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Climate change exposure and M&A: Global evidence

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ABSTRACT

We present global evidence on the effect of climate change exposure (CCE) on mergers and acquisitions. We find that firms facing higher CCE exhibit a reduced propensity to engage in M&A, and experience a decrease in deal numbers and value. We adopt several identification strategies to mitigate endogeneity concerns. Our results indicate that the cost of financing and cash holdings explain this negative relationship. The effect is more concentrated within Anglo-Saxon nations, especially those characterized by advanced economic development and market-oriented institutional frameworks. We also find that firms proactively engage in sustainable practices to mitigate such adverse impacts of CCE. Finally, firms with higher climate change exposure also take longer to complete deals, earn insignificant announcement returns, and exhibit poor operating performance. Overall, our study highlights the importance of considering climate change in M&A decision-making.

1. Introduction

In this study, we examine whether and how climate change exposure (CCE) affects firm-level mergers and acquisitions (M&A) activity. Theoretical and empirical literature on investment suggests that uncertainties generally influence investment decisions through their effects on the cost of capital and cash holdings (Pastor and Veronesi, 2012, 2013; Bates, Kahle, and Stulz, 2009; Gulen and Ion, 2016; Bonaime, Gulen, and Ion, 2018). Prior studies also suggest that exposure to climate change increases uncertainty (Sautner et al., 2023), the cost of borrowing (Chava, 2014; Delis et al., 2024), equity risk premium (Bolton and Kacperczyk, 2021; 2023), and cash flow volatility (Flammer, 2021; TCFD, 2021). This strand of the literature suggests that climate change exposure may reduce firm-level investment, including M&A (i.e., the investment reduction hypothesis). Alternatively, prior literature also suggests that firms may use new investments strategically to hedge against or adapt to climate risks by acquiring greener assets or technologies (Eccles, Ioannou, and Serafeim, 2014; Ehlers and Packer, 2017; Gao and Mohamed, 2018; Ormazabal, 2018; Flammer, 2021; Delis et al., 2024). This literature thus suggests that CCE and investment will be positively associated (i.e., the investment hedging hypothesis). Overall, the direction of the relationship between CCE and investment in general is not clear *ex ante*.

Why does climate change exposure affect mergers and acquisitions decisions in particular? M&A represent one of the most critical

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corporate investment decisions to enhance firm value, achieve rapid growth and expansion, and adapt to an ever-evolving business environment (Moeller, Schlingemann, and Stulz, 2004; Cartwright and Schoenberg, 2006). While M&A decisions could be affected by many factors[4], climate change exposure may influence this important decision for several reasons. First, various stakeholders are putting more emphasis on sustainable business models. As a result, the level of scrutiny of how corporate structures and strategic decisions will tackle climate change challenges increased substantially (Barnett, Brock, and Hansen, 2020; Flammer, 2021; Ginglinger and Moreau, 2023). Second, climate change affects the global regulatory landscape for carbon pricing, emission-reduction targets, and environmental reporting standards (OECD, 2021). These changes have introduced frictions to the business environment in which a firm operates. To the extent that these frictions influence firm-level M&A factors (e.g., cost of capital), climate change exposure is likely to affect M&A activities.

Finally, anecdotal evidence suggests that climate risk-induced regulatory uncertainty, reputational risk, and financing constraints can directly shape strategic decisions in mergers and asset acquisitions, even for financially viable deals. For instance, in August 2025, Peabody Energy walked away from its planned $3.78 billion acquisition of Anglo American's steelmaking coal assets after a fire at the Moranbah North mine halted production.[5] The incident significantly changed the asset's risk profile, prompting Peabody to invoke a material adverse change clause and abandon the deal. Similarly, RWE AG, a German energy firm, planned to phase out its coal-powered plants by 2030, abandoning its planned investment in a new coal-powered facility after shareholders raised concerns about the long-term climate risks. RWE AG is committed to a net-zero strategy and fears that integrating a carbon-intensive asset would not only undermine its ESG ratings but also expose it to future regulatory penalties and reputational backlash.[6] During investor calls, executives cited uncertainty around EU climate policy and the rising cost of capital for non-green assets as key reasons for walking away from the deal. This highlights how climate-related risks tied to regulation and reputation can affect even large, strategic transactions. Thus, CCE emerges as an important determinant for M&A decisions.

Given the importance and conflicting perspectives in the literature, we empirically examine the relationship between CCE and the likelihood of M&A. To that end, we employ a global dataset of 87,319 firm-year observations across 34 countries from 2001 to 2023, along with corresponding deal announcements spanning 2002 to 2024. In our baseline results, we find a negative relationship between firm-level CCE and the likelihood of acquisition, consistent with the investment-reduction hypothesis. In economic terms, a one-standard-deviation increase in firm-level CCE reduces the global acquisition likelihood by approximately 4.95%, underscoring the significant influence of environmental factors on corporate decisions.[7] We also observe that CCE adversely affects deal numbers and value. These results remain robust after alternative tests, including the persistent and alternative measures of climate change, additional macroeconomic and governance indicators, different fixed effects, and endogeneity tests.

We also examine the channels through which CCE can impact M&A likelihood. We find that the negative effect of CCE on acquisition likelihood is more pronounced for firms with higher costs of debt, cost of equity, and lower cash holdings. We further find that firms exposed to climate change prefer capital expenditures to acquisitions and R&D. Several cross-sectional analyses indicate that this negative impact is more prominent in developed economies and countries with low environmental performance, energy-intensive and pro-cyclical industries, and in firms with financial constraints or low profitability. These results provide insights that go beyond the baseline relationship. Greater exposure to climate risks increases the option value of waiting based on investment under uncertainty (e.g., Dixit and Pindyck, 1994). Because M&A represents a largely irreversible investment, firms facing greater climate-related uncertainty delay or reduce acquisition activity until any such uncertainty resolves. This framework implies that CCE affects not only the level of M&A activity but also the timing and type of transactions firms pursue. In related analyses, we find that CCE severely reduces the likelihood of M&A[8] during high economic policy uncertainty and the probability of engaging in domestic deals

Moreover, climate change exposure affects M&A through financial constraints and capital allocation. In the presence of higher perceived climate risk, lenders and investors demand higher risk premia or tighten financing conditions. When external financing becomes costly, firms focus on liquidity and reallocate capital to only necessary strategic projects (Myers and Majluf, 1984). Since acquisitions typically require substantial external financing, firms facing climate-related financing frictions move from M&A toward internal investment or risk-mitigation strategies. We also find similar results. Our findings show that firms with high CCE hold more cash and avoid risky investments such as R&D as climate-related risks increase.

In addition, climate change exposure can also operate through strategic adaptation motives. Firms exposed to climate risk use M&A for different purposes, including restructuring their asset base or diversifying geographically. Prior literature suggests that firms with

[4] Existing literature has extensively investigated the determinants of M&A activity, such as firm-specific attributes, including market liquidity, valuation and managerial preferences (Shleifer and Vishny, 2003; Moeller and Schlingemann, 2019), market conditions like industry shocks and volatility (Harford, 2005; Bhagwat, Dam, and Harford, 2016), and regulatory environments, such as legal environment and policy uncertainty (Alimov, 2015; Nguyen and Phan, 2017).

[5] Oreaco. (2025, August 5). Peabody's Pyrrhic pullout: Anglo American acquisition aborted. https://www.oreaco.com/news-1/peabody%27s-pyrrhic-pullout%3A-anglo-american-acquisition-aborted

[6] RWE AG. (2021). Sustainability Report 2021. https://www.rwe.com/en/investor-relations/reports-presentations/sustainability-reports

[7] The magnitude of the impact is lower than what is reported in prior literature (Bonaime et al., 2018), which shows that a one-standard-deviation increase in policy uncertainty is associated with a 11.74% decrease in acquisition probability. The difference is magnitude could be due to the following: i) our CCE variable in quite different from policy uncertainty though some policy uncertainty may be related to climate change; ii) the sample periods are different, as our sample period runs from 2001-2023 whereas Bonaime et al. (2018) study covers 1985-2014; and finally iii) we utilize a global dataset whereas Bonaime et al. (2018) considers only the U.S. firms.

[8] We find that the relationship between CCE and M&A likelihood is more significant for high economic policy uncertainty subsample. For brevity, we do not report the results in the paper and are available upon request.

greater exposure to climate change and carbon emissions relocate their production facilities to locations with lax environmental regulations and enforcement (Bartram, Hou, and Kim, 2022). We also find that high CCE firms engage in M&A activities mainly for diversification benefits. Taken together, these perspectives suggest that the relationship between CCE and M&A is not simply a correlation but reflects changes in firms' strategic investment incentives, financing conditions, and risk management strategies.

We also explore how firms tackle the adverse effects of CCE on M&A activity. We find that firms with strong environmental performance are better positioned to mitigate and even reverse such adverse impacts. Finally, we examine the impact of CCE on the deal process and subsequent performance. We observe that high CCE is associated with a decreased probability of deal completion and extended deal durations. In addition, firms with higher CCE exhibit lower short-term stock returns and weaker long-term post-deal operating performance. This empirical evidence suggests that climate change uncertainty does not contribute to firms' wealth maximization through acquisitions.

Our study contributes to the existing literature on uncertainty, climate change, and M&A. First, we add to the literature that documents the impact of uncertainty on various corporate outcomes. Pástor and Veronesi (2012, 2013) find that investors demand a higher risk premium as policy and political uncertainty increase or firms delay their investment until some of the uncertainty resolves (Dixit and Pindyck, 1994). Empirical studies show that firms reduce their investment with heightened uncertainty (Gulen and Ion, 2016; Bonaime et al., 2018). We empirically link one of the sources of uncertainty, i.e., climate change exposure, with firms' strategic investment, i.e., M&A, and provide strong evidence that CCE adversely impacts M&A likelihood.

Second, we expand the literature on M&A determinants by introducing climate change exposure as a significant factor in corporate strategy decisions (Bai et al., 2021; Bose, Minnick, and Shams, 2021; Basu, Lee, and Wang, 2024). Some recent papers study closely-related issues but mostly focus on either a single dimension of climate risk, a particular geographical context, or a specific industry. For example, Bose et al. (2021) highlight the role of carbon emissions in selecting a cross-border target but rely on emissions data from a subset of firms in the Carbon Disclosure Project (CDP) questionnaire. Similarly, Bai et al. (2021) investigate the role of regional sea-level rise, while Basu et al. (2024) focus on energy bidders' performance, thereby limiting the generalizability of the findings of these studies. To address this gap, we utilize a broader, forward-looking measure of firm-level CCE to investigate its impact on global M&A activity. This metric captures multiple dimensions of climate change, including physical risks, regulatory shocks, and transitional opportunities, offering a comprehensive perspective on how climate change influences M&A decisions.

Third, our study closely relates to that of Lodh, Deshmukh, and Rohani (2024) and Li et al. (2024). Lodh et al. (2024 show that different risks related to climate affect M&A in the U.S. context. Li et al. (2024) propose a new climate risk measure and focus primarily on how firms respond to transition risk through capital expenditure, R&D, green innovation, and employment. Our study differs and complements these studies in distinct ways. We leverage a large global dataset to capture the diverse effects of CCE on M&A across various regulatory, economic, industrial, and geographical identities. Our approach enhances the generalizability of our findings, providing valuable insights into how firms worldwide respond to climate-related challenges. Moreover, the CCE measure we use differs significantly from the climate risk measures proposed by Lodh et al. (2024) and Li et al. (2024). Lodh et al. (2024) utilize the CDP survey data to construct their physical, regulatory, and reputational risk measures. By construction, these are primarily backward-looking, reflecting a company's past actions and disclosed information. Li et al. (2024) follow a dictionary-based approach to construct their index.

In contrast, the CCE measure developed by Sautner et al. (2023) uses machine-learning-based text mining of conference calls to capture the market's relatively objective, forward-looking perception of a firm's exposure to climate shocks. Additionally, we extend Lodh et al.'s (2024) findings, supported by the risk vulnerability theory, by explaining the relationship between CCE and M&A from the perspective of investment under uncertainty theory. Thus, our study adds to and complements the emerging literature on climate risk. Finally, our study also adds to the extant literature on M&A deal performance. Prior research has extensively investigated the determinants of M&A performance, focusing on factors such as deal structure, financing methods, strategic fit, market conditions, and corporate governance (e.g., Moeller et al., 2004; Harford, 2005; Bruner, 2004) on M&A success. However, there is a dearth of studies exploring the role of environmental factors, particularly climate change exposure, in shaping deal success. Overall, our study makes a distinct contribution by presenting evidence that CCE influences major corporate strategic mergers and acquisitions decisions.

The remainder of the paper is organized as follows. Section 2 provides the literature review and hypothesis development. Section 3 describes the data and sample. Section 4 discusses the empirical results, and Section 5 concludes the paper.

2. Background and hypothesis development

The extant literature examines the factors influencing M&A activity, including firm-specific characteristics, industry-level dynamics, and broader economic conditions (Harford, 2005; Malmendier and Tate, 2008; Yim, 2013). In addition, other studies show macroeconomic uncertainties, such as economic volatility, policy fluctuations, and geopolitical risks, are key factors affecting M&A activity (Bhagwat et al., 2016; Nguyen and Phan, 2017; Huang, Ozkan, and Xu, 2023). A growing stream of literature demonstrates that climate change impacts firm operations, cash flows, and financial stability (Barnett et al., 2020; Brown et al., 2021). These risks lead to increased costs of capital and heightened financial constraints, discouraging firms from pursuing large-scale investments (Bonaime et al., 2018; Bolton and Kacperczyk, 2023) such as M&A (Bai et al., 2021; Bose et al., 2021).

The relationship between CCE and M&A likelihood is not clear *a priori*. Prior literature suggests various financing mechanisms for M&A transactions, with stock and cash being the most common methods (e.g., Faccio and Masulis, 2005; Galubov et al., 2016). Thus, stock price plays an important role in the execution of these deals. Shleifer and Vishny (2003) show that firms are more inclined to engage in M&A activity when their stocks are overvalued, as this provides them with a valuable currency for acquisitions. If CCE affects asset prices, it stands to reason that CCE could also impact M&A activity. Equilibrium models addressing similar risks provide some

guidance and reference points (e.g., Pastor and Veronesi, 2013; Kogan and Papanikolaou, 2014; Bolton and Kacperczyk, 2023; Hong, Wang, and Yang, 2023; Hsu, Li, and Tsou, 2023). These models generally predict that risk-averse investors ask for higher compensation for assets exposed to CCE. As a result, firms with greater exposure to such risks are expected to offer higher returns in equilibrium. The higher expected return arises when a firm's stock price falls below that of a comparable firm with lower exposure. This risk-return relationship suggests that firms with greater CCE may avoid M&A activities, as financing under such conditions may be suboptimal. A similar prediction emerges if investors show preferences regarding firms' CCE (Heinkel et al., 2001; Bolton and Kacperczyk, 2023). Heinkel et al. (2001) model two types of risk-averse investors: those who prefer low CCE stocks and neutral investors. When the former invests only in low-CCE firms while neutral investors hold both types, risk-sharing opportunities decline. Consequently, fewer investors hold high-CCE stocks, leading their share prices to fall to compensate for lower diversification. Lower share prices, in turn, restrict firms' financing options for M&A. Alternatively, firms may rely on cash borrowings to acquire target companies. Prior studies suggest that CCE may increase the cost of debt (Jung et al., 2018), thereby constraining firms' borrowing. Ng, Wang, and Yu (2023) document that when firms with high CCE face financial constraints, they tend to reduce investment. Financially constrained firms often make suboptimal adjustments that hinder their ability to engage in strategic transactions such as M&A (Bartram et al., 2022). Thus, CCE may limit financing options and reduce firms' propensity to pursue M&A. Overall, this strand of literature suggests a negative association between CCE and M&A. We label this as the *investment reduction hypothesis.*

On the other hand, firms may use acquisitions to hedge against climate-related uncertainties as part of their broader risk mitigation strategy. In line with portfolio theory (e.g., Markowitz, 1952), high-CCE firms may attempt to reduce firm-level risk through the diversification of their physical assets (e.g., Giglio, Kelly, and Stroebel, 2021; Basu et al., 2024). In this context, firms may acquire climate-resilient assets (physical diversification) or assets located in less vulnerable regions (geographical diversification) to mitigate their overall exposure. Basu et al. (2024) further argue that firms may acquire downstream and upstream facilities to hedge against climate-related supply chain disruptions. CCE also may complicate a firm's regulatory environment by increasing compliance risk (Tomar, 2023; Wang, 2023). Firms may respond by using M&A as a mechanism to manage this risk, for example, by acquiring assets that comply with regulatory requirements and help mitigate costly compliance burdens (Bose et al., 2021; Clarkson et al., 2011). Firms lacking the appropriate tangible assets (e.g., equipment and technology) or intangible assets (e.g., human capital) may face significant regulatory costs and potential operational disruptions (Basu et al., 2024). By acquiring such assets, firms exposed to CCE may reduce regulatory and compliance risks. Overall, this line of reasoning suggests a positive relation between CCE and M&A activity. We identify this as the *investment hedging hypothesis.*

Given these conflicting perspectives, we propose the following baseline research hypotheses:

H1a: *All else being equal, firms with higher CCE have lower M&A likelihood.*
H1b: *All else being equal, firms with higher CCE have higher M&A likelihood.*

In H1a and H1b, we conjecture that CCE significantly impacts M&A. However, the nature and magnitude of this relationship largely depend on the underlying mechanisms, such as the differences in the cost of financing and precautionary motives. To further reinforce how CCE can affect M&A, we propose two main theoretical reasons: cost of financing and cash holdings.

2.1. Cost of financing

Modigliani and Miller (1958) predict that in the presence of perfect capital markets, firms' investment decisions are independent of their financing decisions. However, different frictions, such as uncertainty, affect the cost of financing and influence investment behavior (Pástor and Veronesi, 2012; 2013). As per the models of uncertainty, government policy changes create both policy and political uncertainty. These uncertainties uniquely affect firms' profitability, influencing expectations about future policies and actions. Thus, investors demand additional compensation, which increases firms' cost of financing. Several studies examine this prediction from the contexts of climate risk and uncertainty (Chava, 2014; Friede, Busch, and Bassen, 2015; Huynh, Nguyen, and Truong, 2020). For instance, Chava (2014) shows that for firms with climate change concerns, investors demand significantly higher expected returns on their stocks. These firms are required to pay a significantly higher interest rate on bank loans, and fewer banks participate in their loan syndication. Climate risk exacerbates firms' risk profiles, leading to higher debt and equity costs as creditors and investors demand additional risk premiums (Friede et al., 2015; Gong et al., 2023). For example, Gong et al. (2023) find that an increase in climate risk increases fossil fuel companies' stock returns significantly. Moreover, firms affected by physical climate risks, such as droughts, see a rise in their cost of equity (Huynh et al., 2020) and have lower leverage due to an increase in the cost of debt (Ginglinger and Moreau, 2023). Countries facing such extreme weather events tend to impose stricter environmental policies, tightening access to both capital and credit markets. Hence, firms with high CCE often face financial constraints, as the increased cost of financing limits their ability to pursue acquisitions (Batten et al., 2016). Thus, if CCE increases firms' cost of financing, then higher CCE will reduce their propensity to engage in M&A.

On the other hand, firms with high CCE may benefit from proactive environmental strategies that can enhance creditworthiness, attract sustainable investment, and provide access to favorable financing options (Flammer, 2021). This, in turn, lowers the cost of capital and increases the likelihood of pursuing acquisitions as firms can leverage their improved financial position to expand strategically (Eccles et al., 2014). Additionally, investors and creditors may perceive firms with strong environmental credentials as lower risk, offering attractive financing terms and lower cost of financing (Clark, Feiner, and Viehs, 2015), facilitating M&A activity.

Building on the above, we posit that the association between a firm's CCE and its M&A decision depends on its influence on the cost of financing. We expect, for example, that if CCE reduces M&A likelihood by increasing the cost of financing, this negative effect will be more pronounced in firms with a high cost of capital, where CCE further increases the cost of capital. Thus, we develop the following

sub-hypothesis:

H2: *All else being equal, the cost of capital makes the association between CCE and M&A likelihood more pronounced.*

2.2. Cash holdings

Cash reserves are a critical determinant of a firm's ability to adapt to external uncertainties (Myers and Majluf, 1984). The real options framework predicts that firms delay irreversible investments until uncertainty resolves (Bernanke, 1983; Dixit and Pindyck, 1994). Pástor and Veronesi (2012) suggest that firms reduce investment as changes in government policy create uncertainty. Thus, firms, to protect themselves from future cash flow shocks, prefer to hold cash reserves when uncertainty is high as per the precautionary motive of cash holdings (Keynes, 1936). Moreover, Bolton, Chen, and Wang (2011; 2013) suggest that cash flow volatility and illiquidity of productive capital influence firms' cash holdings. Climate change-induced natural disasters negatively affect revenues and operating income (Pankratz et al., 2023), increasing cash flow volatility (Brown et al., 2021). In addition, stricter climate regulation renders productive capital illiquid and creates stranded assets (Bolton and Kacperczyk, 2023; Delis et al., 2024). Thus, climate change squeezes firms' cash reserves, leaving little room for M&A activity. Moreover, climate risks impose financial burdens, as firms with high CCE are required to allocate resources to regulatory compliance, operational adaptation, and climate risk mitigation (Bartram et al., 2022; Gounopoulos and Zhang, 2024). These expenditures may further strain firms' cash reserves, prompting heightened liquidity constraints and limiting their ability to finance acquisitions (Harford, Mansi, and Maxwell, 2008). Consequently, we expect CCE to motivate firms to hold more cash as a precaution, as they are already short on cash, which adversely affects their likelihood of engaging in M&A.

