

To Acquire or to Ally? Managing Partner's Environmental Risk in International Expansion

Chenchen Huang, Di Luo, Soumyatanu Mukherjee, Tapas Mishra*

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Chenchen Huang, ch2651@bath.ac.uk, University of Bath; Di Luo, D.Luo@soton.ac.uk, University of Southampton; Soumyatanu Mukherjee, S.Mukherjee@soton.ac.uk, University of Southampton; Tapas Mishra, T.K.Mishra@soton.ac.uk, University of Southampton.

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Abstract

Environmental risk (ER) has become increasingly crucial in international business, and firms endeavor to integrate environmental risk management (ERM) into business strategies. Examining a sample of the cross-border mergers and acquisitions (M&As) and alliances conducted by the US firms from 39 host countries over the last two decades, we show that US firms prefer to choose cross-border M&As over alliances when the environmental risk of foreign partners is high, consistent with the prediction of a mean-variance utility model. The propensity towards M&As are amplified by the US firms' corporate governance quality, financial flexibility, and the host-country passage of sustainability disclosure reforms. Further, the US firms experience high announcement cumulative abnormal returns (CARs) when they select M&A deals rather than alliances to manage high ER from foreign partners. Overall, our study provides novel insights into ERM in firms' decision-making of international expansion.

Keywords: Cross-border mergers and acquisitions; strategic alliances; corporate social responsibility; environmental risk

1. Introduction

Sustainable development has become increasingly crucial in international business since investors are keen on firms' nonfinancial performance (World Federation of Exchanges (WFE), 2015).¹ Corporations endeavor to integrate environmental sustainability into business strategies² and face the requirement to disclose sustainable activities and performance in their annual reports by regulators.³ Further, environmental risk (ER) regularly appears on the corporate board's agenda due to the growing attention from stakeholders on sustainable engagement.⁴ To reduce the adverse effect of investors' ER perception on firms' cost of capital and to mitigate the litigation risk from regulators and stakeholders, environmental risk management (ERM) can be used as a crucial value-increasing device (Sharfman and Fernando, 2008; Aktas et al., 2011; Ghoul et al., 2011; Koh et al., 2013; Chava, 2014; Fernando et al., 2017; Breitenstein et al., 2021).

Despite the prevalence of ERM in a firm's internal production and operation activities, little is known about what role ERM plays in external expansion decisions when the firm faces ER from foreign partners. In this paper, we investigate the importance of ERM in the foreign adventure choices between mergers and acquisitions (M&As) and strategic alliances (Kogut and Singh, 1988; Balakrishnan and Koza, 1993; Hennart and Reddy, 1997; Bodnaruk et al., 2016), which lie in the core of firm boundaries theory (Williamson, 1975, 1985). We posit and show that when a target country has high ER, an acquirer is prone to choose cross-border M&As rather than strategic alliances to take control of the target's environmental engagement,

¹ See <http://www.world-exchanges.org/home/index.php/news/world-exchange-news/wfe-survey-exchanges-seeing-investor-interest-in-sustainability>.

²

³ For example, the U.S. Securities and Exchange Commission (SEC) proposes to require the U.S. public companies to disclose a range of climate-related risk and greenhouse gas emissions (<https://www.sec.gov/news/statement/gensler-climate-disclosure-20220321>).

⁴ For example, the survey of PwC (2019) shows that half of the directors treat environmental risk as the part of enterprise risk management (PwC's 2019 Annual Corporate Directors Survey). The survey of Krueger et al. (2020) shows that institutional investors encourage firms to employ risk management approaches to address climate risk.

thus mitigating the target's adverse environmental shock.⁵ In contrast, when the ER is low, the likelihood of selecting cross-border alliances might be higher since there is no environmental risk management need for the acquirer to conduct M&As.

The key difference between M&As and alliances is whether firms decide to expand their boundary through internalization or outsourcing (e.g., William, 1975; Mathews and Robinson, 2008; Bodnaruk et al., 2016). On the one hand, firms could internalize resources and costs from the target firms and take complete control of the targets through acquisition. For instance, cross-border M&As can lead to fundamental changes in nationality and corporation practices, such as accounting standards, disclosure practices, shareholder protection, and management practices (Bris and Cabolis, 2008; Bris et al., 2008; Wang and Xie, 2009; Bai et al., 2022).

On the other hand, alliances, which are voluntary arrangements for firms to exchange resources and to codevelop or provide products, services, or technologies (Gulati, 1998), are preferred over acquisitions when deals involve high integration problems or financing and transaction costs (Balakrishnan and Koza, 1993; Hennart and Reddy, 1997; Huang et al., 2021). Further, to address the “twin agency problems” (Stulz, 2005), firms are inclined to apply cross-border alliances to mitigate high expropriation risk from the indirect partner, i.e., the host country government, but employ cross-border acquisitions to control the opportunistic behaviors from the direct partner (Bodnaruk et al., 2016).

While these works highlight the role of implementing risk management to mitigate transaction costs, expropriation risk, and litigation risk in a firm’s foreign entry modes, managing ER is increasingly prioritized by senior management teams due to the prevailing concerns from stakeholders. For instance, investors require high returns to compensate for

⁵ We elaborate our hypothesis development in Section 2.

perceived ER in their decision-making (Heinkel et al., 2001; Sharfman and Fernando, 2008). Further, reputational losses, legal costs, and litigation risks could be associated with the negative news about environmental non-compliance (e.g., Karpoff et al., 2005; Koh et al., 2013; Gillan et al., 2021).⁶ Thus, the adverse externalities from the partner's ER cannot be neglected when firms make external investments that expand their international boundaries.⁷

Examining a sample of 8,137 cross-border M&A and alliance deals conducted by US firms with partners from 39 host countries over the last two decades (2003-2020), we document a significantly positive relation between the foreign partner's ER and the ratio of cross-border M&A deals to the sum of M&A and alliance deals undertaken by the US firms.⁸ Specifically, one standard deviation decrease of the ER of the host country leads to a 7% increase in the ratio of M&As made by the US firms on average. This indicates that firms choose cross-border M&As over alliances as the risk management device to control such risk when the foreign partner has high environmental risk, consistent with our prediction.

We further investigate the economic mechanisms behind the choices of cross-border M&As over alliances when the foreign partner has a high environmental risk. First, target firms will likely employ acquirers' corporate governance (Bris et al., 2008), and targets' corporate governance and management practices could be improved (Wang and Xie, 2009; Albuquerque et al., 2019; Bai et al., 2022). Following these studies, we examine how the US firms' corporate governance, proxied by institutional ownership, independent directors, and entrenchment index (E-index), as governance quality could affect the EMR incentives to choose the oversea

⁶ Starks (2009) and Gillan et al (2021) also point out that ESG could affect many types of risk firms face, such as systematic, regulatory, supply chain, product and technology, litigation, reputational, and physical risk.

⁷ For instance, corporate customers are likely to be negatively affected when suppliers face negative shocks such as CSR-related scandals (e.g., Dai et al., 2021)

⁸ We measure the foreign firm's environmental risk by the environmental pillar score from Thomson Reuters ASSET 4 ESG database. The score captures a company's impact on living and non-living natural systems, including the air, land, and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risk and capitalize on environmental opportunities to generate long-term shareholder value. We use the negative environmental score to facilitate the interpretation of the results, so that the high value (i.e., low environmental score) indicates high environmental risk.

expansion deals. We show that well-governed US firms are more likely to select cross-border M&As over alliances as the expansion strategy when facing foreign partners with high environmental risk, highlighting the importance of M&As as ERM device to address partner's the ER.

Second, firms with financial constraints have less flexibility in selecting between M&As and alliances, as they have limited access to M&As that require substantial financial resources. On the other hand, firms with financial slack have more capacity to select investment strategies to pursue optimal risk management policy (Bodnaruk et al., 2016; Huang et al., 2021). Following these works, we further examine the role of foreign partners' ER in M&A or alliance decisions across financially constrained and unconstrained US firms. We show that the impact of the foreign partner's ER on the US firm's deal selection is more pronounced when the US firms are less financially constrained, highlighting the importance of financial slack in the relation between cross-border expansion forms and the partner's ERM.

We examine the robustness of our baseline results using the social, governance, and overall environmental, social, and governance (ESG) performance as proxies for the ESG risk and controlling for the institution quality (Kaufmann et al., 2010; Brockman et al., 2013; Erel et al., 2012), the expropriation risk (Bodnaruk et al., 2016), and carbon risk (Bolton and Kacperczyk, 2021; Ehlers et al., 2022; Seltzer et al., 2022). Moreover, we employ the Heckman selection model to address the potential selection bias during the process of the US firm's international expansion and host country selection. The relation between the environmental risk of the foreign partner in the host country and the ratio of cross-border M&A deals made by the US firms stands firm.

We also consider the impact of environmental regulations on the firm's deal selection to further alleviate the potential endogeneity concerns. In particular, we use the sustainability

disclosure regulation reforms (Krueger et al., 2021; Christensen et al., 2022; Iliev and Roth, 2021) as exogenous shocks to test the effects of environmental regulations on firms' expansion choices. We find that the passage of sustainability disclosure reforms in the host countries leads to a higher likelihood of cross-border alliance over M&As conducted by US firms, suggesting that adopting environmental legislation facilitates a more "market-like" arrangement. This is consistent with Jandik and Kali (2009), which shows that the improvement of the legal system can lead to a transition from "firm-like" arrangements (i.e., M&As) to arm's length "market-like" arrangements (i.e., alliances). The impact from our variable of interest, i.e., the foreign partner's ER, is still significantly positive. We further examine the moderation effect of the environmental regulations on the relationship between the foreign partner's ER and the US firm's deal selection. We find that the US firm's preference on M&As over alliances in high ER countries is more pronounced after the passage of the environmental regulations. Our results remain intact using the Paris Agreement as the alternative exogenous shock.

We also examine the market reactions to the cross-border M&A or alliance announcement in the presence of host-country ER. We find that the US firms experience higher deal announcement returns for the choice of M&A deals than alliances when they face high ER from foreign partners, which suggests the value creation function of ERM in firms' external expansion decisions.

Further, prior studies indicate that market competition can affect ESG engagement (Miles and Covin, 2000; Flammer, 2015) and value creation through acquisitions (Hoberg and Phillips, 2010). We, therefore, examine the market reactions to M&As or alliance decisions across high- and low-competitive markets where the US firms are located. We find that the impact of high ER on M&A performance is more pronounced for firms in high competition markets than low competition ones. While firms are exposed to higher risk in horizontal deals than in diversified deals (Gormley and Matsa, 2016), we also examine the heterogeneity from

the deal attribute. We show that the market reaction to M&As made in high environment risk is more pronounced when the US firms undertake horizontal deals.

We present an analytical model (mean-variance utility or MVU model) to understand the empirical results.⁹ Specifically, a M&A or alliance deal entails a random lump sum upfront cost to manage the target country-specific ER. Compared to an alliance deal, a M&A deal entails only a proportion of the lump-sum amount but additionally a governance cost related to the environmental performance improvement of the target firm owing to acquisition. We then derive sufficiency conditions on the relative risk-return trade-offs for the optimal choices between a M&A and alliance deal. The first-order condition implies that choosing M&As over alliances increases both the expectation and variance of the net efficiency gain of M&As relative to alliances. The increase in expectation increases the maximum attainable utility, while the increase in variance decreases the maximum attainable utility.

Accordingly, there are two opposite effects when the expectation of lump-sum amount increases. One is the wealth effect, which motivates the choice of M&As over alliances since choosing M&As entails only a proportion of the lump-sum amount for ERM. The other is the risk effect, which motivates the choice of alliances over M&As under the sufficiency condition of increasing the degree of absolute risk aversion with respect to the increase in expected net gain. When the degree of absolute risk aversion is not amplified too much with the possibility of higher expected net efficiency gain, the wealth effect dominates the risk effect. Under such scenario, it is optimal choose M&A over alliances.

⁹ Prior studies use the MVU model in portfolio allocation (Eichner, 2008; Eichner and Wagener, 2009; 2012; Eichner, 2010; 2011; Huang & Jiang, 2020), bank's risk-return trade-offs (Broll et al., 2015; Guo et al., 2018); firm's export choices under risks (Broll and Mukherjee, 2017; Broll et al., 2020; Mukherjee et al., 2021); and in supply-chain risk management literature (Padhi and Mukherjee, 2021; Mukherjee and Padhi, 2022; Mukherjee et al., 2022).

