The Impact of Target's ESG Score on Acquirer's Short and Long-Term Performance Change after M&A Deals

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Abstract

This study investigates M&A deals and the impact of the target's ESG score on the acquirer's short and long-term financial performance changes (measured by ROA, ROE, stock price, and stock volatility) by replicating the methodology of Feng (2021). The research is based on 136 M&A deals between 2000 and 2020. For the analysis, the percentage change in the acquirer's performance is first regressed against the target's ESG score, the acquirer's ESG score and a combination of control variables. Second, an interaction term is introduced to explore if the influence of the target's ESG score is affected by the acquirer's own ESG level. Lastly, the acquirers are sorted into two groups of low and high-ESG score acquirers to omit the possible bias that acquiring a target with a high ESG score might have different effects on low or high-ESG level acquirers. The results show no significant impact of the target's ESG score on any of the dependent variables for all three regression models. However, upon examination of the individual ESG pillar scores, the social score shows a statistically significant impact on the long-term ROE change and the governmental score on the stock volatility change at a 90% confidence level. When examining the individual ESG scores and sorting the acquirers in low and high-quartile groups, the impact of the target's environmental and social score on the acquirer's long-term ROA change is significant at a 90% confidence level.

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Keywords: ESG, ESG ratings, M&A, Financial Performance

Sumário

Este estudo investiga as operações de F&A e o impacto da pontuação ESG do alvo nas mudanças de desempenho financeiro de curto e longo prazo do adquirente (ROA, ROE, preço das ações e volatilidade das ações), replicando a metodologia de Feng (2021). A pesquisa é baseada em 136 F&A entre 2000 e 2020. A variação percentual no desempenho do adquirente é primeiro regredida contra a pontuação ESG do alvo, a pontuação ESG do adquirente e uma combinação de variáveis de controlo. Em seguida, é introduzido um termo de interação para explorar se a influência da pontuação ESG da empresa-alvo é afetada pelo nível ESG do próprio adquirente. Por último, os adquirentes são divididos em dois grupos de adquirentes com uma pontuação ESG baixa e alta para omitir o possível enviesamento de que a aquisição de um alvo com uma pontuação ESG alta possa ter efeitos diferentes nos adquirentes com um nível ESG baixo ou alto. Os resultados não revelam qualquer impacto significativo da pontuação ESG da empresa-alvo em nenhuma das variáveis dependentes dos três modelos de regressão. Ao examinar as pontuações individuais dos pilares ESG, a pontuação social mostra um impacto estatisticamente significativo na variação do ROE a longo prazo e a pontuação governamental na variação da volatilidade das acções. Ao examinar as pontuações ESG individuais e ao classificar os adquirentes em grupos de quartil baixo e alto, o impacto da pontuação ambiental e social do alvo na variação do ROA de longo prazo do adquirente é significativo.

Título: O impacto da pontuação ESG do alvo na mudança de desempenho de curto e longo prazo do adquirente após as operações de fusões e aquisições

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Palavras-chave: ESG, classificações ESG, fusões e aquisições, desempenho financeiro

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List of Abbreviations

CEO	Chief Executive Officer
COVID-19	Coronavirus Disease
CSP	Corporate Social Performance
CSR	Corporate Social Responsibility
EBIT	Earnings Before Interest & Taxes
ESG	Environmental, Social, Governance
EU	European Union
M&A	Mergers & Acquisitions
LBO	Leveraged Buyout
OLS	Ordinary Least Squares
ROA	Return on Assets
ROE	Return on Equity
SIC	Standard Industrial Classification
UK	United Kingdom
US	United States of America

1. Introduction

The concept of socially responsible and ethical investing dates back several decades, with individuals and organizations expressing interest in investing in companies that align with their values and avoiding those involved in activities they find objectionable, such as tobacco or weapons manufacturing. Due to the events and catastrophes surrounding the climate crisis in recent years this concern of social responsibility and sustainability has become increasingly important in the last two decades (Townsend, 2020). In the early 2000s the term ESG, short for Environmental, Social and Governance, gained prominence. In its 2004 released report about the impact of financial markets on sustainable development "Who Cares Wins: Connecting Financial Markets to a Changing World" the United Nations used the term ESG for the first time (United Nations, 2004). In 2015, the United Nations developed an agenda for 2030 with 17 sustainable development goals to provide a blueprint for sustainable growth. The 2030 Agenda for Sustainable Development was adopted by all United Nations member states. This new awareness is not only taking place at a governmental level but has also found its way into companies and their decision-making for some time. In his 2018 annual letter to CEOs, Larry Fink, the Chairman and CEO of BlackRock, emphasized the importance of sustainability and long-term thinking in corporate governance. The letter highlighted the environmental responsibility of corporations, urging companies to address climate change and its potential risks to their operations. Fink called on CEOs to disclose their company's strategy for navigating the transition to a low-carbon economy. He promoted the integration of ESG factors into investment and risk management processes and stated that BlackRock would increasingly focus on ESG considerations in its investment decisions (Fink, 2018).

A positive relationship between ESG strategies and financial performance was found by previous researchers. For example, Fatemi et al. (2018) investigated the impact of ESG activities and their disclosure on firm value and found that stronger ESG practices increase firm value. Companies that adopt a sustainability policy outperform companies that have not adopted this policy in terms of both their stock market returns and accounting performance (Eccles et al., 2014). However, implementing ESG practices is not simply a fully voluntary endeavour, it also depends on societal preferences, institutional structures, and governmental regulations (Liang & Renneboog, 2016).

Another, more traditional, approach of aiming to increase the market value of a company is through mergers and acquisitions (M&A). M&A deals allow companies to, amongst other,

diversify their product or service offerings, extend their business operations, and enter new markets. Their chances for growth and differentiation in their sector can both be improved by this expansion. M&A can be a means to achieve financial performance goals, such as improved EBIT or ROA, increasing earnings per share, or enhancing shareholder value. Linking both topics brings up the question of whether ESG considerations in M&A can enhance the acquirer's financial performance. Often, the justification is that by acquiring a target company with a strong ESG track record, a company may enhance its reputation in the market and lower its corporate risk. Indeed, businesses with ethical sustainability practise typically have a strong reputation and pose a reduced legal risk (Franklin, 2020). Not only does ESG encompass sustainability but also governmental aspects. In the early stages of a M&A negotiation, such as the due diligence process, the acquirer can better assess the target's corporate governance and identify its firm-specific risks by taking ESG factors into account (Rydell and Leucht, 2020). These findings indicate that a target with a high ESG score not only has a good reputation which could transfer to the acquirer but also implies high firm governance, leading to less information asymmetry in the transaction and therefore causing less costs. Through a simple ordinary least square (OLS) regression, Salvi et al. (2018) found a positive and statistically significant influence of targets in green sectors on the acquirers' post-M&A deal financial performance, measured by the change in acquirer's return on assets (ROA). In contrast to the previous findings, Feng (2021) examined that the target's ESG score has a negative influence on the acquirer's ROA change or the stock price change, measured one year before and after the M&A deal, when using a simple OLS regression. Even upon sorting the acquirers into high-ESG and low-ESG groups and with the use of an interaction term, the results showed that for low-ESG acquirers the ROA change still declines if the target's ESG score increases.

Given the conflicting findings, it is crucial for academic research to further investigate the influence of ESG scores on financial activities such as M&A. Consequently, the objective of this research is to replicate the findings of Feng (2021), studying the impact of the targets ESG score on the acquirer's ROA and stock price changes after M&A deals. This study also investigates the target's ESG score impact on other financial metrics such as long-term (one year before to two years after the transaction) ROA change, short and long-term return on equity (ROE) change as well as stock volatility change. As Feng (2021) only assessed the impact on the acquirer's short-term performance (the year before and after the deal), this study aims to further add to the research by investigating the longer-term influences when the acquirer makes enough adjustments to finish the strategic and cultural post-merger integration.

The results of this study show, that under the simple OLS regression, which regresses the percentage change of the acquirer's performance change against the ESG score of the target company and control variables, the target's ESG score has no significant influence on the acquirer's performance change. Subsequently, an interaction term is introduced, to take the acquirer's own ESG score into account. The ESG score of the target shows no significant effect on the dependent variables. To omit the problem that a transaction with a high ESG level target might have different effects on the financial performance change of acquirers, because of cultural and strategic differences, a dummy variable is created that classifies acquirers into two groups of high ESG acquirers and low ESG acquirers. However, the results show that even after sorting the acquirers into two groups, the influence of the target's ESG score is still statistically insignificant.

The rest of the paper is organized as follows: First, the literature review will provide a short overview of the existing literature on the research subject and will examine the prior findings. Section 3 describes the dataset used and the sample's key statistics. Section 4 provides the methodology used and section 5 discusses the results. A robustness analysis is included in section 6 to further investigate the research's findings. Lastly, section 7 will conclude the findings and section 8 addresses the limitations of this research.

2. Literature Review

Although companies often describe themselves as sustainable, in their day-to-day business they still largely conduct their business as usual. Yet there is a need for a real transformative sustainability which is more acute than ever. Since the ecological and social problem areas are becoming more threatening every day the pressure on companies to act is increasing directly and from several stakeholders at the same time: regulators, customers and investors are demanding verifiable sustainability (Pérez et al., 2022). As Corporate Social Responsibility (CSR) and good ESG practices can reduce business risk and financial costs firms can be beneficial to respond to these demands. (Bauer et al., 2009; El Ghoul et al., 2011).

The literature review is divided into three parts. First, the relevant literature on the impact of ESG practices and CSR for a company is examined. Secondly, research on ESG and M&A deals is examined. Thirdly, the existing research gaps and the hypotheses development will be presented.

2.1 Effects of ESG practices on companies

2.1.1 Positive Effect

Previous research suggests that good ESG practices have a positive impact on company value, corporate image, and stakeholders, as well as reducing financing costs and corporate risk (Godfrey, 2005; Bauer et al., 2009; Orlitzky et al., 2001). Fombrun et al. (2000) argued that Corporate Social Performance (CSP) does not directly impact the company's financial performance, but rather influences the financial value of its intangible assets such as company reputation. CSR activities lead to positive attributions on the part of stakeholders, who then mitigate their negative judgments and sanctions against companies based on this goodwill (Godfrey, 2005). Martinez-Ferrero et al. (2016) examined how CSR affected capital costs and company reputation and the findings support the notion that CSR enhances the company's brand, is well-received by investors and stakeholders and reduces capital costs. An increased reputation can draw in highly qualified talents (Branco & Rodrigues, 2006) and additional financial investment for the company (Cheng et al., 2014). In addition to drawing in more talent, employees are willing to forgo a part of their salary to work for companies that embrace and implement good ESG practices. Furthermore, clients are inclined to pay higher management costs in order to deal with financial institutions that have good ESG policies (Finger and Rosenboim, 2022). Sassen et al. (2016) found that increasing CSP decreases a firm's systematic and idiosyncratic risk and in turn, has the potential to increase the value of the company through the lowered risk. The findings of Ferrell et al. (2016) showed a positive correlation between company value measured by market cap and ESG as well as CSR scores. Furthermore, they demonstrated that greater ESG and CSR performance levels mitigate the adverse relationship that exists between value and managerial entrenchment. Companies with higher ESG ratings have higher operating performance and Tobin's q (Gillian et al., 2010). Gao and Zhang (2015) also observed a positive relationship between Tobin's q and firm-level ESG scores. Therefore, sustainable practices oriented towards stakeholders have a positive effect on financial activities like M&A transactions and the performance of the acquirers following the transactions (Bettinazzi and Zollo, 2017).

2.1.1 Ambiguous Effect

No significant differences in risk-adjusted performance between firms with low and high CSP ratings were examined by Humphrey and Shen (2012) when using a proprietary CSP ratings database for UK companies. The authors concluded that executives and investors can adopt

CSP strategies or investments without experiencing any appreciable financial cost or advantage in terms of risk or return. For state-owned firms' environmental choices are not significantly related to shareholder value when evaluated using either Tobin's q or long-term profitability (Hsu et al., 2018). Bae et al. (2021) drew the conclusion that pre-crisis CSR is inefficient in protecting shareholder wealth from a crisis' negative consequences, and they hypothesized that there may be a mismatch between companies' CSR ratings and their real actions. They investigated the relationship between CSR and stock market returns during the COVID-19 pandemic market crisis and the subsequent recovery. They found no indication that CSR had an impact on stock returns during the crash period.

2.1.2 Negative Effect

Although there is evidence for the benefits of ESG and CSR practices on a firm's value and performance, scholars also found negative effects. Di Giuli and Kostovetsky (2014) investigated the relationship between a firm's ESG score changes and its revenue growth in a period over three years and found no significant relationship. Contrary to the aforementioned positive effects of ESG and CSR, they found a negative correlation between changes in a firm's ESG scores and changes in ROA and stock returns, measured over a three-year period. They concluded that future stock underperformance and a long-term decline in ROA occur when companies increase their ESG initiatives. Further evidence for the negative relationship between ESG policies and a firm's valuation is presented by Buchanan et al. (2018). Using the Bloomberg ESG rating, which evaluates ESG disclosure quality as opposed to ESG quality, and defining a binary classification of high versus low ESG performance, the researcher found a negative and significant coefficient estimate on an interaction term between their ESG measure, crisis indicators, and Tobin's q. They concluded that agency conflicts worsened during the financial crisis and that firms with higher ESG scores experienced larger reductions in company value caused by the subsequent costs of ESG over-investment.

