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The effect of ESG ratings on M&A performance

By Patrick Coster (S1063602)

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Supervisor: Jan Schmitz

Radboud Universiteit



ABSTRACT

ESG performance has become increasingly important over the last few years and its importance continues to grow. As investor decisions rely increasingly more on ESG performance, this study investigates the relation between ESG performance and cumulative abnormal returns surrounding the announcement of a merger or acquisition. Using an event study methodology with three different event windows: a five-day (-2, +2) window, a three-day (-1, +1) window, and a two-day (0, +1) window and a sample of 2,265 M&A deals over the years 2002 – 2021, an empirical analysis is performed. This study finds a negative relation between ESG performance which leads to believe that investing in ESG is less beneficial for a company that wants to actively participate in mergers and acquisitions than not investing in ESG, as significance to a 1% level is observed in event window (-2, +2) and in event window (0, +1), whereas a significance to a 5% level is found in event window (-1, +1). Furthermore, a negative relation between the environmental and governance pillar and cumulative abnormal returns in each event window, and a positive relation between the social pillar and cumulative abnormal returns are observed.

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1 Introduction

ESG performance has become more important over the last few years and its importance continues to grow. It was Larry Fink, CEO of BlackRock who indicated in his published letter to CEOs that every company and every industry will be transformed by the transition to a net zero world (*BlackRock's Larry Fink to CEOs, 2020*). The growing significance of ESG issues can be seen in the 2020 EY Climate Change and Sustainability Services Institutional Investor survey as well. This survey found that, of the 98% of investors surveyed who assess ESG, 72% carry out a structured review of ESG performance, compared to 32% two years prior to that in the same survey (EY, 2020). As investor decisions rely increasingly more on ESG performance, it would be interesting to see if there is a connection with mergers and acquisitions.

There are multiple reasons why firms engage in takeovers but the idea behind engaging in mergers and acquisitions should be about added value or synergies. A distinction between synergies can be made, as there are operational, managerial, and financial synergies. With operational synergies, there is some overlap in the activities, products, and markets of the acquiring and target company. Operational synergies can be found when, for example, a company takes over a rival or another company in the same industry. A combination of assets and the industry position give the combined firm power in competitive interactions, such as eliminating or weakening a rival, enhanced buying power, or enhanced pricing power (Feldman & Hernandez, 2022). Managerial synergies could be that a competent managerial team takes over a target with less competent managers. Meyer-Doyle et al. (2019) find that the CEO accounts for 33 to 40% of the variance with long term performance of mergers and acquisitions. Financial synergies could be the tax advantage of unused debt capacity in either the bidder or target, the complementary nature of the growth opportunities and financial resources of the merging companies and the coinsurance of debt of the two companies. These synergies share the same principle for a company, as it is about added value. Added value to a company is described by two theories, the stakeholder theory, and the shareholder theory.

The stakeholder theory, whose main exponent was Edward Freeman (1984), proposes that by considering the connections between a business and the various groups and individuals who can influence or be impacted by it, the ability to address three problems: the problem of value

creation and trade, the problem of the ethics of capitalism, and the problem of managerial mindset. In other words, business can be understood as a set of relationships between groups that have a stake in the activities that make up the business (Freeman, 1984; Jones, 1995). The stakeholder theory also suggests that that companies should not act with the aim of maximizing profit, but they should also create a strong relationship with other stakeholders involved in the life of the company and they should take into consideration social and environmental aspect of the business (Bhandari et al., 2022). By creating a strong relationship with stakeholders, additional value is created for the business, leading to higher market prices (Parmar et al., 2010).

In contrast, the shareholder theory is based on the idea that the objective of managers is to act in the interest of shareholders and to maximize shareholder wealth. One main exponent of the theory is Friedman. According to Friedman, managers that invest in CSR spend money of the shareholders to meet the interest of other stakeholders represent a conflict of interest because they are pursuing an agenda contrary to what shareholders demand (Friedman, 1970). So, for this theory, the implementation of CSR has a negative impact on the economic and financial performance of the company and can destroy a company's value. Following along the line of the traditional neoclassical theory, some authors such as Palmer et al. (1995), have shown that investing in social aspects involves additional costs that could be avoided, since these costs should not be borne by companies but by other entities, such as state authorities. Higher costs imposed on companies due to industry regulations that aim to achieve social benefits may lead instead to lower economic results. The theories of added values and the importance of ESG scores leads to the following research question:

What is the impact of ESG performance on mergers and acquisitions?

This research question is interesting as it examines whether ESG factors have an influence on mergers and acquisitions. By using an event study methodology, the financial impact of ESG on M&A transactions can be measured, which can provide valuable insights for companies, investors, and policymakers. This study can possibly highlight the importance of ESG factors in M&A decision-making and this would help companies and investors to identify the specific ESG factors that are most important for generating, for instance positive abnormal returns in M&As. Policymakers could introduce improved ESG standards, if this study shows that a particular ESG

pillar plays a role in M&A transactions. Furthermore, besides practical relevance, this study adds to the already fast-growing literature on the topic of ESG by connecting two different research lines, namely abnormal returns for mergers and acquisitions and ESG.

With an event study methodology, using cumulative abnormal returns around the announcement day of mergers and acquisitions, the effect between ESG performance and firm performance is studied. This study finds a negative relation between ESG performance which leads to believe that investing in ESG is less beneficent for a company that wants to actively participate in mergers and acquisitions than not investing in ESG, as significance to a 1% level is observed in event window (-2, +2) and in event window (0, +1), whereas a significance to a 5% level is found in event window (-1, +1).

The remainder of this paper is organized as follows: Section 2 addresses the hypotheses. Section 3 discusses data and methodology. Section 4 reports the empirical results, and section 5 discusses conclusions, presents the implications for this study, and gives recommendations for future research.

