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Acquirer ESG Performance and M&A Effectiveness: Evidence from China's Market

Xiao Kangtai[†]

Abstract

This study examines how acquirer ESG performance affects M&A outcomes in China's A-share market from 2009 to 2023. Using Huazheng ESG ratings measured one year before the M&A announcement, this study analyzes announcement-period returns, long-term post-announcement stock performance, deal completion probability, and completion time. The results show that higher ESG scores are associated with more favorable short-term market reactions and a higher likelihood of deal completion, but the evidence for long-term stock performance is weaker. Higher ESG scores are also associated with longer completion time. Additional analyses show that ESG effects vary across transaction characteristics and ESG pillars. Overall, ESG appears to function as a non-financial credibility signal in China's M&A market, with effects that differ across outcomes and transaction contexts.

Key Words: ESG ratings; M&A performance; Announcement returns; Deal completion

1 . Introduction

In recent decades, mergers and acquisitions (M&As) have become a prominent strategy for firms seeking external growth and structural transformation. M&A activities allow firms to circumvent barriers to factor mobility, gain access to critical assets, and exploit economies of scale, thereby facilitating high-quality development (Andrade et al., 2001; Almeida et al., 2011). While many successful cases highlight the potential of M&As to enhance firm competitiveness and market expansion, empirical evidence has also revealed substantial failure rates, with many deals resulting in value destruction and disappointing post-merger performance (Fuller et al., 2002; Erel et al., 2015). Such discrepancies underscore the importance of identifying factors that influence M&A outcomes,

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both in terms of transaction success and financial performance.

Traditional literature has examined various internal and external mechanisms that influence M&A success, such as board structure, financial transparency, legal enforcement, and media scrutiny. However, the role of Environmental, Social, and Governance (ESG) performance has received relatively little attention, despite its growing importance as a measure of corporate sustainability. In light of intensifying global challenges such as climate change, income inequality, and regulatory demands, ESG principles have become increasingly integrated into firms' strategic agendas. ESG performance, as a reflection of long-term orientation, ethical governance, and stakeholder responsiveness, may influence corporate decisions across various domains, including M&A strategy.

From a theoretical standpoint, several frameworks support the notion that ESG performance influences M&A outcomes. Signaling theory (Spence, 1978) suggests that strong ESG credentials serve as non-financial indicators of managerial quality and ethical commitment, reducing information asymmetries and transaction-related uncertainty (Aktas et al., 2011). Contract and stakeholder theories further propose that ESG-oriented firms are better equipped to manage complex stakeholder networks, facilitate smoother integration, and navigate regulatory processes during M&A (Deng et al., 2013; Godfrey et al., 2009). These theoretical perspectives imply that acquiring firms with high ESG performance may be more likely to complete deals successfully and deliver superior post-merger outcomes.

Empirical findings offer partial validation of these hypotheses. Prior research shows that acquirers with stronger ESG engagement often experience more favorable short-term market reactions and long-term stock performance (Kruger, 2015; Lins et al., 2017). Some studies suggest that ESG alignment between acquirer and target facilitates post-deal synergy realization (Just, 2023), while ESG incompatibility may impede integration and increase the risk of deal failure (Rahman, 2022). Moreover, although some findings indicate that ESG can accelerate deal closure through enhanced stakeholder trust and regulatory credibility (Chen, 2021), others highlight that high-ESG acquirers may face longer completion times due to more rigorous internal due diligence and public scrutiny (Cardillo and Harasheh, 2023; Tang et al., 2024). This discrepancy underscores the need to contextualize ESG's role within specific market environments, particularly in emerging markets such as China, where regulatory expectations and stakeholder interpretations of ESG are still evolving.

Against this backdrop, this study investigates the impact of acquirer ESG performance on multiple dimensions of M&A outcomes in the Chinese A-share market. Specifically, we examine four key dependent variables: (1) short-term market response measured by cumulative abnormal return (CAR); (2) long-term financial return measured by buy-and-hold abnormal return (BHAR); (3) the likelihood of deal success; and (4) the time required to complete the transaction. By using ESG ratings from the Huazheng database and conducting both linear and logistic regression analyses, this paper seeks to provide a comprehensive understanding of how sustainability performance influences

M&A behavior in a transitional institutional setting.

This research contributes to the literature in three ways. First, it enriches the emerging scholarship on ESG and corporate finance by focusing on its role in M&A outcomes. Second, it provides empirical evidence from China, an emerging economy where ESG practices are rapidly evolving but remain underexplored. Third, this study incorporates deal-specific heterogeneity, including state ownership, payment method, and the distinction between horizontal and non-horizontal transactions, to better clarify the conditions under which ESG performance has varying effects on M&A outcomes and execution.

2. Literature Review and Research Hypotheses

2.1 ESG and Market Response in M&A

Theoretically, several well-established frameworks offer compelling explanations for how ESG performance affects M&A announcements market response. The information asymmetry theory suggests that ESG performance serves as a credible signal that reduces uncertainty and information gaps between corporate insiders and external stakeholders (Cheng et al., 2014). Firms with high ESG ratings are often seen as more transparent and responsible, which may positively influence investors' interpretation of M&A announcements and lead to more favorable stock price reactions. According to contract theory, which forms the origin of stakeholder theory, firms are viewed as networks of both formal and informal agreements (Deng et al., 2013). Companies with strong ESG performance are generally perceived as more reliable in honoring these obligations, thereby enhancing the value of stakeholder relationships. In this context, stakeholders—such as employees, investors, and regulators—are more likely to offer both tangible and intangible support, including capital, goodwill, and cooperation, which can positively impact post-merger integration and performance. Signaling theory further explains the communicative role of ESG performance in capital markets. Stakeholders often have less information than firms, especially during complex events like M&As. When companies exhibit sustained and proactive ESG engagement, they send credible signals of integrity, long-term orientation, and managerial quality (Connelly et al., 2011). These signals help alleviate skepticism regarding M&A announcements, reduce perceived risk, and lower transaction costs (Spence, 1978; Graffin et al., 2016; Yang and Michel, 2018). Agency theory emphasizes how ESG practices can mitigate managerial opportunism by strengthening internal governance mechanisms. Firms with long-term ESG commitments are less likely to face such skepticism, as continuous investment in ESG functions like an “insurance-like” mechanism, protecting firms from reputational and market backlash (Rejda, 2005). Acquirers with high ESG engagement are more likely to pursue value-enhancing deals rather than empire-building or self-serving transactions, thereby increasing both immediate market confidence and long-term integration efficiency (Jensen & Meckling, 1976;

Ferrel et al., 2016).

Empirical studies provide evidence that solid efforts in sustainable development performance enhances short-term market reactions following M&A announcements. Deng et al. (2013) found that acquirers with high CSR scores experience significantly higher announcement-window stock returns, suggesting that stakeholders perceive ESG as a positive quality signal. Similarly, Lins et al. (2017) show that firms with stronger social capital, often built through ESG activities, exhibit greater resilience during economic uncertainty, including during M&A events. These findings align with Godfrey et al. (2009), who argue that ESG functions as a reputation buffer, reducing investor anxiety and increasing confidence in firm decision-making. As such, ESG acts as a short-term performance enhancer by attracting market approval at key strategic moments such as mergers. Beyond immediate market reactions, ESG performance also contributes to long-term financial success after acquisitions. Firms with high ESG ratings tend to maintain better integration outcomes, enjoy improved employee morale, and demonstrate greater adaptability to market changes. Just (2023) reports that ESG alignment between acquirers and targets leads to smoother integration and higher long-term performance. Moreover, Krüger (2015) highlights that while markets may not reward ESG efforts instantly, consistent and genuine ESG engagement yields superior returns over time. This supports the idea that ESG creates enduring value that unfolds gradually, aligning with longer-horizon performance indicators such as operational efficiency and stakeholder loyalty. Therefore, two hypotheses are proposed:

H1: The ESG performance of acquirers is positively associated with the short-term market reaction to M&A announcements.

H2: The ESG performance of acquirers is positively associated with long-term post-announcement stock performance.

2.2 The Role of Acquirer ESG Performance in M&A Success and Deal Completion Time

From a signaling theory perspective (Spence, 1978), sustained ESG commitment reflects managerial credibility, ethical integrity, and strategic foresight. These attributes act as intangible indicators that help reduce information asymmetries between acquirers and external stakeholders, thereby fostering trust during complex negotiations and due diligence. Aktas et al. (2011) find that acquirers with high ESG ratings are more likely to complete deals successfully, as stakeholders interpret ESG as a proxy for quality and reliability.

Complementing this, contract theory and stakeholder theory suggest that strong ESG performance enhances a firm's ability to manage multifaceted relationships with employees, regulators, customers, and investors—relationships that are particularly vital in the M&A context (Deng et al., 2013; Godfrey et al., 2009). Empirical work supports these theoretical insights. For instance, Krishnamurti et al.

(2019) reports that acquirers with superior social performance enjoy greater deal closure rates. Similarly, Rasmussen (2020) demonstrates that socially responsible acquirers in Europe experience more efficient transactions with fewer delays and renegotiations. However, Rahman (2022) highlights that large ESG mismatches between acquirer and target can increase the risk of deal failure, underscoring the importance of ESG alignment. Moreover, in emerging markets, Lertpakakul (2022) finds a negative relationship between acquirer ESG and M&A success, potentially due to lower regulatory harmonization and skepticism toward ESG disclosures. Taken together, these studies imply that ESG enhances deal success when used as a credible long-term strategy, but its effects may vary depending on regional maturity and firm-level ESG congruence.

