

The Effect of Environmental, Social & Governance Investments in Terms of M&A on Post-Merger Market Value and Sustainability Performance

A Case Study of European Mergers & Acquisitions.

Erasmus School of Economics, Erasmus University

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Executive Summary

ESG is becoming a more elevated topic in M&A transactions. But what are the value-added effects of the ESG performance of the target? This research aims to fill the literature gap in explaining an acquirer's change in sustainability performance and market value by considering the relative pre-merger performance. The overall ESG score and the effects of the individual pillars are discussed. It was expected that learning capabilities may be transferred to the acquirer, this can accelerate the much-desired ESG improvements and companies might be more incentivized to commit to ESG if the market value experiences similar positive effects. Our results suggest that there are learning capabilities for the overall ESG score and the environmental and governance performance. Robustness checks with duration variations show similar significant results. We do not find any statistical evidence for a linear relationship between differences in the ESG, environmental, social, or governance performance and changes in the market value. However, additional analyses did find a U-shaped relationship between social performance and the market value of an acquirer, which indicates that social investments do create value only after a certain threshold of investments is reached. The explanatory value of this research is likely highly affected by the small sample; further research is needed as the ESG database is expanding.

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STATEMENT

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1. Introduction

The total value of assets in sustainability-focused index funds has quadrupled between 2017 and 2020 and was worth \$649bn by the end of 2021 (Stevens, 2020; Kerber & Jessop, 2021). A large proportion of investors have made it their personal agenda to commit to sustainability (Barclays, 2022). Clear and transparent disclosure on Environmental, Social, and Governance (ESG) is being pressured and well-performing ESG companies are being appreciated through rich valuations (Barclays, 2022).

The surge in demand for ESG-related investments is partly explained by the increased resilience to crises, e.g., during the pandemic in 2020 ESG funds outperformed the S&P 500 (Whieldon et al., 2020). In addition to resilience, there is a huge market opportunity ahead. The Business and Sustainable Development Commission estimated in 2017 that there are SDG market opportunities worth \$12tr that can be pursued by the year 2030 (Business & Sustainable Development Commission, 2017). For companies, it is important to set up an ESG strategy to fully unlock their potential. Accordingly, companies should incorporate ESG into their entire corporate system. This also includes the Corporate Finance strategy, more specifically within M&A transactions. ESG aspects are becoming increasingly important in this work field. 65% of M&A executives expect that the focus on these aspects will increase in the upcoming three years (Van den Branden et al., 2022). But what are the upsides of incorporating ESG in M&A transactions? And what are the roles of the individual pillars of ESG: Environmental, Social, and Governance?

Hong et al. (2022) & Deng et al. (2013) found that the target's pre-merger ESG score positively influences the success rate of M&A transactions. The effect of M&A on the ESG score of the acquirer was discussed by Barros et al. (2022), who found that M&A deals have a positive effect on combined ESG scores, the environmental score, and the social score, yet results for the governance score were inconclusive. A limitation of the research of Barros et al. (2022) is that they do not discuss the difference between the target and acquirer pre-merger, and the post-merger ESG performance. Aktas et al. (2011) do take this difference into consideration and found evidence for learning capabilities when acquiring a better-rated target resulting in high CAR. Aktas et al. (2011) used the IVA rating, which is a categorical sustainability measure, making it less accurate than our research that includes the ESG score. Previous research that does include the ESG score, often only investigates post-merger profitability of the acquirer or other operating metrics (Kim et al., 2022; Feng, 2021; Chen, 2021). The effects on the sustainability performance or market value post-merger are rarely discussed in existing literature. This research aims to fill this gap by including the relative pre-merger performance as an independent variable in explaining changes in the sustainability performance and market value for the acquirer. Tampakoudis & Anagnostopoulou (2020) already

performed similar research for the combined ESG score. This research extends their findings by also looking into the value-add effects of the individual pillars. As far as our knowledge goes, this is missing in the existing literature. Our main research question is:

What are the value-add effects of an investment's combined ESG performance and its individual pillars in terms of M&A, on the acquirer's post-merger sustainability performance and market value?

The need for increased ESG performance describes our social relevance. If the results show that there may be learning capabilities when acquiring a target with a higher ESG score, or a higher score of its individual components, this can accelerate the developments made in the ESG disciplines. When the market value is also positively influenced by these developments, companies might be more incentivized to commit to ESG, if they were not already. To investigate the main research question, a sample of 77 European transactions between 2003 and 2020 was used for which long(er) term deviations in ESG score were created. The final sample is relatively small as it was necessary to collect an ESG score for both the acquirer and target.

Our results suggest that there are learning capabilities when acquiring a target that has a higher sustainability performance, this is true for the overall ESG score, the environmental pillar and the governance pillar. Robustness checks find the same results when the time period changes for the combined ESG score and the governance score. The governance score experiences stronger effects in the same year as the transaction, which can be explained by the rebalanced relationship between shareholders and the company immediately after a transaction. The regression investigating the effect of the pre-merger environmental performance on the performance the same year as the transaction, did not have any explanatory value. However, it was found that the relative pre-merger environmental performance does have a significant positive effect a year after the transaction and two years after the transaction. This effect seems stronger two years after the transaction, likely caused by the implementation period associated with environmental efforts. This research does not provide any explanatory value in explaining differences in the market value of a company when acquiring a target with a higher ESG score, or of its individual pillars. In addition, we do not find any statistical evidence for a linear relationship between differences in the ESG, environmental, social, or governance performance and changes in the market value. However, additional analysis did find a U-shaped relationship between social performance and the market value of an acquirer. Indicating that social investments do create value only after a certain threshold of investments is reached.

This thesis is structured as follows. In the following chapter, the *Theoretical Framework*, the hypotheses are set out underpinned by existing literature. Subsequently, we will discuss the sample

selection and data sources in the *Data* chapter. This also includes a discussion on the descriptive statistics and correlation within the sample. The model specifications and model selection choices are discussed in the *Methodology* section. The penultimate section encompasses discussing the results, which also includes the results of robustness checks and other analyses performed. Finally, this thesis ends with a *Conclusion* and discussion of the limitations.

2. Theoretical Framework

This section is structured by discussing the underlying literature according to different subjects and outlining multiple hypotheses. The link between ESG and Corporate Finance is the first subject to be discussed. Accordingly, ESG will be discussed and eventually, the focus will shift to the role of ESG in M&A. After considering the combined ESG score, the role of the individual pillars is contemplated.

2.1 ESG & Corporate Finance

Improving financial performance and reducing risk belong to the most common objectives for companies to perform mergers and acquisitions (M&A) (Chen et al., 2020). Within this scope of considerations, Environmental, Social, and Governance (ESG) aspects are becoming increasingly important. 65% of M&A executives expect that the focus on these aspects will increase in the upcoming three years (Van den Branden et al., 2022). A recent survey conducted by Bain & Company found that currently, only 11% of M&A executives assess ESG performance in the M&A process, in other words the least emphasized aspect in the transaction. Yet, by assessing a corporate ESG strategy of a potential target or asset, value opportunities can be created and are therefore becoming more relevant in the choices and success of Corporate Finance related matters (Van den Branden et al., 2022; Tang & Zhang, 2020; Flammer, 2021; Deng et al., 2013). Tang & Zhang (2020) and Flammer (2021) investigated the effect of green bond issuance by companies. Tang & Zhang (2020) found that the issuance of green bonds is beneficial for existing shareholders as it increased stock liquidity and stock performance. The effectiveness of green bonds was confirmed by Flammer (2021), who documented positive announcement returns, enhanced long-term operating performance, and increased environmental performance and green innovations. When looking into M&A transactions, Deng et al. (2013) found that high Corporate Social Responsibility (CSR) acquirers experience higher announcement returns and increased long-term operating performance. In addition, the success rate of transactions is higher for high CSR acquirers and the process is often less time-consuming. To compare the sustainability performance between different entities, Refinitiv (n.d.) came up with the ESG score. The ESG score is a sustainability performance measure based on public data available and relative to other players within the sector and country of incorporation.

Van den Branden et al. (2022) state that there are 2 types of ESG-related M&A strategies. ESG-motivated and ESG-conscious M&A. ESG-motivated strategies are transactions to enhance the acquirer's ESG performance, whereas ESG-conscious M&A do take ESG aspects into account in the process of the transaction, e.g. due diligence on the carbon footprint, to see if the sustainability

goals are aligned (Van den Branden et al., 2022). ESG aspects contain amongst others a corporation's air and water pollution, waste management, data protection, human rights, board composition, and many other factors (CFA Institute, 2022).

2.2 ESG & M&A

Only limited literature is available that discusses the role of ESG within the M&A framework. Firstly, Hong et al. (2022) found that the pre-merger ESG score of the target positively influences the success rate of M&A transactions, and the positive influence is even stronger for the pre-merger ESG score of the acquirer. This is in line with the findings of Deng et al. (2013). The reversed effect was discussed by Barros et al. (2022), who investigated the role of M&A deals worldwide on the combined ESG performance of the acquirer and the separate pillars: Environmental, Social, and Governance. The results showed a positive effect of M&A deals a year after the transaction on the combined ESG scores, the environmental score, and the social score, yet the results for the governance score were inconclusive. These results imply that ESG performance has become increasingly important in the M&A process, partly explained by the scrutiny of authorities and the public (Barros et al., 2022). Yet, Barros et al. (2022) do not discuss the difference between the target and acquirer pre-merger and post-merger ESG performance. Amongst a few others (Ung & Urfe, 2011; Tampakoudis & Anagnosopoulou, 2020), Aktas et al. (2011) do take this difference into consideration and found evidence for learning capabilities when acquiring a better-rated target. The potential for these capabilities increases when the pre-merger sustainability score spread increases between the target and acquirer. These results are found for the overall sustainability rating and the social and environmental scores, governance is left out as a specific pillar (Aktas et al, 2011). The research conducted by Aktas et al. (2021) used Innovest's Intangible Value Assessment (IVA) ratings as a sustainability measure, these ratings are expressed in letters making them less accurate than the ESG scores. Tampakoudis & Anagnostopoulou (2020) did use ESG scores and found that acquiring a target with a higher ESG performance in the pre-merger stage will increase ESG performance post-merger. This is in line with the learning capabilities hypothesis of Aktas et al. (2011). According to the previously discussed literature, the first hypothesis is made:

Hypothesis 1a: The higher the target's pre-merger ESG score compared to the acquirer's pre-merger ESG score, the higher the acquirer's post-merger ESG score

Furthermore, previous research concluded that, as a company, it can pay to be green. Companies with a higher ESG score, tend to have greater operating performance and higher valuations (Awaysheh et al., 2020). In addition, Huang (2021) found that there is a beneficial

relationship between ESG performance and financial performance. Within the M&A field, Ung & Urfe (2021) found that ESG performances, especially good use of resources, considerable human rights and strong management, positively affect the acquisition premium. However, the effect on the premium paid is less for targets that have high analyst coverage as analysts' reports can partly take away the positive side effects of ESG reporting, which alleviates information asymmetries and eases risk mitigation. In related research, Chen (2021) investigated the footprint of ESG risks of the acquirer and target on deal value to assess the short run and the acquirer's operating metrics to assess the effect in the long run. For the overall ESG score, Chen (2021) found that ESG risks lead to higher acquisition premiums which is an ambivalent result as generally less is paid when there is more risk involved. The researcher fails to explain this finding. In addition, Chen (2021) found insignificant results for the effect of environmental risk on deal value but did find negative influences of social and governance risk of both the target and acquirer. In the long run, target ESG risk is rarely an indicator of post-merger performance as this is more determined by the acquirer's overall ESG risk exposure. The individual components show other results in the long run: environmental risk acts as a pure risk, and social and governance risks provide opportunities for fixes in the long run which can positively affect financial performance.

Chen (2021) is, as far as our knowledge goes, the only one that discusses the individual components of ESG on the acquirers' performance, other literature available discusses the combined ESG score (Feng, 2021; Kim et al., 2022; Tampakoudis et al., 2021).

Feng (2021) discussed the effect of the pre-merger combined ESG performance on the acquirer's profitability and stock price by using an interaction effect of the pre-merger ESG performance of the target and acquirer. The overall results did not find any significant results for the pre-merger ESG score of the acquirer and target. However, when the score was segmented into high, medium, and low, Feng (2021) did find that profitability (ROA) decreases for low ESG acquirers as ESG scores of targets get higher. In line with this, Kim, Jung & Cho (2022) investigated the effect of the acquirer's pre-merger ESG score and found that this has a positive effect on profitability within cross-border M&A in Asian emerging markets. However, Tampakoudis et al. (2021) showed that there can be a negative relationship between the acquirer's ESG performance upon merger announcements and its market's reaction before and during the pandemic for U.S. firms. Results provide an indication for the overinvestment hypothesis as the ESG performance shows negative value effects, to some extent even stronger during the pandemic.

A great limitation in the research of Barros et al. (2022), Hong et al. (2022), Feng (2021), Kim et al. (2022), Tampakoudis et al. (2021), and Chen (2021) is that they fail to take the change in ESG performance pre- and post-merger into consideration. This is done by Aktas et al. (2011) who found

that acquisitions of sustainability, and more specifically socially and environmentally, responsible targets increase the acquirer's 3-day abnormal returns. For a visual overview of all literature discussed in this section, please refer to table 1.

Table 1: Literature Review M&A and ESG

Research	Dependent Variable(s)	ESG Score Target	ESG Score Acquirer	Separate ESG Pillars	ΔESG Pre- and Post-merger	ΔESG Target and Acquirer
Barros et al. (2022)	ESG Environmental Social Governance		✓	✓		
Hong et al. (2022)	Success rate of M&A	✓				
Kim et al. (2022)	Profitability acquirer	✓				
Feng (2021)	Profitability acquirer Stock price acquirer	✓	✓			
Ung & Urfe (2021)	Acquisition premium	✓	✓	~ ⁽¹⁾	✓	✓
Chen (2021)	Deal Value & Acquisition Premium (Short-term) Operating Metrics Acquirer (Long-term)	~ ⁽²⁾	~ ⁽²⁾	✓		
Tampakoudis et al. (2021)	Market reaction		✓			
Tampakoudis & Anagnostopoulou (2020)	ESG Market Value	✓	✓		✓	✓
Aktas et al. (2011)	Acquirer CAR Target CAR Deal CAR	~ ⁽³⁾	~ ⁽³⁾	~ ⁽⁴⁾	~ ⁽³⁾	~ ⁽³⁾
This research	ESG Market Value	✓	✓	✓	✓	✓

Notes: (1) Splits pillars into categories. (2) Uses ESG risk instead of ESG score. (3) Uses IVA ratings as the combined score which are less accurate as the Refinitiv's ESG score. (4) Only discusses the Environmental & Social Pillars.

Tampakoudis & Anagnostopoulou (2020) also account for the change in ESG performance pre- and post-merger and found that the enhanced ESG performance has a positive effect on the market value of the acquirer post-merger. A limitation of the research of Tampakoudis & Anagnostopoulou (2020) is that they do not control for capital intensity. Capital intensity is known to have a negative effect on the ESG score of the acquirer, and for this reason, tangibility should be added as a control variable (Barros et al., 2022). Excluding significant control variables could highly impact the outcome of research as it can cause large variations (Brooks, 2019). For further discussion on the control variables, please view the chapter 3.2 *Variables*.

This research expects similar results to these of Tampakoudis & Anagnostopoulou (2020), resulting in the following two hypotheses:

Hypothesis 1b: The higher the target's pre-merger ESG score compared to the acquirer's pre-merger ESG score, the higher the acquirer's post-merger market value

Hypothesis 1c: There is a positive relationship between the enhanced ESG performance and the post-merger market value for the acquirer

As suggested by Chen (2021), ESG value creation in M&A is likely to be found in the individual pillars of ESG. For this reason, we will seek to investigate the effect of the change of the different pillars. Firstly, a broader definition of the build-up of the ESG score will be given. Subsequently, we will discuss the potential effect of each pillar on the post-merger E, S, and G score and the market value.

2.3 ESG Pillars

The ESG score is built up of 630 company-level ESG measures which can be subscribed to 10 main categories within the three pillars: Environmental, Social and Governance (Refinitiv, n.d.). 186 data points are comparable measures per industry. For the 10 category scores, Refinitiv uses a percentile rank scoring methodology. With this methodology Refinitiv (n.d.) reflects the performance against its competitors. The total score is then dependent on the weights per category. The weight of the main categories differs per industry. For this reason, the sum which results in the pillar weights also differ, please view *Appendix A*, for an overview of these weights per industry. Only for the community category, a part of the social pillar, the weight is the same across all industries as this is viewed as equally important. Also, the governance pillar has the same weights for all categories (Refinitiv, 2022). The Environmental Pillar measures resources used, emitted emissions, and innovation efforts. The Social Pillar indicates a score for the workforce, human rights,

community, and product responsibility of a company. The Governance Pillar provides measures for management, shareholders, and corporate social responsibility strategy. A graphical overview of the 10 main categories is given in *Figure 1*.

Figure 1: ESG Pillars Explained

ESG		
Environmental	Social	Governance
Resource use Water Energy Sustainable Packaging Environmental Supply Chain	Workforce Diversity & Inclusion Career Development & Training Working Conditions Health & Safety	Management Structure (Independence, Diversity, Committees) Compensation
Emissions Emissions Waste Biodiversity Environmental Management Systems	Human rights Human Rights	Shareholders Shareholder Rights Takeover Defences
Innovation Product Innovation Green Revenues, R&D & CapEx	Community Community Relationships Protection of Public Health Respecting Business Ethics	CSR strategy CSR Strategy ESG Reporting & Transparency
	Product Responsibility Responsible Marketing Product Quality Data Privacy	

Note: Retrieved from Refinitiv (2022).

