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**An analysis of sustainability and (post-)merger returns:**  
*Evidence from European acquirers*

Master Thesis Financial Economics

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The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics, or Erasmus University Rotterdam.

## Abstract

This study provides a thorough analysis of the relevance of European acquirers' sustainability classifications for their (post-)merger financial performance. Several European countries aim to stimulate more sustainable investments through legislative initiatives that increase the transparency of the sustainability of investments. Using a sample of 1519 European mergers between 2002 and 2020, this research finds no robust evidence for sustainability-related short- or long-term abnormal returns following mergers. This study analyses the cumulative abnormal returns, the buy-and-hold abnormal returns, and the Jensen-alpha results to corroborate its findings. Although this study finds some evidence of a negative effect of acquirers' sustainability characteristics on their (post-)merger performance, the majority of the results do not show a significant relation. This study concludes that this lack of robust evidence raises the question of the effectiveness of the forthcoming European legislation.

**Keywords:** Sustainability, ESG-factors, Mergers and acquisitions, Cumulative abnormal returns, Buy-and-hold abnormal returns, Jensen-alpha

**JEL Classification:** G14, G30, G34, G40

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## List of abbreviations

<b>BHAR</b>	Buy-and-Hold Abnormal Return
<b>CAPM</b>	Capital Asset Pricing Model
<b>CAR</b>	Cumulative Abnormal Return
<b>CFP</b>	Corporate Financial Performance
<b>CSR</b>	Corporate Social Responsibility
<b>ESG</b>	Environmental, Social, and Governance
<b>EU</b>	European Union
<b>GSIA</b>	The Global Sustainable Investment Alliance
<b>M&amp;A</b>	Mergers & Acquisitions
<b>SFDR</b>	Sustainable Finance Disclosure Regulation
<b>SaRI</b>	Sustainable and Responsible Investing
<b>SRI</b>	Socially Responsible Investing
<b>UNGC</b>	United Nations Global Compact
<b>UNPRI</b>	United Nations Principles for Responsible Investment
<b>US</b>	United States of America
<b>VIF</b>	Variance Inflation Factor

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# 1 Introduction

The consideration of sustainable factors in investment decisions began in the 1960s as socially responsible investing. During that time, a number of investors excluded stocks or entire industries based on activities such as tobacco production or involvement in the South African apartheid regime (Guay et al., 2004). Gradually, incorporating sustainability factors in financial decisions became more mainstream. To illustrate, nowadays the interest in ESG-dedicated funds is rapidly increasing (Duuren van et al., 2016). This so-called Environmental, Social, and Governance (ESG) investing has topped one trillion dollars for 2020 according to J.P. Morgan (2020).<sup>1</sup> The American asset manager states that in 2020 the total worldwide investments in these sustainable funds are making up for around 2% of the global stock market.

Parallel to the increasing interest of investors over the years, academics increasingly focused on topics related to the significance of sustainable factors in several financial processes. One of the most widely researched topics is the relationship between sustainable indicators, such as ESG ratings, and Corporate Financial Performance (CFP) of firms. These studies do not provide a clear understanding of this relationship because of a lack of unequivocal results.

In line with a traditional neoclassical view, one could argue that investing in socially responsible aspects of a company might correspond with a rise in costs (Palmer et al., 1995). In a competitive market, these additional costs could reduce the company's profit (Baumol & Blackman, 1991). In the long run, the company's competitiveness could be negatively affected. Derwall et al. (2011) and Capelle-Blancard & Monjon (2014) find, to a certain extent, evidence for this statement. Moreover, this reduction in profits is not in line with Friedman's shareholder theory. In this theory, Friedman states that the only social responsibility of a company is to maximize shareholder value (Jahn & Brühl, 2018).

In the light of other perspectives and assumptions, it can be reasoned that Corporate Social Responsibility (CSR) does create value for a company. For example, one could argue that investing in ESG factors is an 'insurance' against reputational risks (Godfrey et al., 2009). In addition to insuring against reputational risks, CSR can also improve a company's reputation. This could lead to a positive impact on financial performance (McWilliams & Siegel, 2001). Several studies find evidence for such a positive relationship (Clark et al., 2015; Schröder, 2014). Despite a large amount of academic research regarding the relationship between ESG investing and financial returns, no unequivocal conclusion can yet be drawn. One reason for this is the significant fragmentation in findings (Friede et al., 2015). This fragmentation is further elaborated upon in the Literature Review.

Although the relation between sustainability indicators and CFP has been the research topic of many scholars, only a few focus on mergers. The reason this study focuses on mergers is twofold.

First, as one of the most critical corporate investment decisions, mergers can significantly impact

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<sup>1</sup>Environmental, social, and governance (ESG) criteria are a set of standards for a company's operations that socially conscious investors use to screen potential investments. Environmental criteria consider how a company performs as a steward of nature. Social criteria examine how it manages relationships with employees, suppliers, customers, and the communities where it operates. Governance deals with a company's leadership, executive pay, audits, internal controls, and shareholder rights. *Subsection 2.1* discusses the different characterizations of sustainability in more detail.

shareholder value. Furthermore, the merger approval process is usually beset by obstacles and depends on the support from various stakeholders who have a substantial impact on the merger's conclusion and play a crucial part in the post-merger integration process. As a result, mergers are a suitable event for examining the influence of sustainable characteristics on shareholders' value.<sup>2</sup>

Second, including merger announcement returns in the study, potentially mitigates the reverse causality problem associated with the relation between sustainability characteristics and firm value. This is due to the typically unpredictable nature of merger events (Waddock & Graves, 1997; Teoh et al., 1999; Jiao, 2010). For instance, one could argue that good-performing firms could invest relatively more in sustainable characteristics, resulting in a higher Tobin's Q or good accounting performance (Deng et al., 2013). Examining abnormal announcement returns associated with mergers might mitigate this reverse causality.

Deng et al. (2013) are among the first to examine the effect of acquirer CSR characteristics on (post-)merger performance. Their findings suggest that higher CSR ratings positively impact acquirers' announcement returns and post-merger performance. However, their sample consists of mergers in the period 1992 to 2007. As discussed, sustainability has become increasingly important since then. Additionally, the authors use a sample of mergers exclusively originating from the United States. This study is particularly interested in the examined relationship in Europe. The reasons for this are set out later in this section and *subsection 2.1*.

Contrary to Deng et al. (2013), Meckl & Theuerkorn (2015) observe a negative correlation between acquirer CSR characteristics and announcement returns, regardless of the chosen CSR dimension. However, the authors find no robust causal effect of the acquirers' CSR performance on announcement returns. It should be noted that the sample used in this study comprised only 113 transactions in the period 2006 to 2010. Additionally, the authors use a global sample, and nearly half of the deals studied originate from the United States.

Motivated by this, this study focuses on the relationship between acquirer ESG characteristics and (post-)merger returns in Europe. The aim of this study can be summarized in the following research question: to what extent do ESG characteristics of the acquiring firm relate to abnormal returns of the acquirer after a merger announcement in Europe?

The contribution of this paper to the existing literature is twofold. First, as discussed, there has been little prior research into the relation between acquirers' sustainability indicators and (post-)merger returns. This paper contributes to the existing literature and research by focusing on European mergers. Second, this study adds several theories and perspectives to understanding this relationship. Hereby, this paper achieves to gain a better understanding of (post-)merger returns in Europe.

Regarding the practical relevance, it is evident that sustainability indicators are playing an increasingly important role in several financial processes. According to Franklin (2019), the sustainability

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<sup>2</sup>Note that this study solely focuses on mergers in its analyses. Mergers occur when two companies choose to merge rather than continue to operate separately. On the contrary, in acquisitions, the company selling the asset remains a separate legal organization. Because of the distinction between mergers and acquisitions, a variety of problems and support from diverse stakeholders may differ between the two types of events. As a result, this study excludes acquisitions from its analyses.

standards of a company have become a key factor in mergers. The author states that companies invest more and more in ESG standards for their reputation and to recruit new talent in anticipation of regulations. Considering this, a thorough understanding of the relevant existing and upcoming regulations is a must to better understand the effect of ESG characteristics on (post-)merger performance. Therefore, this study includes a profound analysis of the relevant (upcoming) regulations in *subsection 2.1*.

Many national and supranational legislators attempt to influence the effect a firm's sustainability has on its CFP. At the European Union (EU) level, this theme seems to be a priority with the arrival of the Action Plan: Financing sustainable growth in 2018 (European Commission, 2018).<sup>3</sup> The action plan aims to reorient capital flows toward more sustainable investments to make the private sector more sustainable (Bierens, 2020). Moreover, based on this action plan, a more transparent investment climate will be developed, which will make the sustainability of investments by companies and other actors more transparent for everyone (Wijker, 2018). Because of this upcoming transparency, it is valuable to companies, and other financial actors, to learn how sustainable factors could affect them. This study contributes to this understanding of the niche (post-)merger performance.

This study is organized into several sections and subsections. Each (sub)section addresses a specific issue related to the main question to formulate an unambiguous answer to the research question. The remainder of this study is structured the following way. The literature review is set out in *section 2*. This section is divided into four subsections. *Subsection 2.1* sets out the difficulties related to the definition of the concept of sustainability in a European context. This first subsection aims to identify how sustainability components are assessed and why it is highly complex. This subsection has a defining purpose. The existing literature on acquirer announcement returns is presented in *subsection 2.2*. These insights are used in the methodology section to justify the inclusion of several control variables in the models. *Subsection 2.3* sets out the relevant literature on the long-term acquirer post-merger performance. *Subsection 2.4* discusses the literature linking sustainability factors, as set out in *subsection 2.1*, to the financial performance measures, as set out in subsections *2.2* and *2.3*. *Section 3* continues by introducing the sample construction in *subsection 3.1* and the measurement of the sustainability factors in *3.2*. *Section 4* focuses on the merger announcement return analyses. This section is divided into three subsections. *Subsection 4.1* sets out the measurement of the announcement returns and *subsection 4.2* continues

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<sup>3</sup>The European Action Plan consists of several components. A fundamental part of the action plan is the creation of a uniform classification system for sustainable activities. This taxonomy is discussed in *subsection 2.1* of the Literature Review. A second part of the action plan concerns the further development of the laws and regulations concerning the disclosure of sustainable investments. Among other things, the intention is to amend the EU Directive 2016/2341. This regulation is intended for asset managers and institutional investors, such as pension funds. Both the taxonomy and further disclosure regulations could contribute to more transparency in sustainable investments. A third component of the action plan is the creation of new categories of sustainability benchmarks. In addition, a European standard will be created for green bonds. The European Regulation 2019/2088, better known as Sustainable Finance Disclosure Regulation (SFDR), is also a result of the European Action Plan. Articles 8 and 9, SFDR, state that financial actors, who claim to be sustainable in some way, have to offer a scheme with ESG features to disclose in their annual report, starting in 2022, the proportion of equity, bond, and real estate investments that comply with the taxonomy. In addition, Article 4, SFDR, stipulates that a statement on the due diligence policy on the website must describe how the financial actor deals with the "main adverse effects of investment decisions.



by discussing the statistical analyses and the several control variables that are used to examine the announcement returns. The results of these analyses are discussed in *subsection 4.3*. *Section 5* discusses the methodology and results of the long-term analyses. This section is divided into four subsections. The first two subsections are devoted to the design (*subsection 5.1*) and results (*subsection 5.2*) of the Jensen-alpha approach. Similarly, *subsections 5.3* and *5.4* are devoted to discussing the BHAR-approach. *Section 6* consists of the conclusion and discussion of this study. In *subsection 6.1*, the results of this research are interpreted and linked to the expectations. Additionally, the limitations of this research are discussed in *subsection 6.2*. Finally, this study concludes with some recommendations for future research in *subsection 6.3*.

## 2 Literature review

This section provides a thorough evaluation of relevant literature regarding the relation between sustainability indicators and (post-)merger performance. *Subsection 2.1* sets out the difficulties related to the definition of sustainability in a European context. *Subsection 2.2* describes the existing literature on acquirer merger announcement returns. This subsection includes several insights from a behavioral perspective to get a better understanding of these returns. *Subsection 2.3* evaluates the relevant literature regarding the long-run post-merger performance of firms. At last, *subsection 2.4* is committed to evaluating the few studies that link sustainability characteristics to the (post-)merger performance of acquirers.

### 2.1 Sustainability in a European context

This subsection elaborates on the concept of sustainability within investments and firms. This is of significance due to the current lack of consensus on a uniform definition of this concept (Bruggen van, 2017). Partly for this reason, this study continues with an analysis of the definition of the sustainability of an investment according to various criteria. This way, the definition of sustainability is clarified and some discrepancies between different definitions become apparent. This subsection also discusses the consequences of the lack of an unambiguous definition. This subsection ends with a description of the European taxonomy from the Action Plan: 'Financing Sustainable Growth' to further emphasize the practical relevance of this paper. The introduction of this taxonomy is an important step towards an unambiguous definition of sustainability in the European Union.

Concepts such as sustainable investing, ethical investing, ESG investing, Socially Responsible Investing (SRI), Sustainable and Responsible Investing (SaRI), and value-based investing are often regarded as synonyms, despite there being important nuances.<sup>4</sup> There is currently no single universal definition of sustainable investing. As a result, firms determine for themselves which definitions they use in their statements and annual reports. The need for a universal definition will become clear in the following paragraphs.

Investors can make more sustainable decisions using several strategies. The Global Sustainable Investment Alliance (GSIA) identifies seven strategies that stimulate sustainable investments (Global Sustainable Investment Alliance, 2018). First, negative screening can be used. In this process, investors do not invest in sin stocks. A sin stock is a company's share that is considered unethical, such as companies related to the alcohol or tobacco industry. Second, positive screening can be opted for. As a result of this, an investor only invests in companies that perform best in a specific area, for example, based on ESG factors. Third, screening can be done based on standards. Such screening only excludes companies that do not adhere to recognized standards, such as those of the United Nations Global Compact (UNGC) or United Nations Principles for Responsible Investment (UNPRI). Furthermore, ESG integration can be used. Such a strategy integrates ESG factors into the investment process without excluding predetermined

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<sup>4</sup>In view of the purpose and scope of this thesis, these various concepts are not elaborated upon. In Novick et al. (2020), several definitions are set forth.

companies. Fifthly, sustainable investments can be made thematically. Accordingly, an investor only invests in projects related to a specific sustainable theme, such as solar energy. Sixth, one might opt for impact investing and social investing. This way, targeted investments are made in projects that try to solve social problems. Finally, an investor can opt for active shareholding. Hereby, an investor uses his shareholder rights to move the company towards a more sustainable course.

