

The Effect of ESG Information on Market Returns in Mergers

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Abstract

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Using environment, social and governance (ESG) data from the MSCI Intangible Value Assessment (IVA) database, we examine how the aggregate ESG information and the ESG pillar information of targets and acquirers influence their market returns and total market returns around the announcement date. We find that acquirers with higher ESG-related risks and incommensurate managerial ability have lower acquirer and synergistic market returns. We find that an acquirer's aggregate ESG strength has a significant positive impact on its market returns, yet the impact of a target's aggregate ESG performance is not very certain or significant. The target's governance strength and the acquirer's social strength are valued by the market. We also find that targets in the IVA database tend to be large firms with good performance. This phenomenon may explain the insignificant influences of the target's ESG performance on announcement date abnormal returns.

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1. Introduction

With the increasing emphasis on the sustainability or social responsibility of a firm, many scholars have studied the impact of a firm's environmental, social or governmental (ESG) strength on its performance and its cost of capital, for example, Goss and Roberts (2011), Choi (2011), Landier and Nair (2009), Guenster et al., among others. However, we believe that ESG factors also influence the market returns of acquirers and targets during a merger. Given that the acquirer needs to manage environmental pollution exposures in many countries, weakness in ESG issues indicates higher potential risk exposure in the future. What is more, as found by a large portion of researchers, ESG strength is positively related to better firm performance and a lower cost of capital. Large asset owners also pay more and more attention to ESG issues to achieve a sustainable growth. However, most studies establish correlation instead of causality between sustainability and corporate financial performance (Fulton, Kahn, Sharples 2012), as using within-firm time-series variation may result in endogeneity (Wong and Xie, 2008). The target's ownership is fundamentally changed during a merger, as both the target's and the acquirer's stock prices change significantly around the announcement. The acquirer's policies, management team and technology will be applied to the target, while the acquirer may also have the chance to learn from the targets in ESG fields. Thus, we believe it is necessary to analyse the impact the target or acquirer ESG factors have on their market returns, or whether investors value these factors. The effect of a difference in the acquirer and target ESG levels on synergistic gains (losses) can also be investigated throughout this process. We use data from a new database, which has not frequently been used in existing studies. The MSCI ESG Research Intangible Value Assessment (IVA) database provides data related to firms' ESG issues. On the one hand, it can be regarded as a measure of firms' ESG performance. On the other hand, IVA ESG data can be divided into firms' risk exposure related to ESG issues and their corresponding risk managerial ability. These features make IVA ESG data ideal for our research.

To begin, we investigate the impact of target ESG strength on M&A performance. We find that the target's aggregate ESG strength has a positive impact on synergistic merger returns around

the announcement date, but no significant influence on its own abnormal returns. In light of each E, S or G pillar strength, the target governance pillar has the most significant and positive effect on the target and total merger returns, especially in a longer event window. The effect of the environmental pillar is positive, yet it is only significant in a 3-day-event window around the announcement date. The social pillar shows no significant influence at all. Meanwhile, the acquirer's high aggregate ESG level has a positive and significant effect on both the acquirer and total market returns around the announcement date. Among the acquirer's three pillars, only the impact of the social pillar is significant. A higher social pillar level increases the acquirer's market returns and total synergistic merger returns. These impacts are significant in event windows as long as 41 days around the announcement date. We find no significant impact of the difference between acquirers' and targets' ESG levels.

From the perspective of the ESG risk and corresponding risk managerial ability, we find that if the acquirer's ESG managerial ability is not commensurate with its high ESG risk, both its merger returns and the total merger returns will decrease.

In our additional analysis section, we find that the firms included in the IVA database are larger in size and perform better. Then, we examine the reason from the sample selection criteria of the IVA database and provide a possible explanation for why the main results we obtain are less significant than our expectations. The criteria of the IVA database also indicate that our main findings may not be as applicable to smaller and worse-performing firms as to larger, high-performing firms.

Our paper contributes to the literature in three aspects. First, we use a new database, MSCI IVA ESG, which has not frequently been used to conduct research in this field. Second, we examine the impact of the difference between the acquirer's and the target's ESG levels on the total market returns in mergers. Third, we study a firm's ESG issue from the aspect of potential ESG risk and corresponding managerial ability.

The rest of the paper is organised as follows. Section 2 traces and reviews the existing literature in sustainable investing (SI), corporate social responsibility (CSR) and the impact of ESG issues. Section 3 introduces the hypothesis of this paper. The data and methodology are described in Section 4. Sections 5 and 6 present the main results and some additional analysis, respectively. Section 7 is the conclusion of the paper.

2. Literature review

SI and its corporate counterpart CSR have been widely discussed since the 1960's. As an ethically oriented investment strategy when it was founded, SI (or originally socially responsible investing) gradually shifted to a broader approach including environmental, social, corporate and financial factors in the late 1990s. Like its counterpart, early-CSR referred to corporate philanthropy and social relations in the 1950s. The concept was regarded as a trade-off between corporate financial and social performance, which violates the maximum shareholder value business objective posed by Friedman. However, some scholars view CSR strategy from other perspectives. Johnson (1971) proposed its importance in maximising a firm's long-term profit. More recently, Jensen (2001) holds that only by creating a win-win situation with customers and community, firms can maximise their long-term performance. Throughout this period, to satisfy scholars' and investors' desire for more concrete definitions, some related terms have been created by different market participants. Mercer (2007) defines modern socially responsible investing as 'an investment process that seeks to achieve social and environmental objectives alongside financial objectives, utilizing both values-driven, and risk and return screening' (page 64), and CSR as 'an approach to business which takes into account economic, social, environmental and ethical impacts for a variety of reasons, including mitigating risk, decreasing costs, and improving brand image and competitiveness' (page 60). Since 2003, the UNEP FI Asset Management Working Group (AMWG) was founded to study the influence of ESG factors on the investment process and valuation. Although there is no definitive list, ESG factors are used globally to describe one or more of the following characteristics:

- i. Issues that have traditionally been considered non-financial or not material
- ii. A medium- or long-term time horizon
- iii. Qualitative objects that are not readily quantifiable in monetary terms
- iv. Externalities (costs borne by other firms or by society at large) not well captured by market mechanisms
- v. A changing regulatory or policy framework
- vi. Patterns arising throughout a company's supply chain (and therefore susceptible to

unknown risks)

vii. A public-concern focusⁱ

After 2003, the ESG factors were defined in the contemporary CSR framework. Fulton, Kahn and Sharples (2012) conclude that contemporary CSR is an assembly of ESG factors, corporate citizenship and economic responsibility. They also use SI to define all forms of socially responsible investing and ESG-oriented investing.

Both scholars and brokers have studied the materiality of the influence of ESG and CSR. Such researchers mainly focus on two fields: the correlation to the corporate cost of capital and the correlation to the corporate financial performance. In light of CSR and the cost of capital, most of the researchers find a positive relationship between corporate high CSR performance and a lower cost of equity capital or debt capital. Ghoul et al. (2011) find firms with a higher CSR score enjoy cheaper equity financing in the U.S. Goss and Roberts (2011) hold that companies with below average ESG records pay a 7–18 basis point premium, yet lenders are not sensitive to such information if the borrower is a high-quality one. Among the three ESG pillars (E, S or G) and cost of capital, corporate governance is the one studied most extensively. Bhojraj and Sengupta (2003) find the correlation between better corporate governance and a lower bond yield, and they explained that governance reduces the agency costs and information asymmetry between the firm and lenders, thus contributing to a lower default risk. Choi (2011) proves that firms with poorer corporate governance suffer from higher costs of equity capital with Korean samples. As for environmental performance, Schneider (2011) interprets poor environmental performance as a determinant of bankruptcy risk by increasing future environmental liabilities, compliance and clean-up cost. However, Schneider (2011) concludes that firms' environmental performance is a significant component of bond pricing, yet for high-quality bonds, the effect of environmental concerns is much smaller. Chava (2011) finds that firms with environmental strengths embrace higher expected returns and lower interest rates on loans. Few works are done regarding social factors: Bauer et al. (2009) examine the relationship between employee relations and credit risk; they find that firms with better employee relations have less debt, higher credit ratings and lower firm-specific risk. No study on the aggregate ESG issue is conducted in this field because each factor may have a different strength to the cost of capital due to their broad nature (Fulton, Kahn, Sharples 2012).

In terms of the relationship between CSR/SI and corporate financial performance, corporate financial performance is divided into two areas: market-based performance measured by stock price, bond price, Tobin's Q, etc., and accounting-based performance measured by firm value, return on assets, etc. To sum up, most studies recognise that firms with strong CSR have better corporate financial performance. Eccles, Ioannou and Serafeim (2012) find that high-sustainability firms have better stock and accounting performance in the long run. Luo and Bhattacharya (2006) offer evidence that CSR strength results in a higher market value by increasing customer satisfaction. When it comes to the impact of ESG on corporate financial performance, scholars worked on both the aggregate and disaggregated ESG, yet literature on disaggregated ESG performance still outnumbers aggregated performance. The reason stated by Fulton, Kahn and Sharples (2012) is similar to the one given above. The main results found in those papers vary; however, we can still conclude that in most of the papers, ESG factors are positively related to corporate financial performance. Many researchers have studied the effect of corporate governance. Gompers et al. (2001) construct a governance index and realise that 'firms with stronger shareholder rights have higher firm value, higher profits, lower capital expenditures, and made fewer corporate acquisitions.ⁱⁱ' Ammann et al. (2010) construct other three indices of their own and prove that strong corporate governance is positively related to firm value and accounting-based performance. Meanwhile, Bhagat and Botton (2008) find no correlation between governance and a company's future market performance. Bauer et al. (2003) find a negative relationship between corporate governance and firms' value. In terms of environmental concerns, Al-Tuwaijri et al. (2003) reach the conclusion that environmental strength is positively linked with better economic performance. Guenster et al. (2011) contribute to this field by extending environmental factors to eco-efficiency and find a positive association between a firm's operating performance and its market value. However, Fernando et al. (2010) find that the stock market is indifferent to either the positive or the negative environmental performance. Fu and Shan (2009) focus on corporate social equality and conclude that there is a positive relation between equality and stock returns and the market valuation of the company. Derwall et al. (2011) argue that the abnormal returns created by a strong-employee-relations portfolio disappear in the long term. Only one study is conducted using aggregate ESG: Landier and Nair (2009) also conduct a responsible portfolio within S&P

500 and find it embraces a slightly higher average return.

Given the key findings in the existing literature, it seems that CSR/SI does not mean a trade-off between sustainability and economic benefits; they can be adopted as a strategic tool to enhance shareholders' value and firms' value. In addition to the internal motivation, the external "push" from civil society, government, NGOs and investors is emerging. Taking the environmental pillar as an example, the EU has approved the Environmental Liability Directive and made firms financially liable for solving their environmental externalities. In the U.S., the administration of President Barack Obama has pledged to increase the enforcement of existing environmental regulations and adopt stricter standards. Thirty additional contaminants under the federal Safe Water Drinking Act are taken into account by the U.S. Environmental Protection Agency. Tougher and increasing future regulations mean future risks or even liabilities for companies. From the perspective of investors, institutional and other large asset owners, they possess a slice of the entire economy, and thus seek long-term, enduring economic growth. Other investors, who adopt a best-in-class approach and pursue continual outperformance of firms, think about ESG factors as well.

The impact of ESG factors may exist in the process of mergers. As mentioned in section 1, the target's pollution exposures will be traced back for decades and succeeded by bidders in many countries. Deng, Kang and Low (2013) view the necessities from the aspect of stakeholder wealth. From their point of view, investing in CSR suggests that firms may have a stronger reputation for keeping their commitment; therefore, stakeholders are more willing to contribute to the firms' long-term probability and efficiency. As a result, the value of shareholders is increased. In other words, higher CSR acquirers will enjoy higher merger announcement returns. As for corporate governance, a change in control may lead to the change in shareholder rights and other governance policies (Wong and Xie, 2008). They show that the difference in corporate governance between bidders and targets improves the synergistic gains from mergers.

3. Hypotheses

In this section, we set three hypotheses based on Sections 1 and 2. From the perspective of ESG

performance, we expect that better target ESG (E, S or G) performance positively influences the target and total market performance around the announcement date (Hypothesis 1). Regardless of the level of the acquirer's ESG, the target's ESG strength should be valued by investors. That is to say, we suppose that a higher target ESG score and each pillar score are related to higher target abnormal returns and total abnormal returns around the announcement date. Regarding the acquirer's ESG factor, the result may be uncertain because it may be related to the target's ESG performance. If there ends up being a positive relationship between the acquirer's ESG strengths and abnormal returns (or total abnormal returns) around the announcement date, then it means that acquirers with better ESG performance may have better regulations, technology, management team or experience, which make them outstanding. These benefits can help those acquirers successfully deal with the ESG issues of targets. Similarly, if the acquirer's ESG performance is better than the target's, the acquirer can improve the target's ESG performance and thus increase its future market and financial performance. As a result, we suppose that if the acquirer's ESG (E, S or G) performance is better than the target's, there will be a positive impact on their total market value around the announcement date (Hypothesis 2). If the acquirer's ESG performance is worse than the target's, the condition could be complicated. The weakness in the ESG technology or managerial ability of an acquirer with poor ESG performance may ruin the target's strength in ESG fields, which may lead to a negative impact on the acquirer's abnormal return and total abnormal returns around the announcement date. However, if acquirers can learn from targets and improve themselves, the impact may not be negative.

From the perspective of ESG risk and managerial ability, we suppose that acquirers with high potential ESG risk and incommensurate managerial capability has lower acquirer (and total) market abnormal returns around the announcement date (Hypothesis 3), as we believe that they cannot manage additional risk acquired from targets.

4. Data and methodology

4.1 Data source and sample descriptions

Our merger and acquisition samples are extracted from the Securities Data Company's (SDC)

US Mergers and Acquisition database. Mergers between January 1, 1999 and December 31, 2015 are selected using the following criteria:

- i. Both acquirers and targets are public US firms;
- ii. Neither acquirers nor targets are financial institutions;
- iii. Neither acquirers nor targets belong to the utility industry (water, electricity or gas);
- iv. The acquisition is not cross-border;
- v. The form of the deal is a merger or acquisition of majority interest;
- vi. The period between two consecutive bids of the same target is at least 250 days;
- vii. The period between two consecutive bids on the same target by the same acquirer is at least 6 months;

As a result, we get 2748 mergers. The reason we exclude utilities is that the actions of these firms could be highly related to each other. Considering that different countries may have various regulations and standard in ESG fields, we exclude cross-border mergers because we think the country level disparities may either enhance or eliminate the firm-level ESG differences. If the form of the deal is acquisition, the acquirer and target still operate independently afterwards. The acquirer's benefit in ESG issues may not be applied to the target, so we exclude those deals whose form of deal is acquisition.

Then, we use the data from the MSCI ESG Research IVA as the measurement of ESG factors. The IVA analyzes risk and opportunities arose from ESG issues for companies. Key ESG issues in each industry are identified, and firms are evaluated according to their exposure to these issues and their risk managerial ability. Then, after weighing the exposure and managerial ability, the IVA assigns scores to each firm on ESG pillars. The aggregate ESG industry adjusted score is set against the industry peers. First recorded in 1999, the scores range from 0 to 10. Finally, a rating from AAA (the best) to CCC (the worst) is assigned to each firm based on the aggregate ESG industry adjusted score, but the methodology of the assignment is not mentioned. Considering that the rates are developed from the score and not assigned to each pillar, we use the score as our main dependent variables in the paper.