2 Hypotheses

The main question being asked in this study is as follows: What is the impact of ESG performance on mergers and acquisitions?

The idea that ESG performance has an influence on mergers and acquisitions stems from multiple theories. The first theory that is mentioned in previous literature is the stakeholder theory. This theory takes a stakeholder value maximization view, in which CSR activities have a positive effect on shareholder wealth because focusing on the interests of other stakeholders increases the willingness to support a firm's operation, which increases shareholder wealth (Deng et al., 2013). The theory suggests that the interests of shareholders and other stakeholders are in better alignment with each other and therefore are more likely to contribute to firms' long-term profitability and efficiency.

Another theory that may explain some influence on the performance of mergers and acquisitions is the shareholder theory. The shareholder theory states that the primary objective of management is to maximize shareholder value. Maximizing shareholder value, according to the shareholder theory, can be done by management making decisions based on maximizing the combined values of dividends and share price increases (O'Connell & Ward, 2020). Contributing to CSR can be seen as a means that does not maximize shareholder value, as money of the corporation is spent on 'social' causes. Friedman (1970) described, what then was a newer phenomenon, as calling upon stockholders to require corporations to exercise social responsibility by contributing to 'social' causes favored by activists. He implied that in these cases, as far as they succeed, taxes are imposed, and proceeds are spent. Investing in CSR would lead to lower shareholder value. As there is more research suggesting a negative relation between ESG performance and firm performance, the first hypothesis is as follows:

H1: There is a negative relation between acquirer ESG performance and M&A performance.

Previous literature finds that environmentally friendly companies can gain economic benefits, among others gaining a competitive advantage such as more efficient processes, improvements in productivity or lower costs of compliance and new market opportunities (Alexopoulos et al., 2011). Social performance is also positively related to firm performance, especially in low-innovation firms and in industries with little differentiation (Hull & Rothenberg, 2008). For

corporate governance, Rizki and Jasmine (2018) find a significant impact on firm value, stating that an increase in corporate governance implementation in a firm leads to lower firm value. However, Kurnia et al. (2020) find no relation between good governance and firm value. This leads to believe that the impact of ESG performance on performance of mergers and acquisitions will vary depending on the type of ESG pillar being considered. The second hypothesis is therefore:

H2: The impact of acquirer ESG performance on the performance of mergers and acquisitions will vary depending on the type of ESG pillar being considered.

3 Research method

To examine market reactions to announcements of M&A deals, the standard event study methodology is used to compute market model abnormal returns (Brown & Warner, 1985). Because an event study is used, at first the period involved in the event needs to be identified, also the event window. The event window in this study is the period surrounding the announcement of a deal. Daily abnormal returns from day -2 to day +2 are used to calculate the cumulative abnormal returns on windows (0, +1), (-1, +1), and (-2, +2). A trade-off is made between the event window period, as including more days to the period can lead to lower accuracy due to confounding effects from other market events (MacKinlay, 1997). The period of the event window at least includes the day of the announcement and the day after the announcement. This captures the price effects of announcements that take place after the stock market closes on the announcement day. The period of the event window can be extended to capture the acquisition of information about the deal by the market, leading to abnormal returns in the days before the announcement.

The dependent variable that is used in this study is the cumulative abnormal return (CAR) of all acquiring firms in the sample. How the CAR is measured is explained further in this section.

To test the first hypothesis, the combined ESG rating of the acquiring firms is used. The ESG ratings are taken from the Refinitiv ESG database. This database is one of the most comprehensive ESG databases in the industry, as it covers over 85% of the global market cap, across more than 630 different ESG metrics, going back to 2002. The ESG rating from Refinitiv ranges from 0 to 100, with 0 representing the worst possible ESG rating and 100 the best (ESG Data, 2023). The ESG considers three different pillars, namely environmental, social, and governance and each pillar consist of different categories.

The environmental pillar examines how companies contribute to tackling environmental challenges with regards to emission, innovative companies are, and how the company uses resources. Emission includes risks regarding CO2 emissions, and the amount of waste produced. Innovation covers product innovation, and the amount of green revenues, research and development and capital expenditures within a company.

The social pillar examines the policies companies follow regarding the community, human rights, product responsibility, and the workforce of the company. In the categories of product responsibility and workforce a few distinctions are made, where responsible marketing, product quality and data privacy are themes incorporated in the category product responsibility, and diversity, career development and training, working conditions, and health and safety are themes incorporated in the workforce category.

The governance pillar examines the CSR strategy of companies, the management structure and management compensation, and shareholders, more specifically the shareholder rights and takeover defenses that are in place.

Each category in each respective pillar gets a weight assigned to it and the sum of all weights multiplied with the category score makes the pillar score. The sum of the total weights of the pillars multiplied with each pillar score gives the combined ESG rating.

To test the second hypothesis, each standalone pillar score is used. This score is measured as the category weights multiplied with the category scores of each separate pillar.

This study focuses on the acquirer in takeover deals within the period 2002-2021. The database Zephyr is used to obtain the information regarding deal transactions, such as the acquirer, target, deal value, and industry of the acquirer and target. The database covers transactions from 1997 forward for European transactions; from 2000 forward for North American transactions; global transactions from 2003 forward (Reiter, 2013). The first condition that is assigned to the companies is the availability of both the combined ESG score as well as the standalone ESG pillar score for acquirers in the Refinitiv ESG database. How the ESG score is computed is explained later in this paper. The period of 2002-2021 is chosen, as the year 2002 is the first year in which ESG scores are available in the Refinitiv ESG database. Another condition that is assigned to the data is that only transactions with a value of more than EUR 1 million are included to avoid the effects of small deals (Alexandridis et al., 2013; Masulis et al., 2007; Moeller et al., 2004). Furthermore, a condition regarding Standard Industrial Classification (SIC) codes is considered. The SIC codes are four-digit codes that indicate the type of business a company finds itself in. The SIC system classifies the economy into 11 major divisions (*Securities and Exchange Commission, 2023*). Companies with an SIC code of 4900-4999 (Energy & Transportation) and 6000-6999

(Finance, Insurance, and Real Estate) are omitted because these are highly regulated industries (Tampakoudis et al., 2021; Deng et al., 2013; Fuller et al., 2002; Nguyen and Phan, 2017). The penultimate condition is that the acquirer in the takeover needs to be a publicly traded firm, of which daily stock data should be available for the event window and the estimation window. The final condition assigned to the data is that 100% mergers and acquisitions are considered only, to focus on significant M&A deals (Ma et al., 2009). This results in a sample of 2,265 M&A deals being studied in this paper. A description of the M&A transactions by year and country can be found in Appendix 1.