In financial processes, different definitions of sustainability in combination with these different strategies for sustainable investing can have major consequences on the ultimate investment choices and valuations. For example, socially responsible funds have invested more than average in technology stocks in recent years, especially in US tech giants such as Facebook, Apple, Amazon, and Alphabet (Bioy & Lamont, 2018). A possible explanation is that the technology sector is considered to be a sector that is well aware of the importance of a good ESG valuation (KPMG, 2020). However, in recent years, these companies have been accused of various privacy scandals, violations of working conditions, and tax avoidance. Nonetheless, using certain demarcations, such investments can be considered more sustainable than investments in a brewery. This may be the case if such a brewery can be considered a sin stock. Using other demarcations, an opposite conclusion can be reached.

To meet the growing demand, from both private and professional investors, for an unambiguous determination of sustainability, the European Commission has presented the taxonomy in the "Funding Sustainable Growth" action plan. This taxonomy is expected to be fully public by 2023 (European Union Technical Finance Group on Sustainable Finance, 2020). This taxonomy determines how the sustainability of the activities of parties can be qualified. In the years following the publications, publicly traded firms and other financial actors will have to use this taxonomy to determine the sustainability of their operations.

The taxonomy currently focuses mainly on sustainability related to the environment. The European Commission states that the taxonomy has six sustainability goals. First, the taxonomy focuses on mitigating climate change. Related, the taxonomy also aims to adapt to climate change. The third goal is to sustainably use and protect water and marine resources. Fourth, the taxonomy aims to transition to a circular economy. Pollution prevention and control is the fifth goal. Finally, the taxonomy aims to protect and restore biodiversity and ecosystems.

It is expected that the taxonomy will be expanded to include other sustainability factors. Several EU bodies are working to achieve this. The Platform on sustainable finance, an advisory body to the EU, has already drafted a concrete proposal on how several other sustainability factors can be included in the taxonomy. This proposal adds three pillars to the taxonomy, namely: respect for human rights, governance, and the promotion of adequate living conditions for all (Platform on sustainable finance, 2021). These pillars show similarities with the previously mentioned ESG factors. It is expected that the taxonomy, when complete, will contain various environmental, social, and governance factors. This way, the EU attempts to promote sustainable investment in the broadest sense. Therefore, this study uses the acquirer ESG scores in its analyses. This is discussed further in *Subsection 3.1*.

With regard to merger control, the European Commission initially seemed reluctant to the idea of implementing sustainable rules in the merger control instruments. However, recently, the Commission

acknowledged that the transition to a more sustainable financial system also requires the adoption of the competition law instruments. Note that the Commission emphasized that it does not have the mandate to intervene in mergers solely because the mergers are likely to harm the environment if no competition parameter (e.g., innovation) is concerned (Directorate-General for Competition, 2021).

## **2.2 Acquirer merger announcement returns**

Since the early 1970s, several studies focus on the effect of acquisition announcements on the share prices of both acquiring and target firms. In their research, Jensen & Ruback (1983) use a sample of US-listed firms in the period 1956 to 1981. The authors find that the share prices of the target firms experience significantly positive abnormal returns of around 20%-30% at the announcement date of the merger. These percentages are in line with the findings in recent literature (Dutordoir et al., 2021). In their study, Jensen & Ruback (1983) do not find significant abnormal returns for the acquirer. In many cases, acquirer CARs are close to zero or negative upon announcement (Schneider & Spalt, 2017). Academics have presented several potential reasons for these findings. Note that the following overview is not an exhaustive list.

Overpaying could potentially explain the absence of positive announcement returns for the acquirer. In his paper on bidder overpayment, Black (1988) elaborates on this overpaying and offers three possible explanations. First, the author states that, due to competition among bidders, bidders tend to increase their probability of winning by making high offers to outbid other potential bidders. Hereby ignoring the winner's curse. Second, Black (1988) states that a possible source of overpaying could be related to the information asymmetry in mergers. Roll (1986) formulates the Hubris hypothesis to explain this phenomenon. In this hypothesis, Roll (1986) states that a merger decision is based on a valuation of an asset that has an already observable market price. Because the target's inherent value is unknown to potential acquirers, the target's value is evaluated based on the information available to each of the bids. The valuation of the asset can be considered a random variable. Therefore, an offer is made when the valuation - the random variable - exceeds the market price. This results in price offers that exceed the stock's intrinsic value. Malmendier & Tate (2008) test the hubris hypothesis. The authors find that optimistic CEOs complete more mergers, especially diversifying mergers. This relation is the most pronounced among the least equity dependent firms. Moreover, investors are more skeptical about offers made by optimistic CEOs. According to Malmendier & Tate (2008), overconfident CEOs tend to overestimate their ability to generate returns. As a result, these CEOs might overpay for target companies and engage in value-destroying acquisitions. More recently, Schneider & Spalt (2017) also find evidence supporting the hubris hypothesis. According to Black (1988), a third potential source of overpaying can be found in the principal-agent relationship. In the literature, there is a broad consensus on the divergence and misalignment of shareholders' and managers' interests. Shareholders are interested in the returns on their investments, whereas managers are interested in the growth of the company. Their desire to expand could cause managers to overinvest in mergers. These managers may inflate possible gains to justify high premiums (Black, 1988).

A second potential reason for the absence of positive acquirer announcement returns might be the

absence of value creation in mergers. In the literature, there is a consensus that diversifying mergers destroy value for the acquirer (Berger & Ofek, 1995; Akbulut & Matsusaka, 2010). Looking at the dataset of this research, 735 of the 1519 mergers can be seen as diversifying mergers, as shown in Table 2.

A third potential reason might be found in the small target size relative to the buyer (Asquith et al., 1983). According to Asquith et al. (1983), the size of the target relative to the size of the acquirer for acquisitions of public firms matters because of the relative impact of an acquisition on the equity market capitalization of the acquiring firm. Additionally, Moeller et al. (2004) observe that the announcement returns for acquiring-firm shareholders are roughly two percentage points higher for small acquirers irrespective of the form of financing and whether the acquired firm is public or private.

Moreover, there might not be any positive announcement returns if the takeover strategy of the acquirer is already reflected in its stock price. If an acquirer is expected to engage in mergers, the stock price reaction will merely reflect how the market considers the merger to differ from what was expected (Fuller et al., 2002).

Furthermore, merger arbitrageurs might cause the acquirer to have negative announcement returns. Arbitrageurs buy shares of the target and short-sell stock of the acquirer to make a profit. Shorting the acquirer's stock has the purpose of hedging against movements in the stock price of the bidder. The findings of M. Mitchell et al. (2004) suggest that merger arbitrage can explain nearly half of the negative acquirer announcement returns.

### **2.3 Acquirer post-merger performance**

Long-horizon post-merger performance is difficult to measure. Isolating the effects of a single event becomes more challenging when incorporating long horizons. Consequently, the methodological approach to measuring the post-merger performances becomes more challenging (Kothari & Warner, 2007). A more in-depth analysis of these challenges and the methodology this study deploys are set out in *section 5*.

Despite the difficulties associated with empirical designs, several studies suggest a relation between mergers and long-horizon performance. Ratcliffe et al. (2017) investigate this among Australian real-estate Investment Trusts (A-REITs) in the period 1996-2012. The A-REIT sector is chosen because the regulatory environment of the sector mitigates the vulnerability to agency issues (Eichholtz & Kok, 2008). Similar to this study, the authors use both a buy-and-hold abnormal returns model and a Fama-French model to obtain robust results. Their findings suggest that A-REIT acquirers underperform in the long-run in the entire period. Gugler et al. (2003) examine, among other things, the post-merger profits of acquiring firms in continental Europe. Their sample consists of 9595 mergers over the period 1990-1998. Although their results suggest a significant decline in post-merger sales of the combined firm, they find an insignificant increase in post-merger profit. Martynova & Renneboog (2006) examine the European post-merger performance in the period 1997-2001 by measuring its post-merger cash flow. The authors find that the raw profitability decreases significantly following the merger. However, these results become insignificant after controlling for the performance of peer companies. Studies focusing solely on

UK firms offer contradicting results. Dickerson et al. (1997) use a sample of 2941 UK mergers in the period 1948-1977 and state that their results indicate a significant decline in post-merger profitability, whereas Powell & Stark (2005) use several performance measures and find a significant growth in the period 1983-1993.

Agrawal & Jaffe (2000) are among the first to summarize the large set of studies that examined long-horizon stock returns following mergers. The authors identify several different empirical methods and finally conclude that long-run performance following mergers is negative. However, the authors emphasize that the effects of the empirical methods used may modify their conclusion.

## 2.4 Sustainability and financial performance

Academic literature on acquirer financial performance following a merger suggests that several deal-, firm-, industry-, and country-specific characteristics affect acquirer returns. This study offers an in-depth discussion of these characteristics in *subsection 4.2* and includes many of them in its analyses. Few studies have included sustainability indicators in their methodology. Therefore, this subsection is devoted to setting out the existing relevant literature regarding the relation between sustainability indicators and acquirer (post-)merger financial performance. Table 1 provides a brief overview of several relevant studies.

As discussed in the introduction, the studies of Deng et al. (2013) and Meckl & Theuerkorn (2015) find contradicting results. In addition to their merger announcement return analyses, Deng et al. (2013) investigate the long-run post-merger performance of acquirers. The authors use a Jensen-alpha approach to examine the acquiring firms' long-term abnormal stock returns. Their findings suggest that, compared with mergers by low CSR acquirers, those by high CSR acquirers lead to larger increases in long-term operating performance and stock returns.

Caiazza et al. (2021) examine the relation between acquirer ESG scores and post-merger financial performances in the hospitality sector. The study is not limited to mergers in a single country. For their long-term analyses, the authors use a global dataset of 757 acquirers from the period 2000 to 2019. The targets of the deals are active in the hospitality sector. Similar to this study, Caiazza et al. (2021) examine the one-, two-, and three-year post-merger performance. The authors observe some weighty improvements in financial ratios, such as the return on assets and the cash ratios, in these long-term periods concerning the ESG scores. Their findings suggest that the impact of ESG scores on maximizing value for shareholders in the short-term is negligible. However, in the long-run, the corporate strategy to improve corporate sustainability is a process that turns out to add value.

Yen & André (2019) also examine the short- and long-run performances of acquirers in relation to their reported ESG scores. For their short-term analyses, the authors examine the announcement returns of acquirers in 1986 mergers in emerging markets and find no robust relation. In their long-term analyses, however, the authors find a positive and significant effect of acquirer ESG scores on their post-merger cash flow.

Some studies include sustainability measures of the targets in their analyses. Aktas et al. (2011) were among the first to do so and their results indicate that the ESG scores of the targets have a positive and significant effect on the announcement returns of the acquirers. However, due to the scarcity of

such sustainability factors of the targets, the sample of Aktas et al. (2011) only comprises 106 worldwide mergers. This research does not include the sustainability measures of the targets due to the scarcity of such measures. Regarding the short-term analyses, C. Chen et al. (2022) and Qiao et al. (2018) find similar results as Aktas et al. (2011). In addition, these authors investigate the long-term relationship. C. Chen et al. (2022) examine 574 U.S. mergers and find a positive effect of target CSR ratings using the Buy-and-Hold Abnormal Return (BHAR)-methodology. The findings of Qiao et al. (2018) are too fragmented to draw an unequivocal conclusion.

Guidi et al. (2020) investigate the effects of the previously discussed negative screening strategy and empirically establish that shareholders of acquirers on average discount sin mergers. The study uses 23786 worldwide mergers from 1985 to 2015, in 186 of which the target is considered a sin firm. The authors analyze the acquirers' announcement returns and conclude that the costs of acquiring sin targets are considerable.

Concluding this subsection, the findings in the literature are ambiguous regarding the relationship between acquirers' sustainability scores and their short-term stock returns. Regarding the long-term analyses, most of the findings suggest a positive relationship between the sustainability scores of acquirers and their long-term (financial) performance.

**Table 1: Overview of relevant literature**

This table provides a rundown of relevant studies that examine the interaction between sustainability measures and (post-)merger performance of acquirers. The findings indicate the observed relation between sustainability and CFP. Note that this list is not exhaustive, but merely an overview of studies deemed relevant.

Study	Sample period	Sample characteristics	Sustainability measure	Empirical method	Findings
<b>Panel A: acquirer announcement returns</b>					
Aktas et al. (2011)	1997 – 2007	106 worldwide mergers	Target ESG scores (Asset4 ESG Database)	CAR analysis	Positive effect
Caiazza et al. (2021)	2000 – 2019	757 worldwide mergers	Acquirer ESG scores (Asset4 ESG Database)	CAR analysis	Insignificant effect
Deng et al. (2013)	1992 - 2007	1556 U.S. mergers	Acquirer CSR ratings (KLD database)	CAR analysis	Positive effect
Guidi et al. (2020)	1985 - 2015	23786 worldwide mergers	Target is a sin firm (Datastream and Thomson One)	CAR analysis	Positive effect
Meckl & Theuerkorn (2015)	2006 - 2010	113 worldwide mergers (mainly U.S. acquirers)	Acquirer CSR ratings (Oekom Research database)	CAR analysis	Negative effect
Yen & André (2019)	2008 – 2014	1986 mergers in emerging markets	Acquirer ESG scores (Asset4 ESG Database)	CAR analysis	Insignificant effect
<b>Panel B: acquirer long-term stock returns</b>					
Caiazza et al. (2021)	2000 – 2019	757 worldwide mergers	Acquirer ESG scores (Asset4 ESG Database)	Post-merger cash, size, and ROA analyses	Positive effect
C. Chen et al. (2022)	1995 - 2015	574 U.S. mergers	Target CSR ratings (KLD database)	BHAR analysis	Positive effect
Deng et al. (2013)	1992 - 2007	1556 U.S. mergers	Acquirer CSR ratings (KLD database)	Carhart four-factor analysis	Positive effect
Qiao et al. (2018)	2012 - 2014	1090 Chinese mergers	Target CSR ratings (KLD database)	Post-merger earnings per share analysis	Mixed effects
Yen & André (2019)	2008 - 2014	1986 mergers in emerging markets	Acquirer ESG scores (Asset4 ESG Database)	Post-merger cash analysis	Positive effect



### 3 Data

This section describes the sample used in this paper in *subsection 3.1* and the measurement of ESG performance in *subsection 3.2*.