According to the methodology document, IVA ESG scores can be interpreted in two ways. On one hand, a higher score reflects a firm's better overall performance on ESG issues. On the other hand, scores can be regarded as a measure of their future risk exposure and corresponding

managerial ability to manage that risk. If the firm has anticipated the future risk and has the managerial ability to deal with the risk, the risk may turn into opportunities for the firm. As a result, firms with no or little future risk on ESG factors are not assigned a high score under this mechanism. In fact, scores equaling 5 are interpreted as follows: “Risk management is commensurate with the current level of risk exposure, but not anticipating future risks, some probability of adverse impact to the company.”ⁱⁱⁱ While a higher score indicates a higher level of risk exposure and sufficient management capability to deal with it, a lower score suggests a gap between the high-risk exposure and managerial ability. A score equaling 7 indicates that the firm is anticipating future risks. A score equaling 3 suggests that the firm’s risk management on ESG issues is not commensurate with its level of risk, and the risks could negatively affect the firm. Therefore, we define scores around 5 (from 3 to 7, excluding 3 and 7) as little risk, scores of 3 or lower as high risks with incommensurate managerial ability, and scores greater than or equal to 7 as high risk with commensurate managerial ability.

Financial data of the targets are collected from Compustat North America Fundamental Annual database, and the abnormal returns of acquirers and targets are extracted from Eventus database. Both acquirers’ and targets’ cumulated abnormal returns are based on a market model and value weighted. Our sample group A consists of those mergers whose target IVA data are available before the announcement, and sample group B is made of those mergers whose target and acquirer are listed in the IVA database prior to the announcement date. By adding the financial data of targets to sample group A, we construct sample group C. Due to the blanks, the sample size of observations used to run the regression were reduced to 128 and 115 for sample groups A and B, while sample group C involves 54 mergers correspondingly. Table 1 shows the summary statistics of the cumulated abnormal returns of sample group A. Table 2 presents the summary statistics of targets’ and acquirers’ ESG scores of sample A and B. Table 3 shows the summary statistics of merger characteristics and targets’ financial data in Panels A and B, respectively.

The year distribution of targets in sample group A is presented in Table 4 Panel A. According to Chang, Kuo and Chen (2013), sustainability performance varies among industries, so we use the two-digit SIC code of each company to define its industry. The industry distribution of targets in sample group A is displayed in Table 4 Panel B.

4.2 Variable construction

We measure firms' aggregate ESG performance by the industry adjusted score. The performance of each E, S or G factor is measured by the E, S or G pillar score. To examine the impact of the acquirer and target difference on ESG, we construct dummy variables for mergers where acquirers have higher (lower) ESG scores (or E, S, G pillar score) than targets. They are labeled as A>T ESG (E, S or G) score or A<T ESG (E, S or G) score. To measure firms' ESG risk exposure and managerial ability, we also construct 2 dummy variables, Target (Acquirer) ESG score_{0–3} and Target (Acquirer) ESG score_{7–10}. Both indicate high potential risk exposure, but score 0–3 suggest an incommensurate risk management capability. Score 7–10, in contrast, indicates a commensurate risk management power.

The gains (losses) of targets' (acquirers') market returns are measured by the value-weighted cumulated market model abnormal returns around the announcement date. The estimation period ends 46 days prior to the announcement, and the length of the estimation period is 250 days. Considering that the premium, target size and acquirer size extracted from SDC Platinum are four weeks prior to the announcement date, our longest event window starts 20 trading days prior to announcement date and ends 20 trading days after that date. Four windows are used for the CARs: (-20,-2), (-1, 1), (2, 20) and (-20, 20). The reason we include an event window as long as 41 days around the announcement date is that the impact of ESG factors may not be fully recognised in a short period, and the market may need a longer time to act on the changes. We also construct the portfolio cumulated abnormal return of targets and acquirers weighted by their market capital four weeks prior to the announcement date so that we can analyse the total market returns of the merger.

In terms of control variables, we include features of the deal, targets and acquirers. Among features of the deal, we expect that tender offers tend to increase the gains of both targets and acquirers, and targets will capture a larger proportion of gains (Brandley, Desai and Kim, 1988). Payment by all cash is also linked to a higher abnormal return (Fuller, Netter and Stegemoller 2002; Antoniou, Guo and Petmezas, 2008). As for the features of the targets and acquirers, Moellera, Schlingemann and Stulzc (2004) find that small firms have higher abnormal returns than larger ones, while targets with higher Tobin's q are supposed to have higher target and

total returns (Servaes 1991). Since no observation in our sample is a leveraged buyout (LBO), we do not include a dummy variable measuring LBO in control variables. Definitions of all the variables are listed in Appendices.

4.3 Methodology

We perform OLS regressions to test the impact of firms' ESG factors level on their abnormal returns around the announcement date to assess how they influence firms' market value. When we focus on targets' ESG factors, the explanatory variables are the ESG score, E score, S score and G score of targets independently. Explained variables are the target's CAR (TCAR) and market capital weighted portfolio CAR of the target and acquirer (PCAR) in each event window. Control variables consist of features of the target in variable definitions Panel B (exclude institutional) and characteristics of the deal in Panel C. Similarly, when studying the influence of acquirers' ESG level, the ESG score, E score, S score and G score of targets are used as independent variable in each model. The acquirers' CAR (ACAR) and PCAR in each event window are the dependent variables in the models. Control variables are those measuring the acquirer's characteristics in variable definitions Panel B and characteristics of the deal in Panel C. Specially, dummy variables comparing acquirers' and targets' ESG score, $A > T$ ESG (E, S or G) score or $A < T$ ESG (E, S or G) score are adapted as independent variables at the same time in one model. To further analyze the combined impact of acquirers' and targets' ESG factors, we divide the performance into managerial ability and potential risks. Unfortunately, IVA ESG data provide no measurement on firms' absolute ESG risk managerial ability. The management capability is only compared with its corresponding ESG risk exposure. Therefore, we only generally regress the dummy variables Target (Acquirer) ESG score_{0–3} and Target (Acquirer) ESG score_{7–10} on TCAR (ACAR) and PCAR with control variables to see what we can find from the statistical results. Target (Acquirer) ESG score_{0–3} and Target (Acquirer) ESG score_{7–10} are also used as explanatory variables at the same time.

5. Main results

Because IVA ESG scores can be interpreted in two ways, ESG performance, and risk exposure

and managerial ability on ESG issues, we conduct our research with both interpretations in this section. We will examine the effect of ESG factors on abnormal returns from two general perspectives: targets' (acquirers') ESG strength, acquirers' and targets' ESG factors differences.

5.1 ESG level of acquirers and targets

We start with the interpretation of ESG performance. First, we purely examine the relationship between targets' (acquirers') ESG levels and CARs. The other interpretation will be studied in next subsection 5.2.

5.1.1 Targets' ESG performance

First, we investigate the relationship between target's aggregate ESG factors and abnormal returns. As mentioned in the previous section, both targets' abnormal returns and portfolio abnormal returns are studied as dependent variables. The regressions of aggregate target ESG factors on targets' abnormal returns are shown in Table 5, and the results of target's aggregate ESG factors and portfolio abnormal returns are shown in Table 6. From Table 5, we can observe that targets' aggregate ESG scores are not significantly related to target's CAR around announcement date. However, they have a positive relationship with portfolio CAR in (-1, 1), and the result is significant for the larger sample group A.

Tables 7 and 8 present the regressions of each E, S and G factor as independent variables on TCAR and PCAR, respectively. Statistics displayed indicate that targets' social pillar score is not significantly related to their CAR aroused by a merger announcement. As for targets' governance pillar score, it is positively linked to their CAR in (-20, 20) and (-20, -2). The environmental pillar score has a positive relationship with targets' CAR in both (-1, 1) and (-20, 20) windows, but it is only significant in the short window (-1, 1) with the smaller sample group C. When we use the portfolio CAR as the dependent variable, neither the environmental pillar nor social pillar score has a significant relationship with the portfolio CAR in any window studied. Only the governance pillar score is positively related to the portfolio CAR in all windows displayed, and the result is significant in the (-20, -2) window. Given the p-value

of the independent variable in Table 8 Panel A column 8, the positive relationship between the governance pillar score and portfolio CAR is not far from the 10% significance level.

To sum up, the evidence does not fully support our Hypothesis 1 that a higher ESG level of the target is valued by the market; the condition seems to be more complicated. The target's aggregate ESG strength has a positive impact on the synergetic gains of a merger around the announcement date, yet it does not affect the target's market behavior. After analysing each ESG factor, we find a possible explanation. The governance strength of target firms, as many scholars studied, has the most significant positive impact on both target and total market returns. In contrast, targets' social factor level seems to be completely neglected by the market, while the positive impact of environmental pillar on target stock return is only significant in 3 days around announcement date. Therefore, the aggregate effect of three factors can be offset by the different impact of each factor, which leads to the insignificant result of the aggregate ESG score. Other possible reasons will be analysed in Section 6.

5.1.2 Acquirers' ESG performance

After focusing on the target's ESG level in the previous subsection, we test the impact of the acquirer's ESG factors on the acquirer's CAR and portfolio CAR. Due to the limit of sample size and availability of Compustat data, we conduct the regressions with the larger sample group C. That means control variables measuring firm performance, Tobin's q, ROA and Leverage, are not included in the models here. Table 9 shows the regressions analysing the impact of acquirers' aggregate ESG performance. Regressions related to each E, S or G factor and ACAR are presented in Table 10, and regressions related to each E, S or G factor and PCAR are listed in Table 11. Acquirers' aggregate ESG score is positively associated with both acquirers' CAR and portfolio CAR. The relationship is significant at the 10% significance level in (-20, 20) with acquirers' CAR and nearly significant with portfolio CAR in (-20, 20). Environmental and governance pillar scores are not significantly related to either acquirers' CAR or portfolio CAR, while the social pillar score has a positive and significant relationship with acquirers' CAR in (2, 20), (-20, 20), and with portfolio CAR in (2, 20).

Based on these results, we can conclude that the acquirer's total ESG strength has a positive

and significant impact on its abnormal returns around the announcement date, yet the impact on total market returns is not statistically significant. This supports one of our expectations in section 3 that the market may think an acquirer with good ESG performance can deal with the target's ESG-related affairs properly. Among E, S and G pillars, only an acquirer's social pillar strength has significant and positive impacts on acquirer and total market returns, while the other two pillars have no significant influence on the market.

Comparing the conclusions from subsection 5.1.1 and 5.1.2, we find that investors pay attention to different pillars of acquirers and targets. As for targets, governance pillar strength is valued most significantly. Regarding acquirers, social pillar strength is the only pillar with significant influence. The reasons for this phenomenon can be explored in further research.

5.2 Acquirers' and targets' ESG performance differences

In this subsection, we take both targets' and acquirers' ESG conditions into account and investigate their joint effect on total gains or losses of the merger. Unfortunately, compared with mergers in which the acquirer and target enjoy the same ESG level (or E, S G level), mergers that are combinations of firms of different ESG levels (or E, S G levels) have no significant higher or lower total CARs. Regression results are not displayed in the paper, but they are available if requested. The conclusions are not consistent with Hypothesis 2. We believe that when studying the acquirers' and targets' differences on ESG issues, it may not be accurate enough to regard ESG scores as performance. Therefore, we try to view ESG scores from a different aspect. According to the methodology provided by the MSCI IVA database, as we have mentioned, the score can be interpreted as the combination of ESG risk exposures and corresponding management capability. Therefore, in the next subsection, we will re-do part of our research with new dummy variables measuring the risk and management of targets and acquirers.

5.3 Risk exposure and management capability on ESG issues

As mentioned in previous section 4, according to the methodology of MSCI IVA ESG database,

scores around 5 indicate that firms with little future potential risks. Thus, we re-do some of our research in section 5.1 with the dummy variables Target (Acquirer) score0–3 and Target (Acquirer) score7–10. The new results related to targets' ESG level are presented in Tables 12 and 13. Compared with targets with little risk, targets with higher future risk and sufficient risk managerial ability are significantly associated with a lower target CAR, while targets with higher future risks and incommensurate risk managerial ability are significantly related to a higher portfolio CAR. These results are bizarre, but can be explained by the fact that targets' management team and regulations may be changed after the merger. That is to say, their risk managerial ability can be less critical than their future risk exposure, and how the market responds to their potential risks depends on the acquirer. However, the risk managerial ability in ESG scores is only evaluated for a firm's current level of risk correspondingly. There is no absolute standard for it, so we cannot construct a variable or interaction to measure the collective impact of a target's risk and an acquirer's risk managerial ability. All we can do is to simply analyse the mutual influence of the acquirer's risk and managerial ability. We regress the dummy variables Acquirer score0–3 and Acquirer score7–10 on ACAR and PCAR; the regressions are listed in Table 14. We find that acquirers with high risk and no commensurate risk management suffer from a significantly low acquirer and portfolio CAR. The results are consistent with Hypothesis 3. It can be explained in such way that an acquirer who cannot manage its own ESG risks can hardly manage additional risks, if any, from the target after the merger. It seems that the concern of its incommensurate managerial ability on high ESG risk outweigh the expectation that it could learn from the target in the market.

Overall, the evidence reported in this section does not fully support Hypothesis 1 that a target's aggregate ESG strength has a positive influence on its own and portfolio market returns.

Meanwhile, the effect of an acquirer's aggregate ESG strength on the acquirer's and total market returns turn out to be all positive and more significant. The impact of the target's aggregate ESG strength, if significant, tends to gather in a much shorter period around the announcement date, while the acquirer's influence seems to last longer. Regarding separate E, S or G factors, the results are not always consistent with our hypothesis, and the impacts are different for acquirers and targets, which is quite confusing. Targets' governance pillar strength increases both targets' and acquirers' abnormal returns, which indicate that the value

of targets' governance is fully recognised by the market. Targets' environmental strength has a much weaker positive impact on targets' and total gains, while the social factor level shows no significant result on the targets' market returns and total market returns. As for acquirers, only their social factor strength increases acquirers' and total CAR significantly. A higher environmental factor level has a positive and insignificant influence, while the influence of the governance pillar is surprisingly uncertain.

Besides, mergers where acquirers and targets in different ESG (or each E, S or G) levels have no significant total gains or losses in market value around the announcement date, which is inconsistent with Hypothesis 2.

What is more, acquirers with higher risk and lack commensurate risk management suffer losses in the market around the announcement date. Therefore, Hypothesis 3 is supported. Owing to the lack of absolute measurement of an acquirer's risk management capability, the impact of the target's and the acquirer's risks and management ability differences remains uncertain.

6. Additional analysis

In this section, we attempt to determine why we obtained less significant results than expected, especially for targets, from the methodology of the MSCI IVA database. First, we will check whether firms included in the IVA database have any other particular characteristics. If they do, we will analyse how these features affect our regression results in section 5.

6.1 Characteristics of firms in the MSCI IVA database

To investigate whether firms in the IVA database are significantly different from those who are not, we merge our data from SDC with Compustat data by the targets' financial data and obtain a sample of 608 mergers. These mergers are divided into two groups: with target IVA data and without target IVA data. With target IVA data group contains 124 observations, while the without target IVA data group has 484 observations.

We check the announcement year and target industry distributions of these two groups. Table 15 and Table 16 display the distributions correspondingly. Firms in the IVA database clearly are clustered in recent years, and mergers announced from 2013 to 2015 account for 54.84% of

the total. In contrast, firms out of the IVA database gather in much earlier years, 30.16% of mergers are announced in 1999 and 2000. As for the industry distributions, the distributions of two groups are quite similar. Consequently, we can conclude that the IVA database includes more new firms than old ones. As a new database started in 1999, this phenomenon is quite reasonable.

