Expected performance or greenwashing as a premium driver in environmental M&A

Why does it pay to be green?

Master thesis Economics and Business

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ABSTRACT

This thesis looks into bidding premia in M&A for target companies that can be labeled 'green' and those with high environmental CSR scores. Prior research into the specific relationship between M&A and CSR points in the direction of higher premia and better performance. This study focusses on the environmental dimension of CSR within the M&A realm, and whether extra bidding premia are driven by more positive outlooks of 'green' targets or 'window-dressing' considerations. A dataset is constructed using global M&A deals between 2010 and 2016 retrieved from Zephyr. The extra premium for 'green' targets is confirmed within the data. Based on Salvi et al. (2018), it is revealed that 'green' acquisitions outperform their non 'green' counterparts with regards to the ROA development of the acquiring company. The model predicting ROA improvement following an acquisition is used to create fitted values, which are used as a proxy for managerial expectations of a deal. An event-study is drawn up to determine whether there are 'window-dressing' opportunities for the acquiring company, which is confirmed as there is a more positive reaction to the acquisition of 'green' deals than their non 'green' counterparts. Furthermore, it is confirmed that the extra premium for 'green' targets is only driven by expected performance considerations and not by 'window-dressing' opportunities. These findings suggest that acquiring companies do not pay to green themselves through M&A and that 'green' targets outperform their non 'green' counterparts in both internal accounting measures and market reaction.

Keywords: Acquisitions, CSR, Event-Study, environmental CSR, Greenwashing, Green, M&A, Performance, Premium, Sustainability, Window-dressing.

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1. Introduction

'Sustainable investing will be a core component for how everyone invests in the future, we are only at the early stages.' Larry Fink, CEO BlackRock.

In his 2020 letter to CEOs, Larry Fink, Chairman & CEO of the world's largest shareholder, BlackRock, made their stance on climate change unequivocally clear, sustainability is at the center of their investment approach. Fink (2020) claims that they will "vote against management and board directors when companies are not making sufficient progress on sustainability-related disclosures." Ever since the Kyoto protocol from 1997, through an inconvenient truth by Al Gore (2006), public awareness is increasing every year (Gallup, 2020). The statement, by Larry Fink, marks how its importance trickled down to the corporate and financial worlds, and how companies are ready to step up their game and take responsibility for their impact on the environment. While taking responsibility for corporate actions, known as corporate social responsibility, is in no sense new, this investment spearpoint truly is a breakthrough.

Corporate social responsibility or CSR is a business concept that makes companies socially accountable for their actions. It widens old convictions that companies should only look out for their shareholders and shareholder value, to a broader perspective of accountability and stakeholder orientation. Ever since Bowen and Johnson coined the term Corporate Social Responsibility in their 1953 book, there has been a vast amount of academic publications and research into the topic. For example, in management research, there are publications on the relationship with financial performance (e.g., McGuire et al. ,1988), the 'ideal' level of CSR (e.g., McWilliams, & Siegel, 2001), the relationship with profitability (e.g., Aupperle et al., 1985), and also even on the evolution of the concept itself (Carroll, 1999). In financial research, other topics have been studied, for example, corporate social responsibility and the relationship to Mergers and Acquisitions (e.g., Gomes, 2019), market reactions to socially responsible investments (e.g., Aktas et al., 2011), value implications for different shareholders (e.g., Chen, & Gavious, 2015), the financial risk of companies (e.g., Kim et al., 2014) and the cost of capital (El Ghoul et al., 2011). While these publications are just the tip of the iceberg regarding the research into corporate social responsibility, it provides a view of the variety of studies conducted and the scientific interest in this growing phenomenon.

This study will zoom in on one of the more growingly critical dimensions of CSR, as discussed by Larry Fink; Environmental CSR. Environmental CSR is one of the three CSR

dimensions, also known as ESG factors (Environmental, Social, & Governance); its main concerns are those of climate change, sustainability, and all-round environmental friendliness. With growing awareness among the public and investors, studying the effects of environmental CSR or sustainability becomes more important, while the environmental issues and their effects seem abundant. With this growing awareness and importance, so does the opportunity to 'window-dress' grow with regards to sustainability. Due to the interest of the public, companies have incentives to market their environmental stance (and other ESG factors) better, which is also known as corporate greenwashing. Whereas most major companies nowadays have sustainability reporting, these prove to be unreliable, inconsistent, and covers mostly factors that are immaterial to economic performance and global impact (Porter et al., 2019). These findings show that a corporation's self-reported engagement is at least partly due to image concerns. An example of greenwashing; Shell markets itself as a pioneer of a greener future, as their self-reported ambition to become net-zero emission by 2050 or sooner (Shell, 2020). Meanwhile, between 2016-2019 investments, only $2.3 billion of the total $89 billion, are into new energy (Van Dijk, 2020), which seems like an apparent attempt to greenwash their public image.

The study will focus on the M&A – environmental CSR relationship. Previous research considered the relationship between CSR and M&A premia (Gomes & Marsat, 2018) and M&A performance of environmental CSR deals (Salvi et al., 2018). However, these studies consider the broader ESG and CSR definitions rather than focusing on the one environmental dimension. Besides the discussed growing importance of the environmental dimension, Fransen (2013) notes the benefits of researching a single dimension for academic and legislative purposes. While research into CSR captures some of a firm's environmental CSR characteristics, it also displays the effects of the social and governance dimensions. Also, the impact of one of the factors could hugely differ across country borders due to culture and legislation. There are to date no studies considering the M&A premium on just the environmental CSR dimension, and what ultimately drives this premium. In addition, prior research is often limited by database constraints and tight definitions of CSR, whereas this thesis broadens the CSR selection and creates an alternative, more comprehensive, international database.

This paper tried to determine whether 'green' target companies receive higher bid premia and, if so, what drives these premia. The dataset consists of global deals completed between 1 January 2010 and 31 December 2016. From theory and prior literature, two possible main drivers of extra premia for 'green' targets are determined, performance considerations or 'window-dressing' considerations for the acquirer.

The prior literature proved to be ambivalent in determining whether environmental conscious companies outperformed less conscious firms. The main opposing theories regarding the value and performance issue of CSR and environmental investments are the ‘stakeholder-view’ (Porter & Kramer, 2006), which argued that these activities increase value. Opposing is the ‘shareholder expense-view’ (Friedman 1970), which argues that these investment activities are at the expense of the shareholder and, therefore, not within the responsibility of the firm. Whether these activities are valuable seems to be dependent on several aspects such as asset-class and investor type (for more detail please refer to the literature review). Extra premia for high CSR score target companies are proven before, but what drives these higher prices was not yet studied before.

To answer the question of whether 'green' premia are either driven by an attempt to green a company and lure out a market response or simply because of the better prospects of 'green' acquisitions, a measure of reasonably expected performance by an acquiring manager is conceived. The theoretical incentives for corporate greenwashing are in place, and companies have been shown to participate in large numbers (Porter et al., 2019). Whether companies also try to 'greenwash' through corporate acquisitions has to date and to the best of our knowledge not yet been researched. Are companies willing to pay in an acquisition for greenwashing and image considerations? If this turns out to be the case, other follow-up questions come to mind: should companies green themselves to increase their value on the corporate takeover market, or should they engage in greenwashing themself? This research is both relevant to academics and managers alike since the outcomes could help to explain takeover markets and determinants of the price further. It could help managers to gain insight into which target characteristics competitors are paying extra for.

The results of this study confirm that there is indeed an extra premium for 'green' targets over their non 'green' counterparts. The data confirms that acquisitions of 'green' targets outperform non 'green' targets and that there are opportunities for greenwashing for acquiring managers. Since greenwashing opportunities are hard to define, this research defines it as a positive market response to the label ‘green’ (GREEN variable). While this positive reaction is also driven by better expected performance, this thesis also interprets it as the opportunity for an acquiring manager to lure out a positive market reaction. When testing both possible premia drivers against bidding premia, the data shows that while expected performance has a significant positive relationship towards the bidding premia, greenwashing opportunities do not. It is concluded that extra premia for 'green' targets are driven by their better outlooks rather than image concerns of the acquiring company.

This research is structured as follows; In part 2, the current stance on the literature will be discussed and the hypotheses will be drawn, in part 3, the data and methodologies are discussed, in part 4, the results will be presented, and part 5 will conclude on these results.

2. Literature review

CSR & Environmental CSR

Corporate social responsibility (CSR) is becoming a more popular and widespread topic of research within financial studies. The emergence of specific focused investment products and the interest of the general public helped to increase this popularity. For example, green bonds are a growingly popular asset class associated with better credit ratings and lower bond premia (Zerbib, 2019). The focus of this study is the relationship between CSR and M&A. Before linking CSR to M&A, used concepts and the current state of knowledge of both fields will be discussed.

CSR Concepts

Stakeholder orientation, corporate social responsibility (CSR), and environmental corporate social responsibility are three terms that are widely used in the literature and this study. These three concepts and their synonyms will be explained and differentiated. Stakeholder orientation is the intention of a company not only to regard the wishes of their shareholders, but rather all stakeholders. Stakeholders are parties with interest in a company and can either affect or be affected by the business, for example, employees, shareholders, but also broader concepts such as societies. Stakeholder orientation is an umbrella term for all activities conducted by companies that are not only in the *direct* interest of their shareholders but also to the interest of all their stakeholders (Donaldson & Preston, 1995). A measure of stakeholder orientation is the level of corporate social responsibility; how much social responsibility does a company claim and act on? CSR can be seen as a proliferation of stakeholder orientation, and other alike used terms are 'business ethics' and 'social issues in management' (Freeman et al., 2010). Engaging in CSR activities can be costly, examples of this are using more expensive but environmentally friendly products or paying employees a higher yet more fair price. As mentioned, corporate social responsibility is a measure of stakeholder orientation and is broken down into three main dimensions; Environmental, social, and governance (Arouri et al., 2019), or also commonly known as ESG-factors. These three factors are comprehensive because these are important facets to the stakeholders. Environmental indicating a company's stance towards sustainability, the environment, and our planet. The social factor indexes their attitude towards fellow humans, for example, their employees, customers, or society as a whole. And governance as in fair corporate governance.

To summarize the used definitions; Corporate social responsibility is a proliferation of stakeholder orientation, which takes into account all stakeholders instead of only shareholders when making a decision. CSR is commonly split up into three categories: environment, social and governance, or ESG. Other synonyms or used terms in this study for environmental CSR are the 'green' prefix, sustainability goals, or environmentally friendly.

Stakeholder-view or shareholders expense

At the core of the question of whether CSR is valuable to a company lies the debate of the shareholder expense view versus the stakeholder view. This debate is relevant for this study because, if CSR or environmental CSR does not influence firm value, investigating the relationship to M&A would be trivial because of the importance of firm and synergy values in the M&A process. Investing in CSR bear significant costs for a company while not directly benefiting their shareholders. Why should a company invest these significant amounts of shareholders' wealth? The first theory, from a neoclassical point of view, is the 'shareholder expense-view' (Friedman, 1970). This view argues that a company's only responsibility is to its shareholders. Investing in CSR would be at the expense of shareholders for the benefit of others. Since this is not the responsibility of the company, it should focus on maximizing its profits and shareholder value within the law, and therefore not invest in CSR. The opposing view is 'the stakeholder-view' (Freeman, 1984). This view states that it is a company's responsibility to not only care for its shareholders but rather *all* stakeholders. The theory goes further and says that it is actually not at the expense of shareholders and even helps companies to become more profitable for their shareholders (Porter & Kramer, 2006). These opposing views have different normative implications for companies. Both theories are sensible and are, therefore, empirically tested on different dimensions.

Financial findings CSR

Into the benefits of CSR implementations is a vast selection of empirical studies. Below are the main empirical findings into the financial aspects and strategic managerial aspects. The first scrutinized financial relationship is to the cost of capital; El Ghoul et al. (2011) found that firms with higher CSR scores have access to cheaper equity financing, whereas 'sin' industries face higher equity costs. Renneboog et al. (2008a,b) their findings reinforce the conclusions by El Ghoul et al. (2011) by showing that investors in SRI funds accept, however, not unequivocally, suboptimal risk-adjusted returns, showing a preference for socially responsible investments. Becchetti & Ciciretti (2009) have similar results for their dataset of socially

responsible stock. A similar relationship is found by Ghoul et al. (2018) for environmental CSR companies.

The cost of debt is also affected by the level of CSR. Goss and Roberts (2011) found that companies pay a 7 to 18 basis points more on their bank loans when they have social responsibility concerns. The relationship between corporate social responsibility and the borrowing costs are more attenuated for lower quality borrowers, whereas banks seem more indifferent towards CSR levels when facing high-quality borrowers. Also, the cost of debt through bonds is affected by the level of CSR by the issuer. Investors accept a lower yield on bonds issued by socially responsible firms and penalize corporate social transgressions (Oikonomou et al.,2014). In general, research into 'green' bonds and bonds by companies with higher CSR scores, lower yields and better credit ratings are observed (Zerbib, 2019; Ge & Liu, 2015). Since loan-rates and bond-yield spreads can be regarded as a sum of the risk-free rate and the default spreads of a company, one could infer that both banks and markets on average deem corporate social responsibility as a default risk dampener. These findings are in line with general theories into the value of CSR that CSR works as a risk-reducing factor (Godfrey et al., 2009). Both equity and debt costs are on aggregate lower for higher scoring CSR firms, indicating easier access to capital markets and lower required returns on projects, which is generally positive for the future outlooks of a firm.

Into the lower cost of equity are some contradicting results. As mentioned, cheaper equity suggests that investors require a lower return for their equity stake. However, Yamashita et al. (1995) found that the US stock market weakly rewarded for environmental consciousness by companies. Derwall et al. (2005) found that there is an eco-efficiency premium in stock markets. In their 2015 studies, Lenssen et al. (2005) reported that sustainability portfolios perform on average better, and investing socially responsible bears no extra costs for shareholders. Chan and Walter (2014) found a 'green' equity premium for environmentally friendly IPOs and SEOs. Where the outperformance of green and sustainable assets seems consistent in the literature, corporate responsibility on its own does not seem to have the same positive relationship to returns. These results can also display the dispersion between the expected returns, i.e., the cost of equity and the realized returns, i.e., the risk-adjusted realized returns. If this is the case, ex-ante CSR companies acquire equity at lower rates, while their equity investors realize superior risk-adjusted returns.

The relationship between other company risks and CSR are also analyzed. Oikonomou et al. (2012) found that CSR is weakly negatively related to the systematic risk of a company and that social irresponsibility is strongly positively related to the financial risks of a firm.