#### 3.1 Sample

To investigate the announcement returns of European firms, this research uses a sample that consists of mergers in which European publicly held firms acquire European firms in the period January 2002 to December 2020. These deals are obtained from the Thomson ONE database. Following Deng et al. (2013), these standard criteria must be met to be retained in the final sample:

- The acquirer’s public status is “public”;
- The deal is not withdrawn;
- The acquirer purchases at least 50% of the shares in the target;
- The acquirer owns 100% of the shares of the target as a result of the deal;
- The deal value is greater than €1 million;
- The acquirer has stock returns and financial data available from Datastream; and
- The acquirer is not in the financial or utilities industries.

After imposing these criteria, a sample of 5261 mergers remains. Subsequently, deals in which the acquirer has no reported ESG scores in Datastream are excluded from the final sample. This results in a sample of 1519 mergers.

Panel A of Table 2 presents an overview of the countries of the acquiring firms in the final sample. It shows that in almost half of the mergers, the acquirer keeps its headquarters in the United Kingdom.<sup>5</sup> Panel B of Table 2 shows the distribution of the sample mergers according to acquirer industry and year. The number of mergers seems to increase until 2004 and then decreases significantly in 2005 and rebounds from 2005 onwards. Then, it decreases in 2009 and then increases in 2010 and remains more or less stable from 2010. Over the entire study period, most of the acquirers operate in the manufacturing- (41.9%) and the service-sector (30.0%).

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<sup>5</sup>Although the UK is not a member of the European Union, the UK Government has the same sustainability goals as the EU and is trying to follow the European Action Plan: Financing sustainable growth as closely as possible (Her Majesty’s Treasury, 2021).

**Table 2: Acquiring firms characteristics**

This table shows the distribution of the final sample consisting of 1519 mergers between European firms announced and completed in the period 2002 – 2020. Panel A offers an insight into the distribution per country. Panel B shows the distribution over time and per sector.

*Panel A: Countries of acquiring firms*

Acquiring country	Merger Count	Percentage	Cumulative percentage	Acquiring country	Merger Count	Percentage	Cumulative percentage
<b>Austria</b>	24	1.58	1.58	<b>Luxembourg</b>	7	0.46	31.34
<b>Belgium</b>	23	1.51	3.09	<b>Netherlands</b>	51	3.36	34.69
<b>Denmark</b>	26	1.71	4.81	<b>Poland</b>	15	0.99	35.68
<b>Finland</b>	54	3.55	8.36	<b>Portugal</b>	5	0.33	36.01
<b>France</b>	129	8.49	16.85	<b>Spain</b>	60	3.95	39.96
<b>Germany</b>	91	5.99	22.84	<b>Sweden</b>	164	10.80	50.76
<b>Greece</b>	7	0.46	23.30	<b>United Kingdom</b>	748	49.24	100.00
<b>Ireland-Republic</b>	58	3.82	27.12	<b>Total</b>	1519	100.00	
<b>Italy</b>	57	3.75	30.88				

*Panel B: Acquiring industries*

Year	Agriculture, forestry, and fisheries	Mineral Industries, and construction	Manufacturing	Transportation and communications	Wholesale trade and retail trade	Service industries	Total
<b>2002</b>	0	6	32	7	13	22	80
<b>2003</b>	0	7	44	4	9	22	86
<b>2004</b>	0	6	55	7	13	28	109
<b>2005</b>	0	0	4	2	0	1	7
<b>2006</b>	0	2	15	4	7	10	38
<b>2007</b>	0	12	43	13	18	41	127
<b>2008</b>	0	7	33	17	11	40	108
<b>2009</b>	0	4	16	10	6	18	54
<b>2010</b>	0	6	42	7	7	29	91
<b>2011</b>	0	6	37	7	7	36	93
<b>2012</b>	0	7	34	7	13	18	79
<b>2013</b>	0	2	21	6	7	18	54
<b>2014</b>	0	6	34	7	7	19	73
<b>2015</b>	0	3	32	5	10	19	69
<b>2016</b>	0	3	33	15	10	17	78
<b>2017</b>	0	10	26	9	7	14	66
<b>2018</b>	0	2	46	8	10	29	95
<b>2019</b>	1	1	48	7	15	33	105
<b>2020</b>	3	7	41	4	10	42	107
<b>Total</b>	4	97	636	146	180	456	1519

### 3.2 Measuring ESG performance

This study is interested in the effect of the ESG performance of the acquiring firms on their stock returns. The ESG indicators are obtained from the Thomson Reuters ESG Database, also known as ‘Asset4 ESG Database’. This database provides ESG information based on around 750 key performance indicators from 2002 onwards. For clarity, this study focuses on the three main pillars these 750 performance indicators are grouped in, namely the environmental pillar, the social pillar, and the governance pillar. Additionally, the combined ESG score is included. This is an overall company score based on the reported information in the three pillars.

The sample is split into high and low ESG scoring acquirers to measure the impact of sustainability scores on CFP. This division is based on the sample median of the ESG combined score. The results of the split remain similar when establishing the division on one of the three individual ESG pillars. Table 3 shows summary statistics for the total sample and the subsamples. The characteristics of the control variables are discussed in *subsection 4.2*

**Table 3: Summary statistics of the independent variables**

*This table shows the mean and median values of the independent variables used in the analyses. Column (1) shows the values of the full sample, columns (2) and (3) show the values of the high ESG and the low ESG subsamples, and column (4) shows the difference between these two subsamples, respectively. Using the Wilcoxon test, a 10%, 5%, and 1% significance level of the differences between the subsamples are denoted with \*, \*\*, and \*\*\*, respectively.*

	Full Sample (N = 1519)		Subsample high ESG score: A (N = 759)		Subsample low ESG score: B (N = 760)		Test of difference (A-B)	
	(1)		(2)		(3)		(4)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
<b><i>Sustainability measures</i></b>								
ESG combined score	45.976	44.880	62.858	59.980	29.116	29.500	33.742***	30.480***
Environmental pillar	39.881	39.160	60.168	59.760	19.434	16.130	40.734***	43.630***
Social pillar	47.455	44.380	65.016	65.170	29.754	29.350	35.262***	35.820***
Governance pillar	49.006	48.980	61.115	62.970	36.913	34.905	24.202***	28.065***
<b><i>Firm-specific control variables</i></b>								
Return on assets	0.060	0.055	0.061	0.054	0.059	0.056	0.002	-0.002
Acquirer size	9.474	9.433	9.812	9.744	9.137	9.152	0.675***	0.592***
Market-to-book ratio	3.168	2.480	3.153	2.400	3.183	2.570	-0.030	-0.170*
Leverage	0.392	0.385	0.401	0.381	0.383	0.393	0.018	-0.012
Free Cash Flow	3.402	0.927	4.222	1.487	2.578	0.627	1.644***	0.860***
<b><i>Deal-specific control variables</i></b>								
Deal relative size	-1.656	-1.648	-1.742	-1.771	-1.570	-1.552	-0.172***	-0.219***
High tech industries (dummy)	0.259	0.000	0.248	0.000	0.270	0.000	-0.022	0.000
Deal relative size x high tech	-0.025	0.000	-0.071	0.000	0.021	0.000	-0.091***	0.000***
Hostile	0.007	0.000	0.013	0.000	0.001	0.000	0.012***	0.000***
Diversifying merger (dummy)	0.484	0.000	0.513	1.000	0.455	0.000	0.057**	1.000**
Same nation merger (dummy)	0.525	1.000	0.481	0.000	0.570	1.000	-0.089***	-1.000***
Public target (dummy)	0.286	0.000	0.302	0.000	0.270	0.000	0.032	0.000
Private target (dummy)	0.558	1.000	0.509	1.000	0.607	1.000	-0.098***	0.000***
All-cash deal (dummy)	0.300	0.000	0.318	0.000	0.283	0.000	0.035	0.000
Stock deal (dummy)	0.117	0.000	0.101	0.000	0.132	0.000	-0.030*	0.000*

## 4 Merger announcement returns

This section is committed to examining the relationship between the ESG characteristics of acquirers and the corresponding merger announcement returns. The methodology regarding the measurement of the announcement returns is discussed in *subsection 4.1*. Subsequently, the empirical methods this study uses to investigate these announcement returns as well as the control variables it includes, are discussed in *subsection 4.2*. The results of these analyses are discussed in *subsection 4.3*.

### 4.1 Measuring acquirer announcement returns

To estimate the abnormal stock returns of the firms surrounding the announcement date, this paper uses market model regressions. These regressions are estimated over the following period: 200 trading days that end at trading day -41 relative to the announcement date of the deal (derived from Thomson ONE). A gap between the estimation period and the event window is left to avoid the inclusion of potential market movements that could arise because of information leakage (Dutordoir et al., 2021). To have a proxy for the market portfolio, country-specific indices are used as shown in Table A.1 in the Appendix. The returns of any equity  $i$  are estimated as follows:

$$R_{i,t} = \alpha_i + \beta_i * R_{m,t} + \varepsilon_{i,t} \quad (1)$$

$R_{i,t}$  represents the return of equity  $i$  on day  $t$ ,  $\alpha_i$  represents the OLS intercept,  $\beta_i$  represents the estimated OLS slope,  $R_{m,t}$  represents the return of the market portfolio on day  $t$ , and  $\varepsilon_{i,t}$  represents the error term. To estimate the impact of the merger announcement, the abnormal returns of equity  $i$  are estimated as follows:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i * R_{m,t}) \quad (2)$$

$AR_{i,t}$  represents the abnormal returns of equity  $i$  on day  $t$  and is estimated by subtracting the market portfolio return on day  $t$  from the return of equity  $i$  on day  $t$ . Subsequently, the abnormal returns are used to estimate the cumulative abnormal stock returns ('CAR'). Similar to the study by Deng et al. (2013), the cumulative abnormal stock returns from 1 day prior to the announcement date to 1 day after the announcement date are used as the principal measure for the announcement returns. To support the analyses, other announcement measures are taken as robustness checks. The formal estimation of CAR(-1,1) is as follows:

$$CAR_{i,t} = \sum_{t=-1}^{+1} AR_{i,t} \quad (3)$$

This paper avoids outliers that affect the results by winsorizing the announcement returns at the 1% and 99% levels. The results remain similar when winsorized at the 5% and 95% levels. Table 4 reports some characteristics of the CARs for the full sample and the discussed subsamples.

The mean and median CARs of the full sample are depicted in column (1) of Table 4. A significant

positive mean (+0,31%) and (less) significant median (+0,06%) are shown. Of the other CAR measures, only the mean of CAR(-2,2) is significant and shows positive announcement returns (+0,26%). These findings should be interpreted with caution due to the high number of CAR measures that do not report significant results. However, these significant positive findings are surprising because most empirical findings suggest that acquirer CARs are close to zero or negative upon announcement (Andrade et al., 2001; Schneider & Spalt, 2017).

Subsequently, to add to the understanding of this research, the CARs of the subsamples are examined. As shown in column (2), only the mean of CAR(-1,1) is significant of all the CAR measures of the subsample of firms with a high ESG score. This measure reports a positive average CAR(-1,1) (+0,38%). Column (3) shows that all the mean measures of the subsample with low ESG scores report significant and positive CARs.

At last, this paper investigates the difference between the two subsamples. Using a test of difference analysis, column (4) shows that the principal measure does not significantly differ between the high and low subsamples. The subsamples of CAR(-2,2) and CAR(0,2) vary significantly. Using both measures, the abnormal announcement returns are significantly lower in the subsample with high ESG scores than in the subsample with low ESG scores (respectively -0,44% and -0,46%).

Contrary to the findings of Deng et al. (2013), the results in Table 4 suggest that firms with a low ESG score obtain, to some extent, higher announcement returns than firms with a low ESG score. This paper continues with additional analyses to get a better understanding of these findings.

**Table 4: Summary statistics of the cumulative abnormal returns**

*This table shows the mean and median values of the cumulative abnormal returns of the acquirers. Column (1) shows the values of the full sample, columns (2) and (3) show the values of the high ESG and the low ESG subsamples respectively, and column (4) shows the difference between these two subsamples. In columns (1) to (3), using the T-test, the significance at the 10%, 5%, and 1% are denoted with \*, \*\*, and \*\*\*, respectively. In column (4), using the Wilcoxon test, a 10%, 5%, and 1% significance level of the differences between the subsamples are denoted with \*, \*\*, and \*\*\*, respectively.*

	Full Sample (N = 1519)		Subsample high ESG score: A (N = 759)		Subsample low ESG score: B (N = 760)		Test of difference (A-B)	
	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CAR (-1,1)	0.312***	0.061*	0.242**	0.059	0.383***	0.062	-0.141	-0.003
CAR (-2,2)	0.259**	0.008	0.037	-0.067	0.481***	0.060	-0.444*	-0.127
CAR (-5,5)	0.222	0.107	-0.058	-0.110	0.501**	0.252	-0.559	-0.362
CAR (0,2)	0.122	-0.017	-0.110	-0.073	0.353**	0.052	-0.462**	-0.125

## 4.2 Analyzing acquirer announcement returns

As discussed in *subsection 2.2*, most empirical findings suggest that acquirer CARs are close to zero or negative upon announcement (Andrade et al., 2001; Schneider & Spalt, 2017). To provide a comprehensive understanding of the relation between the ESG characteristics of acquirers and announcement returns, this subsection describes the methodological approaches to analyzing the announcement returns. The results of these analyses are discussed in *subsection 4.3*. Several control variables are considered and Table A.2 in the Appendix provides detailed definitions of all these variables and their sources. The following proxies, suggested by the literature, are included:

### *Firm-specific control variables*

*Return on assets:* captures the net income of the acquirer the last twelve months prior to the announcement relative to its total assets. Several studies link (higher) acquirer profitability to (higher) announcement returns (Houston & Ryngaert, 1994; Beitel et al., 2004).