Then, we conduct the following process to get the non-IVA control targets for targets in the IVA database. Targets with IVA data are matched with control targets without IVA data from the without target IVA data group by the same year announced, the same two-digit SIC code industry and the smallest absolute value of difference between their market value four weeks prior to the announcement. A total of 116 of the 124 targets with IVA targets have their non-IVA control targets.

After that, we conduct the t-tests to analyse whether they are significantly different in size, leverage ratio, ROA and Tobin's Q. The results of t-tests are displayed in Table 17. We find that targets with IVA data possess significantly larger size, a higher leverage ratio, ROA and Tobin's Q than their non-IVA control firms. In other words, firms with IVA data are larger and have better performance.

To investigate the reason for these features, we examine the sample selection criteria in the MSCI ESG Research IVA Methodology and MSCI Global Investable Market Indexes (IMI) Methodology, as samples in the IVA are taken from the IMI database. We find the reason for these features from the IMI methodology. Companies must meet some basic requirements to be covered by IMI. These requirements include:

- 1) Equity universe minimum size requirements
- 2) Equity universe minimum float-adjusted market capitalization requirement
- 3) Minimum liquidity requirement
- 4) Minimum foreign inclusion factor and foreign room requirement
- 5) Minimum length of trading requirement

As a result, it is clear that there are some preferences in the selection of samples in IVA data. These preferences may make our samples contain more large and good firms than average. How can these preferences affect our results? According to Goss and Roberts (2011) and Schneider (2011), lenders pay less attention to ESG issues of the firm if the borrower is a

high-quality one. Similarly, for good companies, people may easily be attracted by their performance, which is more clear and visual, and tend to neglect their ESG performance. The impact of larger firm size will be further studied in the next subsection.

6.2 Impact of larger firms on the main results

To assess whether larger targets' ESG factors work differently from smaller targets, we divide sample group C into two further groups by the median of the target size. A target whose size is above the median is defined as 'Large'; others are defined as 'Small'.

Then, we re-run the regressions in Tables 5, 6 and 7. New regressions related to the 'large' target group are listed in Tables 18, 19 and 20, those of the 'small' target group are displayed in Tables 21, 22 and 23. In the small target group, a target's aggregate ESG score is positively and significantly related to the target's CAR in (-1, 1). The governance pillar score has a positive and significant relationship with the target's CAR in (-20, 20), and the social pillar score is negatively and significantly associated with the target's CAR in the (2, 20) window. When it comes to the large target group, only the governance pillar is positively and significantly related to the target's CAR and portfolio CAR. Thus, we conclude that small targets' ESG factors have an extensive and broader impact on their CAR than large targets, which may help to explain why our results in subsection 5.1.1 show a less significant impact than our expectations.

We also check the year and industry distributions of large and small target groups. The results are displayed in Tables 24 and 25, respectively. The year distributions of two groups are similar, while the large size group contains a higher proportion of targets in the manufacturing industry. Thus, we picked up those observations from the manufacturing industry as a separate group and re-ran the regressions in Tables 5, 6 and 7 (regression tables are not displayed in the paper but available upon request). We find that the aggregate ESG scores of manufacturer targets are positively related to the TCAR and PCAR. Their governance pillar scores are significantly and positively associated with TCAR and PCAR in the same event windows as the large group. However, what leads to the difference in other factors? As mentioned, large and institutional investors will pay more attention to a firm's ESG factors because they own a piece of the total

economy and seek long-term, enduring economic growth. Thus, we collect the institutional block holding data of both large and small sample groups from their proxy statements one year before the announcement date in Edgar. These institutional investors are also blockholders of the firm. Three targets in the small target group have no related proxy statements or no related data; all the targets in large target group have the data required.

Then, we test whether the mean of institutional percentage of two groups are significantly different. The results of the t-test are presented in Table 26. The results suggest that small targets have a higher proportion of institutional holding on average than large targets, which is consistent with the statement at the beginning of this paragraph.

To sum up, in this section, we prove that targets in IVA database are larger firms with better performance. Good performance leads to less emphasis on ESG factors. Larger firm size is associated with lower institutional holding percentage, which also means less care on ESG factors. These two characteristics of firms in the IVA database may partly result in the less significant results we obtain in Section 5, especially subsection 5.1.1. Besides, these features may indicate that our results and conclusions in section 5 may not be as applicable to smaller targets and mergers in earlier years as to the larger targets and latest mergers.

7. Conclusions

We examine how the target's and acquirer's ESG information influences their market returns and total market returns during the merger announcement periods by adopting a new database, MSCI ESG Research Intangible Value Assessment (IVA). We find that the target's aggregate ESG performance has a positive, though not always significant, impact on the synergistic market returns 3 days around the announcement date, yet no significant influence on the target market returns. We also demonstrate that the acquirer's good aggregate ESG performance increases its market performance. From the aspects of each pillar of ESG, we prove that the target's governance strength and the acquirer's social strength are preferred by the market. These results do not fully support our Hypothesis 1 that the target's ESG strength increases market returns of itself and the total. Another result that was inconsistent with our hypothesis (Hypothesis 2) is that if the acquirer's ESG (E, S or G) performance is better than the target's,

there is no significant higher synergistic market value around the announcement date.

If we view the ESG score as a measure of risk exposure and corresponding risk managerial ability on ESG issues, our evidence supports Hypothesis 3 that an acquirer with a high ESG risk exposure and incommensurate managerial ability will suffer from lower acquirer and total market returns.

When searching for the reason for the less significant target-related results than our expectations, we show that targets in the IVA database are larger in size and perform better due to the methodology of the database. We find two possible explanations for the less significant results. First, good performance results in less emphasis on a firm's ESG information. Second, larger firms tend to have fewer institutional blockholders, who pay more attention to the ESG information of the company. These findings may also suggest that our main results about targets are more applicable to large targets with good performance than to small targets with poor performance.

ⁱ Quoted from UNEP-Fi, M., & Asset Management Working Group. (2007). Demystifying responsible investment performance. A review of key academic and border research on ESG factors. P61

ⁱⁱ Quoted from the bstract of Gompers, P. A., Ishii, J. L., & Metrick, A. (2001). Corporate governance and equity prices (No. w8449). National bureau of economic research.

ⁱⁱⁱ Quoted from MSCI ESG Research. (2014). Executive Summary: Intangible Value Assessment (IVA) Methodology. P14

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Appendices

Variable Definitions

Variable	Definition
Panel A	Target returns, acquirer returns and portfolio returns
TCAR	Target cumulated abnormal return in event window
PCAR	4-week-announcement-prior market value weighted cumulated abnormal return of target and acquirer
ACAR	Acquirer cumulated abnormal return
Panel B	Target and acquirer characteristics
Premium	Premium of offer price to target trading price four weeks prior to the announcement date
Target ESG score ₀₋₃	Dummy variable: equals 1 if target ESG industry adjusted score belongs to [0,3]; else equals 0
Target ESG score ₇₋₁₀	Dummy variable: equals 1 if target ESG industry adjusted score belongs to [7,10]; else equals 0
Target ESG score	Aggregate ESG Industry adjusted score of target
Target E score	Environmental pillar score of target
Target S score	Social pillar score of target
Target G score	Governance pillar score of target
Target size	Logarithm of target market capital (\$mil) 4 weeks prior to announcement
Acquirer size	Logarithm of acquirer market capital (\$mil) 4 weeks prior to announcement
Q	Tobin's Q: market value of assets over book value of assets: $(\text{Total assets} - \text{Total common/ordinary equity} + \text{common shares outstanding} \times \text{Fiscal annual closing price}) \div \text{Total assets}$
Leverage	Book value of debts over book value of assets: $(\text{Total debt in current liabilities} + \text{Total long-term debt}) \div \text{total assets}$

Variable	Definition
ROA	Operating income before depreciation ÷ total assets
Institutional	Total percentage of target's stock held by institutional investors who are also the blockholders ($\geq 5\%$) of the target.
Acquirer ESG score ₀₋₃	Dummy variable: equals 1 if acquirer ESG industry adjusted score belongs to [0,3]; else equals 0
Acquirer ESG score ₇₋₁₀	Dummy variable: equals 1 if acquirer ESG industry adjusted score belongs to [7,10]; else equals 0
Acquirer ESG score	Aggregate ESG Industry adjusted score of acquirer
Acquirer E score	Environmental pillar score of acquirer
Acquirer S score	Social pillar score of acquirer
Acquirer G score	Governance pillar score of acquirer
A>T ESG score	Dummy variable: equals 1 if acquirer's ESG industry adjusted score > target's ESG industry adjusted score, else equals 0
A<T ESG score	Dummy variable: equals 1 if acquirer's ESG industry adjusted score < target's ESG industry adjusted score, else equals 0
A>T E score	Dummy variable: equals 1 if acquirer's environmental pillar score > target's environmental pillar score, else equals 0
A<T E score	Dummy variable: equals 1 if acquirer's environmental pillar score < target's environmental pillar score, else equals 0
A>T S score	Dummy variable: equals 1 if acquirer's social pillar score > target's social pillar score, else equals 0
A<T S score	Dummy variable: equals 1 if acquirer's social pillar score < target's social pillar score, else equals 0
A>T G score	Dummy variable: equals 1 if acquirer's governance pillar score > target's governance pillar score, else equals 0
A<T G score	Dummy variable: equals 1 if acquirer's governance pillar score < target's governance pillar score, else equals 0

Variable	Definition
Panel C	Deal characteristics

Tender offer	Dummy variable: Equals 1 if the deal is a tender offer, else equals 0
Target hi-tech flag	Dummy variable: Equals 1 if the target is from high-tech industry, else equals 0
Acquirer hi-tech flag	Dummy variable: Equals 1 if the acquirer is from high-tech industry, else equals 0
Pure cash	Dummy variable: Equals 1 if the payment of deal is all cash, else equals 0

Table 1 Summary statistics of cumulated abnormal returns

Statistics in this table are based on our largest sample group A, in which mergers from SDC are matched with IVA data only by the targets. No financial data from Compustat is contained in sample group A. Its sample size is 128 observations. TCAR represents for cumulated abnormal return of the target in the event window around the announcement date. ACAR represents for the cumulated abnormal return of the acquirer in the event window around the announcement date. PCAR represents for the market capital weighted portfolio cumulated abnormal return of acquirer and target in the event window around the announcement date.

Variable	Mean	Median	Maximum	Minimum	Std Dev
TCAR(-20,-2)	0.035	0.028	0.477	-0.29	0.12
TCAR(-1,1)	0.237	0.214	2.308	-0.248	0.27
TCAR(2,20)	0.001	-0.001	0.302	-0.166	0.066
TCAR(-20,20)	0.273	0.239	2.524	-0.301	0.314
ACAR(-20,-2)	0.006	0.000	0.262	-0.217	0.070
ACAR(-1,1)	0.015	0.005	0.303	-0.278	0.086
ACAR(2,20)	-0.007	-0.009	0.55	-0.204	0.09
ACAR(-20,20)	0.013	-0.002	0.569	-0.329	0.150
PCAR(-20,-2)	0.009	0.008	0.226	-0.202	0.069
PCAR(-1,1)	0.049	0.035	0.281	-0.258	0.085
PCAR(2,20)	-0.006	-0.006	0.315	-0.188	0.069
PCAR(-20,20)	0.052	0.036	0.574	-0.310	0.135

Table 2 Summary statistics of ESG scores

Statistics in Panel A are based on our largest sample group A, in which mergers from SDC are matched with IVA data only by the targets. Statistics in Panel B use the sample group B, in which observations contain both target's IVA data and acquirer's IVA data. Sample group A and B include no target's financial data from Compustat. The sample sizes of Sample group A and B are 128 and 115 respectively. ESG score represents for the aggregate industry adjusted score of three pillars. E score represents the environmental pillar score; S score represents for the social pillar score; G score represents the governmental pillar score. $A > T$ ($A < T$) ESG (E, S or G) score is a dummy variable. It equals 1 when acquirer's ESG (E, S or G) score is larger (smaller) than the target's, else equals 0.

Variable	Mean	Median	Maximum	Minimum	Std Dev
Panel A					
Target ESG score	4.072	3.7	10	0	2.027
Target E score	4.338	3.8	10	0	2.271
Target S score	4.209	4.15	8.2	0.5	1.655
Target G score	5.887	5.3	10	1	2.737
Panel B					
Acquirer ESG score	4.503	4.8	10	0	2.18
Acquirer E score	5.172	5	10	0	2.297
Acquirer S score	4.188	4.25	9.6	0	1.548
Acquirer G score	6.133	5.65	10	0	2.98
Acquirer size	9.033	8.985	12.411	5.68	1.6
$A > T$ ESG score	0.574	1	1	0	0.497
$A < T$ ESG score	0.374	0	1	0	0.486
$A > T$ E score	0.574	1	1	0	0.497
$A < T$ E score	0.4	0	1	0	0.492
$A > T$ S score	0.47	0	1	0	0.501
$A < T$ S score	0.409	0	1	0	0.494
$A > T$ G score	0.53	1	1	0	0.501
$A < T$ G score	0.452	0	1	0	0.5

Table 3 Summary statistics of merger characteristics and target's financial data

Statistics in Panel A are based on our largest sample group A, in which mergers from SDC are matched with IVA data only by the targets. Statistics in Panel B use the sample group C, which is constructed by matching target's financial data from Compustat with sample group A. The sample sizes of Sample group A and C are 128 and 54 respectively. Target size equals to the logarithm of target market capital (\$mil) 4 weeks prior to the announcement date. Premium is the ratio of offer price to target trading price four weeks prior to the announcement date.

Variable	Mean	Median	Maximum	Minimum	Std Dev
Panel A					
Premium	40.1%	31.2%	347.1%	-13.3%	0.444
Tender offer	0.227	0	1	0	0.42
Target hi-tech flag	0.523	1	1	0	0.501
Acquirer hi-tech flag	0.547	1	1	0	0.5
Pure cash	0.422	0	1	0	0.496
Target size	7.36	7.304	11.02	4.544	1.451
Panel B					
ROA	0.124	0.121	0.596	-0.127	0.099
Q	1.893	1.497	6.815	0.887	1.007
Leverage	0.312	0.283	1.007	0	0.257

Table 4 Sample distributions by year or industry of the targets

Statistics are based on our largest sample group A, in which mergers from SDC are matched with IVA data only by the target. Neither target's financial data nor acquirer's IVA data is included in sample group A. The sample size is 128 observations. Industry is defined according to two-digit SIC code.