Bouslah et al. (2012) investigate this relationship further and look at how different dimensions of corporate social responsibility affect total and idiosyncratic risk (together; firm-risk) for US-firms. A relevant observation is that for non-S&P 500 companies, firm-risk is negatively related to environmental CSR. Other risk relationships studied are tail-end risk, or the risk for extreme events, Kim et al. (2014) observed that CSR levels on aggregate are a mitigating factor for tail-end risk, with the relationship being stronger for companies which are governed worse. Diemont et al. (2016) investigated tail-end risks but for CSR segregated on different dimensions and geological locations. They found relationships with different signs for the dimensions and locations. An interesting find for Europe is the positive relationship between the environmental factor and the tail-end risk. This find does not seem in line with the findings of Bouslah et al. (2012). However, Diemont et al. (2016) argue that since the levels in Europe for environmental strengths are relatively high, marginal investment in environmental CSR might not be effective in reducing environmental risks. While it proposes a sound theory, this nonmonotonic relationship is not shown empirically through the data. Whether investing in CSR is useful for reducing risk-levels does seem to depend on the location of a firm and the dimension of CSR it is investing in. In theory, CSR would reduce most risks; however, this is not shown empirically. Investing in environmental strengths seems to reduce firm-risks in the US while increasing tail-risks in Europe (Diemont et al., 2016), the influence on value or performance of a high scoring environmental CSR company, therefore, seems ambivalent from a risk point of view.

Another linked financial relationship with CSR is the number of cash holdings and its value. Cheung (2016) shows that company CSR scores are positively related to cash holdings. They argue that because firms with high CSR scores have lower systematic risks, their debts are shorter in maturity, therefore increasing the need for cash holdings. In itself, this would not have much of an implication of the value of CSR firms; however, higher cash holdings are associated with value destructing properties because of agency costs. However, with higher CSR, the value destructing properties of cash holdings are mitigated and should, therefore, have less of an influence on firm performance (Yu et al., 2017; Arouri & Pijourlet, 2017). This mitigation is likely because higher CSR values induce more monitoring and allow for better corporate governance. Theoretically, this could be an advantage for shareholders of CSR firms.

Strategic management findings CSR

Within strategic management research, CSR activities are often linked to reputation as a resource of competitive advantage (Martínez-Ferrero et al., 2016; Aragon-Correa & Sharma, 2003; Barney & Hansen, 1994). Aragon-Correa & Sharma (2003) argue that a pro-

environmental strategy helps the development of intangible assets. Examples of these intangible assets are know-how, corporate culture, and reputation. Because of flexibility the CSR activities offer, they regard it as a strong dynamic capability of the company. Martínez-Ferrero et al. (2016) empirically find the link between CSR and reputation and also confirm prior research that CSR has a negative relationship with the cost of capital. Corporate reputation leads to other advantages for firms adopting CSR policies. Fombrun et al. (2000) find that a better reputation of a company leads to higher customer loyalty; another linked advantage is that companies with a better reputation attract and retain employees (Turban & Greening, 1997; Branco & Rodrigues, 2006). Better reputation is directly linked to trust, which results in better contracting with strategic partners (Barney & Hansen, 1994). Moreover, as is also prevalent in the financial studies, Godfrey et al. (2009) find that a better reputation, or goodwill as they call it, acts as insurance-like protection and therefore mitigates risks of the company.

The value of CSR

All in all, empirical studies seem to find advantages for CSR activities mostly; however, the direct relationship to firm value is still disputed as of today. The definitive answer to whether CSR improves shareholder value is still not in, and it does seem to depend on different factors surrounding the implementing company. Research into the relationship to firm value assesses differently into how the value is attenuated and how it is appropriated. Godfrey et al. (2009) find that only institutional CSR (the CSR activities which are investments in a firm's secondary stakeholders or societies as a whole) yield benefits for the firm's value. In contrast, technical CSR (investments into trading partners, e.g., customers, suppliers, or employees) yield no benefit and destroy value. In other studies that find positive relationships between firm value and CSR levels, they usually find that the positive relationship holds when CSR is combined with other factors. Examples of factors with which the CSR firm value relationship is positive are: whether companies are governed well, well-governed companies have increasing firm value with CSR and engage more in CSR (Ferrell et al., 2016); Mishra (2017) finds that CSR in combination with innovations generates more firm value than similar innovations without the CSR level; Cai et al. (2011) found that companies in 'sin' industries have direct benefits from engaging in CSR; Buchanan et al. (2018) show that the relationship holds and depends on the level of influential institutional ownership; Cahan et al. (2015) found the relationship for unexpected CSR to be value-enhancing; Brown et al. (2006) studies showed that corporate philanthropy enhances shareholders value, so CSR with no reciprocity creates value. Another important find is by Gregory et al. (2013) that firms with higher CSR levels have better long-

term growth prospects. The empirical findings listed above show that whether CSR creates value is a rather complicated question due to the different dependencies. Into the direct relationship between CSR and value, the answer differs per study. For Brazil and India, negative relations are found (Mulyadi & Anwar, 2012; Crisótomo et al., 2011); this, however, could also point to the possibility that in emerging markets, the relationship is different, possibly due to worse governance or simply because of ample investment opportunities besides CSR. A final interesting find into the value implications of CSR is by Chen & Gavious (2015); their research is into whether CSR has different value implications to different kinds of shareholders for Israeli companies. Their results reveal that the marginal investor, on average, pays a premium for CSR and therefore values it. However, more sophisticated investors like institutions or M&A bidders show no such relationship and do not seem to believe in the profit potential of CSR.

A definitive answer is still out, and the dispute between the neoclassical shareholders' expense view and the stakeholder view goes on. However, CSR does seem to create value in some instances, and it is rather clear that it is an essential aspect of contemporary companies. Another critical question to keep in mind is the question of causality. Most mentioned studies conclude with relationships and not the causality, whether they 'do good by doing well' or 'do well by doing good' is a commonly asked question and quite impossible to answer.

M&A Research

In financial research, M&A is a much-studied topic, partly because of the ambiguity and questions that arise when observing the phenomenon; since it is somewhat unclear ex-ante what drives acquisition premia and whether mergers create shareholder value and for whom, and therefore why deals are made. In their 1983 literature review, Jensen and Ruback concluded that the target firm's shareholders benefit from takeovers. In contrast, the shareholders of the acquiring firm, on average, do not lose value and on successful deals earn a return of up to 4%. However, to the contrary, Weidenbaum and Vogt (1987) concluded that shareholders of the bidder were the clear losers in general and target's shareholders the clear winners. From this small example of clearly opposing conclusions, incorporating an analysis of 26 studies into M&A returns, and the importance of M&A events for companies their future operations and results while bearing significant risk, it becomes clear why M&A is an exciting topic of research. The rationale behind the actual generation of seemingly costly deals and the prevalently high acquisition premia raises questions that have puzzled academics since the early 70s and became an even more popular research topic during the leveraged buyout (LBO) boom of the 80s.

M&A Rationale

Even though the exact returns for bidding firms' shareholders are disputed over the ages, studies seem to agree that mergers return a zero risk-adjusted return for the acquiring firm's shareholders at best (Bruner, 2002). This leaves a puzzling question, why do managers engage in lengthy and costly M&A procedures while it leaves the company at virtually no gain? In prevailing financial research, three main explanations are commonly ascribed as to why managers engage in M&A.

The foremost and standard explanation is from the viewpoint of an aligned rational manager. Potential target firms would add value to the acquiring firm for the shareholders. The merger is then valuable to the acquiring firm through either production efficiencies, in other words, known as synergies; tax-benefits, the opportunity to fully utilize tax shields due to a costly takeover; or increasing market power, to either customers or suppliers (Devos et al., 2009). However, if value creation were the primary explanation for merger activity, this would not fit the average experienced insignificant or negative returns.

One explanation could be the consistent overestimation of the value of synergies (Damodaran, 2005), consistent with the behavioral explanation of M&A activity, which will be discussed further on. Another possible explanation is the unaligned agency theory manager. In

agency theory, when the incentives of a manager are not aligned with the goals of the shareholders, managers would try and maximize their utility, which creates investment distortions (Jensen & Meckling, 1976). One of these theorized distortions is overinvesting in M&A and engaging in diversifying mergers. Since non-aligned managers their human capital and compensation are severely under diversified, they are incentivized to engage in diversifying mergers and 'empire-building' (Jensen, 1986). They are diversifying personal risk at the cost of the shareholders (normatively, shareholders should diversify to their preferences through the stock market (modern portfolio theory; Markowitz, 1952)). These mergers, on average, destroy value (Bruner, 2002) and only hold private benefits for the manager. Taking agency theory into consideration, this could explain the merger activity and why it holds no significant returns for the acquiring company.

However, as mentioned before, one explanation remains. Managers could be consistently overestimating the possible synergies of a merger. As Damodaran (2005) concludes, synergy values are rarely delivered because they are incorrectly valued and difficult to appropriate. Theories underlying the results of Damodaran are those of a behavioral financial point of view first coined by Roll (1986) and his hubris hypothesis, which states that managers systematically optimistically overestimates firm-specific synergies in takeovers and have excessive confidence in their valuation of the target. Thereby winning an auction is probably bad news because the winner, by definition, placed the highest bid and valued the asset at play higher than the competition. Optimism about and excessive confidence in their valuation are proliferations of managerial overconfidence. Both are tested empirically by Malmendier and Tate (2008). They conclude that overconfident CEOs engage in more mergers than their non-overconfident counterparts and that their mergers, on average, destroy more value for shareholders. This find shows that a well-aligned manager could also engage in value-destroying mergers if overconfidence is in play.

These three possible explanations of merger activity give a first insight into why there is M&A activity; in reality, managers of all three kinds probably do deals. The literature also suggests that overconfident and non-aligned managers should be taken into account when researching into merger performance since they are more prone to destroy shareholder value.
A commonality between the unaligned manager and the overconfident manager is that they both are likely to engage in diversifying mergers (Jensen,1986; Malmendier & Tate, 2008).

M&A Performance measurement

It should be clear what defines M&A performance, how it is measured, and what usually drives performance and underperformance following a deal. Also, the average empirical deal returns on different measures are compared and reviewed to have an image of typical deal performance. M&A performance is a hard to measure concept and not easily defined. As Zollo & Meier (2008) conclude is that 'M&A performance is a multifaceted construct.'

There are countless methodologies of proxying for M&A performance and measuring certain aspects following completed deals (Zollo & Meier, 2008). However, three quantitative methods are prevalent in empirical research into M&A performance; announcement or short-term stock price event-studies, long-term stock performance analysis, and short- or long-term return analysis on the basis of accounting data (Cording et al., 2010; Bruner, 2002). Because of the complex nature of merger performance and the difficulty to separate the performance of the newly acquired assets, the old assets, and the synergies created by merging, measures of M&A performance might be ambivalent and simplistic. However, while not capturing everything, these measures give a reliable representation of performance, given some assumptions. All three measures each have some advantages and disadvantages to their own, and these will be discussed shortly.

First of all, the short-term event study methodology, introduced by Fama et al. (1969). The event study method captures the performance of acquisitions through the stock market's reaction around the announcement date. A 'normal' return is calculated, and over a chosen time window surrounding the evens, excess returns are accumulated, which are denoted as CARs (Cumulative abnormal returns). The event study methodology relies heavily on the efficient market hypothesis (Malkiel & Fama, 1970) since it assumes that the market instantly correctly prices the value created by the merger. The advantage of this methodology is that it, of the three measures, captures the effect of the merger mostly capsulated in the event frame. It is usually unlikely, however not impossible, that within the event study's frame, other factors could influence the stock price. Another advantage is that the CARs generated are simple returns for the bidders' shareholders. The disadvantages are that it heavily relies on the acceptance of the efficient market hypothesis. While this hypothesis has helped scholars to research and explain market prices, is has been shown a precarious theory in recent studies (Lamont & Thaler, 2003; Shleifer & Vishny, 1997). Another limitation of the event study methodology is that it does not account for any stock build-up of sell-off during the days before the event period. Price movements could occur as a result of illegal insider trading or merely the market anticipating and rumoring the deal announcement (Brigida & Madura, 2012; Tang & Xu, 2016; Jain &

Sunderman, 2014). One way to deal with these stock price runups as a result of anticipation by the market is to calculate the normal returns well before the event window (between t=-280 and t=-30). Concerns are usually dampened by using different event windows; while it does mitigate the problem, pinpointing the exact moment of information-driven trades is hard. Finally, as mentioned before, there is the off chance that the stock price during the event period is affected by external factors unrelated to the merger. This happens in case of other relevant events or announcements that have an impact on stock prices.

Another methodology is the analysis of long-term stock prices. Like the announcement-effect methodology, the analysis of long-term stock prices induces its results and conclusions from the stock markets. Compared to the short-term analysis of the announcement-effect method, some relative advantages and disadvantages occur. This longer-term measure extents the event window of an event study to months or years instead of days. The longer-term expected stock price is usually calculated using the capital asset pricing model or a multiple factor model (Cording et al., 2010). Again, CARs are calculated as in the announcement-effect methodology to measure the value created due to the merger. Using a more extended timeframe has some advantages over using the short-framed event study. Due to the longer time frame used, uncertainty issues are reduced, M&A announcements usually are veiled in various uncertainties. Like completion risk (Mitchell & Pulvino, 2001), uncertainty regarding the integration process, and the uncertainty about the ability of the acquirer to reap synergistic values (Cording et al., 2010; Haspeslagh & Jemison, 1991). Another advantage is that because of the broader time-frame issues regarding pre-event stock price build-up play less of an issue. Disadvantages are, like with the announcement-effect methodology, tied to the efficient market hypothesis. Another limitation of the longer-term stock price analysis is that due to the longer time-frame, the external influences on the stock price are inseparable from the price changes related to the merger (Chatterjee, 1986). For example, company outlooks could have changed without the merger, or the price could have changed because of industry-specific price shocks. Another disadvantage is the joint hypothesis problem; any analysis of long-term stock price performance is a joint test of both stock market efficiency and a model of market equilibrium (Malkiel & Fama, 1970; Cording et al., 2010). This problem is less issue for the announcement-effect methodology because of the generally low expected stock returns over such a short time-period (Andrade et al., 2001). Also, when assessing stock-price movements over more extended periods, projections tend to be roughly estimated and imprecise; it is, therefore, hard to conclude whether an abnormal return is statistically significant (Andrade et al., 2001). Compared to the other measures, the long-term stock price methodology seems quite flawed and impractical.

From the stock price performance measures, the announcement effect methodology seems the more useful pick. While when a long-term analysis is required, the next discussed (accounting-based) methodology will suffice.

The last popular measure of M&A performance is the analysis of accounting-based measures. The accounting-based analysis also takes a longer-term perspective in analyzing M&A performance. Typically used accounting measures are: return on equity (ROE), return on invested capital (ROIC), and return on assets (ROA). These measures are usually calculated for three years after merging and compared to the firm's pre-acquisition performances (Cording et al., 2010). However, the literature suggests using an industry benchmark when the merger is in response to industry shocks since performances are likely to change industry-wide (Andrade et al., 2001; Healy et al., 1992). The significant advantage of using accounting-based measures to determine M&A performance is that these measures are realized firm returns (Cording et al., 2010) and that the returns are not distorted by possibly market mispricing. Therefore, internal returns may reflect a purer measure of M&A performance. Another advantage is that using the scaled return on equity/capital/asset measures, efficiency of the assets, and or capital employed is measured and could proxy for the efficiency of the integration process. Like long-term stock performance, this measure suffers from the possibility of external influences. Other disadvantages are that accounting returns are manipulatable (Chakravarthy, 1986; Cording et al., 2010), and firms may be subject to different forms of accounting principles and rules (Cording et al., 2010). Another disadvantage is, is that while the stock-price measures are forward-looking, the accounting-based measure displays only realized past returns, and is, therefore, backward-looking (Montgomery & Wilson, 1986; Cording et al., 2010).