The main contribution of this paper is twofold. First, we contribute to the literature on risk management and highlight the importance of managing ER through M&As. Theoretical and empirical research shows that the purpose of risk management is to reduce cash flow volatility and maximize firm value (Smith and Stulz, 1985; Froot et al., 1993). Given the increasing attention on environmental sustainability, recent literature sheds light on the crucial role of managing ER associated with a firm's operations. For example, improved ERM could reduce the cost of capital (Sharfman and Fernando, 2008; Ghoul et al., 2011) and increase firms' value (Fernando et al., 2017). Banks also integrate ER into their credit risk management process (Weber et al., 2008). Our paper provides a novel insight into the existing ERM studies by highlighting the importance of managing ER associated with foreign partners. Specifically, cross-border M&As could provide an alternative operational hedging strategy for firms to address ER from the partner firms. Our findings thus deepen the understanding of merger activities as the operational hedging strategy in corporate risk management (Amihud and Lev, 1981; Garfinkel and Hankins, 2011)

We also contribute to the burgeoning literature on the importance of ESG in a firm's international investment, such as cross-listing (Boubakri et al., 2016), global supply chain management (Dai et al., 2021), and cross-border acquisitions (Albuquerque et al., 2019; Bose et al., 2021; Li et al., 2022). However, our paper steps further to investigate the role of environmental responsibility in the firm's choices of expansion strategies between cross-border M&As and alliances. The findings also add to prior theoretical and empirical studies on the firm's options between M&As and alliances, e.g., national culture (Kogut and Singh, 1988), information asymmetry (Balakrishnan and Koza, 1993), transaction costs (Hennart and Reddy, 1997), synergies, resources, and market conditions (Dyer et al., 2004), resource allocations (Villalonga & McGahan, 2005), legal systems (Jandik and Kali, 2009), agency theory and partner risk (Bodnaruk et al., 2016), and litigation risk (Huang et al., 2021).

Finally, our study has important implications for corporate senior management teams and policymakers. Our work benefits such teams to make choices between M&A and alliance deals in the presence of foreign partners' ER. The deal selections depend on firms' inherent ER exposure and financial flexibility. While there are increasing demands from investors for firms' ER disclosure, policymakers in host countries can make better decisions on the disclosure requirement since such policy shocks can affect their local firms' partnership with foreign firms.

The remainder of the paper proceeds as follows. In Section 2, we review the literature and develop our hypotheses. In Section 3, we describe the data and research methodology. In Section 4, we conduct empirical analyses and perform robustness tests. In Section 5, a theoretical framework is developed to explain the underlying mechanism. Finally, Section 6 concludes the paper.

2. Literature Review and Hypothesis Development

Firms' choices between alliances and acquisitions lie in the core of theories of firm boundaries (Williamson, 1975, 1985). Expanding into foreign countries entails substantial investment and faces various risks in the host country, such as high information asymmetry due to cultural and geographical distance, partner's opportunistic behaviors resulting from monitoring difficulty, and host government expropriation and corruption in the country with low institutional quality and limited investor protection (Joskow, 1987; Jandik and Kali, 2009; Bodnaruk et al., 2016; Li and Reuer, 2022).

Therefore, managing the potential costs and risk is embedded in the firm selection decisions between cross-border M&As and alliances in international adventure. For example, alliances are preferred over M&As when there are severe integration problems or considerable financing and transaction costs (Balakrishnan and Koza, 1993; Hennart and Reddy, 1997;

Huang et al., 2021). In the presence of the “twin agency problems” (Stulz, 2005), firms prefer cross-border alliances to deal with high expropriation risk from the indirect partner, i.e., the host country government, but employ cross-border acquisition to oversee the opportunistic behaviors from the direct partner firms (Bodnaruk et al., 2016).

While there have been prior studies on the implementation of risk management to address the transaction costs and expropriation risk from partners during the international investments adventure (Kogut and Singh, 1988; Balakrishnan and Koza, 1993; Hennart and Reddy, 1997; Bodnaruk et al., 2016), there have been few studies on the role of ERM in cross-border transactions. Thus, it is important to fill this research gap since senior management teams gradually switch priority to sustainability. ER exposure could be costly to firms since investors are likely to consider ER factors when making investment decisions and require high returns due to perceived riskiness (Heinkel et al., 2001; Sharfman and Fernando, 2008). There could also be a reputational loss, legal cost, and litigation risk associated with the negative news about environmental non-compliance (e.g., Karpoff et al., 2005; Hong and Kacperczyk, 2009; Gillan et al., 2021).¹⁰

The firm’s international expansion extends firms’ boundaries with broader exposure to stakeholder demands for environmentally responsible activities. However, given the potential costs of ER, the negative externalities from the partner’s environmental underperformance cannot be neglected when firms make external investment decisions involving external partners.¹¹ Prior studies document the importance of managing ESG risk from business partners and highlight the role of environmental and social performance in partner selections. For example, corporate customers prefer to select suppliers with higher CSR engagement to

¹⁰ Besides, Starks (2009) and Gillan et al (2021) also point that ESG could affect many type of risk firms face, such as systematic risk, regulatory risk, supply chain risk, product and technology risk, litigation risk, reputational risk and physical risk.

¹¹ For instance, corporate customers are likely to be negatively affected when suppliers face negative shocks such as CSR-related scandals (e.g., Dai et al., 2021)

reduce their exposure to adverse shocks propagated through the supply chain (e.g., Tao et al., 2022). The customers also exert efforts to improve the supplier CSR performance (Dai et al., 2021). As cross-border acquisitions and alliances are the two major alternatives of international expansion strategy through either collaborating with foreign partners or acquiring foreign targets, it is critical to investigate how firms make such choices to manage ER from foreign partners.

A critical difference between M&As and alliances is whether firms decide to expand its boundary through internalization or outsourcing (e.g., William, 1975; Mathews and Robinson, 2008; Bodnaruk et al., 2016). Through acquisitions, firms could internalize resources and costs from the target firms and ultimately control the target's governance. As cross-border M&As entail a change in the nationality of the target firms, their corporate governance practices will be replaced. The acquirers' corporate governance policies and regulations (e.g., accounting standards, disclosure practices, and shareholder protection) will be applied to the combined firms (Bris and Cabolis, 2008; Bris et al., 2008).¹² Moreover, Wang and Xie (2009) find that acquisitions between well-governed acquiring firms and poorly governed target firms lead to the improvement of corporate governance of the target firms, resulting in high deal synergy. Albuquerque et al. (2019) also show that cross-border M&As lead to positive changes in corporate governance in the host country. Therefore, with the prevailing ESG management in corporate governance, targets' environmental management could be consolidated in the combined firms following the acquirers' governance practices. From the perspective of ERM, we conjecture that when targets have high ER, acquirers are more likely to choose cross-border M&As over contractual partnerships (e.g., strategic

¹² The law applicable to companies is the law of the country of nationality of the firm. Nationality is defined as the location of a company's headquarters, in our case it is the acquiring firm's headquarters after consolidation. However, it is possible that acquiring firm and target firm set contractual arrangements to adopt the practices (e.g., accounting standards) of the target firms to circumvent the legal effects of the transaction or to some extent comply with the legal rules of the target country (Bris and Cabolis, 2008).

alliances) to control the targets' environmental engagements and, thus, mitigate the adverse environmental shocks. In contrast, when targets have low ER, the likelihood of selecting cross-border alliances tends to be high since the pressure on acquirers to conduct M&As to manage ER is low. Our conjecture is in line with the spirit of Fairhurst and Greene (2022), which highlight the corrective motives of initiating M&As deals, i.e., firms with low CSR scores are more likely to become takeover targets as the bidders can change the inefficient CSR policies following the deals.

Hypothesis 1: Firms prefer to choose cross-border M&As over alliances when the partner has a high ER.

Corporate governance plays an important role in M&As and alliances (Manne, 1965; Bris and Cabolis, 2008; Erel et al., 2012; Bodnaruk et al., 2013). Following M&As, target firms tend to adopt acquirers' corporate governance (Bris et al., 2008). Further, M&As can improve targets' corporate governance and management practices (Wang and Xie, 2009; Albuquerque et al., 2019; Bai et al., 2022). On the other hand, alliances usually lack incentives to monitor management, especially when partners diverge from their business visions (Rey and Tirole, 2001). Further, well-governed firms prefer to choose well-governed alliance partners of a similar size (Bodnaruk et al., 2013). Collectively, we postulate that well-governed US firms are more likely to choose M&As rather than alliances to mitigate the negative externality from the partners when partners have high ER.

Firms' oversea ventures are also affected by financial constraints. Financially constrained firms have limited resources to conduct cross-border M&As (Bodnaruk et al., 2016). This indicates that constrained firms are less likely to undertake M&As even when the counterparty has a high ER. On the other hand, alliances involve fewer financial resources than M&As since the focal firms can deploy mutual capital and diversify risks (Lerner et al., 2003;

Reuer and Tong, 2005). For example, alliance partners can combine their resources and activities, enabling them to use other firms' assets with fewer capital requirements and lower transaction costs (Balakrishnan and Koza, 1993). Resources shared by partners are helpful in easing financial constraints (Lerner et al., 2003). Thus, firms are less likely to choose M&As over alliances in the presence of financial constraints.

Hypothesis 2: Firms' propensities toward cross-border M&As over alliances are amplified by corporate governance and financial flexibility.

While sustainable investing is proliferating worldwide, investors often find that there is insufficient information on firms' ESG. Given the high demands from investors and low supplies by firms, countries have adopted mandatory ESG regulations to require firms to disclose ESG information. Recent studies show that the impact of ESG disclosure on credit default swap (CDS) (Kölbel et al., 2020), institutional investors (Ilhan et al., 2021), board structure (Iliev and Roth, 2021), financial information environment (Krueger et al., 2021), and ESG rating disagreement (Christensen et al., 2022). Christensen et al. (2022) highlight that empirical evidence on the real effects of ESG disclosure remains largely underexplored.

Institutional theory (North, 1990; Williamson, 2000; Scott, 2001) shows that firms' decisions, such as entry mode and oversea expansions (Henisz and Delios, 2001), are affected by policy regulations. Institutions, e.g., laws and regulatory policies (Oliver, 1991), determine appropriate behaviors from the social and legal perspective (Meyer and Rowan, 1977; Scott, 2001) and thus play an important role in strategic choices (La Porta et al., 2003; Delios and Henisz, 2003; Peng, 2003; Rossi and Volpin, 2004). For instance, Jandik and Kali (2009) show that the enhancement of the legal system can facilitate a transition from "firm-like" arrangements (i.e., M&As) to arm's length "market-like" arrangements (i.e., alliances).

In a recent survey, regulatory risk is identified as the top climate risk faced by companies over the next five years (Stroebel and Wurgler, 2021). Further, environmental disclosure regulations and climate laws intensify firms' pressure on reducing carbon emissions (Ilhan et al., 2021; Li et al., 2022), which could help reduce ER in a country. While firms prefer cross-border M&As over alliances to manage ER from foreign partners, they can become less tempted to M&As after the passage of environmental regulations. Overall, we conjecture that the adoption of environmental regulations can lead to higher propensities to alliances over M&As in the presence of ER. Further, the US firms are more likely to select cross-border M&As over alliances if the host country has high ER after the regulation shocks.

Hypothesis 3.1: The likelihood of cross-border alliance over M&As increases after host-country environmental disclosure reforms are passed.

Hypothesis 3.2: The US firms are more likely to select cross-border M&As over alliances if the host country has high ER after the regulation shocks.

Extant literature shows that ERM plays an important role in firm valuations (Sharfman and Fernando, 2008; Ghoul et al., 2011; Koh et al., 2013; Chava, 2014; Fernando et al., 2017; Breitenstein et al., 2021). Further, investors and analysts also make their investment decisions and recommendations based on ER (Heinkel et al., 2001; Hong and Kacperczyk, 2009; Luo et al., 2015; Lins et al., 2017; Pastor and Vorsatz, 2020; Bolton and Kacperczyk, 2021; Pedersen et al., 2021; Bansal et al., 2022).

M&A and alliance transactions are important corporate expansion strategies for value creation (McConnell and Nantell, 1985) and thus provide an appealing setting to examine how the financial markets react to such transactions in the context of ERM. The literature shows the role of ESG in M&A market reactions. For instance, Aktas et al. (2011) find that acquirers experience positive abnormal returns when targets have high environmental performance.