Panel A			Panel B		
Year	Num. of mergers	% of sample	Industry	Num. of mergers	% of sample
2000	1	0.78%	Agriculture, forestry and fishery	1	0.78%
2003	1	0.78%	Mining	4	3.13%
2004	1	0.78%	Construction	1	0.78%
2005	1	0.78%	Manufacturing	66	51.56%
2006	3	2.34%	Transportation and communication	11	8.59%
2007	5	3.91%	Wholesale	5	3.91%
2008	2	1.56%	Retail	9	7.03%
2010	1	0.78%	Real estate	9	7.03%
2011	3	2.34%	Service	22	17.19%
2012	9	7.03%	Total	128	100.00%
2013	27	21.09%			
2014	32	25.00%			
2015	42	32.81%			
Total	128	100.00%			

Table 5 Target aggregate ESG performance and target cumulated abnormal returns

The table reports the OLS regressions of target's aggregate ESG level on target cumulated abnormal returns (TCAR). The event windows of the TCARs are shown in the third line of the table. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery; and industry control variable transportation represents the industry section of transportation and communication. Other industry controls include construction, manufacturing, wholesale and real estate for columns (1) to (4); manufacturing, wholesale and real estate for columns (5) to (8). Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 5 (continued)

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	TCAR							
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target ESG score	-0.008 (0.17)	0.006 (0.489)	-0.002 (0.459)	-0.005 (0.656)	-0.007 (0.621)	0.027 (0.126)	<0.001 (0.969)	0.020 (0.359)
Premium	0.081*** (0.003)	0.414*** (<0.001)	-0.013*** (<0.001)	0.483*** (<0.001)	0.168 (0.109)	-0.054 (0.687)	0.052 (0.222)	0.166 (0.325)
Tender offer	0.004 (0.900)	0.050 (0.235)	-0.002 (0.888)	0.052 (0.320)	0.104 (0.308)	-0.133 (0.314)	0.046 (0.281)	0.016 (0.921)
Target hi-tech flag	-0.016 (0.650)	0.076 (0.123)	0.009 (0.616)	0.069 (0.252)	0.008 (0.927)	0.051 (0.667)	-0.078** (0.045)	-0.019* (0.900)
Acquirer hi-tech flag	0.018 (0.609)	-0.068 (0.173)	-0.016 (0.388)	-0.066 (0.282)	0.043 (0.651)	0.098 (0.426)	0.065 (0.104)	0.206 (0.188)
Pure cash	0.006 (0.804)	0.038 (0.293)	-0.001 (0.917)	0.043 (0.335)	0.066 (0.245)	0.132 (0.075)	0.020 (0.380)	0.219** (0.022)
Target size	0.009 (0.244)	-0.019 (0.103)	-0.009** (0.028)	-0.019 (0.185)	<0.001 (0.989)	-0.021 (0.347)	-0.004 (0.553)	-0.025 (0.375)
Q					-0.017 (0.507)	-0.062 (0.067)	0.008 (0.452)	-0.071* (0.095)
Leverage					0.078 (0.470)	0.376*** (0.010)	-0.040 (0.366)	0.414** (0.023)
ROA					0.240 (0.428)	0.171 (0.663)	-0.114 (0.365)	0.297 (0.548)
Agriculture	-0.064 (0.608)	0.038 (0.831)	0.100 (0.127)	0.074 (0.733)	0.012 (0.940)	-0.037 (0.861)	0.119* (0.089)	0.094 (0.728)
Mining	0.060 (0.386)	-0.005 (0.957)	0.109*** (0.004)	0.164 (0.180)	0.034 (0.866)	0.272 (0.307)	-0.033 (0.699)	0.274 (0.414)
Transportation	-0.047 (0.300)	-0.110* (0.093)	0.032 (0.188)	-0.125 (0.119)	-0.013 (0.883)	-0.043 (0.703)	0.048 (0.187)	-0.008 (0.957)
Retail	-0.067 (0.187)	-0.074 (0.309)	-0.020 (0.464)	-0.160* (0.073)	-0.091 (0.412)	0.117 (0.414)	-0.034 (0.454)	-0.008 (0.965)
Other industry controls	Not significant							
Intercept	-0.013 (0.852)	0.172* (0.091)	0.077** (0.042)	0.236* (0.060)	-0.064 (0.695)	0.132 (0.534)	0.009 (0.889)	0.078 (0.772)
Num.of obs.	128	128	128	128	54	54	54	54

Table 6 Target aggregate ESG performance and portfolio cumulated abnormal returns

The table reports the OLS regressions of target's aggregate ESG level on market capital weighted portfolio cumulated abnormal returns (PCAR). The event windows of the PCARs are shown in the third line of the table. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery. Other industry controls include construction, transportation and communication, wholesale, retail and real estate for columns (1) to (4); transportation and communication, wholesale, retail and real estate for columns (4) to (8). Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 6 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	PCAR							
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target ESG score	-0.003 (0.424)	0.009** (0.028)	-0.004 (0.234)	0.002 (0.753)	-0.003 (0.679)	0.008 (0.325)	-0.009 (0.209)	-0.004 (0.763)
Premium	-0.005 (0.773)	-0.009 (0.618)	-0.005 (0.722)	-0.019 (0.52)	0.079 (0.138)	0.039 (0.521)	-0.013 (0.812)	0.105 (0.319)
Tender offer	0.003 (0.889)	-0.012 (0.569)	-0.006 (0.711)	-0.015 (0.644)	0.011 (0.824)	0.030 (0.623)	-0.003 (0.952)	0.038 (0.715)
Target hi-tech flag	0.010 (0.637)	0.012 (0.610)	0.037* (0.063)	0.058 (0.130)	-0.020 (0.671)	0.060 (0.270)	-0.015 (0.754)	0.025 (0.788)
Acquirer hi-tech flag	0.004 (0.834)	-0.022 (0.352)	-0.030 (0.130)	-0.048 (0.219)	<0.001 (0.992)	-0.018 (0.745)	0.003 (0.961)	-0.016 (0.866)
Pure cash	0.004 (0.809)	0.004 (0.811)	-0.002 (0.906)	0.006 (0.828)	0.023 (0.417)	0.018 (0.594)	-0.016 (0.598)	0.025 (0.660)
Target size	0.002 (0.619)	-0.018 (0.001)	<0.001 (0.934)	-0.016* (0.070)	0.007 (0.44)	-0.023** (0.031)	0.009 (0.324)	-0.007 (0.699)
Q					-0.016 (0.218)	-0.010 (0.522)	-0.014 (0.303)	-0.041 (0.128)
Leverage					-0.008 (0.887)	0.166** (0.013)	-0.013 (0.816)	0.144 (0.192)
ROA					0.185 (0.237)	0.061 (0.735)	-0.062 (0.702)	0.183 (0.553)
Agriculture	0.040 (0.596)	-0.002 (0.979)	0.121* (0.088)	0.159 (0.252)	0.073 (0.388)	-0.047 (0.635)	0.099 (0.270)	0.125 (0.459)
Mining	0.044 (0.295)	0.029 (0.546)	0.128*** (0.002)	0.200** (0.011)	0.056 (0.592)	0.088 (0.468)	-0.049 (0.654)	0.095 (0.649)
Manufacturing	-0.007 (0.707)	0.037* (0.079)	0.018 (0.299)	0.048 (0.161)	0.011 (0.738)	-0.018 (0.645)	0.017 (0.642)	0.010 (0.885)
Other industry controls	Not significant							
Intercept	-0.002 (0.971)	0.137*** (0.005)	-0.005 (0.904)	0.131* (0.100)	-0.066 (0.436)	0.129 (0.191)	0.003 (0.977)	0.066 (0.694)
Num.of obs.	128	128	128	128	54	54	54	54

Table 7 Target respective ESG pillar performance and target cumulated abnormal returns

The table reports the OLS regressions of target's E, S or G pillar levels on target cumulated abnormal returns (TCAR) respectively. The event windows of the TCARs are shown in the third line of the table. E, S, G pillar represent environmental pillar, social pillar and governance pillar respectively. Regressions in panel A are based on sample group A, in which mergers from SDC are matched with IVA data only by the targets. Regressions in Panel B are based on sample group C, which is constructed by matching target's financial data from Compustat with sample group A. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery. Industry control variable transportation represents the industry section of transportation and communication. Other industry controls in Panel A include agriculture, construction, manufacturing, wholesale and real estate. Industry controls in Panel B include agriculture, mining, manufacturing, transportation, wholesale, retail and real estate. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 7 (continued)

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variable	TCAR											
Variable	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target E score	-0.006 (0.324)	0.010 (0.221)	-0.001 (0.792)	0.003 (0.743)								
Target G score					0.007* (0.096)	0.003 (0.597)	0.002 (0.319)	0.012* (0.082)				
Target S score									-0.010 (0.147)	-0.003 (0.767)	-0.004 (0.207)	-0.017 (0.146)
Premium	0.088*** (0.003)	0.450*** (<0.001)	-0.011 (0.476)	0.527*** (<0.001)	0.077*** (0.007)	0.459*** (<0.001)	-0.013 (0.381)	0.523*** (<0.001)	0.076*** (0.005)	0.422*** (<0.001)	-0.014 (0.316)	0.484*** (<0.001)
Tender offer	-0.002 (0.95)	0.047 (0.261)	-0.003 (0.84)	0.042 (0.416)	0.003 (0.928)	0.036 (0.383)	-0.003 (0.855)	0.036 (0.472)	0.006 (0.833)	0.048 (0.257)	-0.002 (0.919)	0.053 (0.307)
Target hi-tech flag	-0.018 (0.61)	0.068 (0.153)	0.008 (0.675)	0.058 (0.321)	-0.020 (0.549)	0.078 (0.1)	0.008 (0.668)	0.065 (0.254)	-0.015 (0.653)	0.083 (0.095)	0.010 (0.569)	0.077 (0.198)
Acquirer hi-tech flag	0.025 (0.488)	-0.074 (0.133)	-0.015 (0.435)	-0.064 (0.292)	0.017 (0.633)	-0.067 (0.172)	-0.016 (0.379)	-0.066 (0.261)	0.016 (0.652)	-0.070 (0.164)	-0.017 (0.353)	-0.071 (0.245)
Pure cash	0.005 (0.847)	0.028 (0.424)	-0.002 (0.883)	0.031 (0.473)	-0.002 (0.93)	0.024 (0.501)	-0.004 (0.751)	0.017 (0.685)	0.003 (0.898)	0.036 (0.324)	-0.003 (0.824)	0.036 (0.413)
Target size	0.009 (0.307)	-0.025** (0.032)	-0.010** (0.022)	-0.026* (0.063)	0.002 (0.774)	-0.022* (0.053)	-0.012*** (0.008)	-0.031** (0.023)	0.006 (0.428)	-0.017 (0.127)	-0.010** (0.012)	-0.021 (0.119)
Mining	0.068 (0.33)	-0.009 (0.922)	0.111*** (0.003)	0.169 (0.151)	0.078 (0.26)	-0.001 (0.989)	0.114*** (0.002)	0.191 (0.103)	0.057 (0.411)	-0.012 (0.905)	0.106*** (0.004)	0.152 (0.211)
Transportation	-0.035 (0.438)	-0.121* (0.052)	0.035 (0.141)	-0.121 (0.114)	-0.031 (0.489)	-0.117* (0.062)	0.036 (0.125)	-0.112 (0.139)	-0.045 (0.323)	-0.121** (0.063)	0.031 (0.194)	-0.135* (0.089)
Retail	-0.057 (0.267)	-0.085 (0.225)	-0.017 (0.522)	-0.159 (0.067)	-0.068 (0.18)	-0.081 (0.248)	-0.020 (0.453)	-0.170 (0.048)	-0.066 (0.195)	-0.080 (0.271)	-0.020 (0.45)	-0.166* (0.062)
Other industry controls	Not significant											
Intercept	-0.022 (0.76)	0.196** (0.045)	0.075** (0.047)	0.249** (0.039)	-0.032 (0.653)	0.199** (0.044)	0.072 (0.054)	0.239** (0.045)	0.021 (0.788)	0.198* (0.078)	0.095** (0.021)	0.315** (0.022)
Num.of obs.	127	127	127	127	127	127	127	127	128	128	128	128

Table 7 (continued)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	TCAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target E score	-0.012 (0.379)	0.035** (0.043)	0.007 (0.173)	0.031 (0.155)								
Target G score					0.022** (0.033)	-0.006 (0.674)	0.004 (0.367)	0.02 (0.25)				
Target S score									-0.009 (0.518)	0.019 (0.315)	-0.008 (0.192)	0.002 (0.924)
Premium	0.177* (0.085)	-0.063 (0.625)	0.035 (0.39)	0.149 (0.361)	0.178* (0.059)	0.008 (0.948)	0.057 (0.161)	0.243 (0.131)	0.167* (0.100)	-0.017 (0.895)	0.065 (0.113)	0.214 (0.199)
Tender offer	0.095 (0.345)	-0.099 (0.440)	0.047 (0.249)	0.043 (0.788)	0.039 (0.688)	-0.091 (0.514)	0.035 (0.415)	-0.017 (0.921)	0.105 (0.302)	-0.122 (0.364)	0.051 (0.214)	0.034 (0.838)
Target hi-tech flag	0.019 (0.833)	0.027 (0.816)	-0.091** (0.019)	-0.044 (0.765)	-0.054 (0.539)	0.101 (0.422)	-0.088** (0.026)	-0.042 (0.784)	-0.001 (0.991)	0.088 (0.461)	-0.079** (0.034)	0.008 (0.960)
Acquirer hi-tech flag	0.046 (0.619)	0.081 (0.496)	0.066* (0.086)	0.194 (0.204)	0.073 (0.412)	0.068 (0.592)	0.07* (0.079)	0.211 (0.175)	0.05 (0.59)	0.071 (0.57)	0.067* (0.085)	0.188 (0.231)
Pure cash	0.061 (0.278)	0.14* (0.054)	0.028 (0.213)	0.229** (0.015)	0.075 (0.148)	0.103 (0.161)	0.021 (0.346)	0.199** (0.029)	0.064 (0.255)	0.122 (0.106)	0.013 (0.553)	0.199** (0.037)
Target size	0.004 (0.821)	-0.03 (0.193)	-0.008 (0.259)	-0.034 (0.241)	-0.012 (0.474)	-0.009 (0.704)	-0.006 (0.394)	-0.026 (0.347)	-0.001 (0.975)	-0.015 (0.507)	-0.003 (0.663)	-0.018 (0.513)
Q	-0.021 (0.419)	-0.053 (0.119)	0.012 (0.257)	-0.062 (0.15)	-0.019 (0.438)	-0.071** (0.042)	0.007 (0.475)	-0.082* (0.053)	-0.02 (0.454)	-0.061* (0.085)	0.004 (0.71)	-0.077 (0.083)
Leverage	0.072 (0.499)	0.384*** (0.007)	-0.031 (0.472)	0.425** (0.018)	0.077 (0.444)	0.344** (0.019)	-0.042 (0.338)	0.379** (0.033)	0.074 (0.493)	0.367** (0.013)	-0.05 (0.252)	0.391** (0.033)
ROA	0.263 (0.385)	0.115 (0.765)	-0.137 (0.269)	0.241 (0.622)	0.173 (0.544)	0.235 (0.561)	-0.124 (0.319)	0.284 (0.563)	0.233 (0.44)	0.211 (0.597)	-0.11 (0.367)	0.333 (0.505)
Industry controls	Not significant											
Intercept	-0.059 (0.715)	0.132 (0.521)	-0.004 (0.957)	0.07 (0.79)	-0.105 (0.489)	0.199 (0.36)	0.004 (0.949)	0.098 (0.709)	-0.037 (0.829)	0.106 (0.644)	0.043 (0.538)	0.112 (0.696)
Num.of obs.	54	54	54	54	54	54	54	54	54	54	54	54

Table 8 Target respective ESG pillar performance and portfolio cumulated abnormal returns

The table reports the OLS regressions of target's E, S or G pillar levels on the market capital weighted portfolio cumulated abnormal returns (PCAR) respectively. The event windows of the PCARs are shown in the third line of the table. E, S, G pillar represent environmental pillar, Social pillar and Governance pillar respectively. Regressions in panel A are based on sample group A, in which mergers from SDC are matched with IVA data only by the targets. Regressions in Panel B is based on sample group C, which is constructed by matching target financial data from Compustat with sample group A. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery. Other industry controls in Panel A include construction, manufacturing, transportation and communication, wholesale, retail and real estate. Industry controls in Panel B include agriculture, mining, manufacturing, transportation and communication, wholesale, retail and real estate. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 8 (continued)