Which measure to use when conducting empirical research depends on the situation. When assessing realized returns over the integration period, one should look into the accounting-based measures. However, when approaching returns with a more forward-looking view, we should use the stock measures. The longer-term analysis may be more efficient when researching into the complete performance and integration process. While, the short-term measure should be used when researching into the market's beliefs in the ability to realize synergistic values, about the paid premium, and the deal overall.

M&A Performance

Regarding the returns and thus performance for the target firm's shareholders, the results seem clear. The returns to the target firm are only measured in announcement effects because of the simple fact that in the long run, they are incorporated by the acquiring company. Bruner (2002) summarized 21 studies into the announcement returns of target firms, which all concluded on significant positive returns to their shareholders ranging from +7,45% to +45,6% for the 50 largest deals during the LBO boom. These returns are rather clear and consistently positive over countless deals, and it would make no sense for a target to accept a negative return offer. Therefore the more scrutinized relationship is the performance of the acquiring firm; this research will also focus on their performances.

As described earlier, M&A typically generates negative or insignificant returns to the bidder's shareholders, or at least, it is one of the most stylized accepted facts in M&A studies and business. In his 2002 literature review into M&A performance, Bruner summarizes the findings of 41 studies regarding the market-based returns to buyer firms. Overall, bidder firms at best break-even in merger deals. Deal returns seem to differ over the decades, where the 1960s and 1970s appear to return more positive than the 1980s and 1990s (Bruner, 2002). Bruner (2002) also looks into 13 accounting-based measure studies. These results are varied and pointing in different directions; on average, the economic gains seem to be insignificant. While older research seems to be quite sure about the value-destroying or break-evenness of M&A deals, Alexandridis et al. (2017) find different results for post-2009 mergers. While their own 1990-2009 dataset also displays an average loss for the bidder's shareholders of 1,08%, their post-2009 (until 2015) dataset shows a reversal to an average gain of 1,05%. They argue that because of the governance improvements, both voluntary and mandatory, following the 2008 financial crisis, got rid of overinvestment issues and reduced agency costs. They also find that hubristic behavior (as shown by Malmendier & Tate, 2008) has significantly declined over the last few years. Another fascinating insight by Alexandridis et al. (2017) is that the shift in M&A performance is partly driven by 'mega deals' (>$500 mil), which were previously associated with more negative returns due to, among other explanations, overpayment (Loderer & Martin, 1990). Another insightful finding of M&A performance is that the returns seem to vary significantly throughout a merger wave, generating more value during the earlier years with a sharp decline near the end, fuelled by self-interested managers (Martynova & Renneboog, 2008).

CSR and Performance

The level of CSR for either the target or the acquirer plays a role in the performance of M&A deals. While most relevant research in this area is into the CSR level of the target, one study by Bettinazzi & Zollo (2017) stands out; they find that the level of stakeholder orientation of an acquirer is positively related to the performance of their acquisitions. However, for this study, the interest is mostly in the level of CSR of the target. Pivotal research into this topic by Aktas et al. (2011) studied the matter using the announcement effect methodology. Their findings suggest that the market responds positively to the investment in CSR firms in the social and environmental dimensions. When accepting the efficient market hypothesis, these findings even suggest that these CSR assets have profitable outlooks and high synergistic values for the acquiring companies. In another research into the performance, Salvi et al. (2018) found that using the accounting measure methodology, 'green' deals obtain better financial outcomes and results in the acquiring company seriously increasing their return on assets two or three years after completed acquisitions.

Results into the relationship between M&A and CSR should be interpreted carefully since both concepts are complex and not strictly measured or observed. Outcomes and corresponding conclusions are dependable on several taken assumptions by the studies. Key examples of these are the definition of both M&A performance and CSR, the methodology for measuring the M&A performance, and thereby whether one accepts the efficient market hypothesis or not. Concluding, however, there is a relationship between the level of CSR and different facets of M&A, shown to have a positive influence on the performance, but possibly paid for through extra premia.

M&A Premia

Another critical aspect of M&A is the bidding premium. The bidding or acquisition premium is the excess price the acquiring firm pays or bids over the pre-M&A information market price (Haunschild, 1994). The M&A premium is inherently linked to the expected performance of the acquisition because it essentially requires the bidder to pay for some of the future expected benefits of the acquisition upfront.

An intuitive explanation for the existence of these premia lies in two critical parts of the acquisition process. First, an acquiring firm has the intention to buy a company of the current shareholders; shareholders would have already sold the stock if they thought the market price was sufficient, which means that they value the stock higher than the market. Therefore it makes sense that the acquiring firm has to pay a premium over the market price, simply because else

the current shareholders would not sell their stake. Second, companies are usually sold through a competitive bidding auction, and competing suitors drive the price, and only the company that offers the most substantial acquisition premium wins (Flanagan & Shaugnessy, 2003). Therefore, it is also considered to be a winner's curse because the winner of the auction simply came out at a valuation, which was higher than his competition. On average M&A premia are between 20 and 30% above the pre-M&A market price (Ferris & Petitt, 2013)

The primary neo-classical motivation for companies paying these premia states that the price must be the value of the target plus the present value of the expected synergies (Davidson, 1985). Therefore in this view, the maximum premium is the value of the expected synergies. As mentioned before, managerial overconfidence (Roll, 1986) or valuation errors (Damodaran, 2005) could induce overvaluation of the synergies of the deal; this could lead to overpayment and disappointing returns. However, the expected synergies or the miscalculation thereof are not the only drivers of premia. Agency problems, as discussed in the M&A rationale sector, could also induce managers to overpay for their targets for sheer personal gain. Entrenched managers in the target firm (Shleifer & Vishny, 1989) could also result in the acquiring company paying more than the target value and expected synergies, induced by the possible extra costs of poison pills, golden parachutes, or other anti-takeover provisions. The presence of multiple competing suitors also increases the premia paid (Flanagan & Shaugnessy, 2003). Furthermore, a proven irrational influence on the paid acquisition premia is the 52-week highest stock market price, which poses as an anchor for both acquiring managers as for target shareholders (Baker et al. 2012).

It is clear that not only the expected synergies play a role when determining the acquisition premia in corporate takeovers. In the hypothesis section, another possible reason for premia is coined and explained.

CSR and premia

The relationship between CSR levels of targets and acquisition premia is also discussed in academic literature. Chen & Gavious (2015), their results show that M&A bidders find no extra value for the CSR scores of their targets. However, while introducing an interesting aspect, that marginal investor's likely value CSR more, their sample is only limited to the Israeli corporate market. More specific research into the M&A valuation of CSR is conducted by Gomes & Marsat (2018). The 2018 (Gomes & Marsat) study is less limited in comparison with Chen & Gavious (2015) because a global sample is used. Gomes & Marsat (2018) use the bid premium instead of the sale price; this relative measure of price has the advantage to show how

much the acquiring company values possible synergies. Combined with other earlier results that less sophisticated markets do not appreciate CSR that much (Mulyadi & Anwar, 2012; Crisótomo et al., 2011) and the fact that the Israeli market is relatively unsophisticated, and the results by Gomes & Marsat (2018); an extra premium for CSR seems to exist.

Other relations CSR and M&A

Arouri et al. (2019) studied the completion uncertainty of M&A firms and whether higher CSR levels influence that. They find that there is a negative relationship between the acquirer's CSR level and the arbitrage spreads, or deal uncertainty seems to be less for socially responsible acquirers. Whereas the CSR level of the acquirer influences the uncertainty, the CSR level of the target usually plays a more significant role. When selecting a target, CSR tends to be an important characteristic; higher CSR firms have a higher propensity of becoming an M&A target (Gomes, 2019). Another relationship is between the level of CSR and the payment method; Hussaini et al. (2019) found that better CSR scores are positively related to cash offers. The payment method is usually related to information asymmetry, whereas more informational asymmetric deals are related to stock offers. The discussed relationships point in the direction that higher CSR takes along less information asymmetry problems; this is probably related to the reputational advantage, which is discussed within the strategic management literature. Since within M&A information asymmetry is often a driver of frictions and unsuccessful deals, the implication of CSR could have a significant impact on the deal market.

Hypotheses

In prior literature, a knowledge gap exists in multiple aspects of the CSR - M&A relationship. While there is a shown premium for CSR in M&A deals (Gomes & Marsat, 2018), there is little research into the ESG factors of CSR separately. However, the individual ESG dimensions likely have different implications on the price paid and performance. Whereas, in a stock performance context, the difference between the environmental stock and the CSR stock performance is discussed in the literature reviewed. In an M&A context, in countries where corporate governance legislation is quite weak, acquiring and targeting companies with a good governance score might be of greater importance and, therefore, more valuable than investing in a social or environmental target. This argument goes for all three factors; however, next to legislation, public opinion and consumer preferences could also influence price and performance differences between the three factors. Fransen (2013) marks this theoretical importance of segregated dimensions, rather than viewing CSR as a complete and wholly concept. Because of different laws in between countries regarding the three ESG factors, all three factors vary in their impact between the different countries, however not varying as one whole CSR factor since legislation is usually based on one of the three ESG dimensions.

Upcoming importance of the environmental dimension, as can be seen through increasing public awareness and more stringent international climate agreements, and the recommendation by Fransen (2013), this study will focus solely on this dimension. With the environmental dimension in the spotlight for the public, incentives to greenwash and market company's environmental stance grow. Another knowledge gap is what ultimately drives the extra acquisition premium for M&A investments into high scoring CSR targets, as shown by Gomes & Marsat (2018). Closing this gap and focussing on the environmental dimension, this research will try to ascertain what drives the extra acquisition premium for 'green' targets compared to non-‘green-targets, acquired by listed companies globally, to close this gap.

In investigating the origination of the premium and map the relationship, the first relevant testable hypothesis considers the extra premia for 'green' deals. There is reason to believe that there is an extra positive premium for the acquisition of 'green' targets. This 'green' premium is observable but not consistent for other financial assets; for instance, in green bonds, a two basepoints negative yield premium is found, which suggests a positive premium on the price (Zerbib, 2019). Some studies found that investors in CSR stock pay a premium (El Ghoul et al., 2011; Becchetti & Ciciretti, 2009), while others found that they receive a premium (Yamashita et al., 1995; Derwall et al., 2005; Lenssen et al., 2005). As an M&A investment is often in a competitive bidding setting, and in case of extra desirability for CSR targets (Gomes,

2019), an extra premium for a ‘green’ target over their non ‘green’ counterpart seems probable. Previous research has shown an extra positive premium for CSR performance to exist (Gomes & Marsat, 2018). With environmental CSR being one of the main dimensions of CSR, likely, an extra positive premium is also prevalent for 'green' M&A deals.

Hypothesis 1: There is a significant positive extra acquisition premium for 'green' M&A deals, compared to non 'green' M&A deals.

From a traditional economic perspective, the extra premia for 'green' deals must be driven by specific elements, which can be identified and tested. The first clear driver could simply be the fact that 'green' assets generally have better outlooks for financial performance. Salvi et al. (2018) found that in their dataset, companies acquiring 'green' targets obtain better financial outcomes in terms of ROA. Based on the results of Salvi et al. (2018), it is expected that a similar effect can be observed for 'green' deals within the time frame of this study.

Hypothesis 2: 'Green’ M&A deals outperform their non ‘green’ counterparts.

Hypothesis 3 is created to test whether this expected outperformance has an impact on the paid premium.

Hypothesis 3: The premium bid for ‘green’ M&A deals is driven by their expected outperformance over their non ‘green’ counterparts.

Another possible driver for CSR investments is a rather skeptical view; the ‘window-dressing’ hypothesis (Taylor et al., 2018, among others). The ‘window-dressing’ hypothesis suggests that companies engage in CSR to appear more socially and environmentally involved than they are. In other words, they ‘window-dress’ with their CSR activities for outsiders' opinions, considerations, and possibly legislation. This hypothesis is not empirically tested before in M&A research as a possible source of paid premia.

In an M&A perspective, the ‘window-dressing’ hypothesis could work two ways, from the point of view of the target or the acquirer. The target might overstate their CSR level and ‘window-dress’ for outsiders, to become a more desirable target (Gomes, 2019) and appropriate a more substantial acquisition premium for their shareholders (Gomes & Marsat, 2018). From the acquirers' perspective, the acquirer is intentional on acquiring firms with high CSR levels,

thereby signaling their belief in the value of CSR activities to outsiders, to improve their image and maybe lure out desirable market responses.

'Window-dressing' in an environmental frame has a specific concept; Corporate greenwashing, the idea that companies deliberately frame and act to look more environmentally friendly (De Vries et al., 2015). The third hypothesis is derived from a combination of corporate greenwashing and the 'window-dressing' argument from an acquirers' point of view. There exists the real possibility that acquirers buy into higher-level environmental CSR companies, not for better-expected performance but a more favorable market reaction or image concerns. To be able to test whether acquiring companies are paying for 'window-dressing' considerations, the existence of 'window-dressing' opportunities must first be confirmed.

Hypothesis 4: 'Green' M&A deals have a stronger positive market reaction, compared to non 'green' M&A deals.

To further map the relationship of interest, it is tested whether the 'window-dressing' opportunities are paid for in an acquisition. This is tested by hypothesis 5, which tries to confirm whether the premium is driven by considerations unrelated to performance.

Hypothesis 5: The premium bid for 'green' M&A deals is driven by 'window-dressing' opportunities for the acquiring company.

3. Data and Methodology

Data acquirement

The deal sample is extracted from the Zephyr database by Bureau van Dijk. The data sample consists of 992 deals, completed between 1 January 2010 to 31 December 2016. The start of this time series is due to data availability of Orbis by Bureau van Dijk, the end of this time series is because one of the variables (ΔROA) is formed three years after the acquisition, and 2019 is the last full observable year. Al monetary values are extracted in euros.

The deals are filtered on several critical aspects within Zephyr. The initial stake by the acquirer can be no more than 50%, more would be a controlling share, and the final stake is at least 50,01%, the final stake is controlling. Less would be a minority stake acquisition, for which our key metrics of interest (performance and price) behave differently. All the acquirers are required to be public because else there would be no public accounting data to analyze, the targets are either public or used to be public for the sheer purpose of calculating the bid premia. Moreover, for the same reason, only deals are included for which the offer price is known. As is common in empirical financial research, the financial sector is excluded because their business model differentiates significantly from other companies. Deals below 2 million EUR value, and with either a missing ISIN for the target or acquirer, are removed from the dataset.