Deng et al. (2013) and Fairhurst and Greene (2022) show that acquirers with high CSR have higher announcement returns than those with low CSR. Bose et al. (2021) find that markets react positively when firms with high carbon emissions make cross-border acquisitions with partners in weak environmental regulation countries.

Since the improvement of ERM can cause the financial markets to react positively (Sharfman and Fernando, 2008; Aktas et al., 2011) and firms are more likely to conduct the cross-border M&As over alliances to manage ER from foreign partners (Hypothesis 1), we postulate that choosing M&As over alliances to manage partners' ER creates value for the firms' international expansions.

Hypothesis 4: The US firms experience high announcement cumulative abnormal returns (CARs) when they select M&A deals rather than alliances to manage high ER from foreign partners.

3. Data and Methodology

3.1 Sample Selection

We collect completed cross-border deals, including M&As and strategic alliances announced between 2003 and 2020, from the Securities Data Company (SDC) Platinum database. For the cross-border M&As, we require that the acquirer in a deal is a US firm, the target is a non-US firm, and the acquirer owns less than 50% of the target before the announcement and owns more than 50% after the completion. We exclude the deals classified as a recapitalization, exchange offers, buyback, and minority stake purchases from the sample. For cross-border alliances, we consider the deals with only two participants; one is a US firm and the other is a non-US firm.

Following Bodnaruk et al. (2016), we include the host countries with at least 100 cross-border deals (alliances and M&As in total) involving US firms during our sample period. We

then keep the deals in which the public US firms have GVKEY identifiers from Compustat. There are 5,116 M&A deals and 8,029 alliance deals that US firms conduct with firms from 39 host countries. Panel A of Table 1 provides details of the sample distribution by country. We find that the US firms made the largest number of M&As and alliances with the United Kingdom, followed by Canada during our sample period. The deal ratio for each country is comparable to Bodnaruk et al. (2016), such as in the UK (0.713 vs. 0.583), Canada (0.733 vs. 0.533), and Germany (0.650 vs. 0.522).¹³ The average ratio of M&As to the total number of deals across all the host countries is around 58.8%.

[Table 1 about here]

As we examine the US firm's selection between M&As and alliances in a given host country in a given year, we create the panel data at the US firm-HostCountry-year level. We only keep the observations where the US firm has conducted at least one cross-border deal (M&As or alliances) in a given host country in a given year.¹⁴ After incorporating the ESG performance from the Thomson Reuters ASSET4 ESG database and control variables from Compustat, CRSP, World Bank, and World Scope into our deals sample, 8,137 observations remain at the US firm-HostCountry-year level.¹⁵

3.2 Variable Definition

¹³ Our M&A to total deal ratio in most countries is slightly higher than that of Bodnaruk et al. (2016). This can be due to different sample periods since the period between 1990 and 2011 of Bodnaruk et al. (2016) includes a surge of alliance in 1990s. Thus, their M&A to total deal ratio is slightly lower. Our sample is from 2003 to 2020 which includes the global booming of M&A activities in the 21 century. Another reason can be the construction of alliance deals. We only include the deals with two alliance participants, but Bodnaruk et al. (2016) have no such restriction.)

¹⁴ First, if a US firm has no cross-border activity with a host country during the sample period, we exclude the observations involving that paired US firm-host country. We focus on the US firm's selection between alliances and M&As in a given host country and exclude the observations with the host countries in which the US firm has no interest to invest. Second, we keep the US firm-HostCountry-year observations where there is at least one cross-border deal conducted by the US firm in a given host country in a given country, as we use the ratio of the cross-border M&A deals to the total cross-border deals (i.e., M&As and alliances) made by the US firm in a given host country in a given year as the dependent variable to measure the US firm's selection between M&As and alliances.

¹⁵ Appendix Table A2 elaborates our sample selection.

The key variable of interest in our study is the foreign partner's ER, measured by the average environmental performance of foreign firms' countries in domicile in a given year.¹⁶ To facilitate the interpretation of the results, we change the sign on environmental score so a high value is related to a high level of ER.¹⁷ The environmental performance captures a company's impact on living and non-living natural systems, including the air, land, and water, as well as complete ecosystems.¹⁸

Following Bodnaruk et al. (2016), Li et al. (2019), and Huang et al. (2021), in the main regression analysis of the US firms' selection between cross-border M&As and alliances, we also control for a set of US firm- and host country-level characteristics. Specifically, to capture the US firm-level heterogeneity, we use the natural logarithm of market capitalization ($Ln(MktCap)$), the natural logarithm of book-to-market ratio ($Ln(B/M)$), sales growth rate ($Sales\ growth$), cash holding ($Cash$), capital expenditure to assets ($Capex$), return on equity (ROE), debt to equity ratio (D/E), prior year 12 months stock returns ($Past\ return$), the annualized standard deviation of daily stock returns over the previous 12 months ($Volatility$), and industry concentration measured by the sum of squared market share of each firm in the same industry during a year ($Industry\ Concentration$). To account for the host country-level economic and financial development, we use the natural logarithm of GDP per capital of the host country ($Ln(GDP\ per\ capita)$), GDP growth rate ($GDP\ growth$), stock market-to-GDP ratio ($MktCap/GDP$), stock market turnover ($Stock\ turnover$). We also control for the average

¹⁶ We use the country-level environmental risk to proxy for the foreign firm-level environmental risk due to the environmental data availability for the foreign firms. 78% of sample deals involve private foreign firms or subsidiaries. This is similar to Bodnaruk et al. (2016) which use the country-level Legal Formalism and Procedural Complexity to proxy for the direct partner risk. Our main findings remain robust if we use the environmental performance at the foreign firm-level data with very limited observation. The results are reported in Appendix Table A6.

¹⁷ The environment score ranges from 0 to 100, and a high score indicates high environmental performance. It is commonly used in prior ESG studies (e.g., Ioannou and Serafeim, 2012; Dyck et al., 2019).

¹⁸ Some studies use firm's environmental concerns in MSCI KLD Stats database to measure the US public firm's ER (e.g., Sharfman and Fernando, 2008; Fernando et al., 2017). KLD has surveyed the ESG news for Standard & Poor's 500 firms since 1991 and extended its coverage to Russell 1000 and Russell 3000 in 2000s, while not yet extended globally. As our study focuses on the ER of the firms worldwide, we use the environmental performance in ASSET4 as the proxy for the firm's ER.

characteristics of the listed firms in the host country, including the book-to-market ratio ($\ln(\text{average } B/M)$), cash holdings (*Average cash*), capital expenditure to assets (*Average capex*), and return-on-assets (*Average ROA*). The US firm- and host country-level control variables are lagged by one year, and all continuous variables are winsorized at the 1st and 99th percentiles. Appendix Table A1 provides a detailed description of all variables used in our analysis.

3.3 Summary Statistics

Panels B and C of Table 1 report the summary statistics for the US firm-level and host country-level characteristics. In Panel B, we observe that the annual average ratio of cross-border M&A deals to the total number of cross-border deals made by a US firm in a given host country is 0.640. The US firms, on average in our sample, tend to have considerable firm size (i.e., the market capitalization of 3,181 million dollars, measured as $e^{8.065}$ with around 16.9% sales growth rate and 18.2% annualized stock returns. These are consistent with Bodnaruk et al. (2016), which show that firms with oversea expansions have larger market value and higher sales growth. Besides, Panel C shows that the average environment performance is 53.185, and the GDP growth rate is 1.896% for the host countries in which the US firms collaborated.

4. Main results

4.1 ER and Deal Selection

To explore how the ER of foreign partners influences the US firm's international expansion strategies, we employ the following Tobit regression model (Bodnaruk et al., 2016; Huang et al., 2021):

$$\frac{M\&A}{(M\&A+Alliance)_{i,j,t}} = \beta_0 + \beta_1 ER_{j,t-1} + \beta_2 US\ Firm\ Characteristics_{i,t-1} + \beta_3 Host\ Country\ Factors_{j,t-1} + FEs + \varepsilon_{i,j,t} \quad (1)$$

where i , j , and t represent the US firm, host country, and year, respectively. The dependent variable $M\&A/(M\&A+Alliance)$ captures the US firm's selection preference on M&A over alliance, which is calculated as the ratio of the cross-border M&A deals to the total number of cross-border M&A and alliance deals the US firm made in a given host country in a given year. ER is the variable of interest, which indicates the level of ER of the foreign partners. It is calculated as the average negative environmental performance of foreign firms' countries in domicile in a given year. *US Firm Characteristics* and *Host Country Factors* denote a vector of US firm- and host country-level characteristics as control variables, respectively. FEs are host country, US firm industry, and year fixed effects to account for the industry- and country-level variations, and time-varying differences across years, respectively.

Table 2 reports the results. The model in column (1) examines the standalone effect of the host country ER, showing that there is a significantly positive relationship between the ER of the host country and the ratio of cross-border M&A deals made by the US firms. The coefficients on *Environmental risk* shown in columns (2) and (3) remain significantly positive after controlling for the US firm- and host-country-level control variables. Specifically, one standard deviation increase of the ER of the host country leads to a 7% increase in the ratio of M&As made by the US firms on average.¹⁹ The findings are consistent with our prediction, i.e., when the foreign partner has a higher ER, the multinational firms prefer to choose cross-border M&As over alliances as the ERM device to control the partner's environmental engagement, thus mitigating the negative spillover effect from the partners. We also provide further support for previous studies which show that the counterparty's ESG performance is an important concern for financial decisions such as loan lending (Goss and Roberts, 2011), supply chain trade credit (Zhang et al., 2020), and target selection in acquisition (Gomes, 2019).

¹⁹ 7% is calculated as $10.074 \times (0.005 / 0.640)$, where 0.005 and 10.074 is the coefficient and standard deviation of *Environmental risk* respectively, and 0.640 is the mean of the dependent variable $M\&A/(M\&A + Alliance)$.

Our results remain robust when using Multinomial Logit, Logistic, and OLS regressions with firm fixed effects as shown in columns (4) to (6). Further, the coefficients on the control variables are mostly in line with prior studies (Jandik and Kali, 2009; Bodnaruk et al., 2016; Huang et al., 2021). For example, firms with higher sales growth, higher return on equity, higher past return, lower market value, or lower capital expenditure are more likely to use M&As as external expansions.

[Table 2]

Since the risks from the partner's social and governance performance might also affect the deal selection of US firms, we control these risks in the baseline model as the robustness check. The social and governance risk are proxied by the negative average social and governance performance scores of the foreign partner's domiciled country each year, respectively. The results in column (1) of Appendix Table A3 show that the ER coefficient remains significantly positive, while the coefficients of social and governance risk are insignificant, which might be due to the high correlation between these three risks.²⁰ We, therefore, separately add the social, governance, and overall ESG risk in regression model. Columns (2) to (4) show that the standalone effects of these risks are significantly positive.

4.2 US Firm's Corporate Governance and Financial Constraints

The baseline results provide evidence that the ER of the foreign firms significantly affects the US firm's international expansion strategies. In this subsection, we conduct further cross-sectional tests to examine whether a US firm's corporate governance quality and financial flexibility can affect its deal selection when facing high ER from the partners.

²⁰ In untabulated results, we find that the correlation coefficients are 0.852 between environmental and social risk, 0.310 between environmental and governance risk, and 0.232 between social and governance risk. All of these are significant at the 5% significance level.

Acquirers' corporate governance and management practices are usually embraced by targets after acquisitions, leading to enhancements in targets' corporate governance and management practices (Bris et al., 2008; Wang and Xie, 2009; Albuquerque et al., 2019; Bai et al., 2022). We, therefore, conjecture that the well-governed US firms emphasizing environmental engagement would be more likely to manage the ER from the counterpart firms. M&As rather than alliances would be employed to mitigate the negative externality from the partners when partners have high ER. Prior studies document the positive relationship between corporate governance and CSR performance through the channel of external monitoring, such as institutional ownership, and internal monitoring, such as board independence (e.g., Jo and Harjoto, 2011; Chen et al., 2020). Following these works, we use institutional ownership, the ratio of independent directors, and the entrenchment index (E-index) as the proxies for corporate governance. We then partition the sample into US firms with high (low) governance quality group by using the median value of the proxies in a given year in the sample. Specifically, firms with higher (lower) institutional ownership, higher (lower) fraction of independent directors on board, and lower (higher) E-index are defined as well- (poorly-) governed firms.