While ESG practices may positively influence deal success, their effect on the speed of completion is more nuanced and varies across contexts. On one hand, ESG can accelerate deal closure by improving stakeholder relations, facilitating regulatory approvals, and signaling managerial efficiency. Chen (2021), in a study of U.S. acquirers, finds that firms with better ESG performance finalize deals more quickly, suggesting that high ESG scores mitigate friction during the execution phase.

On the other hand, recent literature points to the possibility that ESG performance can prolong the deal process in certain contexts. Cardillo and Harasheh (2023) find that a greater ESG distance or mismatch between the acquirer and the target tends to prolong the transaction process because such mismatches require more extensive due diligence, internal coordination, and stakeholder communication. This is particularly relevant when acquirers and targets differ in disclosure quality, governance practices, or sustainability standards. Tang et al. (2024) similarly emphasize that ESG misalignment can slow decision-making and increase organizational resistance during integration planning. Just (2023) further shows that deal timing depends on the relative ESG position of the acquirer and target. In the Chinese M&A market, target firms are often non-listed companies with less publicly available information on ESG practices, internal governance, labor relations, environmental compliance, and stakeholder management. For acquirers with stronger ESG performance, such information gaps may lead to more detailed due diligence, more careful compliance assessment, and more formalized internal approval procedures. As a result, stronger acquirer ESG performance may increase procedural rigor and lengthen the completion process. We put forward the following two hypotheses:

H3: In China's M&A market, the better the ESG performance of the acquirer, the higher the success rate of the M&A.

H4: In China's M&A market, the better the ESG performance of the acquirer, the longer the completion time of the M&A.

3. Design of Empirical Research

3.1 Data and Sample

The sample includes M&A transactions conducted by Chinese A-share listed acquirers from 2009 to 2023. ESG data are obtained from Huazheng ESG ratings, while M&A transaction data are sourced from the Wind M&A database. Huazheng ESG ratings are used because they are designed for the Chinese capital market and provide a consistent rating framework for A-share listed firms, making them suitable for studying ESG effects in China's M&A context. Firm-level financial and governance variables are obtained from the CSMAR database.

To ensure sample reliability, transactions without complete ESG ratings, announcement dates, or key control variables are excluded. The sample is restricted to transactions with a deal value of at least RMB 1 million in which the acquirer obtains more than 50% of the target's equity. The unit of analysis is the M&A transaction. Therefore, a listed acquirer may appear more than once if it conducts multiple qualified transactions during the sample period. Year and industry fixed effects are included in the regression models to control for time-specific shocks and industry heterogeneity.

3.2 Variables Design

Table 1 Variables Definitions

Variable	Symbol	Variable Definition
Cumulative Abnormal Return	CAR	Cumulative abnormal return over the event window (two days before and after the M&A announcement)
Buy-and-Hold Abnormal Return	BHAR	Buy-and-hold abnormal return over a 24-month period after the M&A announcement
ESG Rating	ESG	Huazheng ESG rating (converted to numeric scale from C to AAA as 1-9), measured one year prior (T-1) to the M&A announcement
Tobin's Q	Tobinq	Tobin's Q, measured one year prior (T-1) to the M&A announcement
Firm Size	Size	Natural logarithm of total assets, measured one year prior (T-1) to the M&A announcement
Leverage	Lev	Ratio of total liabilities to total assets, measured one year prior (T-1) to the M&A announcement
Return on Assets	ROA	Return on assets, measured one year prior (T-1) to the M&A announcement
Revenue Growth	Growth	Year-over-year growth rate in revenue, measured one year prior (T-1) to the M&A announcement
Top 10 Shareholding Ratio	Top10	Shareholding ratio of the top 10 shareholders, measured one year prior (T-1) to the M&A announcement
Board Size	BoardSize	Natural logarithm of the number of board members, measured one year prior (T-1) to the M&A announcement
Independent Director Ratio	Indep	Proportion of independent directors, measured one year prior (T-1) to the M&A announcement
Firm Age	Age	Natural logarithm of firm age (announcement year minus establishment year), measured one year prior (T-1) to the M&A announcement
Equity Acquisition Ratio	DealRatio	Percentage of the target's equity acquired
Cash Payment Dummy	CashPayment	Dummy variable equal to 1 if the payment method includes cash
Horizontal Merger Dummy	HorizonMerge	Dummy variable equal to 1 if the deal is a horizontal merger

Note: This table reports the definitions of the main variables used in the empirical analysis. Firm-level variables, including ESG, Tobin's Q, Size, Lev, ROA, Growth, Top10, BoardSize, Indep, and Age, are measured one year prior to the M&A announcement. Deal-level variables, including DealRatio, CashPayment, and HorizonMerge, are measured at the transaction level.

3.3 Model Design

To examine the impact of corporate Environmental, Social, and Governance (ESG) performance on merger and acquisition (M&A) outcomes, we construct a series of regression models using both short-term and long-term indicators as dependent variables. Specifically, the Cumulative Abnormal Return (CAR) within a $(-2, +2)$ event window surrounding the M&A announcement is employed to capture the market's immediate reaction to the deal. To assess long-term stock performance, we calculate the Buy-and-Hold Abnormal Return (BHAR) over the 24-month period following the announcement.

For the calculation of CAR, this study follows the standard event-study method. Expected stock returns are estimated using the market model over the estimation window from 150 trading days to 30 trading days before the M&A announcement. The abnormal return is calculated as the difference between the actual stock return and the expected return:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

CAR is then calculated by summing abnormal returns over the event window:

$$CAR_i = \sum_{t=-2}^{+2} AR_{it}$$

where AR_{it} is the abnormal return of acquirer i on trading day t , R_{it} is the actual stock return of acquirer i , and R_{mt} is the market return. α_i and β_i are estimated from the market model during the estimation window. If the announcement date is not a trading day, the next available trading day is used as the event date.

For the calculation of BHAR, this study compares the acquirer's buy-and-hold return with the return of a benchmark portfolio. The baseline BHAR is calculated over the 24-month period after the M&A announcement:

$$BHAR_i = \prod_{t=0}^{24} (1 + R_{it}) - \prod_{t=0}^{24} (1 + R_{pt})$$

where R_{it} is the monthly stock return of acquirer i in month t , and R_{pt} is the monthly return of the benchmark portfolio matched by firm characteristics. The first term represents the acquirer's buy-and-hold return after the announcement, while the second term represents the benchmark portfolio's buy-and-hold return over the same period. Therefore, BHAR captures the acquirer's long-term abnormal stock performance relative to comparable firms.

In addition to market-based performance measures, we evaluate the practical success of the M&A transaction through two further dependent variables: a binary indicator of deal success (equal to 1 if the deal is successfully completed, 0 otherwise), and the natural logarithm of M&A deal completion time, measured as the number of calendar days between the announcement date and legal completion.

The primary independent variable of interest is the acquirer's ESG rating, which is obtained from the Huazheng ESG database and reflects the acquirer's ESG performance in the fiscal year preceding

the M&A announcement. This variable serves as a proxy for the acquiring firm's non-financial credibility, governance quality, and stakeholder engagement capacity prior to the deal.

3.4 Baseline Regression Models

We estimate the following baseline OLS regressions:

Model 1: ESG and Short-term Market Reaction (CAR)

$$CAR_i = \beta_0 + \beta_1 ESG_i + \beta_2 Control_i + \gamma_i + \delta_i + \epsilon_i$$

Model 2: ESG and Long-term Performance (BHAR)

$$BHAR_i = \beta_0 + \beta_1 ESG_i + \beta_2 Control_i + \gamma_i + \delta_i + \epsilon_i$$

Model 3: ESG and Deal Success (Logit Regression)

$$Pr(Completed = 1) = \text{logit}(\beta_0 + \beta_1 ESG_i + \beta_2 Control_i + \gamma_i + \delta_i + \epsilon_i)$$

Model 4: ESG and M&A Deal Completion Time

$$\ln(Days_i) = \beta_0 + \beta_1 ESG_i + \beta_2 Control_i + \gamma_i + \delta_i + \epsilon_i$$

Where:

CAR_i : Cumulative Abnormal Return of firm i within the $(-2, +2)$ window around the M&A announcement date. $BHAR_i$: Buy-and-Hold Abnormal Return of firm i over 24 months after the M&A announcement. $Pr(Completed = 1)$: A binary indicator variable equal to 1 if the M&A transaction is successfully completed, and 0 otherwise. $\ln(Days_i)$: The natural logarithm of the number of days from the M&A announcement date to the legal completion date, used to measure the deal completion time. ESG_i : ESG score of the acquirer from the Huazheng database, measured one year prior to the M&A announcement. $Control_i$: Vector of control variables including Tobin's Q, firm size, leverage, ROA, revenue growth, ownership concentration, board characteristics, and firm age (all measured at $T - 1$), as well as payment method and merger type measured on the announcement date. Industry fixed effects to control for unobserved heterogeneity across sectors. Year fixed effects to control for time-specific shocks.

3.5 Control Variables

To rigorously estimate the impact of acquirer ESG performance on M&A outcomes, we include a set of control variables drawn from established empirical literature on mergers and acquisitions (Moeller et al., 2004; Harford, 2005; Erel et al., 2015). These controls are designed to mitigate potential omitted variable bias and ensure robustness of the regression models.

At the firm level, we control for Tobin's Q to capture market valuation and growth opportunities, as firms with higher valuations may be more acquisitive or face greater market pressure. Firm size (log of total assets) accounts for scale advantages and resource availability, while leverage reflects financial constraints that may affect acquisition capacity (Harford, 2005). Profitability is measured using Return on Assets (ROA), in line with prior studies linking operating efficiency with M&A

success (Martynova and Renneboog, 2008). The growth rate of total assets is included to control for pre-merger expansion momentum.