Conversely, firms with high CCE with liquidity constraints can support their operations by increasing the size of their bank line of credit (Brown et al., 2021) and arranging additional trade credit facilities (Li and Wan, 2024). In addition, some climate exposures do not necessarily correlate with sales and productivity, reducing cash flow uncertainty. For instance, Addoum, Ng, and Ortiz-Bobea (2020) find no correlation between extreme temperature exposures and establishment-level sales and productivity. Hence, firms do not need to hold excess cash as a precaution and may also identify alternative funding sources to pursue M&A activities. Moreover, powerful managers use excess free cash flow for acquisitions, though not always value-maximizing, to retain their control (Jensen, 1988; Harford, 1999). Firms with high CCE already face public scrutiny for their carbon emission and pollution; these managers do not want to attract further attention and are likely to hold less cash by pursuing M&A to protect their managerial control.

Taken together, we argue that the relationship between a firm's CCE and its M&A decision depends on its cash holdings. Thus, we develop the following sub-hypothesis:

H3: *All else being equal, the level of cash holdings makes the association between CCE and M&A likelihood more pronounced.*

An important caveat to our hypotheses is that it is possible for managers in firms with high CCE to exhibit increased risk aversion and pessimism, which can significantly influence acquisition decisions through behavioral rather than purely financial channels. Real options theory suggests that under uncertainty, firms may delay or completely avoid irreversible investments such as M&A due to the value of waiting (Dixit and Pindyck, 1994). Behavioral finance literature further highlights that biases, such as loss aversion, ambiguity aversion, and narrow framing, can exacerbate this conservatism. For instance, March and Shapira (1987) show that managers often prioritize avoiding failure over maximizing expected returns, especially under uncertainty. In high-CCE firms, this can manifest as excessive caution in pursuing M&A, even when such deals may offer long-term strategic benefits. Moreover, Fich and Xu (2025) demonstrate that exposure to salient climate events, such as hurricanes, can lead institutional investors to overweight environmental risks, influencing corporate governance, and potentially reinforcing managerial pessimism. Though due to data limitations, we cannot test this behavioral explanation, however, the direction of the relationship is in line with our financial channel.

However, the hypothesized negative relationship between CCE and M&A activity may not be universally applicable. In some contexts, high CCE may incentivize proactive strategic repositioning through acquisitions, particularly in sectors where environmental innovation or ESG alignment offers a competitive advantage. In such cases, even high financing costs or low cash holdings may not deter M&A activity if acquisitions are perceived as essential for long-term viability. This may introduce a theoretical inconsistency: if CCE can both suppress and stimulate M&A depending on managerial perceptions and stakeholder pressures, then the mechanisms of financial constraint and liquidity must be understood as conditional rather than deterministic. Xu and Kim (2022) provide evidence that financial constraints significantly affect firms' environmental strategies, with constrained firms more likely to increase toxic emissions due to limited abatement capacity. This suggests that in high-CCE firms, financial constraints may not uniformly deter M&A but instead interact with managerial biases and strategic imperatives, such as greenwashing or defensive pessimism (Kim and Lyon, 2015), to shape acquisition behavior in complex and sometimes contradictory ways.

2.3. Mitigating climate change exposure

Firms adopt various practices to mitigate the adverse impacts of climate change exposure. Strong ESG practices lead to better governance and reduce environmental and social risks. Bagh, Bouri, and Khan (2024) find that robust ESG practices help reduce the negative impacts of climate change sentiments on firm value by boosting firm resilience and reducing operational uncertainty and risks. Moreover, climate disclosure improves public perception and attracts investors. Feng and Huang (2024) find that climate risk disclosure promotes green investment, and such disclosure activity enhances corporate reputation and ESG performance, leading to higher returns and reduced risks. In addition, climate readiness helps to tackle climate change exposure better. Gong et al. (2023) find

that stocks in countries with better climate readiness produce better stock market performance. Thus, firms with better environmental performance have lower risk and are better prepared to incorporate emerging regulatory trends and consumer preferences (Friede et al., 2015), and can pursue acquisitions more aggressively compared to their peers with poorer environmental records (Chava, 2014). Thus, we conjecture that the negative impact of CCE on acquisition likelihood will be less pronounced for firms with better environmental performance and develop the following sub-hypothesis:

H4: *All else being equal, the level of environmental performance makes the association between CCE and M&A likelihood less pronounced.*

3. Data

3.1. Sample construction

Our initial sample consists of firms from 34 countries, as the firm-level CCE measure is available for only these 34 countries. We collect firm-level financial and accounting data from Compustat North America and the Compustat Global database from 2001 to 2023. Consistent with prior literature, we exclude financial firms (SIC codes 6000-6999) and regulated utilities (SIC codes 4900-4999) to limit the effects of regulation on corporate decisions. We keep all firms with available accounting data on the Compustat North America and the Compustat Global database, yielding 90,295 firm-year observations. We then focus on CCE and M&A data.

3.1.1. Climate change exposure

For firm-level CCE, we employ the CCE measure of Sautner et al. (2023). They apply a machine learning algorithm to capture keywords of climate change (events or shocks) from earnings conference call transcripts to construct a time-varying, firm-level climate change measure. The exposure is constructed by employing four bigrams: the aggregated firm-level CCE, opportunity exposures, physical shocks, and regulatory shocks. To compute the final measure, they take the ratio of each specific bigram relative to the sum of bigrams present in the transcripts. Several studies employ Sautner et al.'s (2023) climate change measure (Ginglinger and Moreau, 2023; Sautner et al., 2023). In this study, we focus on the aggregated firm-level CCE for some of its unique properties. First, CCE provides a more comprehensive understanding of climate change issues than any single-dimensional measure, such as carbon emissions, intensities, or sea-level rise. Second, climate change information extracted from earnings calls tends to be more forward-looking. Third, the CCE measure is dynamic, varying over time across different firms and countries.

To construct our sample, we start by merging 90,295 firm-year accounting data with firm-level CCE. This process yields a sample of 87,319 firm-year observations across 34 countries from 2001 to 2023.

3.1.2. M&A data

We source our mergers and acquisitions (M&A) data from the Securities Data Company (SDC) database. The data comprises all globally announced deals between 2002 and 2024. We follow Harford (1999; 2005) and Golubov, Yawson, and Zhang (2015) to construct the M&A sample. In line with prior literature, we only include deals with a value of at least $1 million (in 2019 dollars) and acquirers that are listed in the SDC and Compustat North America and the Global database. We also include all deals where the acquirer owns less than 10% shares of the target before the deal announcement and owns more than 50% of the target after the deal completion. We exclude minority stake purchases, recapitalizations, acquisitions of remaining interests, self-tender offers, spin-offs, privatizations, reverse leverage buyouts, exchange offers, and repurchases. We then merge 87,319 firm-year observations with the SDC database to compute the acquisition likelihood. Our final M&A sample comprises 41,859 deals.

To test the main baseline regression of acquisition likelihood, we have 87,319 firm-year observations, where 33,259 firm-year level observations have announced at least one deal, and 54,060 observations with no deal announcements. For deal performance analysis, we have all the required deal characteristics and financial data on 18,100 deals. The process of sample construction is presented in Panel A of Table 1. The definitions of all variables are provided in Table A1. We winsorize all variables at 1% and 99% levels to mitigate the impact of potential outliers.

3.2. Summary statistics

We present descriptive statistics and correlations between different variables in Panels B and C of Table 1, respectively.[9] The mean of CCE is 0.124 with a standard deviation of 0.286, suggesting significant variability in CCE.[10] The mean of unconditional acquisition likelihood is 38.1%, which is higher than the U.S.-focused studies. This higher percentage shows that the global M&A market is more active.[11] Firm size shows a mean of 7.639 with a standard deviation of 2.464, indicating a considerable variation among the sizes of the firms included in the global sample. The descriptive statistics are consistent with prior studies. The CCE correlates negatively with the

[9] We report descriptive statistics and correlations for the deal performance sample in Table A2.

[10] We multiply CCE by 100 for easier interpretation. Sautner et al. (2023) use the CCE multiplied by 1000 to report their summary statistics.

[11] In 2024, the non-US geographies post a higher number of deals compard to the nember of U.S. deals. S&P Global Market Intelligence. (2024, December). Global M&A by the numbers: Q4 2024. Retrieved from https://www.spglobal.com/content/dam/spglobal/mi/en/documents/general/Global-ma-by-the-numbers-q4-2024.pdf

Table 1

Summary statistics. This table first shows the process of sample construction, then presents the descriptive statistics of the baseline sample of listed firms in 34 countries with available firm-level CCE data and financial data from Compustat between 2001−2023. The sample is then merged with the SDC database to compute the acquisition likelihood. The M&A data is from 2002−2024. We include all deals where the acquirer owns less than 10% shares of the target prior to the deal announcement and owns more than 50% of the target after the deal completion. We exclude minority stake purchases, recapitalizations, acquisitions of remaining interests, self-tender offers, spin-offs, privatizations, reverse leverage buyouts, exchange offers, and repurchases. The sample requires deal value to be more than $1 million in 2019-dollar terms. Panel A exhibits the process of sample construction. Panel B presents summary statistics for all the variables employed in our baseline regression. Panel C provides the correlation matrix of the entire sample. Definitions of all variables are provided in the Appendix Table A1.

Panel A: Sample construction

	Number of observations	Number of countries
Global Sample Merged with CCE	87,319	34
Firm-year observations with at least one deal in the SDC M&A database	33,259	
Firm-year observations with no deal in the SDC M&A database	54,060	
Firm-year observations with total number of individual merger and acquisitions	41,859	
Deal-level analysis	18,100	34

Panel B: Descriptive statistics

	N	Mean	Std. Dev	25th Pct	Median	75th Pct
Dependent variable:						
Acquisition likelihood	87,319	0.381	0.486	0	0	1
Number of deals	87,319	0.649	1.042	0	0	1
Aggregate deal value	87,319	126.4	471.6	0	0	0
Cross-border likelihood	87,319	0.152	0.359	0	0	0
Domestic likelihood	87,319	0.273	0.445	0	0	1
Number of cross-border	87,319	0.212	0.567	0	0	0
Number of domestic	87,319	0.429	0.810	0	0	1
Climate Change Exposure:						
CCE	87,319	0.124	0.286	0.012	0.035	0.098
3-year average CCE	58,564	0.355	0.791	0.053	0.109	0.283
5-year average CCE	44,197	0.587	1.271	0.096	0.186	0.480
7-year average CCE	33,050	0.818	1.742	0.140	0.264	0.677
Firm characteristics:						
Size	87,319	7.639	2.464	5.986	7.468	9.048
Book leverage	87,319	0.268	0.286	0.072	0.232	0.386
Tobin's Q	87,319	2.038	1.752	1.065	1.448	2.244
Cash to assets	87,319	0.185	0.200	0.043	0.109	0.250
Sales growth	87,319	0.126	0.380	−0.026	0.068	0.190
R&D	87,319	0.043	0.091	0	0	0.043
Tangibility	87,319	0.493	0.419	0.158	0.367	0.752
Operating margin	87,319	−0.121	1.805	0.056	0.134	0.236

Panel C: Correlation matrix

	Acquisition likelihood	*CCE*	*Size*	*Leverage*	*Market to book*	*Cash to assets*	*Sales growth*	*R&D*	*Tangibility*	*Operating margin*
Acquisition likelihood	1.000									
CCE	−0.001	1.000								
Size	0.095	0.114	1.000							
Book leverage	0.021	0.028	0.104	1.000						
Tobin's Q	0.036	−0.056	−0.169	−0.032	1.000					
Cash to assets	−0.028	−0.094	−0.357	−0.249	0.360	1.000				
Sales growth	0.030	0.005	−0.068	−0.029	0.159	0.138	1.000			
R&D	−0.035	−0.048	−0.264	0.024	0.237	0.377	0.071	1.000		
Tangibility	−0.087	0.148	0.161	0.182	−0.159	−0.334	−0.105	−0.115	1.000	
Operating margin	0.003	0.004	0.023	−0.004	−0.016	−0.046	0.020	−0.079	0.011	1.000
	Number of deals	*CCE*	*Size*	*Leverage*	*Market to book*	*Cash to assets*	*Sales growth*	*R&D*	*Tangibility*	*Operating margin*
Number of deals	1.000									
CCE	−0.009	1.000								
Size	0.127	0.114	1.000							
Book leverage	0.018	0.028	0.104	1.000						
Tobin's Q	0.023	−0.056	−0.169	−0.032	1.000					
Cash to assets	−0.050	−0.094	−0.357	−0.249	0.360	1.000				
Sales growth	0.027	0.005	−0.068	−0.029	0.159	0.138	1.000			
R&D	−0.037	−0.048	−0.264	0.024	0.237	0.377	0.071	1.000		
Tangibility	−0.099	0.148	0.161	0.182	−0.159	−0.334	−0.105	−0.115	1.000	

(*continued on next page*)

Table 1 (*continued*)

Panel C: Correlation matrix										
	Acquisition likelihood	*CCE*	*Size*	*Leverage*	*Market to book*	*Cash to assets*	*Sales growth*	*R&D*	*Tangibility*	*Operating margin*
Operating margin	0.003	0.004	0.023	−0.004	−0.016	−0.046	0.020	−0.079	0.011	1.000
	Agg deal value (log)	*CCE*	*Size*	*Leverage*	*Market to book*	*Cash to assets*	*Sales growth*	*R&D*	*Tangibility*	*Operating margin*
Agg deal value (log)	1.000									
CCE	−0.008	1.000								
Size	0.097	0.114	1.000							
Book leverage	0.019	0.028	0.104	1.000						
Tobin's Q	0.017	−0.056	−0.169	−0.032	1.000					
Cash to assets	−0.025	−0.094	−0.357	−0.249	0.360	1.000				
Sales growth	0.024	0.005	−0.068	−0.029	0.159	0.138	1.000			
R&D	−0.029	−0.048	−0.264	0.024	0.237	0.377	0.071	1.000		
Tangibility	−0.033	0.148	0.161	0.182	−0.159	−0.334	−0.105	−0.115	1.000	
Operating margin	0.005	0.004	0.023	−0.004	−0.016	−0.046	0.020	−0.079	0.011	1.000

acquisition likelihood, deal number, and deal value. These correlations provide preliminary evidence of the relationship between CCE and M&A activities. Overall, the patterns match with prior studies (e.g., Bonaime et al., 2018).

Table A3 reports the distribution of firm-year observations across 34 countries. The US covers 64.40% of the total 87,319 firm-year observations. Developed countries such as the United Kingdom, Japan, and Germany cover about 4.48%, 2.15%, and 1.92% of the overall sample, respectively. Our sample also covers emerging economies such as Russia (0.43%), South Africa (0.66%), and Chile (0.26%). Mean CCE shows that it varies among firms in different countries.

4. Empirical Analysis

In this section, we present the results of our detailed empirical analysis, investigating the impact of CCE on the probability of acquisition likelihood.

4.1. CCE and acquisition likelihood

4.1.1. Baseline regression

To examine the effect of firm-level CCE on acquisition likelihood, we estimate the following logit specification:

$$M\&Alikelihood_{i,t+1} = \alpha + \beta_i \times CCE_{i,t} + C_{i,t} + \gamma_t + \varepsilon_{i,t} \quad (1)$$

where $M\&Alikelihood_{i,t+1}$, the independent variable, is a binary variable that takes the value of 1 if firm i engages in at least 1 acquisition in year $t+1$, and zero otherwise. $CCE_{i,t}$ is the firm-level CCE of firm i in fiscal year t. $C_{i,t}$ is a vector of firm-level control variables in year t. Following Heeley, King, and Covin (2006) and Lawrence, Raithatha, and Rodriguez (2021), we include the following control variables[12]: size, leverage, market-to-book ratio, cash-to-assets ratio, sales growth, research and development expenditures (R&D), tangibility, and operating margin. γ_t represents year, industry-year, industry, and country fixed effects.[13] We include these effects as prior studies indicate that time and industry composition affect acquisitions (e.g., Mitchell and Mulherin, 1996; Shleifer and Vishny, 2003). The standard errors are clustered by firm and year (Bertrand, Duflo, and Mullainathan, 2004) and adjusted for heteroskedasticity.

We present baseline regression results in Table 2. Logit coefficients are in Columns (1)-(4), OLS coefficients are in Columns (5)-(7), while we report marginal effects in Columns (8) and (9). Columns (1) and (2) feature univariate regressions, whereas in Columns (3) and (4), we include control variables. In all specifications, we consistently find a negative association between CCE and acquisition likelihood at the 1% level. The marginal effect estimates of −0.066 and −0.054 are also economically meaningful, as a one standard deviation increase in CCE is associated with a 1.89% (1.54%) reduction in a firm's probability of engaging in acquisitions. This number corresponds to a decrease of 4.95% (4.04%) of the unconditional mean likelihood of M&A. Overall, the results indicate that an increase in CCE reduces M&A likelihood.

4.1.2. Number of deals and aggregate deal value

We further examine the impact of CCE on the number of deals and aggregate deal value. If CCE leads to lower M&A likelihood, it is possible that firms with higher CCE are more likely to engage in fewer deals and smaller M&As. Climate change leaves assets stranded (Delis et al., 2024), and increases in such assets make large acquisitions financially and operationally risky (Bose et al., 2021). In contrast, smaller acquisitions are more manageable as they allow firms to incrementally adapt to uncertain environments and investor

[12] We provide all the variable definitions in Table A1.
[13] We use SIC two-digit code for industry-fixed effect.

Table 2
Firm-level CCE and acquisition likelihood. This table presents the results of regressions for the effect of firm-level CCE on the acquisition likelihood. The dependent variable is acquisition likelihood, a binary variable takes the value of one if firm i engaged in at least one acquisition announcement in year t+1, otherwise zero. The key independent variable, CCE, is firm-level CCE constructed by Sautner et al. (2023). All independent variables are from year t. Columns (1) and (2) show univariate tests of climate change on likelihood of M&As. Columns (3) to (9) include controls. Columns (3) and (4) show results using logit model, and Columns (5) to (7) present results using OLS regressions. Columns (8) and (9) present marginal effects from logit regressions to ease interpretation. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: *Acquisition likelihood*								
Variables	(1) *Logit*	(2) *Logit*	(3) *Logit*	(4) *Logit*	(5) *OLS*	(6) *OLS*	(7) *OLS*	*(8) dydx*	*(9) dydx*
CCE	−0.323***	−0.275***	−0.334***	−0.302***	−0.060***	−0.048***	−0.061***	−0.066	−0.054
	(−9.65)	(−8.37)	(−9.43)	(−8.27)	(−10.04)	(−8.47)	(−6.05)		
Size			0.086***	0.279***	0.017***	0.050***	−0.008**	0.017	0.050
			(22.69)	(54.33)	(22.67)	(57.56)	(−2.31)		
Leverage			0.091***	−0.231***	0.017***	−0.031***	−0.038***	0.018	−0.042
			(3.47)	(−5.23)	(3.50)	(−5.21)	(−3.13)		
Tobin's Q			0.006	0.043***	0.001	0.007***	0.003**	0.001	0.008
			(1.27)	(7.99)	(1.16)	(7.34)	(2.09)		
Cash to assets			−0.457***	−0.223***	−0.092***	−0.041***	0.159***	−0.090	−0.040
			(−8.83)	(−4.01)	(−9.19)	(−4.17)	(9.71)		
Sales growth			0.161***	0.163***	0.032***	0.028***	0.006	0.032	0.029
			(8.26)	(7.90)	(8.17)	(7.44)	(1.54)		
R&D			−0.765***	−0.894***	−0.135***	−0.146***	−0.293***	−0.151	−0.161
			(−6.74)	(−7.39)	(−6.61)	(−7.43)	(−8.44)		
Tangibility			−0.449***	−0.382***	−0.086***	−0.072***	−0.008	−0.088	−0.069
			(−17.69)	(−13.89)	(−18.09)	(−15.31)	(−0.73)		
Operating margin			0.012***	0.006	0.002**	0.000	0.007***	0.002	0.001
			(2.69)	(1.31)	(2.06)	(0.54)	(6.28)		
Constant	−0.121	−0.618	−0.620***	−3.120***	0.313***	0.043***	0.442***		
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes	No	Yes	No	No	Yes
Firm FE	No	No	No	No	No	No	Yes	No	No
N	87,319	87,319	87,319	87,319	87,319	87,319	86,180	87,319	87,319
Pseudo R^2	0.117	0.154	0.129	0.193					
Adj. R^2					0.164	0.228	0.349		

expectations. Thus, we conjecture CCE will be negatively associated with both the number of M&A deals and deal value.

To test this conjecture, we use the OLS, Tobit, and Poisson Pseudo Maximum Likelihood (PPML) model, employing deal number and value as dependent variables.[14] We define deal number as the total number of acquisitions by a firm in a year, and the aggregate deal value as the natural logarithm of the total value of these deals. Table 3 presents the results. Columns (1)-(2) and (7)-(8) show the results for OLS, Columns (3) and (9) for Tobit, Columns (4) and (10) for PPML, and Columns (5)-(6) and (11)-(12) report the marginal effects. We find negative and statistically significant coefficients for CCE across all models, suggesting that firms with higher CCE engage in fewer deals and have lower aggregate deal values. Taking the PPML estimates as examples, a one standard deviation increase in CCE is associated with a 3.72% (5.29%) decrease in the number of deals (deal value) in a year. Taken together, these results indicate that CCE is negatively associated with deal numbers and aggregate values.