Panel A of Table 3 reports the results for the subgroups of US firms sorted on the US firm's governance quality. The significant coefficient of *Environmental risk* in column (1) indicates that the US firms with more institutional ownership are more likely to select cross-border M&As over alliances to deal with the partner's ER.²¹ The results shown in columns (3) and (5) are also in line with our expectation; that is, the impact of a foreign partner's ER is

²¹ We also examine whether institutional investors who are active in environmental engagement could affect the holding firms deal decisions for ERM. Following Azar et al. (2021) which documents the significant role of the "Big Three" (i.e., BlackRock, Vanguard, and State Street Global Advisors) in carbon emissions reduction, we use the shares held by the "Big Three" as the proxy for institutional investors' environmental engagement in a given firm. We find firms with both high and low shares held by "the Big Three" tend to select cross-border M&As over alliances to manage the partner's ER. Results are reported in Appendix Table A4.

more pronounced for the well-governed US firms with a higher fraction of independent directors on board and lower E-index.

Next, we examine the impact of financial flexibility on the US firm's deal selection. Firms with financial constraints have less flexibility in making selections between M&As and alliances, as they have limited access to M&As that require substantial financial resources. On the other hand, firms with financial slack have more capacity to select investment strategies to pursue optimal risk management policy (e.g., Bodnaruk et al., 2016; Huang et al., 2021). Therefore, we expect that the US firms with less financial constraints are more sensitive to the foreign partner's ER when making selections between M&As and alliances. We use the Kaplan-Zingales index (KZ index) and S&P long-term credit rating to proxy for financial constraints (e.g., Farre-Mensa and Ljungqvist, 2016; Nguyen et al., 2018). Specifically, we classify the US firms into a financial constraints (non-financial constraints) group if the firm's KZ index is above (below) the sample yearly median value or whether the firm is without (with) S&P long-term credit rating.

Panel B of Table 3 reports the results across the financially constrained and unconstrained subsamples. The significant coefficients of *Environmental risk* shown in columns (2) and (4) indicate that the impact of the foreign partner's ER on the US firm's deal selection is more pronounced when the US firms are less financially constrained. Overall, these results highlight the importance of financial slack in the relation between cross-border expansion forms and partners' ERM.

[Table 3]

Further, we explore whether the environmental performance of the US firm would affect its motivation to manage ER. We expect that the US firms with good environmental performance would cherish their environmental reputation, thus being more cautious in making

expansion decisions considering the ER from the partners. We measure the US firm's environmental performance using the environmental strengths and concerns from the KLD Stats database.²² Specifically, we categorize the firms into two groups, i.e., green firms and non-green firms. Following Boone and Uysal (2020), we define the firms as green firms if they have at least one environmental strength while having no environmental concerns. Non-green firms are those with at least one environmental concern. The firms without environmental strengths and concerns are excluded from the sample. Appendix Table A5 reports the results, showing that green firms rather than non-green firms are more sensitive to the foreign partner's ER when making expansion decisions.²³

4.3 Further Analysis

4.3.1 Institution Quality and Partner Expropriation Risk

One concern of our regression model is that other institutional factors of the host country could affect both the environmental performance of the host country and the US firm's deal selection, thus biasing our results. For example, the quality of legal systems in the host country not only affects the cross-border M&A decisions (Jandik and Kali et al., 2009; Erel et al., 2012; Brockman et al., 2013) but influences local firm's ESG practice in the host country (Ioannou and Serafeim, 2012; Ghoul et al., 2017). To measure the institution quality, we use the governance indicators from the World Bank's Worldwide Governance Indicators (WGI) index between 1996 and 2020 (Kaufmann et al., 2010; Brockman et al., 2013; Erel et al., 2012).

²² This measurement could also capture the US firm's environmental risk, which is commonly used in prior studies focusing on environmental risk. Our main variable of interest, i.e., the environmental risk of the foreign firms, cannot be measured by using KLD data due to the database coverage, while using KLD data to measure the US firm's environmental risk here could reflect our considerations about keeping consistent with prior related studies.

²³ Besides, we also consider the heterogeneity of the US firms in terms of the level of litigation risk, as firms with high litigation risk may face greater pressure to improve the ESG performance (e.g., Koh et al., 2014). We follow Francis et al. (1994) to identify the firms with high litigation risk if they are in the biotechnology, computers, electronics or retail industries. However, our untabulated empirical results suggest that there is no significant difference between firms with high litigation risk and firms with low litigation risk, i.e., both type of firms tend to select M&As rather than alliances when facing high environmental risk from the partners.

Specifically, we use two proxies: the average score of the six governance indicators (i.e., accountability, political stability, government effectiveness, regulatory quality, the rule of law, and corruption control) from the World Bank’s Worldwide Governance Indicators (WGI) and the regulatory enforcement score from the World Justice Project, where the high value of the proxy indicates strong legal system. These two variables are separately added to the baseline model to rule out the compounding effect of institutional quality. Columns (1) and (2) of Table 4 present the results. The ER of the foreign partners still significantly affects the US firm’s deal selections when we control the institution quality of the host country.

Further, Bodnaruk et al. (2016) find that the expropriation risk from the direct and indirect partners in the host country plays an important role in the deal selection between cross-border M&As and alliances. Following their work, we further control for this type of risk in our model by using *Legal formalism* and *Procedural complexity* to capture the direct partner risk and using *Constraints on executive power* and *Protection against expropriation* to account for the indirect partner risk. As shown in columns (3) and (4) of Table 4, our results remain intact. The impacts of these four proxies on the US firm’s selection between M&As and alliances are consistent with Bodnaruk et al. (2016).

[Table 4]

4.3.2 Environmental Regulation

So far, we show that the partners’ ER plays a significant role in the US firm’s choice of international expansions. We further examine whether the environmental regulations in the host country might affect US firms’ deal selection,²⁴ and whether host countries’ ER might also be affected after the passage of environmental regulations. To rule out the potential estimation

²⁴ For instance, the US firms might outsource the carbon emissions to foreign suppliers (Dai et al., 2022) or to foreign acquisition targets (Bose et al., 2021) in the countries with weak environmental regulatory standards due to the lower carbon emission costs.

bias, we add the environmental regulations as control variables in our regression model. First, we focus on the staggered introduction of environmental sustainability disclosure reforms in certain foreign countries. The information for the sustainability disclosure reforms is collected from Carrot & Sticks, and these reforms could be either newly introduced laws, policies, or regulations on a firm's sustainability disclosure requirements (Schiller, 2018; Iliev and Roth, 2021, Hsu et al., 2021; Christensen et al., 2022).²⁵ We define a dummy variable (*Shock*) to indicate the passage of the environmental-related disclosure reforms at the foreign country-level, which is equal to one if the foreign country has the rules in place in year t , and zero otherwise.²⁶

Table 5 presents the results. Column (1) shows that the coefficient of the environmental risk of the partners is still significantly positive after controlling for the impact from environmental regulations. Moreover, the passage of sustainability disclosure reforms in the host countries leads to a higher likelihood of cross-border alliances over M&As conducted by US firms, indicating that the environmental legislation facilitates a more “market-like” arrangement. This is consistent with Jandik and Kali (2009), which find that the improvement of legal systems leads to a transition from “firm-like” arrangements (i.e., M&As) to arm's length “market-like” arrangements (i.e., alliances).²⁷

Next, as the staggered adoption of sustainability disclosure reforms is the exogenous shock to the different host countries, we conduct difference-in-differences (DID) tests to

²⁵ We thank Iliev and Roth (2021) for providing the list of the countries which adopt the sustainability disclosure requirements during 2000-2016. We only focus on the environmental-related regulations and update the regulations to 2020. All the data is originally collected from the Carrot & Sticks reports (<https://www.carrotsandsticks.net/regulations>). Our results keep consistent if we use the ESG-related regulations shown in Iliev and Roth (2021) as the shocks.

²⁶ If there is a series of environmental rules adopted in a given country during the sample period, we define a regulatory shock as the first year when the first environmental rule was passed.

²⁷ Following Lin et al (2022), we also consider the Environmental Policy Stringency Index (EPSI) as the alternative measurement for the environmental regulations in the host countries. Our untabulated results draw the consistent conclusion, i.e., the US firms tend to make cross-border alliances rather than M&As when the host countries have more stringent environmental regulations.

validate the parallel trend assumption for the exogenous shock. A series of dummy variables are added in the model, where DR (-1), DR (0), DR (+1), and DR (2+) indicate whether the deal is in the year before, in the year of, in the year after, and the two or more years after the adoption of the sustainability disclosure reforms. Column (2) shows that only the coefficients on DR (+1) and DR (2+) are negatively significant, suggesting that there is no pre-treatment difference between the treatment and control groups in terms of deal preference.

Moreover, we examine whether the sustainability disclosure reform in the host country would moderate the relationship between the US firm's deal selection and environmental risk of the foreign partners. We define a dummy variable *High Environmental Risk* to indicate whether the host country has high ER, i.e., lower environmental performance. The variable equals one if the host country's average environmental score is lower than yearly median value in the sample, and zero otherwise. Column (3) reports the results. We find that the coefficient of the interaction term between the *High Environmental risk* and *Shock* is significantly positive, suggesting that the US firm's preference on M&As over alliances in the high environmental risk countries is more pronounced after the passage of the environmental regulation.²⁸

Recent studies show that empirical estimations with multiple time periods and variation in treatment timing (staggered DID method) can lead to the estimation bias (Cengiz et al., 2019; Chaisemartin and d'Haultfoeuille, 2020; Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021; Sun and Abraham, 2021; Baker et al., 2022; Borusyak et al., 2022). Following these works, we conduct the stacked DID tests. Our results remain consistent.

[Table 5]

²⁸ The estimated regression equation is $(0.105 \text{ Shock} + 0.008) \times \text{High environmental risk} - 0.127 \text{ Shock}$

Finally, we employ the adoption of the Paris Agreement among all the host countries as the alternative exogenous shock to the change of environmental regulations. The results in columns (4) and (5) of Table 5 remain consistent.

4.3.3 Carbon Risk

A central theme of sustainable development is that firms should endeavor to reduce carbon emissions during operations to achieve the net-zero emissions goal. Firms with high carbon emissions are expected to pay higher premiums to stockholders and lenders since investors demand a high compensation for carbon risk exposure (e.g., Bolton and Kacperczyk, 2021; Ehlers et al., 2022; Seltzer et al., 2022). As a corporation's carbon footprint attracts various stakeholders' attention, managing the carbon risk from counterparties becomes increasingly important for inter-firm partnership. For instance, environmental scandals associated with suppliers can increase the customers' reputation risk with subsequent stock price drops (Dai et al., 2021). Further, recent studies (e.g., Berg et al., 2021a, 2021b; Gibson et al., 2021; Berg et al., 2022) demonstrate the potential issues of ESG scores. Using CO2 emissions to capture ER can help to alleviate the measurement issues. Overall, we conjecture that high carbon emissions from the foreign partners can amplify the firm's concerns about the partners' overall ER when making deal selections between cross-border M&As and alliances.

To examine our prediction, we use the direct CO2 emissions (*Scope 1*), indirect CO2 emissions (*Scope 2* or *Scope 3*), and corporate total CO2 emissions (sum of *Scope 1* and *Scope 2*) to measure the foreign partners' carbon emissions.²⁹ Specifically, the carbon emissions are calculated as the ratio of the average emission to the host country's net sales each year. *Scope 1* measures the direct emissions from the firm's fossil fuel usage in production. *Scope 2*

²⁹ *Scope 1* and *2* emissions are a mandatory part of reporting for many organizations across the world while the *scope 3* emission mostly remains voluntary to report. Our focus is *scope 1* emission as the firm has the most direct control over this type of emission. We also use the sum of *scope 1* and *scope 2* to capture the total carbon emission of the firm (Seltzer et al., 2022).

measures the emissions from the generation of imported (purchased) electricity, heat, or steam consumed by the organization. Scope 3 measures the emissions from sources not owned or controlled by a firm, such as from its supply chain.