Regarding governance-related variables, we include board size and the independent director ratio, as corporate governance quality may affect both acquisition decision-making and post-merger integration (Core et al., 1999). Firm age is used as a proxy for organizational maturity and institutional experience. The Top 10 shareholder concentration ratio reflects internal monitoring strength and agency cost mitigation (La Porta et al., 1999).

At the deal level, we control for the deal size ratio (deal value divided by acquirer total assets), which captures the relative importance and risk exposure of each transaction (Moeller et al., 2004). Finally, to account for unobserved heterogeneity across time and industries, year and industry fixed effects are included in all regression specifications.

4. Empirical Results and Discussion

4.1 Descriptive Statistics

The average CAR is 0.031 with a standard deviation of 0.122, ranging from -0.253 to 0.353, indicating that most firms experienced modest abnormal returns around M&A announcements. The mean BHAR is -0.044, with a relatively high standard deviation of 0.592, suggesting that on average, M&A events are followed by slightly negative long-term abnormal returns, while also exhibiting considerable heterogeneity across firms.

The average ESG score is 4.114 (SD = 0.951), ranging from 1 to 7. Although Huazheng ESG ratings theoretically range from C (1) to AAA (9), no sample firms receive AA or AAA ratings, and the highest observed rating is A (coded as 7). This indicates that high ESG ratings are relatively rare among the acquirers in the sample.

Among control variables, the average Tobin's Q is 2.116, suggesting that on average, firms are valued more than twice their book value. The log of total assets (Size) has a mean of 22.199. The Leverage (Lev) ratio averages 0.420, ROA is 0.044, Revenue Growth (Growth) is 0.221, and the Top 10 shareholders' ratio (Top10) is 0.597—all within reasonable ranges. In addition, the log of Board Size averages 2.128, the Independent Director Ratio (Indep) is 0.374, Firm Age (log) is 2.860, and the average Equity Deal Ratio (DealRatio) is 0.304. These figures establish a solid foundation for the subsequent regression analysis.

As shown in the table, ESG ratings are unevenly distributed across the 4,209 M&A sample observations. Firms rated B account for the largest proportion, representing 44.31% of the sample, followed by BB (27.85%) and CCC (17.87%). In contrast, higher-rated firms are scarce: BBB only accounts for 5.37%, and A-rated firms are extremely rare, with just 8 firms (0.19%). Notably, no firms in the sample received the highest ESG ratings of AA or AAA, even though Huazheng ESG ratings

Table 2 Descriptive Statistics

Variable	N	Mean	SD	Min	Max
CAR	4209	0.0310	0.122	-0.253	0.353
BHAR	3704	-0.0440	0.592	-1.316	2.445
ESG	4209	4.114	0.951	1	7
Tobinq	4209	2.116	1.378	0.873	9.020
Size	4209	22.19	1.268	19.47	26.28
Lev	4209	0.420	0.200	0.0520	0.932
ROA	4209	0.0440	0.0490	-0.184	0.201
Growth	4209	0.221	0.491	-0.530	3.762
Top10	4209	0.597	0.144	0.248	0.953
BoardSize	4209	2.128	0.195	1.609	2.708
Indep	4209	0.374	0.0510	0.333	0.571
Age	4209	2.860	0.357	1.609	3.526
DealRatio	4209	0.304	0.914	-0.219	15.50

Note: This table presents descriptive statistics for the main variables used in the regression analysis. N denotes the number of observations, Mean denotes the sample average, SD denotes the standard deviation, and Min and Max denote the minimum and maximum values, respectively. CAR is calculated over the $[-2, +2]$ event window around the M&A announcement, and BHAR is measured over the 24-month post-announcement holding period. ESG is based on Huazheng ESG ratings and converted into a numerical scale from 1 to 9. The number of observations differs across variables due to data availability. Continuous financial variables are winsorized to reduce the influence of extreme observations.

include 9 levels from C to AAA.

This distribution indicates that the sample is concentrated in mid- and low-level ESG categories. Since the statistics are based only on firms that conduct qualified M&A transactions, they should not be interpreted as evidence that high-ESG firms are generally less likely to conduct M&As. Instead, the distribution suggests that the ESG variation in this sample is mainly driven by differences among firms rated between CCC, B, BB, and BBB.

Table 3 ESG Rating Statistics

ESG Rating	Freq.	Percent
A	8	0.190
B	1,865	44.31
BB	1,172	27.85
BBB	226	5.370
C	43	1.020
CC	143	3.400
CCC	752	17.87
Total	4,209	100

Note: This table reports the distribution of Huazheng ESG ratings in the M&A sample. Freq. refers to the number of transaction-level observations in each ESG rating category, and Percent refers to the percentage of each category in the full sample. The ratings are converted into a numerical scale from 1 to 9 in the regression analysis, where C equals 1 and AAA equals 9. AA and AAA are not reported because no sample firms receive these ratings. Since the sample is transaction-level, the same listed acquirer may appear more than once.

4.2 Regression Results

Table 4 reports the baseline regression results for short-term market response, long-term stock performance, deal completion probability, and completion time.

Column (1) shows that ESG rating is positively and significantly associated with CAR (coefficient = 0.004, $p < 0.05$), suggesting that firms with better ESG performance receive more favorable short-term market reactions to M&A announcements. This may reflect investors' perception that high-ESG acquirers are more transparent, responsible, and better managed.

Column (2) shows that ESG is positively but insignificantly related to BHAR (coefficient = 0.016), implying that ESG is not a robust predictor of post-announcement abnormal returns over the 24-month holding period.

Column (3) presents the logit estimates for the likelihood that a transaction is completed. ESG is positive and significant. Interpreted in odds terms, the coefficient of 0.090 implies that a one-unit increase in ESG raises the odds of completion by approximately 9.4%. This finding is consistent with the view that better ESG performance is associated with stronger transparency, compliance, and stakeholder management, which may reduce regulatory, financing, and negotiation frictions.

Column (4) considers the log of days to completion. ESG is again positive and statistically significant. Since the dependent variable is in logarithmic form, the coefficient can be interpreted as a semi-elasticity. Thus, higher-ESG acquirers take approximately 5.5% longer to close, ceteris paribus. This pattern suggests that high-ESG acquirers may complete transactions more deliberately because of more extensive due diligence, stricter disclosure practices, or more formalized internal and external approval procedures.

Table 4 Regression of ESG Ratings on CAR, BHAR, Success and Deal Completion Time

	(1) CAR	(2) BHAR	(3) Completed	(4) Days
ESG	0.004** (0.002)	0.016 (0.011)	0.090** (0.041)	0.054** (0.024)
Tobinq	-0.010*** (0.002)	-0.037*** (0.009)	-0.062* (0.032)	0.024 (0.019)
Size	-0.011*** (0.002)	-0.092*** (0.012)	-0.201*** (0.044)	0.062** (0.025)
Lev	0.018 (0.013)	0.107 (0.067)	-0.136 (0.257)	0.118 (0.143)
ROA	-0.024 (0.045)	-0.201 (0.256)	2.889*** (0.865)	-0.659 (0.497)
Growth	-0.005 (0.004)	0.001 (0.020)	0.065 (0.081)	0.035 (0.044)
Top10	0.005 (0.013)	0.240*** (0.073)	0.708*** (0.270)	-0.323** (0.154)
BoardSize	-0.009 (0.012)	0.041 (0.071)	-0.280 (0.256)	0.246* (0.147)
Indep	0.007 (0.043)	0.223 (0.254)	-0.239 (0.875)	0.069 (0.505)
Age	0.001 (0.006)	-0.015 (0.033)	-0.038 (0.123)	0.110 (0.068)
DealRatio	0.034*** (0.003)	0.041*** (0.012)	-0.023 (0.040)	0.257*** (0.029)
Constant	0.221*** (0.056)	1.570*** (0.336)	4.453*** (1.258)	2.515*** (0.741)
Observations	4209.000	3704.000	4180.000	3016.000
R^2	0.175	0.076		0.161
Adjusted R^2	0.155	0.052		0.132
Industry	YES	YES	YES	YES
Year	YES	YES	YES	YES

Note: This table reports the baseline regression results. Columns (1), (2), and (4) use OLS regressions, while Column (3) uses a logit model for deal completion. CAR is measured over the $[-2, +2]$ event window, and BHAR is measured over the 24-month post-announcement period. All regressions include industry and year fixed effects. Standard errors are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Across the four columns, several control estimates behave as expected: Size is significantly negative for CAR, BHAR, and completion (Columns 1-3) but positive for Days (Column 4), implying large acquirers earn lower abnormal returns and face lower completion odds, yet their deals take longer—consistent with the greater complexity of large firms and large projects. Tobin's Q is significantly negative for CAR and BHAR and weakly negative for completion, consistent with market concerns that high-valuation acquirers may overpay or engage in empire building. ROA loads strongly and positively in the completion regression, indicating that more profitable acquirers complete deals more often, and negatively in Days, pointing to faster execution by financially healthy firms. Ownership concentration (Top10) is positive for BHAR and completion but negative for Days, suggesting that monitoring by large blockholders improves long-term performance, facilitates closing, and streamlines execution. DealRatio (relative deal size) is positive for CAR, BHAR, and Days, implying that larger transactions create more value on average but also require more time to complete.

Taken together, the baseline estimates suggest a nuanced pattern. ESG is positively associated with announcement-period CAR and deal completion probability, while it is also associated with longer execution timelines. These results are consistent with two possible channels: a credibility channel, through which ESG reduces information asymmetry and improves stakeholder confidence, and a process-rigor channel, through which high-ESG firms adopt more careful due diligence and approval procedures.