2.4 Post-merger Performance and Environmental Performance

Firstly, the Environmental Performance. There is only limited literature available that discusses the transferability of environmental performance. Eng & Fikru (2020) investigated environmental performance within Food & Beverages M&A and used toxic chemical management as the measurement for environmental performance. The authors found evidence for positive effects of a target’s superior pre-acquisition environmental performance on the post-acquisition environmental performance of the acquirer and target. For this reason, we also expect positive synergy effects when acquiring a target with a superior environmental performance. However, when acquiring a target with less environmental performance, it was found by Eng & Fikru (2020) that

there may be learning capabilities transferred to the target, but this does not affect the performance of the acquirer (Eng & Fikru, 2020). These findings may assume that acquirers are often larger than targets and that an acquisition of a smaller company that scores less is often offset with improvements for the target resulting in no harm to the post-merger environmental performance of the acquirer. In contrast, we do expect an effect on the post-merger environmental performance as the final environmental performance of the acquirer is also based on the performance of its subsidiaries. This means we expect a two-side effect, e.g., an initial positive effect on the acquirer's performance when acquiring a target with superior performance and a negative effect on the environmental score when acquiring a target with less environmental performance. When a target has an initial lower score than the acquirer, it will converge to the score of the acquirer as they will adopt similar environmental efforts through learning capabilities. The strength of convergence is dependent on the relative performance pre-merger. In summary, when the pre-merger performance of the target is performing very bad in comparison to the acquirer, it is expected to be of worse impact on the post-merger performance of the acquirer. In line with this, the following hypothesis is made:

Hypothesis 2a: The higher the target's pre-merger environmental score compared to the acquirer's pre-merger environmental score, the higher the acquirer's post-merger environmental score

Furthermore, the current environment stresses companies to fulfil a multitude of environmental obligations and the importance of complying with these rules is also widely recognized by investors (Ionescu et al., 2019). Yet, environmental investments can be considered costly without a great payoff. Jacobs, Singhal, & Subramanian (2010) investigated the stock market reaction of U.S. companies to environmental performance announcements. They did not find any significant results for aggregated announcements; however, they did find significant results for specific announcements. Jacobs et al. (2010) found significant positive market reactions to ISO 14001 certification announcements, excluding the announcement of charitable gifts for environmental reductions associated as this resulted in a negative market reaction. Another research conducted by Fisher, Vanden & Thorburn (2011) investigated the stock market reaction to two voluntary environmental initiatives, EPA's Climate Leaders and Ceres, in which they found that overall commitments to mitigate greenhouse gasses contradict firm value maximization. Negative effects of environmental efforts were also confirmed by the research of Lyon, Lu, & Yin (2013) held for Chinese companies, the results show that Green Company Awards have a negative effect on the company's shareholder value whereas peers of winning firms showed higher announcement returns. In addition, Lyon et al. (2013) found that the negative effect is even stronger for firms in

low-pollution industries and privately-owned firms. On the other hand, firms in high-pollution industries did not experience negative effects, indicating that there are positive incentives for environmental efforts.

Ionescu et al. (2019) found an inverse effect for environmental factors on the market value of travel and tourism companies which can be explained by the value-enhancing theory. Other papers, for example, the paper of Van Essen (2018), Miralles-Quirós et al. (2019) and that of Nguyen (2022) show a more positive outlook. The theory behind this is that environmental efforts are valuable for a company's future from the perspective of financial stakeholders (Miralles-Quirós et al., 2019).

Van Essen (2018) investigated a sample of worldwide M&A transactions and found that the target's environmental performance positively affects the acquirer's environmental performance when it is lagging, and this effect becomes even stronger the larger the difference is between the performance of the acquirer and target. The enhanced environmental performance has a positive impact on the financial performance. These findings were also confirmed by Miralles-Quirós et al. (2019) who found that for banks there is a positive and significant relationship between environmental performance and Tobin's Q. Positive market reactions for acquirers of environmentally aware targets were also confirmed by Aktas et al. (2011). In addition, Semenova, Hassel, & Nilsson (2010) investigated the market value of SIX 300 Companies listed on the OMX in Stockholm and found that environmental performance positively affects the value of a company. On the other hand, Nguyen (2022) found evidence for a U-shaped relationship between environmental performance and a company's financial performance, at first environmental efforts can deteriorate the financial performance but after a certain threshold has been reached this effect will reverse. That there may be a U-shaped relationship between the financial performance, in this case, the market value, and environmental activities was confirmed by Ersoy et al. (2022) who investigated the U.S. Banking Industry and Lahouel et al. (2020) who investigated a panel of French Companies. Ersoy et al. (2022) provided evidence for long-term positive effects of environmental performance on market value, however Lahouel et al. (2020) provided evidence for the opposite. Within this research, it is expected that it is unlikely to show a U-shaped relationship. This is because the sample mainly consists of large companies, on which it is expected that the ESG performance, including the individual components, has already reached the threshold where the sign of the effect flips. Based on the findings of Van Essen (2018), Nguyen (2022) and Ersoy et al. (2022), a positive relationship is anticipated:

Hypothesis 2b: The higher the target's pre-merger environmental score compared to the acquirer's pre-merger environmental score, the higher the acquirer's post-merger market value

Hypothesis 2c: There is a positive relationship between the enhanced environmental score and the post-merger market value for the acquirer

2.5 Post-merger Performance and Social Performance

Secondly, social performance. The social pillar is based on a score for the following subjects: Workforce (diversity, inclusion, working conditions, health, and safety), Human rights, Community, and Product Responsibility (responsible marketing, product quality, data privacy) (Ersoy et al., 2022). As far as our knowledge goes, there is no literature available that discusses the convergence of social performance between the acquirer and target in M&A transactions. For this reason, it is expected that like environmental performance, there are learning capabilities for social performance as an acquirer. The following hypothesis is made:

Hypothesis 3a: The higher the target's pre-merger social score compared to the acquirer's pre-merger social score, the higher the acquirer's post-merger social score

The effect of social performance on the financial performance is more widely discussed in existing literature. Research conducted by Stähler & Fischer (2020) investigated the effect of Corporate Social Irresponsibility (CSI) on the stock market and reported a negative effect when four or more high reach media outlets report on the event, on average the financial loss amounted \$321 million. Within the M&A playfield, the deal value is negatively impacted when the social risk accumulates in either the target or the acquirer (Chen, 2021). On the contrary, Van Essen (2018) found no significant effect of social performance on the acquirer's abnormal return.

Further research that discusses the link between social and financial performance, often involves the banking industry. Miralles-Quirós et al. (2019) found that the relationship between social performance, e.g., concern for human rights, equal opportunities in employment, diversity etc., and Tobin's Q is negative for European banks, in emerging markets or with headquarters in civil law countries. Ersoy et al. (2022) found evidence for an inverted U-shaped relationship between social performance and bank market value, this indicates that after a certain threshold, social investments do not contribute to maximizing value whereas earlier they did. Contrary to this, most literature does provide evidence for a positive relationship between the corporate social performance components and financial performance (Waddock & Graves, 1998; Edmans, 2012; Esteban-Sánchez et al., 2017; Simpson & Kohers, 2011).

Waddock & Graves (1998) found a positive relationship between corporate social performance and future financial performance as a result of good management. High employee satisfaction, which is a category within the social performance metrics, may result in long-term

abnormal returns for companies (Edmans, 2012; Esteban-Sánchez et al., 2017). In addition, community involvement can result in greater financial performance for banks (Simpson & Kohers, 2011). Aktas et al. (2011) also found that the market rewards acquirers that make acquisitions of socially aware targets. Based on this information and the learning capabilities assumption the following hypotheses are made:

Hypothesis 3b: The higher the target's pre-merger social score compared to the acquirer's pre-merger social score, the higher the acquirer's post-merger market value

Hypothesis 3c: There is a positive relationship between the enhanced social score and the post-merger market value for the acquirer

2.6 Post-merger Performance and Governance Performance

Finally, the Governance Performance. This pillar is based on a score of the following subjects: Management Structure (independence, diversity, committees, and compensation), Shareholders (shareholder rights and takeover defences), and Corporate Social Responsibility (CSR) Strategy (CSR strategy, ESG reporting and transparency) (Ersoy et al., 2022). Responsible governance reduces the agency's problems with financial stakeholders as it guarantees accountability, compliance and transparency (Morales-Quirós, 2019).

Wang & Xie (2009) investigated M&A within the U.S. and presented evidence for synergy effects of corporate governance, e.g., the higher the acquirer's shareholder rights relative to the target's, the higher the acquisition synergy. On a cross-border level, governance convergence is confirmed by Drobetz & Momtaz (2020). As an acquirer with relatively stronger investor protection, there are significant positive governance wealth effects on the target (Albuquerque et al., 2019). The wealth effects were endorsed by the results of Martynova and Renneboog (2008). Albuquerque et al. (2019) even found that the spill-over effects are significant positively to the entire target firm's industry and even result in increases in investments in nontarget firms in the target firm's industry. In contrast to the target and the target's industry, Drobetz & Momtaz (2020) found no significant wealth effects for the bidder, whether the target had either stronger or weaker governance performing targets. This is in line with the findings of Barros et al. (2022) as they find inconclusive results of M&A transactions on the governance performance a year after the transaction. However, in line with the synergy effects found by Wang & Xie, the following hypothesis is made:

Hypothesis 4a: The higher the target's pre-merger governance score compared to the acquirer's pre-merger governance score, the higher the acquirer's post-merger governance score

When discussing the financial performance, Bris et al. (2008) and Martynova & Renneboog (2010) found that within cross-border M&A, the target's Tobin's Q increases when acquired by a company that is from a country with better shareholder protection and accounting standards. This is as a result of legalisation that causes targets to adopt the governance system of the acquirer (Bris et al., 2008). Better shareholder protection and accounting standards are components of good governance, and when this increases it was found to be contributing to the Tobin's Q. In the previous section we discussed that we assume synergy effects for the governance performance in M&A transactions. Thus, targets will converge to the governance performance of the acquirer and vice versa. Since it is expected that the pre-merger governance performance of the target positively affects the post-merger governance performance, it is also expected to have a positive effect on the post-merger market value. These expectations result in the following hypothesis:

Hypothesis 4b: The higher the target's pre-merger governance score compared to the acquirer's pre-merger governance score, the higher the acquirer's post-merger market value

Moreover, the market values companies that willingly adopt better governance practices by a positive valuation (Bris et al., 2008). Ionescu et al. (2019) found that good governance contributes to the market value, independent of the geographic region a company is located in. It is anticipated that an enhanced governance performance will therefore result in a higher market value, leading to the following hypothesis:

Hypothesis 4c: There is a positive relationship between the enhanced governance score and the post-merger market value for the acquirer

3. Data

The following chapter contains information on the data used to investigate the value-added effects of ESG targets. Firstly, the type of data and how the data was derived will be discussed. Following, the type of variables will be further explained. The chapter ends with an overview of the descriptive statistics of all variables and by considering possible correlations.

3.1 Data & Sample Selection

For this research, initially, a mixture of cross-sectional and time-series data is collected. Foremost, data on M&A transactions with a target in Europe that became effective between 2003 and 2020 is collected. For the transactions, the ESG score, and financial metrics are investigated a year before and after the transaction (pre- and post-merger). Since it is expected that it takes a longer period to implement ESG-related investments (Barros et al., 2022), we will initially look at the difference in ESG performance year before the transaction and a year after the transaction. For robustness checks, we will also include the same year as the transaction and even two years after the transaction. Since the ESG score is only available from 2002 onwards, the chosen period for transactions starts in 2003. In addition, 2021 is the most recent year that has available ESG scores. The timespan was designed to include as many transactions as possible to increase overall sample size.

Thomson Reuters was consulted to subtract the first set of data, which includes all M&A transactions in Europe during the sample period. The M&A transactions are subject to the following criteria:

- The acquirer and the target should be headquartered in Europe
- The acquirer and the target be public companies. ESG data is more often available for public companies
- The transaction should be completed between 2003 and 2020
- The deal value must exceed \$1m to circumvent the effects of small deals (Tampakoudis et al., 2021; Alexandridis et al., 2013; Masulis et al., 2007; Moeller et al., 2004)
- Repurchases, exchange offers, self-tenders, and recapitalizations are excluded from the final sample

The first cross-sectional dataset includes 2,179 transactions. Within this dataset, the Datastream code is used to identify and match data from other databases. Transactions with blanks for this identifier were removed, which resulted in 2,030 transactions. Accordingly, the Thomson Reuters ESG database was consulted through Datastream to subtract the yearly ESG data for the

acquirer and the target. The database calculates the ESG scores for over +6,000 public companies globally using publicly made available information for over 750+ indicators (De Wit, 2021; Thomson Reuters, 2011). The ESG data collected encompassed the years 2002 until 2021. Following, the ESG, E, S, and G scores were matched to the transactions' acquirer and target the year before and after the transaction. Barros et al. (2022) found that the effect of M&A deals on the ESG score are not reflected in the year in which the deal is agreed upon. For this reason, the ESG score and its individual components in the subsequent year after the transaction will be used to compare the pre- and post-merger sustainability performances. Since the ESG scores are not available for all companies within the original dataset, the transactions lacking ESG data for both the acquirer and target were removed from the dataset. This resulted in a final dataset of 77 transactions. A small sample set was expected since we only look at M&A that occurred between the +6,000 public companies that have an ESG score.

Finally, the dataset is supplemented with time-series financial data of the acquirer through the database WorldScope. Since most of the financial variables are balance sheet items, it is chosen to use annual data. Eventually, the final dataset only encompassed the financial and ESG data a year before and after the transaction.

3.2 Variables

3.2.1 Dependent Variables

The dependent variables within this research are the change in the ESG score and its individual components, respectively environmental, social, and governance, followed by the change in the market value. For all the variables the change is calculated as a ratio by dividing the absolute difference (value post-merger – value pre-merger) with the pre-merger value.

The remainder of the hypotheses has the change in market value as the dependent variable. Tobin's Q is commonly used as a predictor for the value of a company (Ionescu et al., 2019; Yermack, 1996; Eisenberg et al., 1998). The higher the Tobin's Q, the greater the growth potential for a company as it indicates the firm's ability to invest more (Kwon et al., 2018). Kaldor (1966) was the first one to introduce Tobin's Q to represent a fair market value. In short, Tobin's Q is calculated by dividing the market value of a company with the book value of its total assets (Refinitiv, n.d.). The extensive calculation of Tobin's Q, which is also used by Datastream (Refinitiv, n.d.; Stanford Graduate School of Business, n.d.), thus used in this research, is calculated by:

$$\begin{aligned}
 & \textit{Tobin's Q} \\
 & = \frac{\textit{MV Equity} + \textit{Preferred Stock} + \textit{LT Debt} + \textit{ST Debt} + \textit{Current portion of LT Debt}}{\textit{Total Assets}}
 \end{aligned}$$

A high Tobin's Q, presented by a value greater than 1, may indicate an overvalued stock as the replacement costs of the assets are less than the current stock value. A Tobin's Q between 0 and 1 may indicate an undervalued stock (Rolle et al., 2020).

3.2.2 Explanatory Variables

The explanatory variables within this research differ per hypothesis. For hypothesis 1a the explanatory variable is the difference between the pre-merger, so a year before the transaction, ESG score of the acquirer and target. This variable is presented by dividing the ESG score of the target by the ESG score of the acquirer. When the pre-merger score of the target is greater than the acquirer, this variable will have a value greater than 1. For hypotheses 2a, 2b, 2c, 3a, 3b, 3c, 4a, and 4b the explanatory variables are also the difference between the pre-merger scores of the acquirer and target, yet the respective metrics are now the individual components of ESG: environmental, social, and governance.

Finally, the difference in the scores pre- and post-merger for the acquirer are the explanatory variables for the market value post-merger. For hypothesis 1c this is the difference in the ESG score. Environmental, social and governance scores are the explanatory variables for hypotheses 2d, 3d and 4c. We added these hypotheses as they give more insights into the value contributed by changes within the ESG, environmental, social, and governance scores.

3.2.3 Control Variables | Difference in ESG, E, S and G Scores

Hypothesis 1a has the difference in ESG score as the dependent variable. The difference is calculated for the acquirer pre- and post-merger. The important independent variables were discussed earlier. To improve the internal validity of the regressions, control variables are added to the regressions.

Comparable to Tampakoudis & Anagnostopoulou (2020), the following control variables that apply to the acquirer are added to the regression as control variables: (i) *difference in profitability*; (ii) *difference in size*; (iii) *difference in leverage*. All differences mentioned are for the acquirer pre- and post-merger. D'Amato, D'Ecclesia & Levantesi (2022) found that balance sheet items provide a crucial element to explain ESG scores.

Increased profitability is seen as a prerequisite of ESG adoption as profitable firms can invest in ESG measures (Chams et al., 2021). Profitable companies have the freedom to allocate money to projects that may take a longer period to reap the benefits. These types of projects are sustainability investments. ESG adoption is also a good preparation of the company to prepare itself for the future, whereas non-profitable companies are more focused on surviving. If companies are not profitable

(yet), they will not be able to dedicate a specific budget to sustainability investments, especially when you consider that sustainability investments are often costly (Chams et al., 2021). Similarly, companies with unreliable profits and financial scarcity, tend to prioritize investments to improve the financial goals of the company and the interests of the shareholders (Chams et al., 2021; Artiach et al., 2010). Tampakoudis & Anagnostopoulou (2020) and Ionescu et al. (2019) use ROA as a measure of profitability, whereas Barros et al. (2022) uses ROE. For this research, ROA will be used as a measure of profitability as this also takes the leverage of the company into account. ROA is a commonly used metric for profitability (Kwon et al., 2018; Bereskin et al., 2018; Eccles et al., 2014; Yu et al., 2018).

