Trust Me, I Am Going Green:

Greenwashing Through Mergers and Acquisitions

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Abstract

Greenwashing is the practice of presenting a misleading impression of a firm as environmentally friendly. While this practice can take on many forms, we measure greenwashing as the extent of firms' failure to act on ESG commitments. When firms that engage in greenwashing acquire targets with higher relative ESG ratings, this practice can be interpreted by the market as either a legitimate desire for green transformation, or evidence of even further greenwashing. Our study of the M&A market reveals that acquirers with higher levels of greenwashing tend to acquire targets with higher relative ESG ratings. In addition, we find that higher levels of pre-merger greenwashing of acquirers lower their deal announcement returns. This finding indicates that the market perceives such M&A deals as evidence of further greenwashing rather than a legitimate green transformation. However, further analysis shows that in fact acquirers' levels of greenwashing reduce post-merger after acquiring targets with higher relative ESG ratings. This implies that, despite the market's initial scepticism, acquirers do genuinely engage in green transformation over the long term through M&As.

JEL: G14, G34, G40

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1. Introduction

The benefits that firms derive from a focus on Environmental, Social, and Governance (ESG) factors have been well documented, and include increased reputation (Boone & Uysal, 2020), lower cost of capital (Fatemi et al., 2015), and stronger stakeholder commitment (Arouri et al., 2019; Deng et al., 2013). It is therefore not surprising that firms often face pressure from external stakeholders through social media campaigns to improve on poor ESG practices (Du, 2015; Lyon & Montgomery, 2013). Stakeholders may demand better ESG practices through regulation (Berrone et al., 2013; Bryant et al., 2020; Delmas & Burbano, 2011; Ghitti et al., 2020), customer demand (Bowen, 2000; Parguel et al., 2011), and market demand (Garrow & Valentine, 2012). Firms which perform poorly in ESG or operate in ESG-sensitive industries are strongly exposed to such pressure. They are highly visible to the public, and attract higher scrutiny from a variety of different stakeholders (Bowen, 2000; Marquis et al., 2016).

There is evidence to suggest that firms engage in greenwashing to meet these stakeholders' demands for a change in ESG practices (Delmas & Burbano, 2011; Garrow & Valentine, 2012). Greenwashing is defined as providing stakeholders with misleading information about a firm's environmental performance in order to portray itself as an environmentally friendly organization (Delmas & Burbano, 2011). Seele and Gatti (2017) extend this definition by also including an external accusation of a misleading green message communicated by a company. The misleading claims is measured as the extent of firms' actual ESG practice against what they commit and communicate to their external stakeholders (Marquis & Toeffel, 2012). Walker and Wan (2012) contend that the motive behind greenwashing is to signal to the market that a firm's "green transformation" strategy is legitimate.

An alternative corporate response to stakeholder pressure to increase ESG practices, is to acquire green targets, who perform well in ESG metrics (Li, Xu, et al., 2020). Acquirers could acquire and adopt their targets' green practice, and as a result lead to a post-merger improvement in their ESG performance (Pfeffer & Salancik, 1978). Such M&A deals help acquiring firms enhance their sustainability while simultaneously satisfying stakeholders' ESG demands. However, whether they genuinely transform their ESG performance or simply execute M&A deals as a means of greenwashing to comply with external stakeholder demands are worth investigating.

Acquirers, who engage in greenwashing pre-merger, may acquire targets with high ESG ratings as a greenwashing strategy. They do not intend to, or often have the capacity to integrate their targets' ESG practices. The purpose of such deals are to send a misleading signal of corporate green transformation to the market (Bryant et al., 2020; Li, Xu, et al., 2020).

The scepticism of legitimate green transformation is extremely well illustrated in the M&A deal between Clorox and Burts' Bees in 2007 (Story, 2008). With increased pressure for green products, bleach manufacturer Clorox paid close to $1 billion to acquire Burts' Bees, a green manufacturer of beeswax-related products. Clorox's claims were that it was expecting to learn environmental practices of Burts' Bees in an effort to make its own products eco-friendlier. However, Clorox's history of greenwashing prior to the deal caused scepticism due in part to its vague reporting on its environmental programs (Conley, 2012; Story, 2008). Post-merger however, Clorox introduced Green Work products, a cleaning solution with 99 percent natural ingredients. Its controversies score provided by Refinitiv increased from 50 (pre-merger) to 100 (post-merger). The controversies score captures a firm's ESG practice against its ESG commitment. A higher controversies score implies a higher level of actual commitment to what the firm communicates to the public. As a result, Clorox's level of greenwashing decreased after acquiring Burts' Bees.

Greenwashing is extensively covered in the literature. Most greenwashing studies focus on environmental aspects (Du, 2015; Marquis et al., 2016; Testa et al., 2018; Walker & Wan, 2012), while Lyon and Maxwell (2011) and Yu et al. (2020) expand greenwashing to include also social and governance matters. Such an expansion is essential as all three components – E, S, and G – simultaneously drive a business's sustainability. For instance, in 2006, L'Oréal of France, a firm associated for many years with animal testing of its cosmetics products, acquired Body Shop International, which strongly commits to anti-animal-testing[1]. In 2021, tobacco manufacturer Phillip Morris International Inc acquired Vectura Group plc, a British health-care company[2]. Those controversial deals highlight the importance of social components in a greenwashing issue. We therefore account for all aspects of ESG to examine potential greenwashing issues in M&As.

We aim to investigate the potential of greenwashing in M&A deals. First, we examine whether acquirers, who engage in greenwashing pre-merger, acquire targets with higher

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[1] For more details https://www.nytimes.com/2006/03/17/business/worldbusiness/loral-buys-body-shop.html
[2] For more details 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

relative ESG ratings. Second, we investigate how the market reacts to such deal announcements. Third, we examine the relationship between the pre-merger ESG scores of targets and acquirers' level of greenwashing post-merger. This finding confirms whether greenwashing acquirers legitimately transform their ESG practices, or simply engage in greenwashing through M&A deals.

Although the market perceives such deals as greenwashing around deal announcement dates, we find evidence of legitimate green transformation of greenwashing acquirers one year after deal announcements. We find that acquirers with a one standard deviation higher level of greenwashing pre-merger acquire targets with 2.589 percentage points higher relative ESG scores. Subsequently, acquirers' cumulative abnormal returns are 0.108 and 0.319 percentage points lower in the 3-day and 5-day windows around the deal announcement dates when their level of greenwashing pre-merger is one standard deviation higher. This implies that the market reacts negatively to such deal announcements, with targets' higher relative ESG ratings reinforcing such a negative reaction. This initial scepticism is however disproved one year after the deal announcement as we find that acquiring targets with one standard deviation higher relative ESG scores lowers acquirers' level of greenwashing by 0.346 percentage points post-merger.

We make several important contributions to the literature. First, we find that acquirers with higher level of greenwashing pre-merger tend to acquire targets with higher relative ESG scores. We also provide evidence that such deals reduce acquirers' level of greenwashing post-merger, confirming their green transformation. Our findings are consistent with both the resource dependence theory and the organizational learning theory (Pfeffer & Salancik, 1978). The theories support the view that acquirers could acquire and learn the ESG practices of their targets. Successfully integrating ESG practices could improve acquirers' ESG performance and reduce their engagement in post-merger greenwashing activities. An acquirer's decrease in the level of greenwashing post-merger enriches the green deals' benefits studied in previous literature. Li, Xu, et al. (2020) show that, acquiring a highly sustainable target helps an acquirer improve its legitimacy measured by greater access to resources, lower financial constraint, and reduced tax liability. Green deals also boost acquirers' business model innovation and sustainability (Li, Liu, et al., 2020).