The Zephyr database is used for most of the data. Other used databases are Orbis by Bureau van Dijk for accounting measures after the deal (Zephyr only records financials before the deal), for the event-study data and the CSR ratings Eikon is used.

Main dependent variable

Green

Our main variable of interest is the level of environmental CSR of the target. This is determined in two ways. The first is via the commonly used ASSET4 classification of Thomson Reuters, which is accessed via Eikon. The ASSET4 rates included companies on their ESG factors and assigns a score for each of the dimensions (environment, social, and governance) and a weighted score (overall CSR score), which components precisely are the basis of each score is public through the Thomson Reuters (2018) methodology documents. These scores range from 0 to 100, with 0 being the least environmentally friendly and involved and 100 being the most environmentally friendly. For many observations, the environmental dimension score is missing; if possible, the environmental pillar score is manually calculated using the Thomson Reuters (2018) methodology. The average score of the 167 firms for which the environmental

pillar score is noted is 30.17, suggesting that the average found company does not score well on the environmental pillar (Table 1).

One major disadvantage of the ASSET4 scores is that only 9067 companies worldwide are tracked and rated; only 167 of the deals the target's ASSET4 environmental pillar scores are found. This would reduce the dataset drastically; therefore, another methodology of determining whether the target is 'green' is also used.

The second methodology is based on the methodology used by Salvi et al. (2018). Zephyr's option to text search on the business descriptions of the merging firms, the deal comments, and the deal rationale is used, searching on words like 'green' and similar words. When a deal comes up using this search query, it is classified as green. The search terms of Salvi et al. (2018) are extended with a range of environment-related terms. The final search query is listed in appendix A2. Since none of the search terms are unambiguous and Zephyr automatically also searches in the business description of the acquirer, whereas the interest of this research is into the 'green'-ness of the target, all search results are manually checked. The initial query resulted in 49 'green' deals; after manual checks, the final sample was 33[1]. Next to the corrected deals found using 'text-search', all deals for which the ASSET4 database found a >50% score on the environmental pillar are also marked as a 'green' deal in this variable, resulting in a total of 60 'green' mergers. This addition is done because the 'text-search' is not foolproof, and this way, all available data are utilized optimally.

The variable GREEN is a binary value and takes either 0 for no hits in the search or when it is corrected and 1 for a hit in the search or when the target has an ASSET4 environmental pillar score of more than 50%, indicating a 'green' target. Because this indicator is manually created, no observations are missing, 6.0% of the deals in the dataset is classified as green (Table 1).

Main independent variables

Premium

For the acquisition premium, two measures are used. The acquisition premium is the bid price divided by the current stock price. A common practice is to use the stock price before the announcement; the first measure of acquisition premium is, therefore, the announcement premium. However, as discussed earlier, occasionally in M&A, the price builds up before the announcement. Zephyr tracks the date for which the deal is first rumored and the matching

[1] 1 result had green in the company name, 1 result was a grey merger with 'green' plans, 5 results found the search terms in non-environmental contexts and 9 observations was of a 'green' acquirer acquiring a 'grey' target

stock price, based on which the rumored premium is calculated. The premium measures the extra price over the market price. In conventional financial research, the premium is calculated as the extra payment over the price 30 days before the announcement, to control for any rumors. In this study, we use the rumor premium as our baseline premium. In this case, the premium is controlled for any 'public' secrets; however, it is not controlled for build-up due to insider trading, i.e., the premium we use is the premium for public information of the deal.

In some cases, the rumor date is equal to the announcement date, the premia and other variables related are the same for these cases. Because the premia observations had some substantial outliers, the data was winsorized at a 5% and 95% level. Negative rumor premia are quite prevalent over the dataset, consisting of 146 observations. These negative premia are explained by Weitzel & Kling (2018) as hidden earnouts for the target's shareholders because it is likely that part of the price paid is concealed. These observations are excluded from the models and removed from the dataset since they do not reflect the complete premia, leaving 867 valid deals. The average rumor premium after winsorizing is 41.05%; this is similar to premia found in prior research (Alexandridis et al., 2013; Andrade et al., 2001). Whereas the announcement premium after winsorizing is averaged at 29.212%, this is lower because the stock price is run-up due to the public rumors. The more precise measure of the premium is the rumor premium because this calculates the premium over the stock-price unaffected by acquisition premia. The rumor premium has a high standard deviation of 32.50% (Table 1). Discussed premium further on is the rumor premium.

ΔROA

To be able to measure the long-run performance of an acquisition, the change in Return on assets over time t (ΔROA(t)) is constructed. Constructing ΔROA(t) from realized returns over assets provides an insight into the profitability following an acquisition. ΔROA(t) is also to capture longer-term returns to the acquisition, thereby accounting for full integration of the target into the acquirer. These realized returns are not distorted by markets (mis)beliefs about the acquisition and temporary mispricings and, therefore, less affected by greenwashing considerations.

According to the methodology of Salvi et al. (2018), ΔROA(3) is calculated. This measure is the difference between the return on assets of the acquirer (ROA) in the completion year (t=0) and three years after completion. The ROA is calculated by dividing the net profits by the average total assets of the year of interest. For the target and the acquirer ΔROA(t=-1) and ΔROA(t=-2) are created, which are the differences between the ROA in the completion

year and two or three years prior. To counteract confusion regarding whether the ΔROA is forward-looking or backward-looking, t=min1 or min2 is added for the backward-looking ΔROA's between the brackets. Whereas most other values are relative to the announcement date or year, ΔROA is relative to the completion year, because from that year on, assets are integrated, and returns on them are combined and realized.

The main ΔROA of interest is ΔROA(3) for the acquirer, the descriptive statistics are displayed in table 1 panel A, as is shown. Because this study is looking into the longer-term realized returns of a merger, in prior research, long-term returns are analyzed between 3 and 5 years (Bruner, 2002); Computing a longer-term ΔROA would reduce the dataset significantly and therefore, ΔROA(3) is opted for in this research. The average improvement in the ROA is negative, suggesting that the ROA after most mergers decrease. A possible explanation of this decrease could be that because, in a merger, an acquirer significantly increases their assets. However, it could be hard to appropriate synergy values and thereby increase the efficiency in which a company generates profits on its assets; thus, the company could generate higher returns than before the merger, the ΔROA(3) could still be decreasing because of the asset expansion. Some observations are missing for companies with undisclosed ROAs three years after the deal, possibly due to a delisting. ΔROA(3) contains substantial outliers, averaging at -0.273%, with min and max values of -112.283% & 88.216%, respectively. Because of these outliers, these values are winsorized at the 5% and 95% levels. The ΔROA(min2) of the target descriptive statistics are also shown in table 1.

$$\Delta ROA(t) = ROA(t) - ROA(0) \quad (1)$$

Cumulative abnormal returns

Ever since the research of Fama et al. (1969), the event study is a popular instrument of measuring the impact of an event on the value of a company. As discussed in the literature review, this is also the case for M&A studies. The normal returns are calculated using the event-study methodology proposed by MacKinlay (1997). The estimation window used to determine the market model for each deal is 550 days before the announcement until 50 days before the announcement. The market index used to estimate the market model for each deal is the local stock index of the country the acquirer headquarters in. The market-model is estimated for each stock for each deal as follows.

$$Rit = \alpha i + \beta i\, RMt \quad (2)$$

In the rare case of missing observations of the market index, the S&P 500 index is substituted. If the model still fails to generate normal returns, the normal return is equal to the home market return.

With these normal returns, abnormal returns can be constructed. For each day, the abnormal return is simply the excess or the deficit realized return over calculated normal return by the market model. The cumulative abnormal returns (CAR) are calculated by accumulating the daily abnormal returns over the event-window. The event-window used (CAR[-1,1]) in this research is standard on M&A research (e.g., Andrade et al., 2001; Aktas et al., 2004; Aktas et al., 2011) and is, i.e., the cumulative abnormal returns from 1 day before the announcement and one day after, with t=0 as the announcement date. Another popular event-window in M&A research in CAR[-5,5] (e.g., Lang et al., 1989; Smith & Kim, 1994; Lyroudi et al., 1999), which is also created and tested for.

$$CAR[t1,t2] = SIGMA(t1,t2)\ ARit \quad (3)$$

The CAR[-1,1] around the announcement date is, on average, -0.14%, which is slightly negative. These results are consistent with prior studies, for example, by Andrade et al. (2001) and Aktas et al. (2004), which found -0.7% and -0.15%, respectively. The summary statistics are displayed in table 1.

Control variables

Value and growth are widely discussed in association with the stock market. Value stock is equity, which trades for relatively high book-to-market ratios, suggesting that their market price is relatively low to their actual book assets. In contrast, growth or glamour stock are equities with low book-to-market ratios, suggesting that their price is relatively high to their book assets, which indicates either anticipated growth or overpricing. As either risk factors (Fama & French, 1992) or behavioral mispricing (Lakonishok et al., 1994), value stock does generate a higher risk-adjusted return than growth stock. Since M&A deals are ultimately sizeable stock trades, one could expect the same relationship for mergers. Rau & Vermaelen (1998) found this to be true in their study, value acquisitions (high book-to-market targets) significantly outperformed glamour acquisitions (low book-to-market targets). When determining the performance of M&A deals, one should keep the *book-to-market ratio* in mind when drawing any conclusions. The book-to-market ratio is created by dividing the book value

per share by the stock value before the announcement. Since the book value of the shares of most targets was not available in the databases used, the Book-to-market variable is not included.

Another risk factor by Fama & French (1992) and widely used control variable in financial research is size; in this case, the size of the target, i.e., *deal size*. Deal size is often linked to more value destruction. Loderer & Martin (1990) found that this is because larger targets are linked to more overpayment due to overconfidence by managers (Roll, 1986), and higher private benefits for the acquiring managers (Grinstein & Hribar, 2004). However, there is tension in the literature that suggests that larger targets are linked to lower premia because of a reduction of the winners curse and reduced competitive bidding (Alexandridis et al., 2010), both possibly because there are fewer acquirers for large and mega targets (Gorton et al., 2009). Alexandridis et al. (2013) show that while the larger targets are less prone to be overpaid, they still are linked to destroyed value around the deal announcement. As the deal size is both connected to performance and acquisition price, it is an important variable to include in this research. However, it is to note that part of the deal size variable consists of the paid premium. The size variable is created by taking the natural logarithm of the EUR value of the deal (Zephyr), to mitigate this problem of the included bid premium, and to reduce extreme values and create a more scaled measure. After taking the natural logarithm, the size is normally distributed around 19.984 cut off at 0 (Table 1).

Diversification seems to destroy value (Bruner, 2002); this is in line with the earlier 'empire-building' hypothesis (Jensen, 1986), where the manager diversifies to his benefit. Berger & Ofek (1995), and Maquieira et al. (1998) find negative returns to diversifying buyers, while DeLong (2001) finds that focusing mergers create shareholder value (Bruner, 2002). Also, it coincides with the results of Tate & Malmendier (2008), that overconfident CEOs engage in more diversifying mergers. In other research, Anderson et al. (2011) find that diversifying mergers do not decrease risk, while this is the main reason for these kinds of mergers. Another interesting and opposing find in is that while diversification is not associated with the firm's positive CARs, it is associated with a lasting effect on performance measures up to two years later, possibly related to a diversification discount (Hornstein & Nguyen, 2014). So, while the long-term effects are relatively unclear, the market's beliefs on diversifying mergers seem clear enough due to the findings in event-studies. Diversification is determined by comparing the BvD sector (Bureau van Dijk sector codes are like common industry codes) code for the target and the acquirer; if they are equal, this variable takes the value 0, else (so in

case of a diversifying deal) the variable equals 1. About 20% of the deals in the set are diversifying (Table 1)

Another well-discussed feature of merger deals is the *payment method*. Among others, Travlos (1987) found that stock-for-stock deals were associated with more negative returns when announcing the deal. While this is repeatedly shown to have a negative influence on the deal performance, this is more likely because a stock offer is also more related to the overpriced stock of the bidder. As Rhodes-Kropf et al. (2005) show, when companies with a high firm-specific overvaluation buy companies with a lower firm-specific valuation, the odds of a stock payment rise with this difference. Another sensible interpretation is the signaling or 'windows of opportunity' theory, stating managers signal through equity offerings that their stock is overpriced (Ritter, 1984). While the payment method is not any measure of synergy values or integration success, it is an indicator of overpriced stocks. It could, therefore, distort results when not controlling for it. The payment method is retrieved from the Zephyr database and is changed into a dummy variable, whether the payment was in stocks (variable equals 1) or not. As is shown in table 1, panel B, 47.4% of the deals in the dataset are classified as stock payment deals.

In line with the findings of Alexandridis et al. (2017), *better governance* structures seem to have a positive influence on M&A performance. This positive relationship is likely because it should reduce agency costs incurred due to rational self-interested managers. Bruner (2002) finds in his literature review that returns to the acquiring firm are positively related to the equity holdings by managers and employees (Agrawal & Mandelker, 1987; You et al., 1986). However, this relationship might be nonmonotonic (Liu & Zhao, 2012). Board independence, CEO duality, CEO compensation, and good general governance is also positively related to the performance and profitability of completed deals (Teti et al., 2017; Dahya et al., 2019). Another sign of the cost or benefit of corporate governance is found by Bruner (2002), who shows in multiple studies that M&A through excess cash generally destroys value. This find is in line with the free cash flow hypothesis by Jensen (1986), which suggests that companies with more free cash flows, slack, or excess cash have higher agency costs. Better aligned management would waste less slack resources, and better governance should, therefore, also reduce the free cash flow problem for M&A deals. Together with the results of Alexandridis et al. (2017), it is clear that better governance does lead to better quality deals, and bad governance should be corrected for if possible. As mentioned earlier, we access the Thomson Reuters ASSET4 values through Eikon. One of the measured dimensions is the governance score, and this is measured similarly to the ASSET4 environmental score; however,

instead of environmental assets and qualities, corporate governance provisions and qualities are measured. This variable takes values between 0 and 100, 0 being the worst governance, and 100 being the best. Like the environmental dimension score, the governance dimension has a lot of missing observations due to the lacking ASSET4 data set, which only tracks 9067 firms. Only 136 observations are found; therefore, this variable is not usable in the models (Table 1, panel C).

Another factor that seems to drive the profitability of deals is whether the deal is conducted through management agreements, i.e., *friendly takeover*, or whether it is done through a tender offer, i.e., *hostile takeover*. While in theory, the influence of this factor is in sign unclear, hostile offers could lead to higher acquisition premia (Healy et al., 1997) and, therefore, worse acquisition performance. However, a hostile takeover could also be a sign of entrepreneurial takeovers in which the bidder has found value in the target company, which it does not want to give up in a negotiation with occupying management (Bruner, 2002). Another possible explanation of better returns to tender offers could be that without negotiation with current management, they are more easily replaced and do not bring extra costs through a management buyout. The benefits of this depend on the quality of the corporate governance of the target firm before the deal. Bruner (2002), in their literary review, displays five studies that report significant positive returns for the bidders' firm shareholders while only one source suggests that hostile takeover is an inefficient method of acquisition. Because of the influence on performance, offer style should be taken into account when analyzing relationships with performance. Zephyr keeps track of as they call it 'deal sub-type,' which are categorized in different bidding tactics and strategies. For analysis purposes, a dummy variable is created for *Hostile*, which takes one if Zephyr describes the sub-type as a 'tender-offer.' Only 2.6% of the mergers in the dataset are classified as hostile.