Size is included as it has a positive effect on the ESG score in multiple ways. Barros et al. (2022) found that large firms tend to have a higher ESG score which is likely caused by scale economies, greater efficiency, and greater scrutiny by authorities and the public to report on sustainability performance. Size has a positive effect on the ESG score, as larger firms have higher firm visibility, which increases the disclosure pressure for social and ecological aspects (Drempetic et al., 2019; Gamerschlag et al., 2011; Liang & Renneboog, 2016; Udayasankar, 2008). In addition, larger firms often have larger data availability and more resources available to disclose ESG information (Drempetic et al., 2019). The book value of all assets is taken as a metric for size, as this may vary a lot throughout the dataset, the natural logarithm of the book value is taken to make the data more normally distributed (Minitab, 2022).

When a company has less leverage, they are likely superior in sustainability performance which can be explained by better governance (Dalal & Thaker, 2019; Nadarajah et al., 2018). Subject to this are agency problems. Increased leverage can distort the relationship between shareholders and the management. Therefore, with less leverage, there is often a better alignment of manager's interests to those of shareholders, i.e. better governance (Nadarajah et al., 2018). On another note, companies with high leverage are under more scrutiny to report on ESG topics (Ghosh, 2013).

In addition to the control variables subscribed by Tampakoudis & Anagnostopoulou (2020), Barros et al. (2022) add (iv) *difference in liquidity* and (v) *difference in tangibility* as control variables to assess the implications of M&A deals on the acquiring firms' ESG scores.

Jensen (1986) suggests that high free cash flows may imply a potential agency problem as managers do not utilize the free cash to invest in projects that may further profit the company and its stakeholders, thus increasing the likelihood of sub-optimal investments. Liang & Renneboog (2016) found that agency problems are less prevalent in well-managed firms, thus it is expected that higher liquidity has a negative effect on the ESG score of the acquirer.

Table 2: Overview of All Variables

Variable Name	Name Full Out	Variable Description
ESG	ESG Score	ESG Score is an overall company score based on the self-reported information in the environmental, social and corporate governance pillars ⁽¹⁾
ENV	Environmental Score	Environmental Score is an overall company score based on the self-reported information in the environmental pillar ⁽¹⁾
SOC	Social Score	Social Score is an overall company score based on the self-reported information in the social pillar ⁽¹⁾
GOV	Governance Score	Governance Score is an overall company score based on the self-reported information in the governance pillar
MV	Tobin's Q	Tobin's Q as a metric for the size of the acquirer. Tobin's Q is calculated by adding the Market Value of the Equity to the Preferred Stock, Long Term Debt, Short Term Debt and the Current Portion of Long Term Debt. Following the sum should be divided by the book value of the Total Assets. All values are presented in \$
Profitability	Return on Assets	Return on Assets is calculated by dividing the Net Income with the book value of the Total Assets. Net Income & Total Assets are presented in \$
Size	Total Assets	Natural logarithm of the book value of the Total Assets in \$
Leverage	Leverage	Leverage is calculated by dividing the book value of the Total Liabilities with book value of the Total Assets. Total Liabilities & Total Assets are presented in \$
Tangibility	Tangibility	Tangibility is calculated by dividing the book value of the Property, Plant and Equipment with the book value of the Total Assets. PP&E & Total Assets are presented in \$
Liquidity	Liquidity	Liquidity is calculated by dividing the Current Assets with the Current Liabilities. Current Assets & Current Liabilities are presented in \$

Note: (1) Definition retrieved from Datastream.

Barros et al. (2022) found that tangibility, which captures the capital intensity and is measured as the portion of the tangible assets of the total assets, has a negative effect on the ESG score of the acquirer, especially on the environmental and social scores. This can partly be explained by the necessity of disclosure to reduce risks for higher intangibility ratio's (Özcan, 2020). Especially the governance aspect is being affected by tangibility as good intention and behaviour are under more scrutiny with higher intangibility levels (Klapper & Love, 2004; Himmelberg et al., 1999)

How these variables are defined is discussed in table 2. The above-mentioned control variables will also be used in the regressions that have the separate components of ESG as the dependent variable: change in Environmental, Social and Governance, e.g. hypotheses 2a, 3a, and 4a.

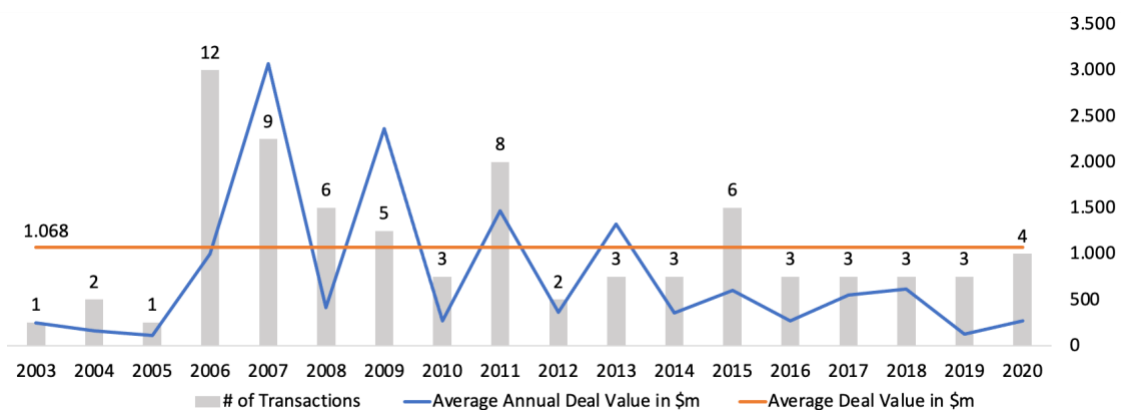
3.2.4 Control Variables | Difference in Market Value

For the other hypotheses, the dependent variable is the change in market value following an M&A transaction. As mentioned earlier, Tobin’s Q is used as a metric for a company’s value. The market value of equity reflects the market expectations of future cash flows based on current earnings. To reflect the current earnings, profitability, measured as ROA, is added as a control variable (Ionescu et al., 2019). Furthermore, size is added as a control variable as it is positively correlates with a company’s value (Mak & Kusnadi, 2005; Tampakoudis & Anagnostopoulou, 2019). In addition to profitability and size, leverage is added as a control variable (Tampakoudis & Anagnostopoulou, 2019; Yu et al., 2018; Kwon et al., 2018). As mentioned earlier, for a summarizing overview of all variables (independent, dependent and control variables), please view table 2.

3.3 Descriptive Statistics

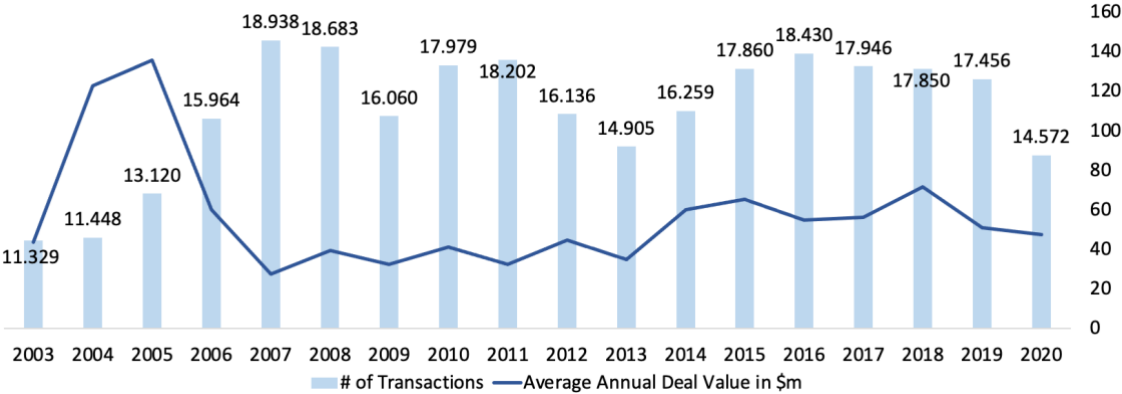
In table 3 the descriptive statistics for the final dataset are presented. For each variable t presents the time of the transaction, $t-1$ a year before the transaction and $t+1$ the observation a year after the transaction. The total dataset consists of 77 transactions that were completed between 2003 and 2020. In *Figure 2*, a yearly overview of all transactions included is provided. Even though our dataset only includes a limited number of transactions, the trend of the number of transactions shows similarities to the historical trendline, shown in *Figure 3*.

Figure 2: Sample Overview # of Transactions Per Year and Average Deal Value in \$m



To circumvent the effect of small deals, the criteria set for the transactions was that the deal value must exceed \$1m. This is still relatively small and since ESG data is often only available for larger deals, the smallest deal included in the sample has a deal value of \$20m. In summary, the sample selection criteria resulted in a final sample set with relatively high deal values. The average deal value of the transactions included was \$1bn. When we look at the annual average deal value, there are more fluctuations, with an average deal value ranging between \$111m and \$3bn. This is still a lot higher than the overall annual average deal value in Europe, which ranges between \$27m and \$135m over the same period.

Figure 3: European Historical Overview # of Transactions Per Year and Average Deal Value in \$m



Note: Retrieved from Statista, 2022.

A deeper dive into the ESG, E, S & G performance show that in contrast to expected, the ESG performance of the acquirers and targets is very diverse. Please view Figure 4 and Figure 5 for the histograms of the pre-merger performance of the acquirers and targets.

The average ESG performance of the acquirers increased from 57 pre-merger to 65 post-merger. The average increase of ESG performance for acquirers, $\Delta acqESG$, was 0.33, in other words, an increase of 33%. The average pre-merger ESG performance of the targets was lower at 51. For acquirers, the average performance of all individual components increased from pre-merger to post-merger. Most of the transactions encompass a target being acquired with inferior performance. Nonetheless, for respectively 27 of the 77 transactions, the pre-merger ESG, E and G performance of the target was superior to the performance of the acquirer. For 29 transactions, the S performance of the target was also greater than the acquirer.

For 7 transactions, the acquirer had an Environmental Performance of 0 before the acquisition. Since it is impossible to divide through 0, these 7 transactions led to no values for calculating $\Delta acqENV$ and $\frac{ENV_{target_{t-1}}}{ENV_{acq_{t-1}}}$, hence the difference in the number of observations. It was

chosen to not change the values of these observations to for example 0.0001 as this would lead to outliers for the previously mentioned variables.

Figure 4: Pre-merger Performance Distribution Acquirers

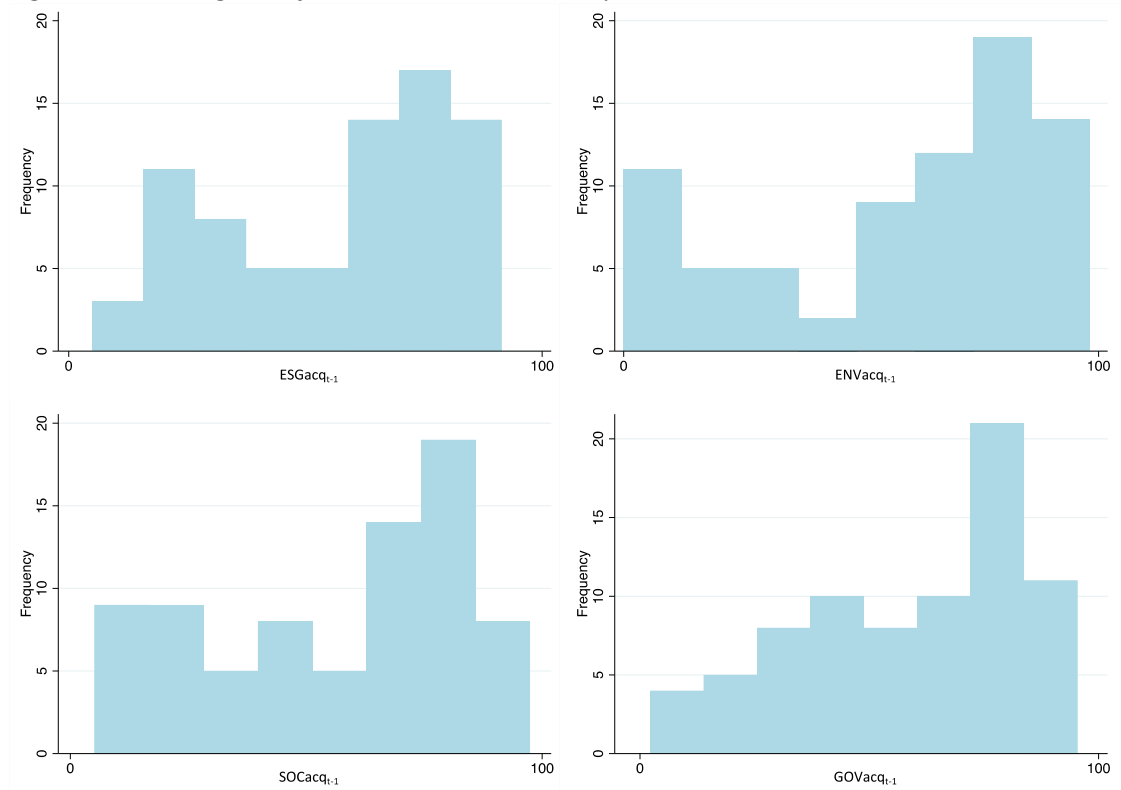
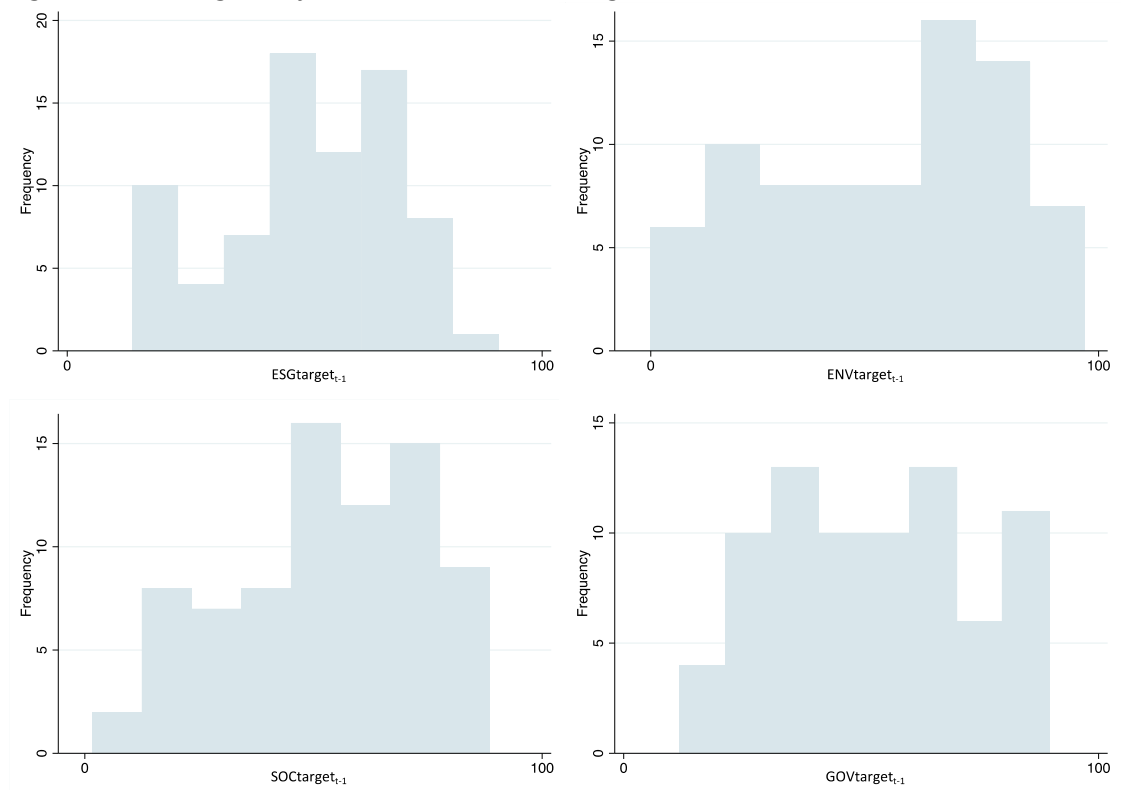


Figure 5: Pre-merger Performance Distribution Targets



The Tobin's Q was chosen as a proxy for the market value of the acquirer. The average Tobin's Q only slightly decreased from 0.73 pre-merger to 0.71 post-merger. The average Tobin's Q of the acquirers is relatively low, which may indicate that the stocks are undervalued. The highest Tobin's Q measured amongst acquirers is 1.37, which is a sign of perceived growth potential by investors.

Moreover, the firm-specific control variables. The first control variable is profitability, which was presented as the return on assets. Generally, a ROA of 5% is an indication of good profitability whereas 20% represents excellent profitability (Hargrave, 2022). The overall profitability of the acquirers is acceptable with a pre-merger ROA of 4%, however, this declines to an average of 3% post-merger. When looking at the individual acquirers, the sample ranges from acquirers that reported net losses up to 6%, to excellent performing companies with profitability above 20%. It stands out that the magnitudes of the losses and gains are higher after the acquisition.

The second control variable is size, size is the book value of the total assets of the acquirer. The largest balance sheet pre-merger consisted of \$7.7bn, whereas the smallest acquirer had \$882k worth of assets. To prevent these large outliers, within the regressions, the natural logarithm of size will be used. The average size across the acquirers increased from respectively \$413m pre-merger to \$467m.

Furthermore, leverage is a control variable. This variable indicates the portion of the total assets that are financed through debt. Pre-merger the highest leverage ratio measured was 1.02, this shows that the company is funded by a significant portion of debt, imposing high risks of default (CFI, 2022). The median leverage is 0.77 pre-merger and 0.79 post-merger. On average the leverage increased only slightly from 0.71 to 0.72 post-merger. This is logical, as new acquisitions are often financed through new debt.