*Acquirer size:* captures the size of the acquiring firm measured by the natural logarithm of the total assets. Moeller et al. (2004) find robust evidence that acquirer size is negatively correlated with the announcement returns. The authors interpret this size effect as evidence supporting the managerial hubris hypothesis as discussed in subsection 2.1. More recently, Yen & André (2019) and Gomes (2019) also find evidence of the negative effect of firm size on announcement returns.

*Market-to-book ratio:* measures the percentage of an acquirer's market value of its equity to the book value. The empirical findings regarding the influence of an acquirer's market-to-book ratio on its announcement returns are ambiguous. In their study, Moeller et al. (2004) find a negative relation. In contrast, other studies find a positive correlation (Lang & Rene, 1991; Servaes, 1991).

*Leverage:* captures the total debt relative to the total capital of the acquirer. Higher debt levels help to restrict future free cash flows and limit managerial discretion. Therefore, leverage functions as a governance instrument (Jensen, 1986; Stulz, 1990). Additionally, due to high debt levels, managers must give substantial control of their firm to creditors and often lose their jobs if their firm goes bankrupt. That way, leverage offers incentives for managers to enhance corporate performance.<sup>6</sup>

*Free cash flow:* determinant that equals the cash earnings per share of the acquirer. Contrary to leverage, the free cash flow hypothesis predicts a negative effect of free cash flow on announcement returns (Jensen, 1986). The rationale behind this is that higher free cash flows result in the availability of more resources to engage in empire-building. However, higher free cash flows can also proxy better recent firm performances. This might be associated with higher quality managers, who tend to make better merger decisions. As a result, it is unclear whether free cash flow is positively or negatively related to acquirer announcement returns.

### *Deal-specific control variables*

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<sup>6</sup>Some of the creditors' legal rights are discussed by Gilson & Vetsuypens (1994) and Baird & Rasmussen (2001). Gilson (1989, 1990) finds that the CEO and board of directors' turnover increase when a company is in a financial crisis.

*Deal relative size:* deal size affects the market reaction to a merger announcement (Meinshausen & Schiereck, 2011; Moeller et al., 2004). Previous studies suggest that acquirer announcement returns increase relative to the relative deal size (Asquith et al., 1983; Moeller et al., 2004). The deal relative size is measured as the logarithm of the deal value over the acquirer's market value.

*High tech:* A dummy variable that is equal to one in case both the acquirer and the target are active in high tech industries, according to Thomson ONE.

*Interaction term deal relative size and high tech:* Following Masulis et al. (2007), an interaction term between deal relative size and high tech is created. Their results suggest a significant relationship between this interaction term and acquirer announcement returns. The authors discuss that it is difficult for same-size high-tech firms to integrate smoothly due to the importance of human capital and intellectual property at these firms, which are often lost because of the high employee turnover associated with mergers. Acquirers in high-tech mergers are more likely to underestimate the costs and overestimate the synergies generated by the combination.

*Hostile:* A dummy variable that is equal to one in the case of a hostile deal and equal to zero in the case of a friendly deal. Relevant literature links hostile deals to decreased acquirer announcement returns (Servaes, 1991; Schwert, 2000).

*Diversifying merger:* a dummy variable that is equal to one in case of a diversifying merger. According to relevant studies, diversifying mergers are value-destroying for shareholders relative to not diversifying mergers (Berger & Ofek, 1995; Masulis et al., 2007).

*Same nation merger:* according to Moeller & Schlingemann (2005), domestic mergers provide higher returns relative to cross-border deals. Therefore, a dummy variable is introduced. If the deal is domestic, the dummy variable equals one, indicating that the acquirer's headquarters and the target's headquarters are in the same country.

*Public target:* a dummy variable that equals one in case the target is public and zero otherwise. The results of Fuller et al. (2002) suggest that acquiring a public firm is associated with significantly lower abnormal returns. The authors state that acquirers capture a liquidity discount when buying non-public targets.

*Private target:* following the study of Fuller et al. (2002), Moeller et al. (2004) find that acquiring privately held firms is associated with short-run shareholder gains. Therefore, this study also includes a dummy variable that equals one if the target is private.

*All-cash deal:* the results of Asquith et al. (1990) suggest that the announcement returns are positive for cash bids and negative and significantly smaller for equity-financed mergers. Several other studies find similar results (Amihud et al., 1990; Servaes, 1991; Brown & Ryngaert, 1991). Generally, this is attributed to the pecking order in equity issuance analyzed by Myers & Majluf (1984).<sup>7</sup> Hence, following Deng et al. (2013), a dummy variable is constructed that equals one if the deal is fully paid in cash and zero otherwise.

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<sup>7</sup>Using several assumptions, Myers & Majluf (1984) predict negative announcement effects for firms that issue equity. The authors state that firms prefer securities least affected by information asymmetry: a pecking order of financing. Additionally, the authors predict that information asymmetry affects firms' decisions to issue equity.

*Stock deal:* as discussed, previous studies show that paying in stock is costly for the acquirer (e.g., Asquith et al. (1990)). Therefore, a dummy variable is created that equals one if the merger is at least partly financed with stock and zero otherwise.

Using these variables, this paper analyzes the impact of ESG characteristics of acquirers on their returns. In the first test, the mean and median of the variables are inspected by splitting the sample into subsamples based on the corresponding ESG scores. This split is discussed in *subsection 3.2*. Table 3 shows the results of this split.

Several features are worth noting. First, firms with high ESG scores have significantly higher acquirer size than firms with low ESG scores, suggesting that larger firms are more active in their ESG activities.

Deng et al. (2013) find that firms with high CSR scores have higher market-to-book ratios and free cash flow than firms with low CSR scores. The authors link this to empirical findings that suggest that strong-performing firms are more active in their sustainable activities (McGuire et al., 1988; Jiao, 2010). Similar to Deng et al. (2013), this study finds that firms with high ESG scores have significantly higher free cash flow. However, contrary to their results, this study finds that other performance measures such as return on assets and the market-to-book ratio do not differ significantly between firms with high and low ESG scores.

As for the deal-specific control variables, the results in Table 3 suggest that firms with relatively high ESG scores prefer relatively smaller targets, targets in different industries, targets in other countries, and targets that are not privately held. In addition, it seems that these firms more often engage in hostile takeovers. In their study, Deng et al. (2013) find that firms with high CSR scores prefer to acquire smaller targets, targets in high-tech industries, targets operating in industries different from their own, and privately held targets.

In *subsection 4.3*, Ordinary Least Squares (OLS) regressions are used to regress the abnormal announcement returns on the characteristics mentioned above and the ESG scores of the firms at the merger announcement date. The dependent variable is the cumulative abnormal return of the acquirer computed over trading days -1 to 1. Several other intervals are considered as the dependent variable as a robustness measure.



### 4.3 Announcement returns results

The previous subsection has described the methodology of the announcement return analyses. In this subsection, the outcomes and the implications of these analyses are discussed.

Prior to this, the presence of multicollinearity is examined. The correlation between any of the independent variables in the analyses is lower than 0.90, which suggests that multicollinearity is not an issue (Dohoo et al., 1997). The Variance Inflation Factor (VIF) values of the independent variables are examined to substantiate this. The multicollinearity is considered high if a variable's VIF value is higher than ten. Therefore, it is argued that the VIF values of all independent variables should be less than ten (Lin, 2008). Some authors argue that a VIF above five can also be considered problematic (Kennedy, 2008; Sheather, 2009). All VIF values in the analyses have a value of less than five. Therefore, it is assumed that multicollinearity in the sample is not an issue.

Table 5 shows the results of the OLS regressions. It should be noted that the explanatory powers (R-squared) of all three models are low compared to similar studies. Previous studies find explanatory scores of 15% up to 25%, whereas this study finds the explanatory power to vary between 0.2% and 8.5% (Deng et al., 2013; Aktas et al., 2011).

Columns (1) and (2) show the effects of the total ESG scores of the acquirers on CAR(-1,1) without controlling for fixed effects. The ESG Combined score has a significant negative sign at the 10% level. Furthermore, for the deal-specific control variable stock deal, a significant positive result is found. This positive relation persists in the models depicted in columns (4), (6), and (8) and conflicts with the predictions stated in *subsection 4.2*. In columns (3) and (4) the Environmental, Social, and Governance scores are individually included. None of these sustainability measures report a significant effect on CAR(-1,1).

Subsequently, F-tests are conducted to test whether the models should account for year-fixed effects, country-fixed effects, or industry-fixed effects. The F-statistics for year-fixed effects (1.50) and the country-fixed effects (0.70) do not reject the hypothesis that the coefficients are jointly equal to zero. The obtained F-statistic of 18.80 rejects the hypothesis that the industry fixed effects' coefficients are jointly equal to zero (p-value < 0.001). Therefore, industry-fixed effects are included in the models in columns (5) through (8).

Contrary to the model in column (1), the model in column (5) does not report a significant ESG combined score. The model in column (6), however, reports a negative significant ESG Combined score at the 5% level. Similar to the models in columns (3) and (4), the individual sustainability measures in columns (7) and (8) do not report any significant results. The firm-specific control variable free cash flow reports a significant negative sign, supporting the empire-building hypothesis discussed in *subsection 4.2*. The deal-specific control variable hostile reports a significant negative impact, this finding is in line with the predictions. As discussed, contrary to the predictions, the deal-specific control variable stock deal reports a significant positive sign.

The results of the OLS regressions of the other announcement return measures are depicted in Table A.3 of the Appendix. The results of these regressions are similar to the results reported in Table 5. The

observed impact of the sustainability measures on the other CARs is either significant and negative or insignificant.

Concluding this section, the analyses conducted in Table 4 and the regression results depicted in Table 5 and Table A.3 suggest that acquirer ESG scores have, to some extent, a negative effect on acquirer announcement returns. However, these results should be interpreted with caution as the majority of the analyses report insignificant findings. In the next subsection, the long-term post-merger analyses are discussed.

**Table 5: OLS regression of announcement returns**

This table reports the OLS regressions of the acquirer cumulative abnormal returns on the ESG measures and the proxies discussed in subsection 4.2. The acquirer's cumulative abnormal returns are calculated over the period -1 to 1 relative to the announcement date. The parentheses contain robust standard errors. The significance at the 10%, 5%, and 1% are denoted with \*, \*\*, and \*\*\* respective.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>ESG combined score</i>	-0.010*	-0.013*			-0.009	-0.017**		
	(0.005)	(0.007)			(0.007)	(0.008)		
<i>Environmental pillar</i>			0.000	-0.002			0.000	-0.004
			(0.006)	(0.006)			(0.007)	(0.007)
<i>Social pillar</i>			-0.004	-0.004			-0.003	-0.005
			(0.007)	(0.008)			(0.008)	(0.009)
<i>Governance pillar</i>			-0.006	-0.006			-0.006	-0.007
			(0.005)	(0.006)			(0.006)	(0.006)
<i>Return on assets</i>		1.744		1.732		3.304		3.378
		-2.203		(2.22)		-2.301		-2.319
<i>Acquirer size</i>		0.097		0.048		0.334		0.308
		(0.246)		(0.252)		(0.304)		(0.311)
<i>Market-to-book ratio</i>		0.039		0.037		0.033		0.032
		(0.036)		(0.036)		(0.038)		(0.038)
<i>Leverage</i>		0.273		0.297		0.268		0.313
		(0.539)		(0.537)		(0.648)		(0.649)
<i>Free Cash Flow</i>		-0.025		-0.026		-0.057**		-0.057**
		(0.02)		(0.02)		(0.026)		(0.026)
<i>Deal relative size</i>		0.050		0.050		0.096		0.105
		(0.186)		(0.187)		(0.201)		(0.202)
<i>High tech industries (dummy)</i>		-0.163		-0.162		0.174		0.177
		(0.267)		(0.267)		(0.37)		(0.371)
<i>Deal relative size x high tech</i>		-0.229		-0.232		-0.266		-0.253
		(0.305)		(0.304)		(0.326)		(0.326)
<i>Hostile</i>		-1.744		-1.736		-2.018**		-2.007**
		-1.106		-1.108		(0.963)		(0.965)
<i>Diversifying merger (dummy)</i>		0.050		0.052		0.086		0.091
		(0.225)		(0.225)		(0.238)		(0.239)
<i>Same nation merger (dummy)</i>		-0.083		-0.089		0.189		0.198
		(0.223)		(0.224)		(0.248)		(0.249)
<i>Public target (dummy)</i>		0.270		0.278		0.177		0.169
		(0.352)		(0.353)		(0.362)		(0.363)
<i>Private target (dummy)</i>		-0.085		-0.078		-0.044		-0.034
		(0.327)		(0.328)		(0.331)		(0.331)
<i>All-cash deal (dummy)</i>		0.241		0.244		0.388		0.389
		(0.244)		(0.244)		(0.252)		(0.254)
<i>Stock deal (dummy)</i>		0.939**		0.916**		0.987**		0.973**
		(0.445)		(0.446)		(0.473)		(0.477)
<i>Constant</i>	0.766***	-0.279	0.807***	0.153	0.542	-2.535	0.602	-2.323
	(0.274)	-2.158	(0.311)	-2.238	(0.951)	-2.696	(0.985)	(2.78)
<i>R<sup>2</sup></i>	0.002	0.014	0.002	0.013	0.067	0.084	0.068	0.085
<i>Adjusted R<sup>2</sup></i>	0.002	0.003	0.001	0.001	0.014	0.018	0.013	0.017
<i>Industry fixed effects</i>	No	No	No	No	Yes	Yes	Yes	Yes
<i>N</i>	1519	1447	1512	1443	1519	1447	1512	1443

## 5 Post-merger returns

This section is committed to examining the relationship between the ESG characteristics of acquirers and their long-term stock returns. Regardless of their horizon lengths, all event studies have to deal with various fundamental methodological issues. These include risk adjustment, the aggregation of firm-specific abnormal returns, and the calibration of the statistical significance of abnormal returns. However, these issues become increasingly important as the horizon increases (Kothari & Warner, 2007). The long-term stock returns following corporate events have been the subject of many studies and have been summarized extensively in studies like Fama (1998) and Schwert (2003). However, the question of whether the apparent abnormal returns are the result of mispricing or methodological issues remains an ongoing debate among financial economists (Kothari & Warner, 2007).

