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From greenwashing to green transformation: evidence from mergers and acquisitions

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Abstract

Purpose – We investigate greenwashing in the context of mergers and acquisitions (M&As). Specifically, we explore whether acquirers with a history of greenwashing strategically acquire targets with relatively higher Environmental, Social and Governance (ESG) ratings to further cloak their poor ESG credentials or embark on a legitimate green transformation ("go green"). The paper also examines the market's reaction to M&A deals.

Design/methodology/approach – We use an innovative ESG statistic to capture activities that deviate from a firm's stated ESG practices to study 489 M&A deals between 2006 and 2020. We examine market responses and analyze changes in acquirers' greenwashing behavior around the deal using regression models to test our hypotheses and identify a suitable instrumental variable to address potential endogeneity concerns. We further examine competing explanations for our results such as deal overvaluation and integration risks.

Findings – Our findings reveal that acquirers with higher levels of greenwashing acquire targets with higher ESG ratings. While the market initially reacts negatively to deals reflecting skepticism of the transaction, acquirers significantly reduce their greenwashing levels by one year after the deal, suggesting a legitimate green transformation.

Originality/value – We provide novel insights to both M&A and ESG literature by providing empirical evidence on how firms can leverage M&As to transform their ESG practices. It also highlights the market's perception of M&A deals and the potential for acquirers to improve their sustainability practices.

Keywords Mergers and acquisitions, ESG, Greenwashing, Sustainability, Announcement returns

Paper type Research article

1. Introduction

The benefits that firms derive from a focus on Environmental, Social and Governance (ESG) factors include increased reputation (Boone and Uysal, 2020), lower cost of capital (Fatemi *et al.*, 2015) and stronger stakeholder commitment (Arouri *et al.*, 2019; Deng *et al.*, 2013). To attract the financial benefits associated with improved ESG practices, firms face pressure from external stakeholders through channels such as social media campaigns (Du, 2015; Lyon and Montgomery, 2013) to address substandard ESG activities. Firms with poor ESG performance or that operate in ESG-sensitive industries are particularly exposed to such pressure. These firms are highly visible to the public and attract greater scrutiny from a variety of different stakeholders (Bowen, 2000; Marquis *et al.*, 2016).

While some firms make genuine efforts and progress to become more environmentally friendly, or greener, others engage in an activity known as "greenwashing" to mask poor

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environmental impacts. For example, a firm may make public statements to convey an image of strong environmental credentials but make no material changes to its underlying operations (Delmas and Burbano, 2011; Garrow and Valentine, 2012) or engage in actions that contradict their stated environmental objectives. Greenwashing may be especially severe amongst firms in ESG-sensitive sectors such as the chemical, oil and gas and mining industries.

One approach to respond to stakeholder pressure to address a firm's poor ESG practices is to acquire a firm with higher ESG metrics (Li *et al.*, 2020b). Acquirers that engage in mergers and acquisitions (M&As) with "green" target firms can access the target's ESG practices, leading to improved ESG practices (Pfeffer and Salancik, 1978). Such deals help the acquiring firm enhance its own sustainability practices while simultaneously satisfying stakeholders' ESG demands. A second motivation to acquire a firm with a higher ESG score is to maintain the illusion that the acquirer is "green." These acquisitions are not intended to integrate the target's ESG practices. The purpose of such deals is to convey an apparent signal of a green transformation to the market (Bryant *et al.*, 2020; Li *et al.*, 2020b).

An example of using M&A to transform a business is the acquisition of Burt's Bees by The Clorox Company (Clorox) in 2007 (Story, 2008). With increased pressure from customers for green products, bleach manufacturer Clorox paid close to $1 billion to acquire Burt's Bees, a green manufacturer of beeswax-related products. Clorox claimed that it was expecting to learn the environmental practices of Burt's Bees in an effort to make its own products eco-friendlier. Clorox's history of greenwashing prior to the deal caused skepticism, partially on account of vague reporting on its environmental programs (Conley, 2012; Story, 2008). However, following the merger, Clorox introduced a new range of cleaning products made from 99% natural ingredients, known as Green Works, leading to a substantial increase in its ESG rating.

In addition to media attention, greenwashing has also attracted a substantial body of academic research. Most greenwashing studies focus on environmental aspects (Du, 2015; Marquis *et al.*, 2016; Testa *et al.*, 2018; Walker and Wan, 2012). However, Lyon and Maxwell (2011) and Yu *et al.* (2020) contend that social and governance are also subject to greenwashing. Controversy is not restricted to environmentally motivated M&A deals. For example, in 2006, L'Oréal of France, a firm associated with animal testing of its cosmetics products, acquired Body Shop International, which is committed to no animal testing of its products [1]. In 2021, tobacco manufacturer Phillip Morris International Inc acquired Vectura Group plc, a British health care company [2]. These controversial deals highlight the emergence of social components in a broader greenwashing scope. Therefore, we examine all three ESG components to explore greenwashing in M&A deals.

Our measure of greenwashing is motivated by Seele and Gatti (2017). They suggest that greenwashing occurs when an external party, such as the media, accuses a company of acting in a manner that contradicts the information it publicly communicates to its external stakeholders. Identifying and measuring, greenwashing is possible through the controversy that arises from an allegation of ESG-wrongdoing. Consequently, we use the ESG controversies (ESGC) score from the Refinitiv ESG Database as a proxy for greenwashing. In contrast to ESG ratings that are based on a firm's stated ESG principles, the ESGC score also incorporates actions that are contrary to its publicly disclosed ESG commitments.

In this paper, we investigate whether M&A deals are used as a channel to improve ESG practices or used for further greenwashing. First, we examine whether greenwashing firms purchase targets with higher ESG ratings. Second, we investigate how the market reacts to such deal announcements. Third, we study the relationship between the pre-merger relative ESG performance of targets and acquirers' level of greenwashing post-merger. Examining both the short-term market reaction and the extent of greenwashing of the merged entity helps us answer the question of whether greenwashing acquirers legitimately transform their ESG practices or simply engage in further greenwashing through M&A deals.

While the short-term market reaction suggests these deals are greenwashing-motivated, over the longer one-year period following the deal, we document evidence of a legitimate green transformation. Firms with higher levels of greenwashing acquire targets with ESGC scores that are significantly larger than the acquirer's scores. Furthermore, acquirers' cumulative abnormal returns around the deal announcement dates are significantly more negative for firms with higher greenwashing scores. This result indicates that the market reacts negatively to the deal, and the negative response is more pronounced when the target firm has a higher ESGC rating. However, this initial skepticism over the stockholder value created through the transaction abates one year after the deal announcement. We find that the acquisition of a target with a higher relative ESGC score results in a significant reduction in the acquirers' greenwashing score following the deal. In further analysis, we rule out alternative explanations for our results. The negative announcement-period return cannot be explained by the acquirer overpaying for the target, and the propensity score matching method demonstrates that greenwashing firms exhibit significantly lower returns than their non-greenwashing counterparts, further supporting our hypotheses.

We make several important contributions. First, we find that acquirers with higher levels of greenwashing acquire targets with higher relative ESGC scores. We also provide evidence that these deals lead to lower greenwashing following the merger, confirming a green transformation. Our findings are consistent with both the resource dependence theory and the organizational learning theory (Pfeffer and Salancik, 1978), which suggests acquirers integrate a target's ESG practices. A decrease in the level of greenwashing by an acquirer after a merger enriches the benefits of green deals studied in previous literature. Li *et al.* (2020b) show that acquiring a highly sustainable target helps an acquirer improve its legitimacy, which is measured by greater access to resources, lower financial constraints and reduced tax liability. Green deals also boost acquirers' business model innovation and sustainability (Li *et al.*, 2020a).

Second, we shed light on how the market perceives deals that involve greenwashing acquirers and higher-rated ESG targets in the context of M&A's. Our finding of a negative market reaction to the deal is consistent with the attribution theory (Parguel *et al.*, 2011). Seele and Gatti (2017) contend that there is information asymmetry between acquirers and the market. Without information regarding the intention of acquirers, the market extrapolates acquirers' greenwashing history and responds negatively to the deal announcement. Our result complements Du (2015), who finds a negative market reaction when a firm is accused of greenwashing, with a more negative response for firms with higher ESGC scores. Previous studies find that the ESG ratings of acquirers and target firms have a positive impact on deal performance, including deal announcement returns, long-term buy-and-hold abnormal returns (Deng *et al.*, 2013) and accounting-based return measures (Tampakoudis and Anagnostopoulou, 2020). In contrast to using ESG ratings, we use ESGC scores to better proxy for greenwashing activity and find a negative relationship between target firms' ESGC score and deal announcement returns.

