
ROE $_A$	0.001 (0.802)	0.003 (0.236)	0.003 (0.172)	0.004 (0.109)	-0.002 (0.804)

ROA_A	-0.055 (0.567)	-0.019 (0.380)	-0.016 (0.868)	-0.073 (0.538)	-0.405 (0.342)
Inflation Rate	**0.015** **(0.089)**	0.008 (0.360)	0.009 (0.315)	0.009 (0.412)	-0.001 (0.968)
Leverage	-0.004 (0.298)	-0.001 (0.865)	-0.001 (0.734)	0.00 (0.938)	0.008 (0.622)
Interest Rate	**0.095** **(<0.001)**	**0.073** **(<0.001)**	**0.074** **(<0.001)**	**0.081** **(<0.001)**	**-0.136** **(0.064)**
Unemployment Rate	**0.042** **(<0.001)**	0.026 (0.031)	**0.027** **(0.022)**	**0.035** **(0.017)**	-0.021 (0.691)
Adjusted R^2	0.341	0.238	0.128	0.221	0.220
F-Stat	3.864	2.733	1.812	2.572	2.566
Observations	124	124	124	124	124

Table 9: Regression Analysis with Deal Premium as the Dependent Variable

This table provide the results for a series of regressions using the deal premium as the dependent variable. The main explanatory variables are the dummy variables identifying positive differences between the target and acquiror ESG ratings (Model 1) and the actual differences between the target and acquiror ESG ratings (Model 2). Coefficients that are significant at the 10% level are bolded.

	Dependent Variable: Deal Premium	
Independent Variables	**Model 1** Coefficient (p-Value)	**Model 2** Coefficient (p-Value)
Intercept	52.657 (0.504)	56.33 (0.464)
ESG Improv Dummy	24.786 (0.409)	-
ESG Improv Dummy*Similar Firm Size Dummy	-41.53 (0.346)	-
ESG Score $_{T-A}$	-	**91.56 (0.067)**
ESG Score$_{T-A}$*Similar Firm Size Dummy	-	-64.86 (0.350)
Cash Deal Dummy	-36.62 (0.106)	-26.77 (0.253)
Stock Deal Dummy	-18.38 (0.448)	-18.67 (0.462)
Ln (Total Assets) $_A$	**30.32 (0.019)**	21.23 (0.115)
ROE$_A$	-0.585 (0.625)	-0.892 (0.383)
ROA$_A$	**361.65 (0.007)**	**320.040 (0.013)**
Inflation Rate	-5.63 (0.339)	-2.921 (0.618)
Leverage	0.167 (0.956)	-0.046 (0.987)
Interest Rate	-18.91 (0.144)	-15.42 (0.207)
Unemployment Rate	**-19.003 (0.033)**	**-17.18 (0.050)**
Adjusted R^2	0.131	0.175
F-Stat	1.811	2.134
Observations	62	62

Table 10: Event Study

This table shows the mean cumulative abnormal return and the various tests conducted on a number of event windows. Panel A shows the Mean CARs of the acquiror firm before the M&A deal took place. Panel B shows the Mean CARs of the acquiring firm around the M&A deal while Panel C shows the Mean CARs of the acquiring firm after the event has taken place.

Panel A: Cumulative Abnormal Return Before the Event

Days	Number of Observations	Mean CAR (%)	Portfolio Time Series (CDA) Test (p-value)	Uncorrected Patell Z test (p-value)	Generalized Sign Z (p-value)
(-10, -1)	62	0.46	0.359	0.0510	0.187
(-5, -1)	62	0.11	0.450	0.133	0.263
(-3, -1)	62	0.33	0.3196	0.0339	0.450
(-1, -1)	62	0.41	0.1590	0.0219	0.450

Panel B: Cumulative Abnormal Return Around the event

Days	Number of Samples	Mean CAR (%)	Portfolio Time Series (CDA) t (p-value)	Uncorrected Patell Z (p-value)	Generalized Sign Z (p-value)
(-10, +10)	62	2.88	0.0614	0.0030	0.0018
(-5, +5)	62	2.76	0.0204	0.0009	0.0039
(-3, +3)	62	1.77	0.0497	<.0001	0.0018
(-1, +1)	62	0.67	0.1724	0.0195	0.049

Panel C: Cumulative Abnormal Return After the Event

Days	Number of Samples	Mean CAR (%)	Portfolio Time Series (CDA) t (p-value)	Uncorrected Patell Z (p-value)	Generalized Sign Z (p-value)
(0, +1)	62	0.26	0.326	0.162	0.0497
(0, +3)	62	1.44	0.0380	0.0005	0.0080
(0, +5)	62	2.65	0.0040	0.0010	0.0080
(0, +10)	62	2.41	0.0367	0.0064	0.0286

Table 11: Regression Analysis Using the ESG Score

This table provides the results for a series of regressions using the cumulative abnormal return (CAR) over various event windows as the dependent variable. The main explanatory variable is a dummy variable that indicates whether the target firm has an ESG rating (ESG Score) that is higher than the ESG rating of the acquiring firm (dummy = 1) or not (dummy = 0). Coefficients that are significant at the 10% level are bolded.