Two of the most widely used methods to measure long-horizon returns are the Jensen-alpha approach and the BHAR approach (Dutta & Dutta, 2015). The Jensen-alpha approach describes stock returns of a portfolio consisting of firms that experience an event and compares these returns to the returns as estimated by an asset pricing model. Contrary to this method, the BHAR approach uses characteristic-based matching to measure abnormal returns. This study uses both approaches to get an insight into the relation between the ESG characteristics and the long-horizon post-merger performances of acquirers. First, a Jensen-alpha model is constructed, the related methodology is set out in *subsection 5.1* and the results are discussed in *subsection 5.2*. Subsequently, a buy-and-hold abnormal return model is composed. The methodology of this approach is elaborated upon in *subsection 5.3* and the results are evaluated in *subsection 5.4*.

### 5.1 Jensen-alpha approach

This study continues to measure the post-merger performance of the firms in the subsamples using the Jensen-alpha approach. To measure the post-merger performances of European firms, an equally-weighted portfolio of firms is constructed. The conditions specified in *subsection 3.1* must be met to be included in the sample. The firms are included in the portfolio for a holding period of 255 trading days, 510 trading days, and 765 trading days starting on the announcement date. The portfolios are rebalanced daily by dropping firms that have reached the end of their holding period and adding firms that have announced a merger. Subsequently, the excess returns are measured. The excess return of a firm is defined as its returns in excess of the appropriate risk-free rate. The risk-free rates are obtained from the Kenneth R. French data library.<sup>8</sup> First, the single-index model is used to measure the excess returns. In this model, the time series of daily excess returns are regressed on the Capital Asset Pricing Model (CAPM) market

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<sup>8</sup>This study uses data from the Kenneth R. French data library. The daily European risk-free rates and the other European related factors obtained from this database are calculated using data from Austria, Belgium, Switzerland, Germany, Denmark, Spain, Finland, France, the United Kingdom, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, and Sweden. Although there is a lot of overlap with the countries this study focuses on, this study does not focus on mergers originating from Switzerland and Norway. Furthermore, data from Poland is not included in the calculations from the Kenneth R. French data library while this country is included in this study.

factor. The excess return of firm  $i$  after a merger on day  $t$  is calculated as:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1(R_{m,t} - R_{f,t}) + \varepsilon_{i,t} \quad (4)$$

$R_{i,t} - R_{f,t}$  represents the expected excess return of equity  $i$  on day  $t$ ,  $\alpha_i$  represents the investment's alpha,  $\beta_1$  represents the market-factor coefficient,  $R_{m,t} - R_{f,t}$  represents the excess return of the market portfolio, and  $\varepsilon_{i,t}$  represents the error term. Subsequently, this model is extended into the Fama and French Three-Factor Model. This model considers the fact that value and small-cap firms outperform markets on a regular basis. The model adjusts for this outperforming tendency by adding two additional factors, namely the size factor and the book-to-market factor. These daily factors are also obtained from the Kenneth R. French data library.<sup>9</sup> Following Fama & French (1993), the size and book-to-market factors are included in the regression. The formal estimation of this model is as follows:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB + \beta_3HML + \varepsilon_{i,t} \quad (5)$$

In addition to the previously stated definitions,  $\beta_2$  represents the SMB-factor coefficient,  $SMB$  represents the size premium,  $\beta_3$  represents the HML-factor coefficient, and  $HML$  represents the value premium. Finally, the model is extended with a fourth factor, namely momentum. Carhart (1997) adds this fourth factor and finds that market momentum can influence the stock performance of firms. The daily momentum factor is obtained from the Kenneth R. French data library.<sup>10</sup> The mathematical equation of this model is as follows:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB + \beta_3HML + \beta_4MOM + \varepsilon_{i,t} \quad (6)$$

$\beta_4$  represents the MOM-factor coefficient and  $MOM$  represents the momentum premium. The models are used to estimate the differences in post-merger performance of firms in equally-weighted portfolios based on their ESG ratings. The subsamples of high and low ESG scores, as described in *subsection 3.2*, are used to measure the effect of ESG scores. Additionally, the returns of a zero-cost portfolio that buys acquirers with high ESG scores and sells acquires with low ESG scores are analyzed.

Subsequently, as a first robustness check, value-weighted portfolios are created. The firms are daily weighted on their market capitalization relative to the other firms in the portfolio. Generally, equally-weighted portfolios outperform value-weighted portfolios. This outperformance is partly because equally-weighted portfolios have higher exposure to systematic risk factors (Malladi & Fabozzi, 2017). Therefore, value-weighted portfolios are analyzed to determine whether the results of this study hold.

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<sup>9</sup>To construct the size factor, six value-weighted portfolios are formed based on size. The small-minus-big factor equals the average return on the three small portfolios minus the average return on the three big portfolios. The same methodology is applied for the book-to-market factor by taking the high book-to-market firms and subtracting the low book-to-market firms.

<sup>10</sup>To construct the momentum factor, six portfolios are formed based on size and prior returns. The momentum factor equals the equally-weighted average of the returns for the two winner portfolios minus the average of the returns for the two loser portfolios.

As a second robustness check, an equally-weighted portfolio is created with firms that do not have any ESG scores available in the Thomson Reuters ESG Database. This way, this study checks whether there is a selection bias when examining the effect of ESG scores. This approach is used because the Thomson Reuters ESG Database bases its scores on the availability of publicly reported data. If firms believe that their ESG scores influence their performance somehow, there might be a selection bias because firms can choose to report their ESG characteristics or not. Note that this will become an obligation when the plans of the European action plan come into effect, as discussed in *subsection 2.1*. The criteria set out in *subsection 3.1* must be met to be included in the sample and in addition the firms must have no ESG scores available. This results in a sample of 2331 mergers. This study continues by discussing the results of the aforementioned Jensen-alpha analyses.

## 5.2 Jensen-alpha results

This subsection discusses the results of the methodological approaches as set out in *subsection 5.1*. The results of these approaches are presented in Table 6.

Panels A and B of Table 6 show the results of the high and low ESG acquirer portfolios, respectively. Both portfolios report significant and positive market- and size-factors in all models. The size factors (SMB) all have a value of about 20%, indicating that the returns being measured are weighted toward small-cap stocks (H. Chen & Bassett, 2014). The book-to-market factor only reports significant results in columns (6) and (8) and should therefore be interpreted with caution. All significant results of this factor report a negative sign, indicating that the portfolios might have a negative relationship to the value premium. The momentum factor is statistically significant and negative in both panels for the three holding periods, indicating that the portfolios react negatively to broader market movements. The findings regarding the four factors are in line with previous research (Deng et al., 2013). Both portfolios report significant and positive abnormal returns for the three holding periods. This would indicate that both portfolios have excess returns above the market.

Subsequently, to measure the economic significance of the differences between the high and low ESG acquirer portfolios, a zero-cost portfolio is constructed that buys acquirers with high ESG scores and sells acquires with low ESG scores. Panel C presents the results for the excess returns on the zero-cost portfolio. The excess returns of this hedge portfolio are positive for the 255-day and 510-day holding period and negative for the 765-day holding period. However, none of these alphas are statistically significant. Therefore, based on panel C, it cannot be argued that significant returns can be obtained in the long run by trading based on an acquirer's ESG scores at the time of a merger.

In Table A.4 in the Appendix, the regressions reported in Table 6 are re-estimated as a robustness test using the value-weighted portfolio return approach. In this approach, the market value of equity is used as weight. It should be noted that the explanatory powers of the value-weighted portfolios are substantially lower compared to the equally-weighted portfolios. The obtained alphas of the zero-cost value-weighted portfolio remain insignificant and do not offer any additional evidence of ESG-related excess returns.

As a final robustness test, the long-run performances of the ESG reporting acquirers are compared

to non-reporting firms. An equally-weighted portfolio of all ESG reporting acquirers is compared to an equally-weighted portfolio of acquirers that do not have any ESG scores available in the Thomson Reuters ESG Database. The results of these analyses are presented in Table A.5 in the appendix. No significant zero-cost portfolio excess returns are obtained, offering no proof of any selection bias as discussed in *subsection 5.1*.

Concluding this subsection, based on the Jensen-alpha approach, both the high and the low portfolios seem to have statistically significant excess returns for a 255-day, 510-day, and 765-day holding period. As the portfolios are compared in the zero-cost portfolios, the excess returns disappear. These results suggest that the ESG scores of the acquirers do not affect the long-run excess returns. To further examine this, the next section discusses the results of the BHAR-methodology.

**Table 6: Equally-weighted Jensen-alpha analyses**

This table reports the regressions of the excess returns of acquirers on the three different factor models discussed in subsection 5.1. The firms are weighted equally and are kept in the portfolio for a pre-specified holding period (255, 510, and 765 trading days) relative to the announcement date. The portfolios are rebalanced daily by dropping all acquirers that reach the end of their holding period and adding all acquirers that have just announced a merger. The parentheses contain robust standard errors. The significance at the 10%, 5%, and 1% are denoted with \*, \*\*, and \*\*\* respective.

Model	After 255 trading days			After 510 trading days			After 765 trading days		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	CAPM	3 Factor	4 Factor	CAPM	3 Factor	4 Factor	CAPM	3 Factor	4 Factor
<b>Panel A: Subsample of acquirers with high ESG scores</b>									
$\beta_{MKT}$	0.637*** (0.013)	0.705*** (0.018)	0.698*** (0.019)	0.635*** (0.011)	0.699*** (0.016)	0.692*** (0.016)	0.636*** (0.011)	0.695*** (0.016)	0.689*** (0.016)
$\beta_{SMB}$		0.202*** (0.041)	0.220*** (0.041)		0.197*** (0.037)	0.223*** (0.037)		0.188*** (0.038)	0.213*** (0.038)
$\beta_{HML}$		-0.028 (0.034)	-0.061 (0.038)		-0.016 (0.029)	-0.059* (0.034)		-0.003 (0.029)	-0.043 (0.034)
$\beta_{MOM}$			-0.063** (0.025)			-0.082*** (0.022)			-0.077*** (0.022)
$\alpha$	0.036** (0.014)	0.033** (0.014)	0.035** (0.014)	0.031*** (0.011)	0.028** (0.011)	0.030*** (0.011)	0.025** (0.010)	0.022** (0.010)	0.024** (0.010)
$N$	4652	4652	4652	4849	4849	4849	4852	4852	4852
$R^2$	0.415	0.420	0.421	0.521	0.527	0.529	0.554	0.560	0.562
<b>Panel B: Subsample of acquirers with low ESG scores</b>									
$\beta_{MKT}$	0.609*** (0.014)	0.673*** (0.02)	0.661*** (0.021)	0.596*** (0.012)	0.664*** (0.017)	0.658*** (0.017)	0.600*** (0.011)	0.666*** (0.016)	0.658*** (0.017)
$\beta_{SMB}$		0.196*** (0.04)	0.227*** (0.039)		0.202*** (0.034)	0.224*** (0.034)		0.202*** (0.035)	0.231*** (0.034)
$\beta_{HML}$		-0.009 (0.035)	-0.063 (0.039)		-0.035 (0.032)	-0.070** (0.034)		-0.016 (0.028)	-0.064** (0.032)
$\beta_{MOM}$			-0.105*** (0.026)			-0.067*** (0.024)			-0.090*** (0.019)
$\alpha$	0.033*** (0.012)	0.030** (0.012)	0.033*** (0.012)	0.027*** (0.01)	0.024** (0.01)	0.026*** (0.01)	0.031** (0.009)	0.027*** (0.009)	0.030*** (0.009)
$N$	4654	4654	4654	4853	4853	4853	4857	4857	4857
$R^2$	0.476	0.482	0.486	0.537	0.545	0.547	0.571	0.579	0.583
<b>Panel C: Portfolios of buying acquirers with high ESG score and selling acquirers with low ESG score</b>									
$\beta_{MKT}$	0.028** (0.013)	0.033* (0.018)	0.037** (0.018)	0.039*** (0.009)	0.037*** (0.012)	0.036*** (0.013)	0.035*** (0.008)	0.030*** (0.011)	0.032*** (0.011)
$\beta_{SMB}$		0.007 (0.037)	-0.005 (0.038)		-0.001 (0.030)	0.004 (0.030)		-0.011 (0.028)	-0.015 (0.028)
$\beta_{HML}$		-0.018 (0.035)	0.003 (0.036)		0.017 (0.029)	0.009 (0.029)		0.012 (0.023)	0.019 (0.027)
$\beta_{MOM}$			0.040 (0.025)			-0.015 (0.021)			0.012 (0.017)
$\alpha$	0.004 (0.015)	0.004 (0.015)	0.002 (0.015)	0.004 (0.011)	0.004 (0.011)	0.004 (0.011)	-0.006 (0.010)	-0.006 (0.010)	-0.006 (0.010)
$N$	4642	4642	4642	4842	4842	4842	4845	4845	4845
$R^2$	0.001	0.001	0.002	0.004	0.004	0.004	0.004	0.004	0.005



### 5.3 Buy-and-hold abnormal returns approach

Contrary to the Jensen-alpha approach, the BHAR approach uses characteristic-based matching to measure abnormal returns. The Buy-and-Hold Abnormal Returns (BHAR) equal the average multiyear returns from a strategy of investing in all firms that complete an event and selling at the end of a prespecified holding period versus a comparable strategy using otherwise similar nonevent firms (M. L. Mitchell & Stafford, 2000). The T-period BHAR of firm  $i$  after a merger on date  $t$  is calculated as:

$$BHAR_i(t, T) = \prod_{t=1}^T (1 + R_{i,t}) - \prod_{t=1}^T (1 + R_{B,t}) \quad (7)$$

$R_{i,t}$  represents the return of firm  $i$  on day  $t$  and  $R_{B,t}$  represents the return of the matched reference portfolio on day  $t$ . Lyon et al. (1999) argue that one of the main benefits of the BHAR method is the better resemblance it offers to the actual investment experience of investors relative to rebalancing entailed approaches to measuring risk-adjusted-performance. A disadvantage of this approach is that it is more sensitive to the problem of cross-sectional dependence among sample firms (Brav & Gompers, 1997).

The BHAR approach is associated with several biases. Barber & Lyon (1997) identify three of those biases in event studies that cause the BHARs to yield biased test statistics. These biases are *the new listing bias*, *the rebalancing bias*, and *the skewness bias*. Lyon et al. (1999) state that, generally, *the new listing bias* creates a positive bias in test statistics, and *the rebalancing* and *skewness biases* create a negative bias. This study continues by discussing these three biases and their implications on the methodological approach of this study.