4.1.3. Endogeneity tests

While climate change may be exogenous, its measurement may not be. In this study, we rely on the firm-level CCE measure of Sautner et al. (2023), which captures the extent to which managers discuss climate-related risks and opportunities during earnings calls. While this measure is well-validated and widely adopted, it is not immune to endogeneity concerns. Several sources of endogeneity are relevant in our context. First, measurement issues may arise from managerial discretion in deciding what climate topics are to be included in firm disclosures. The frequency and tone of climate-related discussions may reflect not only underlying risk exposure but also firms' strategic positioning, managerial beliefs, or anticipatory signaling. Second, reverse causality is a plausible concern if firms anticipating acquisition activity adjust their environmental disclosures to align with investor or stakeholder expectations, regulatory scrutiny, or integration considerations. Third, omitted variable bias may emerge from unobservable factors—such as managerial environmental preferences, risk tolerance, governance quality, or stakeholder pressure that simultaneously affect both the firm's climate-related communication and its acquisition behavior. Finally, sample selection concerns may arise if firms in certain industries or jurisdictions are systematically more likely to face both climate exposure and M&A opportunities, thus biasing cross-sectional

[14] We employ the Tobit model to ensure unbiased and consistent estimates as the dependent variables (number of deals and aggregate deal value) are censored at zero. The PPML model is robust to heteroskedasticity, allows for observations with zero values, and is well-suited for count (e.g., number of deals) and continuous positive data with zeros (e.g., aggregate deal value), providing consistent estimates (Correia, Guimarães, and Zylkin, 2020).

Table 3

Firm-level CCE and number of deals and aggregate deal value. This table presents the results for the effect of firm-level CCE on the number of deals and the firm-level aggregate deal value. In Columns (1) to (6), the dependent variable is *the number of deals*, which is the sum of the number of deals firm *i* engaged in year *t+1*. In Columns (7) to (12), the dependent variable is *the firm-level aggregate deal value*, which is the natural logarithm of the summation of the deal value of firm *i* engaged in year *t+1*. Columns (4) and (10) show the Poisson Pseudo Maximum Likelihood (PPML) estimates. Columns (5), (6), (11), and (12) present the marginal effects of Tobit and PPML estimates for the number of deals and aggregate deal value, respectively. All independent variables are from year *t*. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: Number of deals						*Dependent variable: Aggregate deal value (log)*					
Variables	(1) *OLS*	(2) *OLS*	(3) *Tobit*	(4) *PPML*	(5) *dydx*	(6) *dydx*	(7) *OLS*	(8) *OLS*	(9) *Tobit*	(10) *PPML*	(11) *dydx*	(12) *dydx*
CCE	−0.081***	−0.085***	−0.254***	−0.130***	−0.099	−0.084	−0.170***	−0.198***	−0.170***	−0.185***	−0.159	−0.218
	(−4.76)	(−3.19)	(−7.65)	(−6.15)			(−6.19)	(−3.15)	(−6.19)	(−6.01)		
Size	0.130***	0.006	0.309***	0.188***	0.121	0.122	0.228***	−0.112***	0.228***	0.183***	0.192	0.215
	(23.10)	(0.51)	(59.79)	(59.56)			(46.26)	(−4.80)	(46.29)	(47.67)		
Leverage	−0.051***	−0.093***	−0.191***	−0.099***	−0.075	−0.064	−0.123***	−0.249***	−0.123***	−0.140***	−0.237	−0.165
	(−3.11)	(−3.74)	(−4.43)	(−4.40)			(−5.22)	(−4.24)	(−5.22)	(−5.02)		
Tobin's Q	0.020***	0.011***	0.045***	0.027***	0.017	0.017	0.032***	0.033***	0.032***	0.022***	0.028	0.026
	(6.55)	(3.16)	(9.42)	(9.68)			(7.25)	(4.33)	(7.25)	(6.03)		
Cash to assets	−0.179***	0.216***	−0.310***	−0.228***	−0.121	−0.148	−0.051	0.847***	−0.051	0.026	−0.005	0.031
	(−4.89)	(5.22)	(−5.64)	(−6.44)			(−1.11)	(9.33)	(−1.11)	(0.61)		
Sales growth	0.065***	0.024***	0.193***	0.123***	0.075	0.080	0.123***	0.023	0.123***	0.114***	0.156	0.134
	(7.39)	(2.75)	(9.44)	(9.69)			(6.50)	(1.05)	(6.50)	(7.37)		
R&D	−0.130**	−0.365***	−0.942***	−0.542***	−0.368	−0.352	−0.331***	−1.301***	−0.331***	−0.627***	−0.847	−0.739
	(−1.97)	(−4.60)	(−7.65)	(−6.52)			(−3.83)	(−6.70)	(−3.83)	(−6.01)		
Tangibility	−0.183***	−0.005	−0.451***	−0.292***	−0.176	−0.190	−0.214***	0.061	−0.214***	−0.171***	−0.245	−0.202
	(−10.41)	(−0.19)	(−16.73)	(−16.40)			(−9.36)	(0.93)	(−9.37)	(−7.89)		
Operating margin	−0.006***	0.011***	−0.005	−0.009***	−0.002	−0.006	0.010***	0.029***	0.010***	0.010**	0.024	0.012
	(−3.04)	(4.32)	(−1.03)	(−2.87)			(2.94)	(4.78)	(2.94)	(2.19)		
Constant	−0.238***	0.593***	−2.704***	−1.740***			−0.461***	1.942***	−0.716**	−1.596***		
Industry FE	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	No	No	No	No	Yes	No	No	No	No
N	87,319	86,180	87,319	87,319			87,319	86,180	87,319	87,319		
Pseudo R^2			0.097	0.172					0.045	0.180		
Adj. R^2	0.180	0.375					0.184	0.245				

comparisons.

To address these identification concerns, we employ three approaches: entropy balancing, two-stage least squares (2SLS), and a difference-in-differences approach. Each method relies on distinct identifying assumptions and allows us to isolate the causal impact of CCE on M&A activity from different sources of endogeneity.[15]

4.1.3.1. Entropy balancing. To address concerns about potential biases from differences in firm characteristics, we employ entropy balancing. It ensures a balance in the covariate distribution between the treated and control groups (Hainmueller, 2012). We define treatment and control groups based on whether a firm's CCE score lies above or below the country-year median. Entropy balancing iteratively reweights the control group to achieve covariate balance with the treatment group across the first three moments: means, variances, and skewness of key firm characteristics. This method improves upon traditional matching techniques by directly optimizing covariate balance and avoiding model dependence while preserving the full sample.

Table 4 shows the sample characteristics and results for our main specification (Equation (1)) after entropy balancing. Panels A and B compare the mean, variance, and skewness of different firm characteristics of the treatment and control groups before and after entropy balancing.[16] Initially, the two groups differ quite extensively across the three moments. After balancing, both groups appear statistically indistinguishable, indicating that the reweighting process effectively mitigates sample selection biases. In Panel C, we rerun our main regression using the entropy-balanced observations. The coefficient of CCE remains negative and statistically significant, corroborating our baseline findings.[17] This suggests that observable firm-level characteristics do not explain the negative association between climate exposure and M&A activity.

4.1.3.2. Two-stage least squares regression. To further address concerns related to simultaneity and omitted variable bias, we adopt a 2SLS strategy following Lewbel (2012) and Gormley and Matsa (2014).

Our first approach, proposed by Lewbel (2012), constructs instruments from the model's own data by exploiting heteroskedasticity in the first-stage residuals. This procedure generates identifying variation without relying on external sources and has been found useful in settings where valid external instruments are unavailable or insufficient (e.g., Iosifidi, 2016). Specifically, instruments are formed by interacting the residuals from an auxiliary regression of CCE on exogenous covariates with the mean-centered values of those covariates. Identification in this framework requires that the error terms in the structural and first-stage equations are uncorrelated with the exogenous variables and are mutually independent. Although these assumptions are not directly testable, several features of our setting support their plausibility. The firm-level controls we use in the first stage, such as firm size, leverage, and operating margin, are generally determined prior to CCE disclosures and are unlikely to be systematically related to the stochastic components of either CCE or M&A decisions. Moreover, residual diagnostic tests, a necessary condition for the Lewbel instruments to be valid (including White's test and the Breusch-Pagan test), confirm the presence of sufficient heteroskedasticity in the data.[18] From an economic perspective, the extent to which firms discuss climate change varies due to idiosyncratic factors such as regional regulatory pressure, media attention, or stakeholder engagement, which further supports the independence of residual errors from standard firm covariates. Thus, we expect Lewbel (2012) to be a useful test in our context. In addition, following Gormley and Matsa (2014), we also employ the lagged industry-average CCE excluding the focal firm as an instrumental variable. This variable captures broader sectoral climate discourse that is likely correlated with firm-level CCE but plausibly exogenous to individual firm acquisition decisions.

We report the results in Table 5. Column (1) presents the results of the Lewbel model, and Columns (2) and (3) utilize the prior industry average as an instrumental variable. The coefficients for the instrumented CCE variables are consistently negative and statistically significant across both columns, −0.089 and −0.046, respectively. Additionally, the Kleibergen-Paap and Cragg-Donald Wald tests strongly reject the under-identification and weak identification hypotheses, and the Hansen J statistic confirms that over-identification is not a concern. These findings reaffirm our baseline results that increased CCE reduces M&A likelihood.

4.1.3.3. Difference-in-differences estimation. Finally, we perform a difference-in-differences (DID) analysis employing the 2015 Paris Agreement as an exogenous shock. This global event significantly raised climate awareness and regulatory expectations for firms worldwide, thus serving as a natural experiment. Prior studies show that the Paris Agreement helped investors acknowledge the gravity of climate change and demand higher returns (Bolton and Kacperczyk, 2023), raising the cost of financing essential for M&As.

[15] We mainly address endogeneity concerns associated with M&A likelihood. We find similar results (untabulated) with deal numbers and value, further supporting the validity of our findings.

[16] Due to the global nature of our dataset, the inclusion of additional covariates is constrained by data availability across countries and regions.

[17] For robustness, we further consider several M&A related variables following Cumming et al. (2023) and perform entropy balance. Specifically, we include corporate governance variables, including independent board ratio, board size, CEO board membership, CEO compensation ratio, and institutional ownership. With these additional controls, we still find qualitatively similar results. We report the results in Table A4.

[18] To address potential endogeneity, we employ the heteroskedasticity-based identification approach of Lewbel (2012), which constructs internal instruments as the product of demeaned exogenous regressors and the residuals from the first-stage regression. A necessary condition for the validity of these instruments is the presence of heteroskedasticity in the error terms of the first-stage equation. We test for this using both the Breusch–Pagan/Cook–Weisberg test and the White (1980) test for unrestricted heteroskedasticity. The Breusch–Pagan test rejects the null of homoskedasticity ($\chi^2(1) = 371.02, p < 0.001$), as does the White test ($\chi^2(54) = 3673.65, p < 0.001$). These results confirm the presence of sufficient heteroskedasticity, satisfying the key requirement for applying the Lewbel estimator. And we report first-stage F-statistics and Hansen J-tests to assess instrument relevance and validity.

Table 4

Endogeneity test: Entropy balancing. This table presents the results of the entropy balancing approach of the effect of firm-level CCE on acquisition likelihood, number of deals and firm-level aggregated deal value. First, we split the full sample into two groups: the treatment group are firms with CCE higher than median CCE by each country in each year; others are in the control group. We choose mean, variance, and skewness as the moment properties and the same matching variables in the main regression to re-weight observations in control groups. Panel A presents the differences in the means, variance, and skewness of variables in the treatment and control groups before entropy balancing. Panel B represents matched variables after entropy balancing. Panel C shows the results of CCE (CCE) on acquisition likelihood, number of deals and firm-level aggregated deal value with an entropy-weighted sample. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Before entropy balancing (without weighting)

	Treatment (N: 43,410)			Control (N:43,909)		
Variables	Mean	Variance	Skewness	Mean	Variance	Skewness
Size	7.867	6.168	0.533	7.414	5.871	0.615
Leverage	0.271	0.072	17.190	0.265	0.091	9.291
Tobin's Q	1.884	2.536	3.504	2.192	3.548	2.797
Cash to assets	0.159	0.032	1.869	0.210	0.047	1.407
Sales growth	0.120	0.135	3.107	0.132	0.154	3.085
R&D	0.035	0.006	3.897	0.051	0.010	2.943
Tangibility	0.565	0.181	0.837	0.422	0.159	1.409
Operating margin	−0.048	2.450	−8.909	−0.193	4.047	−6.934

Panel B: After entropy balancing (with weighting)

	Treatment (N: 43,410)			Control (N: 43,909)		
Variables	Mean	Variance	Skewness	Mean	Variance	Skewness
Size	7.867	6.168	0.533	7.866	6.168	0.533
Leverage	0.271	0.072	17.190	0.271	0.073	17.210
Tobin's Q	1.884	2.536	3.504	1.884	2.537	3.503
Cash to assets	0.159	0.032	1.869	0.159	0.032	1.869
Sales growth	0.120	0.135	3.107	0.120	0.135	3.106
R&D	0.035	0.006	3.897	0.035	0.006	3.896
Tangibility	0.565	0.181	0.837	0.565	0.181	0.837
Operating margin	−0.048	2.450	−8.909	−0.048	2.452	−8.906

Panel C: Regressions after entropy balancing

Variables	*(1) Acquisition likelihood (Logit)*	(2) *Number of deals (OLS)*	(3) *Firm-level aggregate deal value (OLS)*
CCE	−0.267***	−0.081***	−0.170***
	(−7.37)	(−4.76)	(−4.78)
Size	0.278***	0.130***	0.228***
	(51.74)	(23.10)	(26.93)
Leverage	−0.200***	−0.051***	−0.123***
	(−3.96)	(−3.11)	(−4.00)
Tobin's Q	0.058***	0.020***	0.032***
	(10.15)	(6.55)	(5.81)
Cash to assets	−0.183***	−0.179***	−0.051
	(−3.10)	(−4.89)	(−0.83)
Sales growth	0.171***	0.065***	0.123***
	(7.35)	(7.39)	(6.15)
R&D	−0.949***	−0.130**	−0.331***
	(−7.17)	(−1.97)	(−2.91)
Tangibility	−0.392***	−0.183***	−0.214***
	(−13.75)	(−10.41)	(−7.08)
Operating margin	0.007	−0.006***	0.010**
	(1.43)	(−3.04)	(2.28)
Constant	−3.228***	−0.238***	−0.461***
Country FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	87,319	87,319	87,319
Pseudo R^2	0.182		
Adj. R^2		0.180	0.184

Table 5
Endogeneity test: Two-step least squares regression. This table reports the results of 2SLS regressions examining the effect of firm-level CCE on M&A activity, including acquisition likelihood, number of deals, and firm-level aggregate deal value. Columns (1) to (3) employ the Lewbel (2012) method, using heteroscedasticity-based instruments. Columns (4) to (7) present the conventional 2SLS estimates, where the prior year's industry-average CCE (excluding the focal firm) serves as the instrument. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Lewbel method (2012)			**2SLS**			
	(1) Acquisition likelihood	(2) *Number of deals*	(3) *Aggregate deal value*	(4) *First stage*	(5) *Acquisition likelihood*	(6) *Number of deals*	(7) *Aggregate deal value*
Industry average CCE (lag 1)				0.615***			
				(30.40)			
CCE fitted	−0.083***	−0.230***	−0.476***		−0.080***	−0.136***	−0.491***
	(−3.74)	(−5.29)	(−4.11)		(−4.69)	(−3.63)	(−5.43)
Size	0.051***	0.130***	0.229***	−0.002***	0.049***	0.128***	0.229***
	(57.73)	(57.21)	(46.18)	(−3.37)	(52.74)	(52.19)	(42.51)
Leverage	−0.049***	−0.081***	−0.203***	−0.005*	−0.028***	−0.046***	−0.116***
	(−6.96)	(−5.51)	(−5.89)	(−1.66)	(−4.84)	(−4.82)	(−4.88)
Tobin's Q	0.006***	0.020***	0.031***	0.001*	0.006***	0.020***	0.030***
	(7.03)	(10.86)	(6.99)	(1.93)	(6.18)	(10.14)	(6.37)
Cash to assets	−0.045***	−0.185***	−0.067	0.011**	−0.034***	−0.175***	−0.055
	(−4.51)	(−9.11)	(−1.43)	(2.05)	(−3.36)	(−8.40)	(−1.13)
Sales growth	0.029***	0.068***	0.129***	0.012***	0.027***	0.068***	0.119***
	(7.63)	(8.54)	(6.78)	(4.64)	(7.17)	(8.24)	(6.10)
R&D	−0.155***	−0.161***	−0.392***	−0.097***	−0.151***	−0.125***	−0.361***
	(−7.75)	(−4.23)	(−4.45)	(−7.89)	(−7.62)	(−3.30)	(−4.09)
Tangibility	−0.070***	−0.175***	−0.197***	0.029***	−0.074***	−0.192***	−0.215***
	(−14.52)	(−18.01)	(−8.39)	(10.54)	(−14.30)	(−18.46)	(−8.41)
Operating margin	0.000	−0.007***	0.007**	−0.005***	0.001	−0.006***	0.008**
	(0.19)	(−5.34)	(2.21)	(−9.01)	(0.83)	(−4.77)	(2.44)
Constant	−0.052	−0.228*	−0.694**	−0.080**	−0.124	−0.303*	−2.486***
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	87,319	87,319	87,319	72,368	72,368	72,368	72,368
Adj. R^2	0.228	0.179	0.183	0.407	0.269	0.207	0.218
Underidentification test:	111.719	111.719	111.719		533.446	533.446	533.446
Kleibergen-Paap LM-statistic	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
(*p*-value)							
Weak identification test:	56.274	56.274	56.274		924.413	924.413	924.413
Kleibergen-Paap Wald F-statistics (*p*-value)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Overidentification test:	1.762	0.152	2.587				
Hansen J statistic	(0.184)	(0.696)	(0.108)				
(*p*-value)							

Thus, we expect CCE to have a more pronounced negative impact on M&A likelihood after the Paris Agreement. To capture this, we classify firms in the top quartile of CCE measured before the Paris Agreement as the treatment group and those in the bottom quartile as the control group. The sample covers a symmetric window of three years before and three years after the Agreement (2012-2018), excluding the event year (2015) to avoid contamination from anticipatory effects.[19]

$$M\&Alikelihood_{i,t+1} = \alpha + \beta_1 \left(CCETreat_{i,t} \times Post\text{-}Paris_{i,t}\right) + \beta_2 \times Post_{i,t} + \beta_3 \times CCETreat_{i,t} + C_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $Post\text{-}Paris_{i,t}$ is an indicator variable which equals one if year t is after the Paris agreement (the year 2015), otherwise zero. All other variables are as in Equation (1). We are interested in $CCETreat_{i,t} \times Post\text{-}Paris_{i,t}$.

Table 6 reports the results. The interaction term, $CCETreat_{i,t} \times Post\text{-}Paris_{i,t}$, is negative and statistically significant at the 5% level across specifications. The estimates indicate that firms with high climate change exposure experience a stronger decline in acquisition likelihood, complete fewer deals, and experience lower aggregate deal value after the Paris Agreement. Collectively, these results help address potential endogeneity issues in our analysis.

[19] To verify the parallel trend assumption, in Fig. A1, we plot the regression coefficients three years before and after the Paris Agreement. In the pre-event period (three years before 2015), we do not find any significant differences in the acquisition likelihood related to CCE between the treated and control firms. However, in the post-event period (three years after 2015) the effect becomes significantly negative.

Table 6
Endogeneity test: Difference-in-differences (DID) approach. This table reports difference-in-differences estimates of the effect of firm-level CCE on acquisition likelihood, using the 2015 Paris Agreement as an exogenous shock. We keep three years prior and post the year of exogenous shock. The dependent variable is the acquisition likelihood at year *t+1*. Post-Paris is a binary variable taking the value of one after the 2015 Paris agreement and otherwise zero. Treated firms are defined as those in the top quartile of CCE measured prior to the Paris Agreement, while control firms are those in the bottom quartile. Column (1) uses acquisition likelihood in year *t+1* as the dependent variable. Column (2) uses the number of acquisition deals in year *t+1*. Column (3) uses the aggregate deal value of acquisitions in year *t+1*. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Variables	Dependent variable (1) *Acquisition likelihood*	(2) *Number of deals*	(3) *Aggregate deal value*
CCE Treat×Post-Paris	−0.142**	−0.038**	−0.117**
	(−2.02)	(−2.10)	(−2.26)
Post-Paris	−0.635***	−0.072***	−0.202***
	(−11.33)	(−3.03)	(−4.10)
CCE Treat	0.053	−0.008	0.051
	(0.72)	(−0.23)	(1.10)
Size	0.184***	−0.128***	0.212***
	(17.97)	(−5.10)	(8.81)
Leverage	−0.394***	−0.363***	−0.382***
	(−5.07)	(−6.86)	(−4.20)
Tobin's Q	0.009**	0.007**	0.002
	(2.17)	(2.67)	(0.95)
Cash to assets	−0.262**	0.419***	−0.215**
	(−2.15)	(10.24)	(−2.64)
Sales growth	0.113**	0.016	0.111***
	(2.47)	(0.94)	(4.40)
R&D	−1.348***	−0.373***	−0.599***
	(−4.44)	(−4.93)	(−4.84)
Tangibility	−0.218***	0.069	−0.152***
	(−3.94)	(1.42)	(−3.26)
Operating margin	0.064***	−0.000	0.023**
	(2.58)	(−0.12)	(2.33)
Constant	−1.193***	1.440***	−0.568**
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	10,560	12,297	12,533
Pseudo R^2	0.148	0.319	0.060

4.1.4. Robustness checks

In this subsection, we conduct several robustness checks to examine the relationship between CCE and acquisition likelihood.