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	PCAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target E score	-0.001 (0.874)	0.005 (0.223)	-0.002 (0.644)	0.003 (0.663)								
Target G score					0.001 (0.572)	0.003 (0.310)	0.003 (0.191)	0.008 (0.106)				
Target S score									-0.002 (0.582)	0.007 (0.123)	-0.002 (0.629)	0.003 (0.681)
Premium	-0.005 (0.779)	-0.006 (0.75)	-0.003 (0.85)	-0.015 (0.655)	-0.006 (0.71)	-0.003 (0.886)	-0.007 (0.68)	-0.016 (0.612)	-0.007 (0.66)	-0.002 (0.91)	-0.009 (0.544)	-0.018 (0.535)
Tender offer	0.002 (0.899)	-0.009 (0.665)	-0.008 (0.653)	-0.015 (0.666)	0.003 (0.885)	-0.015 (0.467)	-0.007 (0.685)	-0.019 (0.557)	0.003 (0.847)	-0.014 (0.478)	-0.005 (0.774)	-0.016 (0.63)
Target hi-tech flag	0.008 (0.708)	0.015 (0.537)	0.034 (0.084)	0.057 (0.141)	0.008 (0.705)	0.020 (0.394)	0.034* (0.081)	0.062 (0.101)	0.009 (0.663)	0.014 (0.548)	0.035* (0.08)	0.058 (0.132)
Acquirer hi-tech flag	0.005 (0.799)	-0.028 (0.261)	-0.028 (0.169)	-0.050 (0.205)	0.004 (0.837)	-0.025 (0.31)	-0.031 (0.126)	-0.051 (0.189)	0.004 (0.847)	-0.021 (0.384)	-0.030 (0.132)	-0.047 (0.227)
Pure cash	0.004 (0.819)	0.003 (0.843)	-0.002 (0.868)	0.005 (0.871)	0.002 (0.897)	0.000 (0.999)	-0.006 (0.698)	-0.004 (0.897)	0.003 (0.838)	0.006 (0.737)	-0.002 (0.896)	0.007 (0.802)
Target size	0.002 (0.757)	-0.018*** (0.003)	-0.001 (0.762)	-0.017* (0.061)	0.001 (0.911)	-0.017*** (0.003)	-0.004 (0.422)	-0.020** (0.027)	0.001 (0.773)	-0.015*** (0.006)	-0.002 (0.694)	-0.016* (0.078)
Agriculture	0.042 (0.581)	-0.015 (0.86)	0.126* (0.079)	0.153 (0.274)	0.037 (0.629)	-0.013 (0.884)	0.114 (0.11)	0.138 (0.318)	0.035 (0.64)	0.012 (0.892)	0.118 (0.101)	0.165 (0.237)
Mining	0.046 (0.274)	0.021 (0.662)	0.131*** (0.001)	0.198** (0.012)	0.049 (0.252)	0.027 (0.571)	0.136*** (0.001)	0.212*** (0.007)	0.044 (0.297)	0.029 (0.548)	0.129*** (0.002)	0.201* (0.01)
Other industry controls	Not significant											
Intercept	-0.006 (0.893)	0.151*** (0.002)	-0.009 (0.814)	0.136* (0.086)	-0.007 (0.862)	0.151*** (0.003)	-0.013 (0.739)	0.130* (0.096)	0.004 (0.926)	0.118** (0.03)	-0.003 (0.945)	0.119 (0.172)
Num.of obs.	127	127	127	127	127	127	127	127	128	128	128	128

Table 8 (continued)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	PCAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target E score	-0.005 (0.486)	0.000 (0.994)	0.004 (0.617)	-0.001 (0.933)								
Target G score					0.011** (0.040)	0.001 (0.93)	0.005 (0.351)	0.017 (0.115)				
Target S score									0.001 (0.877)	0.002 (0.796)	-0.009 (0.229)	-0.006 (0.681)
Premium	0.082 (0.116)	0.060 (0.331)	-0.045 (0.421)	0.097 (0.35)	0.085* (0.078)	0.060 (0.309)	-0.030 (0.572)	0.115 (0.236)	0.070 (0.178)	0.056 (0.357)	-0.020 (0.704)	0.105 (0.306)
Tender offer	0.008 (0.882)	0.037 (0.54)	-0.011 (0.838)	0.034 (0.744)	-0.020 (0.694)	0.036 (0.57)	-0.026 (0.642)	-0.011 (0.919)	0.008 (0.879)	0.035 (0.561)	-0.005 (0.929)	0.038 (0.709)
Target hi-tech flag	-0.016 (0.741)	0.071 (0.209)	-0.033 (0.512)	0.022 (0.818)	-0.050 (0.272)	0.069 (0.223)	-0.041 (0.427)	-0.021 (0.817)	-0.023 (0.611)	0.071 (0.195)	-0.028 (0.562)	0.019 (0.833)
Acquirer hi-tech flag	0.001 (0.982)	-0.025 (0.657)	0.011 (0.829)	-0.013 (0.893)	0.014 (0.757)	-0.024 (0.668)	0.017 (0.748)	0.006 (0.947)	0.002 (0.971)	-0.026 (0.651)	0.012 (0.807)	-0.011 (0.905)
Pure cash	0.021 (0.453)	0.009 (0.782)	-0.002 (0.938)	0.028 (0.620)	0.027 (0.300)	0.009 (0.773)	-0.006 (0.847)	0.031 (0.562)	0.027 (0.341)	0.012 (0.733)	-0.015 (0.617)	0.024 (0.676)
Target size	0.008 (0.367)	-0.020* (0.072)	0.004 (0.692)	-0.008 (0.676)	0.001 (0.887)	-0.020 (0.056)	0.004 (0.703)	-0.016 (0.363)	0.006 (0.516)	-0.020 (0.049)	0.008 (0.405)	-0.007 (0.672)
Q	-0.018 (0.185)	-0.013 (0.429)	-0.009 (0.525)	-0.040 (0.145)	-0.017 (0.165)	-0.013 (0.41)	-0.012 (0.382)	-0.042* (0.100)	-0.015 (0.279)	-0.011 (0.478)	-0.016 (0.259)	-0.042 (0.122)
Leverage	-0.010 (0.857)	0.156** (0.02)	0.003 (0.964)	0.148 (0.181)	-0.009 (0.863)	0.155** (0.019)	-0.004 (0.944)	0.142 (0.179)	-0.003 (0.962)	0.159** (0.018)	-0.014 (0.806)	0.142 (0.202)
ROA	0.194 (0.215)	0.075 (0.68)	-0.090 (0.589)	0.179 (0.565)	0.152 (0.300)	0.074 (0.685)	-0.093 (0.574)	0.134 (0.654)	0.179 (0.251)	0.074 (0.683)	-0.074 (0.648)	0.179 (0.562)
Industry controls	Not significant											
Intercept	-0.064 (0.443)	0.146 (0.141)	-0.024 (0.790)	0.059 (0.724)	-0.085 (0.281)	0.145 (0.141)	-0.024 (0.784)	0.036 (0.820)	-0.077 (0.390)	0.136 (0.197)	0.024 (0.794)	0.084 (0.637)
Num.of obs.	54	54	54	54	54	54	54	54	54	54	54	54

Table 9 Acquirer aggregate ESG performance and cumulated abnormal returns

The table reports the OLS regressions of the acquirer's aggregate ESG level on the acquirer cumulated abnormal returns (ACAR) in columns (1) to (4), and on the market capital weighted portfolio cumulated abnormal returns (PCAR) in columns (5) to (8). Event windows of ACAR (PCAR) are shown in the third line of the table. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery; and industry control variable transportation represents the industry section of transportation and communication. Other industry controls include manufacturing, wholesale and retail. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 9 (continued)

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ACAR				PCAR			
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Acquirer ESG score	0.002 (0.583)	0.004 (0.263)	0.005 (0.249)	0.011* (0.093)	0.002 (0.653)	0.003 (0.461)	0.005 (0.138)	0.009 (0.107)
Premium	0.014 (0.739)	0.158*** (0.001)	0.001 (0.992)	0.173** (0.031)	0.042 (0.321)	0.298*** (<0.001)	0.000 (0.994)	0.340*** (<0.001)
Tender offer	-0.016 (0.453)	0.003 (0.901)	-0.001 (0.979)	-0.014 (0.732)	-0.008 (0.697)	0.020 (0.326)	0.001 (0.970)	0.013 (0.705)
Target hi-tech flag	0.000 (0.994)	-0.019 (0.274)	0.004 (0.84)	-0.015 (0.630)	0.018 (0.293)	-0.005 (0.746)	0.012 (0.445)	0.024 (0.357)
Acquirer hi-tech flag	0.022 (0.355)	-0.013 (0.615)	0.020 (0.494)	0.029 (0.511)	0.025 (0.280)	-0.014 (0.540)	0.024 (0.272)	0.036 (0.336)
Pure cash	0.009 (0.710)	0.011 (0.658)	-0.036 (0.225)	-0.016 (0.716)	0.001 (0.960)	0.017 (0.451)	-0.032 (0.148)	-0.014 (0.711)
Acquirer size	0.011 (0.462)	0.051*** (0.002)	<0.001 (0.998)	0.062 (0.032)	0.006 (0.694)	0.022 (0.135)	0.003 (0.815)	0.032 (0.192)
Agriculture	-0.008 (0.130)	-0.021*** (<0.001)	-0.004 (0.548)	-0.033*** (0.001)	-0.009 (0.074)	-0.030*** (<0.001)	-0.005 (0.265)	-0.044*** (<0.001)
Mining	0.125* (0.098)	-0.036 (0.656)	0.101 (0.289)	0.190 (0.185)	0.082 (0.280)	-0.019 (0.793)	0.111 (0.122)	0.174 (0.149)
Construction	0.080** (0.049)	0.017 (0.703)	0.095* (0.064)	0.192** (0.014)	0.077* (0.059)	-0.003 (0.942)	0.110*** (0.005)	0.184*** (0.005)
Transportation	0.036* (0.07)	0.006 (0.777)	0.011 (0.669)	0.053 (0.161)	0.028 (0.167)	-0.012 (0.541)	0.016 (0.398)	0.032 (0.315)
Real estate	0.077** (0.026)	0.015 (0.687)	0.032 (0.464)	0.124* (0.060)	0.050 (0.152)	-0.006 (0.858)	0.020 (0.533)	0.064 (0.242)
Other industry controls	Not significant							
Intercept	0.069 (0.147)	-0.066 (0.200)	-0.029 (0.632)	-0.025 (0.779)	0.059 (0.218)	-0.084 (0.072)	-0.016 (0.727)	-0.040 (0.592)
Num.of obs.	115	115	115	115	115	115	115	115

Table 10 Acquirer respective ESG pillar performance and acquirer cumulated abnormal returns

The table reports the OLS regressions of the acquirer's E, S or G pillar levels on the acquirer portfolio cumulated abnormal returns (ACAR) respectively. Event windows of ACAR are shown in the third line of the table. E, S, G pillar represent environmental pillar, social pillar and governance pillar respectively. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery. Other industry controls include construction, transportation and communication, wholesale and real estate. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 10 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	ACAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Acquirer E score	0.002 (0.58)	0.004 (0.313)	<0.001 (0.956)	0.006 (0.374)								
Acquirer G score					0.001 (0.777)	0.000 (0.947)	-0.004 (0.217)	-0.003 (0.528)				
Acquirer S score									-0.001 (0.771)	0.008 (0.123)	0.011* (0.058)	0.018** (0.049)
Premium	-0.018 (0.405)	-0.001 (0.957)	<0.001 (0.99)	-0.019 (0.637)	-0.016 (0.455)	0.006 (0.777)	-0.001 (0.974)	-0.010 (0.799)	-0.016 (0.446)	0.006 (0.774)	0.001 (0.978)	-0.009 (0.822)
Tender offer	<0.001 (0.995)	-0.020 (0.257)	0.001 (0.954)	-0.019 (0.547)	-0.003 (0.879)	-0.018 (0.321)	0.006 (0.789)	-0.015 (0.647)	-0.002 (0.884)	-0.015 (0.404)	0.006 (0.762)	-0.011 (0.730)
Target hi-tech flag	0.020 (0.385)	-0.016 (0.532)	0.017 (0.564)	0.022 (0.628)	0.022 (0.353)	-0.017 (0.499)	0.010 (0.745)	0.015 (0.747)	0.021 (0.380)	-0.016 (0.522)	0.019 (0.516)	0.024 (0.590)
Acquirer hi-tech flag	0.008 (0.746)	0.009 (0.722)	-0.036 (0.230)	-0.019 (0.667)	0.008 (0.724)	0.008 (0.746)	-0.031 (0.293)	-0.015 (0.742)	0.009 (0.692)	0.008 (0.742)	-0.037 (0.212)	-0.019 (0.663)
Pure cash	0.010 (0.491)	0.050*** (0.003)	-0.001 (0.974)	0.060** (0.043)	0.011 (0.486)	0.054*** (0.001)	-0.003 (0.893)	0.062** (0.037)	0.010 (0.502)	0.054*** (0.001)	<0.001 (0.99)	0.064** (0.029)
Acquirer size	-0.008 (0.130)	-0.021*** (<0.001)	-0.001 (0.873)	-0.030*** (0.003)	-0.006 (0.180)	-0.020*** (<0.001)	-0.001 (0.813)	-0.027*** (0.003)	-0.006 (0.184)	-0.020*** (<0.001)	-0.002 (0.737)	-0.029*** (0.002)
Agriculture	0.125* (0.099)	-0.037 (0.652)	0.104 (0.280)	0.192 (0.186)	0.123 (0.111)	-0.034 (0.680)	0.123 (0.206)	0.212 (0.151)	0.133* (0.096)	-0.074 (0.382)	0.045 (0.653)	0.104 (0.486)
Mining	0.079** (0.050)	0.012 (0.772)	0.083 (0.102)	0.174** (0.024)	0.077* (0.056)	0.007 (0.866)	0.076 (0.135)	0.159** (0.039)	0.076* (0.058)	0.005 (0.909)	0.080 (0.108)	0.160** (0.033)
Manufacturing	0.036 (0.069)	0.006 (0.789)	0.006 (0.796)	0.048 (0.204)	0.033 (0.106)	0.004 (0.844)	0.014 (0.593)	0.051 (0.191)	0.034 (0.085)	0.004 (0.832)	0.007 (0.790)	0.045 (0.226)
Retail	0.077 (0.026)	0.015 (0.688)	0.028 (0.528)	0.120* (0.072)	0.074** (0.036)	0.007 (0.845)	0.036 (0.408)	0.118* (0.080)	0.076** (0.029)	0.009 (0.796)	0.029 (0.500)	0.114* (0.080)

Table 10 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable							ACAR					
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Other industry controls							Not significant					
Intercept	0.016	0.163***	0.004	0.183**	0.009	0.168***	0.030	0.207**	0.018	0.141***	-0.036	0.123
	(0.700)	(<0.001)	(0.943)	(0.024)	(0.843)	(0.001)	(0.593)	(0.018)	(0.685)	(0.004)	(0.524)	(0.153)
Num.of obs.	115	115	115	115	114	114	114	114	114	114	114	114

Table 11 Acquirer respective ESG pillar performance and portfolio cumulated abnormal returns