The absence of a significant BHAR effect suggests that two-year post-announcement stock performance is influenced by many factors beyond the acquirer's pre-deal ESG performance, including integration quality, macroeconomic shocks, industry cycles, and subsequent corporate decisions. Therefore, the long-term stock performance evidence should be interpreted cautiously.

Overall, the results support the view that ESG is more strongly related to short-term market reactions and transaction execution than to medium-term stock performance. However, because ESG effects may vary across deal characteristics and ESG dimensions, further analyses are conducted below.

5. Endogeneity Concerns and Propensity Score Matching

To mitigate potential endogeneity from non-random ESG selection, I implement a propensity score matching (PSM) procedure. Firms are split into two groups according to ESG score: treated firms have an ESG score of 5 or above, while control firms have an ESG score below 5. Propensity scores are estimated using the same pre-deal covariates as in the baseline model, including Tobin's Q, Size, Lev, ROA, Growth, Top10 ownership, BoardSize, Indep, firm Age, and DealRatio. Matching is conducted using 1:1 nearest-neighbor matching on the common support. Balance diagnostics

Table 5-1 Results of the Balance Test for CAR

Variable	Unmatched Matched	Mean		%bias	%reduct bias	t-test	
		Treated	Control			t	p> t
Tobinq	U	2.004	2.172	-12.6	95.4	-3.750	0.000
	M	2.007	1.999	0.6		0.160	0.874
Size	U	22.448	22.056	30.1	96.4	9.560	0.000
	M	22.432	22.446	-1.1		0.280	0.779
Lev	U	0.412	0.424	-6.0	86.7	-1.840	0.066
	M	0.412	0.411	0.8		0.210	0.834
ROA	U	0.052	0.039	26.5	97.3	7.920	0.000
	M	0.052	0.051	0.7		0.200	0.842
Growth	U	0.228	0.217	2.2	-11.4	0.650	0.513
	M	0.228	0.240	-2.4		-0.660	0.510
Top10	U	0.610	0.591	13.8	54.2	4.250	0.000
	M	0.609	0.618	-6.3		-1.680	0.093
BoardSize	U	2.124	2.130	-3.0	88.2	-0.910	0.364
	M	2.124	2.124	0.4		0.090	0.931
Indep	U	0.381	0.371	18.9	88.8	5.870	0.000
	M	0.380	0.379	2.1		0.530	0.594
Age	U	2.841	2.869	-7.8	97.5	-2.420	0.016
	M	2.844	2.844	-0.2		-0.050	0.958
DealRatio	U	0.214	0.349	-16.0	95.0	-4.550	0.000
	M	0.215	0.221	-0.8		-0.270	0.784

Note: This table reports the covariate balance test before and after propensity score matching for the CAR sample. The treated group consists of observations with ESG scores equal to or above 5, while the control group consists of observations with ESG scores below 5. "U" denotes the unmatched sample, and "M" denotes the matched sample. The percentage bias and t-test results are used to evaluate whether covariate balance improves after matching.

(Tables 5-1-5-4; Figures 1-4) show that after matching, the absolute standardized mean differences for most covariates fall below 10%, and paired t-tests generally fail to reject equality between treated and control groups. Re-estimating the main specifications on the matched samples (Table 6, Columns 1-4) yields qualitatively similar conclusions: ESG remains positively related to CAR and deal completion probability, insignificant for BHAR, and positively associated with days to completion. These results help alleviate selection concerns based on observable characteristics, although they do not completely eliminate the possibility of endogeneity from unobservable factors.

Table 5-2 Results of the Balance Test for BHAR

Variable	Unmatched Matched	Mean		%bias	%reduct bias	t-test	
		Treated	Control			t	p> t
Tobinq	U	1.962	2.199	-18.30	99.20	-5.080	0.000
	M	1.966	1.964	0.10		0.040	0.968
Size	U	22.400	22.000	30.50	81.40	9.130	0.000
	M	22.380	22.310	5.70		1.400	0.161
Lev	U	0.416	0.421	-2.80	-84.50	-0.810	0.419
	M	0.415	0.405	5.10		1.300	0.194
ROA	U	0.051	0.040	23.40	88	6.610	0.000
	M	0.051	0.052	-2.80		-0.710	0.479
Growth	U	0.229	0.218	2.10	14.30	0.600	0.546
	M	0.229	0.238	-1.80		-0.460	0.643
Top10	U	0.609	0.593	11.50	98.70	3.330	0.001
	M	0.608	0.608	0.10		0.040	0.971
BoardSize	U	2.126	2.131	-2.50	-164.40	-0.740	0.462
	M	2.126	2.113	6.70		1.630	0.104
Indep	U	0.381	0.371	19.10	79.10	5.590	0.000
	M	0.380	0.382	-4.00		-0.920	0.358
Age	U	2.816	2.833	-4.80	97.80	-1.390	0.164
	M	2.818	2.818	-0.10		-0.030	0.980
DealRatio	U	0.233	0.386	-17.10	77.30	-4.580	0.000
	M	0.234	0.268	-3.90		-1.250	0.213

Note: This table reports the covariate balance test before and after propensity score matching for the BHAR sample. The matching is based on pre-deal firm characteristics and deal-level controls used in the baseline model. “U” denotes the unmatched sample, and “M” denotes the matched sample. A lower absolute percentage bias after matching indicates improved comparability between the treated and control groups.

Table 5-3 Results of the Balance Test for Completed

Variable	Unmatched Matched	Mean		%bias	%reduct bias	t-test	
		Treated	Control			t	p> t
Tobinq	U	2.003	2.172	-12.60	95.40	-3.750	0.000
	M	2.007	1.999	0.60		0.160	0.874
Size	U	22.450	22.060	30.10	96.40	9.560	0.000
	M	22.430	22.450	-1.10		-0.280	0.779
Lev	U	0.412	0.424	-6.00	86.70	-1.840	0.066
	M	0.412	0.411	0.80		0.210	0.834
ROA	U	0.052	0.039	26.50	97.30	7.920	0.000
	M	0.052	0.051	0.70		0.200	0.842
Growth	U	0.228	0.217	2.20	-11.40	0.650	0.513
	M	0.228	0.240	-2.40		-0.660	0.510
Top10	U	0.610	0.591	13.80	54.20	4.250	0.000
	M	0.609	0.618	-6.30		-1.680	0.093
BoardSize	U	2.124	2.130	-3.00	88.20	-0.910	0.364
	M	2.124	2.124	0.40		0.090	0.931
Indep	U	0.381	0.371	18.90	88.80	5.870	0.000
	M	0.380	0.379	2.10		0.530	0.594
Age	U	2.841	2.869	-7.80	97.50	-2.420	0.016
	M	2.844	2.844	-0.20		-0.050	0.958
DealRatio	U	0.214	0.349	-16.00	95.00	-4.550	0.000
	M	0.215	0.221	-0.80		-0.270	0.784

Note: This table reports the covariate balance test before and after propensity score matching for the deal completion sample. The treated group includes high-ESG observations, defined as ESG scores equal to or above 5. The control group includes observations with ESG scores below 5. The balance test compares the mean values of covariates between the two groups before and after matching.

Table 5-4 Results of the Balance Test for Days

Variable	Unmatched Matched	Mean		%bias	%reduct bias	t-test	
		Treated	Control			t	p> t
Tobinq	U	2.016	2.158	-10.80	51.20	-2.710	0.007
	M	2.018	2.088	-5.30		-1.260	0.208
Size	U	22.320	22.020	22.90	63.30	6.140	0.000
	M	22.310	22.200	8.40		1.870	0.061
Lev	U	0.396	0.417	-10.20	11.60	-2.670	0.008
	M	0.396	0.378	9.00		2.080	0.038
ROA	U	0.053	0.042	22.60	81.40	5.730	0.000
	M	0.053	0.055	-4.20		-0.990	0.323
Growth	U	0.223	0.227	-0.80	-337.10	-0.210	0.835
	M	0.223	0.241	-3.60		-0.800	0.423
Top10	U	0.613	0.597	11.10	98.90	2.910	0.004
	M	0.613	0.613	0.10		0.030	0.978
BoardSize	U	2.116	2.126	-5.30	60.30	-1.390	0.166
	M	2.116	2.112	2.10		0.470	0.640
Indep	U	0.381	0.371	18.60	92.20	4.900	0.000
	M	0.381	0.381	-1.40		-0.300	0.760
Age	U	2.836	2.870	-9.50	56.00	-2.480	0.013
	M	2.837	2.822	4.20		0.930	0.351
DealRatio	U	0.229	0.343	-13.00	98.30	-3.130	0.002
	M	0.229	0.227	0.20		0.060	0.949

Note: This table reports the covariate balance test before and after propensity score matching for the completion-time sample. The matching procedure uses the same covariates as the baseline model, including firm valuation, size, leverage, profitability, growth, ownership concentration, board characteristics, firm age, and deal size. The matched sample is used to re-estimate the effect of ESG on deal completion time.