First, to control for potential omitted variable bias, we additionally control for ESG uncertainty (Ongan, Gocer, and Işık, 2025), GDP, GDP per capita, economic policy uncertainty (EPU), unemployment rate, six components of world governance indicators (WGI), and political and geopolitical risks. We define GDP and GDP per capita based on the data from the country in which the firm is situated.[20] The EPU index of Baker, Bloom, and Davis (2016) captures the average yearly economic policy uncertainty of a firm's resident country.[21] The unemployment rate[22] represents the annual average proportion of the unemployed labor force relative to the total. The six governance measures from the WGI gauge the governance quality of the acquirer's home country, including factors such as corruption, government effectiveness, and political stability.[23] We collect political and geopolitical risk data from the respective authors' websites.[24] Following Cumming et al. (2023), we further control for several M&A related variables highlighted in the M&A literature. Specifically, we include corporate governance variables, including independent board ratio, board size, CEO board membership, CEO compensation ratio, and institutional ownership. All these data are sourced from Refinitiv. We still find negative coefficients on CCE (Panel A of Table 7) after controlling for these macroeconomic and governance variables, indicating that CCE remains a significant negative determinant of M&A decisions.

Second, different countries face different levels of climate risk, have considerable variation in climate policy implementation, and

[20] GDP and GDP per capita are sourced from World Development Indicators on World Bank available at https://databank.worldbank.org/source/world-development-indicators, accessed on 09/08/2023.

[21] EPU is sourced from Economic Policy Uncertainty indices for 22 countries available at https://www.policyuncertainty.com/all_country_data.html, accessed on 12/08/2023.

[22] Unemployment rate is sourced from the Labor Force Statistics database (LFS) of the International Labour Organization available at https://ilostat.ilo.org/data/, accessed on 12/08/2023.

[23] The six components of WGI are sourced from the World Bank available at: https://info.worldbank.org/governance/wgi/, accessed on 12/08/2023.

[24] We employ political risk measure of Hassan et al. (2019) and Geopolitical risk indicator of Caldara and Iacoviello (2022).

Table 7

Robustness checks. This table presents robustness checks using additional controls and alternative CCE specifications. The dependent variable in Columns (1)–(3) is acquisition likelihood; Columns (4)–(6) are the number of deals; and Columns (7)–(9) are firm-level aggregate deal value. In Columns (1), (4), and (7), we add macroeconomic and institutional variables: ESG uncertainty index, GDP, GDP per capita, economic policy uncertainty, unemployment rate, and the six components of the Worldwide Governance Indicators. Columns (2), (5), and (8) control firm-level political and geopolitical risk indices. Columns (3), (6), and (9) include all macro-level and risk controls, along with corporate governance variables, independent board ratio, board size, CEO board membership, CEO compensation ratio, and institutional ownership. Panel B replaces the CCE with country-adjusted CCE, defined as the deviation of firm-level CCE from the country-year average CCE. Then in Panel B, Columns (2), (3), (5), (6), (8), and (9), we further include controls for firm carbon performance, the total carbon emissions, and the emissions score, sourced from Refinitiv. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: With additional controls

	Dependent variable: *Acquisition likelihood*			Dependent variable: *Number of deals*			Dependent variable: *Aggregate deal value*		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CCE	−0.185***	−0.272***	−0.160***	−0.042***	−0.068***	−0.075***	−0.111***	−0.114***	−0.176***
	(−4.42)	(−6.82)	(−2.93)	(−3.96)	(−6.02)	(−4.84)	(−4.83)	(−5.00)	(−4.90)
ESG uncertainty	−0.007***		−0.024***	0.000		−0.006***	0.001		−0.002
	(−3.04)		(−8.15)	(0.28)		(−4.97)	(0.45)		(−1.06)
GDP	0.000***		0.000	0.000***		0.000	0.000**		−0.000
	(11.49)		(1.06)	(9.19)		(0.13)	(2.33)		(−1.29)
GDP per capita	0.000***		0.000***	0.000***		0.000***	−0.000		0.000
	(21.41)		(15.19)	(20.20)		(10.24)	(−0.67)		(1.14)
EPU	0.002***		0.002***	−0.000		0.000	−0.001***		−0.001***
	(6.27)		(6.41)	(−1.50)		(0.31)	(−4.48)		(−4.99)
Unemployment rate	0.120***		0.105***	0.059***		0.033***	0.011*		0.009
	(11.46)		(7.31)	(13.12)		(5.54)	(1.65)		(1.01)
WGI CC	−1.273***		−1.461***	0.033		−0.018	0.149*		0.367***
	(−9.15)		(−7.02)	(0.60)		(−0.22)	(1.80)		(2.93)
WGI GE	0.541***		0.304	−0.157***		−0.236***	−0.076		−0.073
	(3.45)		(1.36)	(−2.70)		(−2.72)	(−0.91)		(−0.58)
WGI PV	−1.932***		−1.776***	−0.275***		−0.246***	0.023		0.082
	(−22.09)		(−13.37)	(−8.60)		(−4.64)	(0.48)		(1.05)
WGI RL	−0.893***		−0.867***	−0.322***		−0.163	−0.263**		−0.915***
	(−3.98)		(−2.75)	(−4.15)		(−1.41)	(−2.01)		(−4.86)
WGI RQ	−0.402***		−0.397*	0.008		−0.125	−0.217***		−0.104
	(−2.68)		(−1.90)	(0.15)		(−1.52)	(−2.59)		(−0.83)
WGI VA	1.325***		1.308***	0.441***		0.233*	0.255*		0.137
	(5.19)		(3.52)	(4.89)		(1.71)	(1.83)		(0.63)
Political risk		−0.026***	−0.000		−0.006***	−0.000**		−0.012***	−0.000
		(−4.40)	(−1.40)		(−3.25)	(−2.30)		(−3.61)	(−1.20)
Geopolitical risk		−0.305***	−0.517***		−0.043**	−0.065**		−0.030	−0.095*
		(−7.31)	(−7.40)		(−2.48)	(−2.12)		(−1.17)	(−1.82)
Independent board			0.013			−0.022***			−0.003
			(0.66)			(−3.06)			(−0.27)
Board size			0.041***			0.010**			0.011
			(3.58)			(2.31)			(1.25)
CEO as board			0.193***			0.055***			0.083***
			(3.52)			(2.68)			(2.78)
CEO compensation			0.029			−0.004			0.065**
			(0.93)			(−0.29)			(2.41)
Institutional ownership			0.408***			0.071***			0.059
			(5.41)			(2.59)			(1.04)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.410	−3.069***	1.753**	−1.808***	−0.223***	−0.888***	−0.286	−0.374***	0.648*
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	78,645	78,105	34,864	78,654	78,114	34,864	78,654	78,114	35,008
Pseudo R^2	0.271	0.175	0.279						
Adj. R^2				0.225	0.158	0.193	0.054	0.055	0.054

Panel B: With country-adjusted CCE and control of carbon emission

	Dependent variable: *Acquisition likelihood*			Dependent variable: *Number of deals*			Dependent variable: *Aggregate deal value*		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CCE country-adjusted	−0.121***			−0.033***			−0.103***		
	(−3.48)			(−2.97)			(−4.81)		
CCE		−0.206***	−0.206***		−0.051***	−0.052***		−0.113***	−0.113***
		(−4.61)	(−4.61)		(−3.44)	(−3.47)		(−3.98)	(−3.97)
Total carbon emission		−0.001***			−0.000**			−0.000**	
		(−5.33)			(−2.56)			(−2.34)	

(*continued on next page*)

Table 7 (*continued*)

Panel B: With country-adjusted CCE and control of carbon emission									
	Dependent variable: *Acquisition likelihood*			Dependent variable: *Number of deals*			Dependent variable: *Aggregate deal value*		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Emissions score			0.001***			0.001***			0.000**
			(6.06)			(5.48)			(2.32)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−3.123***	−2.094***	−2.245***	−0.235***	−0.201***	−0.222***	−0.420***	−0.246***	−0.301***
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	87,319	47,285	47,285	87,319	47,297	47,297	87,319	47,297	47,297
Pseudo R^2	0.190	0.198	0.198						
Adj. R^2				0.177	0.173	0.174	0.057	0.062	0.062

institutional background. To address these institutional differences, we run country-by-country regressions with our baseline model and report the results in the appendix (Table A5). In addition, we also consider country-adjusted CCE and check its implications in Panel B of Table 7. We find that both CCE and country-adjusted CCE put a downward pressure on M&A likelihood, deal numbers, and value. To address issues related to the choice of our climate risk measure, we include controls for firm carbon performance, total carbon emissions, and emissions score. We source these emission data from Refinitiv and still find that CCE negatively influences M&A likelihood, deal numbers, and value.

Third, following Heo (2021), we examine the persistence of the effect of CCE by using long-term CCEs to replace the year *t* CCE, keeping the same controls as in the baseline model. If the negative effect of CCE exists temporarily, then acquisition likelihood might reverse quickly, leading to a swift dissipation of the negative impact. However, if the negative effect persists, it could lead to a sustained decrease in the likelihood of acquisitions, as firms continuously grapple with climate change. We measure three long-term CCEs: 3-, 5-, and 7-year CCEs by averaging the previous 3, 5, and 7 years of firm-level CCE. We present the results in Panel A of Table A6. We find a persistent and strong negative influence of CCE on acquisition likelihood.

Fourth, we incorporate stricter fixed effects into our baseline model. We consider industry-by-country, industry-by-year, and country-by-year fixed effects and report results in Panel B of Table A6. The results remain similar to our main findings.[25] Fifth, we examine whether different sub-components of our CCE measure (e.g., opportunity, regulatory, and physical) impact M&A decisions differently. We report the results in Panel C of Table A6 and find that opportunity and regulatory-related climate exposure significantly reduces acquisition likelihood, deal numbers, and value. However, physical risk impacts M&A decisions positively, though the coefficients are mostly statistically insignificant. This positive impact is not surprising, especially for physical climate risk, as firms exposed to natural disaster-prone areas would want to relocate their operations to safe places, and M&A may serve as a prudent mechanism.

Sixth, we explore whether the negative relationship between CCE and acquisition activity is driven by firm heterogeneity in historical M&A involvement. Specifically, following Fuller, Netter, and Stegemoller (2002), we restrict the sample to firms that have been serial acquirers during the sample period (defined as firms with at least five completed acquisitions within a three-year period) and non-serial acquirers. We then re-estimate our baseline regression. Column (1) of Table A7 shows that CCE has a negative but statistically insignificant association with acquisition likelihood among serial acquirers, suggesting that experienced dealmakers may be less deterred by climate-related risks, potentially due to stronger capabilities in due diligence, integration, or risk hedging. By contrast, we find that the negative effect of CCE on the likelihood of making an acquisition remains statistically significant for the non-serial acquirers (Column 2 of Table A7). This suggests that firms less familiar with the M&A process may act more cautiously in uncertain climate environments. We then turn to the target side of the M&A market to test whether firms exposed to higher climate risk are also less likely to become acquisition targets. We construct a panel where the dependent variable equals one if the firm is acquired in the following year and zero otherwise. Column 3 of Table A7 shows that firms with higher CCE are significantly less likely to become targets, suggesting that climate-exposed firms may be less attractive to potential acquirers, perhaps due to concerns about liability, valuation uncertainty, or environmental risks. These findings suggest that climate change exposure discourages M&A participation on both sides of the market, particularly among less experienced acquirers and vulnerable targets. Taken together, all these results closely align with our baseline findings, reaffirming the robustness of our primary conclusion.

4.2. Tests of potential channels

In this subsection, we focus on the underlying mechanisms driving the relationship between CCE and M&A likelihood. We explore two potential channels: cost of financing and the precautionary motive. As the proxy for cost of financing, we utilize the cost of capital, including both the cost of debt and the cost of equity measures. To capture the precautionary motive, we employ corporate cash holdings.

[25] In Table A6, we provide estimates derived from OLS models with a variety of fixed effects.

4.2.1. The role of the cost of financing

Climate change has emerged as a significant determinant of the cost of capital, which can influence M&A activity. Bolton and Kacperczyk (2021, 2023) find that investors demand a higher equity risk premium for firms with environmental exposure. Moreover, firms exposed to climate-related risks face elevated financing costs due to increased uncertainty and investor risk aversion (Meneses Cerón et al., 2024). Such an upward push in the cost of capital reduces the net present value of potential M&A targets, making deals financially unattractive. Thus, it is likely to discourage acquisition decisions. Additionally, climate stress testing frameworks of Acharya et al. (2023) highlight that climate risks amplify systemic financial vulnerabilities, further tightening credit conditions, and reducing deal flow. These dynamics suggest that climate change not only changes the cost of capital by reshaping firm-level risk structure but also alters broader market incentives, leading to a decline in M&A activity. Thus, we conjecture CCE to adversely affect M&A likelihood by increasing the cost of capital, i.e., the cost of debt and the cost of equity.

Following Frank and Shen (2016), we calculate the cost of debt as the ratio of total interest and related expenses to the sum of long-term debt and current liabilities. Following Botosan (1997) and Attig, Guedhami, and Mishra (2008), we use the earnings-to-price ratio, adjusted for growth and dividend payout, as a proxy for the cost of equity. We first regress the cost of debt and cost of equity

Table 8

Channel analysis. This table reports the results of channels though which firm-level CCE affects the acquisition likelihood. In Panel A, we present the results for the cost of debt. Following Frank and Shen (2016), we compute cost of debt as total interest and related expenses divided by total debt at year t. In Panel B, we display the results for the cost of equity. We follow Botosan (1997) and Attig et al. (2008) and estimate the cost of equity as earning to price ratio adjusted for constant growth rate and dividend payout. In Panel C, we show the results for cash holdings. Following Bates et al. (2009), we calculate cash holdings as cash scaled by total assets at year t. Column (1) reports the results of univariate regression of cost of capital and cash holdings measures on CCE separately. Columns (2) and (3) report results of acquisition likelihood on CCE for subsamples of firms based on the median value of cost of debt, cost of equity, and cash holdings by country and year. For the sake of brevity, we only report the variables of interest. In all models, we control the same firm characteristics used in our baseline regression. All variables' definitions are provided in the Appendix Table A1. Heteroscedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Cost of debt			
	Dependent variable: *Cost of debt*	Dependent variable: *Acquisition likelihood*	
Variables	(1)	(2) High	(3) Low
CCE	0.007***	−0.384***	−0.294
	(4.02)	(−5.77)	(−1.46)
Controls	No	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	71,200	35,608	35,558
Pseudo R^2		0.182	0.227
Adj. R^2	0.041		
Chow test		5.37	
(*p*-value)		(0.004)	
Panel B: Cost of equity			
	Dependent variable: *Cost of equity*	Dependent variable: *Acquisition likelihood*	
Variables	(1)	(2) High	(3) Low
CCE	0.025***	−0.337***	−0.223*
	(3.45)	(−5.16)	(−1.72)
Controls	No	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	81,404	40,709	40,689
Pseudo R^2		0.164	0.252
Adj. R^2	0.033		
Chow test		99.06	
(*p*-value)		(0.000)	
Panel C: Cash holdings			
	Dependent variable: *Cash holdings*	Dependent variable: *Acquisition likelihood*	
Variables	(1)	(2) High	(3) Low
CCE	0.014***	−0.322*	−0.365***
	(6.61)	(−1.84)	(−5.37)
Controls	No	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	77,600	38,797	38,800
Pseudo R^2		0.214	0.210
Adj. R^2	0.246		
Chow test		15.28	
(*p*-value)		(0.000)	

separately on CCE to directly test their relationships. We present the results in Panels A and B of Table 8. Column (1) shows that CCE positively affects both the cost of debt and the cost of equity, making capital costlier and difficult to access. We then test whether the relationship between CCE and M&A likelihood varies across different degrees of cost of debt and cost of equity. To do this, following Hoberg and Phillips (2010) and Duchin, Ozbas, and Sensoy (2010), we divide our sample based on the median values of the cost of debt and cost of equity independently for each year-country and categorize firms into two groups. We keep firms with the cost of debt and cost of equity above (below) their median values in the high (low) groups and re-run our baseline regressions for both subsamples. Columns (2) and (3) present the results for these two segments. The results show that the negative effect of CCE on acquisition likelihood is much more pronounced for firms with a higher cost of debt and cost of equity. Overall, the results show that higher cost of debt and cost of equity exacerbate the negative relationship between CCE and M&A likelihood by increasing the cost of financing.

4.2.2. The role of cash holdings

Javadi et al. (2022) find that firms with greater exposure to climate risks significantly increase their cash reserves. Similarly, Li and Zhang (2025) find that firms facing climate-related uncertainties hoard cash not only to mitigate risk but also to remain flexible for future opportunities, suggesting a shift from investment-driven to risk-averse liquidity management. This strategic cash accumulation may further reduce the likelihood of engaging in M&A. Additionally, Tran et al. (2025) further demonstrate that high carbon-emitting firms face increased climate scrutiny, leading them to adjust their cash policies, taking firms away from capital-intensive activities like acquisitions. Thus, we expect CCE to adversely affect M&A likelihood by motivating firms to hoard more cash to avoid the negative impact of climate change.

Following Bates et al. (2009), we measure cash holdings as cash scaled by the total assets. To test the relationship between CCE and cash holdings, we first directly regress cash holdings on CCE. We present the results in Panel C of Table 8. Column (1) shows that CCE positively impacts cash holdings, indicating that firms hold more cash as a precaution to tackle climate change risk. We next test whether the relationship between CCE and M&A likelihood varies across different levels of cash holdings. Accordingly, we group firms by dividing them based on the median values of their cash holdings following Hoberg and Phillips (2010) and Duchin et al. (2010). The high (low) group includes firms above (below) the median cash holdings value. Columns (2) and (3) present the results for these two subsamples. Consistent with our conjecture, we find that the adverse impact of CCE on acquisition likelihood is stronger for firms with lower cash holdings.

4.3. Additional analysis

4.3.1. Likelihood of acquisition vs. CAPEX or R&D

We find firms become less inclined to pursue M&A as climate risk increases. A natural follow-up question is whether CCE

Table 9

Acquisition likelihood vs. CAPEX or R&D. This table presents the estimated relations of firm-level CCE on M&A decisions and capital expenditures (CAPEX) or research and development expenses (R&D) using seemingly unrelated regressions (SUR). In Column (1), the dependent variable takes the value of 1 if a firm makes at least one acquisition announcement in year and zero otherwise. In Panel A Column (2), the dependent variable is the CAPEX divided by total assets in year *t* and in Panel B Column (2), the dependent variable is the R&D divided by total assets in year *t*. For the sake of brevity, we only report the variables of interest. In all models, we control the same firm characteristics used in our baseline regression. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Acquisition likelihood vs. CAPEX		
Variables	Dependent variable: *Acquisition likelihood* (1)	Dependent variable: *CAPEX* (2)
CCE	−0.043***	0.002***
	(−6.37)	(3.34)
Controls	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Country FE	Yes	Yes
N	75,046	75,046
Adj. R^2	0.20	0.45
Panel B: Acquisition likelihood vs. R&D		
Variables	Dependent variable: *Acquisition likelihood* (1)	Dependent variable: *R&D* (2)
CCE	−0.043***	−0.002***
	(−6.38)	(−3.47)
Controls	Yes	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Country FE	Yes	Yes
N	75,225	75,225
Adj. R^2	0.20	0.86

differentially impacts a firm's internal compared to its external investment decisions.

Climate change-related extreme weather events disrupt the supply chain, increase operating costs, and negatively affect firm performance (Huang, Kerstein, and Wang, 2018). Such adverse impacts on profitability may reduce operational flexibility, making it harder to attract external financing (Chava, 2014). Additionally, climate change negatively impacts corporate risk-taking (Chen and Wang, 2025) and corporate innovation such as R&D (Li et al., 2024). In these cases, firms tend to respond by lowering their external risk-taking (Wen et al., 2021), which could result in a decreased appetite for risky investments like M&A and R&D. Conversely, climate change also creates new opportunities for companies. It opens new market avenues for firms to offer sustainable products and services (Larsen and Dupuy, 2023). Furthermore, Ma, Yuan, and Fu (2023) find that firms exposed to climate change opportunities invest more than their counterparts. Thus, we aim to explore whether CCE influences firms' internal and external investment decisions, as the CCE measure accounts for uncertainty related to physical, regulatory, and transitional or opportunity changes.

We employ seemingly unrelated regression (SUR), where the two regressions are estimated simultaneously with different dependent variables and correlated residuals, to examine the influence of CCE on acquisitions (representing external investments) and on either capital expenditure (CAPEX) or research and development (R&D) spending (proxying internal investments). We report the results of the SUR in Table 9. Panels A and B present the influence of CCE on acquisition decisions relative to CAPEX and R&D, respectively. In Column (1) of both panels, the dependent variable is the acquisition likelihood, whereas in Column (2), the dependent variable is CAPEX as a proportion of total assets, and R&D scaled by total assets, respectively. The estimates indicate that CCE negatively impacts both acquisition likelihood and R&D expenditures while exerting a positive effect on CAPEX. The findings suggest that firms with greater CCE tend to prioritize capital expenditures over riskier M&A and R&D investments.

4.3.2. Cross-sectional analyses

In this subsection, we undertake a series of cross-sectional tests to identify any geographic, industry, and firm-specific factors associated with the impact of CCE on M&A likelihood.

In response to potential catastrophic risks from climate change, governments worldwide are implementing various regulations to reduce greenhouse gas emissions. For instance. The European Union (EU) has adopted the Emission Trading System (ETS) as a key policy tool for reducing global greenhouse gas emissions. Chan, Li, and Zhang (2013) find that the EU ETS has a positive impact on material costs and revenues, while Abrell, Ndoye Faye, and Zachmann (2011) find no significant impact of the EU ETS on profit margins and value added. No consensus has been reached on the best policy approaches. Consequently, climate policies are often highly fragmented across different jurisdictions. Thus, we expect that different countries to have varying degrees of exposure to climate change that might impact M&A likelihood differently. With climate change, one might expect that acquirer firms' origin, a country's economic development, and financial structure are important factors before engaging in M&As. Thus, we examine the country-specific factors to identify whether our results are driven by any particular geographic attributes.