2.2 The Influence of ESG practices on post M&A performance

The link between ESG, CSR and M&A deals has been examined by previous scholars from a variety of aspects. Barros et al. (2022) investigated if M&A activities affect the way companies perform across ESG factors and provide evidence that M&A transactions raise a company's ESG score. They found that there is no influence on the ESG score in the year that the transaction is agreed upon, and the ESG score does not improve immediately. However, when

the year after the transaction is taken into consideration separately, an M&A deal seems to significantly increase ESG performance. Similarly, Tampakoudis and Anagnostopoulou (2020) found that, based on an analysis of 100 European M&A deals, when an acquirer purchases a target business with strong ESG performance, the acquirer's post-M&A ESG level and market value increase. Good ESG practices can also influence the process of M&A deals positively. Research on a sample of US M&A deals conducted by Deng et al. (2013) indicates that acquisitions made by acquirers with high ESG ratings are more likely to be successful, take less time to complete, and can improve these acquirer's operating performance in the long run after the M&A. The importance of ESG in M&A Due Diligence was also examined qualitatively by Rydell and Leucht (2020). They discovered that looking into ESG issues during the Due Diligence phase may aid the acquirer in risk assessment, value identification, and long-term goal support. Cardillo and Harasheh (2022) analysed a sample of 415 M&A deals in the European Union and the United Kingdom from 2002 until 2020. The researchers studied the nexus between differences in pre-deal sustainability performance between target and acquirer firms and deal closure timing in M&A transactions and found that discrepancies in the pre-deal ESG ratings between target and acquirer firms lead to an increase (or a decrease) in the deal timing (or speed of closure). According to Liang et al. (2017), a firm's participation in employee-related issues explains part of the value differential between domestic and cross-border M&A. When purchasing a domestic target, an acquirer's investment in employee relations is positively correlated with the firm's success; however, when acquiring a foreign target, labour-related frictions counteract this benefit. Salvi et al. (2018) investigated 171 businesses throughout the US and 28 EU nations including the UK in a timeframe from 2001 to 2013. They performed a simple OLS regression of the acquirer's performance (measured by ROA) on the total ESG score of the target companies and a set of control factors. Their findings rejected the null hypothesis that the target's ESG level did not significantly affect the acquirer's post-M&A performance and led them to draw the conclusion that acquirers who choose transactions with companies in green sectors may have better financial success than acquirers who combine businesses in different industries. Arouri et al. (2019) focused on 726 M&A deals globally from 2004 to 2016 to primarily explore the relationship between the ESG and M&A uncertainty and found that the arbitrage spreads in M&A deals are decreased by 1.10 percentage points for each unit increase of standard deviation in the acquirer's ESG score. They concluded that high-ESG-level acquirers are more likely to avoid bad transactions.

However, scholars also found a negative relationship between ESG performance and post-M&A performance. Tampakoudis et al. (2021) examined the connection between shareholder wealth

and ESG performance in the context of M&As that occurred both before and during the COVID-19 pandemic. Their research showed that, throughout the sample period, ESG performance had a considerable negative value effect on the shareholders of acquiring corporations. With the beginning of the COVID-19 pandemic, the negative impact seems to be more pronounced. This implies that, amid the economic turbulence caused by the pandemic, the expenses associated with sustainability initiatives surpass any potential benefits. Feng (2021) examined 124 M&A transactions worldwide between 2001 and 2020, excluding transactions during the financial crisis. By considering the coefficient of the target's ESG score on the acquirer's ROA change as well as stock price change, Feng investigated how the acquirer's pre-M&A ESG level can influence the impact of the target's ESG score on the acquirer's performance change. The results showed no significant linear relationship between the variables. Upon examining the influence of the target's ESG score on the acquirer's performance change for both high- and low-ESG acquirers independently, the findings showed a statistically significant impact of target ESG scores on the acquirer's ROA change and no significant influence on the acquirer's stock price change. A rise in the target's ESG score would lead to a decline in the ROA for low-ESG acquirers but will benefit the ROA of high-ESG acquirers.

2.3. Research gaps and hypotheses development

This study will replicate the methodology of Feng (2021) using the same independent variables, the same dependent variables ROA and stock price change, to reinvestigate the impact of the target's ESG scores on financial performance change. As Feng (2021) only studied the change one year before and after the transactions, this study aims to add to further research by using the ROA change one year before and two years after the M&A deal, ROE change one and two years post the transaction, as well as stock volatility change after the deal to examine short-term and long-term effects on financial performance after M&A deals. The Refinitiv ESG database will be used for this research and the M&A dataset will consist of all important M&A deals from 2000 until the end of 2020. Referring to the conclusion of the previous study by Feng (2021), the expectation of the relationship between the target's ESG score and the acquirer's performance changes the following hypotheses are formulated:

Hypothesis 1: No significant influence on the acquirer's ROA & ROE change one and two years after the deal, stock price change and stock volatility change at the 95% confidence level when not considering the impact of the acquirer's ESG scores.

Hypothesis 2: No significant influence on the acquirer's ROA & ROE change one and two years after the deal, stock price change and stock volatility change at the 95% confidence level considering the coefficient β_1 as a linear function of the acquirer's ESG score.

Hypothesis 3: Significant influence on the acquirer's ROA & ROE change one and two years after the deal, and no significant influence on the stock price change and stock volatility change at the 95% confidence level when sorting acquirers into high-ESG and low-ESG groups.

Table 1 below provides a summary of the differences between this research and earlier investigations.

Table 1. Summarized literature comparison

	ESG				Research Entitiy		Dependent Variable					Impacct from
	Environment	Social	Governance	ESG overall	Target	Acquirer	ROA	ROE	Stock price	stock volatility	Other	Acquirer´s ESG
Deng et al. (2013)				✓	✓	✓	✓					
Liang et al. (2017)			✓			✓	✓					
Salvi et al. (2018)				✓	✓		✓					
Arouri et al. (2019)	✓	✓	✓	✓	✓	✓					✓	
Rydell & Leucht (2020)	✓	✓	✓	✓		✓					✓	
Tampakoudis & Anagnostopoulou (2020)				✓	✓	✓	✓		✓			
Tampakoudis (2021)	✓					✓					✓	
Feng (2021)	✓	✓	✓	✓	✓	✓	✓		✓			✓
Barros et al. (2022)	✓	✓	✓	✓		✓					✓	
Cardillo & Harasheh (2022)	✓	✓	✓	✓	✓	✓					✓	
This research	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

3. Data and variable description

3.1. Data collection and description

The Refinitiv Deal Screener was used to provide M&A deals from January 1, 2000, to December 31, 2020, for this study. Only M&A deals that meet the following criteria are chosen for this research: (1) the deal must be completed; (2) the deal value must be at least USD 1 million; (3) the acquirer must initially hold less than 50% of the target company before eventually acquiring more than 50%, and; (4) the Refinitiv ESG database can be used to determine the target's and acquirer's ESG scores. Due to the intense regulation surrounding M&A activity in the utility and banking sectors, this study also removes all utility (SIC code

4000–4949) and banking (SIC code 6000–6999) enterprises from its sample (Edmans et al., 2012). Deals with one or more unavailable values for the variables listed in Table 3, Panel A are eliminated. A total of 136 M&A deals meet all the prerequisites and are utilised as sources for this study. The remaining annual financial data was retrieved from Refinitiv Eikon.

Table 2 provides an overview of these transactions.

Table 2. Summary of deals

Panel A: Sample composition by cross-border			
	Cross-border deals	Domestic deals	Total deals
Number of deals	23 (17%)	113 (83%)	136 (100%)
Panel B: Sample composition by cross-industry			
	Cross-industry deals	Intrra-industry deals	Total deals
Number of deals	85 (63%)	51 (36%)	136 (100%)
Panel C: Sample composition by payment method			
	Cash deals	Non-cash deals	Total deals
Number of deals	70 (51%)	66 (49%)	136 (100%)
Panel D: Sample composition by year			
Year	Number of deals	Year	Number of deals
2000	0	2011	7
2001	0	2012	8
2002	0	2013	4
2003	1	2014	5
2004	0	2015	12
2005	0	2016	12
2006	0	2017	18
2007	3	2018	27
2008	2	2019	26
2009	4	2020	3
2010	3		
Total deals			**136 (100%)**

3.2. Variable description

Figure 1. Correlation-coefficient map among variables

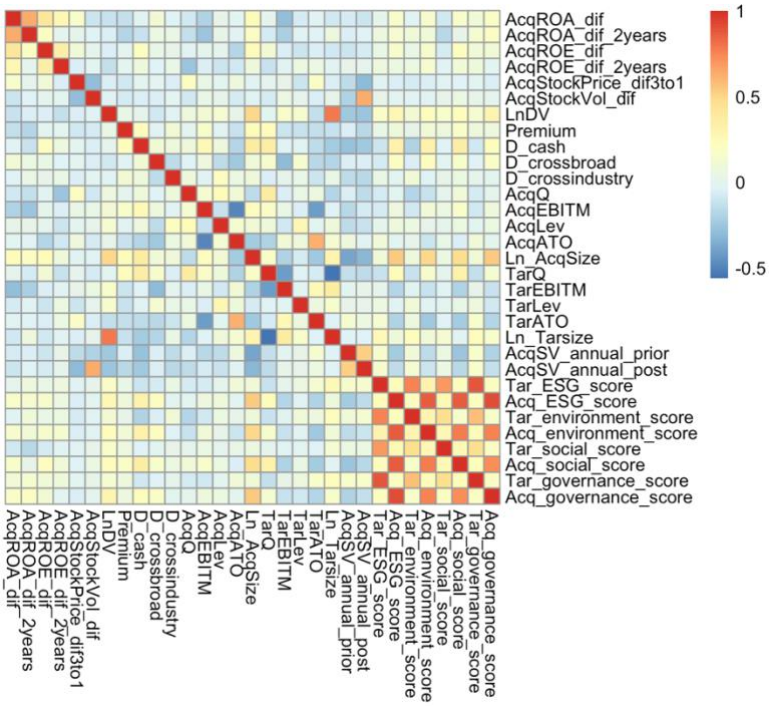

Table 3. Summary of Variables

Panel A: Variable definitions

Dependent variable	
Δ ROAAcq_1year	Acquirer's ROA percentage change the year before and after the deal. The percentage change is calculated as ($\Delta ROAAcq_t/\Delta ROAAcq_{t-1}$) − 1
Δ ROAAcq_2years	Acquirer's ROA percentage change 1 year before and 2 years after the deal. The percentage change is calculated as ($\Delta ROAAcq_t/\Delta ROAAcq_{t-1}$) − 1
Δ ROEAcq_1year	Acquirer's ROE percentage change the year before and the year after the deal. The percentage change is calculated as ($\Delta ROAAcq_t/\Delta ROAAcq_{t-1}$) − 1
Δ ROEAcq_2years	Acquirer's ROE percentage change 1 year before and 2 years after the deal. The percentage change is calculated as ($\Delta ROAAcq_t/\Delta ROAAcq_{t-1}$) − 1
ΔStockPrice_-3to1	Acquirer's stock price percentage change from 3 months before announcement to 1 month after completion
ΔStockVol	Acquirer´s annualized stock volatility percentage change the year before and after the announcement of the deal
Independent variable	
ESGTar	ESG score of the target company
ESGAcq	ESG score of the acquirer
Control variables reflecting characteristics of M&A deals (X)	
LnDV	Nature logarithm of deal value
Premium	Bid premium at the announce date (1 plus percentage premium)
D_Cash	A dummy variable that equals 1 for pure cash-deals, and 0 for others
D_Crossbrd	A dummy variable that equals 1 if the acquirer and target are not in the same country, and 0 otherwise
D_Crossind	A dummy variable that equals 1 if the acquirer and target are not in the same industry, and 0 otherwise
Control variables reflecting characteristics of acquirers (A)	
AcqQ	Tobin´s Q of the acquirer
AcqEBITM	Acquirer´s operating margin - EBIT/sales revenue
AcqLev	Acquirer´s leverage ratio - debt/assets
AcqATO	Acquirer´s asset turnover - sales/assets
Ln_AcqSize	Nature logarithm of acquirer´s total asset (in million)
Control variables reflecting characteristics of targets (T)	
TarQ	Tobin´s Q of the target
TarEBITM	Targets´s operating margin - EBIT/sales revenue
TarLev	Targets´s leverage ratio - debt/assets
TarATO	Targets´s asset turnover - sales/assets
Ln_TarSize	Nature logarithm of targets´s total asset (in million)
Interaction term reflecting acquirer's ESG level	
D_ESGAcq	1 if the acquirer is a high ESG acquirer (top 25%) and 0 if the acquirer is a low ESG acquirer (lowest 25%).
Instrumental variables affecting ESG of target firms	
AESGCty	Average total ESG score of a country
AESGInd	Average total ESG score of a three-digit SIC industry