Table 6 reports the results. The significantly positive coefficient of *Scope 1* shown in column (1) suggests that the likelihood of conducting cross-border M&As by US firms is higher if the direct carbon emissions are higher in the host country. Further, the interaction term between Scope 1 carbon emissions and environment score is significantly positive, consistent with our conjecture that US firms' preference for M&As due to the concern of high ER of foreign partners increases if the host country has higher direct carbon emissions. Our results remain intact using the total carbon emissions (the sum of Scope 1 and 2 emissions), as suggested in column (4). The impact of indirect carbon emission (Scope 2 and 3) is insignificant as shown in columns (2) and (3).³⁰

[Table 6]

4.3.4 Endogeneity Problem

One concern of our analysis might be the potential endogeneity problem due to sample selection bias. For instance, a US firm might choose partners with low ER for risk management rather than make the trade-off between M&As and alliances to manage the partner's ER. One plausible explanation might be that other intentions dominate the US firm's selection of specific partners, such as markets and complementary resources access, geographic distance concerns, and other observed or unobserved determinants. Therefore, using the sample only based on the

³⁰ We also examine the heterogeneity of biodiversity, climate vulnerability index, and climate disaster in the host countries by conducting subsample tests. We obtain the biodiversity data, which is the sub-index of Environmental Sustainability Index, from Passport (Euromonitor International). Climate vulnerability index is obtained from the sub-index Notre Dame-Global Adaptation Index (ND-GAIN) (<https://gain.nd.edu/our-work/country-index/>). We collect the data of climate disaster including drought, extreme temperature, flood, landslide, storm, and wildfire from EM-DAT. Appendix Table A7 shows that the impact of foreign partner's ER on US firm's deal selection is more pronounced when the host country has low biodiversity, high climate vulnerability, and experienced significant disaster in previous three years.

foreign partners conducting deals with the US firms might lead to potential selection bias. To address this, we decompose the selection process into the following three steps in the spirit of Bodnaruk et al. (2016): first, the US firms choose whether to expand internationally, i.e., to conduct any cross-border deals regardless of the host country. Second, the US firms who expand internationally choose which foreign country to enter, regardless of entry modes. Third, given the selected foreign country, the US firms choose either cross-border M&As or cross-border alliances to manage the foreign partner's ER.

We use the Heckman selection model to address this sample selection issue and employ exogenous identification variables for the first- and second-stage selection regressions. For the first-stage selection, i.e., the US firms choose whether to expand abroad, we use Tobit regression models to examine the US public firms' international expansion activities each year. The regression sample includes all the public US firms reported in Compustat during the sample period, and the observations are at the US firm-year level. The dependent variable is the natural logarithm of one plus the total number of cross-border deals (i.e., cross-border M&As and alliances) that the firm has conducted in a given year. Following Bodnaruk et al. (2016), we use the ratio of foreign taxes the US firm has paid to its total assets (*Foreign Tax*) as the identification variable in the first stage regression. Foreign taxes could capture the firm's overall international exposure and activity engagement. However, it is less likely to affect the US firm's host country selection in the second stage and entry modes in the third stage. We also control the number of cross-border M&A and alliance deals the US firm conducted in the previous year and the number of deals the industry peers undertook in the previous year. The US firm's characteristics used in our baseline model are also added in this regression. Panel A of Table 7 shows a significantly positive relationship between the US firm's foreign tax and international expansion decisions, consistent with our conjecture. Further, we find that the US

firm's previous experience on cross-border deals facilitates the US firm to conduct more international deals in the future.

Next, in the second stage, we examine the US firm's selection of host countries conditionally on the firm investing abroad. The sample consists of the US firms which have formed at least one cross-border alliance or one cross-border M&A in a given year (regardless of the host country), and the observations are at the US firm-HostCountry-year level. We use the Tobit model at the stage two regression, and the dependent variable is the natural logarithm of one plus the number of cross-border alliances and M&As that the US firm has formed in a host country in a given year. The inverse Mills ratio (*Lambda 1*) estimated from stage one regression shown in Panel A is also included in the stage two regression. The change of the exchange rate between the host country and the US over the previous year (foreign currency per USD) is adopted as the exogenous identification variable in this stage since the dollar appreciation and depreciation against the foreign currency could affect the US firm's expansion activities in a given foreign country. The foreign partners' ER and the US firm's characteristics are also included in the regression model. We report the results in column (1) of Panel B in Table 7. We find that the coefficient of change of the exchange rate is significantly positive, suggesting that the US dollar appreciation could promote more US firms' investment activities in a given foreign country. However, the results show that the foreign partner's ER coefficient is insignificant. This is consistent with our expectation that the foreign partners' ER should not affect the US firm's choice of specific foreign countries. Instead, it is supposed to directly influence the US firm's entry mode at the third stage.

Finally, in the third stage, we examine the US firm's entry modes (M&As vs. alliances) in a given country. Based on our baseline model, we add the inverse Mills ratios (*Lambda 1* and *Lambda 2*) estimated from the first- and second-stage regressions to correct for the potential selection bias. The results are reported in column (2) of Panel B of Table 7. Our

variable of interest, i.e., the foreign partners' ER, still significantly impacts the US firm's deal selection between M&As and alliances after the Heckman correction.

[Table 7]

4.4 US Firms Performance

In the subsections above, we uncovered the critical role of managing ER in firms' international expansion. In this subsection, we explore the value creation of incorporating ERM into global expansion strategies. Specifically, we conjecture that the choices of cross-border M&As over alliances would be more beneficial when the counterparties have high ER since strengthening ERM can result in a positive financial market reaction (Sharfman and Fernando, 2008; Aktas et al., 2011).

To measure the deal's short-term stock performance, we calculate the 11-day cumulative abnormal return (CAR) in the (-5, +5) days window around the deal announcement date under the Fama-French four-factor model (market, size, value, and momentum factors) following Bodnaruk et al. (2016).³¹ To rule out the possibility that the return differences between M&As and alliances are driven by the heterogeneity of US firms and host country characteristics, we run the regression of the deal returns by using the full sample consisting of both M&A and alliance deals. *M&A dummy* denotes whether the deals made by the US firm are cross-border M&As or alliances, and the interaction term between the *M&A dummy* and *Environmental risk* captures the difference of deal announcement returns between M&A and alliances for a given level of foreign partner's ER.

Table 8 reports the results. Columns (1) to (3) show that the interaction term coefficient between the M&A dummy and the partner's ER is significantly positive. However, the foreign

³¹ We obtain the market returns, size, book-to-market, and momentum factors from Ken French's website: <http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/>.

partner's ER and the M&A deal dummy coefficients are insignificant. Taking the *Environmental risk* coefficient into account when interpreting the interaction term, we find that when the foreign partners have high ER, cross-border M&A is more beneficial than cross-border alliance for the US firms.³² It implies that using M&As to manage partners' ER is value-increasing for the firm's international expansion.

[Table 8]

One concern is that the omitted firm characteristics can influence the deal selection between M&As and alliances, which also affect the deal performance. To address the endogeneity concern, we use the alternative sample with matched M&A and alliance deals based on the US firms' characteristics.

Specifically, we first use the logistic regression to estimate the probability of choosing M&A deals (treated group) on a series of US firm fundamental characteristics including the logarithm of market capitalization ($\ln(MktCap)$), sales growth rate (*Sales growth*), capital expenditure to assets (*Capex*), return on equity (*ROE*), debt to equity ratio (*D/E*), prior year 12 months stock returns (*Past return*), annualized standard deviation of daily stock returns over the previous 12 months (*Volatility*), and industry concentration (*Industry Concentration*). We then match each M&A to an alliance deal by applying a one-to-one nearest-neighbor propensity score matching without replacement and require the propensity scores for each matched pair to be within 1%.

Panel B of Table 8 presents the post-diagnostic test for the matched sample. As can be seen, the means of fundamental characteristics of the US firms are not significantly different

³² The model with estimates shown in column (1) should be $CARs = (0.034 \text{ M\&A dummy} - 0.014) \text{ Environmental risk} + 1.215 \text{ M\&A dummy}$.

between M&A and alliance deals, implying that our matched sample is reliable. Column (4) in Panel A of Table 8 shows that our results remain robust using the matched sample.

Further, we investigate whether the increase in the deal performance is stronger in the subsample of US firms from competitive industries. Firms in highly competitive industries increase CSR engagements to enhance their reputational and competitive advantages for financial performance (Miles and Covin, 2000; Flammer, 2015) and have greater incentives to improve management practices (Bai et al., 2022). Further, acquisitions are helpful for value creation when firms are in a more competitive product market (Hoberg and Phillips, 2010). We, therefore, conjecture that the US firms in the competitive market are more likely to choose M&As to manage high ER. Thus, the market reaction to such deals is more pronounced.

Specifically, we use the Herfindahl–Hirschman index (HHI) and the Hoberg and Phillips (2016) product market similarity to measure market competition. We classify a US firm into a high competition market if its HHI (total similarity) is below (above) the mean of HHI (total similarity) in each year. Panel A of Table 9 shows that the interaction term coefficient between M&A dummy and ER is significantly positive for firms in a high competition market, consistent with our prediction that the impact of high ER on M&A performance is more pronounced for the firm in a highly competitive market.

Finally, we explore the heterogeneity from the deal attribute since horizontal deals are riskier than diversified deals (Gormley and Matsa, 2016). Thus, we conjecture that the market would react well to the deals for ERM. Panel B of Table 9 shows that the market reaction to M&A deals made in high environment risk is more pronounced when the US and foreign firms are in the same industry (i.e., the same two-digit SIC code).

[Table 9]

5. Theoretical Framework

In this section, we present an analytical model to illustrate the effect of ER on the choices between M&As and alliances. Specifically, we assume that the production function has the following technology

$$Q = A \times \text{Invested Capital, where } A > 0 \text{ is a constant} \quad (1)$$

We assume a single-period model with two dates: $t = 0$ and $t = 1$. The investment cost of the US firm is $\frac{cI^2}{2}$; with $0 < c < 1$ being a constant, which implies an increasing marginal cost of investment. Firms have an opportunity to combine their operations to reduce their marginal cost by a constant amount s ($0 < s < c$). They can realize this cost saving either by acquiring or allying. Prices are normalized to unity.

To manage the country-specific ER, the multinational US firm 1 (target firm 2) must pay a random lump sum upfront with realization at $t = 1$, i.e., \tilde{F}_1 (\tilde{F}_2), defined in source country's currency units.³³ Given the total capital investment (I) in the joint venture from the two participant firms, the total terminal (uncertain) net income under alliances is

$$y^{\tilde{JV}} = I \left(A - \frac{c-s}{2}I - \tau - (\tilde{F}_1 + \tilde{F}_2) \right) \quad (3)$$

\tilde{F}_1 represents the ER in the source country, subsumed under the random upfront cost that the firm 1 (located in the source country) has to bear to continue operating. The ER in the host country is captured by the uncertain upfront cost, \tilde{F}_2 , which firm 2 in the host country needs to pay for continuing operation. $\tau > 0$ is the transaction cost from any deal (M&As or alliances) with the partner firm, capturing the asymmetric information between two firms.

When the US firm's foreign target is ultimately acquired, the US firm is only bearing $\alpha \in (0,1)$ share of the uncertain upfront cost for the target firm's country-specific ER (as the target firm's environmental performance would be improved due to the governed ER after acquisitions).

The total net earnings under M&As are,

$$y^{\tilde{MA}} = I \left\{ A - \frac{(c-s)I}{2} - \tau - (\tilde{F}_1 + \alpha\tilde{F}_2) - \gamma \right\}; 0 < \alpha < 1. \quad (4)$$

³³ We denote all random variables by a tilde (\sim), while their realisations are not denoted with a tilde.

where γ is the governance cost related to the environmental performance improvement of the target firm owing to acquisition.

The acquirer incurs a minimum sunk governance cost upfront (θ) to govern the target firm. If \widetilde{F}_2 is greater than a threshold value δ , then the effective governance cost that the acquirer needs to pay becomes $\theta + \beta(\widetilde{F}_2 - \delta)$, with $\beta > 0, \delta > 0$. Also, we assume that the minimum sunk governance upfront cost, θ , that the acquirer has to incur, is higher than the threshold valuation of the ER that the acquirer must face in the host country; viz., $\theta > \beta\delta$. In other words, the minimum sunk governance upfront cost not only mitigates the threshold ER that the acquirer needs to take care of in the host country, but also accounts for any additional cost of monitoring under the threshold ER in the host country.

However, an increase of ER in the foreign partner above this threshold δ implies that the acquirer's effective governance cost is assumed to be higher than the minimum sunk governance cost (θ). For a foreign country with a relatively corrupt legal and institutional structure, the cost of governing the environmental performance of the target firm is typically higher. Hence, for such a partner country under consideration, we can safely presume that $\beta > 0$.