We start by investigating whether there is a variation in impact based on acquirer location (i.e., Anglo-Saxon vs. non-Anglo-Saxon), level of economic development (i.e., developed vs. emerging), and structure of the financial system (i.e., bank-based vs. stock market-based).[26] We expect certain aspects of the legal framework and institutions to be strong in Anglo-Saxon countries. For example, the disclosure regime, corporate governance standards, and stakeholder pressure are quite well-established in these legal-origin systems compared to non-Anglo-Saxon countries. Thus, we expect CCE to have a more significant negative impact on the M&A likelihood for acquirers in Anglo-Saxon countries than in other countries. We re-estimate our baseline regression on these subsamples and report the results in Panel A of Table 10. We find the negative influence of CCE on acquisition likelihood is markedly more significant for Anglo-Saxon acquirers.

Next, certain aspects of climate change are particularly more relevant for developed economies than emerging economies. For example, a New York Times analysis finds that 23 rich industrialized countries are responsible for 50% of all historical emissions.[27] This is due to a combination of factors, including high historical emissions, reliance on carbon-intensive infrastructure, and vulnerability to specific types of climate impacts like extreme weather events and sea-level rise. Thus, we expect that the adverse impact of CCE on M&A likelihood will be more pronounced for firms located in developed economies. We then re-estimate our baseline regression on these subsamples and report the results in Panel A of Table 10. The results again indicate greater sensitivity in developed markets.

Similarly, we explore how the structure of the financial system moderates the CCE and M&A relationship by distinguishing between bank-based and stock market-based countries. In bank-based systems, large systemic banks often dominate corporate finance, credit allocation, and maintain long-term lending relationships with firms. In contrast, stock market-based systems exhibit more dispersed ownership, stronger market scrutiny and monitoring, which can make firms cautious in managing emerging climate risks. Thus, we

[26] We follow the definitions of OECD to identify developed and emerging countries. Full definitions are available at https://www.gov.uk/government/publications/countries-defined-as-developing-by-the-oecd/countries-defined-as-developing-by-the-oecd. For the regional effect, we exclude observations that are not either in North America or Europe, then compare the effect of CCE on acquisition likelihood of North America and European countries. For the environmental performance, we use the environmental performance index (EPI) developed by the Yale Center for Environmental Law and Policy - YCELP - Yale University, and the Center for International Earth Science Information Network - CIESIN - Columbia University. Data is available at https://doi.org/10.7927/dwt2-9k25.

[27] The anlysis was published in a report by Oxfam on December 3, 2023 under the title "Who is responsible for climate change?" Full report is avilable here: https://www.oxfamamerica.org/explore/stories/who-is-responsible-for-climate-change/#:~:text=Rich%20industrialized%20countries%20have%20contributed,global%20emissions%20between%201751%2D2006.

Table 10

Cross-sectional analysis. This table presents several cross-sectional tests of the effect of firm-level CCE on acquisition likelihood. The dependent variable is acquisition likelihood, a binary variable takes the value of 1 if firm *i* engaged in at least one acquisition announcement in year *t+1*, otherwise zero. Panel A investigates heterogeneity based on (i) acquirer location—comparing Anglo-Saxon countries (Australia, Canada, Ireland, New Zealand, UK, US) versus others, (ii) level of economic development—using the OECD classification of developed versus emerging economies, and (iii) heterogeneity by financial system structure, comparing countries with bank-based financial systems (e.g., China, France, Germany, Italy, Japan, Spain among others) to those with more market-based systems. In Panel B, we report an industry-level analysis. First, we compare based on industry cyclicality then focus on energy vs. non-energy industries. The industry cycle is categorized by the firm into pro-cyclical industry and counter-cyclical industry. We first find the correlation between a firm's revenues and the Gross National Income (GNI) over the sample period of 2001−2019 by country. Then, we compute the 2-digit SIC industry average correlation of firms by country. If the industry average correlation coefficient is above the median correlation, then this 2-digit SIC industry is pro-cyclical; otherwise, it is a counter-cyclical industry. In Panel C, we present firm-level cross-sectional tests. First, we examine financial constraints, this variable is proxied as Whited and Wu index (2006) suggested at year *t*. The firm is classified as financially constrained if its Whited-Wu index is higher than the median within each country; otherwise, it is financially constrained. Then, we explore profitability. For the sake of brevity, we only report the variables of interest. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Country-level cross-sectional tests

	Acquiror location		*Economic development*	
Variables	(1) Anglo-Saxon	(2) Non-Anglo-Saxon	(1) Developed	(2) Emerging
CCE	−0.239*** (−5.11)	−0.129** (−2.14)	−0.293*** (−7.56)	−0.038 (−0.34)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N	64,868	22,441	81,148	6,133
Pseudo R^2	0.284	0.120	0.203	0.121
Chow test	89.60		817.31	
(*p*-value)	(0.000)		(0.000)	
	Financial system			
Variables	(1) Bank based		(2) Stock market based	
CCE	−0.165** (−2.34)		−0.260** (−6.40)	
Controls	Yes		Yes	
Year FE	Yes		Yes	
Industry FE	Yes		Yes	
Country FE	Yes		Yes	
N	12,344		74,959	
Pseudo R^2	0.121		0.239	
Chow test	42.74			
(*p*-value)	(0.000)			

Panel B: Industry-level cross-sectional tests

	Cyclicality		*Industry type*	
Variables	(1) Pro-cyclical	(2) Counter-cyclical	(1) Energy	(2) Non-energy
CCE	−0.190*** (−4.49)	−0.131*** (−3.65)	−0.279*** (−4.90)	−0.189*** (−6.54)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N	37,474	6,453	80,836	
Pseudo R^2	0.204	0.253	0.168	0.194
Chow test	239.65		23.63	
(*p*-value)	(0.000)		(0.000)	

Panel C: Firm-level cross-sectional tests

	Financial constraints		*Profitability*	
Variables	(1) FC	(2) FUNC	(1) Low	(2) High
CCE	−2.95***	−0.181***	−0.355***	−0.222***
	(−5.54)	(−2.97)	(−6.20)	(−3.06)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N	38,029	37,552	43,847	43,472
Pseudo R^2	0.195	0.208	0.217	0.179
Chow test	577.20		150.30	
(*p*-value)	(0.000)		(0.000)	

conjecture that market-based mechanisms may make firms more responsive to climate-related risks, potentially through heightened investor scrutiny, ESG performance monitoring, or reputational concerns. We then re-estimate our baseline regression on bank-based and stock market-based subsamples and report the results in Panel A of Table 10.[28] Our results show that the negative impact of CCE on acquisition likelihood is present in both systems, but is more pronounced in stock market-based countries than in bank-based systems. Taken together, these results suggest that the deterrent effect of CCE on M&A activity is stronger in countries with more transparent, market-oriented financial systems and more developed institutional environments.

Next, we explore whether CCE affects different industries disproportionately, as some industries are more exposed to climate change than others. Specifically, we examine whether the impact of CCE on M&A likelihood varies across Fama-French 10 industries and report the results in Table A8. We find that in seven out of ten Fama-French industries, CCE impacts M&A likelihood negatively. Four (Manufacturing, Oil, gas, and coal extraction and production, Business equipment, and Others) out of these seven coefficients are statistically significant. Three industries have a positive coefficient with two (Wholesale, retail, and some services, and Healthcare, medical equipment, and drugs) statistically significant. These findings show that the impact of CCE varies across industries as climate change brings both opportunities and threats for different industries.

We further investigate whether CCE consistently influences the likelihood of acquisitions across various business cycle conditions. Pro-cyclical sectors, which are sensitive to economic fluctuations, may experience amplified disruptions from climate-related events like droughts, floods, and heatwaves, impacting resource availability and supply chains. For example, ArcelorMittal is grappling with the significant challenge of decarbonizing its operations, which are inherently energy-intensive. The company invests in green steel technologies and collaborates with other companies to develop sustainable solutions. Thus, firms within pro-cyclical sectors may curtail investments by preserving cash during potential economic downturns due to their direct reliance on specific environmental conditions. To capture the impact of CCE on M&A likelihood across different business cycle settings, we partition the sample into two groups: pro-cyclical and counter-cyclical industries. Following the prior literature (e.g., Sharpe, 1994; Almeida and Campello, 2007), we use the sales cyclicality of firms as a proxy to identify the industry cyclicality. Initially, we calculate the correlation between each firm's revenues and the country's Gross National Income (GNI).[29] Subsequently, we determine the average correlation for firms within the same 2-digit SIC industry category by country. Industries with average correlation coefficients above the median are classified as pro-cyclical; those below are deemed counter-cyclical.

Then, we explore whether CCE affects the likelihood of acquisitions differently across energy and non-energy industries. Energy-intensive industries are both major emitters of greenhouse gases and are directly affected by climate change through impacts on infrastructure, energy supply, and resource extraction. For example, ExxonMobil and Shell's fossil fuel investments are potentially at risk of becoming "stranded assets" if the world transitions faster to a low-carbon economy than they anticipate. Moreover, energy industries, often directly linked with regulatory scrutiny, might exhibit different strategic responses to climate change compared to non-energy sectors (Pinkse and Kolk, 2010). Following Patari et al. (2012), we utilize the SIC codes to divide industries into energy and non-energy groups.[30]We then re-estimate our baseline regression on these subsamples for comparison and report the results in Panel B of Table 10. We find the negative influence of firm-level CCE on acquisition likelihood is strikingly more significant for pro-cyclical and energy industries.

Then, we examine different firm-specific characteristics to identify the focus of the impact of CCE on acquisition likelihood. First, financially constrained firms typically have limited internal funds and find it difficult to access external financing. For example, Huang et al. (2022) show that firm-level climate risk leads to higher interest rates and stricter loan contract features, which reduces financial flexibility. In such cases, financially constrained firms may prioritize liquidity preservation over acquisitions. Thus, we conjecture that financially constrained firms with high CCE tend to reduce M&A activity. Following Whited and Wu (2006), we construct a financial constraint measure, *WW-Index,* and categorize firms into two groups based on the median of the index for each year-country-industry: financially constrained (FC) and unconstrained firms (FUNC).[31] We assess the impact of CCE on acquisition likelihood separately for each group and report the results in Panel C of Table 10. Consistent with our conjecture, we find that CCE continues to have a significantly negative effect on firms' acquisition likelihood, and the magnitude of the effect is stronger among financially constrained firms. This finding reinforces our interpretation that financing constraints play a mediating role in the relationship between climate change exposure and corporate acquisition activity.

In a related test, we examine how CCE influences the structuring of M&A transactions, i.e., the choice of payment method across deals. Firms facing higher CCE may prefer to preserve liquidity, particularly under financial strain, growing operational uncertainty, or rising risk premiums. Stock financing also helps acquirers share valuation risk with targets, which may be appealing in the presence of elevated long-term environmental risks that could affect future cash flows. We report the results in Table A9 using three alternative dependent variables that capture payment structures: a binary indicator for all-cash payment, a binary indicator for deals that include

[28] Following Beck, Demirgüç-Kunt, and Levine (2000), we classify countries such as Germany, France, Italy, Spain, Austria, Belgium, the Netherlands, Japan, South Korea, China, Finland, Denmark, and Sweden as having bank-based financial systems.

[29] GNI indicator is sourced from the World Bank, available at https://data.worldbank.org/indicator/NY.GNP.MKTP.CD, accessed on 10/08/2023.

[30] We defined firms in energy industries with SIC codes 1300, 1300, 1310, 1320, 1321, 1380, 1381, 1382, 1389, 2900, 2910, 2911, 2990, 2992, 2999, 4910, 4911, 4920, 492, 4923, 4924, 4925, 4930, 4931, 4932, and 4939.

[31] Our results (untabulated) also remain qualitatively similar when we measure financial constraints employing the KZ index of Kaplan and Zingales (1997).

stock payment, and a binary indicator for all-stock payment. We find a negative and statistically significant relationship between CCE and all-cash payment, suggesting that firms with higher CCE are less likely to use 100% cash financing. In contrast, the results show positive and significant associations between CCE and the likelihood of stock-based payments. This pattern indicates a shift from cash to equity financing in M&A deals as climate-related risks increase. These findings are consistent with precautionary motives and capital structure adjustments in response to external climate-related pressures.

Next, we investigate the role of firm profitability in shaping merger and acquisition (M&A) strategies under varying CCE. Less profitable firms, with low financial flexibility and more need for external financing, may respond differently to climate change uncertainty compared to more profitable firms. Healy, Palepu, and Ruback (1992) document that firms with low profitability tend to have fewer resources to allocate towards strategic acquisitions. We define firm profitability as operating income before depreciation, plus total interest rate and related expenses, minus deferred taxes and investment tax credit, scaled by total assets. Next, we categorize firms into two groups based on the median profitability for each year-country-industry: higher and lower profitability firms.

We then re-estimate our baseline regression on these subsamples and report the results in Panel C of Table 10. We find that the negative influence of firm-level CCE on acquisition likelihood is more pronounced for less profitable firms.

Additionally, we explore whether the impact of CCE varies based on deal types, i.e., cross-border and domestic deals. We speculate that CCE may impact domestic M&A more significantly compared to cross-border deals due to concentrated exposure to local physical and regulatory climate risks. Domestic M&A deals often involve firms with overlapping operations and infrastructure, making them more susceptible to localized climate hazards and subject to the same environmental regulations. Additionally, domestic acquirers may face higher valuation pressure when acquiring targets with large carbon footprints, as investors react more negatively to restructuring events involving high-emission firms (Adamolekun and Kyiu, 2025). Cross-border acquirers tend to avoid high-risk jurisdictions to mitigate perceived climate and geopolitical risks (Li, Liu, and Xu, 2023). Overall, while cross-border deals can involve informational and regulatory complexity, domestic M&A is often more directly exposed to concentrated and actionable climate-related financial risk. We examine cross-border and domestic deals separately and find that CCE affects both cross-border and domestic M&A likelihood, deal number, and deal value negatively.[32] However, the impact is stronger for domestic deals, which is in line with our conjecture.

4.4. *Mitigating climate change exposure: the role of environmental performance*

In this subsection, we examine how firms' acquisition strategies vary in response to increased CCE based on firms' environmental performance.

Firms that proactively engage in sustainable practices have different risk profiles and strategic priorities compared to their counterparts (Bolton and Kacperczyk, 2023). These firms have lower risk and are better prepared to tackle emerging regulatory trends and consumer preferences (Friede et al., 2015), and can pursue acquisitions more aggressively compared to their peers with poorer environmental records (Chava, 2014). Thus, we conjecture that the negative impact of CCE on acquisition likelihood will be less pronounced for firms with better environmental performance.

We compute the net positive environmental performance—environmental strengths minus environmental weaknesses—from the environmental data of the MSCI ESG KLD database, reflecting a firm's overall commitment to sustainability through actions that mitigate environmental risks while capitalizing on eco-friendly opportunities. MSCI KLD data primarily covers firms in North America (U.S. and Canada). Given this regional focus, we restrict the sample in these columns to North American acquirers. A higher score indicates that a firm is actively engaging in environmentally responsible initiatives that enhance its resilience to climate-related challenges. We then interact this measure with CCE and re-estimate our baseline regression and report the results in Table 11. We first find that environmental performance is positively related to M&A likelihood (Column 1). In Column (2), we find that the interaction term is positive and significant at the 5% level, implying that firms with better environmental performance are less adversely affected by CCE. To address potential geographic bias, in Columns (3) to (6), we use the Refinitiv environmental pillar score, which provides firm-level environmental performance data across 34 countries from 2006 to 2023. We still find that the interaction term is positive and significant at the 5% level in Columns (5) and (6), underscoring the strategic benefits of proactive environmental management.

To further deepen our understanding of how firms respond to climate-related risks in their acquisition strategies, we examine whether CCE influences the type of acquisitions firms undertake. Specifically, we investigate the likelihood of engaging in deals for diversification or non-diversification (horizontal) reasons. Firms may prefer acquisitions for diversification to hedge industry-specific climate risks, reallocate capital toward less exposed or greener sectors, or restructure corporate portfolios to enhance long-term resilience. In contrast, horizontal deals imply continued concentration within the firm's existing industry risk structure. The analysis of this M&A motivation allows us to identify whether climate risk alters not only the intensive margin (whether firms acquire) but also the extensive margin of acquisition scope. We define diversified acquisitions as deals where the acquirer and target operate in different two-digit SIC industries. Table A11 presents the results from regressions. The dependent variable is an indicator equal to one

[32] We report the results in Table A10 in the Appendix.

Table 11
Additional analysis: Environmental performance. This table presents regression results examining whether environmental performance moderates the relationship between CCE and the likelihood of engaging in acquisitions. The dependent variable is a binary indicator equal to one if the firm initiates an acquisition in a given year, and zero otherwise. In Columns (1) and (2), environmental performance is measured using MSCI KLD data, which primarily covers firms in North America (U.S. and Canada). Given this regional focus, we restrict the sample in these columns to North American acquirers. To address potential geographic bias, Columns (3) to (6) use the Refinitiv environmental pillar score, which provides firm-level environmental performance data across 34 countries from 2006 to 2023. The interaction term between CCE and environmental performance is included to assess the moderating role of ESG efforts in mitigating the negative impact of CCE on acquisition likelihood. All specifications control for firm characteristics. All variables' definitions are provided in the Appendix Table A1. Heteroscedasticity−robust standard errors are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: *Acquisition likelihood*					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
ENV PERF	0.028*	0.011	0.023***	0.023***	0.018***	0.018***
	(1.68)	(0.37)	(4.01)	(4.06)	(2.83)	(2.88)
CCE		−0.141			−0.056***	−0.055***
		(−1.23)			(−3.10)	(−3.05)
CCE × ENV PERF		0.183**			0.034**	0.034**
		(2.11)			(2.09)	(2.06)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	No	No	No
Country FE	Yes	Yes	No	Yes	No	Yes
Firm FE	No	No	Yes	Yes	Yes	Yes
N	14,666	14,666	41,396	41,396	41,396	41,396
Pseudo R^2	0.118	0.100	0.335	0.335	0.335	0.336

if the firm undertakes a diversifying acquisition, conditional on engaging in a deal. We find that CCE is positively and significantly associated with the probability of making a diversifying deal, indicating that higher climate exposure increases the likelihood of firms shifting toward non-core industry acquisitions. These findings are consistent with theories of adaptive diversification and the investment hedging hypothesis.

We also explore firms' acquisition strategy across cross-country heterogeneity by comparing firms headquartered in Anglo-Saxon countries to those in other countries. Table A12 in the Appendix shows that the positive effect of CCE on diversifying deal likelihood is concentrated among non-Anglo-Saxon countries, while it is statistically insignificant among Anglo-Saxon firms. This heterogeneity may reflect that firms in civil law or bank-based systems use M&A as a tool for climate adaptation. Taken together, these results indicate that institutional context shapes not only whether firms acquire but also how they adapt their deal scope in response to climate risk.

4.5. M&A outcomes

In this section, we investigate the implications of CCE on the M&A processes and performance.

4.5.1. Deal completion and duration

We first focus on deal completion and deal duration. Prior studies show that deal completion rates and duration are important M&A processes because any failures and delays can lead to substantial economic losses (Boone and Mulherin, 2007; Haleblian et al., 2009). Thus, we explore these factors in the presence of climate change.

We define deal completion[33] as the probability that an announced deal has been successfully completed, and deal duration[34] as the time to complete the M&A deal. To assess the potential effects of CCE on these metrics, we adopt the Probit model for evaluating deal completion and the Tobit model for measuring deal duration.[35] To account for potential confounding factors, we integrate controls for both firm-specific and deal-specific attributes that could influence the acquisition process.[36]

[33] The deal completion is an indicator variable that takes a value of one if the announced deal is completed, otherwise zero (withdrawn or pending or unknown).

[34] Following Nguyen and Phan (2017), we measure deal duration by taking the natural logarithm of the sum of one day plus the number of days elapsed between the announcement date and the deal's effective date.

[35] We use the Tobit model to estimate the effect of CCE on deal duration because the time to complete a deal is more than zero.

[36] Firm-level controls include firm size, leverage ratio, market to book, cash to assets, sales growth, R&D, tangibility, and operating margin (Harford, 1999; Moeller et al., 2004). Deal-level characteristics are value of the acquisition, target public status, diversification, including stock payment dummy, all cash payment dummy, friendly deal attitude, cross-border dummy, and relative size (Fuller et al., 2002; Golubov, Petmezas, and Travlos, 2012). Definitions of variables are provided in the Appendix.