The table reports the OLS regressions of the acquirer's E, S or G pillar levels on market capital weighted portfolio cumulated abnormal returns (PCAR) respectively. The event windows of the PCARs are shown in the third line of the table. E, S, G pillar represent environmental pillar, Social pillar and Governance pillar respectively. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery. Other industry controls include construction, manufacturing, transportation and communication, wholesale and retail .Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 11 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	PCAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Acquirer E score	0.002 (0.549)	0.002 (0.626)	0.001 (0.782)	0.005 (0.403)								
Acquirer G score					0.001 (0.752)	-0.002 (0.547)	-0.002 (0.443)	-0.003 (0.533)				
Acquirer S score									-0.001 (0.836)	0.004 (0.386)	0.009** (0.036)	0.012 (0.100)
Premium	-0.011 (0.624)	0.018 (0.378)	<0.001 (0.99)	0.008 (0.813)	-0.009 (0.681)	0.019 (0.359)	<0.001 (0.980)	0.011 (0.753)	-0.009 (0.670)	0.020 (0.343)	0.001 (0.948)	0.012 (0.725)
Tender offer	0.018 (0.289)	-0.006 (0.712)	0.009 (0.551)	0.021 (0.426)	0.014 (0.396)	-0.007 (0.679)	0.010 (0.517)	0.018 (0.505)	0.015 (0.383)	-0.007 (0.684)	0.012 (0.435)	0.020 (0.444)
Target hi-tech flag	0.024 (0.302)	-0.016 (0.490)	0.021 (0.341)	0.030 (0.427)	0.027 (0.267)	-0.017 (0.456)	0.018 (0.422)	0.028 (0.471)	0.025 (0.289)	-0.014 (0.542)	0.023 (0.286)	0.034 (0.352)
Acquirer hi-tech flag	<0.001 (1.000)	0.016 (0.477)	-0.032 (0.148)	-0.016 (0.665)	0.001 (0.961)	0.020 (0.389)	-0.029 (0.193)	-0.008 (0.824)	0.002 (0.926)	0.018 (0.432)	-0.032 (0.145)	-0.012 (0.747)
Pure cash	0.005 (0.729)	0.021 (0.149)	0.003 (0.858)	0.029 (0.230)	0.005 (0.736)	0.020 (0.190)	0.001 (0.927)	0.026 (0.288)	0.005 (0.760)	0.021 (0.167)	0.002 (0.872)	0.028 (0.256)
Acquirer size	-0.010* (0.065)	-0.029*** (<0.001)	-0.003 (0.530)	-0.042*** (<0.001)	-0.008* (0.099)	-0.028*** (<0.001)	-0.003 (0.565)	-0.039*** (<0.001)	-0.008 (0.101)	-0.028*** (<0.001)	-0.003 (0.474)	-0.039*** (<0.001)
Agriculture	0.081 (0.284)	-0.019 (0.795)	0.113 (0.119)	0.175 (0.150)	0.079 (0.307)	-0.011 (0.879)	0.122* (0.097)	0.190 (0.125)	0.088 (0.275)	-0.039 (0.613)	0.064 (0.391)	0.113 (0.373)
Mining	0.077* (0.057)	-0.006 (0.871)	0.099*** (0.010)	0.170*** (0.009)	0.075* (0.064)	-0.012 (0.758)	0.094** (0.015)	0.157** (0.015)	0.074* (0.067)	-0.010 (0.790)	0.095** (0.011)	0.158** (0.013)
Real estate	0.050 (0.312)	-0.092* (0.058)	-0.023 (0.630)	-0.064 (0.415)	0.057 (0.238)	-0.084* (0.071)	-0.017 (0.702)	-0.045 (0.555)	0.056 (0.246)	-0.081* (0.086)	-0.007 (0.879)	-0.031 (0.680)
Other industry controls	Not significant											
Intercept	0.044 (0.298)	0.301*** (<0.001)	0.004 (0.924)	0.348*** (<0.001)	0.035 (0.442)	0.307*** (<0.001)	0.014 (0.735)	0.356*** (<0.001)	0.043 (0.344)	0.283*** (<0.001)	-0.032 (0.455)	0.294*** (<0.001)
Num.of obs.	115	115	115	115	114	114	114	114	114	114	114	114

Table 12 Target ESG risk exposure, management and target cumulated abnormal returns

The table reports the OLS regressions of the target's aggregate ESG risk and corresponding managerial ability on the target cumulated abnormal returns (TCAR). The event windows of the TCARs are shown in the third line of the table. Dummy variable Target ESG score0-3 equaling 1 indicates that the target has future risks in ESG issues, and its risk managerial ability is not commensurate with the level of risk. Dummy variable Target ESG score7-10 equaling 1 indicates that the target has future risks in ESG issues, but its risk managerial ability is commensurate with the level of risk. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery; and industry control variable transportation represents the industry section of transportation and communication. Other industry controls include agriculture, construction, manufacturing, wholesale and real estate for columns (1) to (4); agriculture, manufacturing, wholesale and real estate for columns (5) to (8). Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 12 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	TCAR							
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target ESG score0-3	0.013 (0.585)	0.002 (0.944)	0.001 (0.92)	0.017 (0.689)	-0.062 (0.297)	-0.009 (0.917)	-0.025 (0.329)	-0.095 (0.355)
Target ESG score7-10	-0.046 (0.231)	0.013 (0.819)	-0.026 (0.202)	-0.059 (0.377)	-0.188** (0.032)	0.145 (0.226)	-0.036 (0.324)	-0.080 (0.590)
Premium	0.080*** (0.004)	0.420*** (<0.001)	-0.013 (0.356)	0.487*** (<0.001)	0.181* (0.067)	-0.031 (0.818)	0.052 (0.216)	0.202 (0.235)
Tender offer	0.002 (0.936)	0.048 (0.259)	-0.003 (0.857)	0.048 (0.360)	0.084 (0.389)	-0.117 (0.391)	0.038 (0.370)	0.005 (0.976)
Target hi-tech flag	-0.013 (0.711)	0.079 (0.116)	0.012 (0.515)	0.078 (0.205)	0.074 (0.426)	0.025 (0.845)	-0.065 (0.108)	0.033 (0.835)
Acquirer hi-tech flag	0.016 (0.655)	-0.068 (0.178)	-0.018 (0.344)	-0.070 (0.258)	-0.021 (0.821)	0.129 (0.331)	0.052 (0.211)	0.160 (0.336)
Pure cash	0.006 (0.808)	0.038 (0.299)	-0.002 (0.867)	0.042 (0.349)	0.037 (0.506)	0.142* (0.075)	0.016 (0.498)	0.196** (0.050)
Target size	0.009 (0.283)	-0.017 (0.148)	-0.010** (0.026)	-0.018 (0.215)	-0.008 (0.631)	-0.012 (0.598)	-0.007 (0.354)	-0.027 (0.355)
Q					-0.030 (0.238)	-0.061* (0.087)	0.005 (0.634)	-0.085* (0.056)
Leverage					0.052 (0.614)	0.380** (0.012)	-0.044 (0.326)	0.388** (0.036)
ROA					0.379 (0.201)	0.108 (0.792)	-0.084 (0.510)	0.403 (0.432)
Mining	0.059 (0.396)	-0.009 (0.932)	0.108*** (0.004)	0.158 (0.195)	0.054 (0.789)	0.245 (0.387)	-0.016 (0.851)	0.283 (0.423)
Transportation	-0.046 (0.317)	-0.118* (0.076)	0.032 (0.190)	-0.132 (0.103)	0.024 (0.782)	-0.069 (0.574)	0.062 (0.110)	0.017 (0.911)
Retail	-0.062 (0.228)	-0.080 (0.278)	-0.017 (0.537)	-0.159* (0.079)	-0.085 (0.452)	0.099 (0.528)	-0.024 (0.619)	-0.010 (0.960)
Other industry controls	Not significant							
Intercept	-0.042 (0.573)	0.181* (0.091)	0.071* (0.069)	0.211 (0.108)	0.067 (0.696)	0.133 (0.578)	0.050 (0.504)	0.249 (0.405)
Num.of obs.	128	128	128	128	54	54	54	54

Table 13 Target ESG risk exposure, management and portfolio cumulated abnormal returns

The table reports the OLS regressions of the target's aggregate ESG risk and corresponding managerial ability on the market capital weighted portfolio cumulated abnormal returns (PCAR). The event windows of the PCARs are shown in the third line of the table. Dummy variable Target ESG score0-3 equaling 1 indicates that the target has future risks in ESG issues, and its risk managerial ability is not commensurate with the level of risk. Dummy variable Target ESG score7-10 equaling 1 indicates that the target has future risks in ESG issues, but its risk managerial ability is commensurate with the level of risk. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery. Other industry controls include agriculture, construction, manufacturing, transportation and communication, wholesale, retail and real estate for columns (1) to (4); agriculture, manufacturing, transportation and communication, wholesale, retail and real estate for columns (5) to (8). Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 13 (continued)

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
	PCAR							
Target ESG score0-3	0.002 (0.885)	-0.017 (0.303)	0.007 (0.598)	-0.008 (0.773)	-0.016 (0.615)	0.008 (0.828)	0.062* (0.065)	0.055 (0.391)
Target ESG Score7-10	-0.029 (0.213)	0.034 (0.201)	-0.022 (0.313)	-0.017 (0.688)	-0.074 (0.107)	0.044 (0.419)	0.027 (0.568)	-0.003 (0.978)
Premium	-0.005 (0.759)	-0.007 (0.723)	-0.006 (0.688)	-0.018 (0.556)	0.087* (0.094)	0.050 (0.421)	-0.019 (0.728)	0.118 (0.261)
Tender offer	0.002 (0.920)	-0.011 (0.609)	-0.007 (0.681)	-0.016 (0.638)	0.007 (0.895)	0.038 (0.543)	0.009 (0.865)	0.054 (0.609)
Target hi-tech flag	0.013 (0.542)	0.012 (0.623)	0.038* (0.058)	0.062 (0.110)	0.006 (0.903)	0.053 (0.368)	-0.034 (0.510)	0.025 (0.802)
Acquirer hi-tech flag	0.003 (0.897)	-0.021 (0.384)	-0.031 (0.120)	-0.050 (0.208)	-0.026 (0.609)	-0.009 (0.886)	0.020 (0.711)	-0.015 (0.886)
Pure cash	0.003 (0.853)	0.003 (0.859)	-0.002 (0.911)	0.004 (0.879)	0.011 (0.716)	0.019 (0.596)	-0.012 (0.707)	0.018 (0.767)
Target size	0.002 (0.660)	-0.018*** (0.002)	-0.001 (0.893)	-0.016* (0.077)	0.004 (0.623)	-0.019* (0.078)	0.012 (0.204)	-0.003 (0.876)
Q					-0.021 (0.114)	-0.009 (0.566)	-0.009 (0.537)	-0.039 (0.154)
Leverage					-0.019 (0.722)	0.165** (0.016)	-0.008 (0.889)	0.138 (0.220)
ROA					0.238 (0.131)	0.040 (0.829)	-0.105 (0.525)	0.174 (0.585)
Mining	0.043 (0.307)	0.028 (0.551)	0.127*** (0.002)	0.198** (0.012)	0.054 (0.614)	0.068 (0.600)	-0.081 (0.473)	0.040 (0.854)
Intercept	-0.009 (0.839)	0.172*** (0.001)	-0.020 (0.640)	0.143* (0.087)	-0.023 (0.798)	0.118 (0.282)	-0.089 (0.354)	0.006 (0.975)
Num.of obs.	128	128	128	128	54	54	54	54

Table 14 Acquirer ESG risk exposure, management and cumulated abnormal returns

The table reports the OLS regressions of the acquirer's aggregate ESG risk and corresponding managerial ability on the acquirer cumulated abnormal returns (ACAR) in columns (1) to (4), on the market capital weighted portfolio cumulated abnormal returns (PCAR) in columns (5) to (8). Event windows of ACAR (PCAR) are shown in the third line of the table. Dummy variable Acquirer ESG score0-3 equaling 1 indicates that the acquirer has future risks in ESG issues, and its risk managerial ability is not commensurate with the level of risk. Dummy variable Acquirer ESG score7-10 equaling 1 indicates that the acquirer has future risks in ESG issues, but its risk managerial ability is commensurate with the level of risk. Industry control variable agriculture represents the industry section of agriculture, forestry and fishery. Other industry controls include agriculture, construction, transportation and communication, and wholesale. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 14 (continued)

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ACAR				PCAR			
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Acquirer ESG score0-3	-0.021 (0.191)	-0.021 (0.231)	-0.025 (0.231)	-0.067** (0.031)	-0.018 (0.278)	-0.022 (0.167)	-0.019 (0.222)	-0.059** (0.024)
Acquirer ESG Score7-10	-0.035 (0.107)	0.005 (0.829)	-0.020 (0.466)	-0.050 (0.226)	-0.035 (0.111)	-0.001 (0.948)	-0.009 (0.674)	-0.045 (0.191)
Premium	-0.011 (0.603)	0.004 (0.868)	0.003 (0.904)	-0.004 (0.924)	-0.004 (0.866)	0.022 (0.294)	0.003 (0.875)	0.021 (0.522)
Tender offer	<0.001 (0.988)	-0.019 (0.289)	0.003 (0.877)	-0.016 (0.609)	0.017 (0.306)	-0.004 (0.808)	0.011 (0.487)	0.024 (0.357)
Target hi-tech flag	0.025 (0.274)	-0.012 (0.641)	0.022 (0.457)	0.036 (0.420)	0.029 (0.219)	-0.012 (0.609)	0.025 (0.267)	0.042 (0.255)
Acquirer hi-tech flag	0.003 (0.904)	0.011 (0.672)	-0.040 (0.184)	-0.026 (0.554)	-0.004 (0.848)	0.016 (0.489)	-0.034 (0.130)	-0.023 (0.538)
Pure cash	0.010 (0.517)	0.050*** (0.003)	-0.002 (0.936)	0.059** (0.043)	0.005 (0.757)	0.021 (0.148)	0.002 (0.877)	0.028 (0.236)
Acquirer size	-0.006 (0.199)	-0.021*** (<0.001)	-0.002 (0.784)	-0.029*** (0.002)	-0.008 (0.12)	-0.030*** (<0.001)	-0.004 (0.453)	-0.041*** (<0.001)
Mining	0.075* (0.059)	0.015 (0.720)	0.087* (0.087)	0.178** (0.020)	0.072* (0.073)	-0.001 (0.979)	0.103*** (0.008)	0.174*** (0.007)
Manufacturing	0.037* (0.063)	0.006 (0.762)	0.010 (0.695)	0.053 (0.158)	0.028 (0.160)	-0.010 (0.601)	0.015 (0.439)	0.032 (0.299)
Retail	0.078** (0.024)	0.017 (0.648)	0.032 (0.467)	0.126* (0.054)	0.050 (0.150)	-0.003 (0.935)	0.020 (0.543)	0.067 (0.218)
Real estate	0.062 (0.188)	-0.068 (0.188)	-0.036 (0.554)	-0.041 (0.644)	0.052 (0.271)	-0.086* (0.065)	-0.021 (0.650)	-0.054 (0.469)
Other industry controls	Not significant							
Intercept	0.021 (0.618)	0.178*** (<0.001)	0.017 (0.760)	0.216*** (0.009)	0.046 (0.285)	0.316*** (<0.001)	0.015 (0.713)	0.378*** (<0.001)
Num.of obs.	115	115	115	115	115	115	115	115

Table 15 Year distributions of targets with and without IVA data

Observations in this table are obtained by matching the merger data from SDC with the target's financial data from Compustat. Targets in IVA are the targets with ESG data, targets not in IVA are the targets without ESG data.