Finally, Tangibility measures what part of the assets are tangible. Table 3 presents a minimum tangibility of 0.00, this is in fact not exactly 0 but .0001. The highest tangibility measured is 0.97, indicating that for this company 97% of the book value of the assets are tangible assets. The average tangibility decreased from 23% pre-merger to 21% post-merger.

Table 3: Descriptive Statistics

Variable	N	Mean	SD	Median	Min	Max
General Information Transactions						
<i>DealValueUSDMillions</i>	77	1,067.77	2,102.77	481.00	20.04	15,815.17
ESG, E, S & G Statistics						
<i>ESGacq_{t-1}</i>	77	56.78	25.13	65.23	5.09	91.43
<i>ESGacq_{t+1}</i>	77	64.80	22.66	70.34	10.40	91.79
<i>ENVacq_{t-1}</i>	77	58.06	31.16	70.39	0.00	98.11
<i>ENVacq_{t+1}</i>	77	67.65	25.67	74.65	0.00	98.49
<i>SOCacq_{t-1}</i>	77	56.83	28.16	65.84	5.12	97.44
<i>SOCacq_{t+1}</i>	77	66.42	25.62	74.52	4.60	96.54
<i>GOVacq_{t-1}</i>	77	58.36	25.15	64.29	2.27	95.39
<i>GOVacq_{t+1}</i>	77	60.44	26.27	67.85	4.68	95.98
<i>ESGtarget_{t-1}</i>	77	51.34	18.15	52.04	13.70	90.83
<i>ENVtarget_{t-1}</i>	77	52.83	26.72	59.96	0.00	96.79
<i>SOCtarget_{t-1}</i>	77	52.19	22.06	53.29	1.59	88.55
<i>GOVtarget_{t-1}</i>	77	52.26	20.88	53.66	11.86	89.47
$\frac{ESGacq_{t-1}}{ENVtarget_{t-1}}$	77	1.37	1.65	0.86	.25	9.10
$\frac{ENVacq_{t-1}}{SOCtarget_{t-1}}$	70	1.35	1.92	0.75	.24	10.17
$\frac{SOCacq_{t-1}}{GOVtarget_{t-1}}$	77	1.43	1.51	0.89	.24	6.69
$\frac{GOVacq_{t-1}}{GOVtarget_{t-1}}$	77	1.67	3.32	0.81	.23	20.40
ΔESG, E, S & G Statistics						
<i>$\Delta acqESG$</i>	77	0.33	0.68	0.07	-0.58	2.84
<i>$\Delta acqENV$</i>	70	0.49	1.60	0.07	-1.00	8.12
<i>$\Delta acqSOC$</i>	77	0.35	0.69	0.07	-0.46	2.40
<i>$\Delta acqGOV$</i>	77	0.15	0.57	0.03	-0.67	2.09
Market Value Statistics						
<i>MVacq_{t-1}</i>	77	0.73	0.30	0.78	0.07	1.37
<i>MVacq_{t+1}</i>	77	0.71	0.32	0.76	0.07	1.37
<i>$\Delta MVacq$</i>	77	-0.03	0.23	-0.05	0.70	0.52
Firm Specific Control Variables						
<i>acqProfitability_{t-1}</i>	77	0.04	0.05	0.02	-0.03	0.16
<i>acqProfitability_{t+1}</i>	77	0.03	0.04	0.01	-0.09	0.22
<i>$\Delta acqProfitability$</i>	77	-0.44	0.85	-0.25	-3.89	0.83
<i>acqSize_{t-1}</i>	77	4.13e+08	9.31e+08	6.14e+07	8.82e+05	7.17e+09
<i>acqSize_{t+1}</i>	77	4.67e+08	1.13e+09	7.43e+07	1.62e+06	9.24e+09
<i>$\Delta acqSize$</i>	77	0.46	0.67	0.18	-0.40	2.28
<i>acqLeverage_{t-1}</i>	77	0.70	0.24	0.77	0.05	1.02
<i>acqLeverage_{t+1}</i>	77	0.71	0.24	0.79	0.05	0.97
<i>$\Delta acqLeverage$</i>	77	0.03	0.13	0.00	-0.52	0.52
<i>acqTangibility_{t-1}</i>	77	0.23	0.26	0.10	0.00	0.97
<i>acqTangibility_{t+1}</i>	77	0.21	0.23	0.09	0.00	0.87
<i>$\Delta acqTangibility$</i>	77	0.24	1.70	0.00	-0.79	14.16

3.4 Correlation

In this section, the correlation between the variables will be discussed. The correlation coefficient, presented by R^s gives information on the percentage of variation shared between two variables (Ratner, 2009). R^2 can have any value between +1 and -1. The higher the absolute value, the stronger the correlation between the variables. +1/-1 denotes a perfect positive/negative linear relationship. For an overview of all correlations, please refer to Table 4.

Correlations can be segmented based on their relationship. A weak correlation is presented by a correlation between 0 and |0.3|. A moderate strong relationship is presented by a coefficient between |0.3| and |0.7|. Strong correlations are all correlations between |0.7| and |1| (Ratner, 2009). This segmentation is also shown in the correlation matrix.

All strong correlations in the matrix are between the ESG scores and its individual components, which is not surprising as they are dependent on each other. There is also a strong correlation between individual pillars, as the pre-merger environmental score shows a significant positive relationship of 0.8 with the pre-merger social score. More moderate correlations can be found between the acquirer's pre-merger governance score and the pre-merger social score.

Moreover, the difference in the market value of the acquirer is weakly correlated to the difference in governance performance. Changes in leverage and liquidity are moderately correlated to market value. Thus far, there is no relationship found between the difference in ESG score, environmental score and social performance in explaining the difference in the market value for the acquirer.

Preceding, a closer look into the control variables shows that the difference in the acquirer's profitability is moderately correlated to the difference in the ESG score of the acquirer. In addition to this, the matrix shows moderate correlations between the difference in profitability and the pre-merger ESG score, governance score and the difference in size for the acquirer. Size changes are moderately correlated to changes in the ESG, environmental and social score and to the pre-merger ESG, environmental, social score and governance score. Changes in leverage are moderately correlated to the pre-merger ESG, environmental and social performance. Next to this, the matrix shows a moderate correlation between tangibility and pre-merger social performance. The change in social performance also shows a significantly moderate positive relationship with changes in tangibility. Finally, changes in liquidity show a significantly moderate negative relationship with leverage.

3.4.1 Multicollinearity

The sample is inspected for any multicollinearity issues. Multicollinearity can result in less reliable outcomes as there is a relationship between the independent variables. Most of the independent variables show weak or moderately strong correlations, however, none of the R^2 coefficients exceeds the value of 0.7. In summary, after visual inspection, multicollinearity is not an issue within this research. This is once again tested for each individual regression through a Variance Inflation Factor (VIF) test. Correlation between variables amplifies the variance of predictor's coefficients. How much the variance is increased through correlation is specified through the VIF test (Daoud, 2017). VIF can be calculated through the following formula:

$$VIF = \frac{1}{1 - R^2}$$

The root of the outcome of the VIF test shows how much the standard errors (SE) of a coefficient are inflated, e.g., VIF outcome is 9, this indicates that the SE are three times larger than uncorrelated coefficients (Daoud, 2017). R^2 denotes the percentage of variance explained. When the outcome of the VIF test is above 5, there may be multicollinearity (Craney & Surles, 2002). This may be a reason to eliminate some variables of the regressions. Since this is not the case for any of the regressions, we do not need to account for any multicollinearity issues.

Table 4: Correlation Matrix

	Δ ESGacq	ESGtarget _{t-1}	ESGacq _{t-1}	Δ ENVvacq	ENVtarget _{t-1}	ENVvacq _{t-1}	Δ SOcacq	SOctarget _{t-1}	SOcacq _{t-1}	Δ GOvacq	GOVtarget _{t-1}	GOVvacq _{t-1}	Δ MVvacq	Δ Prof.	Δ Size	Δ Lev.	Δ Tang.	Δ Liq.
Δ ESGacq	1																	
ESGtarget _{t-1}	-0.140	1																
ESGacq _{t-1}	-0.647***	0.169	1															
Δ ENVvacq	0.877***	-0.262*	-0.690***	1														
ENVtarget _{t-1}	-0.0444	0.777***	0.0794	-0.0843	1													
ENVvacq _{t-1}	-0.596***	0.218	0.876***	-0.716***	0.0919	1												
Δ SOcacq	0.262*	-0.159	-0.426***	0.310**	-0.249	-0.431***	1											
SOctarget _{t-1}	-0.136	0.880***	0.215	-0.271*	0.512***	0.260*	-0.0688	1										
SOcacq _{t-1}	-0.550***	0.159	0.931***	-0.637***	0.0216	0.796***	-0.452***	0.275*	1									
Δ GOvacq	0.393***	-0.221	-0.0821	0.171	-0.295*	0.0538	-0.0861	-0.0928	0.0406	1								
GOVtarget _{t-1}	-0.173	0.605***	0.138	-0.284*	0.195	0.160	0.0195	0.425***	0.0667	-0.191	1							
GOVvacq _{t-1}	-0.526***	0.0586	0.723***	-0.379**	0.0453	0.403***	-0.139	0.0269	0.530***	-0.391***	0.175	1						
Δ MVvacq	0.0148	-0.132	0.174	-0.00418	-0.233	0.0934	0.200	0.0500	0.162	0.261*	-0.127	0.206	1					
Δ Profitability	0.393***	-0.00421	-0.337**	0.251	-0.0876	-0.148	0.217	0.0347	-0.293*	0.288*	0.0508	-0.407***	-0.124	1				
Δ Size	0.539***	0.0398	-0.354**	0.418***	-0.179	-0.359**	0.371**	0.0819	-0.344**	0.00591	0.325**	-0.115	-0.182	0.430***	1			
Δ Leverage	-0.0630	-0.409***	-0.0896	0.192	-0.486***	-0.166	0.251	-0.335**	-0.211	-0.0984	-0.0220	0.235	0.379**	-0.0875	0.0590	1		
Δ Tangibility	-0.145	0.223	0.0197	-0.177	0.0263	0.0416	0.355**	0.378**	0.0961	-0.185	0.146	-0.136	0.0901	-0.149	0.0269	-0.0303	1	
Δ Liquidity	-0.0802	0.216	0.105	-0.192	0.225	0.135	-0.0745	0.132	0.150	-0.160	0.182	-0.0285	-0.496***	0.196	0.153	-0.504***	-0.00778	1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

$0 < R^2 < |0.3|$ = Weak linear relationship

$|0.3| < R^2 < |0.7|$ = Moderate strong relationship

$|0.7| < R^2 < |1|$ = Strong linear relationship

4. Methodology

This research seeks to investigate the value-add effects on the market value and ESG, E, S and G performance by acquiring ESG targets. Since Barros et al. (2022) found that the effect of M&A deals on the ESG score are not reflected in the year in which the deal is agreed upon, the methodology for this research does not encompass an event-study. We will however compare the ESG and its individual components' performance a year before and after the transaction. To estimate the relationship between the explanatory variables, the control variables and the dependent variables, several regressions are run in the Statistical Software Stata. The final dataset is primarily cross-sectional data. For this reason, Ordinary Least Squares Regressions (OLS) will be run.

The following section will set out the model specifications used to test the hypotheses. Following each regression model will be subject to checks for model selection. In 3.4.1 *Multicollinearity* it was already checked if there were any potential issues with multicollinearity. To continue on this, in section 4.2 *Model Selection*, we will control for potential non-normally distributed errors, independency issues, and heteroskedasticity issues.

4.1 Model Specifications

In chapter 3. *Data* the variables used for each hypothesis were briefly discussed. For a visual representation of the formulas of the regressions used to investigate the hypotheses, please refer to *Appendix C*. In total 12 regression models will be presented. The models are discussed in the same order as the hypotheses are presented in the Theoretical Framework. Foremost, we will discuss the hypotheses with the overall ESG score, followed by its individual components. For the overall ESG score, first the difference in the overall ESG score of the acquirer is regressed. Consecutive, the change in the market value explained by the respective pre-merger ESG performance is presented. Following, the change in the market value explained by the enhanced ESG performance of the acquirer is demonstrated.

Next, the models for the individual components, E, S and G, are given. As the set-up is relatively the same as for the combined ESG score, there is no explanation added to avoid repetition.

4.2 Model Selection

Through visual inspection of the correlation matrix and the VIF tests, all regressions were already inspected for multicollinearity. Following, all regressions are tested for heteroskedasticity using the Breusch–Pagan/Cook–Weisberg test. Under the null hypothesis, the test assumes normal error terms. When this test shows significant results, robust standard errors should be used. Some regressions showed significant results for the Breusch–Pagan/Cook–Weisberg test, indicating that the confidence interval may be too wide (Odhiambo, 2021).

Another assumption of OLS regressions that should be met is a normal distribution of the standard errors. This is tested through the Shapiro-Wilk test and through visual inspection. When the Shapiro-Wilk test shows significant results, it can be an indication of non-normal distributed data. For some of the regressions, the Shapiro-Wilk showed significant results under a significance level of 5%. However, roughly all regressions show after visual inspection normally distributed errors, some imperfections can be explained by the small dataset.

Furthermore, the assumption of independence is among the conditions for OLS regressions (Odhiambo, 2021). A closer look into the sample shows that some transactions are related to each other as they have the same acquirers. The standard errors can therefore be smaller than originally expected (Statology, 2021). For an overview of all acquirers and their frequency, please view *Appendix B*. Most acquirers occur only once in the sample, but some acquirers are more often present with a maximum of up to 5 times. In total there are 50 acquirers in the sample of 77 transactions, 30% of the acquirers i.e., 15 acquirers, occur more often. In total these 15 acquirers have made 42 transactions, which is 55% of the transactions included in the sample. As 55% of the sample may be related to other transactions through the same acquirer, we will use clustered standard errors. In this specific case, clustered standard errors will make the models more reliable.

5. Results

In this section the results of the OLS regressions are presented. First, we will discuss the value-add effects of the combined ESG performance, followed by its individual components: Environmental, social & governance. Following robustness checks will be performed and discussed. Based on the results presented, additional regressions are performed, which will be discussed in *5.6 Additional Analysis*.

5.1 ESG | Hypothesis 1

First, we will discuss the value-add effects of the target's ESG performance. For the regression results, please refer to table 5, column 1. The F-test, shown below in the regression table, is a test to see if the combined mix of the independent variables has any explanatory value in regressing the changes in the ESG performance for the acquirer. The F-test has the following hypotheses:

$H_0: \beta_i = 0, i=\{1,2,3,4,5\}$ (The y-intercept has more explanatory value)

$H_a: \beta_i \neq 0, i=\{1,2,3,4,5\}$ (The full model has more explanatory value)

When the F-test shows significant results, the combined set of independent variables has more explanatory value than the model based on the y-intercept alone, i.e. a model without any independent variables (Penn State, n.d.; Frost, 2017). Even though the F-test shows significant results for the variables together, this does not necessarily indicate that the variables stand-alone will show a significant effect. The p-value of the overall F-test shown in column 1 has a value of 0, this is lower than the significance level of 5%. Consequently, it is concluded that the full model with five independent variables has more explanatory value than the y-intercept model.

Hypothesis 1a stated that the higher the target's pre-merger ESG score compared to the acquirer's pre-merger ESG score, the higher the acquirer's post-merger ESG score will be. The results shown in table 5, column 1, confirm these expectations by showing significant positive results for the coefficient of the first variable, $\frac{ESG_{target_{t-1}}}{ESG_{acq_{t-1}}}$. The coefficient of 0.25 indicates that for example, when a target's ESG score is 10% higher, the ESG score of the acquirer will increase by approximately 0.275. These results are in line with the findings of Tampakoudis & Anagnostopoulou (2020), who found a significant coefficient of 0.29, and confirm that there may be learning capabilities when acquiring a target with a higher ESG score.

The R-squared shows how much of the total variance is explained by the model (Frost, 2018). When calculating the R-squared, the process of adding variables, if they are significant or not, will automatically result in a higher R-squared (Bhalla, 2014). The Adjusted R-squared only presents the variation that is explained by significant variables (Bhalla, 2014). For this reason, only the Adjusted R-squared is presented in the regression tables. In comparison to Tampakoudis & Anagnostopoulou (2020), an Adjusted R-squared of 0.174 vs an Adjusted R-squared of 0.599 for our model presented in column 1,

our model has a higher explanatory value in explaining the change in ESG performance. Tampakoudis & Anagnostopoulou (2020) performed a similar regression, however, left out the tangibility control variable, which does show significant results in our overview and contributes to the explanatory value of the model. Taking the beforementioned into account and acknowledging the fact that the sample is relatively small, the adjusted R-squared, shown in column 1, is still relatively high. This is likely caused by correlation between the dependent and the important independent variable. The relative pre-merger performance includes the pre-merger performance of the acquirer as the denominator. It can be argued that the stand-alone pre-merger performance of the acquirer is related to the post-merger performance of the acquirer. The correlation matrix, table 4, confirms this by showing that for the overall ESG and its individual components, the pre-merger performance is moderately strong to strongly correlated to the change in sustainability performance.