Table 12

M&A process and outcomes. This table provides Logit and Tobit model results for deal completion and duration of deal completion, and results of the effect of firm-level CCE on the acquirer's short-term and operating performance for 2002−2024. In Panel A, we show the CCE and deal completion and the CCE and time to complete results. In Panel A Column (1), the dependent variable, Deal completion, equals one if the acquisition is completed. If the acquisition is ongoing or withdrawn, it takes the value of zero. In Panel A Column (2), we show the impact of CCE on time to complete a deal. The dependent variable, time to complete, is the natural logarithm of one plus the number of days between the announcement date and the effective date. In Panel B, the dependent variable is a five-day (−2, +2) cumulative abnormal return for acquirers, where day 0 is the deal announcement date, using the market model with parameters estimated over the period starting 241 days and ending 41 days preceding the announcement date. The market return is the index computed using all stocks listed in each acquirer's country on Compustat. Panel B Column (1) exhibit results with deal and firm-specific control variables. In Panel B Column (2), we add macroeconomic and governance-related control variables. In Panel C, we present the effects of firm-level CCE on the acquirer's long-run operating performance, specifically, changes in return on assets (ROA). The change in ROA is defined as the bidder's ROA in year $t+1$, $t+2$, and $t+3$ minus its ROA in year $t-1$, where t is the year of the deal announcement. We add the last fiscal year's ROA before the deal announcement to control variables, and all other controls in Panel B (with additional control of acquirer countries' GDP, GDP per capita, and WGI six factors). For the sake of brevity, we only report the variables of interest in Panel C. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Deal completion and time to complete		
	Deal Completion	*Time to complete*
Variables	(1)	(2)
CCE	−0.171**	0.248**
	(−2.05)	(2.31)
Deal value (log)	0.129***	0.758***
	(12.28)	(43.31)
Public target	−0.223***	0.860***
	(−5.72)	(20.93)
Diversify	0.067**	−0.211***
	(2.25)	(−5.26)
Incl. stock	0.042	0.315***
	(0.97)	(5.57)
All cash	0.085***	0.291***
	(2.70)	(6.78)
Friendly	0.994***	0.348***
	(16.40)	(4.03)
Cross-border	−0.100***	−0.004
	(−3.12)	(−0.08)
Size	−0.084***	−0.100***
	(−7.70)	(−5.69)
Relative size	−0.460***	−0.071
	(−8.54)	(−0.95)
Leverage	−0.244***	0.005
	(−2.79)	(0.04)
Tobin's Q	−0.001**	0.001
	(−2.18)	(0.82)
Cash to assets	−0.123	0.269*
	(−1.10)	(1.81)
Sales growth	−0.011	0.029
	(−0.24)	(0.43)
R&D	−0.093	1.324***
	(−0.34)	(3.51)
Tangibility	−0.025	0.239***
	(−0.63)	(4.09)
Operating margin	0.002	−0.006***
	(0.61)	(−3.13)
Sigma	−0.001	−0.001
	(−0.20)	(−0.11)
Constant	0.477	1.300
Industry FE	Yes	Yes
Year FE	Yes	Yes
Country FE	Yes	Yes
N	18,100	16,918
Pseudo R^2	0.115	0.113
Panel B: Acquirer CARs (−2, +2)		
	Dependent variable: 5-*day acquirer CARs*	
Variables	(1)	(2)
CCE	−0.020***	−0.016***
	(−3.37)	(−2.87)
Deal value (log)	0.003***	0.003***
	(3.89)	(3.84)
Public target	−0.016***	−0.016***

(*continued on next page*)

Table 12 (*continued*)

Panel A: Deal completion and time to complete		
	Deal Completion	*Time to complete*
Variables	(1)	(2)
	(−4.74)	(−4.71)
Diversify	0.001	0.001
	(0.50)	(0.43)
Incl. stock	−0.000	0.000
	(−0.08)	(0.04)
All cash	0.004*	0.005**
	(1.72)	(2.04)
Friendly	0.005	0.006
	(0.73)	(0.81)
Cross-border	−0.000	−0.000
	(−0.10)	(−0.04)
Runup	−0.003	−0.003
	(−1.17)	(−1.13)
Sigma	−0.000***	−0.000***
	(−3.29)	(−3.31)
Size	−0.007***	−0.007***
	(−8.25)	(−7.87)
Relative size	0.000	0.000
	(0.62)	(0.63)
Leverage	0.000	0.001
	(0.07)	(0.12)
Tobin's Q	−0.000	−0.000
	(−1.02)	(−1.18)
Cash to assets	0.004	0.003
	(0.50)	(0.45)
Sales growth	0.000	0.000
	(0.11)	(0.10)
R&D	−0.076***	−0.071***
	(−2.81)	(−2.62)
Tangibility	0.001	0.002
	(0.32)	(0.33)
Operating margin	−0.004	−0.006
	(−0.48)	(−0.70)
GDP		−0.005
		(−0.29)
GDP per capita		−0.027
		(−1.24)
WGI Governance Controls	No	Yes
Constant	0.031	0.436
Industry FE	Yes	Yes
Year FE	Yes	Yes
Country FE	Yes	Yes
N	16,665	16,522
Adj. R^2	0.037	0.038

Panel C: Operating performance			
	Dependent variable: *change in ROA*		
Variables	(1) 1-year	(2) 2-year	(3) 3-year
CCE	−0.012***	−0.014***	−0.014***
	(−3.43)	(−3.75)	(−3.49)
Deal and Firm-specific Controls	Yes	Yes	Yes
Macroeconomic Controls	Yes	Yes	Yes
WGI Governance Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	15,457	14,539	13,244
Adj. R^2	0.226	0.264	0.277

We present the results in Panel A of Table 12. We find a negative impact of CCE on the likelihood of deal completion, and a positive effect on deal duration. The results suggest that higher CCE introduces considerable uncertainty into the M&A process.

4.5.2. Short-run and long-run performance

This analysis directly indicates how the market perceives the potential success of a deal. Market participants adjust stock prices based on their evaluations of any anticipated gains or losses of a deal, making post-announcement abnormal returns a crucial measure of the market's immediate reaction to a deal (Asquith, Bruner, and Mullins, 1983). Thus, we measure the short-term performance of deals by measuring the acquirer's announcement period abnormal stock returns.

In line with extant literature (e.g., Golubov et al., 2015), our main dependent variable is the five-day cumulative abnormal returns of the acquirers during the deal announcement, CAR (−2, +2), where day 0 is the deal announcement date. We employ the market model to measure CAR, using parameters estimated from trading data spanning 241 days to 41 days before the announcement. We control for different firm-specific and deal-related characteristics known to influence acquirer short-term returns (e.g., Harford, 1999).[37] We further control macroeconomic and governance variables. We present the results in Panel B of Table 12. Column (1) contains firm- and deal-level controls, and Column (2) further controls for macroeconomic and governance factors. We find a significant negative relationship between CCE and acquirer CARs across all model specifications. The effects of other control variables on acquirer CARs are consistent with prior literature.

We then investigate the relationship between CCE and the long-term operating performance of acquirers. We employ the change in return on assets (ROA) as a measure of operational performance.[38] The ROA is the acquirer's operating income before depreciation divided by total assets. The dependent variable is the change in ROA, calculated as the post-deal (1-, 2-, or 3 years after the deal announcement year) ROA minus the last available ROA before the deal announcement. Panel C of Table 12 reports the results. This model incorporates the same set of controls as detailed in Panel A's second specification, and includes an additional variable to reflect operational performance before the deal announcement.[39] The coefficient estimates of CCE are significantly negative, at least at the 1% level, in all specifications. The CCE negatively affects the change in ROA by 1.2%, 1.4%, and 1.4% over the 1-, 2-, and 3-year post-deal announcement period. These results underscore the tangible impact that CCE has on the sustained operational success of acquiring firms.

5. Conclusion

Our study highlights the significance of climate change in shaping firms' acquisition strategies. Employing Sautner et al.'s (2023) CCE measure, our analysis offers global evidence that a negative association exists between CCE and firms' acquisition decisions. Also, climate change squeezes the number of M&A deals and their aggregate deal value. The decreased propensity for acquisitions due to an increase in CCE intensifies with the cost of financing challenges and lower cash holdings. Our analysis indicates that when exposed to higher levels of climate change risks, firms demonstrate a preference for CAPEX over M&A and proactively engage in sustainable practices to mitigate the adverse impact of CCE on M&A. Our findings further highlight that higher CCE leads to a lower probability of deal completion, extends deal duration, weakens short-term stock performances, and deteriorates long-term operational results post-acquisition.

Our findings inform corporate managers, investors, and regulators alike. Corporate managers need to consider climate change in strategic decision-making and M&A due diligence. Investors factor in climate change while valuing acquirers and acquiring firms' stocks. Policymakers can also leverage these insights to formulate regulations that encourage sustainable and climate-resilient M&A practices, harmonizing corporate strategies with overarching sustainability and climate objectives around the world.

CRediT authorship contribution statement

Yongyi Xue: Writing – original draft, Visualization, Validation, Software, Methodology, Formal analysis, Data curation, Conceptualization. **Shehub Bin Hasan:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Conceptualization. **Muhammad Kabir:** Writing – review & editing, Visualization, Validation, Supervision, Methodology.

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[37] Control variables include deal value, public target, diversify, stock payment, all cash payment, friendly, cross-border, runup, sigma, firm size, relative size, leverage, market-to-book, cash-to-assets, sales growth, R&D, tangibility, and operating margin.

[38] We also examine the change in earnings before interests and taxes. The change in EBIT generate similar results.

[39] We control the *ROA prior*, the return on assets in one year prior to the deal announcement, in the regressions of change in ROA. For brevity, we report only the coefficients of CCE.

Appendix

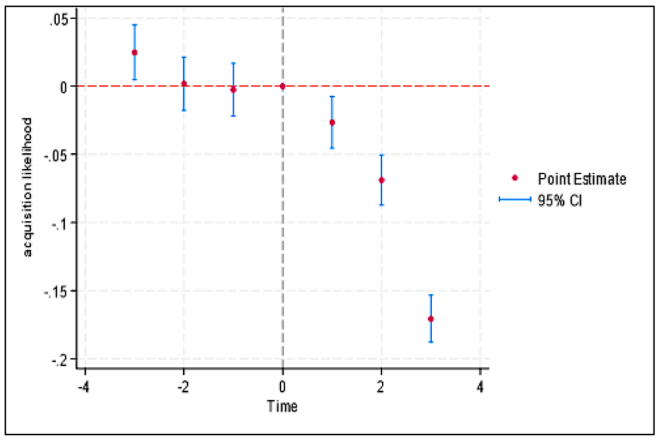

Fig. A1. Parallel trends of DID test

This figure shows the parallel trend of difference-in-difference regressions of the impact of firm-level CCE on the likelihood of M&As, using the 2015 Paris Agreement as an exogenous shock. The dependent variable is the acquisition likelihood at year *t+1*. We classify firms in the top quartile of pre-2016 CCE as the treatment group and those in the bottom quartile as the control group. The sample covers a symmetric window of three years before and three years after the Agreement (2012-2018), excluding the event year (2015) to avoid contamination from anticipatory effects. *Post-Paris* is a binary variable taking the value of one after the 2015 Paris Agreement and otherwise zero. In the line graph, we control the same firm accounting variables as in our baseline. Bands corresponding to 95% confidence intervals based on standard errors clustered by both firm and year are included.

Table A1
Definitions of variables. The table presents definitions of different variables employed in our empirical analyses.

Variable	Description
CCE	Firm-level CCE constructed on the transcripts of earnings conference calls by Saunter et al. (2023) multiplied by one hundred.
3-year CCE	(Firm level CCÉ100)
5-year CCE	The average of the prior three years of firm-level CCE.
7-year CCE	The average of the prior five years of firm-level CCE.
Carbon intensity-scope	The average of the prior seven years of firm-level CCE.
1,2,3	The company's reported Scope 1, Scope 2, and Scope 3 emissions divided by revenue in year t.
Carbon intensity-scope 1,2	The company's reported Scope 1, and Scope 2 emissions divided by revenue in year t.
Acquisition likelihood	The binary variable takes the value of 1, where the firm makes at least one acquisition bid in year *t+1*.
Complete	The binary variable takes the value of 1 if the deal status is completed, otherwise, it is zero.
Time to complete	Natural logarithm of one plus the number of days between the announcement and effective dates.
Number of deals	The sum of number of deals firm *i* engaged in year *t*.
Aggregate deal value	Natural logarithm of sum of deal value of firm *i* engaged in year *t*.
CAR (-2, +2)	Acquirers' cumulative abnormal return (CAR) in the 5-day event window (-2, +2), where 0 is the announcement day. The returns
ROA change (-1, +t)	are computed using the market model with the market model parameters estimated over the period starting 241 days and ending
EBIT change (-1, +t)	41 days prior to the announcement. The market index is constructed by including all stocks listed in each acquirer's country where
Cost of debt	the data is available on Compustat.
Cost of equity	Acquirer's operating income before depreciation divided by total assets 1-, 2-, and 3-years after the deal announcement, minus the
Cash holdings	value in the year prior to the deal announcement.
Dividend payout	Acquirer's earnings before interest and tax divided by total assets 1-, 2-, and 3-years after the deal announcement, minus the value
Industry cycle	in the year prior to the deal announcement.
Financial constraints	Total amount of interest and related expense scaled by total debt.
Polluters	The cost of equity for firm at year is estimated as the following formulawhere is the dividend payout ratio, is the constant growth
Environmental	rate, is the earnings to price ratio.
performance	The ratio of cash to total assets.
Market capitalization	Dividend paid divided by net income.
Book to market value	The binary variable takes the value of 1 where the firm's industry is procyclical, otherwise zero (zero for countercyclical
Firm size (log)	industries).

(*continued on next page*)

Table A1 (*continued*)

Variable	Description
Book leverage	Firm financial constraints index, defined by Whited and Wu (2006). See Whited and Wu (2006) Equation (13) for details.
Tobin's Q	Dummy variable, equals one if the firm's GICS industry classification belongs to (1) Oil, Gas & Consumable Fuels; (2) Electric
Cash to assets	Utilities; (3) Gas Utilities; (4) Independent Power Producers & Energy Traders; (5) Multi-Utilities; (6) Chemicals; (7) Construction
Sales growth	Materials; (8) Metals & Mining; and (9) Paper & Forest Products (CDP 2012) in year t, otherwise they are non-polluters.
R&D	Data from MSCI KLD STATS.
CAPEX	Year-end total market value of a company's outstanding shares of stock.
Tangibility	Book value of assets divided by the sum of the year-end market capitalization and the difference between book value of assets and
Operating margin	book value of common equity.
	Natural logarithm of total assets.
	Long-term debt and current liabilities divided by the book value of total assets.
	Market value of total assets over book value of total assets.
	Cash and short-term investments divided by total assets.
	Sales minus prior year sales, divided by prior year sales.
	Research and development expenses divided by total assets.
	Capital expenditures divided by total assets.
	Total property, plant, and equipment divided by total assets.
	Operating income before depreciation scaled by sales.
Deal value (log)	Natural logarithm of value of the transaction from SDC.
Public target	Binary variable where 1 signifies that target is listed.
Diversify	Binary variable where 1 signifies that the first 2 digits of SICs of the acquirer and the target are different.
Including stock payment	The binary variable takes the value of 1 where the payment of acquisitions includes the percentage of stock payment.
All cash payment	The binary variable takes the value of 1 where the payment of acquisitions is 100% cash.
Friendly	Binary variable where 1 signifies that the deal attitude is friendly.
Cross-border	Binary variable where 1 denotes that the deal is a cross-border deal, the countries of the acquirer and the target are different.
Size (log)	Natural logarithm of acquirer market value one month prior to the announcement.
Relative Size	The ratio of deal value to acquirer market value one month prior to the deal announcement.
Runup	Market-adjusted buy-and-hold return of the acquirer's stock over
Sigma	the period beginning 205 days and ending 6 days prior to the announcement date.
ROA prior	The standard deviation of the acquirer's market-adjusted daily returns over the period beginning 205 and ending 6 days before the deal announcement.
	The ratio of operating income before depreciation to the book value of total assets the year prior to the deal announcement.
EBIT prior	Acquirer's earnings before interest and tax divided by total assets the year prior to the deal announcement.
Acquirer GDP	The GDP in current dollars of the country of the acquirer.
Acquirer GDP per capita	The GDP per capita in current dollars of the country of acquirer.
Acquirer EPU	The average of 12 months of economic policy uncertainty in the acquirer's country.
Acquirer unemployment	The unemployment rate is measured as the unemployment of the total labor force of the country of the acquirer.
rate	The GDP in current dollars of the country of target.
Target GDP	The GDP per capita in current dollars of the country of target.
Acquirer GDP per capita	The average of the measurements of control of corruption by each year and country of acquirer from Worldwide Governance
WGI Corruption	Indicators.
WGI Government	The average of the measurements of government effectiveness by each year and country of acquirer from Worldwide Governance
effectiveness	Indicators.
WGI Political stability	The average of the measurements of political stability and absence of violence or terrorism by each year and country of acquirer
WGI Rule of law	from Worldwide Governance Indicators.
WGI Regulatory quality	The average of the measurements of the rule of Law by each year and country of acquirer from Worldwide Governance Indicators.
WGI Voice and	The average of the measurements of regulatory quality by each year and country of acquirer from Worldwide Governance
accountability	Indicators.
	The average of the measurements of voice and accountability by each year and country of acquirer from Worldwide Governance Indicators.

Table A2

Summary statistics of the deal performance sample. This table shows the descriptive statistics and correlation matrix of the deal performance sample of listed firms in 34 countries with available data from the SDC M&A database during 2002−2024. We include all deals where the acquirer owns less than 10% shares of the target prior to the deal announcement and owns more than 50% of the target after the deal completion. We exclude the minority stake purchases, recapitalizations, acquisitions of remaining interests, self-tender offers, spin-offs, privatizations, reverse leverage buyouts, exchange offers, and repurchases. Panel A exhibits the number of observations (N), mean, standard deviation, 25th percentile, median, and 75th percentile. Panel B and C provides the correlation matrices with deal-level, and additional control variables. Definitions of all variables are provided in the Appendix Table A1.

Panel A: Deal Performance Sample

	N	Mean	Std. Dev	25th Pct	Median	75th Pct
CCE	18,100	0.091	0.201	0.012	0.032	0.081
Complete	18,100	0.884	0.321	1.000	1.000	1.000
Time to complete(log)	16,559	2.850	2.057	0.000	3.611	4.443
5-day CAR	17,090	0.005	0.126	-0.027	0.004	0.038
1-year change in ROA	16,891	-0.010	0.098	-0.032	-0.005	0.017
2-year change in ROA	15,879	-0.012	0.106	-0.038	-0.007	0.019
3-year change in ROA	14,399	-0.040	3.024	-0.043	-0.009	0.020
Deal value	18,100	4.644	1.983	3.219	4.572	5.991
Public target	18,100	0.164	0.370	0.000	0.000	0.000
Diversify	18,100	0.425	0.494	0.000	0.000	1.000
Incl. stock payment	18,100	0.160	0.367	0.000	0.000	0.000
All cash payment	18,100	0.373	0.484	0.000	0.000	1.000
Friendly	18,100	0.968	0.176	1.000	1.000	1.000
Cross-border	18,100	0.348	0.476	0.000	0.000	1.000
Run up	16,364	-0.014	1.439	-0.235	-0.019	0.190
Sigma	18,100	2.825	136.700	0.016	0.022	0.036
Firm size	18,100	8.012	1.898	6.678	7.977	9.324
Relative size	18,100	0.418	14.350	0.010	0.038	0.129
Book leverage	18,100	0.244	0.199	0.084	0.224	0.357
Tobin's Q	18,100	2.493	18.230	1.187	1.596	2.323
Cash to assets	18,100	0.163	0.168	0.042	0.102	0.225
Sales growth	18,100	0.163	0.326	0.009	0.097	0.226
R&D	18,100	0.031	0.051	0.000	0.003	0.044
Tangibility	18,100	0.439	0.374	0.148	0.311	0.665
Operating margin	18,100	0.186	0.188	0.097	0.171	0.274
ROA prior deal	18,100	0.119	0.117	0.079	0.121	0.166

(*continued on next page*)

Table A2 (*continued*)

Panel B: Correlation matrix of the deal performance sample

	Complete	Time to complete	CAR (-2, +2)	1-year ΔROA	2-year ΔROA	3-year ΔROA	CCE	Deal value	Public target	Diversify	Incl. stock payment	All cash payment	Friendly	Cross-border	Run up	Sigma	Firm size	Relative size	Book leverage	Tobin's Q	Cash to assets	Sales growth	R&D	Tangibility	Operating margin
Complete	1.000																								
Time to complete	-0.154	1.000																							
CAR(-2,+2)	0.014	-0.003	1.000																						
1-year ΔROA	0.005	-0.004	0.014	1.000																					
2-year ΔROA	-0.005	-0.005	0.022	0.514	1.000																				
3-year ΔROA	-0.002	-0.003	-0.009	0.038	0.030	1.000																			
CCE	-0.036	0.032	-0.015	0.001	0.002	0.000	1.000																		
Deal value	-0.006	0.558	-0.014	-0.021	-0.024	0.013	0.043	1.000																	
Public target	-0.057	0.366	-0.045	-0.014	-0.019	0.003	-0.007	0.385	1.000																
Diversify	0.020	-0.084	0.006	0.010	-0.009	0.007	0.048	-0.045	-0.052	1.000															
Incl. stock payment	-0.010	0.169	0.002	-0.001	0.006	0.003	0.015	0.174	0.242	-0.086	1.000														
All cash payment	0.040	0.080	0.002	-0.006	-0.003	0.006	-0.037	0.087	0.129	0.012	-0.336	1.000													
Friendly	0.173	-0.103	0.012	0.011	0.011	-0.002	-0.008	-0.168	-0.195	0.024	-0.039	-0.025	1.000												
Cross-border	-0.034	0.017	-0.019	-0.004	-0.001	0.006	0.003	0.007	-0.011	0.006	-0.128	-0.003	-0.026	1.000											
Run up	-0.001	0.002	-0.033	0.018	0.018	0.006	0.006	0.009	0.006	-0.001	0.010	0.005	-0.019	-0.025	1.000										
Sigma	-0.001	-0.007	-0.039	-0.001	-0.002	0.000	0.022	0.000	0.000	-0.002	-0.003	-0.006	0.000	0.012	0.034	1.000									
Firm size	-0.042	0.263	-0.073	0.004	-0.015	0.020	0.026	0.522	0.169	0.059	-0.148	0.120	-0.071	0.175	0.008	0.020	1.000								
Relative size	-0.001	0.012	0.014	0.003	0.001	0.000	-0.001	0.010	0.000	0.005	0.010	0.003	-0.002	-0.005	-0.011	0.000	-0.049	1.000							
Book leverage	-0.041	0.068	0.013	0.053	0.017	-0.003	0.041	0.144	-0.009	0.024	-0.041	-0.041	-0.032	-0.067	0.002	-0.001	0.081	0.013	1.000						
Tobin's Q	-0.026	0.007	-0.009	0.001	0.000	0.000	-0.007	-0.003	-0.011	-0.014	0.005	0.005	0.005	-0.009	-0.036	0.000	0.041	-0.001	-0.010	1.000					
Cash to assets	0.023	-0.067	-0.002	-0.007	0.001	0.007	-0.080	-0.150	0.001	-0.053	0.111	0.030	0.025	-0.007	0.004	-0.007	-0.161	-0.005	-0.397	0.027	1.000				
Sales growth	-0.004	-0.030	-0.002	-0.074	-0.060	-0.019	-0.013	-0.039	-0.016	-0.015	0.091	-0.041	0.003	-0.076	0.003	-0.003	-0.098	-0.006	-0.008	0.013	0.071	1.000			
R&D	0.042	-0.048	-0.019	0.024	0.035	0.007	-0.090	-0.097	0.039	-0.064	0.089	0.033	0.033	0.041	0.016	-0.007	-0.074	-0.006	-0.297	0.010	0.529	0.013	1.000		
Tangibility	-0.063	0.133	-0.010	-0.015	-0.012	-0.013	0.148	0.111	0.044	-0.079	0.014	-0.060	-0.027	-0.037	0.013	0.014	0.080	-0.002	0.233	-0.009	-0.324	-0.089	-0.246	1.000	
Operating margin	-0.034	0.088	-0.027	-0.261	-0.239	0.006	-0.014	0.215	0.044	-0.062	-0.116	0.052	-0.038	0.017	-0.009	0.006	0.334	-0.004	0.192	0.013	-0.228	0.053	-0.241	0.183	1.000