If $\widetilde{F}_2 \leq \delta$ and $\beta = 0$, it would be sufficient for the acquirer to pay only θ as the effective governance cost for $\widetilde{F}_2 \leq \delta$. Collectively, the governance cost (γ) is

$$\begin{aligned}\gamma &= \theta + \beta(\widetilde{F}_2 - \delta), \text{ if } \delta < \widetilde{F}_2; \\ &= \theta, \quad \text{if } \widetilde{F}_2 \leq \delta.\end{aligned}$$

Note that, Therefore, the US firm's net earnings under M&As are

$$\begin{aligned}y^{\widetilde{MA}} &= I \left\{ A - \frac{(c-s)I}{2} - \tau - \widetilde{F}_1 - \widetilde{F}_2(\alpha + \beta) - \theta + \beta\delta \right\}, \text{ if } \theta < \widetilde{F}_2; \\ &= I \left\{ A - \frac{(c-s)I}{2} - \tau - (\widetilde{F}_1 + \alpha\widetilde{F}_2) - \theta \right\}, \quad \text{if } \widetilde{F}_2 \leq \theta.\end{aligned}$$

(4.1)

We define the efficiency gain (loss) of M&As relative to alliances under uncertain upfront costs in the foreign countries as

$$\tilde{D} = y^{\widetilde{MA}} - y^{\widetilde{JV}} \quad (5)$$

Case 1: $\delta < \widetilde{F}_2$: the threshold that the governance cost paid by the acquirer is less than the effective uncertain upfront fixed cost.

$$\tilde{D} = I[\beta\delta - \theta - \widetilde{F}_2\{(\alpha + \beta) - 1\}]$$

Hence, the mean of \tilde{D} is

$$\mu_D = I[\mu_{F_2}\{1 - (\alpha + \beta)\} - (\theta - \beta\delta)] \quad (6)$$

Similarly, the variance of \tilde{D} is

$$v_D = I^2 v_{F_2} [1 - (\alpha + \beta)]^2 \quad (7)$$

The vector of the appropriate parameters (other than the primary decision (endogenous) variable, I) for our model is

$$\Theta = (\mu_{F_2}, v_{F_2}, \theta, \delta, \alpha, \beta).$$

We define the marginal rate of substitution (MRS) between risk and return as:

$$S(v_D(I, \Theta), \mu_D(I, \Theta)) = -\frac{U_v(v_D(I, \Theta), \mu_D(I, \Theta))}{U_\mu(v_D(I, \Theta), \mu_D(I, \Theta))} > 0, \text{ for risk aversion.}$$

$S > 0$ is the two-parameter analogous to the Arrow–Pratt (Arrow, 1965; Pratt, 1964) measure of absolute risk aversion.³⁴ We solve the following problem

$$\max_{I^* > 0} U(v_D, \mu_D)$$

$$\text{s.t. (6), (7), and } \tilde{D}^* > 0$$

³⁴ $U(v_D, \mu_D)$ satisfies the following conditions: (1) $U_\mu(v_D, \mu_D) > 0, U_{\mu\mu} < 0, \forall (v_D, \mu_D)$; (2) $U_v(v_D, \mu_D) < 0, U_{vv} < 0 \forall (v_D, \mu_D)$; (3) $U(v_D, \mu_D)$ is strictly quasi-concave in (v_D, μ_D) , with $U_{\mu v} = U_{v\mu} > 0$. Conditions (1) and (2) are the non-satiation property and risk aversion, respectively. Conditions (2) and (3) imply that the indifference curves are upward sloping.

For the interior solution of the decision problem, the first-order condition for maximisation yields,

$$\frac{[\mu_{F_2}\{1 - (\alpha + \beta)\} - (\theta - \beta\delta)]}{2I^*v_{F_2}[(\alpha + \beta) - 1]^2} = S(I^*, \Theta) \quad (8)$$

RHS is the slope of the “indifference curve” in the (v_D, μ_D) -space, and the LHS is the slope of the “efficiency frontier” (the set of (v_D, μ_D) -pairs that can be attained by changes in I), with the optimal I^* corresponds to the interior solution of Eq. (8).³⁵ For risk aversion, the numerator of slope of the “efficiency frontier” in Eq. (8) must be positive, implying $1 - (\theta - \beta\delta)/\mu_{F_2} > (\alpha + \beta)$. With $\theta > \beta\delta$, this must imply $(\alpha + \beta) < 1$.

Using the optimal investment (I^*), obtained from Eq. (8) in the MV Utility function, we obtain the Indirect Utility Function:

$$U^* = U(v_D(I^*), \mu_D(I^*)) \quad (9)$$

Maximising (9) w.r.t. α and applying envelope theorem we obtain

$$\partial U^*(.)/\partial \alpha U_{\mu_D} I^* = \underbrace{-\mu_{F_2}}_{[1]} + \underbrace{2I^*S(v_D^*, \mu_D^*)v_{F_2}(1 - \alpha - \beta)}_{[2]} = 0 \quad (10)$$

Eq. (10) characterises the relative welfare implication of signing the M&A, as opposed to the alliance deals. The term [1] is negative and represents the *wealth effect of signing the M&A deals*. Increasing α , ceteris paribus, reduces the mean post-deal income due to higher acquisition costs.

With $(\alpha + \beta) < 1$, term [2] is positive, denoting the *risk effect or substitution effect* of increase in α . This effect is therefore positive for a risk-averse source country firm, viz., with $S(v_D^*, \mu_D^*) > 0$.

Solving Eq. (10), we can obtain the optimal value of α (α^*) with respect to the optimal I^* .

³⁵ See, e.g., Eichner (2008), Eichner & Wagener (2012), and Mukherjee et al. (2021). The second-order condition of $\frac{\partial^2 \varphi(I^*, \Theta)}{\partial I} < 0$ is satisfied under the following sufficiency conditions: (1) the quasi-concavity of $U(v_D(I^*, \Theta), \mu_D(I^*, \Theta))$; (2) the risk aversion behaviour of the source country firm; (3) the convexity of $(\partial v_D(I^*, \Theta)/\partial I)$ in I .

We examine under what conditions we have $\partial\alpha^*/\partial\mu_{F_2} \leq 0$. If the optimal α decreases when μ_{F_2} is high, it means that the acquirer bears a lesser burden of the partner country's ER under the M&As compared to alliances. That is, under the higher expected ER in the partner country, the acquirer is more likely to choose the M&As over alliances.

Implicitly differentiating Eq. (10) w.r.t. μ_{F_2} ,

$$\partial\alpha^*/\partial\mu_{F_2} = \left[\underbrace{-1}_{\text{Wealth Effect}} \quad \underbrace{+2S_{\mu_D}^* v_D^*}_{\text{Risk Effect}} \right] \leq 0 \quad (11)$$

The wealth effect is negative, indicating that as μ_{F_2} increases, ceteris paribus, the US firm, being risk averse, would like to opt for higher risk-premium, and therefore, responds by further reducing the optimal α .

Hence, $\partial\alpha^*/\partial\mu_{F_2} \leq 0$, if and only if $S_{\mu_D}^* \leq (1/2v_D^*)$. Although this sufficiency condition comprises the possibility of having increasing absolute risk preference (IARA) ($S_{\mu_D}^* > 0$), it does not preclude the possibility of having DARA (i.e., the likelihood of higher risk-taking (lower risk aversion: $S_{\mu_D}^* < 0$) with the possibility of higher expected return) preference structure and thereby, a positive risk effect and a negative wealth effect.

Given that we are considering a rational and well-behaved US firm, averting to any additional ER from the host country (when the firm's risk aversion is characterised by "properness"), having strictly quasi-concave mean-variance utility function necessitates DARA preference pattern ([Lajeri-Chaherli, 2002](#); [Eichner and Wagener, 2009](#)) of the source country firm ($S_{\mu_D}^* < 0$).

Case – 2: $\delta \geq \widetilde{F}_2$; the threshold that the governance cost paid by the acquirer is greater than or equal to the effective uncertain upfront fixed cost. Deriving the first-order condition of Case 2 is similar to that of Case 1. We again show the sufficient condition for $\partial\alpha^*/\partial\mu_{F_2} \leq 0$ if and only if $S_{\mu_D}^*(.) \leq (1/2v_D^*)$.³⁶ Overall, the US firm with a DARA preference structure is more

³⁶ Internet Appendix Model provides the details for the first-order conditions.

likely to choose M&As over alliances under the higher expected ER in the partner country.

6. Conclusion

ER has an important impact on corporate strategies, and the choices of cross-border M&As and alliances are the critical decisions of international adventure. Examining a sample of the cross-border M&A and alliance deals conducted by the US firms from 39 host countries over the last two decades, we show that firms choose cross-border M&As over alliances when the partner firm has a high ER. This preference of M&As for alliances is significant for firms with good governance quality and financial slack. Our results remain robust when we use the foreign partner's risk from social, governance, and overall ESG performance and control for the institution quality, expropriation risk, and carbon risk.

We use the international ESG regulations and the Paris Agreement as exogenous shocks to alleviate endogeneity concerns. The passage of sustainability disclosure reforms in the host countries and the Paris Agreement increases the likelihood of cross-border alliances over M&As conducted by US firms. Further, the M&A deals rather than alliances could yield higher CARs when the US firms face foreign partners with high ER. The market reaction is more pronounced for firms operating in competitive markets and conducting horizontal deals.

We present a mean-variance utility (MVU) model to illustrate the optimal mode of internationalization (M&As or alliances) under a high ER of the foreign partner firm. The sufficiency condition to optimally choose M&As over alliances can be comprehended in terms of the relative risk-return trade-offs. When the degree of absolute risk aversion is not overly amplified with the possibility of high expected net efficiency gain of M&As over alliances, it is optimal to select M&As over alliances.

Our work contributes to a growing literature on the importance of ESG on firm strategies. It is one of the first studies highlighting the direct effect of ER on cross-border M&As and alliances. Overall, our study enriches our understanding of the importance of ER as a driving force behind corporate international expansion strategy.

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Table 1: Summary statistic

This table reports the descriptive statistics of our data. Panel A presents the distribution of US firms involved in cross-border M&As and alliances deals by the host country. M&A/Total deal is the ratio of M&As to the total number of deals (M&As and alliances). Panels B and C show the summary statistics of US firm-level and host country-level variables, respectively. Continuous control variables are winsorized at the 1st and 99th percentiles. Appendix Table A1 provides detailed descriptions of variables.

Panel A: Deal Distribution across Countries

Host Country	M&A	Alliances	M&A/Total deal
Argentina	54	14	0.794
Austria	51	17	0.750
Australia	449	215	0.676
Belgium	114	55	0.675
Brazil	228	56	0.803
Canada	1,334	486	0.733
Czech Republic	50	7	0.877
Chile	45	16	0.738
China	227	517	0.305
Colombia	28	8	0.778
Denmark	107	76	0.585
Finland	63	38	0.624
France	436	230	0.655
Hong Kong	64	90	0.416
India	209	383	0.353
Ireland-Rep	171	58	0.747
Israel	215	143	0.601
Italy	226	83	0.731
Japan	95	401	0.192
Luxembourg	23	13	0.639
Malaysia	17	18	0.486
Mexico	136	52	0.723
Norway	90	44	0.672
Netherlands	296	132	0.692
New Zealand	66	32	0.673
Philippines	15	20	0.429
Poland	47	19	0.712
Russian Fed	43	66	0.394
South Africa	43	37	0.538
Saudi Arabia	7	60	0.104
Singapore	82	76	0.519
South Korea	64	165	0.279
Spain	211	75	0.738
Sweden	162	114	0.587
Switzerland	176	182	0.492
Turkey	37	23	0.617
Utd Arab Em	19	65	0.226
United Kingdom	1,640	659	0.713
Germany	689	371	0.650
Total	8,029	5,116	

Panel B: Firm characteristics

Variable	Obs	Mean	Std. dev.	Min	Max
M&A/(M&A+Alliance)	8,137	0.640	0.477	0.000	1.000
Ln(MktCap)	8,137	8.065	2.250	2.668	12.787
Ln(B/M)	8,137	-1.107	0.764	-3.607	0.529
Sales growth	8,137	0.169	0.426	-0.554	3.054
Cash	8,137	0.218	0.210	0.004	0.895
Capex	8,137	0.032	0.031	0.000	0.178
ROE	8,137	0.056	0.439	-2.270	1.629
D/E	8,137	0.774	1.599	0.000	12.274
Past return	8,137	0.182	0.480	-0.780	2.250
Volatility	8,137	0.025	0.014	0.009	0.084
Industry Concentration	8,137	0.164	0.172	0.013	0.938