	Dependent Variables		
	Before the Event	Around the Event	After the Event
	CAR (-5, -1)	CAR (-1, 1)	CAR (0, 5)
Independent Variables	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)
Intercept	-0.158 (0.942)	2.44 (0.098)	-5.867 (0.310)
ESG Score Improv Dummy	-1.386 (0.230)	-0.600 (0.433)	0.116 (0.969)
ESG Score Improv Dummy * Similar Firm Size Dummy	2.083 (0.241)	0.886 (0.452)	-3.485 (0.454)
Cash Deal Dummy	0.768 (0.340)	0.668 (0.214)	-1.361 (0.519)
Stock Deal Dummy	-0.153 (0.865)	0.660 (0.271)	-1.254 (0.595)
Similar Firm Size Dummy	-0.368 (0.623)	-0.687 (0.171)	**3.63** **(0.069)**
Ln (Total Assets)	0.145 (0.770)	-0.517 (0.122)	**2.38** **(0.073)**
ROE	-0.004 (0.924)	-0.004 (0.883)	-0.080 (0.440)
ROA	-2.026 (0.649)	**-5.95** **(0.049)**	-12.776 (0.278)
Leverage	-0.079 (0.484)	0.004 (0.955)	0.076 (0.797)
Adjusted R^2	0.057	0.071	0.113
F-Stat	0.351	1.52	0.735
Observations	62	62	62

Table 12: Regression Analysis Using the ESG Combo Score

This table provides the results for a series of regressions using the cumulative abnormal return (CAR) over various event windows as the dependent variable. The main explanatory variable is a dummy variable that indicates whether the target firm has an ESG rating (ESG Combo Score) that is higher than the ESG rating of the acquiring firm (dummy = 1) or not (dummy = 0). Coefficients that are significant at the 10% level are bolded.

	Dependent Variables		
	Before the Event	Around the Event	After the Event
	CAR (-5, -1)	CAR (-1,1)	CAR (0,5)
Independent Variables	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)
Intercept	-0.291 (0.893)	2.146 (0.142)	-7.121 (0.207)
ESG Combo Improv Dummy	1.793 (0.254)	0.127 (0.845)	-6.186 (0.130)
ESG Combo Improv Dummy*Similar Firm Size Dummy	-1.194 (0.220)	0.007 (0.994)	3.265 (0.196)
Cash Deal Dummy	0.667 (0.399)	0.542 (0.308)	-1.564 (0.446)
Stock Deal dummy	-0.232 (0.795)	0.655 (0.277)	-0.869 (0.708)
Similar Firm Size Dummy	-0.387 (0.607)	-0.534 (0.291)	**4.298 (0.031)**
Ln (Total Assets)	0.204 (0.679)	-0.469 (0.160)	**2.43 (0.061)**
ROE	-0.008 (0.829)	-0.005 (0.834)	-0.068 (0.505)
ROA	-1.398 (0.747)	**-5.29 (0.072)**	-10.50 (0.351)
Leverage	-0.073 (0.512)	0.017 (0.819)	0.126 (0.665)
Adjusted R^2	0.058	0.060	0.139
F-Stat	0.355	1.432	0.929
Observations	62	62	62

Table 13: Regression Analysis Using the ESG Controversies Score

This table provides the results for a series of regressions using the cumulative abnormal return (CAR) over various event windows as the dependent variable. The main explanatory variable is a dummy variable that indicates whether the target firm has an ESG rating (ESG Controversies Score) that is higher than the ESG rating of the acquiring firm (dummy = 1) or not (dummy = 0). Coefficients that are significant at the 10% level are bolded.

	Dependent Variables		
	Before the Event	Around the Event	After the Event
	CAR (-5, -1)	CAR (-1,1)	CAR (0,5)
Independent Variables	Coefficient (p-Value)	Coefficient (p-Value)	Coefficient (p-Value)
Intercept	-0.233 (0.914)	2.165 (0.139)	-5.051 (0.368)
ESG Controv Improv Dummy	-1.049 (0.261)	0.035 (0.955)	-0.151 (0.950)
ESG Controv Improv Dummy*Similar Firm Size Dummy	1.872 (0.255)	-0.189 (0.863)	5.798 (0.174)
Cash Deal Dummy	0.454 (0.566)	0.556 (0.295)	-0.868 (0.671)
Stock Deal Dummy	-0.052 (0.954)	0.642 (0.289)	-0.675 (0.772)
Similar Firm Size Dummy	-0.430 (0.579)	-0.493 (0.343)	1.712 (0.394)
Ln (Total Assets)	0.183 (0.713)	-0.468 (0.164)	2.041 (0.117)
ROE	-0.015 (0.707)	-0.005 (0.854)	-0.084 (0.416)
ROA	-0.371 (0.933)	-5.45 (0.068)	-8.95 (0.431)
Leverage	-0.058 (0.594)	0.019 (0.795)	0.00 (0.992)
Adjusted R^2	0.107	0.059	0.141
F-Stat	0.344	1.427	0.949
Observations	62	62	62