Because this study aims to examine the relationship between cumulative abnormal returns in mergers and acquisitions and ESG, an OLS regression will be run. The regression analysis could be used to estimate the effect of the different ESG pillars or the effect of the overall combined ESG score. The function for testing the first hypotheses including control variables is as follows:

$$CAR_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_i + \beta_3 Same_Industry_i + \beta_4 CrossBorder_i + \epsilon_{it}$$

where CAR_{it} is the cumulative abnormal return of company i in the event window t , ESG_{it} represents the ESG score of company i in time t , ϵ_{it} represents the random error term for company i in time t . Following each regression, a Breusch-Pagan test is performed, to test the errors for heteroscedasticity. If heteroscedasticity is present, Weighted Least Squares (WLS) regressions are performed.

To test the second hypothesis, the score per ESG pillar is separated in the function, giving the following:

$$CAR_{it} = \beta_0 + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 Size_i + \beta_5 Same_Industry_i + \beta_6 CrossBorder_i + \epsilon_{it}$$

where E_{it} , S_{it} , G_{it} represent each pillar score of the ESG for company i in time t respectively.

In an ideal situation, one would also be able to consider the ESG scores of the target companies. Unfortunately, these companies were not incorporated in the Refinitiv ESG Database. Other ESG databases like Sustainalytics, MSCI or ESGI yielded no results either. For that reason, two dummy variables were added, GreenTarget and GreyTarget. Target companies that score relatively well get assigned a value of 1 in the GreenTarget dummy and companies that perform relatively poor get assigned a value of 1 in the GreyTarget dummy. The scores were assigned manually and only the environmental pillar is considered, as the ESG databases yielded no results and information on the social and governance pillar for target companies is scarce as well. By adding interaction

effects to the functions, a distinction is made between acquiring companies with a high ESG score and acquiring companies with a low ESG or environmental score. The functions then look as follows:

$$CAR_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_i + \beta_3 Same_Industry_i + \beta_4 CrossBorder_i + \beta_5 ESG_i * GreenTarget_i + \beta_6 ESG_i * GreyTarget_i + \epsilon_{it}$$

$$CAR_{it} = \beta_0 + \beta_1 E_{it} + \beta_2 Size_i + \beta_3 Same_Industry_i + \beta_4 CrossBorder_i + \beta_5 E_i * GreenTarget_i + \beta_6 E_i * GreyTarget_i + \epsilon_{it}$$

Unfortunately, the CAR is not a given, so this value must be computed first. The method used by Brown and Warner (1985) and Ma et al. (2009) is followed here. First, the market model assumes a linear relationship between the return of the company and the return of the market, and this looks as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$$

where R_{it} is the return of security i in time t , and R_{mt} is the return of the market during period t . As the data in this study comprises global data, the return for each company is linked to the return of each market in which the company finds itself. ϵ_{it} is the random error term for security i in the period t . With the estimates of α_i and β_i , a normal return is predicted during the days covered by the event window. The difference between the actual return and the normal return is the abnormal return, and calculated as:

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt}$$

where AR_{it} is the abnormal return for firm i on day t , R_{it} is the actual return for firm i on day t . The daily abnormal returns are then summed over the event window to derive the cumulative abnormal returns (CARs):

$$CAR_{it} = \sum AR_{it}$$

where CAR_i is the cumulative abnormal return for firm i over the event window t . In this study, multiple event windows are used to examine the sensitivity in the empirical results (Ma et al., 2009). The specific event windows used are (0, +1), (-1, +1), (-2, +2).

The secondary analysis that will be conducted is already incorporated in the first function. There are three control variables included, where *Size* represents the size of the deal for firm i , *Same_Industry* is a dummy variable which has a value of 1 if the acquirer and target are both in

the same industry and a value of 0 when the industries differ. Lastly, Crossborder represents a dummy variable as well, where the variable has a value of 1 if the takeover happens between two different countries and a value of 0 if the acquirer and the target are in the same country.

The database Zephyr is used to obtain the information regarding deal transactions, such as the acquirer, target, deal value, and industry of the acquirer and target. When introducing the time period that is central to this study and given the fact that the acquirer has to be a listed company, the sample contains 48,405 mergers and acquisitions. After filtering out deals with a value of less than EUR 1 million and the SIC Codes 4900-4999 of Energy and Transportation and 6000-6999 of Finance, Insurance and Real Estate, the sample consists of 13,269 M&A deals. These deals are brought over to Excel, after which the data is cleaned further. In Excel, only the deals where the merger or acquisition is 100% are considered and linked to the ESG score of the year of the announcement of the merger. This leaves the sample at 2,294 M&A deals. The stock price and market price data are retrieved through Refinitiv Datastream and this reduces the sample size with 29 observations. The final sample thus consists of 2,265 M&A deals. A description of the M&A transactions and the corresponding country code of the acquiring company can be found in appendix 1.