2. Greenwashing hypotheses

2.1 Defining greenwashing

Firms with responsible ESG practices that engage in environmentally transformative initiatives convey a signal of their genuine sustainability concerns to stakeholders (Torelli *et al.*, 2019). However, while firms may publicly claim to maintain responsible ESG credentials, they may engage in actions that are contrary to those claims in a practice known as greenwashing. Due to its multifaceted nature, there is no universally agreed definition of greenwashing. One definition relates greenwashing to selective disclosure. Delmas and Burbano (2011) and Marquis *et al.* (2016) define greenwashing as the act of misleading consumers regarding a firm's questionable environmental activities through positive communication.

Walker and Wan (2012) and Siano *et al.* (2017) contend that greenwashing occurs when a firm engages in "green talk." This language is merely a symbolic action designed to satisfy stakeholders' demands to address sustainability issues. In other words, firms fail to fulfil their commitments on environmental concerns in order to alleviate external public pressure on sustainability (Guo *et al.*, 2018). Seele and Gatti (2017) suggest that greenwashing should combine the two elements of falsity and accusation of misleading information. Without a third party accusing a firm of actions contrary to its stated ESG commitments, the greenwashing remains undetected. Following their approach, we define greenwashing as a firm's misleading behavior, which is alleged and publicly reported by external monitors such as the media or environmental organizations.

2.2 Hypothesis development

Li *et al.* (2020b) refer to green M&As as the acquisition of a green target, which has energy-saving or emission-reduction technologies, by an acquiring firm that is a heavy polluter. The purpose of these deals is to transform an acquirer's operations by obtaining access to the target's green resources and improving green practice (Lu, 2021). Therefore, a green deal may be characterized by a deal where a firm acquires a target with a higher level of "green" credentials. Nguyen *et al.* (2025) report evidence consistent with this description.

There are two views on the acquisition of a higher ESG-rated target by a greenwashing entity. On the one hand, the acquirer may not actually adopt the target's ESG practices but instead uses the M&A deal to mislead the market regarding its intentions. Wang *et al.* (2024) present evidence that firms conduct green M&As with targets located in areas with weaker environmental regulations for pollution transfer reasons. On the other hand, a greenwashing acquirer could legitimately transform its business for sustainability reasons by learning and adopting the target's ESG policies (Pfeffer and Salancik, 1978). Sun *et al.* (2025) find that firms with substandard sustainability practices are more likely to acquire green targets, driven by negative investor sentiment and intense media scrutiny. Such green deals help acquirers enhance green innovation, increase investment in environmental protection and disclosure (Lu *et al.*, 2023) and reduce carbon emissions (Yi *et al.*, 2024).

Both views suggest that acquirers with higher levels of greenwashing acquire targets with higher relative ESGC ratings. This type of transaction allows the acquirer to either further mask its greenwashing or represent a genuine strategy to "go green." Therefore, we propose the following hypothesis:

H1. An acquirer's level of greenwashing is positively related to the target firm's relative ESGC score.

Previous literature finds that greenwashing firms experience lower financial performance and a negative market reaction to M&As. For instance, Walker and Wan (2012) show that greenwashing firms have negative accounting return on assets. Greenwashing activities bear associated costs, such as higher perceived risks and environmental penalties and fines (Bansal and Clelland, 2004). In addition to accounting-based performance, greenwashing is negatively related to market-based measures of financial performance (e.g. TobinQ, Market-to-Book value) (Testa *et al.*, 2018). Furthermore, misleading communication regarding environmental performance negatively impacts a firm's intangible asset value (Konar and Cohen, 2001). Greenwashing firms exhibit lower cumulative abnormal returns (CARs) around greenwashing actions (Du, 2015). The negative market reactions are more pronounced when the levels of reputation and legitimacy attained from misleading communication are higher (Torelli *et al.*, 2019). In terms of M&A deals between firms with disparate ESG ratings, Aktas *et al.* (2011) find that acquisitions where the target has better sustainability performance are linked with higher cumulative abnormal returns, and Tampakoudis and Anagnostopoulou (2020) report that acquirers demonstrate improvements in ESG performance and market value after acquiring a target with a higher ESG rating.

We build on the argument of Seele and Gatti (2017) and theorize that because external stakeholders lack relevant information to infer the legitimacy of green acquisition by a greenwashing firm, investors infer that the firm's existing history of greenwashing will continue following the merger. To reflect skepticism of the deal's financial benefits, there is a negative market reaction to the deal's announcement. Formally, we propose the following hypothesis:

H2. An acquirer's level of greenwashing is negatively related to their cumulative abnormal returns (CAR) around M&A deal announcements.

Our third hypothesis is motivated by the resource dependence theory (Pfeffer and Salancik, 1978) and the organizational learning hypothesis (Aktas *et al.*, 2011) that posit an acquirer could decrease their level of greenwashing after a merger when acquiring targets with higher relative ESG ratings. By acquiring, learning and integrating a target's ESG practices, an acquirer not only improves their own sustainability practices but also reduces their greenwashing activities. Therefore, we propose that:

H3. A target firm's relative ESG performance is negatively related to the change in an acquirer's pre- and post-merger greenwashing.

3. Method

3.1 Sample construction

We obtain data on all international M&A deals from Thomson Securities Data Company (SDC) Platinum Mergers and Acquisitions Database and apply similar criteria to existing studies (Aktas *et al.*, 2011; Alexandridis *et al.*, 2013). Completed deals are announced between January 1, 2006 and December 31, 2020. Both acquirer and target are listed non-financial companies. That is, we exclude firms with Standard Industrial Classification (SIC) codes from 6,000 to 6,999. All deal values are at least US$1 million. We exclude spin-offs, recapitalizations, self-tenders, repurchases, minority stake purchases, acquisitions of remaining interest, exchange offers and privatizations. The acquirer must own less than 50% of the target firm's shares before the deal announcement and at least 50% after completing the deal. These criteria lead to an initial sample of 3,863 observations. Filtering firms with available ESGC scores and accounting data yields a final sample of 489 transactions. Appendix 1 presents the sample description.

3.2 Variable construction

3.2.1 Greenwashing measures. Various greenwashing measures are proposed in the literature. The peer-relative greenwashing measure of Yu *et al.* (2020) combines Bloomberg's ESG disclosure scores and ASSET4's ESG scores. This method addresses the issue of ESG rating disagreement due to a lack of a common framework for scoring ESG performance (Brandon *et al.*, 2021; Jacobs and Levy, 2022), but the calculation of their score suffers from several methodological problems (Lubloy *et al.*, 2025). Following the selective disclosure approach, Marquis *et al.* (2016) use the Trucost database to measure greenwashing. Trucost Plc (2008) states that it collects a firm's self-reported ESG data to examine the environmental impact of 464 business activities. However, it does not account for any accusations of a firm's ESG wrongdoing. Finally, Walker and Wan (2012) assess greenwashing via the substantive and symbolic actions published on a firm's website with a scoring ranging from 1 to 7. This approach is subjective and therefore difficult to replicate. Several studies use MSCI ESG scores to measure a firm's sustainability practice (Bae *et al.*, 2019; Bryant *et al.*, 2020; Giese *et al.*, 2019). However, a limitation of the MSCI ESG score is that it reflects a firm's stated ESG commitments and does not capture firms whose actions

are inconsistent with their claims leading to ESG scores that do not accurately measure the firm's activities.

Due to these limitations associated with extant greenwashing measures, we recognize the definition by Seele and Gatti (2017) and measure the level of greenwashing using the ESG controversies score provided by Refinitiv's ESG Database. The ESG controversies score quantifies a company's stated commitments against its actions by monitoring global media sources. The ESG controversies score assesses information related to 23 ESG controversies topics. A firm with zero controversies surrounding its operations is assigned a score of 100. The minimum score of zero is assigned to firms that are associated with extreme controversies. Refinitiv benchmarks the controversies scores within each industry to make the scores comparable across different firms. The scores also account for the bias due to larger firms attracting more media attention than smaller firms (Delmas and Burbano, 2011; Du, 2015; Lyon and Montgomery, 2013). Seele and Gatti (2017) highlight that, without market accusation, such behaviors of the firm are considered potential greenwashing. The controversies score is a signal that proxies for the significance and materiality of the impact of negative scandals on a firm's actual ESG performance. We then calculate the inverse of the controversies score to proxy an acquirer's level of greenwashing (AGW). The higher the inverse controversies score, the higher the level of greenwashing.