Panel C: Correlation matrix of additional control variables

	Deal dummy	CCE	ESG uncertainty	GDP per capita	GDP	EPU	Unemployment rate	WGI CC	WGI GE	WGI PV	WGI RL	WGI RQ	WGIC VA	Political risk	Geopolitical risk	Independent board	Board size	CEO as board	CEO compensation	Institutional ownership
Deal dummy	1.000																			
CCE	-0.001	1.000																		
ESG uncertainty	-0.035	-0.013	1.000																	
GDP per capita	0.150	-0.027	0.076	1.000																
GDP	0.147	-0.033	-0.132	0.278	1.000															
EPU	0.120	0.074	0.267	0.110	-0.103	1.000														
Unemployment rate	-0.046	0.010	-0.108	-0.164	-0.151	0.005	1.000													
WGI CC	-0.016	-0.056	0.247	0.705	-0.024	-0.004	-0.137	1.000												
WGI GE	-0.004	-0.068	0.137	0.749	0.171	-0.073	-0.153	0.920	1.000											
WGI PV	-0.100	-0.007	0.008	0.473	-0.252	-0.022	-0.004	0.666	0.604	1.000										
WGI RL	0.021	-0.059	0.112	0.789	0.207	-0.028	-0.082	0.918	0.939	0.647	1.000									
WGI RQ	0.031	-0.056	0.196	0.806	0.124	0.000	-0.188	0.910	0.903	0.573	0.932	1.000								
WGIC VA	-0.013	-0.060	0.190	0.602	-0.032	-0.130	0.071	0.813	0.714	0.562	0.817	0.797	1.000							
Political risk	-0.012	0.068	0.015	-0.006	-0.023	0.070	0.049	-0.031	-0.039	-0.012	-0.029	-0.029	-0.023	1.000						
Geopolitical risk	0.125	-0.072	0.150	0.380	0.752	-0.219	-0.171	0.163	0.241	-0.150	0.278	0.269	0.142	-0.022	1.000					
Independent board	0.188	-0.059	-0.052	0.268	0.340	-0.143	-0.024	0.103	0.188	0.017	0.220	0.199	0.095	-0.011	0.467	1.000				
Board size	0.051	-0.055	0.034	0.141	0.105	0.056	-0.070	0.108	0.118	0.057	0.129	0.140	0.062	-0.012	0.094	0.043	1.000			
CEO as board	0.077	0.032	-0.014	-0.037	-0.102	0.201	-0.006	-0.147	-0.142	-0.015	-0.104	-0.087	-0.115	0.017	-0.224	0.432	0.005	1.000		
CEO compensation	0.121	0.053	0.017	0.138	-0.063	0.235	-0.040	0.035	0.007	0.052	0.063	0.096	0.038	0.017	-0.113	0.437	0.050	0.620	1.000	
Institutional ownership	0.156	-0.087	-0.010	0.320	0.497	-0.074	-0.061	0.120	0.228	-0.044	0.265	0.218	0.128	-0.037	0.500	0.496	0.037	0.049	0.107	1.000

Table A3

Distribution of firms across countries. This table presents the distribution of firms across 34 countries over our sample period from 2001 to 2023. We also present the mean and standard deviation of CCE across different countries over the sample period.

Country	Frequency	Percentage	# Firms	Percentage	Average CCE	Std. Dev. of CCE
Austria	246	0.28	26	0.26	0.315	0.443
Australia	1,923	2.20	346	3.44	0.134	0.267
Belgium	341	0.39	42	0.42	0.158	0.292
Bermuda Island	616	0.71	68	0.68	0.088	0.163
Brazil	1,249	1.43	150	1.49	0.204	0.346
Canada	1,732	1.98	264	2.62	0.136	0.297
Switzerland	1,110	1.27	107	1.06	0.114	0.205
Chile	227	0.26	25	0.25	0.335	0.477
China	1,824	2.09	326	3.24	0.222	0.606
Germany	1,677	1.92	203	2.02	0.167	0.316
Denmark	553	0.63	55	0.55	0.121	0.282
Spain	576	0.66	62	0.62	0.351	0.501
Finland	592	0.68	67	0.67	0.172	0.266
France	1,527	1.75	146	1.45	0.174	0.31
Greece	257	0.29	33	0.33	0.085	0.127

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Table A3 (*continued*)

Country	Frequency	Percentage	# Firms	Percentage	Average CCE	Std. Dev. of CCE
Hong Kong	602	0.69	89	0.88	0.196	0.462
Ireland	753	0.86	66	0.66	0.081	0.169
Israel	869	1.00	115	1.14	0.046	0.091
India	1,870	2.14	327	3.25	0.155	0.276
Italy	641	0.73	74	0.73	0.221	0.325
Japan	1,876	2.15	230	2.28	0.128	0.271
South Korea	326	0.37	31	0.31	0.206	0.342
Luxembourg	353	0.40	46	0.46	0.093	0.124
Mexico	648	0.74	67	0.67	0.11	0.179
Netherlands	896	1.03	91	0.90	0.105	0.193
Norway	637	0.73	111	1.10	0.228	0.394
New Zealand	315	0.36	52	0.52	0.227	0.373
Russia	373	0.43	44	0.44	0.13	0.203
Sweden	1,285	1.47	200	1.99	0.108	0.184
Singapore	296	0.34	44	0.44	0.214	0.408
Taiwan	401	0.46	43	0.43	0.1	0.249
United Kingdom	3,913	4.48	465	4.62	0.143	0.26
United States	56,235	64.40	5974	59.33	0.107	0.266
South Africa	580	0.66	80	0.79	0.137	0.185
Total	87,319	100.00	10,069	100.00		

Table A4

Endogeneity test: Entropy balancing with additional controls. This table presents the results of the entropy balancing approach of the effect of firm-level CCE on acquisition likelihood, number of deals, and firm-level aggregated deal value. First, we split the full sample into two groups: the treatment group are firms with CCE higher than median CCE by each country in each year; others are in the control group. We choose mean, variance, and skewness as the moment properties and the same matching variables in the main regression to re-weight observations in control groups. After weighting the control variables from three-moment properties, these control variables should be identical in the treatment and control groups to achieve the covariate distribution balance. Panel A presents the differences in the means, variance, and skewness of variables in the treatment and control groups before entropy balancing. Panel B represents matched variables after entropy balancing. Panel C shows the results of CCE on acquisition likelihood, number of deals and firm-level aggregated deal value with an entropy-weighted sample. For the acquisition likelihood, we use logit model (the results also hold in the OLS model); for the number of deals and aggregated deal value, we use the OLS regression (the results remain constant if choosing alternative models). All variables' definitions are provided in the Appendix. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Before entropy balancing (without weighting)

	Treatment (N: 43,410)			Control (N:43,909)		
Variables	Mean	Variance	Skewness	Mean	Variance	Skewness
Size	8.956	5.402	0.764	8.442	5.136	0.741
Leverage	0.281	0.039	2.115	0.273	0.055	2.210
Tobin's Q	1.905	2.299	3.402	2.329	3.710	2.617
Cash to assets	0.134	0.021	2.203	0.185	0.036	1.670
Sales growth	0.104	0.095	3.442	0.125	0.121	3.431
R&D	0.024	0.003	4.859	0.039	0.007	3.413
Tangibility	0.590	0.179	0.712	0.408	0.144	1.451
Operating margin	0.085	1.294	−12.540	−0.052	2.601	−8.721
ESG uncertainty	27.940	83.210	0.571	28.200	83.120	0.542
GDP per capita	10.630	0.644	−2.747	10.630	0.657	−2.735
GDP	29.690	1.282	−0.702	29.670	1.340	−0.668
EPU	170.800	7453.000	1.898	170.600	7369.000	1.881
Unemployment rate	6.079	6.417	2.054	6.064	6.519	2.063
WGI CC	1.179	0.379	−1.599	1.179	0.386	−1.567
WGI GE	1.301	0.228	−2.211	1.298	0.233	−2.188
WGI PV	0.329	0.208	−0.776	0.323	0.210	−0.778
WGI RL	1.329	0.321	−2.190	1.329	0.322	−2.168
WGI RQ	1.286	0.284	−1.934	1.294	0.286	−1.928
WGI VA	0.974	0.221	−3.471	0.983	0.197	−3.367
Political risk	132.600	26000.000	4.569	115.200	21291.000	6.108
Geopolitical risk	1.352	0.930	−0.004	1.348	0.939	0.002
Independent board	2.563	1.090	−1.099	2.531	1.104	−1.136
Board size	2.377	1.602	−0.068	2.464	1.653	−0.208
CEO as board	0.882	0.104	−2.367	0.876	0.109	−2.283

(*continued on next page*)

Table A4 (*continued*)

Panel A: Before entropy balancing (without weighting)						
	Treatment (N: 43,410)			Control (N:43,909)		
Variables	Mean	Variance	Skewness	Mean	Variance	Skewness
CEO compensation	0.609	0.238	−0.446	0.562	0.246	−0.252
Institutional ownership	0.574	0.106	−0.172	0.577	0.109	−0.167
Panel B: After entropy balancing (with weighting)						
	Treatment (N: 43,410)			Control (N: 43,909)		
Variables	Mean	Variance	Skewness	Mean	Variance	Skewness
Size	8.956	5.402	0.764	8.955	5.403	0.764
Leverage	0.281	0.039	2.115	0.281	0.039	2.120
Tobin's Q	1.905	2.299	3.402	1.905	2.300	3.401
Cash to assets	0.134	0.021	2.203	0.134	0.021	2.203
Sales growth	0.104	0.095	3.442	0.104	0.095	3.442
R&D	0.024	0.003	4.859	0.024	0.003	4.855
Tangibility	0.590	0.179	0.712	0.590	0.179	0.712
Operating margin	0.085	1.294	−12.540	0.085	1.297	−12.530
ESG uncertainty	27.940	83.210	0.571	27.940	83.210	0.571
GDP per capita	10.630	0.644	−2.747	10.630	0.644	−2.747
GDP	29.690	1.282	−0.702	29.690	1.282	−0.702
EPU	170.800	7453.000	1.898	170.800	7453.000	1.898
Unemployment rate	6.079	6.417	2.054	6.079	6.417	2.054
WGI CC	1.179	0.379	−1.599	1.179	0.379	−1.599
WGI GE	1.301	0.228	−2.211	1.301	0.228	−2.211
WGI PV	0.329	0.208	−0.776	0.329	0.208	−0.776
WGI RL	1.329	0.321	−2.190	1.329	0.321	−2.190
WGI RQ	1.286	0.284	−1.934	1.286	0.284	−1.935
WGI VA	0.974	0.221	−3.471	0.974	0.221	−3.471
Political risk	132.600	26000.000	4.569	132.600	26000.000	4.569
Geopolitical risk	1.352	0.930	−0.004	1.352	0.930	−0.004
Independent board	2.563	1.090	−1.099	2.563	1.090	−1.099
Board size	2.377	1.602	−0.068	2.377	1.602	−0.068
CEO as board	0.882	0.104	−2.367	0.882	0.104	−2.367
CEO compensation	0.609	0.238	−0.446	0.609	0.238	−0.446
Institutional ownership	0.574	0.106	−0.172	0.574	0.106	−0.172
Panel C: Regressions after entropy balancing						
Variables	*(1) Acquisition likelihood (Logit)*	(2) *Number of deals (OLS)*	(3) *Firm-level aggregate deal value (OLS)*			
CCE	−0.147***	−0.071***	−0.197***			
	(−2.72)	(−4.37)	(−4.48)			
Size	0.259***	0.132***	0.204***			
	(22.92)	(26.87)	(17.03)			
Leverage	−0.220***	−0.042	−0.291***			
	(−2.71)	(−1.51)	(−4.10)			
Tobin's Q	0.002***	0.001**	0.001			
	(2.77)	(2.35)	(1.64)			
Cash to assets	0.122	0.064	0.242**			
	(1.04)	(1.46)	(2.25)			
Sales growth	−0.001	−0.000**	−0.000***			
	(−0.75)	(−2.37)	(−2.71)			
R&D	−0.347	0.140	0.246			
	(−1.31)	(1.55)	(1.12)			
Tangibility	−0.451***	−0.195***	−0.133***			
	(−9.82)	(−12.02)	(−3.67)			
Operating margin	0.000	−0.000	0.000			
	(1.19)	(−0.15)	(0.06)			
ESG uncertainty	−0.027***	−0.008***	−0.016***			
	(−8.28)	(−6.98)	(−5.43)			
GDP per capita	11.298***	1.419***	7.417***			
	(8.46)	(2.60)	(5.99)			
GDP	−7.368***	−0.576	−4.123***			
	(−5.95)	(−1.11)	(−3.47)			
EPU	0.001***	−0.000	−0.000			
	(3.71)	(−0.44)	(−0.59)			
Unemployment rate	0.099***	0.021***	0.168***			
	(5.86)	(3.00)	(10.20)			
WGI CC	−1.312***	0.001	0.849***			

(*continued on next page*)

Table A4 (*continued*)

Panel A: Before entropy balancing (without weighting)						
	Treatment (N: 43,410)			Control (N:43,909)		
Variables	Mean	Variance	Skewness	Mean	Variance	Skewness
	(−5.48)	(0.01)	(3.98)			
WGI GE	−0.217	−0.305***	−1.939***			
	(−0.86)	(−3.23)	(−8.83)			
WGI PV	−2.773***	−0.568***	−1.014***			
	(−19.43)	(−10.86)	(−8.40)			
WGI RL	−0.515	0.061	−1.281***			
	(−1.53)	(0.48)	(−4.18)			
WGI RQ	−1.146***	−0.347***	−0.226			
	(−5.37)	(−4.10)	(−1.15)			
WGI VA	−2.224***	−0.572***	−1.420***			
	(−5.92)	(−4.02)	(−4.22)			
Political risk	−0.000	−0.000	−0.000			
	(−1.03)	(−1.50)	(−0.16)			
Geopolitical risk	−0.291***	0.030	−0.372***			
	(−3.69)	(0.92)	(−4.76)			
Independent board	0.094***	−0.005	0.008			
	(4.43)	(−0.58)	(0.42)			
Board size	0.046***	0.011**	0.035***			
	(3.68)	(2.31)	(2.96)			
CEO as board	0.230***	0.057**	0.026			
	(3.74)	(2.54)	(0.51)			
CEO compensation	0.081**	0.012	0.159***			
	(2.29)	(0.74)	(4.36)			
Institutional ownership	0.162*	0.026	0.137*			
	(1.93)	(0.84)	(1.68)			
Constant	1.485***	3.209	8.300**			
Country FE	Yes	Yes	Yes			
Industry FE	Yes	Yes	Yes			
Year FE	Yes	Yes	Yes			
N	34,864	34,864	34,864			
Pseudo R^2		0.193	0.233			
Adj. R^2	0.275					

Table A5

Cross-sectional analysis: country specific estimates. This table presents country-specific estimates of the effect of firm-level CCE on acquisition likelihood. The coefficients are obtained by running separate regressions for each of the 34 countries in the sample, using a consistent baseline specification with firm-level controls and fixed effects where applicable. The dependent variable is acquisition likelihood, a binary variable takes the value of one if firm *i* engaged in at least one acquisition announcement in year *t+1*, otherwise zero. The number of firm-year observations used in each country-specific regression is reported in the final column. All independent variables are from year *t*. In all models, we control the same independent variables. We control year, industry, and country fixed effects. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Country/Region	Coefficients of *CCE*	Number of observations
Austria	2.341*	199
Australia	−0.217	1,679
Belgium	−1.109	305
Bermuda Island	−6.503***	533
Brazil	0.365	1,101
Canada	−0.400	1,210
Switzerland	−0.160	1,024
Chile	0.143	174
China	−0.307	1,782
Germany	−0.013	1,627
Denmark	1.955***	498
Spain	−0.577*	518

(*continued on next page*)

Table A5 (*continued*)

Country/Region	Coefficients of *CCE*	Number of observations
Finland	−0.313	536
France	−0.401	1,409
Greece	1.109	144
Hong Kong	0.701	506
Ireland	−21.580***	82
Israel	1.097	793
India	−0.279	1,566
Italy	0.324	584
Japan	0.049	1,730
Luxembourg	−1.815	273
Mexico	−1.227	547
Netherlands	−0.672	806
Norway	0.346	586
New Zealand	0.882	230
Russia	−0.12	300
Singapore	−0.189	230
South Africa	−0.726	490
South Korea	−0.515	303
Sweden	0.548	1,149
Taiwan	1.411**	356
United Kingdom	0.037	3,596
United States	−0.154***	56,234

Table A6

Robustness checks. This table presents a series of robustness checks for the effect of firm-level CCE on firm-level M&A activity, including acquisition likelihood, number of deals, and aggregate deal value. The dependent variable in Columns (1)–(3) is a binary indicator for acquisition likelihood; Columns (4)–(6) report results for the number of deals; and Columns (7)–(9) examine the firm-level aggregate deal value. Panel A tests the persistence of the effect using alternative definitions of CCE, specifically the 3-year, 5-year, and 7-year lagged moving averages of firm-level CCE. Panel B examines the sensitivity of the results to different fixed effects specifications, replacing the baseline two-digit SIC industry, year, and country fixed effects with alternative combinations. Panel C disaggregates the CCE measure into its three component dimensions—opportunity, regulatory, and physical climate change exposures—and assesses their separate effects on M&A outcomes. All regressions control firm-level accounting variables as in the baseline specification. Heteroskedasticity-robust standard errors are clustered at both the firm and year levels. All variable definitions are provided in the Appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Persistence of firm

	Dependent variable								
	Acquisition likelihood			*Number of deals*			*Aggregate deal value* (log)		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3-year CCE	−0.115***			−0.033***			−0.049***		
	(−7.29)			(−6.72)			(−5.23)		
5-year CCE		−0.070***			−0.019***			−0.041***	
		(−6.25)			(−5.41)			(−5.95)	
7-year CCE			−0.040***			−0.011***			−0.036***
			(−4.21)			(−3.84)			(−5.57)
Size	0.289***	0.285***	0.277***	0.139***	0.140***	0.137***	0.161***	0.169***	0.179***
	(44.70)	(37.47)	(30.68)	(47.91)	(41.28)	(33.85)	(30.35)	(26.60)	(22.91)
Leverage	−0.254***	−0.283***	−0.229***	−0.067***	−0.072***	−0.052**	−0.169***	−0.171***	−0.189***
	(−6.04)	(−5.67)	(−3.79)	(−4.83)	(−4.44)	(−2.54)	(−6.41)	(−5.44)	(−4.79)
Tobin's Q	0.045***	0.046***	0.051***	0.022***	0.021***	0.022***	0.039***	0.039***	0.037***
	(6.52)	(5.35)	(4.86)	(8.90)	(7.12)	(6.28)	(8.98)	(7.28)	(5.71)
Cash to assets	−0.332***	−0.417***	−0.442***	−0.186***	−0.175***	−0.178***	−0.168***	−0.158**	−0.129
Sales growth	0.126***	0.118***	0.109**	0.051***	0.057***	0.070***	0.183***	0.190***	0.200***
	(4.23)	(3.16)	(2.31)	(4.49)	(3.81)	(3.60)	(7.52)	(5.98)	(4.74)
R&D	−0.782***	−0.652***	−0.847***	−0.065	−0.013	−0.080	−0.339***	−0.280**	−0.424***
	(−5.03)	(−3.50)	(−3.61)	(−1.25)	(−0.20)	(−0.97)	(−3.65)	(−2.37)	(−2.79)
Tangibility	−0.406***	−0.417***	−0.440***	−0.189***	−0.192***	−0.203***	−0.164***	−0.165***	−0.182***
	(−12.12)	(−10.70)	(−9.61)	(−16.03)	(−14.28)	(−12.87)	(−7.28)	(−6.30)	(−5.73)
Operating margin	−0.010	−0.011	0.004	−0.011***	−0.011***	−0.008**	0.008**	0.007	0.012**
	(−1.55)	(−1.32)	(0.35)	(−5.55)	(−4.20)	(−2.31)	(2.47)	(1.63)	(2.13)
Constant	−3.856***	−3.877***	−4.177***	−0.288***	−0.291***	−0.251***	−0.559***	−0.643***	−0.692***
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	58,560	44,194	33,050	58,564	44,197	33,050	58,564	44,197	33,050