4 Findings

Table 1 presents the descriptive statistics for all variables that are used in the analysis. Table 1 shows a mean value of 51.74 for the ESG scores of acquiring firms in the sample, with a median of 52.33 and a standard deviation of 19.35. The minimum ESG score for a company that acquired another company was 3.22 and the maximum ESG score was 93.89, showing a wide range of ESG scores. E in the table stands for the Environmental score, where a mean value of 46.99 is presented. The median of the environmental score is 49.27 and a standard deviation of 25.95 is observed. The minimum score for E is 0.31 and the maximum is 99.22. S in the table stands for Social score, where a mean value of 51.29 is obtained. The median value of the social score is 50.28 with a standard deviation of 23.23. G in the table stands for the Governance score for acquiring companies in the sample. A mean value of 56.45 and a median value of 58.57 with a standard deviation of 21.45 are observed. Furthermore, the minimum governance score is 2.41 and the maximum score is 97.88. In addition, the variables of Cumulative Abnormal Returns are incorporated in the table. CARlong stands for cumulative abnormal returns in the longest event window that was used (-2, +2). CARmid represents the second event window used for cumulative abnormal returns (-1, +1) and CARshort represents the shortest event window used (0, +1). The mean average for CARlong, CARmid and CARshort are 0.735, 0.651 and 0.635 respectively, meaning that on average the cumulative abnormal returns are positive with a percentage of 0.735%, 0.651% and 0.635%, depending on the event window that is used. The maximum cumulative abnormal return that is observed is 42.78% in the shortest event window and the minimum is -39.935% in the longest event window.

TABLE 1. DESCRIPTIVE STATISTICS FOR ALL VARIABLES

Variables	Mean	Median	SD	Min	Max	Total
ESG	51.74	52.33	19.35	3.22	93.89	2265
E	46.99	49.27	25.95	0.31	99.22	2265
S	51.29	50.28	23.23	0.83	97.49	2265
G	56.45	58.57	21.45	2.41	97.88	2265
CARlong	0.735	0.514	4.763	-39.935	37.603	2265
CARmid	0.651	0.465	4.289	-30.783	37.770	2265
CARshort	0.635	0.364	4.018	-32.122	42.780	2265

In table 2 the results of the first regression can be found. The table shows the regression in which the dependent variables are incorporated in the first three columns. Besides the variables of CAR and ESG, controlling variables were incorporated in the regression with Crossborder, Same_Industry and Value, in which Crossborder represents a merger or acquisition that occurred across borders. Same_Industry represents whether the acquisition happened within the same industry or across industries and Value represents the natural logarithm of the deal size.

The variable ESG shows a negative relation with cumulative abnormal returns, where in the longest event window (-2, +2) the CAR decreases with 0.015% for every point the ESG score increases. The other event windows show a negative relation between ESG score and cumulative abnormal returns as well, with -0.011 and -0.015 respectively. Furthermore, the first and third event window show significant results with a p-value of 0.01, whereas the second event window (-1, +1) shows significant results with a p-value of 0.05. The explanatory power they have however is with a value of 0.003, 0.004 and 0.008 nearly null, meaning that 0.3%, 0.4% and 0.8% of the variance is explained by the regressions. The negative relation between ESG performance and leads to believe that investing in ESG is less beneficent for a company that wants to actively participate in mergers and acquisitions than not investing in ESG, as significance to a 1% level is observed in event window (-2, +2) and in event window (0, +1), whereas a significance to a 5% level is found in event window (-1, +1). This goes against the stakeholder theory and would be more in line with the shareholder theory, supporting the first hypothesis.

TABLE 2. WLS REGRESSION ESG AND CUMULATIVE ABNORMAL RETURNS

	CARlong (1)	CARmid (2)	CARshort (3)
ESG	-0.015*** (0.005)	-0.011** (0.004)	-0.015*** (0.004)
Crossborder	-0.003 (0.193)	0.065 (0.170)	0.111 (0.151)
Same_Industry	0.251 (0.234)	-0.102 (0.179)	-0.175 (0.161)
Value	0.124 (0.110)	0.279*** (0.100)	0.290*** (0.090)
Constant	0.839 (0.540)	-0.137 (0.483)	-0.022 (0.441)
Observations	2,265	2,265	2,265

Adjusted R ²	0.003	0.004	0.008
<i>Note:</i>		* p<0.1 ** p<0.05 *** p<0.01	

Table 3 shows the regression between the separate ESG pillars and the cumulative abnormal returns for each event window. The variable E shows a negative relation with cumulative abnormal returns in all three event windows. In the long event window, an increase of 1 in E would see the CAR to decrease by 0.010%, whereas the decrease is 0.012% in the second and third event window. The results show signs of significance, with significance to a 5% level in the longest event window and significance to a 1% level in the second and third event window. The explanatory power they have is little, however.

The variable S shows a positive relation with cumulative abnormal returns in all three event windows. In the long event window, an increase of 1 in S would see the CAR to increase by 0.004%, whereas the increase would be 0.006% in the second and third event window. For this variable, no signs of significance are observed. This result corresponds to the results of Hull and Rothenberg (2007), as they found that corporate social performance is beneficial to financial performance. The difference between significance in the results may be due to measurement differences. Where this paper considers firm performance as cumulative abnormal returns in a certain event window, Hull and Rothenberg measured performance as return on assets, and this may be the reason why they observed signs of significance in this regard.

The variable G shows a negative relation with cumulative abnormal returns in all three event windows. In the long event window, an increase of 1 in G would see the CAR to decrease by 0.008%, whereas the decrease would be 0.005% and 0.007% in the second and third event window respectively. The results in the third event window show significance to a 10% level, meaning that for companies with higher Governance scores, lower cumulative abnormal returns are observed. The adjusted r-squared of 0.006 indicates that only 0.6% of the variance is explained by this regression, however.