Second, we shed light on how the market perceive deals involving greenwashing acquirers and high ESG-rated targets. Our measured negative market reaction is consistent with

the attribution theory of (Parguel et al., 2011). Seele and Gatti (2017) contend that there is information asymmetry between acquirers and the market. Lacking information about the intention of acquirers, the market consequently refers to acquirers' past greenwashing behaviour, and as a result reacts negatively to the deal announcement. Our finding is also consistent with Du (2015), who finds that a firm's cumulative abnormal return is lower around the date when the market accuses and publishes its greenwashing activities. In addition, the market's negative perception of those deals is more pronounced when the targets' ESG scores are higher. Previous studies find that acquirers' and targets' ESG ratings have a positive impact on deal performance, including deal announcement returns and long-term buy-and-hold abnormal returns (Deng et al., 2013) and accounting-based returns (Tampakoudis & Anagnostopoulou, 2020). Different from those studies, we find that the targets' relative ESG ratings negatively influence the acquirers' deal announcement returns when accounting for the acquirers' greenwashing level pre-merger.

2. Greenwashing in Mergers and Acquisitions

2.1. Benefits and costs of greenwashing

Following good ESG practice has several benefits and engaging in legitimate actions sends a signal of good sustainability practice to stakeholders (Torelli et al., 2019). Weber (1968) and Suchman (1995) refer to the legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions". Obtaining legitimacy benefits the firm through access to greater resources, attaining stronger stakeholders' commitment, and attracting more competitive job applicants (Walker & Wan, 2012).Those advantages improve firm performance (Deephouse, 1999) and ultimately firm value. Firms therefore have an incentive to highlight good ESG practices, even if they are not legitimate.

There is no single definition of greenwashing in academic literature due to its multifaceted nature. One definition relates greenwashing to selective disclosure. Delmas and Burbano (2011) and Marquis et al. (2016) define greenwashing as misleading customers about a firm's poor environmental performance via positive communication. Abrahamson and Park (1994) illustrate how managers conceal a firm's negative outcomes to avoid damaging their reputation and adjusting their incentive contracts. Securing their positions under the threat of takeover also motivates them to selectively disclose negative performance.

Walker and Wan (2012) and Siano et al. (2017) consider greenwashing when a firm engages in "green talk", a symbolic action to satisfy stakeholders' demand in sustainability, without any concrete actions. That is, firms fail to fulfil their commitments on environmental protection, in order to alleviate external public pressure on sustainability (Gou et al., 2018). Seele and Gatti (2017) argue that greenwashing should combine two elements: falsity and accusation of misleading information (i.e., external distortion). If the market does not accuse a firm's symbolic actions, such situation is seen as potential greenwashing. We employ this greenwashing definition in our study.

Greenwashing, however, bears some costs. Seele and Gatti (2017) argue that when stakeholders accuse a firm of misleading behaviour, such an accusation reduces the ESG signal reliability. The firm's legitimacy would then be negatively affected (Berrone et al., 2013). Walker and Wan (2012) show that symbolic actions ("green talk") negatively impacts a firm's financial performance while the substantive actions ("green walk") have no influence. Du (2015) finds evidence that, when firms are accused of greenwashing, its cumulative abnormal return around the date of accusation are smaller. Overall, misleading communication about ESG performance has the potential to help a firm obtain legitimacy, however, the accusation of misleading activities reduces its legitimacy and as a result firm financial performance.

2.2. Benefits of green deals for acquiring firms

Li, Xu, et al. (2020) refer to "green M&As" as an acquisition of a green target, which has energy-saving or emission reduction technologies, by an acquiring firm which is a heavy polluter. The purpose of the M&A is green transformation by obtaining green resources and improving green practice (Lu, 2021). As sustainability issues not only relate to the environment, we can also extend this to include social and governance practice. We therefore extend the scope of a green deal to all three components of ESG – environmental, social and governance. That is to say, a green deal is an acquisition of a target with good ESG practice, which is expected to transform the acquirer's sustainability performance post-merger.

Previous literature shows that obtaining legitimacy is the primary benefit created by a green deal. This legitimacy includes three categories: regulatory, normative, and cognitive (Delmas & Burbano, 2011). Regulatory legitimacy (i.e., or institutional legitimacy) focuses on a firm's compliance with laws and rules. Normative and cognitive legitimacy requires a firm to satisfy social and ethical benchmarks and social expectations (Li, Xu, et al., 2020). That is to say, firms could obtain ESG-related legitimacy as they meet the ESG demands from

regulators (Suchman, 1995; Weber, 1968). Nguyen et al. (2022) find that firms can improve their ESG practice by acquiring targets with higher ESG ratings. The resource dependence and organizational learning theories support this finding. Acquirers could acquire green practice and green resources from green targets (Pfeffer & Salancik, 1978). Thus, the acquiring firms could obtain legitimacy, a factor enhancing firm value, through green deals (Li, Xu, et al., 2020). Improving legitimacy also allow firms to lower the costs of acquiring resources, reduce financial constraints, and enhance capacity of risk-taking (Gupta, 2018).

2.3. Potential of greenwashing through green M&As

There are two views on the acquisition of a high ESG-rated target by a greenwashing acquirer. On the one hand, the acquirer does not actually acquire the target's ESG practice, but instead uses the M&A deal to mislead the market in relation to its intentions. Such misleading green claims send a signal to the market of complying with stakeholders' ESG demands. On the other hand, a greenwashing acquirer could legitimately transform its business to be more sustainable via the M&A. It could acquire and learn the target's ESG practice according to the resource dependence and organizational learning theories (Pfeffer & Salancik, 1978).

Both views suggest that acquirers with higher levels of greenwashing pre-merger acquire targets with higher relative ESG ratings. Such an acquisition helps the acquirer to either strengthen a misleading green signal sent to the market or legitimately acquire more green resources from the target. Therefore, we propose as follows:

Hypothesis 1: Acquirers' levels of greenwashing pre-merger is positively related to targets' relative ESG scores pre-merger.

2.4. The market's response to green M&A deals

Previous literature finds that greenwashing firms experience lower financial performance and a negative market reaction to M&As. Walker and Wan (2012) show that greenwashing firms have negative financial outcomes proxied by return on assets. Greenwashing activities bear associated costs, such as higher perceived risks and environmental penalties and fines (Bansal & Clelland, 2004). In addition to accounting-based performance, greenwashing also negatively impacts 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 & Cohen, 2001). Greenwashing firms exhibit lower cumulative

abnormal return (CAR) around greenwashing actions (Du, 2015). Such negative reaction of the market is more pronounced when the level of reputation and legitimacy attained from misleading communication are higher (Torelli et al., 2019).

Green M&A deals, on the other hand, achieve favourable response from the market. Aktas et al. (2011) find that acquiring targets with better sustainability performance rewards acquirers with higher cumulative abnormal return around the deal announcement date. Such an acquisition signals to the market that acquirers are willing to learn the targets' practice and experience related to sustainability. This learning process could add value to acquirers. Tampakoudis and Anagnostopoulou (2020) further show that acquirers gain a higher TobinQ, which investors perceive as greater growth potential and investment efficiency, after acquiring a target with a higher ESG rating.