Table 6 Sample regression after matching

	(1) CAR	(2) BHAR	(3) Completed	(4) Days
ESG	0.008** (0.003)	0.019 (0.017)	0.133** (0.063)	0.068* (0.036)
Tobinq	-0.007** (0.003)	-0.061*** (0.015)	-0.017 (0.057)	0.034 (0.034)
Size	-0.010*** (0.003)	-0.102*** (0.018)	-0.176** (0.070)	0.082** (0.039)
Lev	0.005 (0.020)	-0.044 (0.109)	0.144 (0.418)	0.221 (0.234)
ROA	-0.077 (0.077)	-0.386 (0.407)	3.496** (1.508)	-1.763** (0.729)
Growth	-0.013** (0.006)	0.012 (0.033)	-0.018 (0.120)	0.023 (0.056)
Top10	0.002 (0.019)	0.081 (0.109)	0.877** (0.406)	-0.147 (0.235)
BoardSize	-0.022 (0.017)	0.168 (0.117)	-0.508 (0.374)	0.259 (0.217)
Indep	0.037 (0.060)	0.656 (0.404)	-0.465 (1.291)	-0.542 (0.762)
Age	0.007 (0.009)	0.030 (0.050)	0.039 (0.192)	0.133 (0.104)
DealRatio	0.038*** (0.006)	0.066*** (0.025)	-0.029 (0.079)	0.365*** (0.048)
Constant	0.229*** (0.083)	1.715*** (0.495)	3.340* (1.988)	2.248** (1.101)
Observations	1883.000	1693.000	1864.000	1405.000
R^2	0.193	0.107		0.181
Adjusted R^2	0.149	0.054		0.121
Industry	YES	YES	YES	YES
Year	YES	YES	YES	YES

Note: This table reports regression results based on the matched samples after propensity score matching. Columns (1), (2), and (4) are estimated using OLS, while Column (3) is estimated using a logit model. The dependent variables are CAR, BHAR, deal completion, and completion time, respectively. Industry and year fixed effects are included in all specifications. Standard errors are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

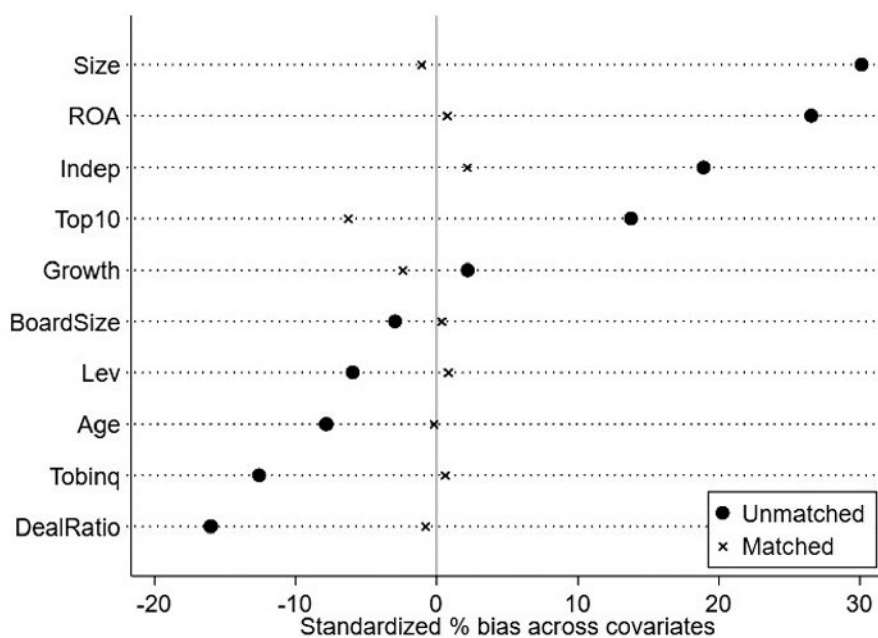


Figure 1 Diagrams of standardized deviations for each variable (CAR)

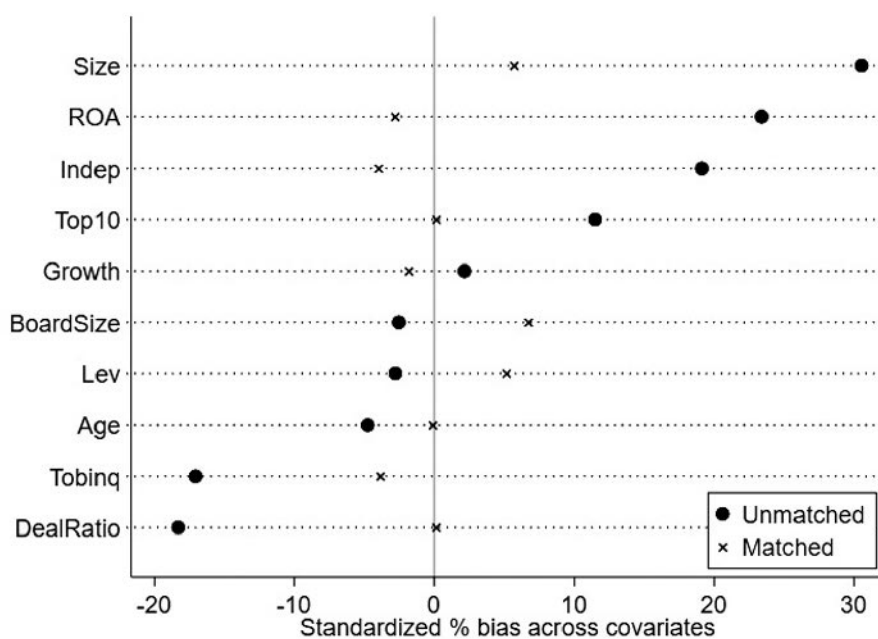


Figure 2 Diagrams of standardized deviations for each variable (BHAR)

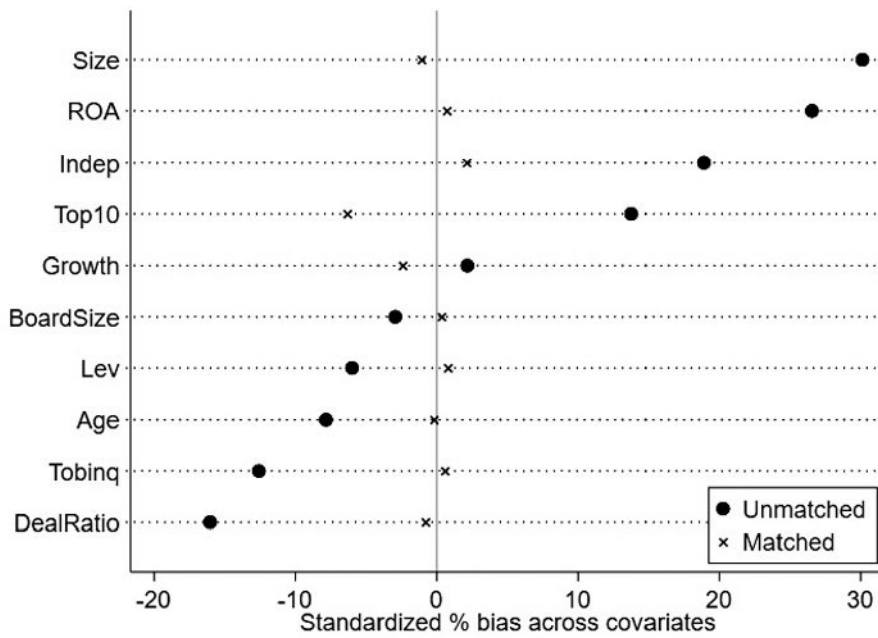


Figure 3 Diagrams of standardized deviations for each variable (Completed)

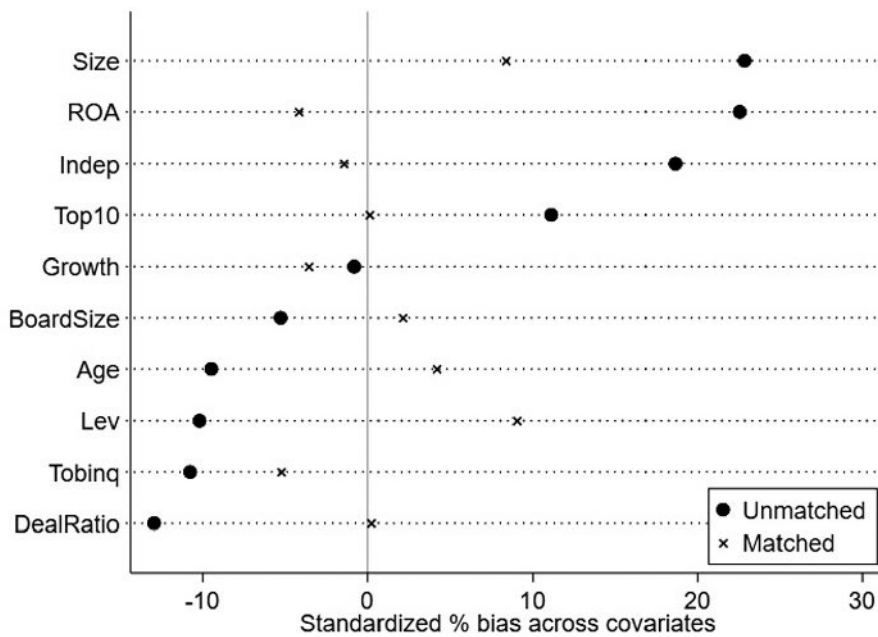


Figure 4 Diagrams of standardized deviations for each variable (Days)

6. Subsample Regressions by Transaction Characteristics

The effect of acquirer ESG performance on M&A outcomes can be influenced by deal characteristics such as payment method, transaction type, and ownership structure. For example, cash-financed deals, when paired with strong ESG performance, may send stronger market signals of financial strength and ethical commitment, thus improving deal success. Hussaini et al. (2023) find that high-ESG firms are more inclined to use cash financing, and these deals tend to progress more smoothly and with greater investor confidence. Similarly, horizontal mergers often face fewer integration challenges and allow ESG strategies to be more effectively implemented post-merger. In contrast, conglomerate M&As may dilute ESG benefits due to complexity. Ownership structure also matters. ESG signals from non-state-owned enterprises (non-SOEs) are more likely to be perceived as credible, given stronger market discipline. In contrast, state-owned enterprises (SOEs) may pursue ESG for compliance reasons, reducing its signaling power in M&A contexts. In sum, ESG's impact on M&A performance is context-dependent, and its value is more likely to be realized in cash deals, horizontal mergers, and non-SOE acquirers.