The Value variable shows a positive relation between the deal value and cumulative abnormal returns in all three event windows, meaning that higher value deals have higher cumulative abnormal returns than lower value deals. In the second and third event window, a significance level of 5% is observed. An explanation for this may be that because higher value deals have more

impact on an acquiring company, that investors react more heavily towards these deals. The results indicate a negative relation between the environmental and governance pillar and cumulative abnormal returns in each event window, and a positive relation between the social pillar and cumulative abnormal returns, thus differing per pillar and supporting the second hypothesis.

TABLE 3. WLS REGRESSION ESG PILLARS AND CUMULATIVE ABNORMAL RETURNS

	CARlong (1)	CARmid (2)	CARshort (3)
E	-0.010** (0.005)	-0.012*** (0.004)	-0.012*** (0.004)
S	0.004 (0.006)	0.006 (0.005)	0.006 (0.005)
G	-0.008 (0.005)	-0.005 (0.004)	-0.007* (0.004)
Crossborder	-0.031 (0.197)	0.015 (0.176)	0.071 (0.161)
Same_Industry	0.232 (0.230)	-0.119 (0.188)	-0.144 (0.174)
Value	0.096 (0.112)	0.257** (0.102)	0.238** (0.094)
Constant	0.944* (0.565)	-0.033 (0.505)	0.109 (0.471)
Observations	2,265	2,265	2,265
Adjusted R ²	0.002	0.004	0.006

Note: *p<0.1 **p<0.05 ***p<0.01

Now, the results above are all considering only the ESG score of the acquiring company. In an ideal situation, one would also be able to consider the ESG scores of the target companies. Unfortunately, these companies were not incorporated in the Refinitiv ESG Database. Other ESG databases like Sustainalytics, MSCI or ESGI yielded no results either. For that reason, two dummy variables were added, GreenTarget and GreyTarget. Target companies that score relatively well get assigned a value of 1 in the GreenTarget dummy and companies that perform relatively poor get assigned a value of 1 in the GreyTarget dummy. The scores were assigned manually and only

the environmental pillar is considered, as the ESG databases yielded no results and information on the social and governance pillar is scarce as well. By adding an interaction effect to the regression, a distinction is made between acquiring companies with a high ESG score and acquiring companies with a low ESG score. In table 4, the results of this regression can be found.

The variable ESG remains to show a negative relation with cumulative abnormal returns, which is logical, as only two dummy variables are added to the regression. The relation does become weaker, however, as the first window loses its significance and the values are only significant to a 10% and a 5% level in the second and third event window. The dummy variable GreenTarget shows a positive relation with cumulative abnormal returns, indicating that when a green target is taken over, the cumulative abnormal returns are higher than compared to target companies that got assigned the value 0. In the first, the value shows significance to a 5% level, whereas the values in the second and third event window show no signs of significance. The interaction between ESG and GreenTarget shows a negative relation with cumulative abnormal returns, indicating that acquiring companies with a higher ESG score that take over green targets obtain lower cumulative abnormal returns than acquiring companies with a lower ESG score. The first event window shows significance to a 10% level.

The dummy variable GreyTarget shows a positive relation with cumulative abnormal returns, indicating that when a grey target is taken over, the cumulative abnormal returns are higher than target companies that got assigned the value 0 for this variable. The third event window shows significance to a 1% level. The interaction between ESG and GreyTarget shows a negative relation with cumulative abnormal returns, indicating that acquiring companies with a higher ESG score that take over grey targets obtain lower cumulative abnormal returns than acquiring companies with a lower ESG score. The first and second event window do not show signs of significance, while the third event window shows significance to a 1% level. The negative relation between the interaction of ESG and GreyTarget with cumulative abnormal returns in event window (0, +1) supports the first hypothesis and indicates that the environmental score of the target has a significant impact on the performance of the deal.

TABLE 4. WLS REGRESSION ACQUIRER AND TARGET ESG

	CARlong (1)	CARmid (2)	CARshort (3)
ESG	-0.008 (0.005)	-0.008* (0.005)	-0.010** (0.004)
Crossborder	0.069 (0.200)	0.111 (0.176)	0.18 (0.160)
Same_Industry	0.32 (0.225)	-0.049 (0.187)	-0.163 (0.170)
Value	-0.007 (0.117)	0.155 (0.106)	0.172* (0.096)
GreenTarget	3.335** (1.555)	2.037 (1.504)	2.09 (1.276)
GreyTarget	1.886 (2.029)	1.518 (1.931)	5.921*** (1.979)
ESG:GreenTarget	-0.040* (0.022)	-0.023 (0.021)	-0.028 (0.017)
ESG:GreyTarget	-0.027 (0.030)	-0.02 (0.029)	-0.087*** (0.025)
Constant	0.943* (0.572)	0.179 (0.507)	0.175 (0.462)
Observations	2,265	2,265	2,265
Adjusted R ²	0.002	0.0004	0.012

Note:

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

In table 5, the results of acquiring companies with a low environmental rating taking over companies with a high environmental rating can be found. The variable E remains to show a negative relation with cumulative abnormal returns in each event window. The dummy variable GreenTarget shows a positive relation with cumulative abnormal returns in each event window. The dummy variable GreyTarget shows a positive relation with cumulative abnormal returns for the first and second event window, but a negative relation for the third. The interaction between the environmental score and GreenTarget shows a negative relation in the first event window and a positive relation in the second and third event window, but the results show no sign of significance. The interaction between the environmental score and GreyTarget show a positive

relation with cumulative abnormal returns for each event window, and no sign of significance is observed.