(*continued on next page*)

Table A6 (*continued*)

Panel A: Persistence of firm									
	Dependent variable								
	Acquisition likelihood			*Number of deals*			*Aggregate deal value* (log)		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Pseudo R^2	0.212	0.232	0.250						
Adj. R^2				0.191	0.204	0.218	0.062	0.060	0.059
Panel B: With alternative fixed effects									
	Dependent variable								
	Acquisition likelihood			*Number of deals*			Aggregate *deal value* (log)		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CCE	−0.058***	−0.028***	−0.020***	−0.099***	−0.048***	−0.032***	−0.116***	−0.114***	−0.101***
	(−9.93)	(−5.14)	(−3.76)	(−8.87)	(−4.69)	(−3.13)	(−5.29)	(−5.13)	(−4.71)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.130***	0.075***	0.078***	−0.045**	−0.194***	−0.185***	−0.277***	−0.446***	−0.443***
Year FE	Yes	No	No	Yes	No	No	Yes	No	No
Industry-country FE	Yes	No	No	Yes	No	No	Yes	No	No
Industry FE	No	No	Yes	No	No	Yes	No	No	Yes
Year-industry FE	No	Yes	No	No	Yes	No	No	Yes	No
Year-country FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
N	87,299	87,282	87,305	87,299	87,282	87,305	87,299	87,282	87,305
Adj. R^2	0.229	0.314	0.310	0.185	0.238	0.234	0.057	0.063	0.060
CCE	−0.058***	−0.028***	−0.020***	−0.099***	−0.048***	−0.032***	−0.116***	−0.114***	−0.101***
	(−9.93)	(−5.14)	(−3.76)	(−8.87)	(−4.69)	(−3.13)	(−5.29)	(−5.13)	(−4.71)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.130***	0.075***	0.078***	−0.045**	−0.194***	−0.185***	−0.277***	−0.446***	−0.443***
Year FE	Yes	No	No	Yes	No	No	Yes	No	No
Industry-country FE	Yes	No	No	Yes	No	No	Yes	No	No
Industry FE	No	No	Yes	No	No	Yes	No	No	Yes
Year-industry FE	No	Yes	No	No	Yes	No	No	Yes	No
Year-country FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
N	87,299	87,282	87,305	87,299	87,282	87,305	87,299	87,282	87,305
Adj. R^2	0.229	0.314	0.310	0.185	0.238	0.234	0.057	0.063	0.060
Panel C: CCE components									
	Dependent variable								
	Acquisition likelihood			*Number of deals*			Aggregate *deal value* (log)		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Opportunity climate change	−0.440***			−0.108***			−0.180***		
	(−6.25)			(−5.41)			(−4.62)		
Regulation climate change		−2.978***			−0.906***			−0.572***	
		(−7.35)			(−8.44)			(−3.14)	
Physical climate change			0.886			0.654**			0.681
			(1.21)			(2.16)			(1.44)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−3.109***	−3.140***	−3.108***	−0.231***	−0.233***	−0.237***	−0.414***	−0.418***	−0.421***
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	87,319	87,319	87,319	87,319	87,319	87,319	87,319	87,319	87,319
Pseudo R^2	0.191	0.191	0.190						
Adj. R^2				0.177	0.177	0.177	0.057	0.057	0.056

Table A7

Serial acquirers and likelihood of being target. This table presents results for the effect of firm-level CCE on M&A likelihood, distinguishing between serial acquirers, non-serial acquirers, and the likelihood of being an acquisition target. Serial acquirers are defined following Fuller et al. (2002) as firms that have completed at least five acquisitions within a three-year period. The dependent variable in Columns (1) and (2) is acquisition likelihood, reported separately for serial and non-serial acquirers. Column (3) reports the probability of a firm being the target of an acquisition in the following year. All variables' definitions are provided in the Appendix Table A1. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variables			
	Acquisition likelihood		*Target likelihood*
Variables	(1) Acquirers	(2) Non-serial acquirers	(3) All
CCE	−0.177	−0.280***	−0.373**
	(−0.53)	(−7.30)	(−2.29)
Size	0.068*	0.224***	0.040***

(*continued on next page*)

Table A7 (*continued*)

Dependent variables			
	Acquisition likelihood		*Target likelihood*
Variables	(1) Acquirers	(2) Non-serial acquirers	(3) All
	(1.86)	(40.05)	(2.69)
Leverage	−0.843***	−0.260***	0.087*
	(−3.25)	(−5.06)	(1.67)
Tobin's Q	0.211**	0.001**	0.001
	(2.16)	(2.35)	(0.26)
Cash to assets	0.535	0.001	0.434***
	(0.93)	(0.01)	(2.76)
Sales growth	−0.003*	−0.000	−0.001
	(−1.86)	(−1.14)	(−0.51)
R&D	0.326	−0.616***	0.133**
	(0.33)	(−3.26)	(1.98)
Tangibility	0.314	−0.239***	−0.023
	(1.36)	(−9.07)	(−0.32)
Operating margin	−0.001	0.000	0.000
	(−0.41)	(0.77)	(0.57)
Constant	2.838*	−2.639***	−5.032***
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	7,109	79,765	69,576
Pseudo R^2	0.162	0.171	0.057

Table A8

Cross-sectional analysis: industry specific estimates. This table presents cross-sectional estimates of the effect of CCE on acquisition likelihood across Fama−French 10 industry classifications. The dependent variable is a binary indicator equal to one if firm *i* engages in at least one acquisition announcement in year *t+1*, and zero otherwise. Each column reports results for a separate industry: (1) Consumer Nondurables; (2) Consumer Durables; (3) Manufacturing; (4) Oil, Gas, and Coal Extraction and Production; (5) Business Equipment; (6) Telephone and Television Transmission; (7) Wholesale, Retail, and Some Services; (8) Healthcare, Medical Equipment, and Drugs; (9) Utilities; and (10) Other Industries. All variable definitions are provided in Appendix Table A1. Heteroskedasticity-robust standard errors are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Acquisition likelihood									
Variables	(1) Consumer Nondurables	(2) Consumer Durables	(3) Manufacturing	(4) Oil, Gas, & Coal Extraction & Production	(5) Business Equipment	(6) Telephone and Television Transmission	(7) Wholesale, Retail, & Some Services	(8) Healthcare, Medical Equipment, & Drugs	(9) Utilities	(10) Other
CCE	−0.163	−0.085	−0.208***	−0.683***	−0.120***	0.391	0.158***	0.519***	−0.035	−0.218***
	(−1.20)	(−0.70)	(−4.68)	(−4.70)	(−2.90)	(1.08)	(3.35)	(3.86)	(−0.47)	(−4.60)
Size	0.135***	0.140***	0.194***	0.218***	0.189***	0.147***	0.092***	0.187***	0.153***	0.039***
	(8.21)	(10.37)	(29.04)	(22.02)	(23.44)	(10.91)	(14.40)	(18.71)	(10.43)	(3.14)
Leverage	−0.049	−0.241**	−0.222***	−0.370***	−0.090	−0.127	−0.251***	0.088	−0.328***	0.324***
	(−0.36)	(−2.25)	(−3.79)	(−4.29)	(−1.52)	(−1.12)	(−5.66)	(1.32)	(−3.28)	(3.21)
Tobin's Q	−0.021	0.002	0.043***	0.027***	0.018**	0.016	0.100***	0.012	0.078***	0.042***
	(−1.17)	(0.08)	(6.65)	(2.65)	(2.32)	(0.96)	(11.53)	(1.26)	(4.33)	(2.71)
Cash to assets	0.187	−0.606**	−0.138**	−0.619***	0.002	−0.652***	−0.239***	−0.037	0.152	0.875***
	(0.73)	(−2.29)	(−2.18)	(−6.15)	(0.02)	(−3.13)	(−2.89)	(−0.34)	(0.65)	(4.82)
Sales growth	0.129	0.207***	0.116***	0.052	0.099**	0.153*	0.181***	0.165***	0.094	0.080
	(1.30)	(4.20)	(3.54)	(1.49)	(2.46)	(1.67)	(5.80)	(3.76)	(1.20)	(1.51)
R&D	0.055	−0.032	−1.104***	−1.828***	1.119***	0.955*	−1.715***	1.685***	−0.316	0.053
	(0.08)	(−0.03)	(−7.65)	(−7.79)	(5.00)	(1.90)	(−4.23)	(7.18)	(−0.48)	(0.08)
Tangibility	−0.297***	−0.350***	−0.409***	−0.075	−0.193***	−0.393***	−0.120***	−0.733***	−0.086*	−0.388***
	(−2.97)	(−5.43)	(−10.73)	(−1.13)	(−5.13)	(−5.88)	(−4.43)	(−14.73)	(−1.67)	(−7.57)
Operating margin	0.009	−0.003	0.016	0.015**	0.001	−0.045	0.037*	−0.014*	0.670***	0.046**
	(0.21)	(−0.15)	(1.50)	(1.98)	(0.08)	(−1.61)	(1.81)	(−1.69)	(4.16)	(2.34)
Constant	−2.670**	−0.832	−2.027***	−3.245***	−1.830***	−2.904***	−1.006***	−2.060***	−2.272***	−1.869***
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(*continued on next page*)

Table A8 (*continued*)

Variables	*Acquisition likelihood* (1) Consumer Nondurables	(2) Consumer Durables	(3) Manufacturing	(4) Oil, Gas, & Coal Extraction & Production	(5) Business Equipment	(6) Telephone and Television Transmission	(7) Wholesale, Retail, & Some Services	(8) Healthcare, Medical Equipment, & Drugs	(9) Utilities	(10) Other
N	2,871	3,912	17,112	8,238	13,550	4,389	16,798	9,404	3,631	6,623
Pseudo R^2	0.256	0.175	0.157	0.250	0.207	0.118	0.126	0.279	0.172	0.407

Table A9

Deal payment methods. This table examines the effect of firm-level CCE on the choice of deal payment method in M&A transactions. The dependent variable in Column (1) is a binary indicator equal to one if the deal is fully paid in cash (all-cash payment), and zero otherwise. Column (2) captures mixed payment methods, with the dependent variable defined as the percentage of the deal paid with stock. Column (3) is a binary indicator equal to one if the deal is fully paid in stock (all-stock payment), and zero otherwise. All variable definitions are provided in Appendix Table A1 Heteroskedasticity-robust standard errors are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variables Variables	(1) All cash payment	(2) Mixed	(3) All stock payment
CCE	−0.140**	0.279***	0.278***
	(−2.03)	(3.76)	(2.90)
Deal value(log)	0.042***	0.362***	0.254***
	(6.61)	(34.24)	(17.53)
Relative size	0.001	−0.005**	−0.003
	(1.64)	(−2.26)	(−0.91)
Friendly	−0.191***	0.051	0.055
	(−3.29)	(0.75)	(0.58)
Cross-border	−0.066***	−0.353***	−0.434***
	(−2.68)	(−10.24)	(−8.19)
Size	0.099***	−0.368***	−0.222***
	(12.89)	(−31.90)	(−14.21)
Leverage	−0.047	−0.315***	−0.051
	(−0.70)	(−3.56)	(−0.41)
Tobin's Q	−0.040***	0.083***	0.016
	(−4.31)	(7.49)	(1.03)
Cash to assets	0.271***	0.316***	0.051
	(3.22)	(2.95)	(0.35)
Sales growth	−0.092**	0.198***	0.017
	(−2.57)	(4.65)	(0.30)
R&D	−0.524**	1.589***	2.170***
	(−2.12)	(4.98)	(5.63)
Tangibility	−0.045	0.043	0.052
	(−1.22)	(0.99)	(0.96)
Operating margin	0.169**	−0.001	−0.001
	(2.44)	(−0.32)	(−0.42)
Constant	0.110	0.171	−1.251***
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N	18,855	18,532	16,659
Pseudo R^2	0.077	0.245	0.205

Table A10

Firm-level CCE on cross-border vs. domestic acquisition. This table reports regressions estimating the effect of firm-level CCE on cross-border and domestic M&As. The dependent variables are: (i) cross-border/domestic deal likelihood, a binary indicator equal to one if a firm announces at least one cross-border/domestic acquisition in year *t+1* (Columns 1−2, 9−10); (ii) number of cross-border/domestic deals (Columns 3−5, 11−13); and (iii) aggregate value of cross-border/domestic deals (Columns 6−8, 14−16). All models control for firm characteristics and include country, year, and industry fixed effects. All variables' definitions are provided in the Appendix. Heteroskedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable								Dependent variable							
	Cross-border deal likelihood		*Number of cross-border deals*			*Aggregate value of cross-border deals*			*Cross-border deal likelihood*			*Number of cross-border deals*			*Aggregate value of cross-border deals*	
Variables	(1) *Logit*	(2) *OLS*	(3) *OLS*	(4) *Tobit*	(5) *PPML*	(6) *OLS*	(7) *Tobit*	(8) *PPML*	(9) *Logit*	(10) *OLS*	(11) *OLS*	(12) *Tobit*	(13) *PPML*	(14) *OLS*	(15) *Tobit*	(16) *PPML*
CCE	-0.108**	-0.011***	-0.013**	-0.094**	-0.065*	-0.018	-0.018	-0.013	-0.259***	-0.038***	-0.059***	-0.247***	-0.098***	-0.106***	-0.106***	-0.219***
	(-2.18)	(-2.71)	(-2.23)	(-2.03)	(-1.73)	(-1.28)	(-1.28)	(-0.20)	(-6.55)	(-7.33)	(-5.85)	(-5.73)	(-3.74)	(-5.00)	(-5.00)	(-4.24)
Size	0.367***	0.039***	0.067***	0.398***	0.319***	0.107***	0.107***	0.332***	0.204***	0.033***	0.074***	0.260***	0.143***	0.151***	0.151***	0.228***
	(53.07)	(54.35)	(52.93)	(57.31)	(60.28)	(37.44)	(37.47)	(40.53)	(38.11)	(39.24)	(31.09)	(34.55)	(31.00)	(35.87)	(35.90)	(40.76)
Leverage	-0.535***	-0.048***	-0.071***	-0.581***	-0.415***	-0.155***	-0.155***	-0.670***	-0.200***	-0.026***	-0.024*	-0.203***	-0.062**	-0.183***	-0.183***	-0.302***
	(-9.29)	(-9.72)	(-9.49)	(-10.05)	(-8.73)	(-8.89)	(-8.90)	(-8.43)	(-4.71)	(-3.90)	(-1.65)	(-4.06)	(-1.97)	(-6.32)	(-6.32)	(-6.00)
Tobin's Q	0.066***	0.007***	0.012***	0.073***	0.054***	0.019***	0.019***	0.067***	0.036***	0.004***	0.008***	0.038***	0.016***	0.024***	0.024***	0.038***
	(9.23)	(10.02)	(11.23)	(10.86)	(10.48)	(7.74)	(7.74)	(8.07)	(6.61)	(5.30)	(4.64)	(6.32)	(4.46)	(7.20)	(7.20)	(6.50)
Cash to assets	-0.166**	-0.030***	-0.062***	-0.204***	-0.157**	-0.053**	-0.053**	0.098	-0.217***	-0.037***	-0.129***	-0.325***	-0.234***	-0.040	-0.040	0.079
	(-2.11)	(-4.13)	(-5.86)	(-2.61)	(-2.46)	(-2.08)	(-2.09)	(0.96)	(-3.66)	(-4.05)	(-6.62)	(-4.68)	(-5.08)	(-1.00)	(-1.00)	(1.14)
Sales growth	0.064**	0.003	0.007*	0.078***	0.081***	0.013	0.013	0.092**	0.182***	0.026***	0.067***	0.256***	0.162***	0.170***	0.170***	0.277***
	(2.18)	(1.34)	(1.87)	(2.64)	(3.33)	(1.42)	(1.42)	(2.20)	(8.45)	(7.44)	(8.48)	(9.81)	(10.02)	(10.18)	(10.18)	(12.16)
R&D	-0.781***	-0.038***	-0.036*	-0.898***	-0.876***	-0.090**	-0.090**	-1.011***	-0.810***	-0.102***	-0.051	-0.949***	-0.424***	-0.332***	-0.332***	-1.214***
	(-4.03)	(-2.72)	(-1.78)	(-4.60)	(-5.08)	(-2.07)	(-2.07)	(-3.68)	(-6.33)	(-5.74)	(-1.59)	(-6.36)	(-4.58)	(-4.75)	(-4.75)	(-6.66)
Tangibility	-0.455***	-0.042***	-0.068***	-0.514***	-0.407***	-0.093***	-0.093***	-0.405***	-0.337***	-0.054***	-0.129***	-0.437***	-0.284***	-0.175***	-0.175***	-0.279***
	(-11.63)	(-12.41)	(-13.23)	(-13.26)	(-12.62)	(-7.19)	(-7.19)	(-7.89)	(-11.36)	(-12.84)	(-14.44)	(-12.56)	(-12.37)	(-9.54)	(-9.55)	(-8.22)
Operating margin	0.023***	0.000	-0.002**	0.026***	0.017**	0.007***	0.007***	0.355***	-0.000	-0.000	-0.005***	-0.009	-0.012***	0.007**	0.007**	0.052***
	(2.62)	(0.61)	(-2.49)	(3.09)	(2.18)	(6.08)	(6.08)	(4.52)	(-0.00)	(-0.75)	(-4.79)	(-1.48)	(-3.79)	(2.57)	(2.57)	(4.11)
Constant	-3.083***	-0.120***	-0.258***	-3.188***	-2.680***	-0.434***	0.242	-1.889***	-4.680***	0.061***	-0.037*	-5.287***	-3.347***	-0.425***	-0.674***	-3.750***
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
N	87,306	87,319	87,319	87,319	87,306	87,319	87,319	87,306	87,319	87,319	87,319	87,319	87,319	87,319	87,319	87,306
Pseudo R^2	0.191			0.134	0.150		0.021	0.087	0.206			0.113	0.180		0.016	0.068
Adj. R^2		0.172	0.150			0.065				0.223	0.172			0.059		

Table A11

Motivation of M&A: diversification vs. non-diversification. This table reports the results examining the relationship between CCE and the likelihood of engaging in diversifying deals, conditional on the firm engaging in an acquisition. The dependent variable is a binary indicator equal to one if the acquirer targets a firm in a different two-digit SIC industry (i.e., a diversifying deal), and zero otherwise (i.e., a horizontal deal). All variables' definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered by both firm and year. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable: *Diversify*			
Variables	(1)	(2)	(3)
CCE	0.137**	0.300***	0.124**
	(2.47)	(7.07)	(2.20)
Size	0.047***	0.051***	0.041***
	(9.02)	(9.45)	(7.61)
Leverage	−0.022	−0.078	0.024
	(−0.39)	(−1.49)	(0.43)
Tobin's Q	−0.001	−0.001	−0.001
	(−1.56)	(−1.50)	(−1.47)
Cash to assets	−0.103	−0.507***	−0.084
	(−1.55)	(−7.28)	(−1.26)
Sales growth	−0.057*	−0.092***	−0.053*
	(−1.92)	(−3.11)	(−1.74)
R&D	−0.338**	−0.872***	−0.324**
	(−2.50)	(−4.85)	(−2.41)
Tangibility	−0.179***	−0.260***	−0.200***
	(−5.11)	(−10.83)	(−5.55)
Operating margin	−0.022***	−0.041***	−0.021**
	(−2.60)	(−2.77)	(−2.57)
Constant	1.230**	−0.353*	1.630***

(*continued on next page*)

Table A11 (*continued*)

Dependent variable: *Diversify*			
Variables	(1)	(2)	(3)
Industry FE	Yes	No	Yes
Year FE	Yes	Yes	Yes
Country FE	No	Yes	Yes
N	40,130	40,506	40,130
Pseudo R^2	0.169	0.020	0.173

Table A12

Diversifying deals: Anglo-Saxon vs. other countries. This table reports the results examining the relationship between firm-level CCE and the likelihood of engaging in diversifying deals, conditional on the firm conducting an acquisition. The dependent variable is a binary indicator equal to one if the acquirer targets a firm in a different two-digit SIC industry (i.e., a diversifying deal), and zero otherwise (i.e., a horizontal deal). Column (1) presents estimates for firms headquartered in Anglo-Saxon countries (Australia, Canada, Ireland, New Zealand, UK, and the U.S.), while Column (2) reports result for firms from all other countries. Heteroskedasticity-robust standard errors are clustered by both firm and year. All variable definitions are provided in Appendix Table A1. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: *Diversify*	
Variables	(1) Anglo-Saxon country	(2) Other country
CCE	0.063	0.204**
	(0.90)	(2.05)
Size	0.036***	0.015
	(5.69)	(1.16)
Leverage	0.012	0.067
	(0.19)	(0.46)
Tobin's Q	−0.009	−0.001
	(−1.15)	(−1.27)
Cash to assets	−0.026	−0.364**
	(−0.33)	(−2.04)
Sales growth	−0.013	0.024
	(−0.38)	(0.35)
R&D	−0.420*	−0.298
	(−1.93)	(−0.50)
Tangibility	−0.010	−0.414***
	(−0.25)	(−5.83)
Operating margin	−0.016*	−0.245**
	(−1.96)	(−2.02)
Constant	0.094	0.738*
Year FE	Yes	Yes
Industry FE	Yes	Yes
Country FE	Yes	Yes
N	30,008	9,844
Pseudo R^2	0.192	0.161
Chow-test	6.89	
(p-value)	(0.001)	

Data availability

The authors do not have permission to share data.

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