We define a target's relative ESGC score (TRESG) as the ratio of a target's ESGC score to that of a corresponding acquirer at the end of the year prior to the deal announcement as follows:

$$TRESG_{t-1} = \frac{\text{TargetESGC}_{t-1}}{AcquirerESGC_{t-1}}$$

We proxy an acquirer's level of greenwashing prior to the deal announcement ($AGWPRE\ or\ AGW_{t-1}$) by the inverse of the ESG controversies score in the year prior to the deal announcement. We also define the change in an acquirer's level of greenwashing pre- and post-merger (*AGWCHANGE*) as:

$$AGWCHANGE_{t+1} = \frac{\text{AGW}_{t+1}}{\text{AGW}_{t-1}} - 1$$

3.2.2 Announcement returns. Following Brown and Warner (1985), we use the market-adjusted model to calculate the cumulative abnormal return (CAR) to measure the market reaction to the M&A deal announcement. We examine a short event window to avoid debate regarding the appropriate risk adjustment method associated with longer event window analyses (Fuller *et al.*, 2002). The abnormal return (AR) is defined as the difference between the return on a firm's stock and the market:

$$AR_{i,t} = R_{i,t} - R_{m,t}$$

where $AR_{i,t}$ is the abnormal return of firm i on day t; $R_{i,t}$ is the return of firm i on day t; $R_{m,t}$ is the corresponding country market index return on day t.

We calculate the cumulative abnormal return (CAR) as follows:

$$CAR_i[m;\ n] = \sum_{t=m}^{n} AR_{i,t}$$

where $[m;n]$ is the event period from m days before to n days after the deal announcement date. We examine three-day and five-day windows around the announcement date. Stock returns and the corresponding country market index returns are obtained from Refinitiv and Bloomberg, respectively. We also employ the market model to measure CARs as a robustness test [3].

3.2.3 M&A deal variables. Our choice of firm-specific variables is motivated by the M&A literature. We gather data on market capitalization (MKCAP), total assets (ASSETS), market-to-book ratio (MTB), leverage (LEV) and Return-on-Equity (ROE) of both acquirers and target firms. Deal characteristics include deal size (DSIZE), deal diversification (DDIV), cross-border deals (DCROSS), deals with multiple bidders (DMUL), cash-offer deals (DCASH) and stock-offer deals (DSTOCK). We exclude the deal attitude as the sample includes all friendly deals. We collect data on board size (BSIZE), percentage of institutional ownership (INSTOWN) and percentage of independent directors on the Board (IDIR) based on the Ghitti *et al.* (2020) and Yu *et al.* (2020). All variables are measured at the end of the fiscal year prior to the deal announcement date. Data are obtained from Refinitiv, and definitions are provided in Appendix 2.

3.3 Summary statistics

Table 1 presents sample descriptive statistics. The acquirers' level of greenwashing (AGWPRE) has an average of 0.026 with a standard deviation of 0.063. This relatively low average indicates that the acquirers are involved in a relatively high level of greenwashing before the deal, due to the way ESG controversy scores are defined. Acquirers' average change in greenwashing (AGWCHANGE) is 38.9%. The mean of the target firm's relative ESGC scores (TRESG) is 0.84. Acquirers' cumulative abnormal returns are 1.5% across both the three and five-day window centered on the deal announcement date (ACAR[−1; +1] and ACAR[−2; +2]).

All acquisitions are friendly transactions. Deal-related statistics show that approximately 30% (DDIV = 0.323) of the deals involve an acquirer and target firm from different two-digit

Table 1. Sample description

Variable	Observations	Mean	Std. dev	Min	Max
AASSETS	489	23.084	1.670	19.045	26.416
ABSIZE	489	10.943	2.588	4	18
ACAR[−1; +1]	344	0.015	0.115	−0.211	0.361
ACAR[−2; +2]	323	0.015	0.122	−0.206	0.434
AGWCHANGE	489	0.389	1.446	−0.900	8.000
AGWPRE	489	0.026	0.063	0.010	0.540
AIDIR	489	0.739	0.189	0.188	1
AINST	489	0.809	0.095	0.425	1
ALEV	489	0.562	0.193	0.108	1.112
AMKCAP	489	23.089	1.670	18.831	26.482
AMTB	489	3.457	4.772	−10.691	30.291
AROE	489	0.173	0.236	−0.932	1.136
DCASH	489	0.061	0.240	0	1
DCROSS	489	0.342	0.475	0	1
DDIV	489	0.323	0.468	0	1
DMUL	489	0.070	0.255	0	1
DSIZE	489	7.953	1.444	3.797	11.282
DSTOCK	489	0.008	0.090	0	1
TASSETS	489	21.621	1.560	18.165	25.004
TLEV	489	0.278	0.186	0	0.916
TMKCAP	489	22.002	1.744	17.928	27.757
TMTB	489	3.668	6.241	−11.615	46.513
TRESG	489	0.840	0.544	0.070	3.166
TROE	489	0.043	0.441	−2.354	2.118

Note(s): This table presents the descriptive statistics of the sample of completed M&A deals from 2006 to 2020. Appendix 2 provides definitions of all variables

SIC industries. Only 34.2% of deals (DCROSS) are undertaken across borders with only 7% of deals (DMUL) involving more than one bidder, indicating these transactions involve relatively low levels of deal competition. In terms of payment method 6.1% of deals are cash (DCASH) and less than 1% are stock-only (DSTOCK), with the remaining deals financed using a combination of cash and stock.

Acquirers are larger in terms of market capitalization (AMKCAP) and total assets (AASSETS), on average, compared to target firms (TMKCAP and TASSETS, respectively). Acquiring firms' profitability (AROE = 17.3%) is higher than that of the target firms (TROE = 4.3%). In addition, institutional investors own 80.9% (AINST) of the acquiring firm, and 73.9% of their boards include independent directors.

4. Greenwashing and target ESGC scores

We estimate the following model to explore the relationship between an acquirer's level of greenwashing and a target's relative ESGC score:

$$TRESG_{i,t-1} = \alpha_0 + \alpha_1 AGWPRE_{i,t-1} + \alpha_2 \sum Controls_{Acquirer,i,t-1} + \alpha_3 \sum Controls_{Target,i,t-1} + \gamma + \delta + \epsilon \quad (1)$$

where i is a deal; t is the year of deal announcement; $\sum Controls_{Acquirer,t-1}$ is a set of control variables related to acquirers' characteristics; and $\sum Controls_{Target,t-1}$ is a set of control variables related to targets' characteristics [4]. Control variables related to acquirers and targets are lagged by one year prior to the deal announcement. γ is the year fixed effect; δ represents acquirer and target industry fixed effects; and ε is the error term.

We include year fixed effects to remove time-varying unobserved heterogeneity. We account for acquirer and target industry fixed effects to eliminate other invariant unobserved heterogeneity across industries. We argue that acquirers' levels of greenwashing tend to be correlated within a country due to the impact of the corruption level in that country Ioannou and Serafeim (2012). Therefore, we cluster the standard errors in Equation (1) at the acquirer country level to account for this potential correlation.

Column (1) of Table 2 reveals the coefficient of AGWPRE is 1.227 and statistically significant, confirming that acquirers with higher levels of greenwashing purchase targets with a higher relative ESGC score. A one standard deviation increase in the acquirer's greenwashing score is associated with a higher relative ESGC score of $0.063 \times 1.227 = 0.08\%$ points. The positive relationship between an acquirer's measure of greenwashing and the target's ESGC score is consistent with Hypothesis 1.