Targets in IVA			Targets not in IVA		
Year	Num. of mergers	% of Total	Year	Num. of mergers	% of Total
1999	0	0	1999	85	17.56%
2000	2	1.61%	2000	61	12.60%
2001	0	0.00%	2001	40	8.26%
2002	0	0.00%	2002	27	5.58%
2003	0	0.00%	2003	27	5.58%
2004	2	1.61%	2004	31	6.40%
2005	1	0.81%	2005	37	7.64%
2006	6	4.84%	2006	34	7.02%
2007	8	6.45%	2007	25	5.17%
2008	7	5.65%	2008	18	3.72%
2009	10	8.06%	2009	27	5.58%
2010	4	3.23%	2010	21	4.34%
2011	7	5.65%	2011	15	3.10%
2012	9	7.26%	2012	12	2.48%
2013	11	8.87%	2013	4	0.83%
2014	21	16.94%	2014	10	2.07%
2015	36	29.03%	2015	10	2.07%
total	124	100.00%		484	100.00%

Table 16 Industry distributions of targets with and without IVA data

Observations in this table are obtained by matching the merger data from SDC with the target's financial data from Compustat. Targets in IVA are the targets with ESG data, targets not in IVA are the targets without ESG data. Industries are defined according to two-digit SIC code.

Targets in IVA			Targets not in IVA		
Industry	Num. of targets	% of Total	Industry	Num. of targets	% of Total
Agriculture, forestry and fishery	1	0.81%	Agriculture, forestry and fishery	2	0.41%
Mining	7	5.65%	Mining	19	3.93%
Construction	0	0.00%	Construction	5	1.03%
Manufacturing	59	47.58%	Manufacturing	199	41.12%
Transportation and communication	15	12.10%	Transportation and communication	54	11.16%
Wholesale	1	0.81%	Wholesale	11	2.27%
Retail	5	4.03%	Retail	19	3.93%
Real estate	9	7.26%	Real estate	16	3.31%
Service	27	21.77%	Service	159	32.85%
Total	124	100.00%	Total	484	100.00%

Table 17 T-tests on differences between targets with IVA and non-IVA controls targets

The table presents the t-test procedures on differences between targets in IVA database, and their controls targets not in IVA database. Control targets are matched with targets by the same announcement year, the same industry and the smallest absolute value of the difference between their market value four weeks prior to the announcement date. Target size equals to the logarithm of target market capital (\$mil) four weeks prior to the announcement date.

Variable	N	Maximum	Minimum	Mean	Std Error	t Value	Pr > t
IVA target size-control target size	115	7.354	-2.447	1.825	0.177	10.290	<.0001
IVA target leverage-control target leverage	114	0.904	-1.331	0.091	0.032	2.870	0.005
IVA target ROA-control target ROA	115	0.613	-0.655	0.047	0.017	2.680	0.009
IVA target Q-control target Q	113	8.969	-3.222	0.435	0.188	2.320	0.022

Table 18 Aggregate ESG performance of large targets and abnormal returns

The table reports the OLS regressions of the large target's aggregate ESG level on target cumulated abnormal returns (TCAR) in columns (1) to (4), and on market capital weighted portfolio cumulated abnormal returns (PCAR) in columns (5) to (8). Event windows of TCAR (PCAR) are shown in the third line of the table. Large targets are defined as the targets with an above median logarithm of target market capital four weeks prior to the announcement in the sample group C. Sample group C consists of the mergers with target's IVA data and financial data from Compustat. Industry control variable agriculture represents the industry section of agriculture, forestry and fish. Industry controls include agriculture, manufacturing, transportation and communication, wholesale, retail and real estate. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	TCAR				PCAR			
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target ESG score	0.015 (0.625)	0.015 (0.647)	-0.005 (0.644)	0.025 (0.537)	0.008 (0.681)	0.005 (0.621)	0.005 (0.602)	0.019 (0.398)
Premium	0.283 (0.205)	-0.255 (0.271)	0.102 (0.179)	0.130 (0.637)	0.029 (0.826)	0.035 (0.617)	-0.056 (0.433)	0.008 (0.957)
Tender offer	0.068 (0.647)	-0.121 (0.447)	-0.044 (0.385)	-0.098 (0.619)	0.007 (0.938)	0.013 (0.794)	-0.017 (0.731)	0.003 (0.977)
Target hi-tech flag	0.013 (0.930)	0.119 (0.471)	0.025 (0.635)	0.157 (0.447)	0.012 (0.905)	0.005 (0.917)	0.044 (0.405)	0.061 (0.571)
Acquirer hi-tech flag	0.031 (0.831)	0.051 (0.739)	-0.016 (0.748)	0.067 (0.728)	-0.005 (0.954)	0.027 (0.577)	0.027 (0.580)	0.049 (0.629)
Pure cash	0.012 (0.804)	-0.011 (0.837)	-0.018 (0.296)	-0.017 (0.798)	<0.001 (1.000)	0.007 (0.665)	-0.009 (0.580)	-0.002 (0.951)
Target size	-0.050 (0.635)	-0.154 (0.195)	-0.017 (0.636)	-0.220 (0.145)	-0.073 (0.294)	0.017 (0.636)	0.017 (0.626)	-0.039 (0.592)
Q	-0.002 (0.995)	0.152 (0.597)	-0.023 (0.796)	0.127 (0.722)	-0.092 (0.595)	-0.039 (0.666)	-0.065 (0.484)	-0.197 (0.318)
Leverage	0.737 (0.565)	1.153 (0.401)	-0.135 (0.749)	1.755 (0.312)	1.086 (0.209)	0.054 (0.898)	-0.149 (0.726)	0.991 (0.285)
ROA	0.122 (0.581)	-0.015 (0.948)	0.109 (0.171)	0.216 (0.462)	0.179 (0.227)	0.044 (0.553)	0.127 (0.121)	0.350 (0.053)
Industry controls	Not significant							
Intercept	-0.254 (0.658)	0.245 (0.684)	0.222 (0.269)	0.214 (0.776)	-0.042 (0.908)	-0.151 (0.438)	0.052 (0.785)	-0.140 (0.725)
Num.of obs.	23	23	23	23	23	23	23	23

Table 19 Large targets' respective ESG pillar performance and target cumulated abnormal returns

The table reports the OLS regressions of the large target's E, S or G pillar levels on target cumulated abnormal returns (TCAR) respectively. The event windows of the TCARs are shown in the third line of the table. E, S, and G pillar represent environmental pillar, social pillar and governance pillar respectively. Large targets are defined as the targets with an above median logarithm of target market capital four weeks prior to the announcement in sample group C. Sample group C consists of the mergers with target's IVA data and financial data from Compustat. Industry control variable agriculture represents the industry section of agriculture, forestry and fish. Other industry controls include transportation and communication, wholesale, retail and real estate. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 19 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	TCAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target E score	-0.053 (0.136)	0.040 (0.311)	0.019 (0.111)	0.005 (0.916)								
Target G score					0.062*** (0.002)	-0.015 (0.622)	-0.006 (0.509)	0.041 (0.26)				
Target S score									-0.037 (0.326)	0.041 (0.291)	0.005 (0.704)	0.009 (0.856)
Premium	0.109 (0.646)	0.250 (0.383)	-0.100 (0.224)	0.259 (0.508)	0.270* (0.059)	0.326 (0.309)	-0.060 (0.535)	0.535 (0.164)	-0.054 (0.811)	0.351 (0.168)	-0.030 (0.717)	0.267 (0.425)
Tender offer	0.318 (0.078)	-0.202 (0.293)	0.091 (0.110)	0.207 (0.428)	0.171* (0.076)	-0.172 (0.425)	0.103 (0.152)	0.101 (0.678)	0.367* (0.076)	-0.254 (0.203)	0.082 (0.232)	0.196 (0.461)
Target hi-tech flag	0.180 (0.182)	-0.155 (0.308)	-0.083* (0.076)	-0.058 (0.773)	0.011 (0.857)	-0.073 (0.629)	-0.045 (0.353)	-0.107 (0.540)	0.050 (0.713)	-0.040 (0.773)	-0.047 (0.350)	-0.038 (0.847)
Acquirer hi-tech flag	-0.054 (0.679)	0.140 (0.369)	0.048 (0.279)	0.134 (0.529)	0.048 (0.458)	0.090 (0.576)	0.025 (0.621)	0.163 (0.391)	0.071 (0.653)	0.018 (0.912)	0.020 (0.727)	0.109 (0.635)
Pure cash	-0.202 (0.234)	0.166 (0.392)	0.065 (0.237)	0.028 (0.913)	-0.014 (0.790)	0.019 (0.887)	-0.004 (0.932)	0.001 (0.993)	-0.036 (0.768)	0.052 (0.681)	0.000 (0.996)	0.016 (0.928)
Target size	-0.007 (0.868)	-0.006 (0.895)	-0.012 (0.396)	-0.025 (0.711)	-0.060 (0.038)	-0.001 (0.993)	-0.010 (0.608)	-0.071 (0.329)	-0.004 (0.930)	-0.005 (0.924)	-0.015 (0.384)	-0.024 (0.726)
Q	-0.041 (0.639)	-0.172 (0.130)	-0.020 (0.488)	-0.233 (0.137)	0.004 (0.924)	-0.175 (0.157)	-0.021 (0.561)	-0.191 (0.176)	-0.086 (0.409)	-0.127 (0.255)	-0.011 (0.770)	-0.223 (0.163)
Leverage	-0.034 (0.875)	0.263 (0.318)	-0.010 (0.883)	0.219 (0.537)	-0.108 (0.339)	0.239 (0.398)	-0.023 (0.784)	0.107 (0.735)	0.042 (0.857)	0.208 (0.406)	-0.038 (0.651)	0.212 (0.539)
ROA	-0.144 (0.898)	1.579 (0.258)	0.170 (0.645)	1.605 (0.395)	-0.273 (0.616)	1.227 (0.383)	-0.004 (0.992)	0.949 (0.552)	0.648 (0.579)	0.966 (0.432)	-0.099 (0.812)	1.515 (0.381)
Agriculture	0.071 (0.679)	-0.041 (0.838)	0.125 (0.057)	0.156 (0.581)	-0.081 (0.387)	-0.012 (0.959)	0.137* (0.093)	0.044 (0.867)	-0.026 (0.907)	0.073 (0.751)	0.135 (0.125)	0.182 (0.572)
Manufacturing	0.018 (0.887)	-0.017 (0.913)	0.116** (0.029)	0.118 (0.583)	0.107 (0.114)	-0.079 (0.606)	0.087 (0.104)	0.115 (0.522)	0.032 (0.830)	-0.002 (0.988)	0.097 (0.111)	0.127 (0.566)
Other industry controls	Not significant											
Intercept	0.433 (0.415)	-0.008 (0.989)	-0.014 (0.933)	0.411 (0.627)	0.106 (0.606)	0.345 (0.510)	0.153 (0.356)	0.604 (0.328)	0.243 (0.667)	0.006 (0.991)	0.128 (0.533)	0.378 (0.645)
Num.of obs.	23	23	23	23	23	23	23	23	23	23	23	23

Table 20 Large targets' respective ESG pillar performance and portfolio cumulated abnormal returns

The table reports the OLS regressions of the large target's E, S or G pillar levels on the market capital weighted portfolio cumulated abnormal returns (PCAR) respectively. The event windows of the PCARs are shown in the third line of the table. E, S, and G pillar represent environmental pillar, social pillar and governance pillar respectively. Large targets are defined as the targets with an above median logarithm of target market capital four weeks prior to the announcement in sample group C. Sample group C consists of the mergers with target's IVA data and financial data from Compustat. Industry control variable agriculture represents the industry section of agriculture, forestry and fish. Other industry controls include manufacturing, transportation and communication, wholesale, retail and real estate. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 20 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	PCAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Acquirer E score	-0.028 (0.225)	0.009 (0.489)	-0.001 (0.914)	-0.021 (0.456)								
Acquirer G score					0.037*** (0.005)	-0.002 (0.863)	-0.003 (0.746)	0.032* (0.077)				
Acquirer S score									-0.020 (0.414)	0.000 (0.974)	0.007 (0.607)	-0.013 (0.636)
Premium	0.077 (0.634)	0.055 (0.554)	-0.053 (0.593)	0.080 (0.692)	0.188 (0.081)	0.082 (0.418)	-0.078 (0.443)	0.193 (0.264)	-0.010 (0.946)	0.093 (0.280)	-0.069 (0.405)	0.014 (0.937)
Tender offer	0.048 (0.655)	0.052 (0.408)	-0.040 (0.537)	0.059 (0.656)	-0.041 (0.530)	0.054 (0.435)	-0.032 (0.642)	-0.019 (0.866)	0.074 (0.531)	0.051 (0.447)	-0.047 (0.473)	0.078 (0.582)
Target hi-tech flag	0.067 (0.440)	0.009 (0.857)	-0.005 (0.928)	0.071 (0.509)	-0.029 (0.530)	0.025 (0.609)	-0.002 (0.959)	-0.007 (0.932)	-0.002 (0.978)	0.022 (0.657)	0.002 (0.972)	0.021 (0.840)
Acquirer hi-tech flag	-0.024 (0.784)	0.008 (0.874)	0.037 (0.496)	0.021 (0.848)	0.033 (0.502)	-0.002 (0.972)	0.036 (0.500)	0.067 (0.440)	0.043 (0.680)	0.000 (0.994)	0.024 (0.668)	0.068 (0.587)
Pure cash	-0.130 (0.258)	0.049 (0.448)	0.009 (0.887)	-0.072 (0.600)	-0.030 (0.471)	0.016 (0.716)	0.015 (0.726)	0.001 (0.991)	-0.041 (0.608)	0.015 (0.736)	0.021 (0.644)	-0.006 (0.953)
Target size	-0.010 (0.716)	0.008 (0.643)	-0.012 (0.496)	-0.015 (0.680)	-0.043 (0.051)	0.007 (0.718)	-0.008 (0.682)	-0.044 (0.201)	-0.009 (0.773)	0.005 (0.761)	-0.010 (0.574)	-0.013 (0.719)
Q	-0.069 (0.270)	0.012 (0.727)	0.015 (0.67)	-0.041 (0.580)	-0.040 (0.270)	0.013 (0.726)	0.012 (0.746)	-0.016 (0.796)	-0.093 (0.193)	0.014 (0.703)	0.020 (0.580)	-0.058 (0.471)
Leverage	-0.109 (0.463)	-0.009 (0.918)	-0.049 (0.584)	-0.167 (0.375)	-0.159 (0.095)	-0.018 (0.838)	-0.039 (0.664)	-0.217 (0.173)	-0.069 (0.654)	-0.022 (0.794)	-0.046 (0.591)	-0.137 (0.463)
ROA	0.617 (0.431)	0.133 (0.763)	-0.218 (0.641)	0.531 (0.582)	0.488 (0.269)	0.032 (0.943)	-0.154 (0.729)	0.366 (0.618)	1.038 (0.199)	0.009 (0.984)	-0.207 (0.622)	0.840 (0.367)
Agriculture	0.152 (0.220)	0.034 (0.619)	0.113 (0.146)	0.299* (0.075)	0.060 (0.411)	0.036 (0.633)	0.122 (0.139)	0.217 (0.114)	0.100 (0.491)	0.030 (0.709)	0.134 (0.128)	0.264 (0.158)
Other industry controls	Not significant											
Intercept	0.324 (0.370)	-0.189 (0.364)	0.121 (0.573)	0.256 (0.563)	0.164 (0.319)	-0.105 (0.532)	0.096 (0.569)	0.155 (0.576)	0.224 (0.546)	-0.096 (0.642)	0.044 (0.828)	0.172 (0.696)
Num.of obs.	23	23	23	23	23	23	23	23	23	23	23	23