Table 7 presents the regression results of acquirer ESG performance on cumulative abnormal returns (CAR) surrounding the M&A announcement, segmented by three key deal characteristics: state ownership, payment method, and deal type. Across all specifications, ESG scores are positively associated with CAR, and the effect is statistically significant in cash transactions (Column 3) and horizontal M&As (Column 5). These results suggest that investors perceive ESG as a favorable signal in transactions where financial commitment is visible and where synergies are more predictable. Interestingly, the ESG coefficients remain positive across SOE and non-SOE samples but are not statistically significant. This may reflect the lower market responsiveness to ESG in government-backed firms, where political considerations often override financial signaling. These findings support signaling theory and highlight that ESG credibility is more impactful in private, horizontal, or cash-intensive contexts, where investors can interpret ESG quality as a proxy for acquirer reliability and post-merger integration potential.

Table 8 evaluates the effect of ESG on BHAR over the 24 months following the M&A announcement. ESG is positive and significant in non-SOE firms and horizontal deals, while it is not significant in SOE firms, cash transactions, non-cash transactions, or non-horizontal deals. This pattern suggests that the long-term stock performance effect of ESG is more likely to appear when market discipline is stronger and when strategic fit is clearer, as in non-SOE acquirers and horizontal mergers. However, because the significance is not consistent across all subsamples, the BHAR evidence should be interpreted cautiously.

Table 9 displays the logit regression results assessing the likelihood of deal completion. ESG

Table 7 Regression of ESG Ratings and CAR Group by Transaction Characteristics

	(1) SOE=1	(2) SOE=0	(3) Cash=1	(4) Cash=0	(5) Horizon=1	(6) Horizon=0
ESG	0.005 (0.004)	0.003 (0.003)	0.004* (0.002)	0.005 (0.011)	0.006** (0.003)	0.003 (0.003)
Tobinq	-0.004 (0.004)	-0.010*** (0.002)	-0.009*** (0.002)	-0.012* (0.008)	-0.008*** (0.002)	-0.012*** (0.003)
Size	-0.012*** (0.004)	-0.011*** (0.003)	-0.010*** (0.002)	-0.010 (0.011)	-0.013*** (0.003)	-0.007** (0.003)
Lev	0.030 (0.021)	0.003 (0.017)	0.017 (0.013)	-0.020 (0.060)	0.045*** (0.017)	-0.012 (0.020)
ROA	-0.109 (0.084)	0.015 (0.056)	-0.000 (0.045)	-0.087 (0.213)	-0.030 (0.063)	-0.009 (0.064)
Growth	-0.004 (0.006)	-0.004 (0.005)	-0.004 (0.004)	-0.004 (0.018)	-0.010** (0.005)	0.006 (0.007)
Top10	0.001 (0.025)	0.006 (0.017)	0.016 (0.013)	-0.089 (0.076)	0.010 (0.018)	0.001 (0.021)
BoardSize	0.002 (0.018)	-0.022 (0.017)	-0.012 (0.012)	-0.032 (0.051)	-0.004 (0.016)	-0.010 (0.020)
Indep	-0.007 (0.072)	-0.020 (0.056)	-0.001 (0.042)	-0.030 (0.213)	0.045 (0.055)	-0.032 (0.071)
Age	-0.006 (0.013)	0.001 (0.007)	0.004 (0.006)	-0.042 (0.035)	0.001 (0.008)	-0.001 (0.010)
DealRatio	0.037*** (0.006)	0.032*** (0.003)	0.036*** (0.005)	0.022*** (0.004)	0.048*** (0.006)	0.029*** (0.003)
Constant	0.238*** (0.087)	0.220** (0.088)	0.198*** (0.055)	0.576** (0.285)	0.230*** (0.073)	0.190** (0.083)
Observations	1370.000	2839.000	3845.000	364.000	2454.000	1755.000
R^2	0.209	0.189	0.140	0.398	0.175	0.222
Adjusted R^2	0.155	0.161	0.117	0.231	0.141	0.178
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES

Note: This table reports subsample regressions of ESG ratings on CAR by transaction characteristics. Columns (1) and (2) divide the sample by acquirer ownership, Columns (3) and (4) divide the sample by payment method, and Columns (5) and (6) divide the sample by transaction type. SOE equals 1 for state-owned acquirers, Cash equals 1 if the payment method includes cash, and Horizon equals 1 for horizontal mergers. Industry and year fixed effects are included in all specifications. Standard errors are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8 Regression of ESG Ratings and BHAR Group by Transaction Characteristics

	(1) SOE=1	(2) SOE=0	(3) Cash=1	(4) Cash=0	(5) Horizon=1	(6) Horizon=0
ESG	-0.016 (0.018)	0.027* (0.015)	0.011 (0.012)	0.051 (0.044)	0.041*** (0.015)	-0.011 (0.018)
Tobinq	-0.034 (0.029)	-0.034*** (0.010)	-0.037*** (0.010)	-0.020 (0.043)	-0.029** (0.013)	-0.040*** (0.014)
Size	-0.044** (0.020)	-0.110*** (0.018)	-0.090*** (0.013)	-0.103** (0.051)	-0.097*** (0.017)	-0.088*** (0.017)
Lev	0.067 (0.121)	0.185** (0.084)	0.109 (0.071)	0.181 (0.241)	0.238*** (0.092)	0.003 (0.098)
ROA	-0.055 (0.473)	-0.238 (0.316)	-0.319 (0.270)	1.675* (0.915)	-0.213 (0.365)	-0.091 (0.358)
Growth	-0.020 (0.041)	0.013 (0.024)	0.010 (0.021)	-0.109 (0.092)	-0.019 (0.024)	0.040 (0.038)
Top10	0.223* (0.117)	0.165* (0.099)	0.220*** (0.076)	0.285 (0.322)	0.362*** (0.100)	0.127 (0.112)
BoardSize	0.143 (0.107)	0.003 (0.097)	0.092 (0.074)	-0.569* (0.295)	0.027 (0.088)	0.087 (0.119)
Indep	0.118 (0.396)	0.173 (0.336)	0.393 (0.266)	-1.448 (0.954)	-0.012 (0.324)	0.494 (0.404)
Age	-0.073 (0.060)	0.017 (0.042)	-0.023 (0.034)	-0.050 (0.178)	-0.029 (0.042)	0.010 (0.056)
DealRatio	0.014 (0.019)	0.049*** (0.014)	0.046** (0.020)	0.039* (0.021)	0.068** (0.031)	0.027** (0.013)
Constant	0.449 (0.550)	2.175*** (0.488)	1.402*** (0.347)	4.094*** (1.396)	1.656*** (0.466)	1.373*** (0.499)
Observations	1175.000	2529.000	3345.000	359.000	2148.000	1556.000
R^2	0.158	0.094	0.080	0.253	0.099	0.109
Adjusted R^2	0.095	0.059	0.053	0.045	0.059	0.054
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES

Note: This table reports subsample regressions of ESG ratings on BHAR by ownership structure, payment method, and transaction type. BHAR is measured over the 24-month post-announcement holding period. Columns (1)-(2) compare SOE and non-SOE acquirers, Columns (3)-(4) compare cash and non-cash transactions, and Columns (5)-(6) compare horizontal and non-horizontal mergers. Industry and year fixed effects are included in all specifications. Standard errors are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 9 Regression of ESG Ratings and Completed Group by Transaction Characteristics

	(1) SOE=1	(2) SOE=0	(3) Cash=1	(4) Cash=0	(5) Horizon=1	(6) Horizon=0
ESG	0.031 (0.079)	0.087* (0.051)	0.089** (0.044)	0.050 (0.159)	0.103* (0.055)	0.073 (0.065)
Tobinq	0.007 (0.082)	-0.074** (0.036)	-0.064* (0.033)	-0.020 (0.170)	-0.054 (0.045)	-0.106** (0.052)
Size	-0.098 (0.085)	-0.266*** (0.058)	-0.217*** (0.047)	0.135 (0.196)	-0.317*** (0.059)	-0.050 (0.070)
Lev	-0.695 (0.481)	-0.009 (0.322)	-0.258 (0.273)	-0.180 (0.973)	-0.106 (0.358)	-0.166 (0.394)
ROA	0.274 (1.708)	4.074*** (1.024)	2.707*** (0.918)	4.281 (3.296)	2.996** (1.290)	2.377* (1.277)
Growth	0.164 (0.138)	0.024 (0.103)	0.101 (0.086)	-0.864*** (0.330)	0.082 (0.098)	-0.000 (0.153)
Top10	0.591 (0.514)	0.670* (0.345)	0.706** (0.285)	1.738 (1.167)	0.800** (0.370)	0.700* (0.413)
BoardSize	-0.617 (0.398)	0.096 (0.355)	-0.293 (0.273)	-0.241 (0.959)	-0.212 (0.341)	-0.376 (0.410)
Indep	-1.487 (1.434)	0.720 (1.197)	-0.350 (0.919)	1.826 (3.369)	-0.882 (1.159)	0.145 (1.392)
Age	0.126 (0.269)	-0.088 (0.149)	-0.020 (0.128)	0.124 (0.562)	0.119 (0.165)	-0.207 (0.196)
DealRatio	0.255** (0.123)	-0.118** (0.054)	-0.104* (0.062)	0.169* (0.091)	0.013 (0.095)	-0.006 (0.046)
Constant	4.442** (2.127)	2.440 (2.008)	4.813*** (1.320)	-4.285 (4.966)	6.647*** (1.664)	1.988 (2.161)
Observations	1349.000	2794.000	3816.000	314.000	2435.000	1738.000
R^2						
Adjusted R^2						
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES

Note: This table reports logit regression results for deal completion by transaction characteristics. The dependent variable equals 1 if the announced M&A transaction is successfully completed and 0 otherwise. Subsamples are divided by ownership structure, payment method, and transaction type. Industry and year fixed effects are included in all specifications. Standard errors are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 10 Regression of ESG Ratings and Days Group by Transaction Characteristics

	(1) SOE=1	(2) SOE=0	(3) Cash=1	(4) Cash=0	(5) Horizon=1	(6) Horizon=0
ESG	0.059 (0.045)	0.054* (0.030)	0.059** (0.026)	0.032 (0.042)	0.053* (0.031)	0.059 (0.039)
Tobinq	0.003 (0.053)	0.026 (0.021)	0.020 (0.020)	-0.011 (0.039)	0.017 (0.024)	0.026 (0.032)
Size	-0.024 (0.047)	0.081** (0.033)	0.070*** (0.026)	0.003 (0.049)	0.087*** (0.033)	0.029 (0.039)
Lev	-0.166 (0.268)	0.146 (0.181)	0.087 (0.155)	-0.014 (0.283)	0.179 (0.190)	0.127 (0.211)
ROA	2.202** (0.895)	0.250 (0.613)	-0.490 (0.530)	-0.508 (0.799)	-0.611 (0.710)	-0.806 (0.718)
Growth	0.080 (0.071)	0.026 (0.055)	0.061 (0.043)	0.106 (0.071)	-0.015 (0.049)	0.191** (0.095)
Top10	0.100 (0.273)	-0.346* (0.196)	-0.289* (0.165)	-0.280 (0.240)	-0.121 (0.208)	-0.675*** (0.231)
BoardSize	0.187 (0.240)	0.216 (0.197)	0.286* (0.156)	-0.124 (0.229)	0.448** (0.199)	0.119 (0.228)
Indep	-0.387 (0.822)	0.404 (0.655)	0.221 (0.537)	0.794 (0.754)	-0.111 (0.681)	0.574 (0.756)
Age	0.228 (0.146)	-0.023 (0.081)	0.119* (0.072)	-0.033 (0.107)	0.107 (0.087)	0.137 (0.112)
DealRatio	0.234*** (0.045)	0.272*** (0.037)	0.343*** (0.045)	0.018 (0.018)	0.476*** (0.059)	0.182*** (0.030)
Constant	4.337*** (1.183)	3.254*** (0.944)	2.143*** (0.786)	5.004*** (1.205)	1.502 (1.008)	3.625*** (1.085)
Observations	953.000	2063.000	2750.000	266.000	1756.000	1260.000
R^2	0.217	0.159	0.148	0.333	0.193	0.210
Adjusted R^2	0.140	0.118	0.116	0.089	0.146	0.147
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES

Note: This table reports subsample regressions for deal completion time by transaction characteristics. The dependent variable is the natural logarithm of the number of calendar days from the M&A announcement date to the legal completion date. The sample is divided by acquirer ownership, payment method, and transaction type. Industry and year fixed effects are included in all specifications. Standard errors are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

performance is positively and significantly associated with deal completion in non-SOE firms, cash transactions, and horizontal deals. These results indicate that ESG serves as a credibility-enhancing mechanism in private-sector deals, where acquirers are under greater pressure to demonstrate transparency and long-term value creation. Cash deals benefit particularly from ESG signaling, likely due to the acquirer bearing more financial risk and needing greater stakeholder buy-in. Conversely, ESG has no significant effect in SOE or non-horizontal deals, reinforcing the idea that ownership structure and transaction complexity can dilute the signaling strength of ESG.

Table 10 examines how ESG affects the time required to complete M&A transactions. ESG is positively related to longer deal duration in several subsamples, especially in SOEs, cash transactions, and horizontal deals. These findings suggest that while ESG may improve transaction credibility, it may also increase procedural rigor, such as internal alignment, stakeholder consultation, and regulatory scrutiny. This pattern is consistent with the idea that ESG commitment can enhance compliance and reduce post-deal risk, but may also lengthen execution due to higher standards and more formal approval processes.

7. Supplementary Tests

7.1 Alternative CAR and BHAR Windows

Table 11 reports supplementary regressions using alternative market-performance windows. Following the event-study framework of MacKinlay (1997), this study uses alternative CAR windows and BHAR holding periods to examine whether the baseline results are sensitive to window selection. For short-term market reactions, $CAR[-1, +1]$ and $CAR[-5, +5]$ are used to capture immediate announcement effects as well as possible information leakage or delayed market adjustment, following prior M&A event studies (Rani et al., 2013). For long-term stock performance, $BHAR[0, 12]$ and $BHAR[0, 36]$ are used as alternative holding periods, consistent with the long-run event study literature (Barber and Lyon, 1997). While the baseline analysis uses $CAR[-2, +2]$ and $BHAR[0, 24]$, this table further examines $CAR[-1, +1]$, $CAR[-5, +5]$, $BHAR[0, 12]$, and $BHAR[0, 36]$.

For short-term market performance, ESG remains positively associated with announcement-period CAR under alternative event windows. In Column (1), the coefficient of ESG on $CAR[-1, +1]$ is 0.004 and significant at the 5% level. In Column (2), the coefficient increases to 0.008 for $CAR[-5, +5]$ and is significant at the 1% level. Together with the baseline $CAR[-2, +2]$ result, this pattern suggests that the positive market response to acquirer ESG performance is not limited to the immediate announcement window and may accumulate over a broader event window.

For long-term stock performance, the results are weaker but show a similar pattern across longer holding periods. In Column (3), ESG is positive but insignificant for $BHAR[0, 12]$, with a coefficient of 0.006. Compared with the baseline $BHAR[0, 24]$ result, the coefficient becomes larger when the

Table 11 Supplementary Tests Using Alternative CAR and BHAR Windows

	(1) CAR1	(2) CAR5	(3) BHAR12	(4) BHAR36
ESG	0.004** (0.002)	0.008*** (0.003)	0.006 (0.007)	0.025* (0.013)
Tobinq	-0.006*** (0.001)	-0.014*** (0.002)	-0.030*** (0.006)	-0.032*** (0.012)
Size	-0.009*** (0.002)	-0.014*** (0.003)	-0.055*** (0.008)	-0.121*** (0.016)
Lev	0.019* (0.010)	0.026 (0.018)	0.111** (0.048)	0.049 (0.083)
ROA	-0.038 (0.035)	-0.026 (0.062)	0.083 (0.169)	-0.197 (0.316)
Growth	-0.005 (0.003)	-0.009 (0.005)	-0.013 (0.012)	-0.023 (0.022)
Top10	0.008 (0.010)	0.000 (0.019)	0.153*** (0.047)	0.341*** (0.091)
BoardSize	-0.003 (0.010)	-0.007 (0.016)	-0.002 (0.046)	0.024 (0.094)
Indep	0.013 (0.034)	-0.005 (0.058)	0.020 (0.169)	0.090 (0.337)
Age	-0.005 (0.005)	-0.001 (0.008)	0.018 (0.022)	-0.048 (0.045)
DealRatio	0.025*** (0.002)	0.051*** (0.004)	0.059*** (0.010)	0.022 (0.016)
Constant	0.192*** (0.044)	0.279*** (0.075)	0.912*** (0.225)	2.144*** (0.442)
Observations	4209.000	4209.000	3949.000	3399.000
R^2	0.161	0.176	0.080	0.087
Adjusted R^2	0.141	0.156	0.057	0.061
Industry	YES	YES	YES	YES
Year	YES	YES	YES	YES

Note: This table reports supplementary regressions using alternative CAR and BHAR windows. CAR[-1, +1] and CAR[-5, +5] measure cumulative abnormal returns around the M&A announcement date. BHAR[0, 12] and BHAR[0, 36] measure buy-and-hold abnormal returns from the announcement month to 12 and 36 months after the announcement, respectively. The regressions include the same control variables as the baseline model, as well as industry and year fixed effects. Standard errors are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

holding period is extended to BHAR[0, 36], where ESG is positive and weakly significant with a coefficient of 0.025. This pattern suggests that the potential value effect of ESG may take more time to materialize, although the statistical evidence is stronger for short-term CAR than for long-term BHAR.

Overall, Table 11 provides supplementary evidence that ESG is more consistently associated with short-term announcement-period market reactions. The increasing coefficients across wider CAR windows and longer BHAR horizons are consistent with a possible accumulated or delayed market response, while the BHAR results remain more sensitive to the choice of holding period.

7.2 ESG Pillar Decomposition and Market Performance

Table 12 decomposes the overall ESG score into environmental, social, and governance pillars to examine which ESG dimension is more closely related to market-based M&A performance. Columns (1)-(3) use CAR as the dependent variable, while Columns (4)-(6) use BHAR.

For short-term market performance, the environmental pillar shows the clearest association with CAR. In Column (1), the coefficient of E_score is 0.003 and significant at the 10% level, while S_score and G_score are not statistically significant. This result may reflect the fact that environmental performance is more visible and easier for investors to interpret around M&A announcements. In China's market, environmental issues are closely linked to regulatory compliance, pollution control, green transformation, and potential policy risk. Therefore, a higher environmental score may reduce investors' concerns about environmental liabilities and regulatory uncertainty, leading to a more favorable short-term market reaction.

For long-term stock performance, the social pillar shows a stronger association with BHAR. In Column (5), the coefficient of S_score is 0.016 and significant at the 5% level, while E_score and G_score are not statistically significant. This suggests that social performance may matter more over a longer horizon, as stakeholder relationships, employee stability, and supplier or customer cooperation may gradually affect post-announcement integration outcomes.