We acknowledge that AGWPRE is potentially endogenous, as several factors may drive its variation. For example, corporate culture (Walker and Wan, 2012), Twitter presence (Lyon and Montgomery, 2013) and regulatory pressure (Bowen, 2000; Walker and Wan, 2012) impact a firm's level of greenwashing. We address the endogeneity concern by employing an instrumental variable and using Two-Stage Least Squares (2SLS) to estimate Equation (1). We employ a country's absence of corruption index (CORRUPT) as an instrumental variable for AGWPRE (Ioannou and Serafeim, 2012; Yu *et al.*, 2020). Ioannou and Serafeim (2012) state that firms in a country with a high level of corruption are more likely to engage in unethical practices to reduce their costs, increase market share and retain their competitiveness. The rewards for ethical behavior in such countries are low, as the government is less likely to provide financial incentives for firms to be socially responsible. Following Yu *et al.* (2020), we proxy a country's absence of corruption using Transparency International's Corruption Perception Index. The index ranges from zero (a highly corrupt country) to 100 (a country with zero corruption).

Confirming that our instrumental variable is relevant, the first-stage regression results reported in Column (2) of Table 2 indicate the coefficient of CORRUPT is −0.006, and highly

Table 2. Relationship between an acquirer's greenwashing score and a target's ESGC score

	OLS (1) TRESG	2SLS First stage (2) AGWPRE	Second stage (3) TRESG
AGWPRE	1.227***		2.589***
	(4.28)		(4.69)
CORRUPT		−0.006***	
		(−3.53)	
Constant	1.819***	0.398***	1.770***
	(6.15)	(2.68)	(5.11)
Acquirer characteristics	Yes	Yes	Yes
Target characteristics	Yes	Yes	Yes
Acquirer Industry FE	Yes	Yes	Yes
Target Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
F statistic		17,139	
Obs.	467	489	489
Adj. R^2	0.227	0.384	0.374

Note(s): This table presents the relationship between an acquirer's greenwashing level and a target's relative ESGC score. Column (1) reports the OLS estimate of Equation (1). Columns (2) and (3) show the first and second stages of the 2SLS estimate, respectively. Control variables include characteristics of acquirers (AMKCAP, AASSETS, ALEV, AMTB, AROE) and of targets (TMKCAP, TASSETS, TLEV, TMTB, TROE). Appendix 2 provides definitions of all variables. *t*-statistics reported in parentheses are calculated using standard errors adjusted for heteroskedasticity and acquirer country clustering. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively

significant. The result supports the findings of Ioannou and Serafeim (2012) and Yu *et al.* (2020) that firms located in a country with a low level of corruption are less likely to engage in greenwashing. The second-stage regression estimates in Column (3) reveal a coefficient on AGWPRE of 2.589 that is approximately twice the magnitude of the coefficient estimated using OLS in Column (1). Thus, after addressing endogeneity, the level of greenwashing remains positively related to the target's ESGC score.

The finding regarding the behavior of a greenwashing acquirer is consistent with the two views explaining the behavior in a green deal. Acquiring a target with a higher ESGC rating conveys a misleading signal to the market regarding its green transformation (Berrone *et al.*, 2015; Delmas and Burbano, 2011; Lyon and Montgomery, 2013). In contrast, transforming ESG performance could also be a motive for a greenwashing acquirer (Li *et al.*, 2020a) through the acquisition of a target with superior sustainability policies.

5. Market's response to deal announcements

5.1 Cumulative abnormal returns

Table 3 presents the acquirer's abnormal return around the deal announcement, for the full sample and subsamples of acquirers based on the level of greenwashing. The mean three-day return, ACAR[−1; +1], is 1.5% for the full sample. Partitioning the sample by the level of greenwashing reveals that acquirers with lower greenwashing scores exhibit announcement-period returns of 8.2% compared to a return of −10.1% for firms with higher values of AGWPRE, with the difference of −18.3% being statistically significant. The negative reaction to the announcement of deals by high greenwashing acquirers compared to acquirers with low greenwashing levels lends prima facie support to the hypothesis that the market is skeptical of the merit of mergers announced by firms associated with levels of greenwashing.

Table 3. Abnormal returns around deal announcements

	Full sample (N = 344)		(A) Subsample of acquirers with high AGWPRE: (N = 126)		(B) Subsample of acquirers with low AGWPRE: (N = 218)		Test of difference (A) – (B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
ACAR[−1; +1]	0.015	0.028	−0.101	−0.101	0.082	0.088	−0.183***	−0.189***

Note(s): This table presents the acquirers' cumulative abnormal returns (ACAR) from one day before to one day after the deal announcement date. ACAR is measured using the market-adjusted model. Acquirers with AGWPRE greater than the median AGWPRE value are categorized as high AGWPRE, and the remainder are classified as low AGWPRE. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively

5.2 Multivariate analysis

We build on the univariate results in the previous section and further explore the relationship between greenwashing scores and abnormal returns in a multivariate setting by estimating the following baseline regression model:

$$ACAR[m;\ n]_i = \alpha_0 + \alpha_1 AGWPRE_{i,t-1} + \alpha_2 \sum Controls_{Deal,i} + \alpha_3 \sum Controls_{Acquirer,i,t-1} + \alpha_4 \sum Controls_{Target,i,t-1} + \gamma + \delta + \varepsilon \quad (2)$$

Consistent with the M&A literature, we control for a set of variables related to deal characteristics ($\sum Controls_{Deal}$) in addition to acquirer and target characteristics in Equation (2) and present the estimation results in Table 4.

We find that the acquirer's three-day return, centered on the deal announcement date, is lower when its level of greenwashing is higher. Column (1) in Table 4 reports the influence of AGWPRE on ACAR[−1; +1]. The relationship between AGWPRE and ACAR[−1; +1] is significantly negative −0.108. In terms of the economic magnitude, an acquirer with a one standard deviation higher level of greenwashing exhibits abnormal returns that are approximately 0.7% points lower. This negative relationship remains using the 2SLS approach reported in Column (3). The coefficient of AGWPRE is −0.284 and remains strongly significant.

The effect of AGWPRE on ACAR[−2; +2] exhibits a similar effect as for the shorter three-day event window. As reported in Column (4) in Table 4, the coefficient of AGWPRE is −0.071 and is significant at the 10% level. The 2SLS estimate in Column (5) is consistent with the OLS estimate [5]. Therefore, these results support Hypothesis 2.

Our evidence that the market reacts negatively to the deal announcement is consistent with the attribution theory of Parguel *et al.* (2011). Information asymmetry between a firm and investors makes it difficult to assess if any green claims are misleading (Seele and Gatti, 2017). Therefore, market participants incorporate the acquirer's greenwashing behavior to assess the value of a deal. The market reaction we observe is consistent with Du (2015), who finds that the market responds negatively to a firm's greenwashing practice when the firm is publicly accused of greenwashing.

5.3 Role of the target's ESGC score

We further investigate how the impact of AGWPRE on abnormal returns varies in accordance with the target's relative ESGC score. We create a dummy variable, HighTRESG, to indicate the level of TRESG. If a target's relative ESGC score is equal or higher than the median value of the entire sample, we classify it as "High" and record "1" and "0" otherwise. We calculate

Table 4. Greenwashing and abnormal returns around deal announcements

	OLS (1) ACAR [−1; +1]	2SLS First stage (2) AGWPRE	Second stage (3) ACAR [−1; +1]	OLS (4) ACAR [−2; +2]	2SLS Second stage (5) ACAR [−2; +2]
AGWPRE	−0.108**		−0.284**	−0.071*	−0.319**
	(−2.72)		(−2.28)	(−2.04)	(−2.32)
CORRUPT		−0.006***			
		(−3.06)			
Constant	0.514***	0.274*	0.282***	0.727***	0.515***
	(7.02)	(1.69)	(3.11)	(6.72)	(4.53)
Deal characteristics	Yes	Yes	Yes	Yes	Yes
Acquirer characteristics	Yes	Yes	Yes	Yes	Yes
Target characteristics	Yes	Yes	Yes	Yes	Yes
Acquirer Industry FE	Yes	Yes	Yes	Yes	Yes
Target Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
F statistics		24,093			
Obs.	324	344	344	301	323
Adj. R^2	0.274	0.371	0.259	0.304	0.269

Note(s): This table shows the relationship between abnormal return around the deal announcement date and acquirer greenwashing score. Column (1) and Column (4) present the OLS estimate from the regression of an acquirer's cumulative abnormal return 3 and 5 days around the deal announcement date on the acquirer's greenwashing score, respectively. Column (2) shows the first stage of the 2SLS estimate from that regression, while Columns (3) and (5) exhibit the second stages. ACAR is measured by the market-adjusted model. Control variables include characteristics of deals (DSIZE, DDIV, DCROSS, DMUL, DCASH, DSTOCK), acquirers (AMKCAP, AASSETS, ALEV, AMTB, AROE) and of targets (TMKCAP, TASSETS, TLEV, TMTB, TROE). Appendix 2 provides definitions of all variables. *t*-statistics reported in parentheses are calculated using standard errors adjusted for heteroskedasticity and target country clustering. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively

the interaction between AGWPRE and HighTRESG to explore the moderating effect of HighTRESG on the relationship between the two variables.