Table 5: Results ESG Regressions

Dependent Variable	(1) ΔESGacq	(2) ΔMVacq	(3) ΔMVacq
$\frac{ESGtarget_{t-1}}{ESGacq_{t-1}}$	0.25*** (0.03)	-0.00 (0.01)	
ΔESGacq			0.10 (0.08)
ΔProfitability	0.05 (0.06)	0.04 (0.04)	0.03 (0.03)
ΔSize	8.33** (4.14)	-1.42 (1.87)	-2.97 (1.87)
ΔLeverage	0.67 (0.40)	0.43** (0.21)	0.39* (0.23)
ΔTangibility	-0.07** (0.03)		
Constant	-0.13* (0.07)	0.01 (0.04)	-0.01 (0.04)
Observations	77	77	77
Adjusted R-squared	0.599	0.0215	0.0774
F-test	79.17	1.482	1.690
p-value	0	0.222	0.167

Robust standard errors in parentheses

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

ΔTangibility shows a significant negative effect, this is in line with the findings of Özcan (2020) that higher intangibility levels, require disclosure to reduce risks. In addition to Tangibility, the coefficient

of Δ Size does show significant positive results, confirming the findings of earlier research that size is positively correlated to greater firm visibility, increased disclosure pressure, scale economies in reporting and larger data availability to disclose ESG information (Barros et al., 2022; Dremptic et al., 2019; Gamerschlag et al., 2011; Liang & Renneboog, 2016; Udayasankar, 2008). Unlike as expected, not all control variables show significant results in the first column. The y-intercept of the OLS regression of column 1 is the significant constant of -0.13, this is the expected value of the difference in the ESG score if all variables in the regression will have a value of 0.

In the second column, the results to test hypothesis 1b are shown. Hypothesis 1b states: The higher the target's pre-merger ESG score compared to the acquirer's pre-merger ESG score, the higher the acquirer's post-merger market value. It was found that the model does not have any explanatory value in regressing the variables since the overall p-value of the F-test of the second regression is insignificant. This conclusion also accounts for the third column which was investigating Hypothesis 1c: There is a positive relationship between the enhanced ESG performance and the post-merger market value for the acquirer. It is relatively odd that the F-test for the models of hypotheses 1b and 1c shows insignificant results, especially since we perform the same steps as Tampakoudis & Anagnostopoulou (2020) and find different results. One explanation for this can be our model specifications. Tampakoudis & Anagnostopoulou (2020) do not use clustered standard errors, whereas this research has clustered standard errors on the acquirer's name, as 55% of the transactions included are related to 1 or more transactions through the same acquirer. When we convert the clustered standard errors into simple robust standard errors, the overall F-test is significant and the results show significant positive effects of enhanced ESG performance on the market value of the acquirer, which is in line with Tampakoudis & Anagnostopoulou (2020). However, the model that sets out the relative pre-merger performance against the post-merger market value, shown in column 2, remains to have an overall insignificant p-value for the F-test. Since not all observations in the dataset are independent of each other, we do find it necessary to include clustered standard errors on a firm level in our model specifications. Please refer again to *Appendix C*, where it was shown that 30% of the acquirers marks up for 55% of the transactions. For this reason, clustered standard errors will be used throughout all further regressions. This is in line with the assumption of independence used for OLS regressions (Odhiambo, 2021).

Another explanation for differences in results with Tampakoudis & Anagnostopoulou can be the sample selection. While the research of Tampakoudis & Anagnostopoulou (2020) uses the same geographic area and a smaller time period, they have more transactions in their final sample, i.e. 100 transactions vs. 77 transactions in this research. In *Appendix D*, an elaborated overview on the sample selection of both studies is given. Even though the original set of transactions is much larger for this research and the data selection criteria appear less strict, the eventual dataset is significantly smaller. A reason for this can be the matching process with the ESG data, which drastically declined our total sample

set. However, no errors could be found in matching the data. Since Tampakoudis & Anagnostopoulou (2020) lack to provide an overview of all transactions included, it is difficult to conclude where the difference in findings comes from.

In summary, we do find significant positive effects of the relative pre-merger ESG performance on the post-merger ESG performance. However, the regression models that include the relative pre-merger ESG performance and the difference in ESG performance as independent variables in estimating the difference in market value, do not have more explanatory value than the y-intercept model.

5.2 Environmental | Hypothesis 2

The value-add effects of the environmental performance of the target are presented in table 6. In column 1, hypothesis 2a is regressed. The p-value of the F-test, 0.0229, is smaller than the significance level, indicating that the model with the full set of independent variables has more explanatory value than the y-intercept model. It was expected that with a higher target's pre-merger environmental score compared to the acquirer's pre-merger environmental score, there will be a higher acquirer's post-merger environmental score. This is confirmed by the significant positive coefficient for the first variable, $\frac{ENV_{target_{t-1}}}{ENV_{acq_{t-1}}}$. These results imply that there are learning capabilities for the acquirer when acquiring a target with superior environmental performance. This is in contradiction to Eng & Fikru (2020), who found that there are learning capabilities for environmental performance, yet only for the acquirer. Moreover, the control variables for the first regression of environmental performance are statistically insignificant. Hence, the control variables in this model do not have any explanatory value. The Adjusted R-squared, 0.557, is still relatively high, which is again likely caused by correlation between the dependent and the important independent variable.

This can partly be explained by the small sample, as the environmental performance was only available for 70 transactions. Furthermore, the regression that has the relative pre-merger environmental performance as an independent variable in explaining the change in the market value, presented in column 2, does not show any significant results for the F-test. The hypothesis was made that the relative pre-merger performance would have a positive effect on changes in the market value. Nonetheless, this regression does not provide any explanatory value. In addition, we neither find significant results for the F-test presented in column 3. Consequently, it is not possible to reject the null hypothesis that the y-intercept model has more explanatory value than the model that includes the enhanced environmental performance as an independent variable. Based on former literature, the hypothesis was made that there is a positive relationship between the enhanced environmental score and the post-merger market value for the acquirer. This was based on the findings of Van Essen (2018), Nguyen (2022) and Ersoy et al. (2022).

Table 6: Results Environmental Regressions

Dependent Variable	(1) ΔENVacq	(2) ΔMVacq	(3) ΔMVacq
$\frac{ENVtarget_{t-1}}{ENVacq_{t-1}}$	0.55** (0.26)	-0.00 (0.01)	
ΔENVacq			0.00 (0.01)
ΔProfitability	0.15 (0.18)	0.03 (0.03)	0.03 (0.03)
ΔSize	9.68 (9.16)	-2.54 (1.72)	-2.65 (1.79)
ΔLeverage	2.31 (1.77)	0.46* (0.24)	0.45* (0.24)
ΔTangibility	-0.12 (0.16)		
Constant	-0.35 (0.24)	-0.01 (0.04)	-0.01 (0.04)
Observations	70	70	70
Adjusted R-squared	0.557	0.0615	0.0624
F-test	2901	1.715	1.804
p-value	0.0229	0.162	0.144

Robust standard errors in parentheses

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

Furthermore, the regression that has the relative pre-merger environmental performance as an independent variable in explaining the change in the market value, presented in column 2, does not show any significant results for the F-test. The hypothesis was made that the relative pre-merger performance would have a positive effect on changes in the market value. Nonetheless, this regression does not provide any explanatory value. In addition, we neither find significant results for the F-test presented in column 3. Consequently, it is not possible to reject the null hypothesis that the y-intercept model has more explanatory value than the model that includes the enhanced environmental performance as an independent variable. Based on former literature, the hypothesis was made that there is a positive relationship between the enhanced environmental score and the post-merger market value for the acquirer. This was based on the findings of Van Essen (2018), Nguyen (2022) and Ersoy et al. (2022).

5.3 Social | Hypothesis 3

Social performance is the second individual pillar that is tested for its value added in M&A transactions. In table 7, column 1, the relative pre-merger social performance is one of the independent variables in explaining the change in the post-merger social performance of the acquirer.

Table 7: Results Social Regressions

Dependent Variable	(1) ΔSOCacq	(2) ΔMVacq	(3) ΔMVacq
$\frac{SOC_{target_{t-1}}}{SOC_{acq_{t-1}}}$	0.03 (0.07)	0.00 (0.02)	
ΔSOCacq			0.09 (0.06)
ΔProfitability	0.05 (0.09)	0.04 (0.04)	0.04 (0.03)
ΔSize	9.46* (5.62)	-1.56 (1.76)	-2.46 (1.50)
ΔLeverage	0.73 (0.51)	0.43** (0.20)	0.37* (0.21)
ΔTangibility	-0.00 (0.06)		
Constant	0.16 (0.11)	0.00 (0.04)	-0.01 (0.04)
Observations	77	77	77
Adjusted R-squared	0.117	0.0213	0.0938
F-test	2844	1.573	2.001
p-value	0.0245	0.196	0.109

Robust standard errors in parentheses

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

The overall F-test is significant, in essence, this shows that the model provided has more explanatory value than the y-intercept model. It was expected that the higher the target's pre-merger social score compared to the acquirer's pre-merger social score, the higher the acquirer's post-merger social score will be. Nonetheless, there are no significant results found that can substantiate this hypothesis. These results suggest that the social performance of the acquirer shows more fluctuations in comparison to other variables, making the regressions less reliable. Further analysis of the control variables shows significant positive results for the difference in size. This is in line with earlier research that size results in higher firm visibility which increases the disclosure pressure for social aspects (Drempetic et al., 2019; Gamerschlag et al., 2011; Liang & Renneboog, 2016; Udayasankar, 2008). There

are no significant results for the other control variables in explaining the difference in social performance of the acquirer.

Please view columns 2 and 3 in table 7. Again, we see no significant results for the overall F-test in explaining the difference in market value, denoting that we cannot interpret the stand-alone coefficients as the model is lacking explanatory value.

5.4 Governance | Hypothesis 4

The final pillar discussed is the governance pillar. In column 1 of table 8, the relative pre-merger performance is listed as an explanatory variable in explaining the pre- and post-merger difference in governance performance. The p-value of the F-test shows significant results, indicating that the model with the independent variables has more explanatory value than the y-intercept model. The coefficient of the relative pre-merger performance shows significant positive effects, even under a significance level of 1%. These findings are in line with the assumed synergy effects of corporate governance by Wang & Xie (2009) and governance convergence of Drobetz & Momtaz (2020). In addition to this, we see significant positive results for the change in profitability. Based on the regression model, when profitability increases by 10%, the governance performance will increase with 0.01. Furthermore, Klapper & Love (2004) and Himmelberg et al. (1999) found that especially governance performance is affected by tangibility as good intention and behaviour are under more scrutiny with higher intangibility levels. In contrast, we find a significant positive effect of tangibility on the change in the acquirer's governance performance. An explanation for this is missing, as the opposite is assumed. The small sample set may be the causative agent in this story.

Table 8: Results Governance Regressions

Dependent Variable	(1) $\Delta GOVacq$	(2) $\Delta MVacq$	(3) $\Delta MVacq$
$\frac{GOVtarget_{t-1}}{GOVacq_{t-1}}$	0.05*** (0.01)	-0.01 (0.01)	
$\Delta GOVacq$			0.01 (0.05)
$\Delta Profitability$	0.14** (0.07)	0.05 (0.04)	0.04 (0.04)
$\Delta Size$	-2.54 (3.35)	-1.11 (1.92)	-1.53 (1.69)
$\Delta Leverage$	0.48 (0.54)	0.42* (0.21)	0.42* (0.21)
$\Delta Tangibility$	0.11*** (0.02)		
Constant	0.12	0.01	0.00

	(0.11)	(0.05)	(0.04)
Observations	77	77	77
Adjusted R-squared	0.253	0.0351	0.0213
F-test	23.12	3.019	1.467
p-value	0	0.0262	0.226

Robust standard errors in parentheses

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

5.5 Robustness Checks

As robustness checks for this research, the same hypotheses are tested with minor alterations. First, we will make an alteration in the periods used. Robustness checks increase the validity of the results when the same effects are found with minor alterations in the model specification. For the alterations in the periods used, we will compare the results found in the initial regressions, which are partly reliant on a year after the transaction, to results found in the same year of the transactions and two years after the transactions. These results are presented in *Appendix E – L*.

In *Appendix E*, the regression results are provided for changes in the ESG performance in the same year as the transaction. The different duration did not affect the outcomes of the overall F-tests. Only the results shown in column 1, persist to have a significant p-value for the F-test. The coefficient of the relative pre-merger ESG performance remains to be significantly positive. The same test results for the F-test and the t-test of the coefficient of the relative pre-merger performance are found in *Appendix I*, column 1. These results show the regression based on the outcomes 2 years after the transaction. In *Appendix I*, columns 2 and 3, the regression results are shown for changes in the market value 2 years after the transaction. The extended period did contribute to the explanatory value of the regressions since the overall p-value of the F-tests now shows significant. However, we do not find any significant results for the prime coefficients, i.e., the relative pre-merger ESG performance and the change in ESG performance.

The regression shown in column 1 in *Appendix F* sets out the relative pre-merger environmental performance to the change in the environmental score the same year of the transaction. The regression has insignificant results for the overall F-test and is therefore not of any explanatory value. The regression results shown in column 2 and 3 in *Appendix F*, neither have any explanatory value as shown by the insignificant p-value for the F-test. However, when looking at the regressions that show the changes in ESG performance two years after the transaction, shown in *Appendix J*, the overall F-tests for all regressions are now significant. Likely caused by the explanatory value of the control variables added. If the individual coefficients are investigated, the results show that the effect on the environmental score, as shown in column 1 in *Appendix J*, the relative pre-merger

performance was found to be of a stronger effect after two years in comparison to the regression coefficient based on results a year after the transaction. This can be caused by the longer period it takes to implement environmental efforts.

For the regressions that have the change in social performance as the dependent variable, changing the duration does affect the overall significance of the regressions. The F-tests of the regressions that include the differences the same year as the transaction, shown in *Appendix G*, all show insignificant results. This contrasts with the regressions two years after the transaction, presented in *Appendix K*, whereas columns 2 and 3 now have significant results. The F-test of the regression that includes the relative pre-merger performance in explaining the change in the social performance, is now not significant, when in fact this was significant for the regression that looked at one year after the transaction. However, the independent coefficient, the relative pre-merger performance, also did not show any significant results in this regression.

Furthermore, for changes in the governance score. The F-tests of the regressions based on a year after the transaction is only significant for the regression that has the change in governance performance as the dependent variable, as shown in column 1 in *Appendix H*. When the regression duration is extended to two years, all regressions show significant results for the F-tests, please view *Appendix L*. The coefficient for the relative pre-merger performance remains to be significantly positive. However, this is with a small side note. When we look at the regression that shows the results two years after the transaction, there is only a significant effect for the relative pre-merger performance when the significance level of the test is increased to 10%. Because of the small sample, we still view this test as significant. In comparison to the other periods, the relative pre-merger governance score has a stronger positive effect on the post-merger performance in the same year as the transaction. This can be explained by the fact that when a transaction is completed, the relationship between the shareholders and the management is immediately rebalanced. The regression that includes the relative pre-merger performance in explaining the governance performance for the same year as the transaction, shown in column 1 *Appendix H*, also has a higher adjusted R-squared. On the contrary, extending the duration contributes to the value of the adjusted R-squared for the regressions that have the market value as the dependent variable, as shown in column 2 & 3 in *Appendix L*. The important independent variables do not show any significant effects.

In summary, the results we initially found for changes in the performance, for the overall ESG score, the environmental performance and the governance performance, are robust to changes in the duration of the timespan under investigation. In addition, extending the duration to two years after the transaction contributes to the explanatory value of the regressions explaining the changes in the market value. The F-tests of the regressions show significant results, whereas earlier this was lacking, and the value of the Adjusted R-squared seems to be positively affected by the increased duration.

This is likely caused by the increased significant effects found for the control variables. However, the extended duration did not provide enough statistical evidence to reject that the coefficients of the principal variables are equal to zero in explaining differences in the market value.

5.6 Additional Analysis | U-shape Relationship ESG, E, S & G Pillars and Market Value

It is striking that unlike expected, neither of the regressions of the independent pillars, nor the combined ESG performance, that has the change in market value as the dependent variable, are of any explanatory value. On the one hand, this can be caused by the relatively small dataset. On the other hand, recalling research of Nguyen (2022), Lahouel et al. (2020) and Ersoy et al. (2022), this may be caused by the fact that the relationship between a pre- and post-merger ESG performance and market value may be U-shaped rather than linear as originally expected. The linear relationship assumed that within this sample there are mainly large companies, which are likely to have a greater ESG performance. However, as shown in the descriptive statistics and the histograms of the acquirer's pre-merger ESG performance and of its individual components, please view *Figure 4*, the performance of the acquirers is actually very diverse. For this reason, the quadratic of the change of the pre-merger ESG, E, S & G performance is regressed against the change in market value. Please view table 9 for these regressions.

The overall F-test shows insignificant results for the regressions that may justify the assumption of a U-shaped relationship between market value and the combined ESG performance, the environmental performance and the governance performance. This is shown in columns 1, 2 and 4. However, as shown in column 3, the overall F-test shows significant results. The Adjusted R-squared for this regression is also higher, 0.144 in comparison to the 0.0938 that was found in the regression that included the linear relationship, please view table 7, column 3. The results shown in Table 9, exhibit that there are significant positive effects found for a U-shaped relationship between the change in social performance and the market value. The results are even significant under a significance level of 1%. These results indicate that investments in social performance will at first deteriorate the market value, only until a certain threshold of social performance is reached as it will then positively contribute to the market value.

As far as our knowledge goes, only Ersoy et al. (2022) found evidence for a U-shaped relationship between social investments and market value, however, he found an inverted relationship. Ersoy et al. (2022) findings indicate that after a certain threshold, social investments do not contribute to maximizing value whereas earlier they did. Still, most of the existing literature that investigated the relationship between social and financial performance, did find a positive relationship. Our findings contribute to this, based on the assumption that at first a certain threshold of social performance must be reached to add value.