TABLE 5. WLS REGRESSION ACQUIRER AND TARGET E

	CARlong (1)	CARmid (2)	CARshort (3)
E	-0.010** (0.004)	-0.012*** (0.004)	-0.012*** (0.003)
Crossborder	0.019 (0.199)	0.06 (0.174)	0.223 (0.150)
Same_Industry	0.268 (0.227)	-0.128 (0.187)	-0.206 (0.168)
Value	-0.004 (0.117)	0.182* (0.104)	0.219** (0.089)
GreenTarget	1.415 (1.157)	0.323 (1.039)	0.113 (0.938)
GreyTarget	0.248 (1.615)	0.144 (1.526)	-0.275 (1.455)
E:GreenTarget	-0.007 (0.018)	0.008 (0.016)	0.006 (0.014)
E:GreyTarget	0.002 (0.024)	0.004 (0.021)	0.004 (0.017)
Constant	1.005* (0.560)	0.231 (0.490)	-0.035 (0.419)
Observations	2,265	2,265	2,265
Adjusted R ²	0.002	0.004	0.007
<i>Note:</i>		* p<0.1 ** p<0.05 *** p<0.01	

Besides the regressions, the results of acquiring companies with their environmental score taking over target companies with the manually assigned values are visualized. The visualization can be seen in the graph in figure 1, which is separated into four categories, HighBuysHigh, HighBuysLow, LowBuysHigh and LowBuysLow. HighBuysHigh stands for an acquiring company with a high environmental score taking over a target with a high manually assigned environmental score. The others are high environmental taking over low environmental, low environmental taking over high environmental and low environmental taking over low environmental scoring companies. On the left side of the graph is the average environmental score for each category

and on the right side of the graph is the average one year later. For HighBuysHigh and HighBuysLow the scores are around the same value in the year of the announcement and the year after the announcement with score between 74.28 and 78.45. For LowBuysHigh and LowBuysLow it is different, however. Where LowBuysHigh has an average score of 15.41 in the announcement year, the score increases to 22.76 in the year following the announcement. For LowBuysLow, the increase is even larger, as in the announcement year the average score was 20.37, and the year following the announcement the average score increased to 32.12. An explanation for acquiring companies with a low environmental score to acquire companies with a high environmental score could be the desire to become greener or to make it appear as if the company desires to become greener, while in reality they are greenwashing.

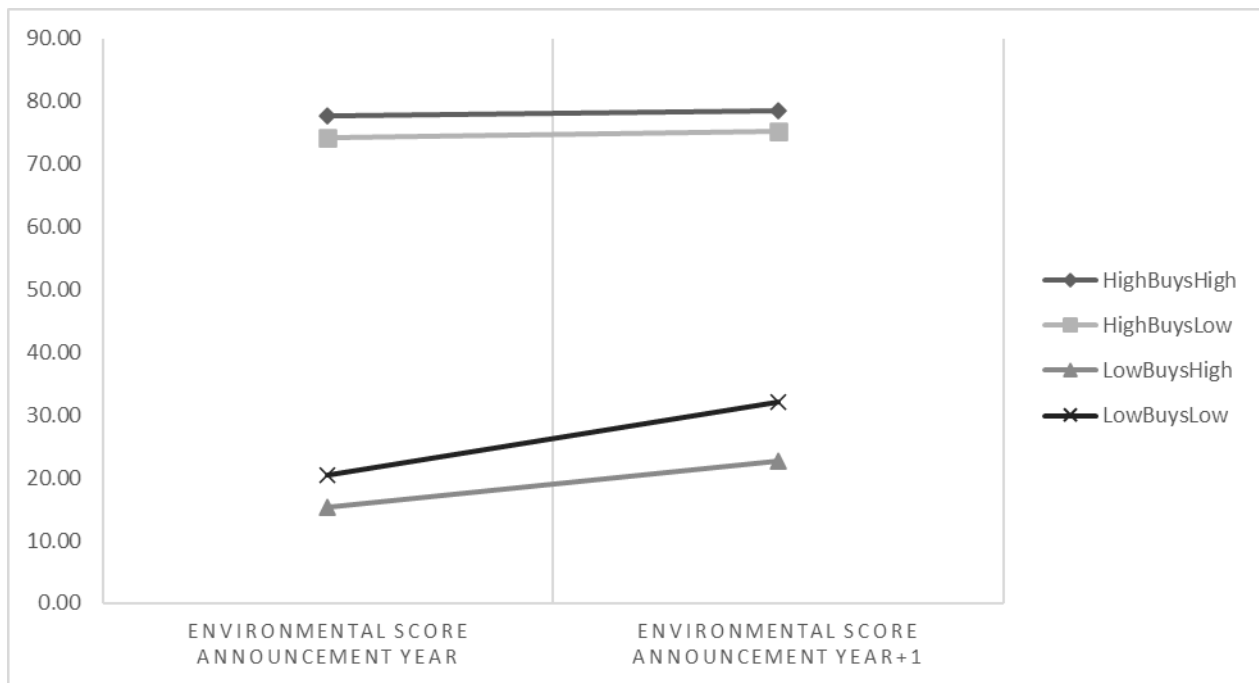


FIGURE 1. ENVIRONMENTAL SCORES THE YEAR OF AND 1 YEAR AFTER MERGER ANNOUNCEMENT

WLS regressions of the differences between acquirers with a high or low ESG and environmental score and targets with a high or low environmental score are, due to a small number of observations, incorporated in appendix 2.

5 Discussion and conclusion

The aim of this study was to test multiple hypotheses and ultimately answer the following research question: What is the impact of ESG performance on mergers and acquisitions?

To answer this research question, the answer to the two hypotheses will be given first. The first hypothesis was based on the shareholder theory and implies there is a negative relation between the implementation of CSR and the economic and financial performance of the company. Some authors such as Palmer et al. (1995), have shown that investing in social aspects involves additional costs that could be avoided, since these costs should not be borne by companies but by other entities, such as state authorities. Higher costs imposed on companies due to industry regulations that aim to achieve social benefits may lead instead to lower economic results. This study finds a negative relation between the overall ESG score and cumulative abnormal returns, with significance to a 1% level in event window (-1, +1) and event window (0, +1), supporting the first hypothesis.