We find that the impact of an acquirer's level of greenwashing on the market's reaction to the deal is more pronounced when acquiring a target with a high ESGC score. Column (1) in Table 5 reports that the coefficient of AGWPR × HighTRESG is −0.156, and significant. As reported in Column (2), the coefficient is smaller in magnitude but remains highly significant when the CAR window length is extended from three days to five days.

5.4 Alternative explanations

5.4.1 Target overpayment. Overpaying for a target firm may explain the market's negative reaction to a deal (Baker *et al.*, 2012). Baker *et al.* (2012) find that the offer prices are significantly influenced by the most recent 52-week high of the targets. Using the target's 52-week high as an instrumental variable for the offer premium, they show that the market perceives that a higher difference between a target's pre-takeover stock price and its 52-week-high reflects a higher potential for overpayment, with the market exhibiting a negative reaction to the deal announcement.

Therefore, we follow the methodology of Baker *et al.* (2012) and measure the overpayment potential and investigate whether it explains the market's negative response that we observe. The offer premium (OFFERPREM) is defined as the percentage difference from the target's stock price 30 days prior to the deal announcement. The 52-week high of a target is its highest price over a 335-day period ending 30 days prior to the announcement date. The 52-week high

Table 5. Moderating effect of the target's ESG rating

	(1) ACAR [−1; +1]	(2) ACAR [−2; +2]
AGWPRE*HighTRESG	−0.156***	−0.115***
	(−7.33)	(−5.13)
AGWPRE	−0.052*	−0.029
	(−2.05)	(−1.41)
HighTRESG	−0.011	−0.006
	(−1.17)	(−0.49)
Constant	0.516***	0.729***
	(7.43)	(6.66)
Deal characteristics	YES	YES
Acquirer characteristics	YES	YES
Target characteristics	YES	YES
Acquirer Industry FE	YES	YES
Target Industry FE	YES	YES
Year FE	YES	YES
Obs.	324	301
Adj. R^2	0.284	0.306

Note(s): This table presents the impact of an acquirer's greenwashing on the cumulative abnormal return around the deal announcement date according to the target's relative ESGC score. HighTRESG is a dummy variable that equals one (or "high') if a target's relative ESGC score is greater than the median ESGC score and zero otherwise. Columns (1) and (2) show the moderating effect of HighTRESG on the relationship between AGWPRE and abnormal returns for different length event windows. Control variables include characteristics of deals (DSIZE, DDIV, DCROSS, DMUL, DCASH, DSTOCK), acquirers (AMKCAP, AASSETS, ALEV, AMTB, AROE) and of targets (TMKCAP, TASSETS, TLEV, TMTB, TROE). Appendix 2 provides definitions of all variables. *t*-statistics reported in parentheses are calculated using standard errors adjusted for heteroskedasticity and target country clustering. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively

is then expressed as a percentage difference from the respective target's market price 30 days prior to the deal announcement (T52WKHI).

Column (1) in Table 6 presents the regressions of OFFERPREM on T52WKHI. Consistent with Baker *et al.* (2012), the coefficient of T52WKHI is positive and significant, suggesting that acquirers use the targets' 52-week highs as a reference point to determine the offer price. Columns (2) and (3) demonstrate how the overpayment potential influences the abnormal return across a three-day and five-day window around the deal announcement date, and Columns (4) and (5) report the results using the market model to measure abnormal returns. The coefficients of T52WKHI across four regressions are negative but insignificant. Therefore, we discount the possibility that the market's negative response is explained by the overpayment potential.

5.4.2 Placebo test. To confirm that the perception of further greenwashing toward such deals drives the market's negative reaction, we apply the propensity score matching (PSM) method. We define a categorical variable TREATMENT indicating two groups of deals: treatment (recorded as 1) and control (recorded as 0). The treatment (control) group includes deals with acquirers having (not having) ESG scores and ESG controversies scores available pre-merger, respectively. We then estimate the propensity scores using a logistic regression model, where TREATMENT is regressed on the set of control variables mentioned above. We match each treated deal with one control deal based on the similarity of their propensity scores, using nearest-neighbor matching with a caliper of 0.05 to ensure quality matches. This step yields 300 matched pairs of deals. Table 7 shows that ACAR around the announcement dates

Table 6. Abnormal returns and potential overpayment

	(1)	Market-adjusted model (2) ACAR	(3) ACAR	Market model (4) ACAR	(5) ACAR
	OFFERPREM	[−1; +1]	[−2; +2]	[−1; +1]	[−2; +2]
T52WKHI	0.156***	−0.003	−0.008	−0.003	−0.006
	(9.76)	(−0.38)	(−0.64)	(−0.41)	(−0.52)
Constant	1.078***	0.532***	0.732***	0.447***	0.726***
	(38.32)	(7.19)	(7.08)	(7.18)	(6.53)
Deal characteristics	Yes	Yes	Yes	Yes	Yes
Acquirer characteristics	Yes	Yes	Yes	Yes	Yes
Target characteristics	Yes	Yes	Yes	Yes	Yes
Acquirer Industry FE	Yes	Yes	Yes	Yes	Yes
Target Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Obs.	489	324	301	324	301
Adj. R^2	0.162	0.271	0.305	0.257	0.284

Note(s): This table presents results of regressing the target's 52-week-high stock price on the offer premium. OFFERPREM is the offer price shown as a percentage difference from the respective target's market price 30 days prior to the deal announcement. T52WKHI is the target's 52-week high – the highest price over 335-day period ending 30 days prior to the announcement date. The 52-week high is expressed as a percentage difference from the respective target's market price 30 days prior to the deal announcement. Column (1) shows the regression of OFFERPREM on T52WKHI. Columns (2) and (3) present the regressions of ACAR[−1; +1] and ACAR[−2; +2], estimated by the market-adjusted model, on T52WKHI, respectively. Columns (4) and (5) display the regressions of ACAR[−1; +1] and ACAR[−2; +2], estimated by the market model, on T52WKHI, respectively. Control variables include characteristics of deals (DSIZE, DDIV, DCROSS, DMUL, DCASH, DSTOCK), acquirers (AMKCAP, AASSETS, ALEV, AMTB, AROE) and of targets (TMKCAP, TASSETS, TLEV, TMTB, TROE). Appendix 2 provides definitions of all variables. *t*-statistics are reported in parentheses. *** denotes statistical significance at 1% level

Table 7. Average treatment effect using propensity score matching

Average treatment effect	Market-adjusted model (1) ACAR[−1; +1]	(2) ACAR[−2; +2]	Market model (3) ACAR[−1; +1]	(4) ACAR[−2; +2]
TREATMENT (1 vs 0)	−0.032***	−0.045***	−0.018***	−0.023***
	(−6.76)	(−7.18)	(−16.5)	(−12.75)

Note(s): This table presents the average treatment effect of TREATMENT on ACAR by regressing acquirers' cumulative abnormal return around the deal announcement dates on TREATMENT and a set of control variables. The treatment (control) group includes deals with acquirers (not) having ESG scores and ESG controversies scores available pre-merger respectively. The treatment group is recorded as 1, and 0 otherwise. Columns (1) and (2) show the regression results with an acquirer's cummulative abnormal return 3 and 5 days around the deal announcement date, respectively, using the market-adjusted model. Columns (3) and (4) show the regression results with an acquirer's cumulative abnormal return 3 and 5 days around the deal announcement date, respectively, using the market model. Control variables include characteristics of deals (DSIZE, DDIV, DCROSS, DMUL, DCASH, DSTOCK), acquirers (AMKCAP, AASSETS, ALEV, AMTB, AROE) and of targets (TMKCAP, TASSETS, TLEV, TMTB, TROE). Appendix 2 provides definitions of all variables. z-statistics reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively

of the treated group is statistically significantly lower than that of the control group. This analysis confirms that, all else being equal, the market's negative response is driven by the acquirer's level of greenwashing prior to the merger instead of other variables.