Panel B: Summary statistics

Variable	mean	sd	median	min	max	range
Δ ROAAcq_1year	-0.21	1.26	-0.37	-1.13	11.22	12.35
Δ ROAAcq_2years	0.04	2.15	-0.28	-1.62	16.79	18.41
Δ ROEAcq_1year	-0.61	1.11	-0.79	-2.27	5.98	8.25
Δ ROEAcq_2years	-1.06	2.21	-0.93	-5.40	15.29	20.69
ΔStockPrice_-3to1	0.05	0.28	0.04	-0.65	1.19	1.84
ΔStockVol	0.19	0.47	0.12	-0.57	2.81	3.38
LnDV	8.51	1.07	8.59	6.11	11.21	5.10
Premium	1.22	0.20	1.19	0.81	2.01	1.20
D_Cash	0.52	0.50	1.00	0.00	1.00	1.00
D_Crossbrd	0.17	0.38	0.00	0.00	1.00	1.00
D_Crossind	0.63	0.48	1.00	0.00	1.00	1.00
AcqQ	2.12	0.94	1.88	0.62	5.64	5.02
AcqEBITM	0.17	0.11	0.16	0.00	0.40	0.40
AcqLev	0.58	0.18	0.57	0.12	1.15	1.03
AcqATO	0.74	0.49	0.64	0.05	2.82	2.77
Ln_AcqSize	9.52	1.46	9.45	5.77	12.71	6.94
TarQ	3.04	2.12	2.23	0.98	9.07	8.09
TarEBITM	-0.04	0.48	0.09	-1.82	0.33	2.15
TarLev	0.57	0.28	0.55	0.05	2.09	2.04
TarATO	0.77	0.54	0.67	0.00	3.00	3.00
Ln_TarSize	7.74	1.33	7.86	4.28	10.69	6.41
ESGTar	31.45	13.47	30.19	1.73	64.94	63.21
ESGAcq	47.28	18.03	45.78	9.50	64.94	73.48
Environment_score_Tar	25.19	16.31	22.32	0.91	82.98	65.57
Environment_score_Acq	42.23	21.90	43.12	1.57	66.48	86.91
Social_score_Tar	33.06	14.05	31.19	2.06	88.48	68.25
Social_score_Acq	48.75	20.36	48.39	2.46	70.32	88.60
Governance_score_Tar	35.05	15.76	34.20	2.86	91.06	65.98
Governance_score_Acq	50.83	18.53	50.65	11.20	68.83	76.33

To reflect the acquirer's performance change from various angles, this study employs several proxies as the dependent variables. The first dependent variable this study utilises is ROA change, an accounting metric. The second accounting metric is the ROE change, which was not used in the study of Feng (2021). For the purposes of this study, and in line with Feng (2021), the ROA is calculated by dividing EBIT by total assets. EBIT is utilised as the nominator of ROA because it is a more reliable metric for return than net income as it does not account for the impact of transaction features on the acquirer's performance. For example, following a transaction, the acquirer's net income will be lower in situations such as leveraged buyouts (LBOs) or transactions in nations with high-income taxes. However, since these characteristics do not affect EBIT, ROA with EBIT as the nominator is a more appropriate metric for capturing the profitability of acquirers. For the calculation of ROE, EBIT is also used as the nominator instead of net income due to the reason previously mentioned. In this study, the ROA and ROE change between the year before and one year as well as two years after the deal will be used. Previous research on post-acquisition performance has shown that gains from acquisitions are realised two or three years after the deal completion (Zollo & Singh, 2004; Leger & Quach, 2009; Cording et al., 2010). To also include the more recent deals until 2020, this study uses a time frame of two years after deal completion. The third metric is the stock price change, which serves as a viewpoint of the financial market. In specific, the change in stock price three months before the announcement and one month following completion is used. The fourth metric is stock volatility change, which is frequently used to describe the degree of risk or uncertainty associated with the magnitude of variations in the value of a security. If a stock experiences increased volatility, it implies higher shifts in the security's price. Lower volatility indicates that the value of the security tends to be more stable and does not vary substantially. It is assumed that the acquisition of a high-ESG level target will decrease the company's stock volatility change. In this study, the stock volatility change is calculated between the annualized volatility over a window of 252 trading days one year before and one year after the M&A deal announcement. The rationale behind the use of the deal announcement instead of the deal completion is that investors will price in the M&A deal into the stock price upon the announcement. The reasoning behind the time window of 252 days is to also capture the effect of the deal completion on the stock volatility, as the average duration from the announcement until the completion of the 136 M&A deal is 144 days. For his study, Feng (2021) used the ESG scores from the Thomson Reuters Asset 4 database. In 2022 the Refinitiv ESG database, the successor of the ASSET4 ESG database, and their scoring methodology were renewed. For a lot of companies, the new ESG scores differ significantly in comparison to the old ASSETT4

ESG database. Therefore, this study uses the new Refinitiv ESG database to gather the ESG scores. The same method of Feng (2021) for the calculation of the total and separate ESG scores is used in this research. The arithmetic mean of a company's ESG score from 2000 to the year before the announcement year is used for the independent variables. To eliminate the bias of anomalous ESG changes caused by anticipated M&A operations, the average score before the announcement year is used, as opposed to the completion year. In addition, sometimes corporations do not have their ESG scores available prior to the announcement year, although they had them in the previous years before the M&A deal. This serves as an additional argument for utilizing the historical average ESG score. Three environmental scores ("Resource Use Score", "Emissions Score", and "Environmental Innovation Score"), three social scores ("Human Rights Score", "Community Score", and "Product Responsibility Score"), and four governance scores ("Management Score", "Shareholders Score", "CSR Strategy Score", and "Workforce Score") are all listed in the Refinitiv ESG database. In the same method as for the total ESG score, the arithmetic mean of each index relative to the ESG pillar is used to establish a company's separate environmental, social and governance score. Furthermore, this study also uses the same control variables as Feng (2021). Deal size, the deal premium, geographic information (cross-border deal or domestic deal), industry information (cross-industry deal or inter-industry deal) and the deal payment methods (cash or others) are used to reflect characteristics of the deal. Financial data from the acquirer and target one year before the deal announcement is used for the control variables to reflect firm characteristics. The following control variables reflect the company from different angles. The debt-to-asset ratio can be used as a stand-in for the company's financial leverage. The asset turnover ratio is a measure of how well a company uses its assets to produce income. A company's capacity to convert sales revenue into profit is gauged by its EBIT margin. By looking at Tobin's Q value it may be determined if a company is overpriced or undervalued in the market. To further depict the scale of the company, the natural log value of all assets is included in this study.

As seen in Figure 1, there are no significant correlations between any of the independent and control variables.

4. Methodology

The main objective of this study is to examine the potential effects of target firms' sustainability level on acquirer's performance after M&A transactions. For this purpose, this study replicates the methodology of Feng (2021). Firstly, this study regresses the acquirer's performance change

against the target company's ESG ratings, the acquirer's ESG rating, and control variables reflecting the target, acquirer, and transaction characteristics. Secondly, this research uses an interaction term – the product of the acquirer's ESG score and the target's ESG score. The interaction term considers the impact of the target's ESG score on the acquirer's performance change as a linear function of the acquirer's ESG score, which takes the impact of the acquirer's own ESG level into account when examining the causal effect of the target company ESG score on the acquirer's performance change. Thirdly, acquirers are sorted into two groups in the interaction regression model by introducing a dummy variable that equals 0 for acquirers with low ESG scores and 1 for those with high ESG scores, to determine if there is a significant difference in the causal effect between the two groups.

4.1. Regression 1 – Simple OLS regression

The OLS regression is presented as following:

$$\Delta\, Performance_i = \alpha + \beta_1 ESGTar_i + \beta_2 ESGAcq_i + \beta_4 T_i + \beta_5 A_i + \beta_6 X_i + f_T + f_C + f_I + \varepsilon_i$$

The change in the acquirer's performance following the M&A deal is denoted by $\Delta\, Performance$. This research runs the regression based on the following multiple proxies of performance change: ROA and ROE change, stock price change and stock volatility change. The identity of transactions is represented by the index i. The intercept of the regression is denoted by α. $ESGTar_i$ and $ESGAcq_i$ are the initial ESG scores of the target and acquirer firms. T_i, A_i and X_i are control variables that represent the target, acquirer, and deal characteristics. Time, country, and industry-specific fixed effects are represented by f_T, f_C and f_I, respectively.

4.2. Regression 2 – Considering the coefficient β_1 as a linear function

Based on the methodology of Feng (2021), this study constructs an interaction term by using the product of $ESGTar_i$ and $ESGAcq_i$. The interaction term takes into account the possibility that acquirers, that have different ESG levels, may see varying effects on post-M&A performance from the acquisition or merger of a target business.

The regression with the interaction term is presented as:

$$\Delta\, Performance_i = \alpha + \beta_1 ESGTar_i + \beta_2 ESGAcq_i + \beta_3 ESGAcq_i * ESGTar_i + \beta_4 T_i + \beta_5 A_i + \beta_6 X_i + f_T + f_C + f_I + \varepsilon_i$$

Rearranged the equation can also be written as:

$$\Delta\, Performance_i = \alpha + (\beta_1 + \beta_3 ESGAcq_i) * ESGTar_i + \beta_2 ESGAcq_i + \beta_4 T_i + \beta_5 A_i + \beta_6 X_i + f_T + f_C + f_I + \varepsilon_i$$

In this equation, the overall coefficient of the target's ESG score ($ESGTar_i$) is encompassed of a constant (β_1) and a term that is determined by the acquirer's ESG score ($\beta_3 * ESGAcq_i$). β_1 represents the impact of the target's ESG score on the acquirer's performance change when the acquirer's ESG score equals zero. The influence of the acquirer's ESG score on the target's overall coefficient of ESG score is measured by β_3, which indicates the incremental effect of the target's ESG on the acquirer's performance change when the acquirer's ESG score rises by 1. Hence, $\beta_1 + \beta_3 ESGAcq_i$ is the combined effect of the target's ESG score on the acquirer's performance change. As defined in section 4.1. the control variables T_i, A_i and X_i reflect the attributes of the target business, the acquirer, and the transaction individually. Time, country, and industry-specific fixed effects are represented by f_T, f_C and f_I.

4.3. Regression 3 – Grouping into low and high-ESG score acquirers

It is crucial to consider the acquirer's ESG level as it may affect how the target's ESG levels affect the acquirer's post-deal performance changes. Although the coefficient β_3 in regression 2 is dedicated to capturing this effect, the equations are based on all M&A deals and do not discern between acquirers with high and low ESG levels in terms of how the target's ESG levels affect their performance difference. The linear relationship between the acquirer's ESG score and the overall effect of the target firm's ESG score that the coefficient $\beta_1 + \beta_3 ESGAcq_i$ in regression 2 expresses, may not hold in reality. Following the methodology of Feng (2021), for the third regression, acquirers are sorted into two groups of low and high-ESG score acquirers, to study the influence of the acquirer's own ESG score and to release the limiting presumptions of a linear relationship. Naturally, there should be a clear difference between these two group's ESG ratings. As a result, the methodology only chooses transactions when the acquirer is in the bottom 25% (low-ESG acquirer) and top 25% (high-ESG acquirer) of all acquirers in terms of overall ESG ratings. To differentiate the acquirers according to their overall ESG levels, a dummy variable called D_ESGAcq_i is established. D_ESGAcq_i is 0 if the acquirer has a low ESG score and 1 if the acquirer has a high score. The effect of the target's ESG score on performance change between high- and low-ESG acquirers is distinguished by using the product of this dummy variable and the target's ESG score as an interaction term.

The adjusted regression is exhibited as following:

$$\Delta\, Performance_i = \alpha + (\beta_1 + \beta_3 \text{D\_E}SGAcq_i) * ESGTar_i + \beta_2 \text{D\_E}SGAcq_i + \beta_4 T_i + \beta_5 A_i + \beta_6 X_i + f_T + f_C + f_I + \varepsilon_i$$

To indicate the differences in the acquirer's ESG levels, D_ESGAcq_i is used instead of $ESGAcq_i$. In the group of low-ESG score acquirers, $D\_ESGAcq_i = 0$, and the coefficient β_1 indicates how the ESG level of the targets affects the acquirer's performance change. For the group of high-ESG score acquirers, $D\_ESGAcq_i = 1$ and consequently the sum $\beta_1 + \beta_3$ reflects the impact of the targets ESG score on the acquirer's performance change. As previously explained, the rest of the equation are control variables that reflect the acquirer, target company and deal characteristics, as well as fixed effects of time, country, and industry.

5. Numerical Analysis

The key findings from the three regressions are covered in this section. Table 4 displays the results of the first regression. Next, Table 5 shows the outcome of the second regression, which considers the target's ESG score's coefficient as a linear function of the acquirer's ESG score. The results of the third regression, which includes an interaction term to class the acquirers into high- and low-ESG acquirers, are shown in Table 6.