Aktas et al. (2011) did use two other control variables, which proxy as an indication of a less easy integration process and, therefore, likely a less well-performing acquisition. These control variables are the *relative size* and whether the deal is conducted *cross-border*. Larsson & Finkelstein (1999) have shown a positive relationship between relative size and performance & integration, likely because when an acquirer is much larger than the target synergy potential will be limited (Seth, 1990). The relative size variable is created by dividing the deal size by the market capitalization of the acquirer. Cross-border deals are associated with cultural differences and are negatively related to performance (Datta & Puia, 1995). The cross-border variable is a dummy variable that takes the value one if the countries of the acquirer and target

do not match (as in Arouri et al., 2019). As is shown in table 1, panel B, 23% of the deals are conducted Cross-border.

The final set of control variables is taken from Gomes & Marsat (2018), which are features of the target and whether the acquirer is a *blockholder* before the acquisition or not. These are also common control factors in financial research. The target's features are; Net profit (From Zephyr), *ROA* (net profit / average assets from Zephyr), *liquidity ratio* (retrieved from Orbis), *leverage ratio* (retrieved from Orbis, as a percentage), and *research and development expenditures* (retrieved from Orbis, as a percentage of sales). Also, an interaction term between Cross border and 'green' is created, following Gomes & Marsat (2018). They argue that it plays a vital role as in cross border deals; CSR scores tend to become more critical due to the higher levels of information asymmetry. For these variables, the descriptive statistics are shown in Table 1, panel C. What stands out is that the average leverage ratio is quite high in the dataset; this could be because Orbis tracks the leverage ratio as book-leverage, and not as the standard market-leverage.

Fixed effects

In the regressions, fixed effects are used to control for clustered aspects of deals. In this research, the fixed effects are categorical variables. Year fixed effects are used to control for temporal mispricings, momentum, and merger wave cycles, which impact the premia (Simonyan, 2014; Rhodes-Kropf et al., 2005). The year fixed effects also absorb any macro-economic and systemic shocks like the euro-crisis, which influenced performances. The standard year fixed effects used in this research are obtained through the year of the announcement date of the deal. Country fixed effects are used to correct for similar occurrences geographically, like local mispricings and local outperforming markets (Simonyan, 2014; Rhodes-Kropf et al., 2005). Finally, industry fixed effects are used to correct for sector mispricings and regulations (Simonyan, 2014; Rhodes-Kropf et al., 2005). Sectors, as well as the sample distribution between continent and sectors, are defined in Appendix A3. The sample is heavily focused on North-America, which is no surprise since this is the most active market of corporate takeovers. Africa and South-America do not have many observations because of their relatively young and underdeveloped corporate markets.

In appendix A4, the main variables of interest are displayed per year. While the premia in most years are around 39%, three years stand out, 2008, 2010, and 2016. In the first place, 2008, because of a single observation. Furthermore, 2010 and 2016 display higher average premia as a result of heated M&A markets during that specific period. The yearly means do not

prove significantly different based on a joint F-test. However, T-testing the means of 2010 and 2016 separately against the other years produces a statistically different result. The annual means of the performance measures, car & ΔROA, do not prove significantly different based on a joint F-test as well. T-testing for different years results in statistically different means.

Table 1
Summary statistics

	Obs.	Mean	SD	Min	Max
Panel A: Main variables					
Premium	867	41.053	32.503	0	120
envZephyr	867	0.055	0.229	0	1
envASSET4	146	28.744	26.317	0	127.210
ΔROA(3)	800	-2.234	15.772	-94.546	82.946
CAR[-1,1]	782	-0.142	7.475	-61.149	33.147
Panel B: Deal & Acquirer characteristics					
lnDealvalue	867	20.050	2.678	14.672	28.099
relsize	857	3576.690	99410.34	0	2910000
hostile	867	0.027	0.161	0	1
inistake	867	4.478	11.361	0	49.141
acquiredstake	867	93.044	16.995	3.556	100
blockholder	867	0.163	0.369	0	1
stock	867	0.434	0.496	0	1
diversifying	867	0.209	0.407	0	1
CrossBorder	867	0.242	0.429	0	1
Panel C: Target Characteristics					
govASSET4	115	38.613	25.220	0.920	88.320
T_roa	818	-8.348	75.215	-1642.692	63.808
dT_roamin2	756	0.991	89.056	-1636.277	1014.075
T_leverage	495	0.721	0.953	0	5.881
T_liquidity	559	3.706	8.492	0.026	93.625
T_rd	335	5.92	10.733	-1.276	78.239

Premium is the rumor date bid premium winsorized on the 5% and 95% levels. envZephyr is a Binary value, taking the value 1 when the deal results from the specified Zephyr text search, 0 otherwise. envASSET4 is the ASSET4 value for the environmental pillar from the Eikon Thomson Reuters database, taking values between 100 and 0, as a percentage score. ΔROA(3) is the difference between the ROA of the acquirer 3 years after the deal completion and in the year of the deal completion winsorized on the 5% and 95% levels. CAR[-1,1] is the cumulative abnormal return on the [-1,1] window around the announcement date of the deal. lnDealvalue is the natural logarithm of the deal value in thousand euros. relsize is the relative size measured as the target's total assets divided by the acquirer's total assets. Hostile is a Binary value, taking the value 1 for deals for which the subtype is classified as either "Hostile bid," "Tender offer," or "Unsolicited bid," 0 otherwise. inistake is the initial stake of the acquirer in percentages. Acquiredstake is the acquired stake in the deal in percentages. blockholder is a binary value, which takes the value 1 when inistake is equal to or larger than 5%, 0 otherwise. Stock is a binary value that indicates whether a deal is paid in stock, 1, and 0 otherwise. Diversifying is a binary value, which takes the value 1 if the target industry code is not equal to the acquirer industry code, 0 otherwise. CrossBorder takes the value 1 if the target country is not equal to the acquirer country, 0 otherwise. govASSET4 is the ASSET4 value for the governance pillar from the Eikon Thomson Reuters database, taking values between 100 and 0, as a percentage score. T_roa is the target's ROA in the deal year in percentages. dT_roamin2 is the difference between the deal year target ROA and the target ROA 2 years before the deal. T_leverage is the gearing ratio of the target, as measured by Orbis. T_liquidity is the liquidity ratio of the target, as measured by Orbis. T_rd is the R&D expenses divided by sales of the target *100. All variables are measured in the announcement year unless otherwise specified.

Correlations

Correlations are shown in table 2. Significant correlations at the 95% level are marked with a star (*); otherwise, the correlation is statistically insignificant, indicating no linear relationship between the variables. Note that the correlations are pairwise and, therefore, only measured for non-missing observations of the two variables correlated, i.e., the correlations for the envASSET4 are only for 167 deals. Blockholder is highly negatively correlated with acquiredstake, bearing the same information; therefore, only blockholder is included.

The first thing that stands out is that the green deal indicators are negatively correlated with the rumor premium; this is contrary to the first hypothesis. However, the correlations are not significant and, therefore, not sensible to interpret.

The premium is positively and significantly correlated with the acquired stake, and blockholder is negatively correlated to the bid premium since they are the inverse of each other. A blockholder is likely to pay less for a target because of mitigated information asymmetries. For a similar reason, the crossborder variable is positively correlated with the premium, indicating more information asymmetry. The stock payment variable is negatively correlated with the premium, which is inconsistent with prior literature and theory that stock payment is usually linked to overpriced acquiring stock leading to higher bid premia. The target ROA is negatively correlated with the premium, suggesting that acquirers do not pay for internal accounting returns of their targets. The paid premium is negatively correlated with the change in ROA, and this could indicate that 'cheaper' deals have more success in improving internal accounting returns. However, since ΔROA(3) formed after observing the premium, if there is a causal relationship, this could only be from the premium to the ΔROA(3), and not the other way around.

The deal size is positively correlated with our green measure envZephyr; this could be likely because bigger companies have more slack to invest in CSR activities on average. Stock is negatively correlated with the deal value, suggesting that as the deal size grows, the odds of making a stock payment decrease. The table also suggests that bigger deals are more likely to be diversifying and crossborder. Also, the target ROA grows with deal size, whereas the ROA of the target seems to get more critical as deals get bigger in value.

While the correlations give a first insight into the data and possible peripheral relationships, correlations do not represent causal relationships. In chapter 4, models are constructed to determine whether there are causal relationships related to our hypotheses.

Table 2
Pairwise correlations main variables & control variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Premium	1.000														
(2) envZephyr	-0.042	1.000													
(3) envASSET4	0.015	0.372*	1.000												
(4) ΔROA(3)	-0.073*	0.000	-0.098	1.000											
(5) CAR[-1,1]	-0.001	0.008	-0.067	-0.026	1.000										
(6) lnDealvalue	-0.096*	0.158*	0.161	-0.023	-0.034	1.000									
(7) relsize	0.045	-0.009	-0.061	-0.000	0.040	0.011	1.000								
(8) hostile	-0.012	-0.009	-0.029	-0.036	0.001	0.006	-0.006	1.000							
(9) acquiredstake	0.107*	0.002	-0.100	-0.030	0.010	-0.010	0.015	-0.473*	1.000						
(10) blockholder	-0.083*	-0.011	0.059	-0.003	-0.034	-0.046	-0.016	0.180*	-0.776*	1.000					
(11) stock	-0.101*	-0.049	-0.043	-0.029	-0.047	-0.328*	-0.032	-0.130*	0.111*	0.031	1.000				
(12) diversifying	0.027	0.062	-0.039	0.017	0.007	0.088*	-0.018	0.092*	-0.091*	0.012	-0.135*	1.000			
(13) CrossBorder	0.087*	0.028	-0.011	0.086*	0.009	0.119*	0.060	-0.060	0.059	-0.081*	-0.169*	0.014	1.000		
(14) govASSET4	-0.023	0.301*	0.003	0.004	-0.037	0.245*	-0.191*	0.007	0.006	-0.120	-0.054	0.241*	-0.050	1.000	
(15) T_roa	-0.157*	0.035	0.068	0.042	-0.004	0.119*	-0.031	0.022	-0.047	0.043	-0.065	0.027	0.001	-0.100	1.000

Premium is the rumor date bid premium winsorized on the 1% and 99% levels. envZephyr is a Binary value, taking the value 1 when the deal results from the specified Zephyr text search, 0 otherwise. envASSET4 is the ASSET4 value for the environmental pillar from the Eikon Thomson Reuters database, taking values between 100 and 0, as a percentage score. ΔROA(3) is the difference between the ROA of the acquirer 3 years after the deal completion and in the year of the deal completion winsorized on the 5% and 95% levels. CAR[-1,1] is the cumulative abnormal return on the [-1,1] window around the announcement date of the deal. lnDealvalue is the natural logarithm of the deal value in thousand euros. relsize is the relative size measured as the target's total assets divided by the acquirer's total assets. Hostile is a Binary value, taking the value 1 for deals for which the subtype is classified as either "Hostile bid," "Tender offer," or "Unsolicited bid," 0 otherwise. Acquiredstake is the acquired stake in the deal in percentages. blockholder is a binary value, which takes the value 1 when inistake is equal to or larger than 5%, 0 otherwise. Stock is a binary value that indicates whether a deal is paid in stock. Diversifying is a binary value, which takes the value 1 if the target industry code is not equal to the acquirer industry code, 0 otherwise. CrossBorder takes the value 1 if the target country is not equal to the acquirer country. govASSET4 is the ASSET4 value for the governance pillar from the Eikon Thomson Reuters database, taking values between 100 and 0, as a percentage score. All variables are measured in the announcement year unless otherwise specified. Correlations significant on a 95% level are marked with a star (*).

Methodology

Ordinary least square (OLS) regressions will be conducted for each hypothesis separately (a detailed variable list is included, appendix A1). All regressions will use a set of relevant control variables, as discussed above, and fixed effects. The statistical software used for data analysis and processing is StataMP 15. Which control variables are included are determined based on three aspects: 1) whether it is sensible in a theoretical sense to include a variable, 2) the F-statistic, and 3) the adjusted R^2 of the model resulting from the inclusion of the variables.

To test the first hypothesis, whether there is an extra premium for 'green' deals over their non 'green' counterparts, the main dependent variable is the Premium, and the main independent variable is GREEN. The null hypothesis can be rejected when the variable GREEN returns a significant positive coefficient. The baseline regression will use the 'Text-search' green indicator from the Zephyr database combined with the ASSET4 >50% scores, because of the numerous missing observations for the ASSET4 environmental pillar score on itself. The main variable used for the premium is the rumor date winsorized premium, as this accounts for the price runup since public rumors of the deal. The baseline regression model 1 to test hypothesis 1 is formulated as below.

$$Premium = \beta 1\ GREEN + Controls + Fixed\ effects + \varepsilon \qquad (4)$$

The second hypothesis is to determine whether 'green' deals outperform their non-'green' counterparts. As discussed above, ΔROA is constructed to measure the performance of the acquisition. This measure is used because the market's beliefs do not influence this measure about the performance of 'green' assets, but rather the actual realized returns of these assets and the improvement of the relative returns. A flaw of using ΔROA is that not all of ΔROA is ascribable to the acquisition. It could, for example, be partly due to a trend in the ROA of the acquiring company or a cost-saving program. The baseline regression uses the GREEN variable and the performance, as indicated by ΔROA(3). The null-hypothesis for hypothesis 2 is rejected when the variable GREEN, returns a significant positive coefficient estimate. The baseline model 2 is formulated as follows.

$$\Delta ROA(3) = \beta 1\ GREEN + Controls + Fixed\ effects + \varepsilon \qquad (5)$$

To test whether the extra paid premium for ‘green’ deals over their non ‘green’ counterparts is driven by expected outperformance of ‘green’ acquisitions, hypothesis 3 is tested. Because ΔROA(3) is observed after the premium, a measure of expected performance by an acquiring manager has to be constructed. An estimation of the expectations of the manager is created by fitting values for ΔROA(3) using formula (5). This results in the creation of ΔRÔA(3), a proxy for performance measured by improvement in ROA, as an expectation of a rational manager for a deal. Important is to note that by interpreting these fitted values as reasonable expectations by managers, some assumptions are made. The acquiring manager is a rational manager and not biased in estimating the expected performance of the merger. Another assumption made is that the acquiring manager assesses the expected performance of an acquisition on similar aspects as the variables used in formula 5. The ΔRÔA(3) fitted values are not a 100% representation of the actual expected performance by the manager, since the manager has inside information. In contrast, the models only account for public information found in financial databases. However, expected performance cannot accurately be measured, and this method allows us to construct a close proxy for it.