Overall, the pillar-level results show that the effects of separate E, S, and G scores are not uniform across market-performance measures. Environmental performance is more closely related to short-term CAR, while social performance is more relevant to long-term BHAR. These findings suggest that the overall ESG rating may capture a broader non-financial signal, but the separate pillar results are more mixed and depend on the specific performance horizon examined.

7.3 ESG Pillar Decomposition and Deal Execution Outcomes

Table 13 examines whether different ESG pillars affect deal execution outcomes, including deal completion probability and deal completion time. Columns (1)-(3) report the results for deal completion, while Columns (4)-(6) report the results for completion time.

Table 12 Effects of Environmental, Social, and Governance Pillars on CAR and BHAR

	(1) CAR	(2) CAR	(3) CAR	(4) BHAR	(5) BHAR	(6) BHAR
E_score	0.003** (0.002)			0.008 (0.010)		
S_score		0.001 (0.001)			0.016** (0.006)	
G_score			0.002 (0.002)			0.004 (0.008)
Tobinq	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)	0.037*** (0.009)	0.037*** (0.009)	0.037*** (0.009)
Size	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)	0.090*** (0.012)	0.093*** (0.012)	0.088*** (0.012)
Lev	0.014 (0.013)	0.014 (0.013)	0.018 (0.013)	0.092 (0.067)	0.092 (0.067)	0.100 (0.069)
ROA	-0.015 (0.044)	-0.017 (0.045)	-0.021 (0.045)	-0.163 (0.253)	-0.241 (0.257)	-0.174 (0.255)
Growth	-0.005 (0.004)	-0.006 (0.004)	-0.005 (0.004)	-0.001 (0.020)	0.001 (0.020)	-0.000 (0.020)
Top10	0.007 (0.013)	0.006 (0.013)	0.006 (0.013)	0.244*** (0.073)	0.239*** (0.073)	0.242*** (0.073)
BoardSize	-0.010 (0.012)	-0.009 (0.012)	-0.009 (0.012)	0.041 (0.071)	0.040 (0.071)	0.040 (0.071)
Indep	0.014 (0.043)	0.015 (0.043)	0.007 (0.043)	0.255 (0.252)	0.258 (0.252)	0.237 (0.256)
Age	-0.000 (0.006)	0.000 (0.006)	0.000 (0.006)	-0.017 (0.033)	-0.012 (0.033)	-0.017 (0.033)
DealRatio	0.034*** (0.003)	0.034*** (0.003)	0.034*** (0.003)	0.040*** (0.012)	0.042*** (0.012)	0.041*** (0.012)
Constant	0.224*** (0.056)	0.213*** (0.056)	0.207*** (0.055)	1.561*** (0.335)	1.618*** (0.333)	1.527*** (0.332)
Observations	4209.000	4209.000	4209.000	3704.000	3704.000	3704.000
R^2	0.175	0.174	0.174	0.076	0.078	0.076
Adjusted R^2	0.155	0.154	0.155	0.052	0.053	0.051
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES

Note: This table reports regressions using the environmental, social, and governance pillar scores of Huazheng ESG ratings. Columns (1)-(3) use CAR as the dependent variable, while Columns (4)-(6) use BHAR. Each ESG pillar score is entered separately to examine whether different ESG components are associated with different market-performance outcomes. Industry and year fixed effects are included in all specifications. Standard errors are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 13 Effects of Environmental, Social, and Governance Pillars on Deal Completion and Completion Time

	(1) Completed	(2) Completed	(3) Completed	(4) Days	(5) Days	(6) Days
E_score	0.032 (0.035)			-0.002 (0.020)		
S_score		0.025 (0.024)			0.014 (0.013)	
G_score			0.099*** (0.030)			0.005 (0.018)
Tobinq	-0.064** (0.032)	-0.063** (0.032)	-0.060* (0.032)	0.023 (0.019)	0.023 (0.019)	0.023 (0.019)
Size	-0.185*** (0.043)	-0.184*** (0.043)	-0.200*** (0.043)	0.076*** (0.025)	0.072*** (0.025)	0.075*** (0.024)
Lev	-0.216 (0.255)	-0.220 (0.255)	-0.025 (0.260)	0.067 (0.142)	0.068 (0.142)	0.077 (0.145)
ROA	3.078*** (0.862)	2.985*** (0.867)	2.774*** (0.863)	-0.541 (0.495)	-0.597 (0.501)	-0.559 (0.503)
Growth	0.055 (0.081)	0.055 (0.081)	0.073 (0.081)	0.026 (0.044)	0.028 (0.044)	0.027 (0.044)
Top10	0.729*** (0.269)	0.720*** (0.269)	0.707*** (0.271)	-0.316** (0.154)	-0.318** (0.154)	-0.317** (0.154)
BoardSize	-0.282 (0.256)	-0.278 (0.255)	-0.289 (0.256)	0.248* (0.146)	0.248* (0.146)	0.248* (0.146)
Indep	-0.073 (0.872)	-0.058 (0.871)	-0.484 (0.884)	0.164 (0.504)	0.171 (0.503)	0.142 (0.508)
Age	-0.052 (0.122)	-0.044 (0.123)	-0.040 (0.123)	0.103 (0.068)	0.107 (0.068)	0.104 (0.068)
DealRatio	-0.028 (0.040)	-0.025 (0.040)	-0.026 (0.040)	0.254*** (0.030)	0.255*** (0.030)	0.254*** (0.030)
Constant	4.338*** (1.255)	4.320*** (1.251)	4.119*** (1.252)	2.385*** (0.747)	2.458*** (0.744)	2.383*** (0.744)
Observations	4180.00	4180.00	4180.00	3016.00	3016.00	3016.00
R^2				0.159	0.159	0.159
Adjusted R^2				0.131	0.131	0.131
Industry	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES

Note: This table reports regressions using the environmental, social, and governance pillar scores for deal execution outcomes. Columns (1)-(3) use deal completion as the dependent variable and are estimated using logit models. Columns (4)-(6) use completion time as the dependent variable and are estimated using OLS. Each ESG pillar score is entered separately. Industry and year fixed effects are included in all specifications. Standard errors are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

For deal completion, the governance pillar shows the strongest explanatory power. In Column (3), the coefficient of *G_score* is 0.099 and is statistically significant, while *E_score* and *S_score* are not significant. This suggests that governance quality is more directly related to whether an announced transaction can be successfully completed. Stronger governance may improve internal control, decision-making transparency, information disclosure, and transaction execution capability, thereby reducing execution uncertainty and increasing the probability of deal completion.

For deal completion time, none of the ESG pillars is statistically significant. This indicates that the length of the completion process is not mainly explained by any single ESG dimension. Instead, completion time may depend more on deal complexity, regulatory review, negotiation difficulty, approval procedures, and other transaction-specific factors.

8. Conclusion

This study explores the impact of acquirer ESG performance on M&A effectiveness in China's A-share market. Using transaction-level M&A data from 2009 to 2023, the study examines short-term market reactions, long-term post-announcement stock performance, deal completion probability, and completion time. The results suggest that ESG has a multifaceted but not uniformly strong relationship with M&A outcomes.

First, acquirers with higher ESG ratings experience more positive abnormal stock returns around the announcement window, consistent with signaling theory. Second, the relation between ESG and long-term stock performance is weaker: ESG is insignificant for *BHAR24*, although supplementary tests indicate a weakly positive association over a 36-month horizon. Third, ESG is positively associated with the probability of deal completion and with longer completion time. This suggests that ESG may improve credibility and stakeholder trust, while also introducing more rigorous due diligence, compliance, and approval procedures. Finally, subgroup analyses indicate that the ESG effect varies by ownership structure, payment method, and transaction type.

The findings suggest that ESG may function as a credibility signal in China's M&A market, but its effects are heterogeneous across outcomes and should not be interpreted as uniformly improving all dimensions of M&A performance. Since this study mainly relies on Huazheng ESG ratings, future research may further examine whether the findings hold under alternative ESG rating systems, given the methodological differences across ESG rating providers.

9. Practical Implications and Policy Recommendations

The findings offer several insights for practitioners, investors, and policymakers:

A. For Corporate Managers

Firms should view ESG not merely as a compliance or marketing tool but as a strategic asset that can enhance deal credibility and market response. To fully leverage ESG in M&A contexts, acquirers should ensure the consistency, authenticity, and transparency of their ESG disclosures prior to and during transactions. Moreover, aligning ESG priorities with those of the target can reduce post-deal integration frictions.

B. For Investors

Investors may consider ESG ratings as an additional dimension in evaluating the quality and credibility of M&A announcements. However, the nuanced impact of ESG on deal duration suggests that while ESG enhances trust, it does not always translate into transactional efficiency. Therefore, ESG should be analyzed in conjunction with deal structure, payment method, and ownership type to guide investment decisions.

C. For Regulators and Policymakers

In emerging markets such as China, where ESG standards are still evolving, regulators should promote standardized ESG disclosure frameworks to improve comparability and credibility. Clearer disclosure standards can help investors better evaluate the role of ESG in corporate transactions and reduce information asymmetry in the M&A market. Rather than providing automatic preferential treatment for high-ESG acquirers, policymakers should focus on improving disclosure quality, comparability, and enforcement.

D. For ESG Rating Agencies

As ESG scores increasingly influence capital market behavior and corporate strategy, rating agencies bear the responsibility of enhancing methodological transparency and market relevance. Given the heterogeneous relation between ESG performance and M&A outcomes, ESG metrics should not only evaluate general sustainability performance but also improve the transparency of how environmental, social, and governance dimensions are weighted and interpreted.

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