External stakeholders may, however, fail to distinguish misleading green claims by a firm. Seele and Gatti (2017) find that the existence of information asymmetry between a firm and its external stakeholders makes the greenwashing strategy successful. Due to information asymmetry, investors lack relevant information to infer the legitimacy of green acquisition by a greenwashing firm. However, when a firm is accused of greenwashing by the market prior to a M&A deal, investors may infer that the firm's current green acquisition is evidence of further greenwashing. As a result, the market may negatively respond to such deal announcements. Therefore, we hypothesize that:

Hypothesis 2: Acquirers' levels of greenwashing pre-merger are negatively related to cumulative abnormal returns (CAR) around deal announcement dates.

2.5. The post-merger practice of greenwashing acquirers

Following the resource dependence and organizational learning theories of Pfeffer and Salancik (1978), an acquirer could decrease their level of greenwashing post-merger when acquiring targets with higher relative ESG ratings. By acquiring, learning, and integrating a targets' ESG practices, acquirers could not only improve their sustainability practice but also reduce their greenwashing activities. Therefore, we propose that:

Hypothesis 3: Targets' relative ESG scores pre-merger are negatively related to the change in acquirers' pre- and post-merger levels of greenwashing.

3. Data and measures
3.1. ESG Scores

We measure the sustainability performance of a firm by using the ESG Combined Score (ESGC) provided by Refinitiv ESG Database. ESGC data is available for more than 11,000 global firms since 2002. The ESGC is based on an assessment of more than 500 ESG measures that are grouped into 10 categories and 3 pillars (i.e., Environmental, Social, and Governance). Refinitiv adopts the percentile rank scoring method to make the scores relative within a respective industry. Those scores are also benchmarked against The Refinitiv Business Classifications to make them comparable across industries. The ESG score measures a firm's ESG performance, commitment, and effectiveness based on the company's self-reported data. The ESG score is then discounted by the controversies score, which captures the frequency and severity of the firm's negative media coverage relating to ESG issues. It aims to provide a comprehensive score of a firm's ESG performance and is so-called ESG Combined Score. Particularly, if the ESG score is higher than the controversies score, the ESGC is the average of those two scores. Otherwise, the ESGC is equal the ESG score. The ESGC ranges from 0 (the worst) to 100 (the best). Some 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 scores is that it does not fully discount the controversy scores, so the Refinitiv ESGC appears superior to measure the actual ESG performance of a firm.

We calculate 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. It is as follows:

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

3.2. The level of greenwashing

There are various greenwashing measures in the literature. Yu et al. (2020) consider greenwashing as the difference between Bloomberg's ESG disclosure scores and ASSET4's ESG scores. This method faces an issue of ESG rating disagreement due to a lack of a common framework for scoring ESG performance (Brandon et al., 2021; Jacobs & Levy, 2022). 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 fails to account for the market accusation of a firm's ESG wrongdoing. Finally, Walker and Wan

(2012) assess greenwashing via the substantive and symbolic actions published in a firm's website with a scoring range from 1 to 7. This approach appears subjective and is open to replication issues.

Following the greenwashing definition proposed by Seele and Gatti (2017), we employ the ESG controversies score from the Refinitiv ESG Database to proxy a firm's level of greenwashing. Greenwashing is an act of misleading stakeholders about a firm's ESG performance and the market accusation of such activities. In other words, a firm that is involved in greenwashing fails to meet its sustainability commitments. It does not commit to what they communicate to the public or even conceal the negative practice against its positive communication. The Refinitiv ESG controversies scores capture a company's actions against commitments via global media sources. Those negative scandals are accused by the market and reported in media sources. Seele and Gatti (2017) highlight that, without the market accusation, such behaviours of the firm are considered potential greenwashing. The controversies scores exhibit how significant and material the impact of those negative scandals are on a firm's actual ESG performance. The higher the controversies scores, the lower the extent of greenwashing. We then calculate the inverse of the controversies score to proxy the level of greenwashing (AGW). The higher the inverse controversies score, the higher level of greenwashing.

The ESG scores assess information related to 23 ESG controversies topics. A firm with no controversies is assigned a score of 100, with the lowest score of zero awarded to firms that have extreme controversies. Refinitiv benchmarks the controversies scores within a respective industry to make the scores comparable. The scores also account for the market capitalization bias, which accounts for the fact that larger firms attract more media attention than a smaller firms (Delmas & Burbano, 2011; Du, 2015; Lyon & Montgomery, 2013). Refinitiv adjusts the raw controversies scores according to severity and capitalization rates to obtain the ESG controversies scores.

We proxy an acquirer's level of greenwashing prior to the deal announcement ($AGWPRE$ or AGW_{t-1}) by utilizing its inverse of ESG controversies score at the end of the year prior to the deal announcement date. We also measure the change in an acquirer's level of greenwashing between pre- and post-merger as follows:

$$AGWCHANGE_{t+1} = \frac{AGW_{t+1}}{AGW_{t-1}} - 1$$

3.3. *An acquirer's cumulative abnormal return (CAR)*

Following Brown and Warner (1985), we employ the market-adjusted model to calculate the cumulative abnormal return (CAR), a proxy of the market reaction to the deal announcement. There is a high probability that acquirers' greenwashing behaviours in a pre-merger period is included in the estimation period, so estimating beta is less meaningful. In addition, we use the short-window event study, so weighting market returns by firms' betas does not significantly improve the estimation (Fuller et al., 2002).

Abnormal return (AR) is the difference between stock daily return and the country market return:

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

$AR_{i,t}$ is the abnormal return of firm i on day t. $R_{i,t}$ is the daily stock return of firm i on day t. $R_{m,t}$ is the respective country market return on day t.

We calculate the cumulative abnormal return (CAR) 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. The stocks' daily returns and the respective country market returns are obtained from Refinitiv and Bloomberg, respectively. We further employ the market model to measure the acquirers' CAR as a robustness test[3].

3.4. Control variables

Regarding the first regression of $TRESG_{t-1}$ on $AGWPRE_{t-1}$, we control for several acquirers' and targets' characteristics. Drempetic et al. (2020) indicate that the larger-size and higher-leverage firms have more resources to invest in ESG-related activities, improving their ESG ratings. Barnea and Rubin (2010), on the other hand, argue that the higher level of leverage may restrict the free cash flow in hands of firm managers. It is expected to reduce the ESG overinvestment by those managers, preventing the firms' extremely high ESG ratings.

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[3] Following Aktas et al. (2011), the abnormal return is measured as follows: $AR_{i,t} = R_{i,t} - (\alpha_i - \beta_i R_{m,t})$. 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.

We, therefore, control the market capitalization (MKCAP), total assets (ASSETS), market-to-book ratio (MTB), leverage (LEV), and Return-on-Equity (ROE) of both acquirers and targets.

In the second regression of CAR on AGW_{t-1}, and the third regression of $AGWCHANGE_{t+1}$ on $TRESG_{t-1}$, we follow Aktas et al. (2011) and Ghitti et al. (2020) to further control deal characteristics besides the acquirers' and targets' characteristics as mentioned above. The 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 drop the deal attitude as the sample comprises of all friendly deals. Noticeably, Ghitti et al. (2020) and Yu et al. (2020) study that board size (BSIZE), percentage of institutional ownership (INSTOWN), and percentage of independent directors on Board (IDIR) negatively impact the level of greenwashing due to higher scrutiny. We therefore control those three variables in the third regression. Control variable data is obtained from Refinitiv. All control variables are at the end of the year prior to the deal announcement date. Table 1 describes the measures of all control variables.