5.1. Regression 1 – Simple OLS regression

The results of the OLS regression are presented in Table 4. The dummy variable Crossbrd shows significance at the 95% level for the ROA change after 1 and 2 years, as well as for the stock price change. For example, for the ROA change +1 year, when D_Crossbrd changes from 0 (acquirer and target in the same country) to 1 (acquirer and target in different countries), there is an estimated increase of approximately 5.02%. The positive coefficient suggests that, on average, international expansion is associated with a higher increase in the acquirer's ROA. Confirming *Hypothesis 1* and in line with the results from Feng (2021), ESG scores of the acquired target show no significant influence on acquirers post 1- and 2-year M&A ROA & ROE change, stock price change and stock volatility change at the 95% confidence level. A reason why the target's ESG score has no significant influence on the financial performance change may be that acquirers at different ESG levels are affected differently when a target with a high ESG score is merged. Since the OLS regression is based on all transactions, the opposing effects could cancel one other out. The third regression, which performs the regression on the low-ESG and high-ESG acquirer groups independently, investigates if the opposing impacts are present.

Table 4. Acquirer's performance change: OLS regression

	Dependent variable					
	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-6.810**	-7.349**	-1.383	0.291	-0.282	0.588
	(-2.471)	(-2.257)	(-0.434)	(0.073)	(-0.429)	(0.356)
Targets ESG Score	-0.001	-0.007	-0.0004	-0.023	-0.001	0.016
	(-0.115)	(-0.402)	(-0.020)	(-1.035)	(-0.235)	(1.780)
Acquiror ESG Score	0.005	0.015	0.002	0.011	-0.002	0.003
	(0.408)	(0.949)	(0.884)	(0.639)	(-0.725)	(0.388)
LN_DV	-0.785*	-1.199**	0.357	-1.063	-0.032	0.041
	(-1.715)	(-2.215)	(0.674)	(-1.610)	(-0.297)	(0.151)
Premium	-1.332	-2.390**	-0.635	-0.325	0.036	-0.993
	(-1.404)	-0.740*	(-0.579)	(-0.237)	(0.161)	(-1.748)
D_Cash	-0.694	-0.740*	0.032	-0.477	-0.034	-0.209
	(-1.967)*	(-1.776)	(0.079)	(-0.938)	(-0.403)	(-0.992)
D_Crossbrd	5.017***	5.706***	0.035	0.309	0.629***	-0.445
	5.755	(5.539)	(0.034)	(0.246)	(0.005)	(-0.852)
D_Crossind	-0.071	-0.175	0.074	0.064	0.168*	-0.225
	(-0.202)	(-0.420)	(0.181)	(0.127)	(1.985)	(-1.064)
AcqQ	0.249	0.176	0.209	-0.181	-0.026	-0.095
	(1.480)	(0.884)	(1.076)	(-0.743)	(-0.636)	(-0.939)
AcqEBITM	-1.040	-3.246	-1.493	-1.582	-0.041	0.618
	(-0.646)	(-1.705)	(-0.802)	(-0.681)	(-0.105)	0.640
AcqLev	-0.859	-0.665	1.185	-5.696***	-0.063	0.105
	(-0.692)	(-0.453)	(0.825)	(-3.179)	(-0.211)	(0.142)
AcqATO	0.352	-0.112	-0.436	-0.370	-0.061	0.289
	(0.786)	(-0.211)	(-0.842)	(-0.573)	(-0.568)	(1.079)
Ln_AcqSize	0.758***	0.881***	-0.054	0.658**	-0.094**	0.033
	4.419	(4.351)	(-0.276)	(2.660)	(-2.285)	(0.321)
TarQ	0.202	0.284	0.081	0.165	0.006	0.046
	(1.139)	1.357	(0.396)	(0.647)	(0.134)	(0.437)
TarEBITM	-0.684	-0.968	0.033	0.679	0.105	0.213
	(-1.721)	(-2.060)	(0.072)	(1.185)	(1.104)	(0.896)
TarLev	0.163	0.086	0.331	0.929	0.005	-0.131
	(0.282)	(0.125)	(0.493)	(1.110)	(0.037)	(-0.376)
TarATO	0.205	0.149	-0.344	-0.125	0.029	-0.595
	(0.281)	(0.173)	(-0.407)	(-0.118)	(0.171)	(-1.361)
Ln_TarSize	0.464	0.873	-0.205	0.461	0.072	-0.108
	(1.111)	1.770	(-0.424)	(0.766)	(0.726)	(-0.436)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	136	136	136	136	136	136
Adjusted R^2	0.5408	0.7802	0.2115	0.6902	0.464	0.1872
p-Value of NCV test	0.2052	0.4528	0.751	0.9284	0.503	0.6763

Note: All continuous variables are winsorized at the 5% and 95% level. T-statistics are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The Breusch-Pagan test (NCV test) is used to test whether heteroscedasticity exists. If the p-value is greater than or equal to 0.05 we would fail to reject the null hypothesis. This indicates that there is no strong evidence to suggest the presence of heteroscedasticity.

5.2. Regression 2 – Considering the coefficient β_1 as a linear function

In Table 5 the results of the second regression, which constructs an interaction term, are presented. The coefficient of the target's ESG score in Table 5 is insignificant at the 95% confidence level for all dependent variables and confirms *Hypothesis 2*. The findings of the second regression are in line with the conclusion of the previous regression that the acquirer's post-M&A financial performance is not significantly impacted by the target's ESG scores. The possible reasons for the insignificance can be the same as the aforementioned reason in the OLS regressions.

Table 5. Acquirer's performance change: Considering the coefficient ß$_1$ as a linear function

	Dependent variable					
	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-9.500***	-10.079**	-1.543	2.659	-0.370	1.264
	(-2.889)	(-2.792)	(-0.393)	(0.549)	(-0.456)	(0.625)
Targets ESG Score	0.049	0.0571	0.003	-0.068	0.001	0.004
	(1.274)	(1.270)	(0.058)	(-1.207)	(0.082)	(0.173)
Acquiror ESG Score	0.040	0.059*	0.004	-0.019	-0.001	-0.005
	(1.472)	(1.843)	(0.131)	(-0.467)	(-0.163)	(-0.343)
TarESGxAcqESG	-0.01	-0.001	0.000	0.001	0.000	0.000
	(-1.445)	(-1.571)	(-0.072)	(0.864)	(-0.191)	(0.590)
LN_DV	-0.662	-1.041*	0.365	-1.172*	-0.028	0.010
	(-1.443)	(-1.931)	(0.665)	(-1.737)	(-0.252)	(0.037)
Premium	-0.725	-1.615	-0.599	-0.858	0.056	-1.145*
	(-0.709)	(-1.343)	(-0.490)	(-0.570)	(0.223)	(-1.820)
D_Cash	-0.765**	-0.8315*	0.028	-0.414	-0.036	-0.191
	(-2.184)	(-2.019)	(0.067)	(-0.804)	(-0.420)	(-0.889)
D_Crossbrd	4.716***	5.323***	0.017	0.573	0.618***	-0.369
	(5.347)	(5.136)	(0.016)	(0.442)	(2.840)	(-0.681)
D_Crossind	-0.058	-0.158	0.075	0.053	0.168*	-0.228
	(-0.166)	(-0.387)	(0.858)	(0.103)	(1.959)	(-1.069)
AcqQ	0.246	0.171	0.209	-0.177	-0.026	-0.093
	(1.480)	(0.877)	(1.058)	(-0.725)	(0.533)	(-0.920)
AcqEBITM	-0.493	-2.548	-1.461	-2.063	-0.023	0.480
	(-0.303)	(-1.331)	(-0.751)	(-0.860)	(-0.056)	(0.479)
AcqLev	-0.672	-0.427	1.196	-5.860***	-0.057	0.058
	(-0.547)	(-0.296)	(0.815)	(-3.239)	(-0.186)	(0.078)
AcqATO	0.498	0.074	-0.427	-0.498	-0.056	0.252
	(1.102)	(0.140)	(-0.791)	(-0.749)	(-0.502)	(0.909)
Ln_AcqSize	0.747***	0.869***	-0.053	0.667**	-0.094**	0.035
	(4.429)	(4.380)	(-0.274)	(2.684)	(-2.257)	(0.342)
TarQ	0.142	0.209	0.077	0.218	0.004	0.061
	(0.796)	(0.990)	(0.363)	(0.825)	(0.084)	(0.556)
TarEBITM	-0.757*	-1.061**	0.029	0.744	0.103	0.231
	(-1.920)	(-2.290)	(0.061)	(1.281)	(1.054)	0.955
TarLev	0.225	0.165	0.336	0.874	0.007	-0.146
	(0.394)	(0.246)	(0.490)	(1.037)	(0.051)	(-0.415)
TarATO	0.338	0.319	-0.335	-0.242	0.034	-0.628
	(0.468)	(0.375)	(-0.389)	(-0.227)	(0.191)	(-1.412)
Ln_TarSize	0.370	0.754	-0.210	0.543	0.069	-0.085
	(0.891)	(1.543)	(-0.424)	(0.888)	(0.677)	(-0.334)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	136	136	136	136	136	136
Adjusted R^2	0.5599	0.7898	0.1862	0.6878	0.4472	0.2038
p-Value of NCV test	0.2255	0.6325	0.766	0.9117	0.5248	0.6401

Note: All continuous variables are winsorized at the 5% and 95% level. T-statistics are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The NCV test (Breusch-Pagan test) is used to test whether heteroscedasticity exists. If the p-value is greater than or equal to 0.05 we would fail to reject the null hypothesis. This indicates that there is no strong evidence to suggest the presence of heteroscedasticity.

5.3. Regression 3 – Grouping into low and high-ESG score acquirers

The results of the third regression, which also uses the interaction term but with grouped low and high-ESG score acquirers, are presented in Table 6. As the acquirers are sorted into two groups the direction of the impact of the target's ESG score also differs. For low ESG score acquirers, the dummy variable takes the value zero, therefore the coefficient β_1 reflects the impact of the target's ESG score. The impact of the target's ESG score for the high-ESG score acquirers is measured by $\beta_1 + \beta_3$.

As seen in Table 3, the mean value of the ROA and ROE change for the majority of acquirers in this research is negative. Hence, a decline in both ROA or ROE change suggests that the acquirer's ROA/ROE declines and that the ROA/ROE change becomes more negative.

For low-ESG acquirers, if the target's ESG score increases one unit, the ROA change after one year after the deal will increase 1.10% but will be evened out after two years by a decrease of 1.10%. Interestingly for the ROE change an increase in the target's ESG score of one unit will have the opposite effect. It decreases by 1.10% one year after and will increase by 0.60% two years after the M&A deal. As expected, and in line with the results of Feng (2021) the target's ESG score has no significant effect on the stock price change. An increase of the target's ESG score by one unit will decrease the stock price change by 0.40%. To further investigate the impact on the firm's stock, annualized stock volatility change is also examined. The ESG score of the target has also no significant negative influence on a firm's stock volatility, which contradicts the intuitive assumption that acquiring a company with a high ESG rating would reduce the rate of fluctuations in the price of a security.

For the high-ESG acquirer group, the ROA change (+1 year) equals -4.40% (0.011 - 0.055). This translates to, that the acquirer's ROA change will decrease by 4.40% if the target's ESG score increases by one unit. For the ROA change (+2 years) this negative decrease will be slightly reduced, as it will decrease by 3.70% (-0.011 – 0.026). Unlike the low-ESG score acquirer group, the increase of the target ESG score has a positive effect of 1.20% (-0.011 + 0.023) on the ROE change the year after the deal. But for the ROE change two years after the deals this effect is turned over as the ROE change will decrease by 3.40% (0.006 – 0.04). Same for the low-ESG score group, the target ESG score also has no significant impact on the stock price and the stock volatility change for the high-ESG score group.

Although acquirers are sorted into high- and low-ESG groups using this approach, the ESG scores of target companies still have no significant influence on the post-deal financial

performance of acquirers and consequently do not confirm *Hypothesis 3*. Similar to the findings of Feng (2021) the two groups show some opposing effects in this study. However, in his study, the negative effect of the target's ESG score on financial performance was overturned to a positive effect in the high-ESG acquirer group. The results of this research show that the negative influence of the target ESG score even increases for the high-ESG score acquirer group. The results are also contradicting previous research that found an increase in firms' performance after an M&A deal with a high ESG target firm. Salvi et al. (2018), observed that by buying firms with better ESG scores than themself, acquirers could enhance their ROA after the transactions. As well as Tampakoudis and Anagnostopoulou (2020) who found that the acquirer's post-M&A stock price rises when an acquirer merges a target business with strong ESG performance.