The second hypothesis stated that the impact of ESG performance on the performance of mergers and acquisitions will vary depending on the type of ESG pillar being considered. This hypothesis was based on multiple studies that found differing results, whether there be a positive or negative relation between the different ESG pillars and firm performance. The results indicate a negative relation between the environmental and governance pillar and cumulative abnormal returns in each event window, where a positive relation between the social pillar and cumulative abnormal returns is observed, supporting the second hypothesis. Due to these results, the hypotheses cannot be rejected, as there are significant results supporting each hypothesis. The explanatory power is nearly negligible and thus an answer to the research question can be given.

Thus, this paper does prove the existence of an impact of acquirer ESG performance on firm performance and a differing impact between ESG pillars on firm performance, albeit that the impact is negligible.

In the introduction the idea that policymakers could introduce improved ESG standards if this study would show that a particular ESG pillar plays a role in M&A transactions was mentioned. This study shows that the ESG score and the environmental pillar play a role in M&A transactions, but the results indicate that a higher ESG or environmental score leads to lower firm performance.

Based on this information, the policy recommendation that could be made would be considering the ESG score or environmental pillar.

The negative relation between the ESG score and cumulative abnormal returns and the environmental pillar and cumulative abnormal returns could be valuable information for companies that are considering engaging or are already engaged in mergers and acquisitions. Companies with a higher ESG or environmental score may choose to defer from acquiring another company as on average these companies show lower cumulative abnormal returns than companies with a lower ESG or environmental score.

In addition, the information that can be obtained from the results may be of interest for investors interested in mergers and acquisitions. With the results of this study in mind, they may be inclined to invest in companies that engage in mergers and acquisitions with a lower ESG or environmental score, as the observed cumulative abnormal returns are higher for these companies. It is, however, unlikely that investors would invest based on the information in this paper, as the explanatory power is negligible.

As the explanatory power of this research is low, more research needs to be done on this topic. Furthermore, the data on ESG scores used in this paper can be used with other measures, for example firm size or the amount of leverage a firm has, as done in other studies that researched the effect of mergers and acquisitions.

Moreover, one implication of this study is that the process of manually assigning environmental scores to target companies is very subjective. As for the majority of observations, no or very little information about environmental performance could be found for target companies, the majority got assigned a value of 0, making it hard to objectively assess the differences between a green acquirer taking over a green target and a green acquirer taking over a grey target, for instance. Future research could implement a more objective manner to assign corporate social performance for target companies if these scores are not incorporated into ESG databases.

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7 Appendix

APPENDIX 1: DESCRIPTION OF M&A TRANSACTIONS BY YEAR AND COUNTRY CODE

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
AE								1													1
AT	2	2			1	2						1					1	1		1	11
AU		3	7	5	2	4	9	7	9	9	13	5	13	7	14	9	8	10	11	7	152
BE			2	3	6		2	2	1	2		2		1	1	1		1	1		25
BM				2				1	1					1	1				1		7
BR						2	2		4	3	5		1	2		1	1	5	2	2	30
CA		1	2	2	10	11	9	11	15	10	18	14	17	20	24	16	22	12	13	20	247
CH	4	7	3	2	7	10	6	5	7	8	3		7	5	5	5	3	4	1	4	96
CL						1			1						1	1		1	1	1	7
CN			5		4	2	1	1	2		3	1	2		1	5	1		1	8	37
CO								1					1								2
CW									1		1		1	1	1	1					6
DE	2	4	2	8	7	6	7	2	4	5	5	1	5	5	5	3	3	4	2	3	83
DK				1	2	1	1		3			2	2		3	1		1	3	6	26
ES	1	1	4	5	5	1	2	1	2	2	2	2				1		5	2	2	38
FI		1	1	3	1	1	3	1	1	3	1	2	1	3	2	1	1	1	2	2	31
FR	4	5	2	12	7	19	9	4	9	14	4	4	8	4	5	5	6	5	4	4	134
GB	12	7	19	39	29	49	28	12	32	34	33	31	28	28	19	17	14	17	18	21	487
GR								2													2
HK				1				1			2		2					1			7
HU								2	2			1		1							6
ID										1	1						1				3
IE	2	2	2	6	1	2	4	6	7	5	8	2	4	12	6	5	2	5	3	7	91
IL								1							1		1		2		5
IN							1	1	1		2	2	2	5	8	4	7	1	2	2	38
IT				1	2	2	2	1		1	1	1		1	2	2	1	3	2	3	25
JP	1	2	6	9	15	7	6	14	10	13	14	7	2	13	11	10	11	9	8	5	173
KR				1			1	4	2	3	6	4	6		4		6	4	3	4	48
KY								1							1		1			2	5
LU							2		1						2		1	1			7
MT														1					1	1	3
MU													1		1				1		3
MX			1	1			1		2	1		2		1			1	1		1	12
MY									1				1	3						1	6
NL	5	2	2	6	8	8	2	2	4	4	5	2	3	1	3	3		3	2	4	69
NO	1		1	4	3	4	3			2	1	2		1		4		2		1	29
NZ			1						1			2	1		1	1		4			11
PA																	1				1
PH								1							2				1		4
PL								1		1			1								3
PT													1								1
RU					2	2	3		1	1	5	7		4		2	1	1	2		31
SA						1														2	3
SE	5	4	4	7	10	5	10	8	12	14	8	2	5	3	1	2	7	5	3	10	125
SG				2	1	1			1		2										7
TH						1			1										1		4
TR													1								2
TW								1	2			2				1				1	7
US	2	4	2	2	9	4	5	8	5	4	4	7	4	7	6	7	8	9	9	8	114
Total	41	45	66	120	133	146	121	103	144	140	147	108	120	130	131	108	109	117	101	135	2265