Table 21 Aggregate ESG performance of small targets and abnormal returns

The table reports the OLS regressions of the small target's aggregate ESG level on the target cumulated abnormal returns (TCAR) in columns (1) to (4), and on the market capital weighted portfolio cumulated abnormal returns (PCAR) in columns (5) to (8). Event windows of TCAR (PCAR) are shown in the third line of the table. Small targets are defined as the targets with a below median logarithm of target market capital four weeks prior to the announcement in sample group C. Sample group C consists of the mergers with target IVA's data and financial data from Compustat. Industry controls include mining, manufacturing, transportation and communication, retail. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	TCAR				PCAR			
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target ESG score	-0.013 (0.543)	0.049** (0.044)	-0.008 (0.377)	0.029 (0.402)	-0.004 (0.677)	0.014 (0.339)	-0.016 (0.187)	-0.006 (0.813)
Premium	0.250 (0.194)	-0.551** (0.013)	0.119 (0.131)	-0.183 (0.540)	0.125 (0.176)	0.046 (0.722)	0.084 (0.413)	0.255 (0.242)
Tender offer	-0.012 (0.942)	-0.062 (0.732)	0.019 (0.786)	-0.056 (0.835)	0.026 (0.749)	0.005 (0.967)	-0.013 (0.886)	0.018 (0.928)
Target hi-tech flag	-0.072 (0.786)	0.773** (0.014)	-0.147 (0.185)	0.554 (0.200)	-0.041 (0.749)	-0.038 (0.836)	-0.040 (0.785)	-0.118 (0.697)
Acquirer hi-tech flag	0.111 (0.738)	-0.766** (0.045)	0.173 (0.209)	-0.481 (0.367)	-0.011 (0.947)	0.122 (0.596)	-0.001 (0.994)	0.110 (0.772)
Pure cash	0.099 (0.292)	0.085 (0.398)	0.016 (0.673)	0.200 (0.185)	0.037 (0.414)	0.021 (0.746)	0.005 (0.925)	0.062 (0.558)
Target size	-0.014 (0.671)	-0.025 (0.493)	-0.013 (0.330)	-0.052 (0.330)	0.013 (0.427)	-0.027 (0.245)	0.026 (0.169)	0.011 (0.767)
Q	-0.010 (0.878)	-0.179 (0.018)	0.051 (0.063)	-0.138 (0.190)	-0.029 (0.351)	-0.007 (0.876)	0.042 (0.241)	0.006 (0.936)
Leverage	0.143 (0.579)	-0.163 (0.558)	0.068 (0.519)	0.048 (0.906)	-0.005 (0.970)	0.307* (0.098)	-0.003 (0.986)	0.300 (0.314)
ROA	0.291 (0.656)	0.261 (0.710)	0.088 (0.739)	0.641 (0.538)	-0.014 (0.965)	-0.087 (0.848)	0.351 (0.331)	0.251 (0.737)
Industry controls	Not significant							
Intercept	-0.059 (0.891)	0.968** (0.049)	-0.117 (0.506)	0.792 (0.254)	-0.054 (0.793)	0.034 (0.908)	-0.285 (0.234)	-0.305 (0.536)
Num.of obs.	31	31	31	31	31	31	31	31

Table 22 Small targets' respective ESG pillar performance and target cumulated abnormal returns

The table reports the OLS regressions of the small target's E, S or G pillar levels on the target cumulated abnormal returns (TCAR) respectively. The event windows of the TCARs are shown in the third line of the table. E, S, G pillar represent environmental pillar, social pillar and governance pillar respectively. Small targets are defined as the targets with a below median logarithm of target market capital four weeks prior to the announcement in sample group C. Sample group C consists of the mergers with target's IVA data and financial data from Compustat. Other industry controls include mining and transportation and communication. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively.

Table 22 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	TCAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target E score	-0.005 (0.852)	0.043 (0.151)	0.008 (0.436)	0.047 (0.247)								
Target G score					0.025 (0.145)	0.021 (0.322)	0.005 (0.528)	0.051* (0.060)				
Target S score									0.003 (0.878)	0.015 (0.556)	-0.017** (0.030)	0.001 (0.983)
Premium	0.230 (0.227)	-0.500** (0.029)	0.098 (0.204)	-0.172 (0.551)	0.142 (0.440)	-0.534** (0.030)	0.089 (0.267)	-0.303 (0.286)	0.225 (0.235)	-0.468** (0.048)	0.111 (0.104)	-0.132 (0.658)
Tender offer	-0.020 (0.907)	-0.040 (0.834)	0.011 (0.876)	-0.050 (0.850)	-0.102 (0.547)	-0.095 (0.654)	-0.002 (0.984)	-0.198 (0.445)	-0.026 (0.881)	-0.048 (0.816)	0.037 (0.544)	-0.037 (0.895)
Target hi-tech flag	-0.070 (0.820)	0.612* (0.093)	-0.212 (0.102)	0.330 (0.488)	-0.007 (0.977)	0.950*** (0.008)	-0.146 (0.200)	0.797* (0.055)	-0.107 (0.693)	0.834** (0.019)	-0.117 (0.233)	0.610 (0.173)
Acquirer hi-tech flag	0.103 (0.778)	-0.589 (0.169)	0.233 (0.128)	-0.252 (0.655)	-0.059 (0.861)	-1.002** (0.029)	0.151 (0.311)	-0.910* (0.092)	0.140 (0.680)	-0.801* (0.062)	0.138 (0.260)	-0.523 (0.343)
Pure cash	0.110 (0.244)	0.059 (0.572)	0.028 (0.451)	0.198 (0.176)	0.093 (0.291)	0.018 (0.865)	0.020 (0.593)	0.131 (0.327)	0.117 (0.232)	0.055 (0.629)	<0.001 (0.996)	0.172 (0.270)
Target size	-0.013 (0.703)	-0.034 (0.386)	-0.015 (0.295)	-0.062 (0.249)	-0.025 (0.452)	-0.035 (0.394)	-0.015 (0.290)	-0.075 (0.145)	-0.014 (0.690)	-0.025 (0.547)	-0.015 (0.221)	-0.053 (0.335)
Q	-0.010 (0.873)	-0.181** (0.024)	0.049* (0.077)	-0.143 (0.167)	-0.030 (0.634)	-0.189** (0.025)	0.047* (0.095)	-0.172* (0.085)	-0.010 (0.882)	-0.167** (0.047)	0.042* (0.082)	-0.134 (0.214)
Leverage	0.140 (0.616)	-0.052 (0.870)	0.108 (0.340)	0.196 (0.646)	-0.004 (0.988)	-0.356 (0.293)	0.047 (0.684)	-0.313 (0.444)	0.164 (0.533)	-0.192 (0.543)	0.044 (0.633)	0.017 (0.968)
ROA	0.296 (0.691)	-0.105 (0.901)	-0.062 (0.835)	0.129 (0.910)	0.365 (0.555)	0.612 (0.433)	0.076 (0.776)	1.053 (0.273)	0.225 (0.731)	0.478 (0.542)	0.073 (0.750)	0.776 (0.461)
Manufacturing	0.022 (0.910)	-0.297 (0.187)	0.123 (0.129)	-0.152 (0.609)	-0.051 (0.773)	-0.489** (0.040)	0.085 (0.281)	-0.455 (0.108)	0.041 (0.822)	-0.388* (0.093)	0.066 (0.315)	-0.28 (0.350)
Retail	<0.001 (0.999)	-0.412 (0.296)	0.133 (0.343)	-0.279 (0.597)	-0.198 (0.553)	-0.809* (0.066)	0.052 (0.717)	-0.955 (0.074)	0.034 (0.917)	-0.576 (0.153)	0.038 (0.742)	-0.504 (0.341)
Other industry controls	Not significant											
Intercept	-0.09 (0.838)	0.988* (0.060)	-0.177 (0.323)	0.722 (0.292)	0.085 (0.840)	1.316** (0.022)	-0.111 (0.546)	1.29* (0.058)	-0.133 (0.771)	1.042* (0.070)	-0.014 (0.928)	0.895 (0.231)
Num.of obs.	31	31	31	31	31	31	31	31	31	31	31	31

Table 23 Small targets' respective ESG pillar performance and portfolio cumulated abnormal returns

The table reports the OLS regressions of the small target's E, S or G pillar levels on the market capital weighted portfolio cumulated abnormal returns (PCAR) respectively. The event windows of the PCARs are shown in the third line of the table. E, S, G pillar represent environmental pillar, social pillar and governance pillar respectively. Small targets are defined as the targets with a below median logarithm of target market capital four weeks prior to the announcement in sample group C. Sample group C consists of the mergers with target's IVA data and financial data from Compustat. Industry controls include mining, manufacturing, transportation and communication, retail. Variable definitions are displayed in the Appendices. The p-values are given in parenthesis. *, **, *** indicate 10%, 5% and 1% significance level respectively

Table 23 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable	PCAR											
	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)	(-20,-2)	(-1,1)	(2,20)	(-20,20)
Target E score	0.001	0.004	0.004	0.009								
	(0.933)	(0.826)	(0.769)	(0.748)								
Target G score					0.009	-0.001	0.013	0.022				
					(0.262)	(0.963)	(0.183)	(0.267)				
Target S score									0.008	0.002	-0.015	-0.005
									(0.417)	(0.897)	(0.214)	(0.848)
Premium	0.117	0.068	0.052	0.237	0.086	0.073	0.012	0.171	0.115	0.071	0.061	0.247
	(0.202)	(0.605)	(0.622)	(0.268)	(0.342)	(0.593)	(0.910)	(0.423)	(0.198)	(0.588)	(0.544)	(0.248)
Tender offer	0.023	0.014	-0.026	0.011	-0.007	0.017	-0.066	-0.057	0.012	0.012	-0.004	0.02
	(0.781)	(0.909)	(0.792)	(0.956)	(0.933)	(0.895)	(0.495)	(0.772)	(0.883)	(0.920)	(0.964)	(0.919)
Target hi-tech flag	-0.056	-0.033	-0.098	-0.186	-0.015	-0.011	-0.024	-0.05	-0.071	-0.014	-0.034	-0.118
	(0.705)	(0.879)	(0.578)	(0.592)	(0.902)	(0.954)	(0.872)	(0.866)	(0.579)	(0.942)	(0.820)	(0.700)
Acquirer hi-tech flag	0.002	0.123	0.048	0.174	-0.075	0.104	-0.077	-0.047	0.018	0.105	-0.017	0.107
	(0.991)	(0.633)	(0.817)	(0.675)	(0.652)	(0.682)	(0.694)	(0.904)	(0.909)	(0.660)	(0.927)	(0.781)
Pure cash	0.042	0.009	0.023	0.073	0.034	0.007	0.01	0.051	0.052	0.009	0.001	0.062
	(0.351)	(0.895)	(0.661)	(0.484)	(0.430)	(0.917)	(0.836)	(0.614)	(0.253)	(0.894)	(0.988)	(0.569)
Target size	0.013	-0.029	0.025	0.01	0.009	-0.028	0.021	0.002	0.014	-0.028	0.025	0.011
	(0.436)	(0.244)	(0.200)	(0.799)	(0.572)	(0.267)	(0.276)	(0.954)	(0.388)	(0.256)	(0.189)	(0.774)
Q	-0.03	-0.006	0.04	0.004	-0.037	-0.005	0.031	-0.011	-0.026	-0.005	0.034	0.003
	(0.345)	(0.893)	(0.294)	(0.960)	(0.240)	(0.914)	(0.395)	(0.881)	(0.403)	(0.921)	(0.352)	(0.966)
Leverage	0.004	0.306	0.032	0.343	-0.06	0.294	-0.069	0.165	0.015	0.294	-0.011	0.298
	(0.975)	(0.13)	(0.838)	(0.282)	(0.644)	(0.153)	(0.65)	(0.594)	(0.901)	(0.124)	(0.936)	(0.321)
ROA	-0.049	-0.074	0.216	0.094	0.017	-0.022	0.347	0.343	-0.045	-0.021	0.294	0.229
	(0.891)	(0.888)	(0.611)	(0.911)	(0.956)	(0.963)	(0.335)	(0.633)	(0.884)	(0.964)	(0.410)	(0.756)
Industry controls	Not significant											
Intercept	-0.074	0.073	-0.362	-0.363	0.001	0.084	-0.244	-0.159	-0.131	0.074	-0.235	-0.293
	(0.723)	(0.812)	(0.160)	(0.466)	(0.994)	(0.790)	(0.320)	(0.745)	(0.54)	(0.818)	(0.348)	(0.571)
Num.of obs.	31	31	31	31	31	31	31	31	31	31	31	31

Table 24 Year distributions of targets in large (small) target sample group

Small targets are defined as the targets with a below median logarithm of target market capital four weeks prior to announcement in sample group C; and large targets are defined as the targets with an above median logarithm of target market capital four weeks prior to announcement in sample group C. Sample group C consists of the mergers with target's IVA data and financial data from Compustat.

Large targets			Small targets		
Year	Num. of mergers	% of Total	Year	Num. of mergers	% of Total
	1	4.35%	2000	0	0.00%
2004	1	4.35%	2004	1	3.23%
2005	0	0.00%	2005	1	3.23%
2006	1	4.35%	2006	1	3.23%
2007	1	4.35%	2007	3	9.68%
2008	1	4.35%	2008	0	0.00%
2010	1	4.35%	2010	0	0.00%
2011	2	8.70%	2011	0	0.00%
2012	0	0.00%	2012	2	6.45%
2013	2	8.70%	2013	5	16.13%
2014	4	17.39%	2014	9	29.03%
2015	9	39.13%	2015	9	29.03%
Total	23	100.00%	Total	31	100.00%

Table 25 Industry distributions of targets in large (small) target sample group

Small targets are defined as the targets with a below median logarithm of target market capital four weeks prior to announcement in sample group C; and large targets are defined as the targets with an above median logarithm of target market capital four weeks prior to announcement in sample group C. Sample group C consists of the mergers with target's IVA data and financial data from Compustat. Industries are defined according to two-digit SIC code.

Large targets			Small targets		
Industry	Num. of targets	% of Total	Industry	Num. of targets	% of Total
Agriculture, forestry, fishery	1	4.35%	Agriculture, forestry, fishery	20	64.52%
Construction	1	4.35%	Construction	0	0.00%
Manufacturing	8	34.78%	Manufacturing	0	0.00%
Transportation and communication	3	13.04%	Transportation and communication	3	9.68%
Wholesale	1	4.35%	Wholesale	0	0.00%
Retail	2	8.70%	Retail	3	9.68%
Real estate	1	4.35%	Real estate	0	0.00%
service	6	26.09%	Service	5	16.13%
Total	23	100.00%	Total	31	100.00%

Table 26 T-test on difference between means of institutional blockholding of targets in small and in large target sample group

Blockholders are defined as a 5% (or higher) shareholder. Small targets are defined as the targets with a below median logarithm of target market capital four weeks prior to announcement in sample group C; and large targets are defined as the targets with an above median logarithm of target market capital four weeks prior to announcement in sample group C. Sample group C consists of the mergers with target's IVA data and financial data from Compustat.

Panel A						
Variable: Institutional						
class	N	Mean	Std Dev	Std Er	Minimu	Maximu
				r	m	m
Large target	23	0.200	0.116	0.024	0	0.394
Small target	28	0.370	0.195	0.037	0	0.683
Diff (Large target - Small target)		-0.170	0.164	0.046		

Panel B							
class	Method	Mean	95% CL	Mean	Std Dev	95% CL	Std Dev
Large target		0.200	0.150	0.250	0.116	0.089	0.164
Small target		0.370	0.294	0.446	0.195	0.154	0.266
Diff (Large target - Small target)	Pooled	-0.170	-0.263	-0.077	0.164	0.137	0.205
Diff (Large target - Small target)	Satterthwaite	-0.170	-0.259	-0.082			

Panel C				
Method	Variances	DF	t Value	Pr > t
Pooled	Equal	49	-3.68	0.001
Satterthwaite	Unequal	44.938	-3.86	<0.001

Panel D				
Equality of Variances				
Method	Num DF	Den D	F Value	Pr > F
		F		
Folded F	27	22	2.85	0.015