There could be different reasons for these opposite results and why the target ESG score has no significant influence on the financial performance change in this research. A reason could be the problem that a company's ESG rankings can change depending on the ESG proxies it uses. According to a study by Gibson et al. (2019), there are significant differences in ESG ratings across seven distinct data sources. In the study by Salvi et al. (2018), the company's ESG level is determined by the characteristics of its business (green industry or sin industry). Tampakoudis and Anagnostopoulou (2020) utilised the Thomson Reuters Asset 4 ESG database for their research. Feng (2021) also used the Thomson Reuters ASSET 4 ESG database. In this study, the ESG scores are obtained from the Refinitiv ESG database to compute the average ESG scores of the companies prior to the M&A deals. The data limitation of the studies—this research gathers 136 deals—could be another explanation. The research of Tampakoudis and Anagnostopoulou (2020) only included 100 deals that met the criteria; the study of Feng (2021) gathered 124 deals and the study of Salvi et al. (2018) is based on 171 M&A deals. Small datasets like this cannot fully provide evidence for a solid and reliable conclusion.

Table 6. Acquirer's performance change: Sorting acquirers into low and high-ESG groups

	Dependent variable					
	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-1.442	0.36403	-4.479	-1.179	-0.736	3.1376***
	(-0.449)	(0.086)	(-1.677)	(-0.329)	(-1.259)	(3.105)
Targets ESG Score	0.011	-0.011	-0.011	0.006	-0.004	0.000
	(0.413)	(-0.328)	(-0.511)	(0.206)	(-0.688)	(0.039)
D_ESGAcq	1.577	0.753	-1.491	1.932	-0.517	0.254
	(1.129)	(0.411)	(-1.284)	(1.240)	(-1.468)	(0.579)
TarESGxD_ESG Acq	-0.055	-0.0263	0.023	-0.040	0.007	0.007
	(-1.471)	(-0.533)	(0.734)	(-0.941)	(0.952)	0.591
LN_DV	0.861	0.916	-0.398	-0.618	0.144	-0.155
	(0.929)	(0.752)	(-0.517)	(-0.598)	(0.739)	(-0.530)
Premium	-1.272	-1.634	0.107	3.004**	-0.311	-1.069***
	(-1.082)	(-1.058)	(0.109)	(2.290)	(-1.316)	(-2.892)
D_Cash	-0.416	-0.161	0.386	0.063	-0.031	-0.536**
	(-0.733)	(-0.216)	(0.819)	(0.100)	(-0.263)	(-3.003)
D_Crossbrd	0.644	0.799	0.544	-0.896	-0.004	-0.118
	(1.126)	(1.063)	(1.143)	(-1.402)	(-0.040)	(-0.658)
D_Crossind	-0.528	-0.411	-0.241	-1.034**	-0.002	0.102
	(-1.297)	(-0.768)	(-0.712)	(-2.272)	(-0.022)	(0.794)
AcqQ	0.047	-0.123	0.722**	-0.374	0.157*	-0.187
	(0.135)	(-0.264)	(2.456)	(-0.948)	(2.007)	(-1.683)
AcqEBITM	-0.113	-1.737	-2.271	2.017	0.455	0.643
	(-0.050)	(-0.587)	(-1.214)	(0.803)	(0.872)	(0.909)
AcqLev	-0.511	-0.821	-0.4836	-0.247	0.225	0.259
	(-0.439)	(-0.536)	(-0.499)	(-0.190)	(0.803)	(0.708)
AcqATO	0.379	-0.081	-0.252	0.850	-0.017	-0.148
	(0.558)	(-0.092)	(-0.445)	(1.121)	(-0.114)	(-0.696)
Ln_AcqSize	0.357	0.313	0.636***	0.103	0.060	-0.007
	(1.458)	(0.975)	(3.125)	(0.376)	(1.098)	(-0.096)
TarQ	-0.393	-0.408	0.016	-0.101	-0.043	0.070
	(-1.482)	(-1.170)	(0.073)	(-0.342)	(-0.763)	(0.844)
TarEBITM	-0.913	-1.324*	0.672	-1.246*	-0.032	0.323*
	(-1.589)	(-1.754)	(1.408)	(-1.943)	(-0.305)	(1.787)
TarLev	-0.822	-1.592	-0.516	1.709*	-0.324*	-0.103
	(-1.014)	(-1.494)	(-0.766)	(1.889)	(-1.981)	(-0.407)
TarATO	0.071	0.281	0.284	0.415	0.233*	-0.081
	(0.110)	(0.328)	(0.524)	(0.570)	(1.820)	(-0.398)
Ln_TarSize	-0.842	-0.747	0.129	0.362	-0.126	0.060
	(-1.066)	(-0.720)	(0.197)	(0.411)	-0.747	(0.243)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	63	63	63	63	63	63
Adjusted R^2	0.197	0.1481	0.3345	0.2723	0.1636	0.3809
p-Value of NCV test	0.2435	0.2057	0.3589	0.1697	0.311	0.3067

Note: All continuous variables are winsorized at the 5% and 95% level. T-statistics are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The Breusch-Pagan test (NCV test) is used to test whether heteroscedasticity exists. If the p-value is greater than or equal to 0.05 we would fail to reject the null hypothesis. This indicates that there is no strong evidence to suggest the presence of heteroscedasticity.

6. Robustness Analysis

6.1. Separate ESG scores

As recommended by Fransen (2013), Feng (2021) exploited the effects of the three ESG pillars individually for a robustness analysis. This research also examines the separate ESG scores. Consequently, the total ESG score in the simple OLS regression model is replaced with the environment, social, and governance scores separately to investigate whether the individual ESG scores of the target have distinct effects on the acquirer's performance change. As shown in Table 7, the results indicate that almost no ESG pillar has a significant influence on the dependent variables. However, a significant impact at a 90% confidence level is observed from the target's environmental score on the acquirer's ROE change two years after the deal as well as the target's governance score on the stock volatility change. If the environmental score of the target increases by one unit, the ROE change (+2 years) decreases by 2.90%. In case of a one-unit increase in the governance score, the acquirer's stock volatility change increases by 1.30%. Table 11 in the appendix presents the results for the separate ESG scores for the third regression. Doing the separate ESG pillar analysis for the third regression, where acquirers are categorised into the low and high-score quartile groups, the significant influence of the environmental score on the ROE change (+2 years) and the governance score on the volatility change is no longer present. However, for the ROA change two years after the deal both the target's environmental as well as social score show a statistically significant negative impact at a 90% confidence level. If the environmental or social score of the target increases by one unit, the long-term ROA change for the low-quartile score acquirers decreases by 2.80% or 6.90% respectively. For the high-quartile group, where the impact is represented by $\beta_1 + \beta_3$, this equals a decrease of 0.20% if the environmental or 2.20% if the social score respectively increases by one unit. Interestingly, under this robustness test, the previously observed effect that the decrease of the ROA change performance gets worse for the high-ESG score group is reversed. To recall for the long-term ROA, an increase of the target's ESG score by one unit, results in a change of 1.10% for the low-ESG score and 3.70% for the high-ESG score group. For both an increase in the target's environmental and social score, the long-term ROA change decreases less for the high-quartile group.

Table 7. Acquirer's performance change: Separate ESG scores

	(1) Environment						(2) Society						(3) Governance					
	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-7.022**	-7.545**	-1.318	-0.257	-0.311	0.796	-7.094**	-6.966*	-0.688	0.149	-0.608	-0.303	-6.725**	-7.178**	-1.333	0.184	-0.318	0.850
	(-2.591)	(-2.353)	(-0.413)	(-0.068)	(-0.471)	(0.457)	(-2.384)	(-1.958)	(-0.208)	(0.034)	(-0.862)	(-0.166)	(-2.461)	(-2.234)	(-0.425)	(0.047)	(-0.499)	(0.516)
Target Environment Score	-0.007	-0.011	0.000	-0.029*	-0.001	0.006												
	(-0.745)	(-0.902)	(-0.015)	(-1.969)	(-0.408)	(0.877)												
Target Social Score							0.003	-0.003	-0.015	-0.002	0.003	0.009						
							(0.329)	(-0.215)	(-1.178)	(-0.167)	(1.193)	(1.221)						
Target Governance Score													0.005	0.008	0.010	-0.014	-0.001	0.013*
													(0.454)	(0.605)	(0.787)	(-0.892)	(-0.446)	(1.887)
Acquirer Environment Score	0.011	0.016	0.000	0.019	-0.001	0.002												
	(1.076)	(1.332)	(-0.023)	(1.366)	(-0.508)	(0.445)												
Acquirer Social Score							0.001	0.002	0.012	0.006	0.000	0.006						
							(0.088)	(0.270)	(1.211)	(0.474)	(-0.381)	(1.167)						
Acquirer Governance Score													0.002	0.011	-0.001	0.012	-0.003	0.004
													(0.247)	(0.831)	(-0.076)	(0.745)	(-1.446)	(0.632)
LN_DV	-0.761	-1.170**	0.350	-1.077	-0.040	0.064	-0.801	-1.214**	0.375	-1.057	-0.033	-0.005	-0.771	-1.179**	0.395	-1.112	-0.034	0.071
	(-1.674)	(-2.173)	(0.655)	(-1.691)	(-0.366)	(0.221)	(-1.748)	(-2.216)	(0.736)	(-1.579)	(-0.304)	(-0.019)	(-1.681)	(-2.186)	(0.750)	(-1.677)	(-0.319)	(0.258)
Premium	-1.280	-2.457**	-0.678	-0.274	0.066	-0.991*	-1.403*	-2.631**	-0.471	-0.497	0.070	-0.816	-1.452	-2.647**	-0.769	-0.391	0.049	-1.058*
	(-1.416)	(-2.295)	(-0.638)	(-0.216)	(0.302)	(-1.704)	(-1.505)	(-2.362)	(-0.455)	(-0.365)	(0.319)	(-1.423)	(-1.577)	(-2.445)	(-0.728)	(-0.294)	(0.231)	(-1.907)
D_Cash	-0.715**	-0.756*	0.040	-0.488	-0.032	-0.213	-0.682*	-0.706	0.033	-0.470	-0.042	-0.193	-0.686*	-0.730*	0.042	-0.497	-0.032	-0.191
	(-2.051)	(-1.834)	(0.098)	(-1.001)	(-0.380)	(-0.954)	(-1.941)	(-1.681)	(0.087)	(-0.917)	(-0.506)	(-0.892)	(-1.953)	(-1.768)	(0.104)	(-0.978)	(-0.399)	(-0.906)
D_Crossbrd	4.889***	5.618***	0.055	0.097	0.616***	-0.519	5.134***	5.822***	-0.253	0.533	0.677***	-0.450	5.066***	5.866***	0.046	0.608	0.624***	-0.584
	(5.746)	(5.581)	(0.055)	(0.082)	(2.962)	(-0.950)	(5.892)	(5.591)	(-0.262)	(0.419)	(3.276)	(-0.840)	(5.998)	(5.907)	(0.048)	(0.498)	(3.164)	(-1.147)
D_Crossind	-0.028	-0.165	0.058	-0.010	0.159**	-0.119	-0.123	-0.242	0.235	-0.038	0.149*	-0.177	-0.112	-0.259	0.017	0.016	0.162*	-0.196
	(-0.082)	(-0.411)	(0.146)	(-0.022)	(1.916)	(-0.543)	(-0.354)	(-0.580)	(0.607)	(-0.076)	(1.806)	(-0.825)	(-0.328)	(-0.645)	(0.044)	(0.032)	(2.026)	(-0.951)
AcqQ	0.242	0.151	0.208	-0.284	-0.031	-0.027	0.238	0.149	0.190	-0.269	-0.030	-0.068	0.207	0.079	0.151	-0.199	-0.012	-0.127
	(1.518)	(0.801)	(1.113)	(-1.274)	(-0.817)	(-0.271)	(1.455)	(0.765)	(1.045)	(-1.127)	(-0.779)	(-0.679)	(1.194)	(0.387)	(0.759)	(-0.794)	(-0.303)	(-1.213)
AcqEBITM	-0.585	-2.831	-1.571	-0.921	-0.038	0.810	-1.106	-3.773*	-1.745	-2.171	0.079	1.041	-1.293	-3.776**	-1.819	-1.669	-0.015	0.486
	(-0.364)	(-1.487)	(-0.830)	(-0.409)	(-0.098)	(0.784)	(-0.706)	(-2.015)	(-1.002)	(-0.949)	(0.215)	(1.080)	(-0.822)	(-2.042)	(-1.007)	(-0.734)	(-0.042)	(0.512)
AcqLev	-0.262	0.056	1.117	-4.312**	-0.047	-0.024	-0.856	-1.019	0.972	-5.800***	0.078	0.334	-0.851	-0.501	1.118	-5.389***	-0.165	0.149
	(-0.195)	(0.036)	(0.707)	(-2.291)	(-0.145)	(-0.028)	(-0.677)	(-0.674)	(0.692)	(-3.141)	(0.262)	(0.429)	(-0.659)	(-0.330)	(0.754)	(-2.883)	(-0.549)	(0.191)
AcqATO	0.364	-0.073	-0.438	-0.381	-0.072	0.282	0.323	-0.063	-0.323	-0.261	-0.084	0.129	0.375	-0.104	-0.354	-0.465	-0.038	0.280
	(0.822)	(-0.140)	(-0.839)	(-0.614)	(-0.668)	(0.990)	(0.710)	(-0.117)	(-0.638)	(-0.393)	(-0.778)	(0.461)	(0.816)	(-0.194)	(-0.672)	(-0.699)	(-0.354)	(1.009)
Ln_AcqSize	0.741***	0.878***	-0.043	0.613**	-0.099**	0.068	0.768***	0.918***	-0.104	0.617**	-0.106**	0.036	0.739***	0.826***	-0.079	0.631**	-0.076*	0.010
	(4.498)	(4.503)	(-0.222)	(2.656)	(-2.473)	(0.649)	(4.442)	(4.443)	(-0.546)	(2.445)	(-2.591)	(0.339)	(4.122)	(3.917)	(-0.385)	(2.434)	(-1.826)	(0.097)
TarQ	0.171	0.264	0.086	0.156	0.007	0.002	0.220	0.326	0.069	0.244	0.007	0.019	0.229	0.347*	0.114	0.203	0.002	0.041
	(1.004)	(1.307)	(0.433)	(0.656)	(0.187)	(0.021)	(1.301)	(1.608)	(0.371)	(0.987)	(0.194)	(0.185)	(1.335)	(1.720)	(0.579)	(0.819)	(0.058)	(0.402)
TarEBITM	-0.775**	-1.034**	0.045	0.595	0.105	0.105	-0.631*	-0.865*	-0.030	0.904	0.119	0.123	-0.609*	-0.817	0.153	0.716	0.108	0.198
	(-2.064)	(-2.326)	(0.102)	(1.131)	(1.147)	(0.436)	(-1.716)	(-1.966)	(-0.075)	(1.682)	(1.366)	(0.545)	(-1.568)	(-1.790)*	(0.345)	(1.275)	(1.200)	(0.848)
TarLev	0.061	-0.001	0.346	0.783	0.003	-0.190	0.195	0.178	0.242	1.055	0.003	-0.246	0.222	0.239	0.382	1.061	-0.010	-0.143
	(0.109)	(-0.001)	(0.517)	(0.982)	(0.023)	(-0.521)	(0.342)	(0.262)	(0.382)	(1.265)	(0.028)	(-0.702)	(0.393)	(0.361)	(0.588)	(1.296)	(-0.076)	(-0.420)
TarATO	0.454	0.372	-0.367	0.143	0.020	-0.331	0.080	-0.028	-0.065	-0.575	-0.027	-0.396	0.040	-0.221	-0.572	-0.326	0.041	-0.541
	(0.657)	(0.456)	(-0.452)	(0.149)	(0.123)	(-0.747)	(0.121)	(-0.036)	(-0.088)	(-0.590)	(-0.173)	(-0.963)	(0.059)	(-0.277)	(-0.733)	(-0.331)	(0.259)	(-1.319)
Ln_TarSize	0.469	0.880*	-0.198	0.529	0.079	-0.117	0.470	0.892*	-0.159	0.445	0.062	-0.047	0.449	0.848*	-0.238	0.473	0.072	-0.110
	(1.129)	(1.790)	(-0.407)	(0.910)	(0.785)	(-0.441)	(1.126)	(1.789)	(-0.344)	(0.730)	(0.627)	(-0.185)	(1.079)	(1.730)	(-0.498)	(0.784)	(0.742)	(-0.440)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136
Adjusted R^2	0.5563	0.7871	0.2109	0.718	0.4587	0.1270	0.5401	0.7747	0.2699	0.682	0.4721	0.2480	0.5433	0.7836	0.2263	0.6943	0.4922	0.1891
p-Value of NCV test	0.2148	0.5924	0.7802	0.8717	0.6645	0.6507	0.2719	0.6709	0.6386	0.9486	0.6465	0.7741	0.2112	0.4584	0.7028	0.9617	0.4313	0.8487