Table 9: Results U-shape Relationship ESG, E, S & G Pillars and Market Value

Dependent Variable	(1) ΔMVacq	(2) ΔMVacq	(3) ΔMVacq	(4) ΔMVacq
(ΔESGacq) ²	0.04 (0.04)			
(ΔENVacq) ²		0.00 (0.00)		
(ΔSOCacq) ²			0.05*** (0.02)	
(ΔGOVacq) ²				-0.01 (0.04)
ΔProfitability	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.05 (0.04)
ΔSize	-2.67 (1.76)	-2.58 (1.75)	-2.46 (1.50)	-1.53 (1.66)
ΔLeverage	0.45** (0.22)	0.46* (0.25)	0.40* (0.21)	0.44** (0.22)
Constant	-0.00 (0.04)	-0.01 (0.04)	-0.02 (0.04)	0.01 (0.05)
Observations	77	70	77	77
Adjusted R-squared	0.0687	0.0616	0.144	0.0235
F-test	1788	2.001	3.607	1.528
p-value	0.146	0.109	0.0117	0.208

Robust standard errors in parentheses

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

6. Conclusion

A recent survey conducted by Bain & Company found that currently, only 11% of M&A executives assess ESG performance in the M&A process, in other words the least emphasized aspect in the transaction. Yet, by assessing a corporate ESG strategy of a potential target or asset, value opportunities can be created and are therefore becoming more relevant in the choices and success of Corporate Finance related matters (Van den Branden et al., 2022; Tang & Zhang, 2020; Flammer, 2021; Deng et al., 2013). The Business and Sustainable Development Commission estimated in 2017 that there are SDG market opportunities worth \$12tr that can be pursued by the year 2030 (Business & Sustainable Development Commission, 2017). Partly due to these potential market opportunities, 65% of M&A executives expect that the focus on these aspects will increase in the upcoming three years (Van den Branden et al., 2022). But what are the upsides of incorporating ESG in M&A transactions? And what is the role of the individual pillars of ESG: Environmental, Social, and Governance?

This research is aimed at filling the gap in existing literature by discussing the effect of the relative pre-merger performance of the acquirer and target on the post-merger performance and market value. Similar research was performed by Tampakoudis & Anagnostopoulou (2020), however they only discussed the combined ESG score. The goal of this research is to answer the following main research question for European transactions through empirical results: *What are the value-add effects of an investment's combined ESG performance and its individual pillars in terms of M&A, on the acquirer's post-merger sustainability performance and market value?*

Based on existing literature, twelve hypotheses were formed, three for the combined ESG score and three for each individual pillar. The hypotheses for each pillar set out the potential effect of the pre-merger performance on the post-merger performance and market value. A third hypothesis discusses the effect of the difference in performance on the market value of the acquirer. It was expected that for the post-merger performance, regardless of the pillar, there were learning capabilities for the acquirer based on the pre-merger performance. Thus, when acquiring a target with a superior score, it is expected that this will eventually result in a higher score for the acquirer as well. In addition to this, it was expected that a relatively higher pre-merger performance of the target will result in an increased post-merger market value, as generally sustainability investments are welcomed by the market. Finally, for the combined score and the individual pillars, it was expected that an enhanced performance will result in a higher market value. For an overview of all hypotheses, please refer to *Appendix M*, the overview also includes the results found per hypothesis.

For the results, we initially compared the year before the transaction to the year after the transaction. This was intentionally chosen to investigate the long-term effects, as it is expected that the implementation of ESG-related investments takes a longer period (Barros et al., 2022). Through

OLS-regressions in Stata it was tried to regress the effects. Since 30% of the acquirers make up for 55% of the transactions, clustered standard errors on the acquirers were used.

Our results suggest that there are indeed learning capabilities when acquiring a target with a higher ESG performance. Thus, there are synergy effects between the acquirer and target. These results were also found for the environmental and governance pillar. The results are robust for changes in the time periods. When comparing the results of the different periods, it was found that the change in the governance score is stronger affected by the pre-merger difference in the same year as the transaction. This effect can be explained by the immediate rebalanced relationship between the shareholders and management of the acquiring company. The relative pre-merger environmental performance has a greater influence on the post-merger performance two years after the transaction which is likely caused by the implementation time that goes together with environmental efforts. The significant positive effect of the combined ESG score remains relatively the same throughout all the years. Based on these findings, companies should consider a target's ESG, environmental and governance score as this can positively affect the acquirer's post-merger performance. This approach could accelerate the much-desired goal to become more sustainable for the future and eventually reach all SDGs.

The robustness checks also show that the extended period, i.e., two years after the transaction did contribute to the explanatory value of the regressions in explaining the market value for the regressions of the overall ESG score and of all individual pillars. This is likely caused by the significant effects found for the control variables. However, there are no significant results found for the prime coefficients, i.e., the relative pre-merger ESG performance and the change in ESG performance.

Based on the original linear regressions, this research did not have any explanatory value for the differences in market value. Additional analyses were performed, recalling the findings of U-shaped relationships between sustainability performance and financial performance in previous literature (Nguyen, 2022; Ersoy et al., 2022; Lahouel et al., 2020). The results suggest that there is a quadratic relationship between social performance and market value. Indicating that social investments can add value to a business, however only after a certain threshold has been reached. The results do not suggest that companies should not invest in the other pillars of ESG as these regressions have no explanatory value in this research. Other research did find significant results for enhanced performance to be contributing to the financial performance of a company. The lack of explanatory value is likely caused by the limitations of this research.

6.1 Limitations & Future Research

This research has several limitations. Foremost is the small number of transactions that is included in the final sample. Only 77 transactions were included and missing data for the

environmental pillar, led to regressions that even relied on only 70 observations. The small sample is a result of matching transactions to ESG data. What is striking, is that for the first hypothesis, and only the first, we perform the exact same steps as performed by Tampakoudis & Anagnostopoulou (2020). Our initial set of transactions was much larger, but after matching to ESG data this declined significantly. Tampakoudis & Anagnostopoulou (2020) final dataset included 100 transactions, while their observation period was much shorter. No errors could be found for this difference. ESG data is only available for +6,000 public companies, so a small dataset was anticipated as it is unlikely to have a lot of M&A activity in the same group of +6,000 companies. It would therefore be good to repeat this research when more ESG data comes available to have more reliable results.

Furthermore, this research does not take differences between industries in account. Firstly, this is manifested in the weighting of the scores as not all components have equal weights for different industries (Refinitiv, 2022). Future research should try to materialize this while investigating the effect of the three different pillars. In addition, since ESG performance can differ greatly between different industries, it would also be good to check if there are any inter-industry differences found when looking at the value-add effects of the different pillars.

Another limitation of this research is that it does not control for the relatability between the target and the acquirer. If the companies are very similar, synergies are more likely to be created whereas this is much less for a diversifying acquisition. Palepu (1985) found that related diversification shows better profit growth opportunities than unrelated diversification. The same may be expected for ESG related investments. A suggestion for follow-up research may be to include tests for similarities.

Unfortunately, a growing concern in the ESG market is greenwashing (Jahns, 2021). Greenwashing is “the deceptive practice of branding a company as environmentally-friendly without adopting legitimate sustainable operations” (Jahns, 2021). Since ESG data is reliable on publicly made available data, it is possible that some ESG data in the dataset is polluted with greenwashing. While disclosure on ESG performance is being pressured, global standards for ESG is still missing. Future research may look at ideas to control for potential greenwashing by looking at more tangible metrics instead of entire pillars.

In addition, it is unclear if there are really learning capabilities or if the enhanced performance in ESG, environmental and governance score may be a result of better reporting. The due diligence steps in the M&A process may have led greater scrutiny of the public and authorities, resulting in better reporting. Since better reporting positively influences the ESG score, this may have affected our results.

Finally, Ung & Urfe (2021) found that premiums are paid for targets that have high ESG performances. This research does not control for potential premiums paid with the acquisition. Since

this may affect the acquirer's company value, future research should take acquisitions premiums into consideration.

Since there is still a lot unclear about the effect of ESG and the ESG database is being further expanded, there are more recommendations for further research. Within this research, it was found that there is a U-shaped relationship between social performance and market value. Since it is still unclear what this threshold may be, future research may focus on what this threshold is. Because the sample only includes listed companies, it would be good to also investigate the results for non-listed companies, if possible.

References

- Aktas, N., De Bodt, E., & Cousin, J. (2011). Do Financial Markets Care About SRI? Evidence From Mergers and Acquisitions. *Journal of Banking & Finance*, 35(7), 1753-1761.
- Albuquerque, R., Brandão-Marques, L., Ferreira, M., & Matos, P. (2019). International Corporate Governance Spillovers: Evidence from Cross-border Mergers and Acquisitions. *The Review of Financial Studies*, 32(2), 738-770.
- Alexandridis, G., Fuller, K., Terhaar, L., & Travlos, N. (2013). Deal Size, Acquisition Premia and Shareholder Gains. *Journal of Corporate Finance*, 20, pp. 1-13.
- Artiach, T., Lee, D., Nelson, D., & Walker, J. (2010). The Determinants of Corporate Sustainability Performance. *Accounting & Finance*, 50(1), 31-51.
- Awaysheh, A., Heron, R., Perry, T., & Wilson, J. (2020). On The Relation Between Corporate Social Responsibility and Financial Performance. *Strategic Management Journal*, 41(6), 965-987.
- Barclays. (2022, March 10). *10 ESG themes for 2022: The transition mission*. Retrieved October 2022, from Barclays: <https://www.cib.barclays/our-insights/10-esg-themes-for-2022.html>
- Barros, V., Matos, P., & Vieira, P. (2022). M&A Activity as a Driver for Better ESG Performance. *Technological Forecasting and Social Change*, 175, 121338.
- Bereskin, F., Byun, S., Officer, M., & Oh, J. (2018). The Effect of Cultural Similarity on Mergers and Acquisitions: Evidence from Corporate Social Responsibility. *Journal of Financial and Quantitative Analysis*, 53, 1995-2039.
- Bhalla, D. (2014). *Difference Between Adjusted R-Squared and R-Squared*. Retrieved October 2022, from Listen Data: <https://www.listendata.com/2014/08/adjusted-r-squared.html>
- Bris, A., Brisley, N., & Cabolis, C. (2008). Adopting Better Corporate Governance: Evidence from Cross-border Mergers. *Journal of Corporate Finance*, 14(3), 224-240.
- Bobbit, Z. (2021, April). *Statology*. Retrieved October 2022, from What are Clustered Standard Errors? (Definition & Example): <https://www.statology.org/clustered-standard-errors/>
- Business & Sustainable Development Commission. (2017, January). *Better Business, Better World. The Report of the Business & Sustainable Development Commission*. Retrieved October 2022, from Sustainable Development Goals Knowledge Platform: <https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=2399&menu=1515>
- CFA Institute. (2022) *ESG Investing and Analysis*. Retrieved September 2022, from CFA Institute: <https://www.cfainstitute.org/en/research/esg-investing>
- CFI. (2022, May 7). *Debt to Asset Ratio*. Retrieved September 2022, from Corporate Finance Institute: <https://corporatefinanceinstitute.com/resources/knowledge/finance/debt-to-asset-ratio/>

- Chams, N., García-Blandón, J., & Hassan, K. (2021). Role Reversal! Financial Performance as an Antecedent of ESG: The Moderating Effect of Total Quality Management. *Sustainability*, *13*, 7026.
- Chen, J., Zhao, X., Niu, X., Fan, Y., & Taylor, G. (2020). Does M&A Financing Affect Firm Performance Under Different Ownership Types? *Sustainability*, *12*(8), 3078.
- Chen, R. (2021). *Bang for Your (Green) Buck: The Effects of ESG Risk on US M&A Performance*. Duke University, Durham, North Carolina.
- Clower, E. (2019, November 29). *Introduction to the Fundamentals of Panel Data*. Retrieved September 2022, from Aptech: <https://www.aptech.com/blog/introduction-to-the-fundamentals-of-panel-data/>
- Craney, T., & Surlles, J. (2002). Model-Dependent Variance Inflation Factor Cutoff Values. *Quality Engineering*, *14*(3), 391-403.
- Dalal, K., & Thaker, N. (2019). ESG and Corporate Financial Performance: A Panel Study of Indian Companies. *IUP Journal of Corporate Governance*, *18*(1), 44-59.
- D'Amato, V., D'Ecclesia, R., & Levantesi, S. (2022). ESG Score Prediction Through Random Forest Algorithm. *Computational Management Science*, *19*, 347-373.
- De Wit, A. (2021, July 28). *New Thomson Reuters ESG scores added to Datastream*. Retrieved August 7, 2022, from Erasmus University Library: <https://libguides.eur.nl/edsc-manuals/blog/newthomson-reuters-esg-scores-added-to-datastream>
- Deng, X., Kang, J., & Low, B. (2013). Corporate Social Responsibility and Stakeholder Value Maximization: Evidence from Mergers. *Journal of Financial Economics*, 87-109.
- Drempetic, S., Klein, C., & Zwergel, B. (2019). The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. *Journal of Business Ethics*, *167*, 333-360.
- Drobetz, W., & Momtaz, P. (2020). Corporate Governance Convergence in The European Market. *Finance Research Letter*, *32*, 101091.
- Eccles, R., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, *60*, 2835-2857.
- Edmans, E. (2012). The Link Between Job Satisfaction and Firm Value, With Implications for Corporate Social Responsibility. *Academy of Management Perspectives*, *26*, 1-19.
- Eisenberg, T., Sundgren, S., & Wells, T. (1998). Larger Board Size and Decreasing Firm Value in Small Firms. *Journal of Financial Economics*, *48*, 35-54.
- Eng, L., & Fikru, M. (2020). Environmental Performance of Food and Beverage Firms in Merger and Acquisition Deals. *Journal of Agricultural & Food Industrial Organization*, *18*(2), 20170037.
- Ersoy, E., Swiecka, B., Grima, S., Özen, E., & Romanova, I. (2022). The Impact of ESG Scores on Bank Market Value? Evidence from the U.S. Banking Industry. *Sustainability*, *14*(15), 9527.

- Esteban-Sánchez, P., De la Cuesta-González, M., & Paredes-Gazquez, J. (2017). Corporate Social Performance and Its Relation with Corporate Financial Performance: International Evidence in The Banking Industry. *Journal of Cleaner Production*, *162*, 1102-1110.
- Feng, X. (2021). The role of ESG in acquirers' performance change after M&A deals. *Green Finance*, *3*(3), 287-318.
- Fisher-Vanden, K., & Thorburn, K. (2011). Voluntary Corporate Environmental Initiatives and Shareholder Wealth. *Elsevier*, *62*(3), 430-445.
- Flammer, C. (2021). Corporate Green Bonds. *Journal of Financial Economics*, *142*(2), 499-516.
- Frost, J. (2017). *How to Interpret the F-test of Overall Significance in Regression Analysis*. Opgeroepen op October 2022, van Statistics by Jim: <https://statisticsbyjim.com/regression/interpret-f-test-overall-significance-regression/>
- Frost, J. (2018). *How To Interpret R-squared in Regression Analysis*. Retrieved October 2022, from Statistics by Jim: <https://statisticsbyjim.com/regression/interpret-r-squared-regression/>
- Gamerschlag, R., Möller, K., & Verbeeten, F. (2011). Determinants of Voluntary CSR Disclosure: Empirical Evidence from Germany. *Review of Managerial Science*, *5*(2-3), 233-262.
- Ghosh, A. (2013). Corporate Sustainability and Corporate Financial Performance: The Indian Context. *Indian Institute of Management Calcutta: Working Paper Series*, *72*, 1-37.
- Gillan, S., Koch, A., & Starks, L. (2021). Firms and Social Responsibility: A Review of ESG and CSR Research in Corporate Finance. *Journal of Corporate Finance*, *66*, 101889.
- Gilson, R. (2001). Globalizing Corporate Governance: Convergence of Form or Function. *The American Journal of Comparative Law*, *49*(2), 329-358.
- Hargrave, M. (2022, June 14). *Return on Assets (ROA): Formula and 'Good' ROA Defined*. Retrieved September 2022, from Investopedia: <https://www.investopedia.com/terms/r/returnonassets.asp#:~:text=A%20ROA%20of%20over%205,sheet%20than%20a%20car%20maker.>
- Himmelberg, C., Hubbard, R., & Palia, D. (1999). Understanding the Determinants of Managerial Ownership and the Link Between Ownership and Performance. *Journal of Financial Economics*, *53*(3), 353-384.
- Hong, X., Lin, X., Fang, L., Gao, Y., & Li, R. (2022). Application of Machine Learning Models for Predictions on Cross-Border Merger and Acquisition Decisions with ESG Characteristics from an Ecosystem and Sustainable Development Perspective. *Sustainability*, *14*(5), 2838.
- Huang, D. (2021). Environmental, Social and Governance (ESG) Activity and Firm Performance: A Review and Consolidation. *Accounting & Finance*, *61*(1), 335-360.