When hypothesis 2 is confirmed, ΔRÔA(3) also accounts for the expected outperformance of ‘green’ acquisitions over their non ‘green’ counterparts. If so, hypothesis 3 can be tested by investigating whether the expected performance by the acquiring manager, measured as ΔRÔA(3), has a significant positive influence on the premium bid. Since the GREEN variable partly constructs ΔRÔA(3), the expected outperformance of the ‘green’ acquisition is also measured in this variable. If ΔRÔA(3) has a positive significant coefficient, this points in the direction that the expected outperformance by ‘green’ deals drives the premium (possibly among other factors). However, if either hypothesis 1 or 2 is rejected, hypothesis 3 cannot be confirmed because the model will measure the expected performance (which in this case is not driven by the variable GREEN) influence on the premium bid (which in this case is not higher for ‘green’ deals). Therefore the interpretation of the outcomes of model 3 is dependent on models 1 and 2.

Model 3 uses the expected performance as measured by ΔRÔA(3) as its main independent variable; the independent value is the winsorized rumor premium (Premium). The null-hypothesis of hypothesis 3 can be rejected when hypotheses 1 and 2 are accepted, and ΔRÔA(3) returns a significant positive coefficient estimate.

$$Premium\ i = \beta 1\ \Delta R\hat{O}A(t)i + Controls + Fixed\ effects + \varepsilon \qquad (6)$$

One of the main goals and novelties of this study is to determine whether a company is acquired for its better performance outlooks or 'window-dressing' considerations from an acquirer's point of view. To be able to test for this, first, it needs to be determined whether there are 'window-dressing' opportunities, i.e., does the market respond more positively to a 'green' deal than to its non 'green' counterparts? The cumulative abnormal return (CAR) over an event study with a [-1,1] window is interpreted as the market response to the acquisition, to test the fourth hypothesis. When the market response is more positively to the 'green' acquisitions, there exist 'window-dressing' opportunities for managers to engage in 'green' mergers. The acquiring company buys a 'green' firm to appear greener and more environmentally conscientious and thereby falling into grace (or disgrace) with both investors, customers, governments, and societies.

The baseline regression model 4 uses the CAR[-1,1], around the announcement date, as its main dependent variable, the CAR is measured as the arithmetic accumulation of the returns over the event-window. The null-hypothesis of hypothesis 4 can be rejected when the variable GREEN returns a significant positive coefficient estimate.

$$\text{CAR[-1,1] i} = \beta 1\ GREEN + + Controls + Fixed\ effects + \varepsilon \qquad (7)$$

To test the final hypothesis, and check whether acquiring managers pay for 'window-dressing' opportunities in an acquisition, it is determined whether bidding premia are driven by considerations unrelated to performance. A final model is drawn up, similar to model 3, to test hypothesis 5. The interpretation of model 5 is dependent on the acceptance of previous hypotheses. When hypothesis 1 is rejected, no extra premium on 'green' targets over their non-green counterparts is experienced, and therefore the interpretation of model 5 is precarious. The baseline regression model 5 uses the winsorized rumor premium (Premium); the main independent variables are GREEN & ΔRÔA(3). This model estimates coefficients for both measures and determines how this drives the acquisition premium. The null-hypothesis of hypothesis 5 can be rejected when GREEN returns a significant positive coefficient estimate. This coefficient is interpreted as a premium bid for the label 'green,' unrelated to performance considerations. Baseline model 5 is constructed as follows.

$$Premium\ i = \beta 1\ GREEN + \beta 2\ \Delta RÔA(3)i + Controls + Fixed\ effects + \varepsilon \qquad (8)$$

3. Results

Hypothesis 1

There is a significant positive extra acquisition premium for 'green' M&A deals, compared to non 'green' M&A deals.

Table 3 displays the regression results for hypothesis 1 in model 1 & 2. The dependent variable is the bidding premium over the price before the rumor date of the deal. In model 2, an interaction term between GREEN and CrossBorder is added as proposed by Gomes & Marsat (2018) to map the relations further.

Model 1 shows that acquiring a 'green' target has a positive and significant effect on the premium paid. The extra premium paid for a 'green' target in comparison to a non 'green' target is circa 12.7%. This result confirms the finding by Gomes & Marsat (2018) and the first hypothesis.

Most other variables are in line with prior research (e.g., Gomes & Marsat, 2018; Rossi & Volpin, 2004). Model 2 shows that crossborder acquisitions cost an estimated 17.8% more in premia relative to domestic deals. Only the coefficient for the natural logarithm of net profit stands out. The estimation suggests that a relative 1% increase in the net profits of a target results in a 0.05% decrease in bid premia. DT_roamin2, the difference between the target's ROA in the year of the deal completion and two years prior, partly offsets this effect. The coefficients suggest that acquirers are inclined to pay less for current profits, but are willing to pay for internal return improvements, as a positive DT_roamin2 indicates. The tendency to pay for a growing return can be interpreted as a momentum effect, which is paid for (Simonyan, 2014).

The R-squared level is quite high; this is because of the tendency of R-square to increase with every variable added. Since all fixed effects are constructed as dummy variables, resulting in an extensive selection of estimated coefficients. Therefore it is more sensible to interpret the adjusted R-square since this is corrected for the tendency to increase with each variable. The model accounts for 30.8% of the variance in the acquisition premia, and the F-statistic shows that the odds of misspecification is less than 0.1%.

Some more insight is achieved by looking at model 2, which includes the interaction term between CrossBorder and GREEN. While the interaction itself does not return a statistically significant coefficient and is therefore precarious to interpret, it has a measurable impact on our variable coefficient of interest. As is shown in table 3, regression 2, the estimated coefficient of GREEN has a higher significance level of 95% estimated at 17.4%, suggesting

that with domestic ‘green’ deals bidding premia are 17.4% higher than for non ‘green’ deals. This extra premium for ‘green’ targets is thus higher when acquiring companies within the acquirer’s home country. An acquiring party might be less willing to pay extra for the environmental CSR score of a target because it is less clearly observable cross border, differences in sustainability legislation and policies also might play a role in this effect. Adding the interaction does not further improve the model or explains any more residual variation of the rumor bid premium.

The variable ‘green’ is related positively and significantly to the rumor premium. The first null-hypothesis is therefore rejected, there is an extra premium for ‘green’ targets in M&A deals over their non ‘green’ counterparts

Table 3
Regression results hypothesis 1

	(1) Premium	(2) Premium
GREEN	12.651*	17.400**
	(7.139)	(8.678)
Cross X env		-14.943
		(15.512)
CrossBorder	17.798***	19.062***
	(6.205)	(6.344)
lnDealvalue	2.005	2.175*
	(1.224)	(1.237)
stock	9.341	9.467
	(5.895)	(5.899)
dT_roamin2	0.243**	0.249**
	(0.121)	(0.122)
lnT_NP	-5.560***	-5.590***
	(1.415)	(1.416)
T_rd100	-0.177	-0.147
	(0.325)	(0.326)
_cons	35.314	32.425
	(35.441)	(35.582)
Obs.	149	149
R-squared	0.575	0.579
Adjusted R-squared	0.308	0.308
F-statistic	2.157	2.134
Country Effects	YES	YES
Industry Effects	YES	YES
Year Effects	YES	YES

Premium is the rumor date bid premium winsorized on the 5% and 95% levels. GREEN is a Binary value, taking the value 1 when the deal results from the specified Zephyr text search, or the target has an environmental pillar score of >50, 0 otherwise. Cross X env is an interaction term of GREEN*CrossBorder. CrossBorder takes the value 1 if the target country is not equal to the acquirer country. lnDealvalue is the natural logarithm of the deal value in thousand euros. Stock is a binary value that indicates whether a deal is paid in stock (value =1), 0 otherwise. dT_roamin2 is the difference between the deal year target ROA and the target ROA 2 years before the deal. lnT_NP is the natural logarithm of the net profit of the target in the year of the announcement. T_rd100 is the R&D expenses divided by sales of the target times 100, as a percentage. All variables are measured in the announcement year unless otherwise specified. Significance levels are marked with stars; *, **, ***; 10%, 5% and 1% respectively. Standard errors are in parenthesis.

Hypothesis 2

'Green' M&A deals outperform their non 'green' counterparts.

Table 4 displays the results from the regressions for hypothesis 2 in model 3 & 4. Model 4 includes an interaction term between CrossBorder and GREEN, as suggested by Gomes & Marsat (2018).

As displayed in model 3, the main coefficient of interest, GREEN, is positive and statistically significant. These findings are in line with Salvi et al. (2018) and hypothesis 2. However, one should be careful in interpreting the magnitude of the coefficient, due to two observations. First, in comparison to the research of Salvi et al. (2018) and the mean and standard deviation of ΔROA(3) (-2.2% and 15.7%, respectively), the coefficient of GREEN seems quite high. Second, the intercept value is -30.3% and highly significant, in comparison to the mean of the ΔROA(3), this is low; therefore, the other coefficients could be a bit overestimated. The coefficient suggests that 'green' deals achieve a 3.8% higher ROA increase three years after the year of the deal completion, due to the peculiarities mentioned above, this might be overestimated.

The other variable coefficients have no surprising estimations. As expected, the ROA development of the target before the deal has a significant influence on the ROA development of the acquirer after completion. Also, the acquirer's ROA in the completion year (A_roa) has a negative and significant coefficient, this points in the direction that with a higher initial ROA, it is harder to improve it over the following years.

As with the model (1), the adjusted R-square is the main measurement of predicted variance, since R-square is likely overestimated due to overfitting. The model predicts the variance in the ΔROA(3) reasonably well at 27%. Using the F-statistic, the null-hypothesis, that all the coefficients are equal to zero, is rejected with a confidence level of 99%.

More insight is gained while looking into model 4, which is a similar specification with an interaction term between CrossBorder and GREEN added. Again our variable of interest's coefficient magnitude and significance increased, suggesting that domestic 'green' deals achieve a 5.6% increase in their ROA three years after the completion of the acquisition. However, it does not suggest that international deals perform worse, which is shown by the coefficient of the variable CrossBorder, merely that 'green' acquisitions tend to perform better within country borders.

The models are reasonable and explain the variance of the ROA development of the acquirer quite well; the coefficient of the variable of interest is both positive and statistically significant. The null-hypothesis of the second hypothesis is therefore rejected, and it is

confirmed that 'green' deals outperform their non 'green' counterparts in terms of ROA development after three years of deal completion. As model 4 performs a bit better in explaining the variance in ΔROA(3), it is used to predict ΔRÔA(3) (dA_rôa) values as is discussed in the methodology sector; these fitted values are used in the models for hypothesis 3 and 5 below.

Table 4
Regression results hypothesis 2

	(3) dA_ROA(3)	(4) dA_ROA(3)
GREEN	3.779*	5.585**
	(2.227)	(2.735)
Cross X env		-5.482
		(4.840)
CrossBorder	2.972	3.345*
	(1.934)	(1.958)
diversifying	0.544	0.884
	(1.630)	(1.655)
T_leverage	-1.470	-1.494
	(0.971)	(0.969)
TROAmin1	0.150**	0.151**
	(0.072)	(0.072)
TROAmin2	-0.139***	-0.144***
	(0.045)	(0.045)
T_rd100	0.250**	0.266**
	(0.104)	(0.105)
lnDealvalue	0.377	0.444
	(0.425)	(0.428)
A_roa	-0.339**	-0.361***
	(0.135)	(0.136)
lnT_TA	1.310	1.304
	(0.981)	(0.979)
lnT_NP	-0.517	-0.520
	(0.764)	(0.762)
_cons	-30.336**	-31.669***
	(11.648)	(11.685)
Obs.	134	134
R-squared	0.593	0.600
Adjusted R-squared	0.269	0.271
F-statistic	1.828	1.826
Country Effects	YES	YES
Industry Effects	YES	YES
Year Effects	YES	YES

dA_ROA(3) is the change in ROA of the acquirer 3 years after deal completion. GREEN is a Binary value, taking the value 1 when the deal results from the specified Zephyr text search, or the target has an environmental pillar score of >50, 0 otherwise. Cross X env is an interaction term of GREEN * CrossBorder. CrossBorder takes the value 1 if the target country is not equal to the acquirer country. Diversifying is a binary value, which takes the value 1 if the target industry code is not equal to the acquirer industry code, 0 otherwise. T_leverage is the gearing ratio of the target, as measured by Orbis. TROAmin1 and TROAmin2 are the return on assets of the target, respectively, 1 and 2 years before the acquisition. T_rd100 is the R&D expenses divided by sales of the target times 100, as a percentage. lnDealvalue is the natural logarithm of the deal value in thousand euros. A_roa is the return on assets of the acquirer in the year of the deal. lnT_TA is the natural logarithm of the book assets of the target. lnT_NP is the natural logarithm of the net profit of the target in the year of the announcement. Year effects are measured from the completion year. Significance levels are marked with stars; *, **, ***; 10%, 5% and 1% respectively. Standard errors are in parenthesis.

Hypothesis 3

The premium bid for 'green' M&A deals is driven by their expected outperformance over their non 'green' counterparts.

Table 5 displays the results for the estimations regarding the third hypothesis. The fitted value ΔRÔA(3), used as a proxy for managerial expectations, has a positive and significant coefficient. The results could indicate that with every expected percentage of change in ROA 3 years after deal completion, as expected by an acquiring manager, results in a 1.7% higher bid premium over the stock price before the rumor date.

Since this model tests for the variance predicted by the expected performance, which is partly driven by the GREEN and the interaction between crossborder and GREEN, these variables are not included in the model. Other variables omitted in model (3) are not included because their explanatory value is absorbed by the fitted value ΔRÔA(3). New included variables such as the leverage and liquidity of the target showed to have prediction value, which they did not show in model (1). This is possibly because of correlations with the omitted variables. The estimated coefficients are in line with other studies (e.g., Gomes & Marsat, 2018).

The intercept value of model 5 is relatively high in comparison to model 1 and the summary statistics of the premium. This is partly offset by the highly negative and significant estimated coefficients for the fixed effects of both country and industry, varying between 0 and -45.95. Still, it could have biased other estimations in the model, suggesting that the other discussed coefficients are possibly underestimated.