*The new listing bias*: this bias refers to the tendency of newly listed firms to underperform market averages (Ritter, 1991). Therefore, it is likely that the average long-horizon abnormal returns compared to a benchmark is overestimated.

*The rebalancing bias*: this bias arises because the compound returns of a reference portfolio are typically measured assuming periodic rebalancing, while the returns of sample firms are compounded without rebalancing. Canina (1996) finds that this bias is more pronounced if there is daily rather than monthly rebalancing.

*The skewness bias*: this bias arises because long-horizon abnormal returns are positively skewed. According to Barber & Lyon (1997), this results in right-skewed BHARs. However, Kothari & Warner (2007) state that this right-skewness declines with sample size. The authors emphasize that *the skewness bias* is a problem for small samples, such as the 50 firms in the sample of Barber & Lyon (1997), but that the bias does not hold for large samples. The argument set forth is based on the *Central Limit Theorem* which states that the sum of a large number of independent random variables has a distribution that is approximately normal (Ross, 1976).<sup>11</sup> This study deals with the skewness bias by using large samples to substantiate its results.

The effects of *The new listing bias* and *the rebalancing bias* are more difficult to mitigate. Lyon et

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<sup>11</sup>The central limit theorem states that the distribution of sample means approximates a normal distribution as the sample size gets larger, regardless of the population's distribution.

al. (1999) find that these biases can be minimized by carefully constructing reference portfolios. The authors discuss that the biases can be alleviated by constructing the reference portfolios based on firm size. The construction of the reference portfolios of this study is based on these findings of Lyon et al. (1999). Following their findings, the reference portfolios are constructed as follows:

- A reference firm must be located in one of the countries set forth in panel A of Table 1;
- Firms that are in the research group are excluded from the reference portfolio;
- Firms that are involved in mergers, according to the Thomson ONE database, are excluded from the reference portfolio from the merger announcement date up to 765 trading days after the announcement date to avoid the inclusion of these firms in the reference portfolios;
- The firm status is “public” according to the Thomson ONE database and has daily stock returns and financial data available on Datastream over the period January 2002 to December 2020;
- During this period, the stocks of the reference firms are ranked daily based on their size. The firm size on a specific day is defined as the market value on that day.<sup>12</sup> Subsequently, based on these rankings, daily size decile portfolios are constructed; and
- The returns of the ten size portfolios are tracked from day  $t$  to day  $T$ .

Based on these steps, the ten reference portfolios are constructed. Based on the market value of the acquirers of interest, these acquirers are daily matched to a reference portfolio to determine the BHARs as described in equation (7).

This study avoids outliers that affect the results by winsorizing the BHARs of both the research group and the reference portfolios at the 1% and 99% levels. The results remain similar when winsorizing at the 5% and 95% levels. To add to the understanding of this research, Table 7 reports some characteristics of the 255-, 510-, and 765-day BHARs. Several features are worth noting.

The mean and median BHARs of the full sample are depicted in column (1) of Table 7.  $BHAR(0,255)$  and  $BHAR(0,510)$  report significant positive means (respectively +1,52% and +1,91%). The other reported full-sample measures are not significant. Columns (2) and (3) offer the characteristics of the ESG subsamples. The means of the BHARs of firms with low ESG scores are significant and positive, whereas the means of the BHARs of firms with high ESG scores report mixed and insignificant results. These positive BHARS are surprising since most of the studies that investigate the long-term post-merger stock performances of firms report negative BHARs.<sup>13</sup>

As a first way of looking into the relation between ESG scores and the BHARs, column (4) reports the differences between the two subsamples. The difference test of  $BHAR(0,765)$  reports both a negative and significant difference in mean (-7,91%) and median (-5,39%), indicating that the  $BHAR(0,765)$  of firms

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<sup>12</sup>The daily market value is calculated by multiplying the outstanding shares on a specific day with the closing stock price on that same day.

<sup>13</sup>Agrawal & Jaffe (2000) offer an extensive overview of numerous studies that examine the post-merger performance of firms. In their paper, the authors conclude that most studies find negative acquirer BHARs following mergers.

with high ESG scores are significantly lower than those of companies with low ESG scores. To better understand the cross-sectional variation in acquirer BHARs, several OLS regressions are presented in *subsection 5.4* using the BHARs as the dependent variable and the firms' ESG scores as key independent variable. The control variables discussed in *subsection 4.2* and fixed effects are included in additional regressions.

**Table 7: Summary statistics of the buy-and-hold abnormal returns**

This table shows the means, medians, and sample sizes of the acquirer buy-and-hold abnormal returns. Column (1) shows the values of the full sample, columns (2) and (3) show the values of the high ESG and the low ESG subsamples, and column (4) shows the difference between these two subsamples. In columns (1) to (3), using the T-test, the significance at the 10%, 5%, and 1% are denoted with \*, \*\*, and \*\*\*, respectively. In column (4), using the Wilcoxon test, a 10%, 5%, and 1% significance level of the differences between the subsamples are denoted with \*, \*\*, and \*\*\*, respectively.

	Full Sample			Subsample high ESG score: A			Subsample low ESG score: B			Test of difference (A-B)	
	(1)			(2)			(3)			(4)	
	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median
<i>BHAR(0,265)</i>	1.520***	0.177	1333	0.647	-0.322	654	2.427***	0.876*	679	-1.779	-1.198
<i>BHAR(0,510)</i>	1.912**	-0.638	1213	0.763	-2.387	593	3.113**	1.333	620	-2.350	-3.72
<i>BHAR(0,765)</i>	0.611	-5.294	1111	-3.255	-7.624***	543	4.654**	-2.232	568	-7.909**	-5.392**

## 5.4 Buy-and-hold abnormal returns results

This subsection discusses the results of the BHAR-methodology as set out in the previous subsection. It focuses on the OLS regressions of the acquirer BHARs on the acquirer ESG scores and the in *subsection 4.2* discussed characteristics associated with acquirer returns.

BHAR(0,255), BHAR(0,510), and BHAR(0,765) are each analyzed using four models. The first two columns of each analysis show the effects of the acquirers' ESG scores on the respective BHARs without controlling for fixed effects. Subsequently, F-tests are conducted to test whether the models should account for year-fixed effects, country-fixed effects, or industry-fixed effects. For BHAR(0,255), the F-statistics for year-fixed effects (4.01), the country-fixed effects (11.67), and the industry fixed effects (5.93) reject the hypotheses that any of the coefficients of the fixed effects are jointly equal to zero (p-value < 0.001). Therefore, all three fixed effects measures are included in columns (3) and (4). The obtained F-statics for BHAR(0,510) and BHAR(0,765) result in the similar inclusion of fixed-effects in columns (7), (8), (11), and (12). The R-squared of the models fluctuates between 3.6% and 18.1%, this is in line with previous studies (Agrawal & Jaffe, 2000).

Intuitively, the results of Table 8 show many similarities to those presented in Table 5. The relationship between ESG scores and long-term performance appears to be either significant and negative or insignificant. In contrast, the previously cited studies by Deng et al. (2013) and the studies analyzed by Caiazza et al. (2021) suggest that sustainable acquirers would perform relatively better in the short- and long-run. Looking at the individual ESG pillars, some report significant results. Again, all significant results have a negative sign. However, there are too few significant results to draw an unambiguous conclusion.

The market-to-book ratio variable has a significant and positive impact on long-term performance in all models. The return on assets and the all-cash deal control variables are positive in every model and significant almost in every model. Contrary to the findings of Moeller & Schlingemann (2005), domestic mergers seem to have a significant and negative impact on the BHARs in almost every model.

Due to the small number of significant results in Tables 7 and 8, it is not possible to draw a unified conclusion about the impact of acquirers' ESG scores on their 255-day, 510-day, and 765-day BHARs. The results that do report significant statistics seem to hint at a negative relationship.

**Table 8: OLS regression of buy-and-hold abnormal returns**

his table reports the OLS regressions of the acquirer buy-and-hold abnormal returns on the ESG measures and the proxies discussed in subsection 4.2. The BHARs of the acquirers are calculated over the period 0 to 255, 0 to 510, and 0 to 765 relative to the announcement date. The parentheses contain robust standard errors. The significance at the 10%, 5%, and 1% are denoted with \*, \*\*, and \*\*\* respective.

	BHAR(0,255)				BHAR(0,510)				BHAR(0,765)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>ESG combined score</i>	-0.012 (0.045)		-0.109** (0.054)		0.040 (0.071)		-0.096 (0.084)		-0.093 (0.108)		-0.321*** (0.123)	
<i>Environmental pillar</i>		0.018 (0.039)		-0.022 (0.044)		-0.001 (0.061)		-0.076 (0.072)		-0.071 (0.092)		-0.211** (0.105)
<i>Social pillar</i>		0.013 (0.046)		-0.026 (0.052)		0.146* (0.075)		0.095 (0.083)		0.160 (0.114)		0.080 (0.121)
<i>Governance pillar</i>		-0.040 (0.035)		-0.053 (0.037)		-0.107** (0.054)		-0.099* (0.058)		-0.181** (0.082)		-0.176** (0.087)
<i>Return on assets</i>	24.646* (14.152)	24.089* (14.182)	17.586 (14.443)	17.535 (14.542)	51.642** (22.740)	52.283** (22.835)	46.452** (23.388)	48.671** (23.546)	69.008* (36.768)	71.929* (36.959)	74.300* (39.158)	76.760* (39.538)
<i>Acquirer size</i>	-1.397 (1.437)	-1.748 (1.457)	-2.976* (1.806)	-3.142* (1.815)	-4.177* (2.371)	-4.739** (2.396)	-5.100* (2.882)	-5.454* (2.919)	-3.278 (3.777)	-4.242 (3.854)	-2.791 (4.344)	-3.380 (4.419)
<i>Market-to-book ratio</i>	0.531** (0.234)	0.499** (0.232)	0.476* (0.269)	0.462* (0.268)	0.835** (0.362)	0.728** (0.356)	0.850** (0.398)	0.797** (0.397)	1.036* (0.537)	0.931* (0.531)	1.044* (0.592)	1.016* (0.593)
<i>Leverage</i>	-3.465 (3.279)	-2.811 (3.272)	-1.038 (3.854)	-0.365 (3.846)	-2.655 (5.171)	-1.531 (5.142)	-0.976 (6.014)	0.137 (6.011)	-3.747 (7.823)	-3.779 (7.823)	-5.127 (8.804)	-5.851 (8.821)
<i>Free Cash Flow</i>	-0.127 (0.120)	-0.131 (0.119)	-0.217 (0.158)	-0.223 (0.157)	-0.130 (0.222)	-0.155 (0.221)	-0.394 (0.291)	-0.399 (0.293)	-0.563* (0.295)	-0.602** (0.295)	-1.134*** (0.399)	-1.132*** (0.405)
<i>Deal relative size</i>	-1.392 (1.049)	-1.446 (1.047)	-2.786** (1.191)	-2.832** (1.191)	2.582 (1.673)	2.678 (1.672)	0.936 (1.875)	0.934 (1.873)	2.771 (2.346)	2.972 (2.345)	1.101 (2.676)	1.185 (2.665)
<i>High tech industries (dummy)</i>	4.070** (1.654)	4.104** (1.656)	3.996* (2.155)	4.006* (2.158)	2.883 (2.666)	2.832 (2.638)	3.344 (3.330)	3.320 (3.308)	2.883 (3.951)	2.386 (3.907)	3.574 (5.024)	3.157 (4.990)
<i>Deal relative size x high tech</i>	2.502 (1.644)	2.393 (1.638)	2.161 (1.658)	2.256 (1.665)	-0.414 (2.786)	-0.685 (2.746)	-0.346 (2.890)	0.081 (2.895)	-0.074 (4.445)	-0.393 (4.420)	0.422 (4.388)	0.700 (4.414)

	BHAR(0,255)				BHAR(0,510)				BHAR(0,765)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Hostile</i>	-3.056 (6.876)	-3.000 (6.926)	-0.592 (7.692)	-0.714 (7.693)	3.173 (10.093)	3.721 (10.231)	0.720 (9.221)	0.889 (9.338)	-10.843 (11.921)	-9.705 (11.994)	-4.495 (14.713)	-3.232 (14.708)
<i>Diversifying merger (dummy)</i>	-0.167 (1.376)	-0.009 (1.375)	0.187 (1.455)	0.339 (1.453)	0.905 (2.133)	1.228 (2.119)	2.479 (2.250)	2.696 (2.242)	4.022 (3.229)	4.257 (3.222)	5.997* (3.436)	6.133* (3.421)
<i>Same nation merger (dummy)</i>	-4.155*** (1.407)	-4.161*** (1.411)	-1.827 (1.541)	-1.748 (1.548)	-7.711*** (2.220)	-7.924*** (2.219)	-4.754* (2.442)	-4.702* (2.439)	-12.824*** (3.371)	-13.013*** (3.369)	-8.628** (3.737)	-8.362** (3.762)
<i>Public target (dummy)</i>	1.749 (2.073)	1.746 (2.071)	3.449* (2.042)	3.295 (2.039)	3.708 (3.386)	3.664 (3.350)	6.095* (3.332)	5.706* (3.304)	1.017 (5.123)	1.296 (5.095)	1.950 (5.004)	2.045 (5.007)
<i>Private target (dummy)</i>	-0.408 (1.914)	-0.307 (1.912)	0.259 (1.984)	0.361 (1.980)	2.357 (3.193)	2.652 (3.163)	2.713 (3.331)	2.788 (3.310)	-1.842 (4.717)	-1.560 (4.680)	-0.284 (4.830)	-0.209 (4.831)
<i>All-cash deal (dummy)</i>	2.084 (1.481)	2.329 (1.481)	3.138** (1.527)	3.381** (1.524)	4.853** (2.357)	5.405** (2.337)	5.180** (2.442)	5.473** (2.439)	8.051** (3.529)	8.384** (3.512)	9.308** (3.716)	9.288** (3.715)
<i>Stock deal (dummy)</i>	1.792 (2.717)	1.865 (2.730)	2.127 (2.768)	2.275 (2.772)	-0.546 (4.234)	-0.700 (4.282)	0.004 (4.255)	0.368 (4.247)	3.438 (6.391)	2.307 (6.478)	7.952 (6.331)	7.103 (6.369)
<i>Constant</i>	11.955 (12.836)	14.905 (13.113)	33.762** (16.727)	35.790** (16.915)	38.802* (21.118)	44.156** (21.460)	75.058*** (27.284)	78.051*** (27.696)	38.116 (34.058)	47.891 (34.904)	85.040** (41.553)	90.613** (42.413)
<i>R<sup>2</sup></i>	0.036	0.037	0.160	0.161	0.043	0.049	0.165	0.169	0.044	0.049	0.177	0.181
<i>Adjusted R<sup>2</sup></i>	0.024	0.023	0.093	0.091	0.030	0.034	0.093	0.096	0.030	0.033	0.101	0.103
<i>Year fixed effects</i>	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
<i>Country fixed effects</i>	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
<i>Industry fixed effects</i>	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
<i>N</i>	1292	1289	1292	1289	1174	1171	1174	1171	1075	1074	1075	1074

## 6 Conclusion

This study offers an in-depth analysis of the relevance of sustainability classifications for acquiring firms in a merger context. This study focuses on the (post-)merger stock returns of acquirers. The interpretations of the results are discussed in *subsection 6.1*. *Subsection 6.2* considers the limitations of this study. Finally, some recommendations for future research are made in *Subsection 6.3*.