- Ionescu, G., Firoiu, D., Pirvu, R., & Vilag, R. (2019). The Impact of ESG Factors on Market Value of Companies from Travel and Tourism Industry. *Technological and Economic Development of Economy*, 25(5), 820-849.
- Jacobs, B., Singhal, V., & Subramanian, R. (2010). An Empirical Investigation of Environmental Performance and The Market Value of The Firm. *Journal of Operations Management*, 28(5), 430-441.
- Jahns, K. (2021, August 10). *The Environment is Gen Z's No. 1 Concern – And Some Companies Are Taking Advantage of That*. Retrieved October 2022, from CNBC: <https://www.cnbc.com/2021/08/10/the-environment-is-gen-zs-no-1-concern-but-beware-of-greenwashing.html>
- Kaldor, N. (1966). Marginal Productivity and the Macro-Economic Theories of Distribution: Comment on Samuelson and Modigliani. *The Review of Economic Studies*, 33(4), 309-319.
- Kaspereit, T., & Lopatta, K. (2016). The Value Relevance of SAM's Corporate Sustainability Ranking and GRI Sustainability Reporting in The European Stock Markets. *Business Ethics: A European Review*, 25(1), 1-24.
- Kerber, R., & Jessop, S. (2021, December 23). *Analysis: How 2021 became the year of ESG investing*. Retrieved October 2022, from Reuters: <https://www.reuters.com/markets/us/how-2021-became-year-esg-investing-2021-12-23/>
- Kim, B., Jung, J., & Cho, S. (2022). Can ESG mitigate the diversification discount in cross-border M&A. *Borsa Istanbul Review*, 22(3), 607-615.
- Klapper, L., & Love, I. (2004). Corporate Governance, Investor Protection, and Performance in Emerging Markets. *Journal of Corporate Finance*, 10(5), 703–728.
- Kwon, O., Lim, S., & Lee, D. (2018). Acquiring Startups in The Energy Sector: A Study of Firm Value and Environmental Policy. *Business Strategy and The Environment*, 27, 1376-1384.
- Lahouel, B., Bruna, M., & Zaied, Y. (2020). The Curvilinear Relationship Between Environmental Performance and Financial Performance: An Investigation of Listed French Firms Using Panel Smooth Transition Model. *Finance Research Letters*, 35, 101455.
- Liang, H., & Renneboog, L. (2016). On the Foundations of Corporate Social Responsibility. *The Journal of Finance*, 72(2), 853-910.
- Lyon, T., Lu, Y., & Yin, Q. (2013). How Do Investors Respond to Green Company Awards in China? *Ecological Economics*, 94, 1-8.
- Mak, Y., & Kusnadi, Y. (2005). Size Really Matters: Further Evidence on The Negative Relationship Between Board Size and Firm Value. *Pacific-Basin Finance Journal*, 13(3), 301-318.
- Martynova, M., & Renneboog, L. (2010). Spillover of Corporate Governance Standards in Cross-border Mergers and Acquisitions. *The Law and Economics of Corporate Governance*.

- Masulis, R., Wang, C., & Xie, F. (2007, 1851-1889). *The Journal of Finance*. *The Journal of Finance*, 62(4), 1851-1889.
- Minitab. (2022). *Natural log (log base e) function*. Retrieved September 2022, from Minitab Statistical Software: <https://support.minitab.com/en-us/minitab/21/help-and-how-to/calculations-data-generation-and-matrices/calculator/calculator-functions/logarithm-calculatorfunctions/natural-log-log-base-e-function/#:~:text=ln%20statistics%2C%20the%20natural%20log,straigh>
- Miralles-Quirós, M., Miralles-Quirós, J., & Redondo-Hernández, J. (2019). ESG Performance and Shareholder Value Creation in The Banking Industry: International Differences. *Sustainability*, 11(5), 1404.
- Moeller, S., Schlingemann, F., & Stulz, R. (2004). Firm Size and The Gains from Acquisitions. *Journal of Financial Economics*, 73(2), pp. 201-228.
- Nadarajah, S., Ali, S., Liu, B., & Huang, A. (2018). Stock Liquidity, Corporate Governance and Leverage: New Panel Evidence. *Pacific-Basin Finance Journal*, 50, 216-234.
- Nguyen, L. (2022). The Relationship Between Environmental Performance and Financial Performance: Evidence from an Emerging East Asian Economy. *International Journal of Disclosure and Governance*, 1-14.
- Odhiambo, S. (2021, July 13). *Key Assumptions of OLS: Econometrics Review*. Retrieved September 2022, from Albert: <https://www.albert.io/blog/key-assumptions-of-ols-econometrics-review/>
- Özcan, I. (2020). Determinants of Environmental, Social, and Governance Reporting of Rail Companies: Does State Ownership Matter? *New Trends In Public Sector Reporting*, 153-173.
- Palepu, K. (1985). Diversification Strategy, Profit Performance and The Entropy Measure. *Strategic Management Journal*, 6(3), 239-255.
- Park, H. (2011). *Practical Guides to Panel Data Modelling: A Step-By-Step Analysis Using Stata* (12 ed.). International University of Japan: Public Management and Policy Analysis Program, Graduate School of International Relations.
- Penn State. (n.d.). 6.2 - *The General Linear F-Test*. Retrieved October 2022, from Penn State - Eberly College of Science: <https://online.stat.psu.edu/stat501/lesson/6/6.2>
- Ratner, B. (2009). The Correlation Coefficient: Its Values Range Between +1/-1, or do they? *Journal of Targeting, Measurement and Analysis for Marketing*, 17, 139-142.
- Refinitiv. (2022, May). *Environmental, Social and Governance Scores From Refinitiv*. Retrieved August 2022, from Refinitiv, an LSEG Business: https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf
- Refinitiv. (n.d.). *Refinitiv ESG Company Scores*. Retrieved August 2022, from Refinitiv, an LSEG

- Business: <https://www.refinitiv.com/en/sustainable-finance/esg-scores>
- Refinitiv. (n.d.). *User Guide Hints & Tips Refinitiv*. Retrieved September 2022, from Refinitiv: https://shib.isor.univie.ac.at/eikon_datastream/manuals/User%20Guide_Hints%20&%20Tips.pdf
- Rolle, J., Javed, B., & Herani, G. (2020). Micro and Macroeconomic Determinants of Profitability of Conventional Banks and Stock Performance Using Tobin's Q Ratio: Evidence from The Banking Sector of Pakistan. *International Journal of Business and Economic Development*, 8(2), 74-89.
- Semenova, N., Hassel, L., & Nilsson, H. (2010). The Value Relevance of Environmental and Social Performance: Evidence from Swedish SIX 300 Companies. *Liiketaloudellinen Aikakauskirja*(3), 265-292.
- Simpson, W., & Kohers, T. (2011). The Link Between Corporate Social and Financial Performance: Evidence from The Banking Industry. *Journal of Business Ethics*, 35, 97-109.
- Stäbler, S., & Fischer, M. (2020). When Does Social Irresponsibility Become News? Evidence From More Than 1,000 Brand Transgressions Across Five Countries. *Journal of Marketing*, 84(3), 46-67.
- Stanford Graduate School of Business. (n.d.). *Worlscope Key Variables*. Retrieved September 2022, from Database Guide: Datastream: Overview: <https://libguides.stanford.edu/library/datastream>
- Stevens, P. (2020, September 2). *ESG index funds hit \$250 billion as pandemic accelerates impact investing boom*. Retrieved October 2022, from CNBC: <https://www.cnbc.com/2020/09/02/esg-index-funds-hit-250-billion-as-us-investor-role-in-boom-grows.html>
- Tampakoudis, I., & Anagnostopoulou, E. (2020). The Effect of Mergers and Acquisitions on Environmental, Social and Governance Performance and Market Value: Evidence from EU Acquirers. *Business Strategy and the Environment*, 29(5), 1865-1875.
- Tampakoudis, I., Noulas, A., Kiosses, N., & Drogalas, G. (2021). The Effect of ESG on Value Creation from Mergers and Acquisitions: What Changed During The COVID-19 Pandemic? *The International Journal of Business in Society*, 21(6), 1117-1141.
- Tang, D., & Zhang, Y. (2020). Do Shareholders Benefit from Green Bonds? *Journal of Corporate Finance*, 61, 101427.
- Thomson Reuters. (2011, December). *Asset 4 assetmasterProfessional Reference Guide*. Retrieved August 7, 2022, from Refinitiv: https://my.refinitiv.com/content/dam/myrefinitiv/productdoc/Asset4ESGProfessional_Guide.pdf
- Udayasankar, K. (2008). Corporate Social Responsibility and Firm Size. *Journal of Business Ethics*, 83(2), 167-175.

- Ung, T., & Urfe, M. (2021). *ESG - Does it Pay in M&A?: Investigating the ESG Premium in Mergers and Acquisitions*. Norwegian School of Economics, Bergen.
- Van den Branden, J., Seemann, A., & Lino, M. (2022, February 8). *The ESG Imperative in M&A*. Retrieved September 2022, from Bain & Company: <https://www.bain.com/insights/esgimperative-m-and-a-report-2022/>
- Van Essen, J. (2018). *Does it Pay Off to 'Buy' Well? Empirical Evidence from an M&A Perspective*. Uppsala University, Disciplinary Domain of Humanities and Social Sciences, Faculty of Social Sciences, Department of Business Studies.
- Waddock, S., & Graves, S. (1998). The Corporate Social Performance-Financial Performance Link. *Strategic Management Journal*, 18(4), 303-319.
- Wang, C., & Xie, F. (2009). Corporate Governance Transfer and Synergistic Gains from Mergers and Acquisitions. *The Review of Financial Studies*, 22(2), 829-858.
- Whieldon, E., Clark, R., & Copley, M. (2020, August 13). *ESG funds outperform S&P 500 amid COVID-19, helped by tech stock boom*. Retrieved October 2022, from S&P Global Market Intelligence: <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/esg-funds-outperform-s-p-500-amid-covid-19-helped-by-tech-stock-boom-59850808>
- Yermack, D. (1996). Higher Market Valuation of Firms with a Small Board of Directors. *Journal of Financial Economics*, 40, 185-211.
- Yu, E., Guo, C., & Luu, B. (2018). Environmental, Social and Governance Transparency and Firm Value. *Business Strategy and the Environment*, 27, 987-1004.

Appendix A | Overview ESG score weights per industry

Industry group	Environmental			Social				Governance		
	Emission	Innovation	Resource use	Human rights	Product responsibility	Workforce	Community	Management	Shareholders	CSR strategy
Aerospace and defense	4	4	3	7	3	5	5	10	3	2
Automobiles and auto parts	6	10	5	9	5	6	5	10	3	2
Banking services	1	4	1	4	4	8	5	10	3	2
Beverages	8	3	8	9	7	6	5	10	3	2
Biotechnology and medical research	4	1	6	1	5	3	5	10	3	2
Chemicals	9	9	9	10	5	6	5	10	3	2
Coal	10	1	10	3	1	5	5	10	3	2
Collective investments	1	1	1	1	2	3	5	10	3	2
Communications and networking	2	4	3	2	5	3	5	10	3	2
Computers, phones and household electronics	3	8	2	10	6	6	5	10	3	2
Construction and engineering	8	8	5	7	3	6	5	10	3	2
Construction materials	10	8	10	7	3	7	5	10	3	2
Containers and packaging	9	6	9	10	5	6	5	10	3	2
Diversified industrial goods wholesalers	3	7	4	9	1	6	5	10	3	2
Diversified retail	6	2	6	2	4	4	5	10	3	2
Electric utilities and IPPs	10	8	9	4	3	8	5	10	3	2
Electronic equipment and parts	7	6	8	5	2	4	5	10	3	2
Food and drug retailing	6	3	4	5	8	6	5	10	3	2
Food and tobacco	8	2	8	7	8	6	5	10	3	2
Freight and logistics services	7	6	6	4	4	7	5	10	3	2
Healthcare equipment and supplies	3	3	2	5	6	4	5	10	3	2
Healthcare providers and services	3	1	4	3	6	4	5	10	3	2
Homebuilding and construction supplies	6	9	6	8	5	6	5	10	3	2
Hotels and entertainment services	6	1	7	4	9	5	5	10	3	2
Household goods	6	10	5	7	5	5	5	10	3	2
Industrial conglomerates	7	9	7	9	5	6	5	10	3	2
Insurance	1	3	1	3	4	6	5	10	3	2
Investment banking and investment services	1	3	1	1	3	4	5	10	3	2
Investment holding companies	7	2	8	2	1	2	5	10	3	2
Leisure products	2	3	2	4	9	3	5	10	3	2
Machinery, tools, heavy vehicles, trains and ships	5	10	4	6	5	4	5	10	3	2
Media and publishing	2	2	2	4	6	5	5	10	3	2
Metals and mining	10	2	10	10	2	7	5	10	3	2
Multiline utilities	10	9	9	6	4	7	5	10	3	2
Natural gas utilities	7	7	8	5	5	8	5	10	3	2
Office equipment	4	10	3	10	7	5	5	10	3	2
Oil and gas	7	7	9	10	4	8	5	10	3	2
Oil and gas related equipment and services	8	3	7	8	2	6	5	10	3	2
Paper and forest products	10	9	10	6	1	7	5	10	3	2
Passenger transportation services	7	3	7	5	4	8	5	10	3	2
Personal and household products and services	6	4	6	8	10	7	5	10	3	2
Pharmaceuticals	5	2	5	7	5	6	5	10	3	2
Professional and commercial services	4	3	4	6	4	5	5	10	3	2
Real estate operations	6	4	6	2	2	8	5	10	3	2
Renewable energy	6	6	6	1	3	3	5	10	3	2
Residential and commercial REITs	8	2	8	1	3	5	5	10	3	2
Semiconductors and semiconductor equipment	6	7	6	9	5	6	5	10	3	2
Software and IT services	1	2	2	2	4	2	5	10	3	2
Specialty retailers	3	2	3	3	5	4	5	10	3	2
Telecommunications services	4	4	4	8	9	8	5	10	3	2
Textiles and apparel	3	4	4	8	7	8	5	10	3	2
Transport infrastructure	7	2	7	6	3	9	5	10	3	2
Uranium	10	1	10	1	3	3	5	10	3	2
Water and related utilities	9	8	9	3	2	8	5	10	3	2

Note: This table was retrieved from Refinitiv (2022).

Appendix B | Overview Acquirers

#	Acquiror Full Name	Freq.	Percent	Cum.
1	Acciona SA	2	2.60	2.60
2	Actividades de Construccion y Servi..	4	5.19	7.79
3	Assicurazioni Generali SpA	1	1.30	9.09
4	Atlantia SpA	1	1.30	10.39
5	BNP Paribas SA	1	1.30	11.69
6	BP PLC	1	1.30	12.99
7	Banco Bilbao Vizcaya Argentaria SA	4	5.19	18.18
8	Banco Santander SA	2	2.60	20.78
9	Bolloré SE	1	1.30	22.08
10	Bouygues SA	1	1.30	23.38
11	Castellum AB	1	1.30	24.68
12	Commerzbank AG	1	1.30	25.97
13	Corporacion Financiera Alba SA	2	2.60	28.57
14	Credit Agricole SA	1	1.30	29.87
15	Cyfrowy Polsat SA	1	1.30	31.17
16	Daimler AG	1	1.30	32.47
17	EDP Energias de Portugal SA	1	1.30	33.77
18	Eiffage SA	1	1.30	35.06
19	Electricite De France SA	1	1.30	36.36
20	Enel SpA	3	3.90	40.26
21	Equinor ASA	1	1.30	41.56
22	Eurazeo Sa	1	1.30	42.86
23	Fsk Yees	1	1.30	44.16
24	Iberdrola SA	3	3.90	48.05
25	Intesa Sanpaolo Spa	1	1.30	49.35
26	Investor AB	1	1.30	50.65
27	KGHM Polska Miedz SA	1	1.30	51.95
28	Liberty Global PLC	1	1.30	53.25
29	Mediobanca Banca Di Credito Finanziar..	1	1.30	54.55
30	National Bank of Greece SA	1	1.30	55.84
31	OAO "Gazprom"	1	1.30	57.14
32	Orkla ASA	3	3.90	61.04
33	Porsche AG	2	2.60	63.64
34	Powszechny Zaklad Ubezpieczen SA	1	1.30	64.94
35	Royal Bank of Scotland Group PLC	2	2.60	67.53
36	Sacyr Vallehermoso SA	5	6.49	74.03
37	Sampo Oyj	1	1.30	75.32
38	Societe Generale SA	1	1.30	76.62
39	Statoil ASA	2	2.60	79.22
40	Surgutneftegaz OAO	1	1.30	80.52

41	Tamburi Investment Partners SpA	1	1.30	81.82
42	Telefonica SA	1	1.30	83.12
43	Total SA	1	1.30	84.42
44	Unicredit SpA	1	1.30	85.71
45	Unicredito Italiano SpA	1	1.30	87.01
46	Unipol Gruppo SpA	1	1.30	88.31
47	Vinci SA	2	2.60	90.91
48	Vivendi SE	4	5.19	96.10
49	Wendel SE	2	2.60	98.70
50	Zurich Financial Services AG	1	1.30	100.00
Total		77	100.00	

Appendix C | Extensive model specification

ESG | Hypothesis 1

For hypothesis 1a, which stated “The higher the target’s pre-merger ESG score compared to the acquirer’s pre-merger ESG score, the higher the acquirer’s post-merger ESG score”, the following model is composed.

$$\Delta ESGacq = \alpha + \beta_1 * \frac{ESGtarget_{t-1}}{ESGacq_{t-1}} + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \beta_5 * \Delta acqTangibility + \varepsilon_{i,t}$$

$\frac{ESGtarget_{t-1}}{ESGacq_{t-1}}$ will have a value greater than 1 if the pre-merger performance of the target is superior to the pre-merger performance of the acquirer. The first coefficient, β_1 , will indicate the effect on the post-merger ESG performance based on the relative pre-merger performance of the acquirer and target. If β_1 is positive, there are positive value effects for the post-merger ESG score of the acquirer if the ESG score of the target is greater than the acquirer. Furthermore, the model describes the effect of the control variables, represented by β_2 , β_3 , β_4 , and β_5 , and is supplemented by a constant and an idiosyncratic error.

The model that discusses the value-add effects of acquiring an ESG target on the post-merger market value is presented below, i.e., hypothesis 1b. This model is like the first regression model presented, only the dependent variable differs and there are different control variables.

$$\Delta MVacq = \alpha + \beta_1 * \frac{ESGtarget_{t-1}}{ESGacq_{t-1}} + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \varepsilon_{i,t}$$

The dependent variable is the difference in market value of the acquirer a year before and post the transaction. The first coefficient, β_1 , will indicate the effect on the post-merger market value based on the relative pre-merger performance of the acquirer and target. The control variables are changes in profitability, size and leverage.