[Insert Table 1 here]

4. Methods

4.1. Sampling

We obtain all international deals from Thomson Securities Data Company (SDC) Platinum Mergers and Acquisitions Database with the following criteria. The completed deals are announced from January 1, 2006 to December 31, 2020. Both acquirers and targets are listed non-financial companies, that is, we drop firms with Standard Industrial Codes (SIC) from 6000 to 6999. All deal value is 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 acquirers must own less than 50% of the target'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. We then match that sample with the accounting- and market-based data described above. The final sample is of 489 deals. Table 2 presents the sample statistics.

[Insert Table 2 here]

4.2. Regression models

The following are three main regression models in our study.

Model 1:

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

Model 2

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

Model 3

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

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

We include a year fixed effect to remove time-invariant unobserved heterogeneity from the error term. We additionally account for an acquirer's and a target's 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. We therefore cluster the standard errors in Eq. (1) and (2) at the acquirer country level to account for that possible serial correlation. In addition, the legal origin of a particular country influences a firm's ESG performance in that country, so we cluster the standard errors in Eq. (3) at the target country level.

4.3. Estimation strategy

We execute some diagnostic tests to determine the efficient and consistent estimate for three regression models above. First, we investigate the multicollinearity issue by examining the Pearson correlations among independent variables. Table 3 shows that correlations among independent variables are less than 0.8. Those variables are not highly correlated. Their Variance Inflation Factors (VIF) are all less than 10. Hence, we can rule out the existence of multicollinearity issue in the dataset (Mansfield & Helms, 1982).

[Insert Table 3 here]

Second, we perform Breusch-Pagan test to check the problem of heteroskedasticity (Breusch & Pagan, 1979). Table 4 reports that only the Breusch-Pagan test in the regression of ACAR[-1;+1] on AGWPRE is statistically insignificant. The result supports the null hypothesis that the error term has constant variance. The regression is free of the heteroskedasticity issue. Having the statistically significant Breusch-Pagan tests, the remaining regressions deal with an issue of heteroskedasticity. As suggested by White (1980), the standard errors are robust in the employed estimations to address such a problem.

[Insert Table 4 here]

A potential source of endogeneity in this paper is the measurement error of AGWPRE in Eq. (1) and (2) and of TRESG in Eq. (3). Previous literature shows that several factors drive the variation of AGWPRE and TRESG. For instance, corporate culture (Walker & Wan, 2012), Twitter presence (Lyon & Montgomery, 2013), regulatory pressure (Bowen, 2000; Walker & Wan, 2012), impact a firm's level of greenwashing. Meanwhile, the ESG scores in previous years (Bae et al., 2019), religion rank of a firm's headquarter location (Deng et al., 2013), and the state where its headquarter is located (Rubin, 2008) determine its ESG scores.

We follow Hausman (1978) to conduct the Wu-Hausman test to examine the endogeneity potential of AGWPRE and TRESG in the employed regression models. With the international sample, we employ a country's absence of corruption index (CORRUPT) as an instrumental variable for AGWPRE (Ioannou & Serafeim, 2012; Yu et al., 2020). Ioannou and Serafeim (2012) state that firms in a country with high level of corruption are more likely to engage in unethical practice to reduce their costs, increase market shares, and remain their competitiveness. The rewards for ethical behaviours in such countries are low as the government is less likely to provide incentives for firms to be socially responsible (i.e. tax exemption, financial support, etc.). Following Yu et al. (2020), we obtain a country's absence of corruption index (CORRUPT) from Transparency International. The index varies from 0 (a highly corrupt country) to 100 (a highly clean country). The higher CORRUPT, the lower AGWPRE is, that is, the relevance condition is satisfied. There is no reason to believe that the level of corruption of an acquirer's country has a direct impact on a target's relative ESG score and an acquirer's abnormal return rather than an indirect effect via the acquirer's greenwashing level pre-merger. Thus, the exclusion restriction is met.

Following Kim et al. (2017), we account for legal origins (LEGAL) of the countries where 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 the common law, the civil law is featured by a more concentrated ownership structure, which has a high level of managerial shareholding. It motivates the managers to pay attention to long-term investments and performance. The civil law system focuses on maximizing the stakeholder value while the common law regime emphasizes the shareholders' wealth and the protection of investor rights (Porta et al., 1998). That is why civil-law-based firms tend to have a greater extent of socially responsible investment than those located in common-law-countries, increasing 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 which could be acquired by the acquirers. Hence, the exclusion restriction is met. We account for only one instrumental variable for one endogenous variable in each regression, so our models are just identified. LEGAL is recorded as "1" if the target firm is located in a civil law country, 0 in a common law country. Table 5 shows the targets' countries classified as common law and civil law according to Porta et al. (1998).

[Insert Table 5 here]

Table 4 presents the result of Wu-Hausman test. The regressions of TRESG and ACAR[-2:+2] on AGWPRE, respectively, experience significant Wu-Hausman tests (p-value less than 0.05). The results reject the null the hypothesis that Ordinary Least Squares (OLS) is efficient and consistent. We therefore employ Two-Stage Least Squares (2SLS) to measure these regressions. Besides, the Wu-Hausman tests in the regression of AGWCHANGE and ACAR[-1;+1] on TRESG and AGWPRE, respectively, are insignificant (p-value larger than 0.1), confirming the null hypothesis. We perform the OLS to estimate these regressions.

5. Empirical analysis

5.1. Statistical description

Table 6 presents the data statistics. The acquirers' level of greenwashing pre-merger (AGWPRE) has an average of 0.026 with a standard deviation of 0.063, that is, the average controversies score is 38.96 out of 100. That threshold is low, indicating that the acquirers involve in relatively high level of greenwashing pre-merger. The acquirers' change in a level of greenwashing post-merger (AGWCHANGE) is 38.9% in average with a standard deviation

of 1.446. The mean of the targets' relative ESG scores (TRESG) is 0.84 deviated at 54.4%. The acquirers' accumulative abnormal returns around the deal announcement date (ACAR[-1;+1], and ACAR[-2;+2]) experience an average of 1.5%.

To the deals' characteristics, all sampled deals are in the friendly manner. Nearly 70% of the acquirers acquire the targets in the same 2-digit-SIC industries. Only 34.2% of deals are undertaken cross borders. Only 7% of deals involve more than one bidder, so the competitiveness in these deals appears low. 6.1% of the deals are offered in cash; 0.8% are in the stock offer manner; and the remaining deals use the mixed payment.

Regarding the acquirer- and target-level statistics, the acquirers have a larger size in term of total market capitalization and total assets than the targets. The acquiring firms' profitability (AROE) is higher than that of the targets. 80.9% of the acquirers' ownership are institutional investors and their boards comprise of 73.9% of independent directors.

[Insert Table 6 here]

5.2. Model 1 – The relationship between an acquirer's level of greenwashing pre-merger (AGWPRE) and a target's relative ESG score (TRESG)

Regarding the diagnostic tests, we perform the 2SLS estimate to regress a target's relative ESG score on an acquirer's level of greenwashing pre-merger. The OLS estimate additionally serves as a robustness test.

Column (1) in Table 7 confirms that the absence of corruption index (CORRUPT) empirically satisfies the relevance condition of a good instrumental variable. The coefficient of CORRUPT is negative (-0.006) and statistically significant at p-value less than 0.01. It is consistent with Ioannou and Serafeim (2012) and Yu et al. (2020) studying that firms located in a country with low level of corruption are less likely to involve in greenwashing. The F statistics in that first stage regression is higher than 10, so the relevance condition is statistically satisfied (Staiger & Stock, 1997).