### 6.1 Discussion

This study offers a new perspective on the expected effects of the upcoming European directives and regulations following the Action Plan: Financing sustainable growth in 2018 (European Commission, 2018). These legislative initiatives aim to reorient capital flows toward more sustainable investments. This study presents a profound analysis of these upcoming legislative initiatives and their relation to CFP.

Regarding the results of the announcement return analyses, it is not possible to formulate an unequivocal conclusion. The majority of findings suggest an insignificant relation between the ESG characteristics of acquirers and their announcement returns. The few findings that indicate a significant relation hint at a negative effect.

After evaluating the long-term effects, a similar picture emerges. The majority of the results do not indicate significant excess returns in relation to ESG performance. Both the equally-weighted and the value-weighted zero-cost portfolios of buying acquirers with high ESG scores and selling acquirers with low ESG scores report insignificant excess returns (see Panel C of Table 6 and Table A.4).

Supporting these insignificant findings, most of the results of the BHAR analyses also suggest insignificant effects. Again, the few results pointing towards a significant relation hint at a negative effect. In particular, some of the analyses of the 765-day BHARs seem to suggest that there is a negative and significant effect of acquirer ESG scores (see Table 7 and Table 8). This would imply that a significant excess return could be obtained after three years if the acquirer had a low ESG score at the time of the merger. In support of this statement, the 765-day zero-cost portfolios of Panel C of Table 7 and Table A.4 also seem to indicate negative excess returns, although insignificant.

Hence, most of the analyses of this study suggest no significant relation between the ESG characteristics of European acquirers and their (post-)merger stock returns. Nevertheless, this paper does contribute to the broader understanding of this relation and has especially practical relevance. As discussed in the literature review, European countries are currently investigating ways to stimulate sustainable investments. The findings of this study contribute to this process. More specifically, this study does not find robust evidence that investors include the ESG scores of acquirers in their investment decisions. This is not surprising given the large fragmentation of findings in relevant studies, as discussed in subsection 2.4). Studies like Deng et al. (2013), Meckl & Theuerkorn (2015), Yen & André (2019), and this study all obtain (partly) contradicting results. The lack of a uniform definition of sustainability may explain these differences. This will remain an issue until not only policymakers have formulated a uniform definition but also until investors include sustainability in their investment decisions.

Therefore, the question arises whether more transparency regarding the sustainability of investments effectively stimulates more sustainable investments, which is the aim of the European action plan. This study finds no robust evidence to support this statement.

## 6.2 Limitations

This research is subject to several limitations. A first limitation is the availability of data regarding sustainability measures. As discussed, scholars have to choose how to measure sustainability. In this study sustainability is measured using the ESG scores from the Asset4 database. Although this database offers substantial data regarding the different ESG characteristics, it only offers ESG scores of 1519 European acquirers from 2002 to 2020.

Second, to limit its scope, this study solely focuses on stock returns as a proxy to measure CFP. Including other proxies of the short- and long-term performance analyses such as a free cash flow, return on assets, or market-to-book ratio would offer a broader and more comprehensive understanding of the relation between sustainability and acquirer performance.

Regarding the BHAR-methodology, the reference portfolios of the BHARs are constructed using acquirer size as the matching criterion. However, Lyon et al. (1999) find that also including the book-to-market ratios of firms in the matching process helps to mitigate *the rebalancing bias* and *skewness bias*. This study has not adopted this methodology in its analyses due to the scarcity of yearly book-to-market ratios.

Furthermore, as discussed in the literature review, Aktas et al. (2011), C. Chen et al. (2022), and Qiao et al. (2018) include the sustainability scores of the targets in their studies and find robust effects. This study does not include target ESG scores, because these ESG scores are only available from 36 targets in the final sample. However, such an inclusion would offer further insights into the relation between sustainability ratings and CFP.

Finally, endogeneity remains a concern in event studies. Although this study applies multiple methods to mitigate this, isolating the effect of ESG scores on financial performance remains challenging.

## 6.3 Directions for future research

The European action plan continues to take shape in the coming years. Several regulations will come into effect to increase the sustainable transparency of European companies. Further research could therefore explore how the relationship between sustainability and CFP in the light of mergers develops over time. As discussed in *Subsection 6.2*, future research could include other performance measures, such as long-term cashflows and return on assets, to obtain a more comprehensive understanding of the relation between ESG and performance.

Furthermore, this study solely focuses on the environmental, social, governance, and combined scores. As discussed in the literature review, the European action plan currently focuses on environmental transparency but is expected to expand and include other sustainability measures. Future research could investigate the more than 750 individual ESG metrics of the Thomson Reuters ESG Database to determ-



ine whether there is a difference between these metrics. In addition to this, it would be interesting to compare the effect of several different sustainability indicators on CFP. Because of the current lack of consensus on a uniform definition of sustainability, these effects might differ significantly.

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# Appendix

**Table A.1: Description of the benchmark indices**

*This table describes the indices that are used to measure the abnormal returns as set out in subsection 4.1.*

Country	Market portfolio proxy	Description of the proxy
Austria	Austrian Traded Index	This index is one of the most important stock market indices of the Wiener Börse. The ATX is, like most European indices, defined as a price index and currently consists of twenty stocks.
Belgium	Bel 20	This index is the benchmark stock market index of Euronext Brussels. In general, the index consists of a minimum of ten and a maximum of twenty companies traded at the Brussels Stock Exchange.
Denmark	OMX Copenhagen 25	This index is the top-tier stock market index for Nasdaq Copenhagen, which is part of the Nasdaq Nordic. It is a market value weighted index that consists of the 25 most-traded stock classes.
Finland	OMX Helsinki 25	This index is a stock market index for the Helsinki Stock Exchange. It is a market value-weighted index that consists of the 25 most-traded stock classes. The maximum weight for a single stock is limited to 10%.
France	Cotation Assistée en Continu 40	This index is the benchmark French stock market index of Euronext Paris. The index represents a capitalization-weighted measure of the 40 most significant stocks among the 100 largest market caps on the Euronext Paris.
Germany	Deutscher Aktienindex	This index is a stock market index consisting of the 40 major German blue-chip companies trading on the Frankfurt Stock Exchange.
Greece	ATHEX 25	This index is the stock index of the twenty-five largest companies on the Athens Stock Exchange.
Ireland	ISEQ 20	This index is a benchmark stock market index composed of companies that trade on Euronext Dublin. The index comprises the twenty companies with the highest trading volume and market capitalization contained within the ISEQ Overall Index.
Italy	FTSE MIB	This index is the benchmark stock market index for the Borsa Italiana, the Italian national stock exchange, which superseded the MIB-30 in September 2004. The index consists of the 40 most-traded stock classes on the exchange.
Luxembourg	LuxX Index	This index is the main stock market index of the Luxembourg Stock Exchange. The LuxX is a weighted index of the nine most valuable listed stocks by free floated market capitalization.



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<b>Country</b>	<b>Market portfolio proxy</b>	<b>Description of the proxy</b>
Netherlands	Amsterdam Exchange index	This index is a stock market index composed of Dutch companies that trade on Euronext Amsterdam. The index is composed of a maximum of 25 of the most frequently traded securities on the exchange.
Poland	Warsaw General Index	This index is a capitalization-weighted stock market index of the twenty largest companies on the Warsaw Stock Exchange.
Portugal	Portuguese Stock Index	This index is a benchmark stock market index of the twenty largest companies that trade on Euronext Lisbon, the main stock exchange of Portugal.
Spain	IBEX 35	This index is the benchmark stock market index of the Bolsa de Madrid, Spain's principal stock exchange. It is a market capitalization weighted index comprising the 35 most liquid Spanish stocks.
Sweden	OMX Stockholm 30	This index is a stock market index for the Stockholm Stock Exchange. It is a capitalization-weighted index of the 30 most-traded stock on the Nasdaq Stockholm stock exchange.
United Kingdom	FTSE100	The FTSE100 is a share index of the 100 largest companies by market value listed on the London Stock Exchange.

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**Table A.2: Description of the control variables**

This table describes the source and construction of each control variable that is used in this study. All firm-specific control variables are measured at the end of the year prior to the deal announcement.

<b>Variable name</b>	<b>Source</b>	<b>Variable construction</b>
<i>Firm specific variables</i>		
<i>Return on assets</i>	Thomson ONE	Acquirer return-on-assets is calculated by dividing the acquirer's net income the last twelve months prior to the announcement by the acquirer's total assets as of the date of the most current financial information prior to the announcement.
<i>Acquirer size</i>	Datastream	Acquirer size is defined as the natural logarithm of the total assets in the year prior to the announcement.
<i>Market-to-book ratio</i>	Datastream	Acquirer market-to-book ratio is defined as the market value of the ordinary (common) equity divided by the balance sheet value of the ordinary (common) equity of the acquirer in the year prior to the announcement.
<i>Leverage</i>	Datastream	Acquirer leverage is defined as the acquirer's total debt divided by the acquirer's total capital in the year prior to the announcement.
<i>Free cash flow</i>	Datastream	Acquirer free-cash-flow is defined as the cash earnings per share of the acquirer for the twelve months ended the last calendar quarter of the year of the announcement.
<i>Deal-specific variables</i>		
<i>Deal relative size</i>	TO and DS	The deal relative value is calculated by dividing the total value of the transaction (Thomson ONE) by the acquirer's total market value (Datastream).
<i>High tech industries (dummy)</i>	Thomson ONE	The high tech variable is a dummy variable that is equal to one in case both the acquirer and the target are active in high tech industries
<i>Deal relative size x high tech</i>	TO and DS	This is an interaction term between the deal relative size and high tech variables.
<i>Hostile (dummy)</i>	Thomson ONE	The hostile variable is a dummy variable that equals one in case of a hostile deal and equals zero in case of a friendly deal.
<i>Diversifying merger (dummy)</i>	Thomson ONE	The diversifying merger variable is constructed by examining whether the acquirer industry code is the same as the target industry code according to the Thomson ONE database. The variable equals one if the industry is the same and zero if the industries differ.
<i>Same nation merger (dummy)</i>	Thomson ONE	The same nation merger variable is constructed by examining whether the acquirer nation code is the same as the target nation code according to the Thomson ONE database. The variable equals one if the nation is the same and zero if the nations differ.
<i>Public Target (dummy)</i>	Thomson ONE	The public target variable is a dummy variable that equals one if the target is public and zero otherwise.
<i>Private Target (dummy)</i>	Thomson ONE	The private target variable is a dummy variable that equals one if the target is private and zero otherwise.
<i>All-cash deal (dummy)</i>	Thomson ONE	The all-cash deal variable is a dummy variable that equals one if the deal is fully paid in cash and zero otherwise.
<i>Stock deal (dummy)</i>	Thomson ONE	The stock deal variable is a dummy variable that equals one if the merger is at least partly financed with stock and zero otherwise.

**Table A.3: Additional OLS regressions of announcement returns**

This table reports the OLS regressions of the acquirer cumulative abnormal returns on the ESG measures and the proxies discussed in subsection 4.2. The acquirer's cumulative abnormal returns are calculated over three different periods, namely:  $CAR(-2,2)$ ,  $CAR(-5,5)$ , and  $CAR(0,2)$ . The parentheses contain robust standard errors. The significance at the 10%, 5%, and 1% are denoted with \*, \*\*, and \*\*\* respective.