Note: All continuous variables are winsorized at the 5% and 95% level. T-statistics are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The Breusch-Pagan test (NCV test) is used to test whether heteroscedasticity exists. If the p-value is greater than or equal to 0.05 we would fail to reject the null hypothesis. This indicates that there is no strong evidence to suggest the presence of heteroscedasticity.

6.2. Financial and COVID-19 crisis deals excluded

The M&A dataset used in this study includes all important M&A cases from the start of 2000 until the end of 2020. For this robustness check 12 deals from the financial crisis and the COVID-19 crisis deals between 2007 and 2009 and from the year 2020 are deleted, to check if there is a possible abnormal impact from the crisis years. The deals from the financial crisis and the COVID-19 crisis are expected to have a negative influence on the overall financial performance change. As shown in Table 8, the target's ESG scores also show no significant impact on the financial performance change. Different than expected the ROA changes for the high-ESG score group notably decrease for the worse if the target's ESG score increases by one unit. ROA change one year before and one year after changes from -4.40% to -4.80% and ROA change two years after worsens from -3.70% to -4.20% if crisis deals are excluded. However, the ROA change performance for the low-ESG group improves in comparison to the all-deal data with the ROA change being 1.50% (+1 year) and -0.50% (+2 years).

Table 8. *Acquirer's performance change: Sorting acquirers into low and high-ESG groups excluding crisis years*

	Dependent variable					
	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-1.902	-0.308	-4.498*	-3.836	0.363	1.950*
	(-0.618)	(-0.076)	(-1.734)	(-1.100)	(0.646)	(1.997)
Targets ESG Score	0.015	-0.005	-0.011	0.005	0.000	-0.001
	(0.556)	(-0.152)	(-0.490)	(0.178)	(-0.074)	(-0.065)
D_ESGAcq	1.726	0.933	-1.455	1.936	-0.281	0.233
	(1.213)	(0.500)	(-1.211)	(1.199)	(-1.082)	(0.516)
TarESGxD_ESG Acq	-0.063	-0.037	0.022	-0.038	0.006	0.008
	(-1.636)	(-0.744)	0.687	-0.873	(0.849)	(0.700)
LN_DV	0.933	0.988	-0.366	-0.607	0.046	-0.160
	(0.987)	(0.797)	(-0.460)	(-0.566)	(0.269)	(0.536)
Premium	-1.298	-1.670	0.105	3.007**	-0.091	-1.064***
	(-1.090)	(-1.070)	(0.105)	(2.228)	(-0.421)	(-2.815)
D_Cash	-0.339	-0.017	0.355	0.028	0.017	-0.562***
	(-0.567)	(-0.023)	(0.705)	(0.043)	(0.159)	(-2.958)
D_Crossbrd	0.685	0.849	0.552	-0.895	-0.096	-0.124
	(1.180)	(1.115)	(1.127)	(-1.360)	(-0.906)	(-0.676)
D_Crossind	-0.533	-0.419	-0.239	-1.031**	0.051	0.103
	(-1.292)	(-0.775)	(-0.688)	(-2.205)	(0.676)	(0.788)
AcqQ	0.031	-0.143	0.719**	-0.374	0.140**	-0.184
	(0.088)	(-0.305)	2.376	(0.363)	(2.144)	(-1.622)
AcqEBITM	-0.167	-1.760	-2.326	1.986	0.163	0.639
	(-0.073)	(-0.587)	(-1.205)	(0.766)	(0.390)	(0.879)
AcqLev	-0.616	-1.030	-0.427	-0.190	0.075	0.298
	(-0.509)	(-0.649)	(-0.419)	(-0.139)	(0.342)	(0.776)
AcqATO	0.535	0.150	-0.256	0.822	-0.115	-0.183
	(0.757)	(0.163)	(-0.430)	(1.026)	(-0.896)	(-0.819)
Ln_AcqSize	0.346	0.303	0.630***	0.100	0.027	-0.006
	(1.394)	(0.932)	(3.006)	(0.356)	(0.609)	(-0.085)
TarQ	-0.375	-0.373	0.007	-0.110	-0.030	0.064
	(-1.380)	(-1.046)	(0.033)	(-0.357)	(-0.606)	(0.741)
TarEBITM	-1.040	-1.519	0.683	-1.219*	0.008	0.353
	(-1.734)	(-1.932)	(1.350)	(-1.792)	(0.074)	(1.855)
TarLev	-0.688	-1.385	-0.528	1.679*	-0.207	-0.136
	(-0.823)	(-1.263)	(-0.750)	(1.772)	(-1.356)	(-0.513)
TarATO	-0.032	0.119	0.294	0.438	0.107	-0.056
	(-0.049)	(0.135)	(0.519)	(0.575)	(0.877)	(-0.264)
Ln_TarSize	-0.847	-0.720	0.096	0.339	-0.089	0.051
	(-1.045)	(-0.678)	0.141	(0.369)	(-0.600)	(0.200)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	62	62	62	62	62	62
Adjusted R^2	0.0621	0.1128	0.3355	0.2428	0.1422	0.3181
p-Value of NCV test	0.1364	0.1115	0.3322	0.1545	0.3492	0.2808

Note: All continuous variables are winsorized at the 5% and 95% level. T-statistics are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The Breusch-Pagan test (NCV test) is used to test whether heteroscedasticity exists. If the p-value is greater than or equal to 0.05 we would fail to reject the null hypothesis. This indicates that there is no strong evidence to suggest the presence of heteroscedasticity.

6.3. US deals only

In this study only 136 deals fulfilled all the requirements and had all variables available, therefore some nations had only one deal available. Even with the country effect taken into account, the regression models may be biased. Of the 136 transactions, 106 (around 78%) are non-cross-border US transactions. To further control for the country effect, only all US deals are used in this robustness test. Table 9 presents the results for the third regression with the US-only deals. If non-US deals are excluded, financial performance mostly increases now if the ESG score of the target increases. The stock price change for the low-ESG group now increases by 0.20% and the stock volatility change decreases by 0.40% if the target's ESG score is increased by one unit. This improved performance change can be especially observed in the high-ESG score group. If the target ESG score increases by one unit the short and long-term ROA now increases (0.70% and 1.40%) instead of a decrease, and long-term ROE decreases less (-2.30% vs. -3.40% for all-deals) as well as a slightly lower stock volatility change (0.60% vs. 0.70% for all deals).

Table 9. Acquirer's performance change: Sorting into low and high-ESG groups for US deals only

	Dependent variable					
	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-2.011***	-0.743	-4.709	-1.629	-0.717	2.758**
	(-2.987)	(-0.418)	(-1.518)	(-0.413)	(-0.996)	(2.086)
Targets ESG Score	-0.002	-0.018	-0.002	-0.009	0.002	-0.004
	(-0.497)	(-1.191)	(-0.083)	(-0.267)	(0.353)	(-0.358)
D_ESGAcq	-0.438	-0.778	-0.638	0.193	0.047	-0.010
	(-1.371)	(-0.921)	(-0.433)	(0.103)	(0.138)	(-0.016)
TarESGxD_ESG Acq	0.009	0.032	0.003	-0.014	-0.001	0.010
	(1.045)	(1.401)	(0.080)	(-0.284)	(-0.162)	(0.621)
LN_DV	0.318*	0.480	-0.252	-0.661	0.038	-0.185
	(1.764)	(1.007)	(-0.304)	(-0.625)	(0.198)	(-0.522)
Premium	-0.111	0.374	0.325	1.830	0.140	-1.165**
	(-0.468)	(0.597)	(0.297)	(1.315)	(0.553)	(-2.499)
D_Cash	0.097	0.234	-0.013	0.177	-0.001	-0.581**
	(0.728)	(0.663)	(-0.022)	(0.226)	(-0.007)	(-2.214)
D_Crossind	0.000	0.146	-0.307	-1.058*	-0.046	0.052
	(0.002)	(0.601)	(-0.722)	(-1.951)	(-0.467)	(0.288)
AcqQ	0.093	-0.067	0.991***	-0.424	0.158*	-0.210
	(1.261)	(-0.344)	(2.905)	(-0.978)	(2.000)	(-1.448)
AcqEBITM	-0.213	-1.449	-2.318	1.104	-0.120	0.866
	(-0.393)	(-1.009)	(-0.926)	(0.347)	(-0.208)	(0.812)
AcqLev	0.328	0.438	-1.147	-0.413	0.105	0.304
	(1.351)	(0.682)	(-1.023)	(-0.290)	(0.405)	(0.638)
AcqATO	0.008	-0.373	-0.575	0.800	-0.157	-0.221
	(0.057)	(-0.949)	(-0.839)	(0.917)	(-0.986)	(-0.757)
Ln_AcqSize	0.218***	0.083	0.708***	0.348	0.006	0.036
	(4.469)	(0.648)	(3.141)	(1.215)	(0.124)	(0.382)
TarQ	-0.122**	-0.172	-0.098	-0.010	-0.049	0.094
	(-2.207)	(-1.179)	(-0.384)	(-0.033)	(-0.841)	(0.869)
TarEBITM	-0.043	-0.330	1.701	-1.246	0.016	0.082
	(-0.168)	(-0.487)	(1.440)	(-0.829)	(0.061)	(0.164)
TarLev	-0.350*	-0.569	-0.398	0.713	-0.001	-0.257
	(-1.872)	(-1.151)	(-0.461)	(0.650)	(-0.008)	(-0.700)
TarATO	0.290**	0.518	0.580	0.307	0.172	-0.005
	(2.217)	(1.499)	(0.963)	(0.400)	(1.231)	(-0.023)
Ln_TarSize	-0.383**	-0.425	-0.125	0.444	-0.057	0.125
	(-2.345)	(-0.986)	(-0.167)	(0.464)	(-0.328)	(0.391)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	54	54	54	54	54	54
Adjusted R^2	0.5806	0.1773	0.3463	0.1556	0.0907	0.2250
p-Value of NCV test	0.1312	0.3625	0.5924	0.5901	0.5282	0.3087

Note: All continuous variables are winsorized at the 5% and 95% level. T-statistics are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The Breusch-Pagan test (NCV test) is used to test whether heteroscedasticity exists. If the p-value is greater than or equal to 0.05 we would fail to reject the null hypothesis. This indicates that there is no strong evidence to suggest the presence of heteroscedasticity.