We find that an acquirer with higher level of greenwashing pre-merger would acquire a target with higher relative ESG score. Column (2) in Table 7 presents the second stage of the 2SLS estimate. AGWPRE positively impacts TRESG with a coefficient of 2.589 and p-value less than 0.01. With one standard deviation higher in the level of greenwashing pre-merger, an acquirer would acquire a target with higher relative ESG score of 2.589 percentage points. AGWPRE and other control variables explain 37.4% variation in TRESG. Column (3) reports

that the impact of AGWPRE on TRESG remains robust in the OLS estimate. Therefore, the result supports the Hypothesis 1.

The finding about the behaviour of a greenwashing acquirer is consistent with the two views explaining its behaviour in a green deal. Acquiring the target with higher ESG rating, the acquirer sends the market a more strongly misleading signal on its green transformation (Berrone et al., 2013; Delmas & Burbano, 2011; Lyon & Montgomery, 2013). Besides, transforming ESG performance could also be a motive of a greenwashing acquirer (Li, Liu, et al., 2020). It could acquire and learn ESG practice from a target with better performance in sustainability. Both circumstances help the acquirer gain legitimacy and then external stakeholders' commitment.

[Insert Table 7 here]

5.3. Model 2 – The relationship between an acquirer's level of greenwashing pre-merger (AGWPRE) and its cumulative abnormal return (ACAR)

We find that an acquirer's announcement return around the deal announcement date is lower when its level of greenwashing pre-merger is higher. Column (1) in Table 8A presents the influence of AGWPRE on ACAR[-1;+1] with the OLS estimate. AGWPRE negatively impacts ACAR[-1;+1] with a coefficient of -0.108, which is significant at a confidence level of 95%. An acquirer with one standard deviation higher in its level of greenwashing pre-merger has 0.108 percentage points lower in its cumulative abnormal return from one day before to one day after a deal announcement date. AGWPRE and other control variables explain 27.4% variation of ACAR[-1;+1]. The results remain robust in the 2SLS estimate reported in Column (3) (i.e., the coefficient of AGWPRE is -0.284 and p-value is less than 0.05).

The effect of AGWPRE on ACAR[-2;+2] experiences a similar trend. Regarding the diagnostic tests, we perform the 2SLS estimate to measure the regression. Column (4) in Table 8 shows the second stage of the estimate. The coefficient of AGWPRE is -0.319 with p-value less than 0.05. The model explains 26.9% variation of ACAR[-2;+2]. The OLS estimate is also in the same line with the 2SLS estimate. Those results also appear consistent when using the market-model-based-ACAR as a robustness test, which is reported in Table 8B. Therefore, these statistics support Hypothesis 2.

[Insert Table 8A here]

[Insert Table 8B here]

We document evidence that the market negatively reacts to the deal announcement. It perceives the deal as a greenwashing activity of a greenwashing acquirer. The finding is consistent with the attribution theory studied by Parguel et al. (2011). The information asymmetry between a firm and its investors makes them difficult to realize whether the green claim is misleading (Seele & Gatti, 2017). The investors may refer to the acquirer's pre-merger greenwashing behaviours as references to interpret the deal announcement. The market reaction in this study is in line with Du (2015) who finds that the market negatively responds to a firm's greenwashing practice when the firm is publicly reported as a greenwasher.

We further investigate how the impact of AGWPRE on the ACAR[-1;+1] and ACAR[-2;+2], respectively, varies according to the target's relative ESG score. We create a dummy variable, HighTRESG, to indicate the level of TRESG: high or low. If a target's relative ESG score is equal or higher than the median value of whole sample, we classify it as "High" and record "1", and 0 otherwise. Following Baron and Kenny (1986), we calculate the interaction between AGWPRE and HighTRESG to examine the moderating effect of HighTRESG on the studied relationships.

We find that the impact of an acquirer's level of greenwashing pre-merger on the market's reaction to the deal is more pronounced when acquiring a target with high ESG score. Column (1) in Table 9 shows that coefficient of AGWPRE*HighTRESG is -0.156 and statistically significant with p-value less than 0.01. Those statistics indicate that, all else being equal, acquiring a high ESG target makes ACAR[-1;+1] lower by 0.156 percentage points compared to acquiring a low ESG target. As reported in Column (2) in Table 9, that effect remains when extending the window of CAR to two days before and two days after the announcement date. That is to say, a high relative ESG score of a target strengthens the negative relationship between AGWPRE and ACAR. The market may perceive the higher ESG score of a target as a signal that a greenwashing acquirer want to obtain higher legitimacy through its greenwashing deal. Figure 1 illustrates such a strengthening effect.

[Insert Table 9 here]

[Insert Figure 1 here]

5.4. Model 3 – The relationship between a target's relative ESG score (TRESG) pre-merger and an acquirer's change in the level of greenwashing pre- and post-merger.

We discover that acquiring a higher ESG target reduces an acquirer's greenwashing level post-merger. We perform the OLS estimate, which is efficient and consistent, to estimate the regression of an acquirer's change in greenwashing level between pre- and post-merger on a target's relative ESG score. Column (1) in Table 10 shows that TRESG has a negative and significant impact on AGWCHANGE with a coefficient of -0.346 and p-value less than 0.05. When acquiring a target with one standard deviation higher in a relative ESG score, an acquirer could lower its lower of greenwashing post-merger by 0.346 percentage points. All variables in the model explain 11.2% variation in AGWCHANGE. Therefore, the result supports Hypothesis 3.

The finding is robust with the 2SLS estimate reported in Column (2) and (3) in Table 10. Column (2) shows the first stage regression with LEGAL as an instrumental variable for TRESG. The legal origin of a target's country has a positive and significant impact on its relative ESG rating (i.e., a coefficient of 0.7 and p-value less than 0.01). It is consistent with Kim et al., (2017) stating that civil-law-based firms tend to have high ESG scores than those located in common-law-countries. It empirically confirms the relevance condition of a good instrumental variable with F value greater than 10. The second stage presented in Column (3) supports the negative influence of TRESG on AGWCHANGE with a coefficient of -0.052 and p-value less than 0.1.

[Insert Table 10 here]

The finding is in line with the view related to transforming ESG practice of a greenwashing acquirer (Li, Liu, et al., 2020; Li, Xu, et al., 2020). After successfully integrating a target's ESG practice, a greenwashing acquirer could improve its ESG performance and reduce greenwashing activities. Accused by the external stakeholders, greenwashing behaviours bear costs to a greenwashing firm, such as lower signal reliability, legitimacy and firm financial performance. Therefore, going green via green deals could help firms, especially greenwashing firms, sustain their businesses although the costs of ESG practice appear high and the ESG-related benefits take time to realize.

Overall, although acquiring a green target helps a greenwashing acquirer transform its ESG practice, the market does not trust in its intention of going green. The findings of Model 1 and Model confirm the green transformation post-merger of a greenwashing acquirer with a decrease of its level of greenwashing in the post-takeover period. The market's misperception of the deal intention results in its negative reaction to the deal announcement. This finding

highlights the importance of communication between a greenwashing acquirer and its external stakeholders. Nguyen et al. (2022) find that acquiring a target with higher relative ESG ratings could enhance an acquirer's ESG performance post-merger. It comprehensively confirms the green transformation of a greenwashing acquirer when involving in a deal with a better-ESG target.

6. Conclusion

Our study has several practical implications. First, acquiring a better ESG-rated target is a strategic solution for firms to reduce greenwashing activities and transform ESG performance. Regulators could refer to this finding to guide firms, who engage in greenwashing, to improve their sustainability practice. Second, when transforming ESG practice via green deals, greenwashing firms' managers should focus on communicating deal motives and the up-to-date integration process to the market. Due to potential asymmetric information, the market refers to the acquirers' previous greenwashing behaviours to interpret the signal. Clear, detailed, and informative communication helps to avoid the market's negative response around the deal announcement date. Third, understanding how the market reacts to such deals provides investors a reference to make investment decisions related to those deals.