6. Changes in greenwashing

We examine the variation in greenwashing around M&A deals by estimating the following model:

$$AGWCHANGE_{i,t+1} = \alpha_0 + \alpha_1 TRESG_{i,t-1} + \alpha_2 \sum Controls_{Deal,i} + \alpha_3 \sum Controls_{Acquirer,i,t-1} + \alpha_4 \sum Controls_{Target,i,t-1} + \gamma + \delta + \varepsilon \quad (3)$$

The legal origin of a particular country may influence a firm's ESG performance in that country (Kim *et al.*, 2017), so we cluster the standard errors in Equation (3) at the target country level.

OLS estimates show that acquiring a higher ESGC target reduces an acquirer's greenwashing level post-merger. Column (1) in Table 8 reports that TRESG has a negative and significant impact on AGWCHANGE with a coefficient of −0.346. When acquiring a target with one standard deviation higher in a relative ESGC score, an acquirer lowers its level of greenwashing by 0.346% points. These results support Hypothesis 3.

The measurement error of TRESG in Equation (3.3) is a potential source of endogeneity. Several factors determine a firm's ESG scores, such as the ESG scores in previous years (Bae *et al.*, 2019), religion rank of a firm's location of its headquarters (Deng *et al.*, 2013), and the state where its headquarters is located (Rubin, 2008). We address such a potential issue by using an instrumental variable for TRESG and the 2SLS to estimate Equation (3.3).

Following Kim *et al.* (2017), we account for the legal origins (LEGAL) of the countries in which the targets are located as an instrumental variable for TRESG. Most countries follow one of two primary legal systems: civil law or common law. Compared to common law, civil

Table 8. Target's ESGC score and an acquirer's change in greenwashing around M&A deals

	OLS (1) AGWCHANGE	2SLS (2) TRESG	(3) AGWCHANGE
TRESG	−0.346**		−0.052*
	(−2.48)		(−1.70)
LEGAL		0.700***	
		(5.45)	
Constant	−2.431	1.856***	−4.085**
	(−1.35)	(3.34)	(−2.10)
Deal characteristics	Yes	Yes	Yes
Acquirer characteristics	Yes	Yes	Yes
Target characteristics	Yes	Yes	Yes
Acquirer Industry FE	Yes	Yes	Yes
Target Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
F statistics		3,521	
Obs.	478	489	489
Adj. R^2	0.112	0.430	0.237

Note(s): This table shows the impact of a target's relative ESGC score (TRESG) on the change in an acquirer's ESG score (AGWCHANGE) around the deal. Column (1) reports the OLS estimate. Columns (2) and (3) show the first and second stages of the 2SLS estimate, respectively. Control variables include characteristics of deals (DSIZE, DDIV, DCROSS, DMUL, DCASH, DSTOCK), acquirers (AMKCAP, AASSETS, ALEV, AMTB, AROE, ABSIZE, AINST, AIDIR) and targets (TMKCAP, TASSETS, TLEV, TMTB, TROE). Appendix 2 provides definitions of all variables. *t*-statistics reported in parentheses are calculated using standard errors adjusted for heteroskedasticity and target country clustering. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively

law is characterized by a more concentrated ownership structure, which has a high level of managerial shareholding. It motivates managers to focus on long-term investments and performance. The civil law system focuses on maximizing stakeholder value, while the common law regime emphasizes shareholders' wealth and the protection of investor rights (Porta *et al.*, 1998). For this reason, civil-law-based firms tend to have a greater focus on socially responsible investment than those located in common-law-countries, thereby leading to higher ESG ratings (Kim *et al.*, 2017). Therefore, LEGAL theoretically satisfies the relevance condition of a good instrumental variable. There is no reason to believe that the targets' legal origins have a direct impact on the acquirers' ESG ratings rather than an indirect effect via the targets' ESG performance thereby satisfying the exclusion restriction. LEGAL assumes a value of one if the target firm is in a civil law country and zero in a common law country [6].

Our results are reinforced by the 2SLS estimate reported in Columns (2) and (3) of Table 8. Column (2) shows the first-stage regression with LEGAL as an instrumental variable for TRESG. The legal origin of a target firm's country has a positive and significant relationship with its relative ESGC rating, with a significant coefficient of 0.7. This result is consistent with Kim *et al.* (2017), who report that civil-law-based firms tend to have higher ESG scores than those located in common-law-countries. The large F-value indicates our instrumental variable, LEGAL, is sufficiently relevant. The second stage estimation results in Column (3) support the negative effect of TRESG on AGWCHANGE, with a significant coefficient of −0.052.

This finding is in line with the view that greenwashing acquirers embark on ESG transformations (Li *et al.*, 2020a, b). After successfully integrating a target's ESG practices, a greenwashing acquirer improves its ESG performance and reduces greenwashing activities. Accused by external stakeholders, greenwashing behaviors bear costs to a greenwashing firm, such as lower signal reliability, legitimacy and firm financial performance. Therefore, green M&A deals could enable greenwashing firms the opportunity to sustain their businesses, despite the inherent costs of high ESG standards and the fact that ESG-related benefits take time to realize.

Overall, acquiring a green target helps a greenwashing acquirer transform its ESG practices, but the market initially distrusts the company's intention of going green. These findings confirm the green transformation of a greenwashing acquirer with a decrease in its level of greenwashing following the merger. This finding is consistent with Nguyen *et al.* (2025), who find that acquiring a target with higher relative ESGC ratings enhances an acquirer's post-merger ESG performance. It confirms the green transformation of a greenwashing acquirer when involved in a deal with a firm with superior ESG practices, even if the market is initially skeptical due to the acquirer's existing greenwashing.

7. Conclusion

We find that greenwashing acquirers genuinely transform their sustainability practices by acquiring firms with better ESG practices. After eliminating the hypothesis that the acquirer is overpaying for the target, the negative return around the deal announcement suggests that the market perceives the M&A transaction as being motivated as a means for the acquirer to further greenwash to mask poor environmental practices. However, acquirers exhibit a reduction in greenwashing following the deal, thereby suggesting that the acquirer incorporates the target's environmental credentials and transforms its own operations.

There are several practical implications of these results. First, acquiring a higher ESG-rated firm is a strategic solution for firms to reduce greenwashing and transform ESG practice. Regulators could refer to this finding to guide firms that engage in greenwashing to improve their sustainability practices. Second, when transforming ESG practices through green M&A deals, the managers of acquiring firms should focus on communicating deal motives and the up-to-date integration process to the market. The market uses the acquirer's past greenwashing behavior to interpret the signal, so evidence is necessary to overcome their reputation for

greenwashing. Clear, detailed and informative communication, particularly around the planned adoption of ESG practices, may help to compensate for the firm's tarnished reputation and may lessen the market's negative response around the deal announcement date. Third, understanding how the market reacts to such deals provides investors with a reference for making investment decisions related to these deals.

Further research could explore which factors drive the ESG-related integration process of an acquirer and impact the acquirer's overall ESG practices. These factors could provide a comprehensive framework regarding the details required to implement a green acquisition as an ESG transformation channel.

Appendix 1

Table A1. Sample distribution by deal announcement year

Year	# Deals	# Cross-border deals	# Cross-industry deals
2006	5	4	1
2007	7	4	1
2008	15	3	6
2009	16	5	6
2010	21	10	8
2011	29	10	5
2012	27	10	11
2013	16	4	7
2014	39	12	12
2015	47	16	14
2016	52	22	20
2017	51	19	21
2018	67	22	21
2019	64	22	15
2020	33	9	10
Total	489	172	158

Note(s): This table partitions M&A deals by calendar year. The second column reports the number of deals. The third column shows the number of cross-border deals, in which acquirers' and targets' nations are different. The fourth column contains the number of cross-industry deals, in which acquirers' and targets' industries are different

Appendix 2

Table A2. Variable definitions

Variable	Abbreviation	Definition
Deal size	DSIZE	Natural logarithm of total deal value in US dollars
Deal diversification	DDIV	1 if the 2-digit-SIC industries of the target and the acquirer are different, 0 otherwise
Cross-border deal	DCROSS	1 if the nations of the target and the acquirer are different, 0 otherwise
Multiple bidder deal	DMUL	1 if the deal involves more than one bidder, 0 otherwise

(*continued*)