Table 5
Regression results hypothesis 3

	(5) Premium
ΔRÔA(3)	1.698**
	(0.777)
A_roa	0.694
	(0.499)
T_leverage	6.094*
	(3.321)
T_liquidity	1.728**
	(0.847)
lnT_NP	-5.555***
	(1.364)
T_rd100	-0.589
	(0.388)
_cons	107.126***
	(35.210)
Obs.	137
R-squared	0.529
r2_a	0.209
F	1.655
Country Effects	YES
Industry Effects	YES
Year Effects	YES

Premium is the rumour date bid premium winsorized on the 5% and 95% levels. ΔRÔA(3) is the expected change in ROA of the acquirer 3 years after the deal by a manager, proxied for by fitted values for Y using model 3 from the regressions from hypothesis 2. A_roa is the return on assets of the acquirer in the year of the deal. T_leverage is the gearing ratio of the target as measured by Orbis. T_liquidity is the liquidity ratio of the target as measured by orbis. lnT_NP is the natural logarithm of the net profit of the target in the year of the announcement. T_rd100 is the R&D expenses divided by sales of the target times 100, as a percentage. All variables are measured in the announcement year unless otherwise specified. Significance levels are marked with stars; *, **, ***; 10%, 5% and 1% respectively. Standard errors are displayed in the parenthesis.

This is possibly caused by outliers, which variance is captured within the fixed effect dummies. This could have an influence on the magnitude of the economic interpretation, however not on the sign of the interpretation and the significance. Therefore, within models 5 and 8, interpretation regarding the magnitude of the main variables is precarious.

Otherwise, the model predicts the variance reasonably well, and the F-statistic lies within the 98% confidence interval. Using the positive and significant coefficient of $\Delta R\hat{O}A(3)$ and the acceptation of the second hypothesis ('green' outperform their non 'green' counterparts), the null-hypothesis of the third hypothesis is rejected. The premium bid for 'green' M&A deals is (partly) driven by outperformance of 'green' deals over non 'green' deals.

Hypothesis 4

'Green' M&A deals have a stronger positive market reaction compared to non 'green' M&A deals.

In table 6, the regression results for hypothesis 4 are displayed. Model 6 includes country fixed effects and model 7 not. Whether to include these effects is disputable because the dependent variable is measured relative to a country's home equity market; however, countries' responses to acquisitions could differ significantly, therefore for completeness, both models are displayed.

The GREEN variable returned a significant and positive coefficient estimation at the 90% level (95% without country fixed effects). This suggests that 'green' deals have a more favorable market reaction surrounding the announcement date than their non 'green' counterparts. The models implicate that for 'green' deals, the CAR at the three-day announcement event-window is 2.4% or 2.5% higher than for non 'green' deals.

The CrossBorder coefficient is in line with prior research (Aktas et al., 2011). The third significant coefficient, the ROA of the acquirer, is somewhat surprising because of the high significance level. However, the sign is in line with prior research by Aktas et al. (2004). The internal return by the acquiring company has a negative relationship with the announcement returns. This is possibly due to agency problems; cash-rich companies with high internal returns might engage in inefficient M&A deals for personal considerations of the manager. Another explanation could be that for companies with a higher ROA, the market might expect that it is hard to maintain this high level when integrating new assets into the company.

The model predicts the variance well, and the F-statistic is well above conventional critical values. With the significant GREEN coefficient, the null-hypothesis of the fourth

hypothesis is rejected. 'Green' deals have a stronger market reaction than their non 'green' counterparts, suggesting that there are 'window-dressing' opportunities for the acquirer.

Table 6
Regression results hypothesis 4

	(6) CAR[-1,1]	(7) CAR[-1,1]
GREEN	2.357*	2.544**
	(1.357)	(1.291)
CrossBorder	2.437*	2.081**
	(1.375)	(0.974)
A_roa	-0.186***	-0.231***
	(0.071)	(0.064)
T_liquidity	0.141	0.124
	(0.166)	(0.168)
lnT_NP	-0.195	-0.152
	(0.236)	(0.211)
_cons	0.849	-1.716
	(5.029)	(3.286)
Obs.	186	186
R-squared	0.575	0.449
Adjusted R-squared	0.381	0.325
F-statistic	2.964	3.623
Country Effects	YES	NO
Industry Effects	YES	YES
Year Effects	YES	YES

CAR[-1,1] is the cumulative abnormal return in the three-day event-window around the announcement date measured in percentages. GREEN is a Binary value, taking the value 1 when the deal results from the specified Zephyr text search, or the target has an environmental pillar score of >50, 0 otherwise.CrossBorder takes the value 1 if the target country is not equal to the acquirer country. A_roa is the return on assets of the acquirer in the year of the deal. T_liquidity is the liquidity ratio of the target, as measured by Orbis. lnT_NP is the natural logarithm of the net profit of the target in the year of the announcement. All variables are measured in the announcement year unless otherwise specified. Significance levels are marked with stars; *, **, ***; 10%, 5% and 1% respectively. Standard errors are displayed in parenthesis.

Hypothesis 5

The premium bid for 'green' M&A deals is driven by 'window-dressing' opportunities for the acquiring company.

The results of model 8 are displayed in table 7. Model 8 is similar to model 5; however, GREEN is added to test whether this variable explains any residual variance in the bid premium. For peculiarities and interpretation of the model's estimations other than GREEN, the description of model 5 is referred to.

As is shown in table 7, the model's estimation does not alter significantly when including the GREEN variable. The GREEN variable has an insignificant coefficient and is, therefore, statistically not different from zero. The significance level of $\Delta\hat{ROA}(3)$ drops a bit to 94.4%, which is still within an acceptable range (and well above 95% using robust standard errors).

The model does not alter significantly, the coefficient of GREEN is insignificant, and the adjusted R-squared value is lower than in model 5. All points in the direction that including the 'green' variable besides the proxy measure for expected performance (ΔRÔA(3)) does not have any predictive value. Therefore the null-hypothesis of the fifth hypothesis cannot be rejected, and the results are unable to show that bid premia are driven by 'window-dressing' opportunities for the acquirer.

Table 7
Regression results hypothesis 5

	(8) Premium
GREEN	5.425
	(7.843)
ΔRÔA(3)	1.560*
	(0.805)
A_roa	0.601
	(0.518)
T_leverage	5.720*
	(3.375)
T_liquidity	1.694**
	(0.851)
lnT_NP	-5.501***
	(1.371)
T_rd100	-0.527
	(0.400)
_cons	106.216***
	(35.349)
Obs.	137
R-squared	0.532
r2_a	0.204
F	1.623
Country Effects	YES
Industry Effects	YES
Year Effects	YES

Premium is the rumor date bid premium winsorized on the 5% and 95% levels. GREEN is a Binary value, taking the value 1 when the deal results from the specified Zephyr text search or the target has an environmental pillar score of >50, 0 otherwise.ΔRÔA(3)is the expected change in ROA of the acquirer 3 years after the deal by a manager, proxied for by fitted values for Y using model 3 from the regressions from hypothesis 2. A_roa is the return on assets of the acquirer in the year of the deal. T_leverage is the gearing ratio of the target, as measured by Orbis. T_liquidity is the liquidity ratio of the target, as measured by Orbis. lnT_NP is the natural logarithm of the net profit of the target in the year of the announcement. T_rd100 is the R&D expenses divided by sales of the target times 100, as a percentage. All variables are measured in the announcement year unless otherwise specified. Significance levels are marked with stars; *, **, ***; 10%, 5% and 1% respectively. Standard errors are in parenthesis.

Robustness checks

Several tests and variable substitutions are conducted to test for the robustness of the statistical specifications. All models are tested using the variance-inflation factor (VIF) to test for possible multicollinearity. None of the included variables exceeded a VIF of 6.01, which is well below the conventional cut-off value of 10 (Hair et al., 1995). All models are also drawn up using robust standard errors to test the robustness of the standard errors and the significance levels of the main variables. The significance levels do not change when using the robust standard errors, except for model 2, for which the significance level is widened to 94%. Since the change in significance is minor, the results hold for robust standard errors.

For the models using the rumor bid premium as the main dependent variable, the announcement premium is substituted to see whether the prior results still hold. The sign of the main independent variables in the three models (1, 5, and 8) do not change; however, the significance levels do. Instead of a 95% confidence level, only a 90% confidence level is achieved. This is likely because, after a public rumor, the target stock price starts to increase in anticipation of an offer.

For models 6 and 7, another event-window is used to check for robustness (CAR[-5,5]). The results do not change in significance or sign. The results do not depend on the width of the event-window.

For model 4, ΔROA(3) is substituted with ΔROA(2); this has a significant impact on all estimations and measures. The regression results using ΔROA(2) are displayed in appendix A4 column 2. Using ΔROA(2) as the dependent variable, all deal specific independent variables lose their predictive power. The only consistent predictor is the ROA of the acquirer in the year of the deal completion. The possibility that this is due to statistical misspecification or randomness is tested for by constructing multiple models using the ΔROA(2) as the dependent variable. All hold the same results; Only the fixed effects and the ROA of the acquirer in the year of the deal completion result in statistically significant coefficients. The same test is conducted using ΔROA(3) as the dependent variable to check whether perhaps the earlier specification as a result of pure chance. This was not the case; the deal-specific variables did not lose their statistical significance in their estimated coefficients.

When comparing these test results, a rather typical interpretation is evident. An acquisition does not seem to have a significant influence on the return on asset change two years after deal completion. It is instead driven by time and geographical effects, but deal specifications have a significant influence on the return on asset change three years after deal

completion. This result is not in line with Salvi et al. (2018); however, their results were not tested for fixed effects that seem to drive ΔROA(2).

To test ΔROA(4) is constructed as well to test whether 'green' M&A deals only influence return on asset development over 3 years or longer. This variable has more missing observations because a part of the deals is completed in 2016, and 2019 is the last available ROA year. After some alterations and different specifications (removing variables with too many missing observations in combination with ΔROA(4) or no predictive value), most statistical specifications resulted in a positive coefficient for GREEN with a confidence level varying between 90% and 95%, an example of one of these specifications is displayed in appendix A5 column 3. Other variables, while more significant than within a specification of ΔROA(2), did not result in significance levels above 90%. The R-squared values and F-statistic scored worse for this specification. Likely because of the longer time between the completion and the observation of ROA. An evaluation of the ROA measure will follow in the discussion of the limitations.

The positive relationship between 'green' deals and ROA improvements are robust for long term improvements above three years. Speculatively this is because of the time it takes to integrate the 'green' assets completely and increase their earnings.

4. Conclusions

Interpretation

To be able to test what drives extra premia for ‘green’ acquisitions over their non-‘green’ counterparts, whether or not there is an extra premium has to be proven. Previous research (Gomes & Marsat, 2018) had shown a statistically significant higher premium for high scoring CSR and environmental targets within the ASSET4 database by Thomson Reuters. This study widened the criteria by combining results of a text-search through Zephyr by Bureau van Dijk as suggested by Salvi et al. (2018) and ASSET4 database information, creating a binary value whether a target is considered ‘green’ or not. The label ‘green’ was linked to deals which resulted from the extended ‘search-text’ method as suggested by Salvi et al. (2018) or when the target company had an ASSET4 environmental pillar score of more than 50 in the year prior to the acquisition (for more detail please refer to the methodology chapter). This method resulted in a more varied and complete database than Salvi et al. (2018) and Gomes & Marsat (2018).

Based on model 1, it is revealed that the deals classified as ‘green’ receive higher bid premia than deals that are not classified as such. Acquiring managers pay for their targets to be ‘green’ and environmentally conscious. ‘Green’ targets receive about 12.7% more over their prevailing share price than non ‘green’ targets. As is discussed in the literature review, theoretically, there are two potential reasons for a manager to pay this extra premium, which are tested in this paper; A higher expected performance or company image considerations, also known as ‘window-dressing’ by the acquiring company.

The results of model 3 show that acquisitions of ‘green’ targets result in better improvements in internal returns 3 years after the deal, measured as ΔROA(3). ‘Green’ acquisitions perform better than their non ‘green’ counterparts. If one accepts the efficient market hypothesis, the results of models 6 and 7 can be perceived as a fortification of this conclusion. The magnitude of the post-acquisition outperformance remains debatable due to possible overestimations in the statistical specification; however, the sign and significance are clear.

Model 5 displays that the expected outperformance, as measured by the fitted values of model 4, significantly affects the bid premium. In combination with the conclusion of hypotheses 1 and 2, a higher premium and outperformance of ‘green’ deals over non ‘green’ deals, it can be concluded that part of the extra bid premium for ‘green’ targets is driven by expected performance.

In regards to the greenwashing or ‘window-dressing’ opportunities for the acquiring company, model 6 shows a significantly more positive market reaction than non ‘green’ deals.

Within acceptation of the efficient market hypothesis, this points in the direction of better expectations by the market of the future performance of ‘green’ acquisitions. However, with or without acceptance of the efficient market hypothesis, it shows that the market reacts more positively to ‘green’ deals than non ‘green’ deals, showing that the market places the acquirer in higher regard for acquiring the ‘green’ target. This general response by the market shows that there is at least an opportunity for acquiring companies to ‘window-dress,’ in other words, they could acquire a ‘green’ target in expectation of a more favorable market reaction and a better image towards their shareholders and potential investors.

Whether these considerations drive the extra bid premium observed for ‘green’ companies is tested in model 8. Model 8 shows that besides the expected performance, which is partly abstracted from whether the target is ‘green’ or not, the variable ‘green’ has no further explanatory value towards the bid premium. This shows that the expected performance measure explains all the extra premium paid for ‘green’ deals and that it is not paid merely for the label ‘green.’

In summary, it can be concluded that there is an extra premium for ‘green’ targets in M&A deals in respect to their non ‘green’ counterparts. This extra premium is instead driven by the expected outperformance of the ‘green’ acquisition over a non ‘green’ acquisition, then by image, greenwashing, or ‘window-dressing’ considerations by the acquiring company.

Relevance and implications

This study further advances the academic realm into CSR – M&A relations, in particular within the environmental dimension. It reinforces previous finds by Aktas et al. (2011), Gomes & Marsat (2018), and Salvi et al. (2018) by extending the conclusions to an international level and a broader, more comprehensive indicator of 'green'-ness. The used database is not constricted by European or Northern American borders nor the ASSET4 database by Thomson Reuters.

This research adds to the existing strand of the literature of possible 'window-dressing' effects in 'green' M&A deals and bid premia. This avenue was not previously studied and it extends our knowledge into how bids are devised by acquiring managers and what it is they are willing to pay for.

The relevance of the focus on the environmental dimension & 'green' targets, is underlined by the grown importance among investors (i.e., BlackRock CEO letter), increasing public awareness into global warming (Gallup, 2020), greenwashing attempts by corporations (Porter et al., 2019; Shell, 2020), and political interest (Carter, 2018).

The results, together with the results of Gomes (2019); which found that higher CSR scoring companies are more often picked as targets. Implicate that for potential target shareholders, it could be profitable to engage in more environmental activities, as they are likely to receive a higher premium and are more likely to receive an offer. This could also have the perverse incentive that companies which are keen on being sold, engage in more corporate greenwashing.

For the acquiring firms, the results implicate that 'green' targets are suitable and solid choices because they are likely to outperform their non 'green' counterparts. However, as the results show, the acquiring company is likely to pay extra for a 'green' target, so who ends up with the benefits remains a question to be asked.