Further research could explore what factors drive the ESG-related integration process of a greenwashing acquirer in a green deal. Those factors help the acquirer reduce its greenwashing level and improve its ESG practice more significantly. Those factors provide a comprehensive framework to use a green deal as an ESG transformation channel.

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TABLES

Table 1: Control variable measures

Variable	Abbreviation	Measure
Deal size	DSIZE	Natural logarithm of total deal value in U.S. 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
Cash-offer deal	DCASH	1 if the deal is offered by 100% cash, 0 otherwise
Stock-offer deal	DSTOCK	1 if the deal is offered by 100% stocks, 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 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	AINSTOWN	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	AIDIRECT	An acquirer's the percentage of independent directors 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

Table 2: Sample description

Year	# Deals	# Cross-border deals	# U.S. Domestic deals
2006	5	4	0
2007	7	4	1
2008	15	3	5
2009	16	5	6
2010	21	10	5
2011	29	10	10
2012	27	10	5
2013	16	4	7
2014	39	12	16
2015	47	16	19
2016	52	22	22
2017	51	19	19
2018	67	22	34
2019	64	22	34
2020	33	9	15
Total	489	172	198

Table 3: Pearson correlations among variables and their Variance Inflation Factor (VIF)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	VIF
(1) AGWPRE	1																								
(2) AGWCHANGE	-0.105**	1																							
(3) TRESG	0.052*	-0.150***	1																						
(4) ACAR11	-0.235***	-0.088*	0.125**	1																					
(5) ACAR22	-0.234***	-0.07	0.089	0.948***	1																				
(6) DSIZE	0.162***	0.082*	0.013	-0.249***	-0.301***	1																			2.54
(7) DDIV	-0.032	0.229***	-0.043	-0.158***	-0.193***	0.013	1																		1.11
(8) DCROSS	0.019	0.190***	-0.174***	0.027	0.005	-0.017	0.083*	1																	1.13
(9) DMUL	0.026	0.058	0.041	-0.008	-0.013	0.120***	-0.034	0.057	1																1.03
(10) DCASH	0.037	0.056	-0.045	-0.064	-0.003	-0.166***	0.024	0.05	-0.036	1															1.09
(11) DSTOCK	-0.017	-0.027	0.067	0.068	0.062	0.055	-0.014	0.078*	-0.025	-0.023	1														1.04
(12) AMKCAP	0.309***	0.172***	-0.183***	-0.417***	-0.462***	0.559***	0.155***	0.094**	0.047	0.01	0.063	1													7.62
(13) AASSETS	0.296***	0.165***	-0.171***	-0.377***	-0.428***	0.493***	0.137***	0.097**	0.059	0.024	0.053	0.671***	1												7.83
(14) ALEV	0.045	0.055	0.057	-0.04	-0.025	0.193***	0.142***	-0.084*	0.04	-0.035	-0.014	0.153***	0.280***	1											1.44
(15) AMTB	0.02	0.143***	0.095**	-0.112**	-0.094*	0.114**	0.056	-0.06	-0.015	0.007	0.022	0.162***	-0.080*	0.161***	1										1.66
(16) AROE	0.051	0.110**	-0.073*	-0.112**	-0.149***	0.184***	-0.004	-0.023	0.028	0.024	0.031	0.278***	0.166***	0.088*	0.373***	1									1.28
(17) ABSIZE	0.144***	0.032	0.02	-0.187***	-0.227***	0.363***	0.039	0.094**	-0.001	-0.033		0.483***	0.531***	0.222***	-0.006	0.073*	1								1.58
(18) AINST	-0.192***	-0.120***	-0.003	0.225***	0.241***	-0.073*	-0.051	-0.062	0.005	-0.014	-0.001	-0.293***	-0.282***	-0.075*	-0.122***	-0.019	-0.168***	1							1.18
(19) AIDIR	0.153***	0.047	-0.095**	-0.192***	-0.161***	0.206***	-0.092**	-0.107**	0.052	-0.084*	-0.028	0.152***	0.064	0.059	0.112**	0.015	-0.152***	-0.004	1						1.3
(20) TMKCAP	0.06	0.016	0.105**	-0.093*	-0.189***	0.526***	0.031	-0.125***	0.015	-0.155***	0.017	0.358***	0.382***	0.098**	0.048	0.112**	0.273***	-0.073*	-0.134***	1					1.92
(21) TASSETS	0.047	0.06	0.155***	-0.153***	-0.201***	0.610***	0.017	-0.114**	0.080*	-0.170***	0.087*	0.363***	0.469***	0.195***	-0.051	0.083*	0.293***	-0.075*	-0.012	0.590***	1				2.46
(22) TLEV	0.045	-0.011	-0.081*	-0.009	-0.007	0.192***	-0.132***	-0.084*	0.01	-0.142***	0.017	0.051	0.111**	0.240***	-0.021	-0.003	0.130***	-0.031	0.112**	0.031	0.204***	1			1.2
(23) TMTB	-0.024	0.039	-0.110**	-0.068	-0.07	0.116**	0	-0.017	0.037	-0.04	0.009	0.139***	0.055	0.135***	0.096**	0.092**	0.106**	-0.078*	0.097**	0.062	-0.126***	0.099**	1		1.24
(24) TROE	-0.066	-0.03	-0.003	0.024	-0.036	0.131***	0.061	-0.078*	0.032	-0.016	0.03	0.098**	0.045	0.089**	0.037	0.154***	0.079*	0.134***	-0.019	0.175***	0.128***	-0.017	0.233***	1	1.18

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively

Table 4: Breusch-Pagan and Wu-Hausman Tests

	(1)	(2)	(3)	(4)
Dependent Variable	TRESG	ACAR[-1;+1]	ACAR[-2;+2]	AGWCHANGE
Independent Variable	AGWPRE	AGWPRE	AGWPRE	TRESG
Breusch-Pagan Test				
H_0: The error term has a constant variance				
Chi squared (1)	85.09	2.08	6.95	264.18
Prob > Chi squared	0.000	0.1493	0.0084	0.000
Wu-Hausman Test				
H0: the independent variable of interest is exogenous				
F statistic	14.9564	2.78043	5.48168	1.3472
p-value	0.0004	0.107	0.0268	0.2534
Employed estimation	2SLS	OLS	2SLS	OLS

Table 5: The legal origins of the targets' countries

Country	Legal origins	Country	Legal origins
Netherlands	Civil law	Russian Fed	Civil law
Australia	Common law	United Kingdom	Common law
Hong Kong	Common law	South Korea	Civil law
United States	Common law	Sweden	Civil law
Switzerland	Civil law	South Africa	Common law
Japan	Civil law	Germany	Civil law
Spain	Civil law	France	Civil law
Papua N Guinea	Common law	Taiwan	Civil law
India	Common law	Norway	Civil law
Canada	Common law	Israel	Common law
Greece	Civil law	Finland	Civil law
Mexico	Civil law	Singapore	Common law
Austria	Civil law	Argentina	Civil law
Brazil	Civil law	Cyprus	Common law
Italy	Civil law	Malaysia	Common law
Ireland Rep.	Common law	China	Civil law
Thailand	Common law	New Zealand	Common law
Morocco	Civil law		
Poland	Civil law		