Table A2. Continued

Variable	Abbreviation	Definition
Cash-offer deal	DCASH	1 if the deal is 100% cash, 0 otherwise
Stock-offer deal	DSTOCK	1 if the deal is 100% stock, 0 otherwise
Acquirer's market capitalization	AMKCAP	Natural logarithm of an acquirer's total market capitalization at the end of the year prior to the deal announcement
Acquirer's extent of greenwashing pre-merger	AGWPRE	The inverse of the Refinitiv ESG controversies score at the end of the year prior to the deal announcement
Acquirer's change in the extent of greenwashing post-merger	AGWCHANGE	The percentage of change in an acquirer's inverse ESG controversies scores from one year before to one year after the deal announcement
Acquirer's cumulative abnormal return	ACAR	*First*, we employ two models to calculate the abnormal returnAR. • Market-adjusted model: $AR_{i,t} = R_{i,t} - R_{m,t}$. $R_{i,t}$ is the stock's daily return and $R_{m,t}$ is the country market index return. • Market model: $AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t})$. α_i and β_i are the estimated ordinary least squares (OLS) regression intercept and slope, respectively. Parameters are estimated over the period from day −250 to day −10, where day 0 is the deal announcement date. *Second*, the cumulative abnormal return (CAR) is calculated as follows: $CAR_i[m; n] = \sum_{t=m}^{n} AR_{i,t}$ [*m*;*n*] is the event period from *m* days before to *n* days after the announcement date. We examine 3-day and 5-day windows around the deal announcement date.
Acquirer's total assets	AASSETS	Natural logarithm of an acquirer's total assets at the end of the year prior to the deal announcement
Acquirer's market-to-book value	AMTB	A target's market-to-book value of equity at the end of the year prior to the deal announcement
Acquirer's leverage	ALEV	An acquirer's total debts-to-total assets ratio at the end of the year prior to the deal announcement
Acquirer's return-on-equity	AROE	An acquirer's net income divided by its total stockholders' equity at the end of the year prior to the deal announcement
Acquirer's Board size	ABSIZE	An acquirer's total Board members at the end of the year prior to the deal announcement
Acquirer's percentage of institutional ownership	AINST	An acquirer's the percentage of institutional ownership at the end of the year prior to the deal announcement
Acquirer's percentage of independent directors	AIDIR	An acquirer's the percentage of independent directors at the end of the year prior to the deal announcement
Target's ESG performance	TRESG	The ratio of a target's ESG Combined (ESGC) score to that of a corresponding acquirer at the end of the year prior to the deal announcement
Target's market capitalization	TMKCAP	Natural logarithm of a target's total market capitalization at the end of the year prior to the deal announcement
Target's total assets	TASSETS	Natural logarithm of a target's total assets at the end of the year prior to the deal announcement
Target's market-to-book value	TMTB	A target's market-to-book value of equity at the end of year prior to the deal announcement
Target's leverage	TLEV	A target's total debts-to-total assets ratio at the end of the year prior to the deal announcement
Target's return-on-equity	TROE	A target's net income divided by its total stockholders' equity at the end of the year prior to the deal announcement

Note(s): This table describes the abbreviation and calculation of each variable

Notes

1. For more details, see https://www.nytimes.com/2006/03/17/business/worldbusiness/loral-buys-body-shop.html
2. For more details, see https://www.bloomberg.com/press-releases/2021-07-09/philip-morris-international-inc-announces-firm-offer-to-acquire-vectura-group-plc-acquisition-accelerates-pmi-s-beyond
3. Following Aktas *et al*. (2011), the abnormal return is measured in the following manner: $AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t})$. α_i and β_i are the estimated ordinary least squares (OLS) regression intercept and slope, respectively. We estimate the market model parameters over the period from day −250 to day −10, where day 0 is the deal announcement date.
4. For brevisty, we do not present the correlation matrix but note that there is no significant pairwise correlation.
5. As a robustness check, we calculate abnormal returns using the market model and obtain similar results.
6. To conserve space, we do not tabulate the legal origin of our sample firms, but the table may be provided on request.

References

Aktas, N., Bodt, E.d. and Cousin, J.-G. (2011), "Do financial markets care about SRI? Evidence from mergers and acquisitions", *Journal of Banking and Finance*, Vol. 35, pp. 1753-1761, doi: 10.1016/j.jbankfin.2010.12.006.

Alexandridis, G., Fuller, K.P., Terhaar, L. and Travlos, N.G. (2013), "Deal size, acquisition premia and shareholder gains", *Journal of Corporate Finance*, Vol. 20, pp. 1-13, doi: 10.1016/j.jcorpfin.2012.10.006.

Arouri, M., Gomes, M. and Pukthuanthong, K. (2019), "Corporate social responsibility and M&A uncertainty", *Journal of Corporate Finance*, Vol. 56, pp. 176-189, doi: 10.1016/j.jcorpfin.2019.02.002.

Bae, K.-H., Ghoul, S.E., Guedhami, O., Kwok, C.C.Y. and Zheng, Y. (2019), "Does corporate social responsibility reduce the costs of high leverage? Evidence from capital structure and product market interactions", *Journal of Banking and Finance*, Vol. 100, pp. 135-150, doi: 10.1016/j.jbankfin.2018.11.007.

Baker, M., Xin, P. and Wurgler, J. (2012), "The effect of reference point prices on mergers and acquisitions", *Journal of Financial Economics*, Vol. 106 No. 1, pp. 49-71, doi: 10.1016/j.jfineco.2012.04.010.

Bansal, P. and Clelland, I. (2004), "Talking trash: legitimacy, impression management, and unsystematic risk in the context of the natural environment", *Academy of Management Journal*, Vol. 47 No. 1, pp. 93-103, doi: 10.2307/20159562.

Berrone, P., Fosfuri, A. and Gelabert, L. (2015), "Does greenwashing pay off? Understanding the relationship between environmental actions and environmental legitimacy", *Journal of Business Ethics*, Vol. 144 No. 2, pp. 363-379, doi: 10.1007/s10551-015-2816-9.

Boone, A. and Uysal, V.B. (2020), "Reputational concerns in the market for corporate control", *Journal of Corporate Finance*, Vol. 61, 101347, doi: 10.1016/j.jcorpfin.2018.08.010.

Bowen, F.E. (2000), "Environmental visibility: a trigger of green organizational response", *Business Strategy and the Environment*, Vol. 9 No. 2, pp. 92-107, doi: 10.1002/(sici)1099-0836(200003/04)9:2<92::aid-bse230>3.0.co;2-x.

Brandon, R.G., Krueger, P. and Schmidt, P.S. (2021), "ESG rating disagreement and stock returns", *Financial Analysts Journal*, Vol. 77 No. 4, pp. 104-127, doi: 10.1080/0015198X.2021.1963186.

Brown, S.J. and Warner, J.B. (1985), "Using daily stock returns: the case of event studies", *Journal of Financial Economics*, Vol. 14 No. 1, pp. 3-31, doi: 10.1016/0304-405x(85)90042-x.

Bryant, A., Griffin, J.J. and Perry, V.G. (2020), "Mitigating climate change: a role for regulations and risk-taking", *Business Strategy and the Environment*, Vol. 29 No. 2, pp. 605-618, doi: 10.1002/bse.2391.

Conley, G.A. (2012), "The tension between capitalism and corporate social responsibility: a case study of strategic ambiguity in clorox environmental Communication, 1970-present" Kent State University, (Unpublished master's thesis).

Delmas, M.A. and Burbano, V.C. (2011), "The drivers of greenwashing", *California Management Review*, Vol. 54 No. 1, pp. 64-87, doi: 10.1525/cmr.2011.54.1.64.

Deng, X., Kang, J.-k. and Low, B.S. (2013), "Corporate social responsibility and stakeholder value maximization: evidence from mergers", *Journal of Financial Economics*, Vol. 110 No. 1, pp. 87-109, doi: 10.1016/j.jfineco.2013.04.014.

Du, X. (2015), "How the market values greenwashing? Evidence from China", *Journal of Business Ethics*, Vol. 128 No. 3, pp. 547-574, doi: 10.1007/s10551-014-2122-y.

Fatemi, A., Fooladi, I. and Tehranian, H. (2015), "Valuation effects of corporate social responsibility", *Journal of Banking and Finance*, Vol. 59, pp. 182-192, doi: 10.1016/j.jbankfin.2015.04.028.

Fuller, K., Netter, J. and Stegemoller, M. (2002), "What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions", *The Journal of Finance*, Vol. 57, pp. 1763-1793, doi: 10.1111/1540-6261.00477.