APPENDIX 2 WLS REGRESSIONS

TABLE 6. WLS REGRESSION HIGHBUYSHIGH ESG

	CARlong (1)	CARmid (2)	CARshort (3)
ESG	-0.088 (0.054)	-0.066 (0.044)	-0.083* (0.042)
Crossborder	1.33 (0.956)	0.982 (0.786)	0.816 (0.819)
Same_Industry	0.46 (1.117)	0.29 (0.892)	-0.885 (0.875)
Value	-0.146 (0.480)	0.088 (0.396)	0.093 (0.394)
Constant	7.515 (4.753)	4.852 (3.889)	6.263* (3.663)
Observations	74	74	74
Adjusted R ²	0.017	0.004	0.015

Note: *p<0.1 **p<0.05 ***p<0.01

TABLE 7. WLS REGRESSION HIGHBUYSLow ESG

	CARlong (1)	CARmid (2)	CARshort (3)
ESG	0.089 (0.171)	0.243 (0.143)	0.145 (0.155)
Crossborder	-2.66 (2.318)	-3.857** (1.553)	-2.856 (2.069)
Same_Industry	-0.272 (2.372)	-2.102 (1.921)	-1.355 (2.109)
Value	-1.785 (1.220)	-1.457 (0.923)	-0.996 (1.088)
Constant	6.37 (10.284)	-5.862 (8.535)	-2.701 (9.333)
Observations	23	23	23
Adjusted R ²	0.091	0.341	0.024

Note: *p<0.1 **p<0.05 ***p<0.01

TABLE 8. WLS REGRESSION LOWBUYSHIGH ESG

	CARlong (1)	CARmid (2)	CARshort (3)
ESG	-0.115 (0.070)	-0.071 (0.064)	-0.07 (0.058)
Crossborder	1.611 (1.596)	1.517 (1.557)	1.304 (1.273)
Same_Industry	2.069* (1.160)	2.250** (1.095)	2.334** (0.930)
Value	0.872 (0.794)	1.838** (0.723)	1.433** (0.673)
Constant	-0.356 (4.774)	-7.398* (4.339)	-5.359 (4.033)
Observations	38	38	38
Adjusted R ²	0.156	0.255	0.265

Note: * p<0.1 ** p<0.05 *** p<0.01

TABLE 9. WLS REGRESSION LOWBUYSLow ESG

	CARlong (1)	CARmid (2)	CARshort (3)
ESG	-0.081 (0.235)	-0.18 (0.165)	-0.154 (0.128)
Crossborder	-5.091 (6.512)	-8.136* (3.833)	-6.429* (3.182)
Same_Industry	-2.578 (3.085)	-4.846** (1.900)	-3.824** (1.325)
Value	1.212 (1.189)	0.434 (0.681)	0.447 (0.561)
Constant	3.763 (12.864)	12.991 (7.890)	10.834 (6.639)
Observations	12	12	12
Adjusted R ²	-0.217	0.44	0.716

Note: * p<0.1 ** p<0.05 *** p<0.01

TABLE 10. WLS REGRESSION HIGHBUYSHIGH E

	CARlong (1)	CARmid (2)	CARshort (3)
E	0.017 (0.039)	0.037 (0.035)	0.049 (0.035)
Crossborder	1.516* (0.868)	1.207 (0.797)	1.336* (0.790)
Same_Industry	2.254* (1.257)	1.52 (0.928)	0.326 (0.829)
Value	-0.058 (0.391)	0.229 (0.362)	0.034 (0.341)
Constant	-1.654 (3.647)	-4.5 (3.304)	-4.51 (3.210)
Observations	74	74	74
Adjusted R ²	0.045	0.041	0.021

Note: *p<0.1 **p<0.05 ***p<0.01

TABLE 11. WLS REGRESSION HIGHBUYLOW E

	CARlong (1)	CARmid (2)	CARshort (3)
E	0.034 (0.072)	-0.004 (0.058)	-0.052 (0.075)
Crossborder	-1.514 (2.407)	-2.537 (1.895)	-1.997 (2.754)
Same_Industry	0.87 (2.727)	-1.235 (2.445)	-1.338 (2.559)
Value	-2.420** (1.056)	-0.825 (0.874)	-0.312 (1.109)
Constant	13.867* (7.111)	8.475 (5.794)	7.814 (7.338)
Observations	23	23	23
Adjusted R ²	0.244	0.166	-0.07

Note: *p<0.1 **p<0.05 ***p<0.01

TABLE 12. WLS REGRESSION LOWBUYSHIGH E

	CARlong (1)	CARmid (2)	CARshort (3)
E	0.062 (0.080)	-0.102 (0.076)	-0.064 (0.061)
Crossborder	0.964 (1.123)	3.715*** (1.027)	1.849** (0.803)
Same_Industry	1.747 (1.181)	2.013* (1.037)	2.996*** (0.672)
Value	2.104*** (0.735)	3.065*** (0.717)	2.286*** (0.621)
Constant	-10.965*** (3.307)	-15.061*** (3.115)	-11.126*** (2.646)
Observations	37	37	37
Adjusted R ²	0.355	0.772	0.556

Note: *p<0.1 **p<0.05 ***p<0.01

TABLE 13. WLS REGRESSION LOWBUYLOW E

	CARlong (1)	CARmid (2)	CARshort (3)
E	0.566 (0.266)	0.371 (0.259)	0.173 (0.260)
Crossborder	7.646 (5.330)	2.883 (5.107)	-1.254 (4.177)
Same_Industry	5.553 (3.299)	1.568 (3.037)	-0.279 (2.811)
Value	5.382 (3.120)	4.374 (2.857)	1.374 (2.221)
Constant	-41.148 (22.651)	-28.352 (19.869)	-6.845 (15.654)
Observations	9	9	9
Adjusted R ²	0.231	0.36	0.221

Note: *p<0.1 **p<0.05 ***p<0.01