Table 6: Descriptive statistics

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	0.1875	1
AINST	489	0.809	0.095	0.4254073	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	18.16519	25.00411
TLEV	489	0.278	0.186	0	0.9160777
TMKCAP	489	22.002	1.744	17.92815	27.75739
TMTB	489	3.668	6.241	-11.61534	46.51276
TRESG	489	0.840	0.544	0.070	3.166
TROE	489	0.043	0.441	-2.354073	2.118461

Table 7: Model 1 - The relationship between an acquirer's level of greenwashing pre-merger (AGWPRE) and a target's relative ESG score (TRESG)

	2SLS		OLS
	(1)	(2)	(3)
	AGWPRE	TRESG	TRESG
AGWPRE		**2.589***	**1.227***
		(4.69)	(4.28)
CORRUPT	-0.006***		
	(-3.53)		
AMKCAP	0.005*	-0.122***	-0.109**
	(1.89)	(-3.40)	(-2.61)
AASSETS	0.001	-0.032	-0.025
	(0.31)	(-0.76)	(-0.56)
ALEV	-0.022	0.189*	0.164
	(-1.11)	(1.66)	(1.23)
AMTB	0	0.020***	0.020***
	(-0.06)	(8.67)	(7.76)
AROE	-0.003	-0.251***	-0.272***
	(-0.31)	(-3.96)	(-3.72)
TMKCAP	0.002	-0.018	-0.021
	(0.67)	(-1.05)	(-1.07)
TASSETS	-0.005	0.123***	0.119***
	(-1.32)	(7.18)	(7.97)
TLEV	0.009	-0.475***	-0.439***
	(1.25)	(-8.90)	(-7.68)
TMTB	-0.001*	-0.002	-0.003
	(-1.74)	(-0.73)	(-1.02)
TROE	-0.010**	0.045	0.035
	(-2.58)	(1.03)	(0.79)
Constant	0.398***	1.770***	1.819***
	(2.68)	(5.11)	(6.15)
Acquirer Industry Fixed Effect	YES	YES	YES
Target Industry Fixed Effect	YES	YES	YES
Year Fixed Effect	YES	YES	YES
F statistics	17139		
Observations	489	489	467
Adjusted R^2	0.384	0.374	0.227

Notes: 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.

Table 8A: Model 2 – The relationship between an acquirer's level of greenwashing pre-merger (AGWPRE) and its cumulative abnormal return (ACAR) measured by the market-adjusted model

	OLS	2SLS		2SLS	OLS
		1st stage	Second stage	Second stage	
	(1)	(2)	(3)	(4)	(5)
	ACAR[-1;+1]	AGWPRE	ACAR[-1;+1]	ACAR[-2;+2]	ACAR[-2;+2]
AGWPRE	**-0.108**		**-0.284**	**-0.319**	**-0.071***
	(-2.72)		(-2.28)	(-2.32)	(-2.04)
CPI		-0.006***			
		(-3.06)			
DSIZE	-0.012*	0.001	-0.011**	-0.011	-0.011
	(-1.87)	(0.14)	(-2.36)	(-1.58)	(-1.26)
DDIV	-0.037***	-0.015**	-0.042***	-0.054***	-0.046***
	(-2.98)	(-2.08)	(-4.53)	(-6.66)	(-5.45)
DCROSS	0.021*	0.012	0.020**	0.01	0.01
	(1.89)	(0.86)	(2.13)	(0.94)	(0.75)
DMUL	0.005	-0.003	0.006	-0.001	-0.003
	(0.31)	(-0.26)	(0.45)	(-0.11)	(-0.16)
DCASH	-0.024	0.002	-0.022	-0.014	-0.015
	(-0.81)	(0.09)	(-0.96)	(-0.68)	(-0.62)
DSTOCK	0.074***	0.005	0.072***	0.081***	0.084***
	(3.09)	(0.54)	(3.68)	(4.31)	(3.53)
AMKCAP	-0.008	0.008*	-0.006	-0.015*	-0.017
	(-0.69)	(1.79)	(-0.62)	(-1.73)	(-1.66)
AASSETS	-0.013	-0.002	-0.012	-0.007	-0.01
	(-1.40)	(-0.45)	(-1.52)	(-0.82)	(-0.91)
ALEV	0.050**	-0.031	0.043**	0.028	0.039*
	(2.32)	(-0.86)	(2.54)	(1.22)	(1.72)
AMTB	-0.003***	0	-0.003***	-0.001	-0.001
	(-5.43)	(-0.94)	(-6.26)	(-1.18)	(-0.95)
AROE	-0.003	0.006	-0.005	-0.027	-0.022
	(-0.21)	(0.68)	(-0.47)	(-0.91)	(-0.68)
TMKCAP	0.007**	0.004	0.007**	0.002	0.003
	(2.20)	(1.13)	(2.48)	(0.57)	(0.55)
TASSETS	-0.004	-0.007	-0.005	-0.004	-0.003
	(-0.87)	(-1.01)	(-1.03)	(-0.57)	(-0.40)
TLEV	0.025	-0.005	0.025	0.025	0.027
	(0.82)	(-0.26)	(0.98)	(0.90)	(0.77)
TMTB	-0.002***	0	-0.002***	-0.002***	-0.002**
	(-3.06)	(-1.02)	(-3.77)	(-3.17)	(-2.52)
TROE	0.015	-0.011**	0.013	0.008	0.012
	(1.22)	(-2.37)	(1.29)	(0.64)	(0.77)
Constant	0.514***	0.274*	0.282***	0.515***	0.727***

	(7.02)	(1.69)	(3.11)	(4.53)	(6.72)
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		24093			
Observations	324	344	344	323	301
Adjusted R^2	0.274	0.371	0.259	0.269	0.304

Notes: 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.

Table 8B: Model 2 – The relationship between an acquirer's level of greenwashing pre-merger (AGWPRE) and its cumulative abnormal return (ACAR) measured by the market model

	OLS	2SLS		2SLS	OLS
		1st stage	Second stage	Second stage	
	(1)	(2)	(3)	(4)	(5)
	ACAR[-1;+1]	AGWPRE	ACAR[-1;+1]	ACAR[-2;+2]	ACAR[-2;+2]
AGWPRE	-0.084**		-0.224**	-0.297**	-0.068**
	(-2.42)		(-2.08)	(-2.21)	(-2.62)
CPI		-0.006***			
		(-3.06)			
DSIZE	-0.009*	0.001	-0.009**	-0.01	-0.01
	(-1.93)	-0.14	(-2.42)	(-1.61)	(-1.29)
DDIV	-0.032***	-0.015**	-0.036***	-0.049***	-0.042***
	(-2.88)	(-2.08)	(-4.33)	(-6.23)	(-5.05)
DCROSS	0.018*	0.012	0.017**	0.01	0.01
	(1.81)	-0.86	(2.06)	(1.09)	(0.86)
DMUL	0.00	-0.003	0.00	(0.00)	(0.00)
	(0.23)	(-0.26)	(0.35)	(-0.21)	(-0.26)
DCASH	(0.02)	0.002	(0.02)	(0.02)	(0.02)
	(-0.82)	-0.09	(-0.98)	(-0.92)	(-0.80)
DSTOCK	0.065***	0.005	0.063***	0.065***	0.068**
	(3.26)	-0.54	(3.92)	(3.28)	(2.71)
AMKCAP	(0.01)	0.008*	(0.01)	-0.015*	(0.02)
	(-0.66)	-1.79	(-0.60)	(-1.73)	(-1.67)
AASSETS	(0.01)	-0.002	(0.01)	(0.01)	(0.01)
	(-1.37)	(-0.45)	(-1.49)	(-0.84)	(-0.91)
ALEV	0.047**	-0.031	0.041***	0.03	0.04
	(2.32)	(-0.86)	(2.68)	(1.16)	(1.59)
AMTB	-0.003***	0	-0.003***	(0.00)	(0.00)
	(-5.41)	(-0.94)	(-6.30)	(-0.85)	(-0.68)
AROE	(0.00)	0.006	(0.01)	(0.02)	(0.02)
	(-0.24)	-0.68	(-0.49)	(-0.78)	(-0.58)
TMKCAP	0.006**	0.004	0.006**	0.00	0.00
	(2.17)	-1.13	(2.43)	(0.55)	(0.54)
TASSETS	(0.00)	-0.007	(0.01)	(0.00)	(0.00)
	(-0.83)	(-1.01)	(-0.99)	(-0.59)	(-0.43)
TLEV	0.02	-0.005	0.02	0.03	0.03
	(0.70)	(-0.26)	(0.84)	(1.05)	(0.89)
TMTB	-0.002***	0	-0.002***	-0.002***	-0.002***
	(-3.45)	(-1.02)	(-4.23)	(-3.55)	(-2.82)
TROE	0.01	-0.011**	0.01	0.01	0.01
	(1.12)	(-2.37)	(1.18)	(0.53)	(0.67)
Constant	0.433***	0.274*	0.221***	0.489***	0.719***
	(6.98)	-1.69	(2.77)	(4.32)	(6.45)