Panel C: Host country variables

Variable	Obs	Mean	Std. dev.	Min	Max
Environment Score	8137	53.185	10.074	27.200	78.005
Social Score	8137	53.147	9.255	29.850	76.320
Governance Score	8137	49.944	1.642	42.330	56.619
Ln(GDP per capita)	8137	10.243	0.924	7.161	11.386
GDP growth (%)	8137	2.896	2.855	-4.114	12.721
MktCap/GDP (%)	8137	102.283	97.200	17.579	886.115
Stock turnover (%)	8137	81.129	47.289	6.035	249.907
Ln(average B/M)	8137	-0.773	0.296	-1.527	0.011
Average cash	8137	0.046	0.021	0.010	0.125
Average capex	8137	0.043	0.015	0.019	0.096
Average ROA	8137	3.397	12.737	-91.330	10.953

Table 2: Climate risk and firms' choice between alliances and M&As

This table reports the regression results of host country-level environmental risk on the US firms' choice between alliances and M&As. The sample includes firms that have made at least one alliance or M&A in a given host country in a given year. Columns (1) to (3) show the Tobit regression, and the dependent variable is $MA / (MA + ALLIANCE)$, which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. Column (4) shows the Multinomial Logit regression. The dependent variable takes the value of one if the US firm has only made M&As in a given host country in a given year, two if it did both alliances and M&As, and zero if it only made alliances (Baseline group is the ones which only made alliances). Column (5) shows the Logit regression. The dependent variable is a dummy variable which equals one if the firm did M&As, and zero otherwise. The regressions in column (1) to (5) control for the host country, year, and US firm industry fixed effects. Column (6) shows the OLS regression with host country, year, and US firm fixed effect. *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Tobit			Multinomial		Logit	OLS
	(1)	(2)	(3)	(4)		(5)	(6)
	M&A/(M&A+Alliance)			M&A	Alliance & M&A	=1 if M&As, 0 otherwise	M&A/(M&A+Alliance)
Environmental risk	0.003** (2.06)	0.003** (2.01)	0.005*** (3.72)	0.013** (2.37)	0.015 (0.72)	0.013** (2.36)	0.002** (2.20)
Ln(MktCap)		-0.053*** (-8.67)	-0.052*** (-8.86)	-0.206*** (-10.57)	0.238** (2.49)	-0.196*** (-10.13)	0.018 (1.25)
Ln(B/M)		0.012 (0.91)	0.013 (0.94)	0.012 (0.24)	0.259** (2.06)	0.012 (0.24)	-0.005 (-0.36)
Sales growth		0.066*** (4.41)	0.064*** (4.36)	0.255*** (4.55)	-0.527 (-1.38)	0.247*** (4.36)	0.017 (1.23)
Cash		-0.473*** (-6.61)	-0.465*** (-6.73)	-1.606*** (-7.47)	-2.877*** (-3.84)	-1.622*** (-7.60)	0.154*** (3.02)
Capex		-0.720** (-2.08)	-0.697** (-2.10)	-2.868** (-2.43)	-1.562 (-0.33)	-2.804** (-2.37)	0.174 (0.48)
ROE		0.130*** (4.08)	0.130*** (4.04)	0.388*** (3.45)	1.949*** (7.05)	0.398*** (3.54)	0.061* (1.97)
D/E		-0.030*** (-4.79)	-0.030*** (-4.79)	-0.112*** (-5.64)	-0.311*** (-3.68)	-0.114*** (-5.74)	-0.008 (-1.26)
Past return		0.138***	0.141***	0.515***	0.799**	0.516***	0.055***

		(7.01)	(7.16)	(6.53)	(2.15)	(6.86)	(3.86)
Volatility		-0.566***	-0.569***	-2.175***	0.011	-2.129***	-0.224***
		(-7.99)	(-8.11)	(-12.24)	(0.01)	(-11.70)	(-3.06)
Industry Concentration		0.028	0.030	0.132	-1.943***	0.102	-0.034
		(0.78)	(0.83)	(0.79)	(-3.10)	(0.62)	(-0.68)
Ln(GDP per capita)			-0.185**	-0.384*	-0.026	-0.369	-0.027
			(-2.28)	(-1.66)	(-0.05)	(-1.61)	(-1.19)
GDP growth			0.005	0.006	-0.059	0.006	-0.002
			(1.04)	(0.40)	(-0.53)	(0.37)	(-0.49)
MktCap/GDP			-0.000*	-0.001*	-0.004	-0.001**	0.000
			(-1.78)	(-1.90)	(-1.41)	(-2.24)	(0.32)
Stock turnover			-0.001	-0.002	-0.010	-0.003	-0.000
			(-1.43)	(-1.22)	(-1.64)	(-1.36)	(-0.09)
Ln(average B/M)			0.048	0.171	-0.543	0.148	0.022
			(0.88)	(0.70)	(-0.69)	(0.61)	(0.55)
Average cash			-0.776	-3.426	12.561	-3.045	-0.772
			(-1.28)	(-1.42)	(1.43)	(-1.28)	(-1.39)
Average capex			2.628**	11.312***	-24.788**	10.284**	1.071
			(2.30)	(2.68)	(-2.00)	(2.49)	(1.49)
Average ROA			0.000	-0.000	0.000	-0.000	0.000
			(1.06)	(-0.30)	(0.02)	(-0.32)	(0.08)
Constant	0.822***	1.579***	3.201***	7.597***	-17.757***	7.388***	0.747***
	(10.84)	(13.76)	(4.05)	(3.52)	(-3.27)	(3.48)	(2.79)
Host Country FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
US firm industry FE	YES	YES	YES	YES	YES	YES	NO
US firm FE	NO	NO	NO	NO	NO	NO	YES
Cluster Host Country	YES	YES	YES	YES	YES	YES	YES
Observations	8,137	8,137	8,137	8,137	8,137	8,137	8,137
Pseudo R ²	0.149	0.182	0.185	0.2547	0.258	0.258	0.439

Table 3: Subsample tests: Corporate governance and financial constraints of US firms

This table reports the subsample regression analysis of US firms' expansion choices by considering the impacts of US firms' corporate governance and financial constraints. We use the institutional ownership, the ratio of independent directors, and the entrenchment index (E-index) as the proxies for the US firm's corporate governance quality and use the KZ index and S&P long-term credit rating to proxy for the US firm's financial constraints. The sample is split into US firms with high corporate governance quality (financially constrained) groups and US firms with low corporate governance quality (financially unconstrained) groups by using the median value of the proxies in a given year in the sample. Panels A and B present the results using the corporate governance and financial constraints proxies, respectively. The dependent variable is $MA / (MA + ALLIANCE)$, which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Corporate governance of US firm

	M&A/(M&A+Alliance)					
	(1)	(2)	(3)	(4)	(5)	(6)
	Institutional investors		Independent directors		E-index	
	High	Low	High	Low	Low	High
Environmental risk	0.005*** (2.81)	0.003 (1.42)	0.006** (2.14)	0.003 (0.73)	0.007* (1.81)	0.004 (1.56)
Ln(MktCap)	-0.076*** (-5.54)	-0.055*** (-7.11)	-0.099*** (-6.47)	-0.074*** (-7.48)	-0.091*** (-8.22)	-0.063*** (-5.09)
Ln(B/M)	-0.056*** (-3.20)	0.033 (1.48)	-0.007 (-0.33)	0.041 (1.56)	-0.027 (-1.30)	0.011 (0.49)
Sales growth	0.006 (0.17)	0.089*** (2.94)	0.075 (0.94)	0.156*** (2.59)	0.022 (0.42)	-0.014 (-0.68)
Cash	-0.539*** (-5.40)	-0.500*** (-6.09)	-0.254 (-1.60)	-0.391*** (-3.41)	-0.312*** (-3.26)	-0.407*** (-4.21)
Capex	-1.662** (-2.40)	0.513 (1.25)	-0.576 (-0.91)	-1.079** (-2.48)	0.164 (0.33)	-1.237* (-1.95)
ROE	0.176*** (3.11)	0.064 (1.40)	0.078 (1.38)	0.307*** (3.31)	-0.079*** (-2.97)	0.099*** (2.77)
D/E	-0.048*** (-4.52)	-0.025* (-1.86)	-0.052*** (-4.76)	-0.076*** (-3.23)	-0.006 (-1.60)	-0.038** (-2.06)
Past return	0.104*** (3.87)	0.181*** (6.60)	0.135*** (5.78)	0.119*** (3.15)	0.125*** (3.69)	0.136*** (5.44)
Volatility	-0.556*** (-4.48)	-0.659*** (-8.01)	-0.692*** (-3.71)	-0.783*** (-4.86)	-0.812*** (-4.32)	-0.747*** (-5.24)
Industry Concentration	-0.024	-0.021	-0.129*	0.064	0.091	-0.084

	(-0.28)	(-0.28)	(-1.87)	(0.80)	(1.17)	(-1.32)
Ln(GDP per capita)	-0.081	-0.265***	-0.067	-0.134	-0.149*	-0.167*
	(-1.38)	(-2.60)	(-0.75)	(-1.49)	(-1.68)	(-1.82)
GDP growth	0.004	0.002	0.010	-0.016**	0.002	0.001
	(0.55)	(0.32)	(1.24)	(-2.18)	(0.32)	(0.08)
MktCap/GDP	0.001	-0.001***	-0.000	-0.000	0.001	-0.000
	(1.30)	(-3.51)	(-0.65)	(-0.13)	(1.33)	(-0.93)
Stock turnover	-0.000	-0.001	-0.001	-0.000	0.000	-0.001
	(-0.44)	(-1.49)	(-1.19)	(-0.61)	(0.25)	(-1.51)
Ln(average B/M)	0.115	0.075	0.044	-0.016	-0.014	0.096***
	(1.47)	(0.89)	(0.56)	(-0.12)	(-0.27)	(3.02)
Average cash	0.807	-3.269***	0.836	-1.005	0.695	-2.393**
	(0.81)	(-2.87)	(0.79)	(-0.68)	(1.40)	(-2.12)
Average capex	1.932	1.833	2.081	5.428***	4.113**	2.186
	(1.13)	(1.29)	(0.99)	(3.36)	(2.30)	(1.52)
Average ROA	0.000	0.001**	0.000	0.001*	-0.000	0.001***
	(1.29)	(2.08)	(0.22)	(1.89)	(-0.20)	(4.15)
Constant	2.283***	4.218***	2.586**	2.988***	2.920***	3.941***
	(3.80)	(4.16)	(2.57)	(3.62)	(3.27)	(3.98)
Host Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
US firm industry FE	YES	YES	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES	YES	YES
Observations	3,238	3,241	2,620	2,228	2,387	2,864
Pseudo R ²	0.1979	0.2092	0.2093	0.1952	0.1979	0.1848

Panel B: US firm financial constraints

	M&A/(M&A+Alliance)			
	(1)	(2)	(3)	(4)
	KZ index		Credit rating	
	Low	High	With	Without
Environmental risk	0.008***	0.003	0.006**	0.004
	(4.27)	(1.48)	(2.10)	(1.32)
Ln(MktCap)	-0.055***	-0.059***	-0.082***	-0.018
	(-6.94)	(-6.10)	(-3.11)	(-1.53)
Ln(B/M)	0.042***	-0.028	0.019	0.025
	(2.73)	(-1.36)	(0.54)	(0.99)
Sales growth	0.062***	0.090***	0.015	0.003