6.4. Two-stage least squares model

In order to boost its financial performance through an M&A deal, a corporation could purchase a target with a particular ESG score. Consequently, the acquirer's desired ESG scores of the targets may be determined by their typically expected performance change, and in reality, acquirers choose to combine targets whose ESG levels are comparable to their preferences. In consequence, through this reverse effect, the causal correlation between the target's ESG scores and the acquirer's changes in financial performance following an M&A transaction is less likely to be explained. To address this endogeneity problem and to strengthen the result that the target's ESG level is what causes the acquirer's performance to change, Feng (2021) used a two-stage least squares model. For this robustness test, the method is replicated. In the first stage, two instrument variables that do not directly affect the acquirer's performance shift, but rather merely identify the target company's ESG level are used – the target's average industry ESG score ($AESGCInd_i$) and the target's average country ESG score ($AESGCty_i$). The ESG scores of the target companies are regressed against the control variables and a set of control variables that reflect the firm characteristics of the targets. The regression model is presented as follows, with the results presented in column (1) in Table 10.

$$ESGTar_i^0 = \varphi + \gamma_1 AESGCty + \gamma_1 AESGCInd + \gamma_3 T_i + \xi_i$$

$ESGTar_i^0$ represents the observed ESG score of the target company. If endogeneity issues are present, the residual term ξ_i may have a non-zero correlation with the dependent variable or the residual term ε_i. Consequently, a fitted $ESGTar$ is used later as an independent variable in the second stage. The equation for the fitted *ESGTar* is shown as:

$$\widehat{ESGTar_i} = \varphi + \gamma_1 AESGCty_i + \gamma_2 AESGCInd_i + \gamma_3 T_i$$

In the second stage, the third regression model is regressed again, this time using the fitted ESG score of the targets, to address the endogeneity problem. In column (2) of Table 10 the results of the second-stage regression are presented. The results are consistent with the conclusion from the original third regression and the impact of the target ESG scores are not significant. It is to be noted, that for the high ESG score acquirer group the accounting-based financial performance change indices notably improve. If the target's ESG score increases by one unit the decrease of the ROA change one year and two years after the deal is weaker (-3.70% and 1.50% respectively) and the ROE change one year after (2.80%) is higher.

Table 10. Acquirer's performance change: Two-stage least square regression

	(1)	(2)					
		Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-33.576*	-1.210	0.285	-4.690*	-0.878	-0.726	3.107***
	(-1.841)	(-0.367)	(0.067)	(-1.772)	(-0.245)	(-1.125)	(3.083)
Targets ESG Score (fitted)		0.003	-0.030	-0.007	0.023	-0.002	0.005
		(0.108)	(-0.774)	(-0.303)	(0.727)	(-0.434)	(0.579)
AESGInd	1.101***						
	(8.485)						
AESGCty	0.607**						
	(0.277)						
D_ESGAcq	13.068***	1.103	-0.677	-1.969	2.545	-0.351	0.334
	(3.836)	(0.699)	(-0.331)	(-1.553)	(1.482)	(-1.135)	(0.693)
TarESGxD_ESGAcq		-0.040	0.015	0.035	-0.059	0.007	0.004
		(-0.954)	(0.288)	(1.018)	(-1.273)	(0.846)	(0.293)
LN_DV	2.015	0.828	0.752	-0.445	-0.497	0.067	-0.138
	(0.407)	(0.867)	(0.607)	(-0.580)	(-0.479)	(0.361)	(-0.475)
Premium	-5.284	-1.466	-1.943	0.063	3.032**	-0.125	-1.042***
	(0.403)	(-1.229)	(-1.255)	(0.066)	(2.337)	(-0.536)	(-2.859)
D_Cash	1.841	-0.400	-0.030	0.452	-0.019	0.053	-0.539***
	(0.604)	(-0.679)	(-0.040)	(0.954)	(-0.031)	(0.459)	(-2.990)
D_Crossbrd	2.174	0.712	0.799	0.492	-0.829	-0.080	-0.128
	(0.704)	(1.214)	(1.051)	(1.045)	(-1.301)	(-0.698)	(-0.718)
D_Crosssind	-1.637	-0.484	-0.371	-0.224	-0.985**	0.044	0.106
	(-0.744)	(-1.159)	(-0.686)	(-0.669)	(-2.170)	(0.545)	(0.831)
AcqQ	-4.781**	0.115	-0.062	0.721**	-0.335	0.130*	-0.191*
	(-2.489)	(0.322)	(-0.133)	(2.509)	(-0.863)	(1.864)	(-1.753)
AcqEBITM	20.984*	-0.376	-2.003	-2.494	1.629	0.166	0.575
	(1.773)	(-0.161)	(-0.663)	(-1.334)	(0.643)	(0.365)	(0.808)
AcqLev	4.739	-0.577	-0.815	-0.425	-0.312	0.061	0.271
	(0.750)	(-0.484)	(-0.526)	(-0.444)	(-0.240)	(0.262)	(0.743)
AcqATO	-1.652	0.274	-0.146	-0.185	0.825	-0.054	-0.122
	(-0.457)	(0.397)	(-0.163)	(-0.334)	(1.098)	(-0.405)	(-0.581)
Ln_AcqSize	-2.965**	0.394	0.403	0.659**	0.070	0.029	-0.013
	(-2.294)	(1.564)	(1.234)	(3.258)	(0.256)	(0.604)	(-0.181)
TarQ	-1.074	-0.374	-0.353	0.030	-0.127	-0.019	0.066
	(-0.762)	(-1.372)	(-0.998)	(0.141)	(-0.429)	(-0.370)	(0.792)
TarEBITM	-5.842	-0.827	-1.307	0.693	-1.080	-0.066	0.341*
	(-1.936)	(-1.382)	(-1.683)	(1.443)	(-1.660)	(0.262)	(1.864)
TarLev	1.147	-0.997	-1.808	-0.546	1.654*	-0.159	-0.091
	(0.271)	(-1.220)	(-1.705)	(-0.832)	(1.862)	(-0.997)	(-0.364)
TarATO	9.317	0.191	0.490	0.220	0.260	0.107	-0.139
	(2.966)	(0.285)	(0.562)	(0.408)	(0.356)	(0.813)	(-0.680)
Ln_TarSize	0.982	-0.841	-0.613	0.161	0.205	-0.077	0.040
	(0.233)	(-1.026)	(-0.576)	(0.246)	(0.231)	(-0.480)	(0.163)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	68	68	68	68	68	68	68
Adjusted R^2	0.6868	0.1585	0.1055	0.2079	0.1768	0.1271	0.3871
p-Value of NCV test	0.3377	0.2125	0.2078	0.4232	0.1251	0.3031	0.5558

Note: All continuous variables are winsorized at the 5% and 95% level. T-statistics are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The Breusch-Pagan test (NCV test) is used to test whether heteroscedasticity exists. If the p-value is greater than or equal to 0.05 we would fail to reject the null hypothesis. This indicates that there is no strong evidence to suggest the presence of heteroscedasticity.

7. Conclusion

As ESG continues to gain more relevance in practice, it is important to investigate the impact of ESG ratings. This research examines how within M&A transactions an acquirer's financial performance changes post-transaction in response to the target's existing ESG scores. The goal of this study is to reinvestigate the findings of Feng (2021) and to assess how this research's results differ. Furthermore, this research aims to add to previous literature by investigating additional variables and by reviewing both a short-term but also a long-term time frame.

The data sources of this research are the Refinitiv Deal Screener, the Refinitiv ESG database and Refinitiv Eikon. In total 136 M&A deals fulfilled all requirements for the analysis. First, this research runs an OLS regression, where the ESG scores of targets show no significant impact on the acquirer's performance changes. Secondly, an interaction term is constructed to also take into account the impact of the ESG score of the acquirer. As expected, the results still show no significant influence of the target's ESG scores. Thirdly, to overcome the problem that acquiring a target company with a high ESG score might have different impacts on a low or high-ESG-score acquirer, the acquirers are grouped into the low and high-quartile ESG-level companies. Unlike predicted and different to the results of Feng (2021) the ESG scores of the targets still show no statistical significance when acquirers are sorted into low and high-ESG score quartiles. No clear pattern for the influence of the target's ESG score on the financial performance change for both groups is observed. While for the low-ESG score group the ROA change one year after the M&A deal is positive, it turns negative two years after completion. For the high-ESG score acquirers, this negative change is observed one year as well as two years after the deal. Moreover, an opposing effect for the two groups can also be observed in the ROE change. Whilst the ROE change one year after the deal is negative for the low-ESG score group, it is positive for the high-ESG score group. The effect is exactly the opposite two years after the deal – positive for the low-level and negative for the high-level group. For the low-ESG score group, the stock price change is also slightly negatively affected whereas for the stock volatility change, no impact is examined. However, for the high-ESG score acquirer group, the influence of the target's ESG score is positive on the stock price change and the stock volatility. The negative impact of the target's ESG score on the acquirer's short and long-term ROA change as well as the long-term ROE change is observed to be more pronounced for the high-ESG score acquirers than for the low-ESG score acquirers. Therefore, this study could not confirm the conclusion from Feng (2021), who stated that „in the short term, high-ESG acquirers will (…) decrease less in their ROA after acquiring a similar high-ESG target than

low-ESG acquirers do“ (Feng, 2021, p. 304). Although the target’s ESG score shows no statistically significant influence on the acquirer’s financial performance under the three main regression models, a statistical significance is found through the analysis of the separate ESG scores. For the first regression model, a significant negative impact at a 90% confidence level is seen from the environmental score on the acquirer’s ROE change two years after the deal and a significant positive influence also at a 90% confidence level from the governance score on the stock volatility change. Through the examination of the individual ESG scores for the third regression model, a significant impact of the environmental and social score at a 90% confidence level on the long-term ROA is observed.

The findings of this research do not show a clear pattern of the impact of the target’s ESG score and do not present evidence that an acquisition of a high-ESG level target improves the short and long-term financial performance of a company. Apart from these research results and evidence that also M&A deals with high-ESG level targets can be harmful for financial performance (Tampakoudis et al., 2021; Feng, 2021), it cannot be concluded that an M&A deal with a high-ESG score target is an irrational transaction. As previous scholars argued, CSP and good ESG practices do not necessarily need to impact the company’s financial performance but rather influence stakeholders as a whole and consequently can improve important intangible values such as a company’s public image (Fombrun et al., 2000; Godfrey, 2005).

8. Limitations and further research

It must be emphasized that there are some limitations to this study that need to be looked at further. This research only studies the impact on ROA and ROE change one and two years after the M&A deal completion. Salvi et al. (2018) found a ROA increase upon studying the acquirer’s change three years after merging with a green target, but they did not take the acquirer’s own ESG level into account. Additionally, in this research, the stock price change has been only investigated three months prior to the announcement and one month after the completion, as well as annualized stock volatility only on a time window of 252 trading days before and after the announcement. For future research the time frame should be extended, to see if the effects on the variables reverse when enough adjustments are done from the acquirer to complete the full integration of the target. As the analysis of the separate ESG scores shows that some specific scores have a significant influence on different dependent variables, it could be valuable for future research to further examine the effects of the individual scores on specific performance variables and industries. Additionally, for the context of this research, it is also

important to understand that various ESG databases exist that strongly differ in methodology and ratings. The Global Initiative for Sustainability Ratings provides a searchable database for corporate ESG rating, rankings and indices that tabulates 121 ESG indexes and 39 ESG rating products across the globe (Boubaker et al., 2018). An issue for research is that these data providers have significant disagreements on company ESG ratings (Gibson et al., 2019). These ESG databases and ratings are not free from errors and can contain some biases. Drempetic et al. (2020) investigated the ESG scores of the Thomson Reuters ASSET4 ESG ratings to examine the influence of a firm's size, its available resources for providing ESG data and the availability of its ESG data on the sustainability performance. They found a size bias in the measurement of corporate sustainability that gives an advantage to larger-sized firms. The Refinitiv ESG database, which is based on the ASSET4 ESG database, was renewed in 2022. The scoring methodology to assess a firm's degree of sustainability was revised and thus the new Refinitiv ESG scores differ significantly for companies in comparison to the old ASSET4 ESG database since the update. With this new methodology, Refinitiv claimed to have addressed and minimized the size bias (Refinitiv, 2022). But as Dobrick et al. (2023) reinvestigated the presence of the size bias in the new Refinitiv ESG database, the successor of the ASSET4 ESG database, they found the size bias to be still present under the new ESG data despite the new methodology. Given these findings, the regression models of this research, as well as previous research, can be biased. Lastly, this study could only identify 136 transactions with both the target and the acquirer being publicly traded businesses and an accessible ESG score before the M&A deal. Findings derived from such a small database might be biased and lack sufficient evidence. US transactions represent most of the deals that were used in this study. Since ESG practises on M&A transactions might differ across the US, Europe, and developing economies, there could also be different effects on acquirers throughout the regions. As the small data set did not allow for examining these possible effects, it is worth conducting further research on the influence of the target's ESG scores when additional and less limited data is available.