Limitations

A few limitations to this research should be discussed and displayed. This study tried to separate the expected performance of 'green' acquisitions from the label of 'green' acquisitions. Thus, a separation of expected performance considerations and 'window-dressing' considerations, a measure of expected performance, had to be conceived. Since expected performance by a manager is not directly measurable, a proxy had to be made. As with all proxies, this comes with some assumptions and limitations.

The expected performance was proxied for by fitting ΔROA(3) values to model 4, and this assumes that with the independent variables of model 4, and acquiring manager could assess the potential performance of a target when acquired. It can be debated whether the assumption that all acquiring managers assess their targets in a similar fashion is valid. Another limitation of using the fitted value ΔROA(3), is the long time between completion of the deal and observation of the actual ΔROA(3). The model used for fitting the values suggests a strong relationship. However, because of this long time between completion and observation of this, it is unclear whether the relationship between the deal and ΔROA(3) could be as strong as suggested by these results. One would expect that over three years more factors play a role in the development of the return on assets.

Another problem arises with the use of the proxy measured by the fitted values of the model (2); A joint-hypothesis problem. In this case, three hypotheses are simultaneously tested, whether: 1) ΔROA(3) is a reliable measure of post-acquisition performance 2) the fitted value of ΔROA(3) in model 4 is an appropriate proxy for a manager's expectation of the performance of an acquisition 3) the fitted ΔROA(3) value has a significant relationship to bid premia. Within the boundaries of this research, we can only reliably answer the third of these hypotheses, which is accepted. The first hypothesis is argued to be correct but flawed (Cording et al., 2010; Bruner et al., 2002); however, other measures of acquisitional performance are flawed and limited as well, as discussed in the literature review. The second of the three joint hypotheses is rather hard to confirm since a managerial expectation can differ from manager to manager with all kinds of company and personal traits. Some of these aspects are possible to map, such as firm size or managerial overconfidence; however, most aspects are latent and impossible to observe (e.g., a manager's expectation could be influenced by their current mood). Therefore a lacking proxy is inevitable.

Another limitation is the reliance on the measurement of whether a target is 'green' or not. While all text-search hits through zephyr are manually checked and therefore clear of any accidental results by misspecification of the search query, there exists the real possibility that

deals which should have been marked as ‘green’ are missed. The search query is not complete and does most likely not include all possibilities of environmental-related words (due to the wide variety of English, it is unlikely that someone could come up with all the possibilities). However, all obvious picks are included, and writers of deal rationale would likely use the apparent descriptions as well when describing a particular deal. This limitation is mitigated by combining the ASSET4 information with the text-search data.

Recommendations

From the results of this study, new questions arise. Determining what drives the outperformance of ‘green’ acquisitions over their non ‘green’ counterparts is an exciting avenue for future research. While prior literature suggests some reasons for better performance outlooks such as risk mitigation (Godfrey, 2009) or better company reputation (Fombrun et al., 2000), it does not determine which aspects of CSR investments have these positive effects. Future research into what drives the outperformance could be highly valuable for managers since this could result in a separation of CSR and environmental investments, which improves company value from those investments that do not. In extension, future research could also look into how to assess better whether a company or an investment is ‘green’ or not since the ASSET4 database is somewhat lacking, and a text-search tends to be incomplete by construction.

Another interesting avenue of future research is to directly ask the decision-makers within an M&A process what their viewing points and considerations are in regards to the bid premia, what do they think or reason to pay for, or get paid for. As discussed in the limitations, it is hard to construct the expectations of an (acquiring) manager; by directly asking them what their actual expectations are and what drives these expectations, this problem is reduced. While other problems arise with self-reported data, new insights could be created. This could help determine in more detail what drives acquisition premia and how managerial traits have an influence on those.

A point of view worth looking into could be to inspect how the ‘green’-ness of an acquiring company develops after acquiring a ‘green’ target. Since this paper determined that the premia are paid for performance considerations, it could be valuable to unravel whether this better performance over non ‘green’ targets is driven partly by how much of the ‘green’-ness is adopted by the acquiring company. Testing for whether the combined company is more ‘green’

several years after the acquisitions could also provide new insights into the more direct relationship between ‘green’-ness and performance.

Furthermore, research into the different returns for ‘environmental’ M&A deals, general ‘green’ equity returns, green mutual funds, and perhaps even environmentally focussed private equity or hedge funds, could prove to be interesting. As shown in the literature review, there exist differences in returns for different kinds of shareholders and investors with regards to CSR and environmental investments. As there is no obvious theoretical explanation for these differences, more research is required to clarify these findings.

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Appendix A1
Variable list

Variable	Symbol	Note
Winsorised rumored premium	Premium	Winsorized at the 5% and 95% level.
Winsorised announcement premium	wa_prem	Winsorized at the 5% and 95% level.
Zephyr environmental Text filter	envZephyr	See Appendix A2 for the query
ASSET4 Environmental pillar score	envASSET4	
ΔROA(2) acquirer	dA_roa2	
ΔROA(3) acquirer	ΔROA(3)	Winsorized at the 5% and 95% level
CAR[-1,2] announcement date	car	T=0 Announcement date
CAR[-1,2] rumoured date	rum_car	T=0 Rumoured date
Cross border acquisition	CrossBorder	
Natural logarithm of the deal value	lnDealvalue	
Year of the rumored date	Rum_year	
Year of the announcement date	year	
Year of the completion date	Comp_year	
Diversifying acquisition	diversifying	
Stock payment	stock	
Initial stake of the acquirer	inistake	
Blockholder acquirer	blockholder	Initial stake of the acquirer > 5%
Hostile takeover	hostile	
Acquired stake in the acquisition	acquiredstake	
Final stake after the acquisition	finalstake	
ASSET4 Governancel pillar score	govASSET4	Of the target in announcement year
ROA of the target	T_roa	In announcement year
ΔROA(min2) target	dT_roamin2	
Relative size	relsize	Targets total assets / acquirer total assets
Leverage ratio of the target	T_leverage	In announcement year
Liquidity ratio of the target	T_liquidity	In announcement year
R&D expenditures / Sales of the target	T_rd	In announcement year
Natural logarithm total assets target	lnT_TA	In announcement year
Natural logarithm total assets acquirer	lnA_TA	In announcement year
Natural logarithm net profit target	lnT_NP	In announcement year
Natural logarithm net profit acquirer	lnA_NP	In announcement year
Continent of the acquirer	continent	Manual constructed from country code
Major sector of the acquirer	sector	As defined by Bureau van Dijk

Appendix A2
Text filter Zephyr keywords (based on Salvi et al., 2018)
Within business description, deal comments, or deal rationale: anywords("green" , "alternative power" , "biomass" , "bioenergy" , "bio energy" , "energy storage" , "bio-energy" , "biofuel" , "fuel cell" , "hydrogen" , "photovoltaic" , "renewable energy" , "reusable energy" , "re-usable energy" , "solar" , "waste to energy" , "wind power" , "wind farm" , "wave power" , "geothermal" , "geothermal" , "hydropower" , "hydro-power" , "bio-diesel" , "biodiesel" , "bio diesel" , "energy resource management" , "electric vehicle" , "water purification" , "intelligent power" , "air quality" , "energy efficiency" , "thin-film energy" , "thin film energy" , "energy efficiency software" , "battery power" , "water treatment" , "waste management" , "biogas" , "anaerobic digestion" , "wastewater" , "green construction" , "green buildings" , "smart meter" , "smart grid" , "energy monitoring" , "marine energy" , "solar thermal" , "algae" , "green energy" , "cleantech" , "clean tech" , "environmental technology" , "greentech" , "charging station" , "green infrastructure" , "clean energy" , "tidal power" , "tidal energy" , "biodegradable" , "alternative fuel" , "environmental friendly" , "environmental CSR" , "environmental practices" , "environmental conscientious" , "biological" , "sustainable developments"

, "green future" , "waste reduction" , "ecological responsible" , "environmental responsible" , "environmentally responsible" , "carbon neutral" , "reforestation" , "recycling" , "zero carbon" , "emission neutral" , "renewable" , "preservation" , "preservation of nature" , "nature preservation" , "biodegradable" , "biological control" , "recirculate" , "recirculation" , "eco-friendly" , "eco friendly" , "emission reduction" , "ozone friendly" , "carbon footprint" , "carbon dioxide reduction" , "carbon dioxide emission" , "carbon dioxide neutral" , "carbon sink" , "clean coal technology" , "methane reduction" , "emission mitigation" , "reducing emissions" , "decarbonization" , "net zero carbon emissions" , "greenhouse gas neutral" , "greenhouse gas reduction" , "greenhouse gas limitation" , "greenhouse gas mitigation" , "climate neutrality" , "environment neutrality" , "polution control" , "polution reduction" , "polution-free" , "anti polution" , "emission control" , "polution prevention" , "polution-control" , "Carbon-neutral" , "smog reduction" , "smog control" , "greening")

Appendix A3
Sample distribution by continent & sector

	Continent						
Acquirer sector	NA	EU	AS	AF	SA	OC	Total
10	1	0	2	0	0	0	3
11	180	16	3	0	2	40	241
12	17	2	3	0	0	0	22
13	1	3	6	0	1	0	11
14	12	3	11	0	1	0	27
15	3	1	1	0	0	0	5
16	7	1	0	0	0	0	8
17	3	1	1	0	0	0	5
18	23	23	25	0	0	0	71
19	0	0	3	1	1	0	5
20	3	7	13	0	1	0	24
21	64	30	34	0	0	0	128
22	4	1	0	0	0	0	5
23	16	11	7	0	0	6	40
24	5	1	10	0	0	0	16
25	1	0	0	0	0	0	1
26	4	2	7	0	0	0	13
27	12	3	17	0	1	1	34
28	12	4	5	0	0	2	23
29	7	3	5	0	0	0	15
30	51	9	11	0	0	2	73
31	1	1	3	0	2	1	8
33	22	8	7	1	0	4	42
34	13	9	4	0	1	0	27
35	3	3	1	0	0	0	7
37	4	4	3	0	1	0	12
38	1	0	0	0	0	0	1
Total	470	146	182	2	11	56	867

Sectors are by Bureau van Dijk and are defined as followed; 10 is Agriculture, Horticulture & Livestock; 11 is Mining & Extractions; 12 is Utilities, 13 is construction; 14 is Food & Tabaco Manufacturing; 15 is Textiles & Clothing Manufacturing; 16 is Wood, Furniture & Paper manufacturing; 17 is Printing & Publishing; 18 is Chemicals, Petroleum, Rubber & Plastic; 19 is Leather, Stone, Clay & Glass products; 20 is Metals & Metal Products; 21 is Industrial, Electric & Electronic Machinery; 22 is Computer Hardware; 23 is Communications; 24 is Transport Manufacturing; 25 is Miscellaneous Manufacturing; 26 is Wholesale; 27 is Retail; 28 Transport, Freight & Storage; 29 is Travel, Personal & Leisure; 30 is Computer Software; 31 is Media & Broadcasting; 33 is Property Services; 24 is Business Services; 35 is Biotechnology & Life Sciences; 36 is Information Services; 37 is Public Administration; Education, Health Social Services; 38 Waste Management & Treatment. Continents are defined as; NA is North-America; EU is Europe; AS is Asia, AF is Africa, SA is South-America, and OC is Oceania.

Appendix A4

Summary statistics main variables by year

	Premium			envZephyr			ΔROA(3)			CAR[-1,1]		
	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD
2008	1	16.321		1	0		1	11.933		0		
2009	36	39.223	73.665	36	0	0	32	-1.369	10.823	32	0.159	4.821
2010	131	46.125	66.153	131	0.046	0.210	127	0.062	10.860	120	0.360	5.661
2011	135	38.760	39.040	135	0.074	0.263	125	-1.365	11.999	118	-1.065	6.591
2012	108	41.183	44.648	108	0.028	0.165	103	-0.215	18.675	100	-1.070	7.038
2013	109	39.632	43.198	109	0.055	0.229	102	0.912	11.715	96	.817	8.333
2014	126	35.813	43.461	126	0.063	0.245	120	-0.408	9.269	115	1.404	6.289
2015	140	41.422	39.057	140	0.071	0.258	133	-0.975	10.468	130	-.905	10.868
2016	81	47.045	54.185	81	0.062	0.242	69	-0.202	17.501	71	-.685	5.480
Total	867			867			812			782		
Mean		41.053	47.866		0.055	0.222		-0.394	12.444		-0.147	7.195

Premium is the rumor date bid premium winsorized on the 1% and 99% levels. envZephyr is a Binary value, taking the value 1 when the deal results from the specified Zephyr text search, 0 otherwise. ΔROA(3) is the difference between the ROA 3 years after the deal completion and in the year of the deal completion. CAR[-1,1] is the cumulative abnormal return on the [-1,1] window around the announcement date of the deal. Year is defined as the announcement year of the deal.

Appendix A5
Model (2) regression results using ΔROA(2) as dependent

	ΔROA(2)	ΔROA(4)
GREEN	0.049	5.901**
	(2.368)	(2.944)
CrossBorder	-0.394	-0.239
	(1.766)	(2.132)
Cross X env	3.090	-5.691
	(4.203)	(5.610)
diversifying	-1.028	
	(1.428)	
T_leverage	-0.808	
	(0.837)	
TROAmin1	0.095	0.014
	(0.063)	(0.091)
TROAmin2	-0.050	-0.037
	(0.039)	(0.048)
T_rd100	0.081	0.148
	(0.091)	(0.108)
lnDealvalue	0.072	
	(0.371)	
A_roa	-0.502***	-0.484***
	(0.117)	(0.140)
lnT_TA	0.340	
	(0.847)	
lnT_NP	-0.279	0.166
	(0.657)	(0.462)
_cons	-7.480	-14.582
	(10.099)	(9.645)
Obs.	135	124
R-squared	0.593	0.519
Adjusted R-squared	0.262	0.129
F	1.794	1.333
Country Effects	YES	YES
Industry Effects	YES	YES
Year Effects	YES	YES

ΔROA(t) is the change in ROA of the acquirer t years after deal completion. GREEN is a Binary value, taking the value 1 when the deal results from the specified Zephyr text search, or the target has an environmental pillar score of >50, 0 otherwise. CrossBorder takes the value 1 if the target country is not equal to the acquirer country. Cross X env is an interaction term of GREEN*CrossBorder. Diversifying is a binary value, which takes the value 1 if the target industry code is not equal to the acquirer industry code, 0 otherwise. T_leverage is the gearing ratio of the target, as measured by Orbis.TROAmin1 and TROAmin2 are the return on assets of the target, respectively, 1 and 2 years before the acquisition. T_rd100 is the R&D expenses divided by sales of the target times 100, as a percentage. lnDealvalue is the natural logarithm of the deal value in thousand euros. A_roa is the return on assets of the acquirer in the year of the deal. lnT_TA is the natural logarithm of the book assets of the target. lnT_NP is the natural logarithm of the net profit of the target in the year of the announcement. All variables are measured in the announcement year unless otherwise specified. Year effects are measured from the completion year. Significance levels are marked with stars; *, **, ***; 10%, 5% and 1% respectively.