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		24093			
Observations	324	344	344	323	301
Adjusted R^2	0.260	0.371	0.245	0.251	0.284

Notes: 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.

Table 9: The moderating effect of TRESG on the relationship between AGWPRE and the market's reaction

	(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)
DSIZE	-0.011*	-0.011
	(-1.95)	(-1.28)
DDIV	-0.037***	-0.045***
	(-3.25)	(-5.28)
DCROSS	0.018	0.009
	(1.62)	(0.68)
DMUL	0.005	-0.003
	(0.29)	(-0.19)
DCASH	-0.028	-0.018
	(-0.94)	(-0.71)
DSTOCK	0.079***	0.086***
	(3.24)	(3.64)
AMKCAP	-0.012	-0.019*
	(-0.97)	(-1.85)
AASSETS	-0.011	-0.009
	(-1.25)	(-0.89)
ALEV	0.050**	0.039
	(2.44)	(1.69)
AMTB	-0.002***	-0.001
	(-3.81)	(-0.68)
AROE	0.001	-0.019
	(0.09)	(-0.58)
TMKCAP	0.006*	0.002
	(1.99)	(0.43)
TASSETS	-0.001	0
	(-0.11)	(-0.01)
TLEV	0.017	0.021
	(0.53)	(0.65)
TMTB	-0.002***	-0.002**
	(-2.90)	(-2.34)
TROE	0.012	0.009
	(0.93)	(0.59)
Constant	0.516***	0.729***
	(7.43)	(6.66)
Acquirer Industry FE	YES	YES

Target Industry FE	YES	YES
Year FE	YES	YES
Observations	324	301
Adjusted R^2	0.284	0.306

Notes: 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.
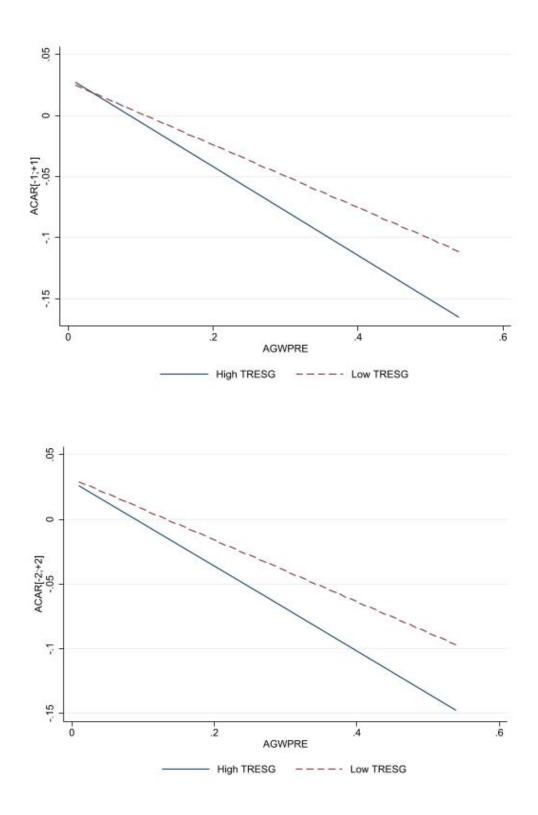
Table 10: Model 3 – The relationship between a target's relative ESG score (TRESG) pre-merger and an acquirer's change in the level of greenwashing pre- and post-merger

	OLS	2SLS	
	(1)	(2)	(3)
	AGWCHANGE	TRESG	AGWCHANGE
TRESG	**-0.346****		**-0.052***
	(-2.48)		(-1.70)
LEGAL		0.700***	
		(5.45)	
DSIZE	-0.014	0.089***	-0.02
	(-0.23)	(4.12)	(-0.36)
DDIV	0.685***	-0.026	0.693***
	(3.16)	(-0.45)	(3.60)
DCROSS	0.434	-0.112***	0.472*
	(1.37)	(-4.44)	(1.75)
DMUL	0.152	0.117	0.127
	(1.08)	(1.47)	(0.93)
DCASH	0.169	-0.009	0.166
	(0.50)	(-0.15)	(0.54)
DSTOCK	-0.178	-0.074	-0.326
	(-0.38)	(-0.43)	(-0.77)
AMKCAP	-0.191	-0.112**	-0.163
	(-1.49)	(-2.67)	(-1.37)
ALEV	-0.179	0.101	-0.221
	(-0.65)	(0.72)	(-0.95)
AASSETS	0.250**	0.020	0.258**
	(2.08)	(0.43)	(2.45)
AMTB	0.045***	0.017***	0.041***
	(5.82)	(4.43)	(5.62)
AROE	0.415**	-0.252***	0.492***
	(2.27)	(-4.23)	(3.20)
ABSIZE	-0.012	0	-0.017
	(-0.49)	(-0.06)	(-0.80)
AINST	-0.762	-0.101	-0.685*
	(-1.57)	(-0.75)	(-1.65)
AIDIR	0.434	0.192	0.434
	(0.99)	(1.19)	(1.14)
TMKCAP	-0.035	-0.085***	-0.029
	(-1.01)	(-3.53)	(-1.04)
TASSETS	0.120*	0.077***	0.094*
	(1.79)	(4.70)	(1.82)
TLEV	-0.131	-0.412***	-0.005
	(-0.45)	(-5.84)	(-0.02)
TMTB	0.005	-0.003**	0.007

	(0.26)	(-1.29)	(0.42)
TROE	-0.219	0.012	-0.218*
	(-1.67)	(0.31)	(-1.80)
Constant	-2.431	1.856***	-4.085**
	(-1.35)	(3.34)	(-2.10)
Acquirer Industry Fixed Effect	YES	YES	YES
Target Industry Fixed Effect	YES	YES	YES
Year Fixed Effect	YES	YES	YES
F statistics		3521	
Observations	478	489	489
Adjusted R^2	0.112	0.430	0.237

Notes: 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.

FIGURE

Figure 1: The moderating effect of TRESG on the AGWPRE and ACAR relationship