	CAR(-2,2)				CAR(-5,5)				CAR(0,2)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>ESG combined score</i>	-0.016*		-0.019*		-0.019		-0.019		-0.018***		-0.022**	
	(0.009)		(0.011)		(0.013)		(0.016)		(0.007)		(0.009)	
<i>Environmental pillar</i>		-0.000		-0.005		-0.005		-0.006		-0.001		-0.006
		(0.008)		(0.009)		(0.012)		(0.013)		(0.006)		(0.007)
<i>Social pillar</i>		-0.002		-0.002		0.014		0.013		-0.005		-0.007
		(0.010)		(0.011)		(0.015)		(0.017)		(0.008)		(0.009)
<i>Governance pillar</i>		-0.015**		-0.014*		-0.032***		-0.025**		-0.014***		-0.011*
		(0.007)		(0.007)		(0.010)		(0.011)		(0.005)		(0.006)
<i>Return on assets</i>	2.978	3.089	4.190	4.443	1.003	1.404	1.558	2.085	2.334	2.442	2.941	3.210
	(2.744)	(2.767)	(2.958)	(2.977)	(4.089)	(4.140)	(4.384)	(4.415)	(2.185)	(2.203)	(2.355)	(2.370)
<i>Acquirer size</i>	0.021	-0.047	0.148	0.114	-0.076	-0.175	-0.072	-0.163	0.193	0.145	0.253	0.245
	(0.301)	(0.308)	(0.369)	(0.376)	(0.461)	(0.472)	(0.561)	(0.574)	(0.233)	(0.239)	(0.303)	(0.308)
<i>Market-to-book ratio</i>	0.068	0.062	0.064	0.062	0.105	0.088	0.101	0.092	0.072**	0.067*	0.069*	0.067*
	(0.046)	(0.046)	(0.049)	(0.049)	(0.072)	(0.072)	(0.077)	(0.077)	(0.035)	(0.036)	(0.038)	(0.038)
<i>Leverage</i>	0.293	0.350	0.044	0.107	0.093	0.284	-0.640	-0.386	0.518	0.552	0.762	0.793
	(0.669)	(0.671)	(0.798)	(0.802)	(1.060)	(1.057)	(1.208)	(1.205)	(0.513)	(0.518)	(0.609)	(0.613)
<i>Free Cash Flow</i>	-0.013	-0.014	-0.028	-0.028	-0.012	-0.017	-0.039	-0.040	0.002	0.000	-0.004	-0.004
	(0.020)	(0.020)	(0.029)	(0.029)	(0.034)	(0.033)	(0.048)	(0.048)	(0.015)	(0.015)	(0.022)	(0.022)
<i>Deal relative size</i>	0.058	0.050	0.016	0.023	-0.205	-0.206	-0.397	-0.363	0.217	0.210	0.142	0.139
	(0.217)	(0.218)	(0.254)	(0.254)	(0.330)	(0.330)	(0.387)	(0.387)	(0.161)	(0.161)	(0.194)	(0.194)
<i>High tech industries (dummy)</i>	-0.211	-0.220	0.261	0.246	-0.550	-0.572	0.024	0.012	-0.103	-0.113	0.189	0.178
	(0.341)	(0.341)	(0.463)	(0.465)	(0.513)	(0.508)	(0.673)	(0.673)	(0.266)	(0.265)	(0.364)	(0.365)
<i>Deal relative size x high tech</i>	-0.195	-0.225	-0.208	-0.209	-0.089	-0.168	-0.149	-0.176	-0.246	-0.266	-0.307	-0.291
	(0.373)	(0.374)	(0.384)	(0.386)	(0.523)	(0.521)	(0.555)	(0.555)	(0.294)	(0.295)	(0.290)	(0.290)
<i>Hostile</i>	-1.841	-1.780	-1.781	-1.743	-2.122	-1.982	-2.550	-2.517	-0.690	-0.630	-0.399	-0.361

	CAR(-2,2)				CAR(-5,5)				CAR(0,2)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	(1.237)	(1.225)	(1.216)	(1.204)	(1.587)	(1.553)	(1.611)	(1.588)	(1.196)	(1.196)	(1.037)	(1.035)
<i>Diversifying merger (dummy)</i>	-0.095	-0.091	-0.099	-0.093	0.156	0.177	0.174	0.189	-0.120	-0.105	-0.142	-0.127
	(0.283)	(0.283)	(0.303)	(0.303)	(0.429)	(0.428)	(0.456)	(0.456)	(0.222)	(0.222)	(0.234)	(0.234)
<i>Same nation merger (dummy)</i>	-0.178	-0.200	0.134	0.137	-0.460	-0.507	-0.207	-0.222	-0.088	-0.101	0.097	0.107
	(0.287)	(0.288)	(0.316)	(0.317)	(0.439)	(0.439)	(0.493)	(0.493)	(0.231)	(0.232)	(0.260)	(0.261)
<i>Public target (dummy)</i>	0.594	0.606	0.491	0.490	0.834	0.841	0.526	0.487	0.365	0.371	0.324	0.319
	(0.434)	(0.436)	(0.457)	(0.459)	(0.673)	(0.673)	(0.724)	(0.723)	(0.341)	(0.342)	(0.352)	(0.353)
<i>Private target (dummy)</i>	0.336	0.347	0.303	0.318	0.925	0.967	0.703	0.736	0.294	0.312	0.326	0.349
	(0.403)	(0.404)	(0.418)	(0.419)	(0.611)	(0.611)	(0.646)	(0.644)	(0.320)	(0.321)	(0.332)	(0.332)
<i>All-cash deal (dummy)</i>	0.469	0.483	0.678**	0.679**	0.116	0.185	0.316	0.329	0.222	0.247	0.425*	0.446*
	(0.309)	(0.309)	(0.324)	(0.327)	(0.469)	(0.469)	(0.499)	(0.500)	(0.237)	(0.236)	(0.248)	(0.248)
<i>Stock deal (dummy)</i>	1.573***	1.544***	1.589***	1.558***	2.003**	1.983**	2.373***	2.401***	0.464	0.437	0.477	0.453
	(0.535)	(0.536)	(0.563)	(0.568)	(0.777)	(0.778)	(0.842)	(0.845)	(0.432)	(0.432)	(0.476)	(0.479)
<i>Constant</i>	-0.010	0.741	-2.339	-1.887	0.376	1.419	-1.998	-1.104	-1.306	-0.728	-2.887	-2.579
	(2.641)	(2.740)	(3.339)	(3.401)	(4.054)	(4.201)	(5.050)	(5.136)	(2.066)	(2.133)	(2.658)	(2.695)
<i>R<sup>2</sup></i>	0.019	0.021	0.083	0.084	0.015	0.019	0.071	0.074	0.015	0.017	0.082	0.083
<i>Adjusted R<sup>2</sup></i>	0.008	0.008	0.017	0.017	0.003	0.007	0.004	0.006	0.004	0.004	0.016	0.016
<i>Industry fixed effects</i>	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
<i>N</i>	1447	1443	1447	1443	1447	1443	1447	1443	1447	1443	1447	1443

**Table A.4: Value-weighted Jensen-alpha robustness check**

This table reports the regressions of the acquirers' excess returns on the three different factor models discussed in subsection subsection 5.1. The firms are value-weighted and are kept in the portfolio for a pre-specified holding period (255, 510, and 765 trading days) relative to the announcement date. The portfolios are rebalanced daily by dropping all acquirers that reach the end of their holding period and adding all acquirers that have just announced a merger. The parentheses contain robust standard errors. The significance at the 10%, 5%, and 1% are denoted with \*, \*\*, and \*\*\* respective.

Model	After 255 trading days			After 510 trading days			After 765 trading days		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	CAPM	3 Factor	4 Factor	CAPM	3 Factor	4 Factor	CAPM	3 Factor	4 Factor
<b>Panel A: Subsample of acquirers with high ESG scores</b>									
$\beta_{MKT}$	0.641*** (0.030)	0.623*** (0.039)	0.619*** (0.038)	0.626*** (0.019)	0.622*** (0.026)	0.617*** (0.026)	0.626*** (0.017)	0.619*** (0.023)	0.617*** (0.023)
$\beta_{SMB}$		-0.061 (0.082)	-0.051 (0.085)		-0.011 (0.060)	0.011 (0.059)		-0.019 (0.055)	-0.009 (0.054)
$\beta_{HML}$		-0.013 (0.061)	-0.031 (0.065)		0.003 (0.048)	-0.031 (0.050)		0.008 (0.044)	-0.009 (0.047)
$\beta_{MOM}$			-0.034 (0.058)			-0.065* (0.036)			-0.031 (0.033)
$\alpha$	0.044* (0.026)	0.045* (0.027)	0.046* (0.026)	0.034* (0.018)	0.035* (0.018)	0.037** (0.018)	0.027* (0.015)	0.027* (0.015)	0.028* (0.015)
$N$	4652	4652	4652	4849	4849	4849	4852	4852	4852
$R^2$	0.168	0.168	0.168	0.277	0.277	0.278	0.361	0.361	0.362
<b>Panel B: Subsample of acquirers with low ESG scores</b>									
$\beta_{MKT}$	0.605*** (0.016)	0.643*** (0.022)	0.632*** (0.023)	0.588*** (0.013)	0.641*** (0.018)	0.638*** (0.019)	0.601*** (0.014)	0.666*** (0.020)	0.663*** (0.021)
$\beta_{SMB}$		0.106** (0.044)	0.133*** (0.043)		0.108*** (0.038)	0.118*** (0.038)		0.162*** (0.045)	0.174*** (0.044)
$\beta_{HML}$		-0.029 (0.042)	-0.077 (0.048)		-0.146*** (0.046)	-0.162*** (0.043)		-0.108*** (0.042)	-0.127*** (0.043)
$\beta_{MOM}$			-0.092*** (0.028)			-0.031 (0.034)			-0.036 (0.029)
$\alpha$	0.035** (0.017)	0.034* (0.017)	0.037** (0.017)	0.023* (0.013)	0.021 (0.013)	0.022 (0.014)	0.023* (0.013)	0.020 (0.013)	0.021 (0.013)
$N$	4654	4654	4654	4853	4853	4853	4857	4857	4857
$R^2$	0.299	0.300	0.302	0.387	0.392	0.392	0.405	0.410	0.410
<b>Panel C: Portfolios of buying acquirers with high ESG score and selling acquirers with low ESG score</b>									
$\beta_{MKT}$	0.036 (0.032)	-0.019 (0.040)	-0.013 (0.037)	0.038* (0.020)	-0.017 (0.024)	-0.020 (0.024)	0.025 (0.018)	-0.046** (0.021)	-0.045** (0.021)
$\beta_{SMB}$		-0.166** (0.080)	-0.183** (0.084)		-0.115** (0.058)	-0.104* (0.058)		-0.179*** (0.053)	-0.180*** (0.053)
$\beta_{HML}$		0.017 (0.067)	0.046 (0.072)		0.147** (0.067)	0.129** (0.057)		0.114** (0.055)	0.117** (0.051)
$\beta_{MOM}$			0.056 (0.061)			-0.035 (0.052)			0.005 (0.043)
$\alpha$	0.012 (0.030)	0.015 (0.030)	0.013 (0.030)	0.012 (0.021)	0.014 (0.021)	0.015 (0.021)	0.004 (0.018)	0.007 (0.018)	0.007 (0.018)
$N$	4642	4642	4642	4842	4842	4842	4845	4845	4845
$R^2$	0.000	0.002	0.002	0.001	0.004	0.005	0.001	0.006	0.006

**Table A.5: Equally-weighted Jensen-alpha robustness check**

This table reports the regressions of the acquirers' excess returns on the three different factor models discussed in subsection 5.1. The firms are weighted equally and are kept in the portfolio for a pre-specified holding period (255, 510, and 765 trading days) relative to the announcement date. The portfolios are rebalanced daily by dropping all acquirers that reach the end of their holding period and adding all acquirers that have just announced a merger. The parentheses contain robust standard errors. The significance at the 10%, 5%, and 1% are denoted with \*, \*\*, and \*\*\* respective.

Model	After 255 trading days			After 510 trading days			After 765 trading days		
	(1) CAPM	(2) 3 Factor	(3) 4 Factor	(4) CAPM	(5) 3 Factor	(6) 4 Factor	(7) CAPM	(8) 3 Factor	(9) 4 Factor
<b>Panel A: Subsample of acquirers with high ESG scores</b>									
$\beta_{MKT}$	0.626*** (0.011)	0.689*** (0.017)	0.679*** (0.017)	0.619*** (0.01)	0.685*** (0.015)	0.677*** (0.015)	0.621*** (0.01)	0.684*** (0.015)	0.676*** (0.016)
$\beta_{SMB}$		0.195*** (0.035)	0.223*** (0.034)		0.203*** (0.031)	0.231*** (0.031)		0.2*** (0.033)	0.23*** (0.032)
$\beta_{HML}$		-0.011 (0.029)	-0.062* (0.034)		-0.018 (0.027)	-0.064** (0.031)		-0.005 (0.026)	-0.053* (0.03)
$\beta_{MOM}$			-0.097*** (0.022)			-0.086*** (0.02)			-0.092*** (0.019)
$\alpha$	0.032*** (0.01)	0.029*** (0.01)	0.032*** (0.01)	0.027*** (0.009)	0.024*** (0.009)	0.027*** (0.009)	0.026*** (0.009)	0.022*** (0.009)	0.026*** (0.009)
$N$	4664	4664	4664	4860	4860	4860	4864	4864	4864
$R^2$	0.567	0.573	0.577	0.610	0.619	0.622	0.628	0.636	0.640
<b>Panel B: Subsample of acquirers with low ESG scores</b>									
$\beta_{MKT}$	0.573*** (0.012)	0.667*** (0.016)	0.659*** (0.017)	0.581*** (0.012)	0.678*** (0.016)	0.669*** (0.017)	0.583*** (0.011)	0.676*** (0.015)	0.667*** (0.016)
$\beta_{SMB}$		0.287*** (0.034)	0.315*** (0.033)		0.298*** (0.033)	0.329*** (0.032)		0.289*** (0.032)	0.323*** (0.031)
$\beta_{HML}$		-0.024 (0.029)	-0.068** (0.032)		-0.024 (0.026)	-0.074** (0.03)		-0.018 (0.025)	-0.073** (0.029)
$\beta_{MOM}$			-0.084*** (0.02)			-0.095*** (0.018)			-0.104*** (0.018)
$\alpha$	0.026*** (0.009)	0.021** (0.009)	0.024*** (0.009)	0.024*** (0.009)	0.019** (0.008)	0.023*** (0.008)	0.028*** (0.008)	0.023*** (0.008)	0.027*** (0.008)
$N$	4897	4897	4897	4898	4898	4898	4898	4898	4898
$R^2$	0.571	0.589	0.592	0.602	0.621	0.626	0.606	0.624	0.630
<b>Panel C: Portfolios of buying acquirers with high ESG score and selling acquirers with low ESG score</b>									
$\beta_{MKT}$	0.055*** (0.007)	0.026*** (0.01)	0.027*** (0.01)	0.037*** (0.006)	0.004 (0.008)	0.005 (0.008)	0.037*** (0.005)	0.005 (0.007)	0.007 (0.007)
$\beta_{SMB}$		-0.084*** (0.022)	-0.086*** (0.022)		-0.102*** (0.018)	-0.106*** (0.018)		-0.094*** (0.016)	-0.099*** (0.016)
$\beta_{HML}$		0.018 (0.025)	0.022 (0.022)		0.01 (0.018)	0.016 (0.017)		0.017 (0.015)	0.025* (0.015)
$\beta_{MOM}$			0.008 (0.018)			0.011 (0.012)			0.014 (0.01)
$\alpha$	0.006 (0.009)	0.008 (0.009)	0.007 (0.009)	0.003 (0.007)	0.004 (0.007)	0.004 (0.007)	-0.002 (0.006)	0.000 (0.006)	-0.001 (0.006)
$N$	4664	4664	4664	4860	4860	4860	4864	4864	4864
$R^2$	0.013	0.017	0.017	0.010	0.019	0.019	0.012	0.022	0.023