Garrow, N. and Valentine, T. (2012), "Aspects of acquirer behaviour in Australian mergers and acquisitions", *Proceedings of the 26th Australian and New Zealand Academy of Management Conference: Managing for volatility and instability*, Australian and New Zealand Academy of Management, Perth, pp. 1-14.

Ghitti, M., Gianfrate, G. and Palma, L. (2020), "The agency of greenwashing", SSRN Working Paper, available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3629608

Giese, G., Lee, L.-E., Melas, D., Nagy, Z. and Nishikawa, L. (2019), "Foundations of ESG investing: how ESG affects equity valuation, risk, and performance", *Journal of Portfolio Management*, Vol. 45 No. 5, pp. 69-83, doi: 10.3905/jpm.2019.45.5.069.

Guo, R., Zhang, W., Wang, T., Li, C.B. and Tao, L. (2018), "Timely or considered? Brand trust repair strategies and mechanism after greenwashing in China—from a legitimacy perspective", *Industrial Marketing Management*, Vol. 72 No. 9, pp. 127-137, doi: 10.1016/j.indmarman.2018.04.001.

Ioannou, I. and Serafeim, G. (2012), "What drives corporate social performance? The role of nation-level institutions", *Journal of International Business Studies*, Vol. 43 No. 9, pp. 834-864, doi: 10.1057/jibs.2012.26.

Jacobs, B.I. and Levy, K.N. (2022), "The challenge of disparities in ESG ratings", *The Journal of Impact and ESG Investing*, Vol. 2 No. 3, pp. 107-111, doi: 10.3905/jesg.2022.1.040.

Kim, H., Park, K. and Ryu, D. (2017), "Corporate environmental responsibility: a legal origins perspective", *Journal of Business Ethics*, Vol. 140 No. 3, pp. 381-402, doi: 10.1007/s10551-015-2641-1.

Konar, S. and Cohen, M.A. (2001), "Does the market value environmental performance?", *The Review of Economics and Statistics*, Vol. 83 No. 2, pp. 281-289, doi: 10.1162/00346530151143815, available at: https://www.jstor.org/stable/3211606

Li, B., Liu, X., Liu, Y. and Liu, M. (2020a), "Green M&A, business model innovation and sustainability of heavy polluters: evidence from the China's environmental protection storm", SSRN Working Paper, doi: 10.2139/ssrn.3597310.

Li, B., Xu, L., McIver, R., Wu, Q. and Pan, A. (2020b), "Green M&A, legitimacy and risk-taking: evidence from China's heavy polluters", *Accounting and Finance*, Vol. 60 No. 1, pp. 97-127, doi: 10.1111/acfi.12597.

Lu, J. (2021), "Can the green merger and acquisition strategy improve the environmental protection investment of listed company?", *Environmental Impact Assessment Review*, Vol. 86, 106470, doi: 10.1016/j.eiar.2020.106470.

Lu, J., Li, H. and Wang, G. (2023), "The impact of green mergers and acquisitions on illegal population discharge of heavy polluting firms: mechanism, heterogeneity and spillover effect", *Journal of Environmental Management*, Vol. 340, 117973, doi: 10.1016/j.jenvman.2023.117973.

Lubloy, A., Kereszturi, J.T. and Berlinger, E. (2025), "Quantifying firm-level greenwashing: a systematic literature review", *Journal of Environmental Management*, Vol. 373, 123399, doi: 10.1016/j.jenvman.2024.123399.

Lyon, T.P. and Maxwell, J.W. (2011), "Greenwash: corporate environmental disclosure under threat of audit", *Journal of Economics and Management Strategy*, Vol. 20 No. 1, pp. 3-41, doi: 10.1111/j.1530-9134.2010.00282.x.

Lyon, T.P. and Montgomery, A.W. (2013), "Tweetjacked: the impact of social media on corporate greenwash", *Journal of Business Ethics*, Vol. 118 No. 4, pp. 747-757, doi: 10.1007/s10551-013-1958-x.

Marquis, C., Toffel, M.W. and Zhou, Y. (2016), "Scrutiny, Norms, and selective disclosure: a global study of greenwashing", *Organization Science*, Vol. 27 No. 2, pp. 483-504, doi: 10.1287/orsc.2015.1039.

Nguyen, D.T., Van de Venter, G., Michayluk, D. and Walker, S. (2025), "Improvement in sustainability: evidence from the mergers and acquisitions market", *Australian Journal of Management*, Vol. 50 No. 2, pp. 484-523, doi: 10.1177/03128962231222824.

Parguel, B., Benoit-Moreau, F. and Larceneux, F. (2011), "How sustainability ratings might deter 'greenwashing': a closer look at ethical corporate communication", *Journal of Business Ethics*, Vol. 102 No. 1, pp. 15-28, doi: 10.1007/s10551-011-0901-2.

Pfeffer, J. and Salancik, G.R. (1978), *The External Control of Organizations: A Resource Dependence Perspective*, Harper & Row.

Porta, R.L., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W. (1998), "Law and finance", *Journal of Political Economy*, Vol. 106 No. 6, pp. 1113-1155.

Rubin, A. (2008), "Political views and corporate decision making: the case of corporate social responsibility", *Financial Review*, Vol. 43 No. 3, pp. 337-360, doi: 10.1111/j.1540-6288.2008.00197.x.

Seele, P. and Gatti, L. (2017), "Greenwashing revisited: in search of a typology and accusation-based definition incorporating legitimacy strategies", *Business Strategy and the Environment*, Vol. 26 No. 2, pp. 239-252, doi: 10.1002/bse.1912.

Siano, A., Vollero, A., Conte, F. and Amabile, S. (2017), "More than words': expanding the taxonomy of greenwashing after the Volkswagen scandal", *Journal of Business Research*, Vol. 71, pp. 27-37, doi: 10.1016/j.jbusres.2016.11.002.

Story, L. (2008), "Can Burt's bees turn Clorox green?", The New York Times, available at: https://www.nytimes.com/2008/01/06/business/06bees.html

Sun, Z., Sun, X., Wang, L. and Wang, W. (2025), "Substantive transformation or strategic response? The impact of a negative social responsibility performance gap on green merger and acquisition of heavily polluting firms", *Journal of Environmental Planning and Management*, Vol. 68 No. 6, pp. 1238-1262, doi: 10.1080/09640568.2023.2285727.

Tampakoudis, I. and Anagnostopoulou, E. (2020), "The effect of mergers and acquisitions on environmental, social and governance performance and market value: evidence from EU acquirers", *Business Strategy and the Environment*, Vol. 29 No. 5, pp. 1865-1875, doi: 10.1002/bse.2475.

Testa, F., Miroshnychenko, I., Barontini, R. and Frey, M. (2018), "Does it pay to be a greenwasher or a brownwasher?", *Business Strategy and the Environment*, Vol. 27 No. 7, pp. 1104-1116, doi: 10.1002/bse.2058.

Torelli, R., Balluchi, F. and Lazzini, A. (2019), "Greenwashing and environmental communication: effects on stakeholders' perceptions", *Business Strategy and the Environment*, Vol. 29 No. 2, pp. 407-421, doi: 10.1002/bse.2373.

Trucost Plc (2008), *Trucost Methodology Overview: Measuring Company Environmental Impacts*, Trucost Plc, London.

Walker, K. and Wan, F. (2012), "The harm of symbolic actions and green-washing: corporate actions and communications on environmental performance and their financial implications", *Journal of Business Ethics*, Vol. 109 No. 2, pp. 227-242, doi: 10.1007/s10551-011-1122-4.

Wang, D., Wang, Y. and Zhou, M. (2024), "Can environmental tax promote green M&A in emerging market firms? Evidence from China's heavy polluters", *Business Ethics, the Environment and Responsibility*, Vol. 34, pp. 1-25.

Yi, Z., Liu, H., Wang, Y. and Chen, J. (2024), "How does green finance policy affect firms' pro-environmental mergers and acquisitions?", *Accounting and Finance*, Vol. 64 No. 5, pp. 4723-4748, doi: 10.1111/acfi.13329.

Yu, E.P.Y., Luu, B.V. and Chen, C.H. (2020), "Greenwashing in environmental, social and governance disclosures", *Research in International Business and Finance*, Vol. 52, pp. 1-23, doi: 10.1016/j.ribaf.2020.101192.

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