Appendix

Table 11. Acquirer's performance change: Separate ESG pillar analysis for low and high-quartile score acquirers

(1) Environment

	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-1.987	-1.205	-1.987	0.923	-0.520	2.070**
	(-1.387)	(-1.062)	(-1.387)	(0.303)	(-1.078)	(2.427)
Target Environment Score	0.012	-0.028*	0.012	0.046	-0.008	0.003
	(0.637)	(-1.840)	(0.637)	(1.137)	(-1.381)	(0.296)
D_E_Acq	0.277	-0.631	0.277	1.821	0.076	0.015
	(0.453)	(-1.302)	(0.453)	(1.399)	(0.370)	(0.042)
TarExD_E_Acq	-0.022	0.026	-0.022	-0.054	0.001	0.001
	(-1.092)	(1.570)	(-1.092)	(-1.231)	(0.138)	(0.083)
LN_DV	0.025	0.570	0.025	-1.327	0.103	0.163
	(0.050)	(1.421)	(0.050)	(-1.233)	(0.605)	(0.542)
Premium	0.413	-0.035	0.413	4.112**	0.191	-1.179**
	(0.481)	(-0.052)	(0.481)	(2.253)	(0.663)	(-2.305)
D_Cash	0.158	0.335	0.158	-1.061*	-0.067	-0.160
	(0.551)	(1.468)	(0.551)	(-1.733)	(-0.690)	(-0.934)
D_Crossbrd	0.115	0.214	0.115	-1.153	-0.058	-0.126
	(0.330)	(0.770)	(0.330)	(-1.545)	(-0.493)	(-0.606)
D_Crossind	-0.166	0.262	-0.166	-0.542	-0.078	0.069
	(-0.585)	(1.168)	(-0.585)	(-0.898)	(-0.821)	(0.410)
AcqQ	-0.141	-0.120	-0.141	-0.181	0.116**	-0.091
	(-0.900)	(-0.965)	(-0.900)	(-0.541)	(2.194)	(-0.981)
AcqEBITM	2.707	-0.624	2.707	5.338	-0.417	1.182
	(1.651)	(-0.481)	(1.651)	(1.533)	(-0.756)	(1.212)
AcqLev	-0.533	-0.107	-0.533	-0.507	0.040	-0.096
	(-0.742)	(-0.189)	(-0.742)	(-0.332)	(0.169)	(-0.225)
AcqATO	0.364	-0.486	0.364	0.523	-0.129	0.241
	(0.784)	(-1.322)	(0.784)	(0.531)	(-0.828)	(0.873)
Ln_AcqSize	0.316	0.137	0.316**	0.362	-0.005	0.015
	2.472**	(1.358)	(2.472)	(1.333)	(-0.117)	(0.200)
TarQ	-0.152	-0.196	-0.152	0.077	-0.031	-0.088
	(-0.898)	(-1.461)	(-0.898)	(0.215)	(-0.545)	(-0.878)
TarEBITM	0.132	-0.062	0.132	0.648	-0.125	0.000
	(0.417)	(-0.248)	(0.417)	(0.959)	(-1.170)	(0.000)
TarLev	1.129**	0.017	1.129**	2.685**	0.015	-0.222
	(2.158)	(0.042)	(2.158)	(2.415)	(0.087)	(-0.713)
TarATO	-0.229	0.566**	-0.229	-0.455	0.064	-0.109
	(-0.675)	(2.103)	(-0.675)	(-0.631)	(0.560)	(-0.539)
Ln_TarSize	-0.325	-0.536	-0.325	0.101	-0.049	-0.171
	(-0.703)	(-1.463)	(-0.703)	(0.103)	(-0.319)	(-0.624)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	63	63	63	63	63	63
Adjusted R^2	0.167	0.0784	0.1670	0.1021	0.2041	0.2485
p-Value of NCV test	0.1499	0.3109	0.4140	0.5918	0.8172	0.5722

(2) Society

	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	1.507	3.604	0.704	0.113	0.021	1.810*
	(0.535)	(0.708)	(0.313)	(0.042)	(0.036)	(1.846)
Target Social Score	0.007	-0.069*	0.008	0.008	-0.004	0.005
	(0.347)	(-1.771)	(0.503)	(0.374)	(-1.023)	(0.709)
D_S_Acq	1.271	-1.172	0.366	1.520	-0.091	0.052
	(0.990)	(-0.505)	(0.357)	(1.241)	(-0.341)	(0.117)
TarSxD_S_Acq	-0.046	0.047	-0.014	-0.043	0.004	0.006
	(-1.264)	(0.714)	(-0.496)	(-1.233)	(0.583)	(0.504)
LN_DV	0.492	-3.466**	0.330	0.760	0.012	-0.223
	(0.651)	(-2.534)	(0.546)	(1.053)	(0.078)	(-0.849)
Premium	-2.312*	-2.330	-1.120	2.436*	0.186	-0.585
	(-1.750)	(-0.976)	(-1.060)	(1.932)	(0.676)	(-1.272)
D_Cash	-0.156	-0.548	0.031	-0.310	0.080	0.356*
	(-0.286)	(-0.555)	(0.072)	(-0.594)	(0.707)	(-1.873)
D_Crossbrd	-0.080	-0.056	0.154	-0.482	-0.247	-0.004
	(-0.096)	(-0.037)	(0.230)	(-0.602)	(-1.414)	(-0.014)
D_Crossind	-0.656	-0.807	0.320	-0.817*	0.067	-0.024
	(-1.458)	(-0.992)	(0.891)	(-1.902)	(0.724)	(-0.153)
AcqQ	0.114	0.879	0.370	-0.995***	0.148**	-0.005
	(0.351)	(1.496)	(1.426)	(-3.206)	(2.184)	(-0.049)
AcqEBITM	-2.670	-1.598**	-0.975	0.764**	-0.100	0.435
	(-0.889)	(-2.322)	(-0.406)	(2.654)	(-0.161)	(0.417)
AcqLev	-0.798	-1.516	0.208	-0.190	0.026	0.199
	(-0.585)	(-0.614)	(0.191)	(-0.146)	(0.093)	(0.420)
AcqATO	-0.003	-1.572	-0.733	1.810**	-0.054	0.104
	(-0.004)	(-1.044)	(-1.101)	(2.275)	(-0.314)	(0.359)
Ln_AcqSize	0.555**	0.860*	0.368*	0.265	-0.035	0.036
	(2.289)	(1.963)	(1.900)	(1.145)	(-0.703)	(0.436)
TarQ	-0.291	0.742*	-0.187	-0.359	-0.027	0.058
	(-1.257)	(1.772)	(-1.013)	(-1.623)	(-0.572)	(0.720)
TarEBITM	-0.847	-1.162	0.804	-0.025	-0.142	0.398
	(-1.147)	(-0.871)	(1.362)	(-0.037)	(-0.929)	(1.550)
TarLev	0.141	-0.629	-0.331	1.659**	0.091	-0.051
	(0.169)	(-0.413)	(-0.493)	(2.066)	(0.519)	(-0.174)
TarATO	-0.261	-0.311	-0.365	-0.569	-0.017	-0.034
	(-0.495)	(-0.326)	(-0.865)	(-1.129)	(-0.159)	(-0.186)
Ln_TarSize	-0.870	3.177**	-0.775	-1.440**	-0.046	0.126
	(-1.297)	(2.621)	(-1.446)	(-2.249)	(-0.329)	(0.540)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	63	63	63	63	63	63
Adjusted R^2	0.1525	0.2136	0.130	0.3609	0.1064	0.1820
p-Value of NCV test	0.1561	0.2960	0.4325	0.2164	0.1061	0.8030

(3) Governance

	Acquirer ROA % change (-1 to +1 year)	Acquirer ROA % change (-1 to +2 years)	Acquirer ROE % change (-1 to +1 year)	Acquirer ROE % change (-1 to +2 years)	Acquirer stock price % change (-3 to +1 month)	Acquirer stock volatility % change (-1 to +1 year from annoucement)
Constant	-0.984	3.017	-4.054*	0.275	-0.309	0.616
	(-0.373)	(0.591)	(-1.947)	(0.106)	(-0.669)	(0.576)
Target Governance Score	0.011	-0.015	0.005	0.029	0.000	0.004
	(0.506)	(-0.350)	(0.260)	(1.336)	(0.085)	(0.495)
D_G_Acq	-0.282	-1.203	-0.401	0.646	-0.127	0.216
	(-0.230)	(-0.505)	(-0.413)	(0.533)	(-0.592)	(0.434)
TarGxD_G_Acq	-0.012	0.031	-0.003	-0.025	0.002	0.001
	(-0.418)	(0.545)	(-0.135)	-0.867	(0.441)	(0.155)
LN_DV	0.611	-3.723**	0.098	1.489**	-0.126	0.076
	(0.846)	(-2.659)	(0.172)	(2.093)	(-0.996)	(0.263)
Premium	-1.456	0.012	-0.185	1.456	0.134	-0.827*
	(-1.290)	(0.006)	(-0.209)	(1.311)	(0.681)	(-1.810)
D_Cash	0.012	-0.709	-0.219	1.100*	-0.050	-0.304
	(0.019)	(-0.569)	(-0.433)	(1.737)	(-0.450)	(-1.168)
D_Crossbrd	0.986	-0.392	0.244	1.000	-0.189	-0.002
	(1.495)	(-0.308)	(0.470)	(1.543)	(-1.640)	(-0.008)
D_Crossind	-0.333	-0.586	-0.241	-0.459	0.027	0.102
	(-0.821)	(-0.745)	(-0.751)	(-1.149)	(0.385)	(0.621)
AcqQ	0.209	0.382	0.773***	-0.481	0.144**	-0.082
	(0.589)	(0.555)	(2.754)	(-1.374)	(2.317)	(-0.574)
AcqEBITM	-4.023	-10.402**	-1.640	-2.331	0.686	0.666
	(-1.519)	(-2.029)	(-0.785)	(-0.895)	(1.477)	(0.621)
AcqLev	-0.389	-0.654	0.154	-0.097	-0.202	-0.080
	(-0.344)	(-0.298)	(0.173)	(-0.087)	(-1.015)	(-0.175)
AcqATO	0.061	-0.867	-0.398	0.179	-0.117	-0.073
	(0.093)	(-0.679)	(-0.765)	(0.276)	(-1.017)	(-0.276)
Ln_AcqSize	0.435	0.830	0.658***	-0.032	0.021	-0.013
	(1.656)	(1.632)	(3.176)	(-0.125)	(0.461)	(-0.129)
TarQ	-0.330	0.881*	-0.172	-0.726***	0.020	-0.003
	(-1.409)	(1.941)	(-0.930)	(-3.150)	(0.508)	(-0.037)
TarEBITM	-0.519	-0.271	0.815*	-0.430	-0.056	0.306
	(-0.875)	(-0.237)	(1.743)	(-0.737)	(-0.541)	(1.277)
TarLev	-1.360	-1.058	-0.503	0.781	-0.256*	-0.107
	(-1.685)	(-0.677)	(-0.791)	(0.983)	(-1.807)	(-0.327)
TarATO	-0.439	-1.704	0.071	0.334	0.073	-0.107
	(-0.770)	(-1.542)	(0.159)	(0.595)	(0.728)	(-0.327)
Ln_TarSize	-0.573	3.364***	-0.560	-1.578**	0.088	-0.115
	(-0.908)	(2.752)	(-1.126)	(-2.539)	(0.801)	(-0.452)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	63	63	63	63	63	63
Adjusted R^2	0.2083	0.1584	0.2749	0.1276	0.1440	0.1574
p-Value of NCV test	0.1902	0.1725	0.5639	0.2155	0.1085	0.1902

Note: All continuous variables are winsorized at the 5% and 95% level. T-statistics are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. The Breusch-Pagan test (NCV test) is used to test whether heteroscedasticity exists. If the p-value is greater than or equal to 0.05 we would fail to reject the null hypothesis. This indicates that there is no strong evidence to suggest the presence of heteroscedasticity.

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