The final model presents the model envisioned in explaining hypothesis 1c: There is a positive relationship between the enhanced ESG performance and the post-merger market value for the acquirer.

$$\Delta MVacq = \alpha + \beta_1 * \Delta ESGacq + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \varepsilon_{i,t}$$

The first coefficient, β_1 , will indicate the effect on the post-merger market value based on ESG performance changes of the acquirer. For this regression, the control variables are again changes in profitability, size and leverage.

Environmental | Hypothesis 2

Hypothesis 2a: The higher the target's pre-merger environmental score compared to the acquirer's pre-merger environmental score, the higher the acquirer's post-merger environmental score

$$\Delta ENVacq = \alpha + \beta_1 * \frac{ENVtarget_{t-1}}{ENVacq_{t-1}} + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \beta_5 * \Delta acqTangibility + \varepsilon_{i,t}$$

Hypothesis 2b: The higher the target's pre-merger environmental score compared to the acquirer's pre-merger environmental score, the higher the acquirer's post-merger market value

$$\Delta MVacq = \alpha + \beta_1 * \frac{ENVtarget_{t-1}}{ENVacq_{t-1}} + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \varepsilon_{i,t}$$

Hypothesis 2c: There is a positive relationship between the enhanced environmental score and the post-merger market value for the acquirer

$$\Delta MVacq = \alpha + \beta_1 * \Delta ENVacq + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \varepsilon_{i,t}$$

Social | Hypothesis 3

Hypothesis 3a: The higher the target's pre-merger social score compared to the acquirer's pre-merger social score, the higher the acquirer's post-merger social score

$$\Delta SOCacq = \alpha + \beta_1 * \frac{SOCtarget_{t-1}}{SOCacq_{t-1}} + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \beta_5 * \Delta acqTangibility + \varepsilon_{i,t}$$

Hypothesis 3b: The higher the target's pre-merger social score compared to the acquirer's pre-merger social score, the higher the acquirer's post-merger market value

$$\Delta MVacq = \alpha + \beta_1 * \frac{SOCtarget_{t-1}}{SOCacq_{t-1}} + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \varepsilon_{i,t}$$

Hypothesis 3c: There is a positive relationship between the enhanced social score and the post-merger market value for the acquirer

$$\Delta MVacq = \alpha + \beta_1 * \Delta SOCacq + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \varepsilon_{i,t}$$

Governance | Hypothesis 4

Hypothesis 4a: The higher the target's pre-merger governance score compared to the acquirer's pre-merger governance score, the higher the acquirer's post-merger governance score

$$\Delta GOVacq = \alpha + \beta_1 * \frac{GOVtarget_{t-1}}{GOVacq_{t-1}} + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \beta_5 * \Delta acqTangibility + \varepsilon_{i,t}$$

Hypothesis 4b: The higher the target's pre-merger governance score compared to the acquirer's pre-merger governance score, the higher the acquirer's post-merger market value

$$\Delta MVacq = \alpha + \beta_1 * \frac{GOVtarget_{t-1}}{GOVacq_{t-1}} + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \varepsilon_{i,t}$$

Hypothesis 4c: There is a positive relationship between the enhanced governance score and the post-merger market value for the acquirer

$$\Delta MVacq = \alpha + \beta_1 * \Delta GOVacq + \beta_2 * \Delta acqProfitability + \beta_3 * \Delta acqSize + \beta_4 * \Delta acqLeverage + \varepsilon_{i,t}$$

Appendix D | Differences Sample Selection Tampakoudis & Anagnostopoulou (2020) vs. This Research

	Tampakoudis & Anagnostopoulou (2020)	This research
Period	2003-2017	2003-2020 (ESG data from 2002-2021)
HQ acquirers & targets	EU, Norway or Switzerland	Europe
ESG data source	Thomson Reuters	Thomson Reuters
M&A data source	Thomson Reuters	Thomson Reuters
Financial data source	Worldscope	Worldscope
Initial M&A data sample (# of transactions)	1,112	2,179
Public companies?	Acquirer & Target are listed firms	Acquirer & Target are listed firms
Financial Info available	Of year-end before the transaction	From 2002-2021
Exclude small deals	Deal Values must exceed \$1m and deal ratios (deal value / market capitalisation of acquirer month before the merger announcement) should exceed 1%	Deal Values must exceed \$1m
Deal types	Omit buybacks, exchange offers and recapitalisations	Omit repurchases, exchange offers, self-tenders and recapitalizations
Industry specific	Exclude firms from the financial industry due to highly regulated nature	No industry specific criteria
Final sample (# of transactions)	100	77

Appendix E | Regressions Results Robustness Checks – Same year as transaction – ESG

Dependent Variable	(1) $\Delta_t \text{ESGacq}$	(2) $\Delta_t \text{MVacq}$	(3) $\Delta_t \text{MVacq}$
$\frac{\text{ESGtarget}_{t-1}}{\text{ESGacq}_{t-1}}$	0.27*** (0.08)	-0.01 (0.01)	
$\Delta_t \text{ESGacq}$			-0.02 (0.03)
$\Delta_t \text{Profitability}$	0.02 (0.04)	0.03 (0.02)	0.03 (0.02)
$\Delta_t \text{Size}$	-3.23 (6.11)	-0.28 (1.55)	-0.56 (1.46)
$\Delta_t \text{Leverage}$	-1.07** (0.44)	0.22 (0.20)	0.19 (0.25)
$\Delta_t \text{Tangibility}$	-0.07* (0.04)		
Constant	-0.16* (0.09)	-0.01 (0.03)	-0.02 (0.03)
Observations	77	77	77
Adjusted R-squared	0.563	0.0189	0.0110
F-test	3.911	1.150	0.838
p-value	0.00454	0.344	0.508

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Appendix F | Regressions Results Robustness Checks – Same year as transaction – ENV

Dependent Variable	(1) $\Delta_t \text{ENVacq}$	(2) $\Delta_t \text{MVacq}$	(3) $\Delta_t \text{MVacq}$
$\frac{\text{ENVtarget}_{t-1}}{\text{ENVacq}_{t-1}}$	0.49* (0.27)	0.00 (0.01)	
$\Delta_t \text{ENVacq}$			0.01 (0.01)
$\Delta_t \text{Profitability}$	0.04 (0.08)	0.03 (0.02)	0.03 (0.02)
$\Delta_t \text{Size}$	13.55 (13.92)	-2.05 (1.67)	-2.14 (1.72)
$\Delta_t \text{Leverage}$	-2.10 (2.48)	0.55** (0.22)	0.57** (0.22)
$\Delta_t \text{Tangibility}$	-0.37 (0.40)		
Constant	-0.33 (0.25)	-0.03 (0.03)	-0.02 (0.03)
Observations	70	70	70
Adjusted R-squared	0.488	0.0566	0.0582
F-test	1.858	2.330	2.405
p-value	0.119	0.0693	0.0624

Robust standard errors in parentheses

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

Appendix G | Regressions Results Robustness Checks – Same year as transaction – SOC

Dependent Variable	(1) $\Delta_t \text{SOCacq}$	(2) $\Delta_t \text{MVacq}$	(3) $\Delta_t \text{MVacq}$
$\frac{\text{SOCtarget}_{t-1}}{\text{SOCacq}_{t-1}}$	-0.01 (0.04)	-0.00 (0.01)	
$\Delta_t \text{SOCacq}$			-0.08 (0.08)
$\Delta_t \text{Profitability}$	0.02 (0.02)	0.03 (0.02)	0.03 (0.02)
$\Delta_t \text{Size}$	-1.46 (4.23)	-0.61 (1.49)	-0.80 (1.29)
$\Delta_t \text{Leverage}$	-0.26 (0.31)	0.22 (0.23)	0.20 (0.24)
$\Delta_t \text{Tangibility}$	0.01 (0.02)		
Constant	0.14** (0.06)	-0.02 (0.03)	-0.01 (0.03)
Observations	77	77	77
Adjusted R-squared	-0.0516	0.00991	0.0341
F-test	1.054	0.714	1.169
p-value	0.397	0.586	0.336

Robust standard errors in parentheses

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

Appendix H | Regressions Results Robustness Checks – Same year as transaction – GOV

Dependent Variable	(1) $\Delta_t \text{GOVacq}$	(2) $\Delta_t \text{MVacq}$	(3) $\Delta_t \text{MVacq}$
$\frac{\text{GOVtarget}_{t-1}}{\text{GOVacq}_{t-1}}$	0.19*** (0.01)	-0.01 (0.00)	
$\Delta_t \text{acqGOV}$			-0.00 (0.02)
$\Delta_t \text{Profitability}$	0.02 (0.02)	0.03 (0.02)	0.03 (0.02)
$\Delta_t \text{Size}$	-3.39 (4.44)	-0.35 (1.45)	-0.64 (1.47)
$\Delta_t \text{Leverage}$	-0.63 (0.54)	0.19 (0.21)	0.20 (0.25)
$\Delta_t \text{Tangibility}$	-0.07*** (0.02)		
Constant	-0.08 (0.05)	-0.01 (0.03)	-0.02 (0.03)
Observations	77	77	77
Adjusted R-squared	0.712	0.0226	0.00871
F-test	118.2	1.212	0.675
p-value	0	0.317	0.613

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Appendix I | Regressions Results Robustness Checks – Two Years After Transaction – ESG

Dependent Variable	(1) $\Delta_{t+2}\text{ESGacq}$	(2) $\Delta_{t+2}\text{MVacq}$	(3) $\Delta_{t+2}\text{MVacq}$
$\frac{\text{ESGtarget}_{t-1}}{\text{ESGacq}_{t-1}}$	0.25*** (0.06)	-0.03 (0.03)	
$\Delta_{t+2}\text{ESGacq}$			-0.02 (0.06)
$\Delta_{t+2}\text{Profitability}$	-0.01 (0.02)	-0.02*** (0.01)	-0.02** (0.01)
$\Delta_{t+2}\text{Size}$	6.06** (2.82)	-1.26 (1.57)	-1.97 (1.51)
$\Delta_{t+2}\text{Leverage}$	0.50 (0.35)	0.26** (0.11)	0.29** (0.12)
$\Delta_{t+2}\text{Tangibility}$	-0.19 (0.37)		
Constant	-0.06 (0.10)	-0.07** (0.03)	-0.08*** (0.03)
Observations	71	73	71
Adjusted R-squared	0.432	0.263	0.231
F-test	11.05	18.50	13.92
p-value	5.59e-07	3.43e-09	1.82e-07

Robust standard errors in parentheses

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

Appendix J | Regressions Results Robustness Checks – Two Years After Transaction – ENV

Dependent Variable	(1) $\Delta_{t+2}ENV_{acq}$	(2) $\Delta_{t+2}MV_{acq}$	(3) $\Delta_{t+2}MV_{acq}$
$\frac{ENV_{target_{t-1}}}{ENV_{acq_{t-1}}}$	0.62*** (0.12)	-0.02 (0.02)	
$\Delta_{t+2}ENV_{acq}$			-0.04 (0.03)
$\Delta_{t+2}Profitability$	-0.12* (0.06)	-0.02** (0.01)	-0.03** (0.01)
$\Delta_{t+2}Size$	13.10** (5.81)	-1.71 (1.31)	-1.06 (1.61)
$\Delta_{t+2}Leverage$	1.60** (0.60)	0.29** (0.13)	0.36** (0.15)
$\Delta_{t+2}Tangibility$	-0.04 (0.11)		
Constant	-0.65*** (0.16)	-0.07** (0.03)	-0.10*** (0.03)
Observations	65	66	65
Adjusted R-squared	0.824	0.258	0.281
F-test	18.82	17.89	30.12
p-value	5.78e-10	7.44e-09	0

Robust standard errors in parentheses

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

Appendix K | Regressions Results Robustness Checks – Two Years After Transaction – SOC

Dependent Variable	(1) $\Delta_{t+2}\text{SOCacq}$	(2) $\Delta_{t+2}\text{MVacq}$	(3) $\Delta_{t+2}\text{MVacq}$
$\frac{\text{SOCtarget}_{t-1}}{\text{SOCacq}_{t-1}}$	0.09 (0.06)	-0.02 (0.02)	
$\Delta_{t+2}\text{SOCacq}$			-0.00 (0.03)
$\Delta_{t+2}\text{Profitability}$	-0.02 (0.03)	-0.02** (0.01)	-0.02** (0.01)
$\Delta_{t+2}\text{Size}$	0.82 (3.86)	-1.86 (1.20)	-2.28** (1.04)
$\Delta_{t+2}\text{Leverage}$	-0.03 (0.53)	0.24** (0.11)	0.29** (0.12)
$\Delta_{t+2}\text{Tangibility}$	-0.04 (0.40)		
Constant	0.24 (0.15)	-0.07* (0.04)	-0.09*** (0.03)
Observations	71	73	71
Adjusted R-squared	-0.0267	0.247	0.227
F-test	0.881	12.25	13.37
p-value	0.502	6.71e-07	2.94e-07

Robust standard errors in parentheses

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

Appendix L | Regressions Results Robustness Checks – Two Years After Transaction – GOV

Dependent Variable	(1) $\Delta_{t+2}acqGOV$	(2) $\Delta_{t+2}MVacq$	(3) $\Delta_{t+2}MVacq$
$\frac{GOVtarget_{t-1}}{GOVacq_{t-1}}$	0.04* (0.02)	-0.02 (0.01)	
$\Delta_{t+2}acqGOV$			0.04 (0.06)
$\Delta_{t+2}Profitability$	0.01 (0.02)	-0.02*** (0.01)	-0.02** (0.01)
$\Delta_{t+2}Size$	0.84 (2.73)	-0.86 (1.69)	-2.44** (1.14)
$\Delta_{t+2}Leverage$	0.08 (0.35)	0.26** (0.11)	0.28** (0.13)
$\Delta_{t+2}Tangibility$	0.28* (0.16)		
Constant	0.03 (0.08)	-0.09*** (0.02)	-0.09*** (0.03)
Observations	71	73	71
Adjusted R-squared	0.147	0.278	0.238
F-test	16.47	46.24	14.95
p-value	3.19e-09	0	7.58e-08

Robust standard errors in parentheses

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

Appendix M | Summarizing Overview Results

# Hypothesis	Coefficient	Test results
Hypotheses 1 - ESG		
1a <i>The higher the target's pre-merger ESG score compared to the acquirer's pre-merger ESG score, the higher the acquirer's post-merger ESG score</i>	$\frac{ESG_{target_{t-1}}}{ESG_{acq_{t-1}}}$	$\beta_1 > 0$ (Significant positive effect) ^(2,3)
1b <i>The higher the target's pre-merger ESG score compared to the acquirer's pre-merger ESG score, the higher the acquirer's post-merger market value</i>	$\frac{ESG_{target_{t-1}}}{ESG_{acq_{t-1}}}$	No significant results to reject the null hypothesis
1c <i>There is a positive relationship between the enhanced ESG performance and the post-merger market value for the acquirer</i>	ΔESG_{acq}	No significant results to reject the null hypothesis
Hypotheses 2 - Environmental		
2a <i>The higher the target's pre-merger environmental score compared to the acquirer's pre-merger environmental score, the higher the acquirer's post-merger environmental score</i>	$\frac{ENV_{target_{t-1}}}{ENV_{acq_{t-1}}}$	$\beta_1 > 0$ (Significant positive effect) ⁽³⁾
2b <i>The higher the target's pre-merger environmental score compared to the acquirer's pre-merger environmental score, the higher the acquirer's post-merger market value</i>	$\frac{ENV_{target_{t-1}}}{ENV_{acq_{t-1}}}$	No significant results to reject the null hypothesis
2c <i>There is a positive relationship between the enhanced environmental score and the post-merger market value for the acquirer</i>	ΔENV_{acq}	No significant results to reject the null hypothesis
Hypotheses 3 - Social		
3a <i>The higher the target's pre-merger social score compared to the acquirer's pre-merger social score, the higher the acquirer's post-merger social score</i>	$\frac{SOC_{target_{t-1}}}{SOC_{acq_{t-1}}}$	No significant results to reject the null hypothesis
3b <i>The higher the target's pre-merger social score compared to the acquirer's pre-merger social score, the higher the acquirer's post-merger market value</i>	$\frac{SOC_{target_{t-1}}}{SOC_{acq_{t-1}}}$	No significant results to reject the null hypothesis
3c <i>There is a positive relationship between the enhanced social score and the post-merger market value for the acquirer</i>	ΔSOC_{acq}	No significant results to reject the null hypothesis ⁽⁴⁾
Hypotheses 4 - Governance		
4a <i>The higher the target's pre-merger governance score compared to the acquirer's pre-merger governance score, the higher the acquirer's post-merger governance score</i>	$\frac{GOV_{target_{t-1}}}{GOV_{acq_{t-1}}}$	$\beta_1 > 0$ (Significant positive effect) ^(2,3)
4b <i>The higher the target's pre-merger governance score compared to the acquirer's pre-merger governance score, the higher the acquirer's post-merger market value</i>	$\frac{GOV_{target_{t-1}}}{GOV_{acq_{t-1}}}$	No significant results to reject the null hypothesis
4c <i>There is a positive relationship between the enhanced governance score and the post-merger market value for the acquirer</i>	ΔGOV_{acq}	No significant results to reject the null hypothesis

Notes: (1) For all hypotheses the following hypotheses are tested for the coefficients: $H_0: \beta = 0$, $H_a: \beta \neq 0$. When the test-results are significant, the null hypothesis can be rejected. This is subject to a significant F-test. (2) Results are robust for changes in the time period used, in this case for the period of the year before the transaction to the same year as the transaction. (3) Results are robust for changes in the time period used, in this case for the period a year before the transaction to two years after the transaction. (4) Results of additional analysis show significant results for a U-shaped relationship between difference in the social performance and the market value of the acquirer.