	(2.60)	(2.81)	(1.28)	(1.13)
Cash	-0.520***	-0.678***	-0.014	-0.552***
	(-8.66)	(-4.97)	(-0.11)	(-3.41)
Capex	-0.085	-0.957**	-0.152	-0.625
	(-0.16)	(-2.45)	(-0.22)	(-1.50)
ROE	0.028	0.182***	-0.026	0.000
	(0.78)	(4.48)	(-0.85)	(0.00)
D/E	-0.022**	-0.031***	-0.001	-0.005
	(-2.36)	(-4.22)	(-1.02)	(-0.92)
Past return	0.123***	0.149***	0.089**	0.106***
	(5.20)	(6.02)	(2.11)	(4.86)
Volatility	-0.541***	-0.579***	-0.844***	-0.397***
	(-6.15)	(-5.57)	(-3.92)	(-4.68)
Industry Concentration	-0.079	0.058	0.059	0.034
	(-1.10)	(0.97)	(0.37)	(0.23)
Ln(GDP per capita)	-0.250**	-0.185*	-0.055	-0.290**
	(-2.48)	(-1.89)	(-0.93)	(-2.55)
GDP growth	-0.000	0.012	-0.002	0.012**
	(-0.04)	(1.37)	(-0.33)	(2.01)
MktCap/GDP	-0.000	-0.001***	-0.000	-0.000
	(-1.64)	(-2.82)	(-0.93)	(-0.98)
Stock turnover	-0.001	-0.000	0.000	-0.001
	(-1.47)	(-0.17)	(0.23)	(-1.12)
Ln(average B/M)	0.110	-0.082	0.048	0.070
	(1.18)	(-1.24)	(0.61)	(1.44)
Average cash	-0.523	-0.252	-1.219*	0.327
	(-0.52)	(-0.22)	(-1.66)	(1.11)
Average capex	1.948	2.038	5.229**	0.068
	(1.40)	(1.20)	(2.24)	(0.05)
Average ROA	0.001***	-0.000	0.001	0.001
	(2.88)	(-0.52)	(0.89)	(1.02)
Constant	3.949***	2.970***	2.432***	3.747***
	(4.00)	(2.99)	(3.29)	(3.21)
Host Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
US firm industry FE	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES
Observations	3,672	3,644	3,327	4,810
Pseudo R ²	0.1990	0.1993	0.1683	0.2010

Table 4 Control for institution quality and partner expropriation risk

This table reports the regression results of host country-level environmental risk on the US firms' choice between alliances and M&As by controlling for the effect of institution quality and partner expropriation risk in the host country. *Governance indicator* and *Regulatory enforcement* are two proxies for institution quality. *Legal Formalism* and *Procedural Complexity* as two proxies for the direct partner risk, and *Constraints on Executive Power* and *Protection Against Expropriation* as two measures for indirect partner risk. The dependent variable is MA / (MA + ALLIANCE), which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. All regressions control for the host country, year, and US firm industry fixed effects. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	M&A/(M&A+Alliance)			
	(1)	(2)	(3)	(4)
Environmental risk	0.005*** (3.89)	0.005*** (3.63)	0.005*** (3.55)	0.005*** (3.50)
Governance indicator	0.069 (0.55)			
Regulatory enforcement		1.349*** (3.03)		
Legal formalism (direct risk)			7.249*** (4.00)	
Constraints on executive power (indirect risk)			-11.542*** (-4.05)	
Procedural complexity (direct risk)				0.493*** (5.34)
Protection against expropriation (indirect risk)				-0.796*** (-9.77)
Controls	YES	YES	YES	YES
Host Country, Yeas, US firm industry FE	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES
Observations	8,137	7,331	7,133	7,299
Pseudo R ²	0.185	0.188	0.1867	0.1909

Table 5 The effect of environmental regulation shocks in the host countries

This table reports the impact of environmental regulation shocks in the host countries on the US firms' choice between alliances and M&As. We use sustainability disclosure reforms and Paris Agreement as proxies for environmental regulations. *Disclosure Reform* indicates whether the host countries have introduced sustainability disclosure reforms. It equals one if the host country has the reforms in place in year t and zero otherwise. *Paris Agreement* equals one if the agreement is in place in year t , and zero otherwise. The dependent variable is $MA / (MA + ALLIANCE)$, which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. *High environmental risk* indicates whether the host country's average environment scores are below the median value of the sample in a given year. All regressions control for the host country, year, and US firm industry fixed effects. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	M&A/(M&A+Alliance)				
	Disclosure Reform		Paris Agreement		
	(1)	(2)	(3)	(4)	(5)
Environmental risk	0.005*** (3.70)	0.005*** (3.62)		0.005*** (3.72)	
Shock	-0.077*** (-3.26)		-0.127*** (-4.22)	-0.362*** (-3.56)	-0.410*** (-5.01)
DR (-1)		-0.045 (-1.16)			
DR (0)		-0.041 (-1.23)			
DR (+1)		-0.110** (-2.57)			
DR (2+)		-0.120*** (-3.51)			
High environmental risk			0.008 (0.34)		0.048** (2.14)
High environmental risk * Shock			0.105*** (2.91)		0.109** (2.11)
Controls	YES	YES	YES	YES	YES
Host Country, Yeas, US firm industry FE	YES	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES	YES
Observations	8,137	8,137	8,137	8,137	8,137
Pseudo R ²	0.185	0.186	0.186	0.1848	0.1850

Table 6 The impact of carbon emission in the host countries

This table reports the impact of average carbon emission in the host countries on the US firms' choice between alliances and M&As. *CO2 Emission* measures the average CO2 Emission divided by the net sales in the host country in a given year, which are proxied by *Direct CO2 Emission (Scope 1)*, *Indirect CO2 Emission (Scope 2)*, *Indirect CO2 Emission (Scope 3)*, and *Total CO2 Emission* respectively. *Total CO2 Emission* is the sum of direct (scope 1) and indirect CO2 (scope 2) emissions. The dependent variable is $MA / (MA + ALLIANCE)$, which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. All regressions control for the host country, year, and US firm industry fixed effects. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	M&A/(M&A+Alliance)			
	Scope 1	Scope 2	Scope 3	Total CO2 Emission
	(1)	(2)	(3)	(4)
Environmental risk	0.004** (2.39)	0.005** (2.55)	0.004 (1.60)	0.002 (1.16)
Carbon emission	0.104* (1.90)	0.146 (1.15)	0.008 (0.60)	0.159*** (3.56)
Environmental risk* Carbon Emission	0.003* (1.88)	0.004 (1.14)	0.000 (0.83)	0.004*** (3.49)
Ln(MktCap)	-0.051*** (-9.56)	-0.051*** (-9.62)	-0.051*** (-9.13)	-0.051*** (-9.58)
Ln(B/M)	0.017 (1.19)	0.016 (1.16)	0.016 (1.22)	0.017 (1.17)
Sales growth	0.056*** (3.64)	0.056*** (3.64)	0.047*** (2.89)	0.055*** (3.66)
Cash	-0.446*** (-6.58)	-0.447*** (-6.63)	-0.470*** (-6.70)	-0.446*** (-6.57)
Capex	-0.532* (-1.77)	-0.529* (-1.77)	-0.435 (-1.43)	-0.530* (-1.77)
ROE	0.139*** (4.40)	0.139*** (4.41)	0.118*** (4.02)	0.139*** (4.39)
D/E	-0.031*** (-4.25)	-0.031*** (-4.22)	-0.028*** (-3.54)	-0.031*** (-4.27)
Past return	0.151*** (6.93)	0.152*** (7.03)	0.161*** (6.20)	0.152*** (6.95)
Volatility	-0.572*** (-7.28)	-0.571*** (-7.30)	-0.555*** (-5.91)	-0.572*** (-7.33)
Industry Concentration	0.015 (0.40)	0.015 (0.40)	0.020 (0.53)	0.016 (0.44)
Ln(GDP per capita)	-0.118 (-1.09)	-0.134 (-1.23)	-0.153 (-1.21)	-0.128 (-1.28)
GDP growth	0.006 (1.31)	0.005 (1.07)	0.006 (1.29)	0.006 (1.36)
MktCap/GDP	-0.001 (-1.21)	-0.001 (-1.10)	0.000 (0.25)	-0.001 (-1.14)

Stock turnover	-0.000	0.000	0.001	0.000
	(-0.00)	(0.06)	(0.97)	(0.18)
Ln(average B/M)	0.014	0.029	0.062	0.027
	(0.20)	(0.43)	(0.66)	(0.41)
Average cash	-0.606	-0.628	-0.698	-0.624
	(-0.77)	(-0.79)	(-0.76)	(-0.85)
Average capex	1.660	1.898	0.986	1.209
	(1.27)	(1.48)	(0.58)	(0.97)
Average ROA	0.001**	0.000**	0.001**	0.001**
	(2.27)	(2.13)	(2.56)	(2.27)
Constant	2.656***	2.836***	3.119**	2.714***
	(2.60)	(2.76)	(2.56)	(2.83)
Host Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
US firm industry FE	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES
Observations	7,520	7,520	6,309	7,520
Pseudo R ²	0.1970	0.1970	0.2079	0.1973

Table 7 Heckman selection model: Deal selection

This table reports the results of the Heckman selection model on US firm's international expansion, host country selection, and the choice between cross-border M&As and alliances. The identifying variable used in the first stage is the ratio of foreign taxes the US firm has paid to its total assets (*Foreign Tax*). Panel A presents the results for the first-stage regression by using the Tobit model, where the dependent variable is the natural logarithm of one plus the total number of cross-border deals (i.e., cross-border M&As and alliances) the firm has done in a given year. The identifying variable used in the second stage is the change of the exchange rate between the host country and the US over the previous year (foreign currency per USD). Panel B reports the results for the second-stage and third-stage regression by using the Tobit model. The dependent variable in column (1) is the natural logarithm of one plus the number of cross-border alliances and M&As that the US firm has formed in a given host country in a given year. The dependent variable in column (2) is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. Robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Stage 1-Expand abroad

	(1)
	Stage 1: Expand abroad
	Ln(1+M&A+alliance)
Ln(1+M&A)	1.235*** (36.81)
Ln(1+alliance)	1.181*** (23.56)
Ln(1+industry M&A)	0.071*** (5.30)
Ln(1+industry alliance)	-0.003 (-0.20)
Ln(MktCap)	0.193*** (32.25)
Ln(B/M)	-0.089*** (-6.62)
Sales growth	0.037** (1.99)
Cash	0.093* (1.87)
Capex	-2.572*** (-10.34)
ROE	-0.111*** (-5.11)
D/E	-0.016*** (-2.72)
Past return	-0.041** (-2.16)
Volatility	0.054 (1.13)
HHI	0.630*** (9.47)
Foreign tax	21.041*** (17.15)
Constant	-3.288*** (-37.92)
Industry FE	YES
Year FE	YES
Observations	81,345
Pseudo R ²	0.1639

Panel B: Stage 2-Host country selection and Stage 3-deal selection between M&A and alliance

	Stage 2: Host country selection	Stage 3: Deal selection
	Ln(1+M&A+alliance)	M&A/(M&A+Alliance)
	(1)	(2)
Environmental risk	0.000 (0.23)	0.006*** (4.07)
Ln(MktCap)	0.029*** (4.54)	-0.094*** (-7.57)
Ln(B/M)	0.044*** (3.36)	-0.008 (-0.29)
Sales growth	0.005 (0.25)	0.058*** (3.83)
Cash	0.040 (0.86)	-0.478*** (-8.58)
Capex	0.090 (0.32)	-0.490 (-1.60)
ROE	-0.004 (-0.21)	0.142*** (4.23)
D/E	0.018*** (2.99)	-0.039*** (-3.98)
Past return	0.002 (0.09)	0.142*** (6.91)
Volatility	0.163*** (2.98)	-0.675*** (-7.74)
Industry Concentration	-0.009 (-0.17)	-0.007 (-0.17)
Ln(GDP per capita)	0.043 (0.81)	-0.207** (-2.27)
GDP growth	0.011** (2.05)	-0.005 (-0.77)
MktCap/GDP	-0.000 (-0.78)	-0.000 (-0.93)
Stock turnover	0.001** (1.97)	-0.001*** (-2.70)
Ln(average B/M)	0.025 (0.45)	0.003 (0.04)
Average cash	-1.929** (-2.36)	0.430 (0.45)
Average capex	3.543*** (3.50)	-0.146 (-0.06)
Average ROA	-0.003 (-0.70)	0.001** (2.50)
Change of exchange rate	0.299* (1.86)	
Lambda 1	-0.204*** (-11.18)	0.066 (0.64)
Lambda 2		-0.853 (-1.62)
Constant	-3.933*** (-7.40)	6.942*** (2.79)
Host Country FE	YES	YES
Year FE	YES	YES
US firm industry FE	YES	YES
Observations	276,737	276,737
Pseudo R ²	0.1836	0.1836

Table 8 US firm performance

This table reports the abnormal return around the cross-border deals (i.e., M&A and alliance) considering the impact of host country-level climate risk. The abnormal return is the 11-day cumulative abnormal returns ((-5, +5) days window) of the US firms around the announcement date of the deals, estimated by the Fama-French 4-factor model (market, size, value, and momentum factors). Panel A reports the regression results, where columns (1) to (3) show the results of the full sample, and column (4) shows the results by using the PSM sample. M&A dummy equals one if the deal is M&A and zero otherwise (i.e., alliance). *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. Panel B reports the results of post-match diagnostic tests. We first use logit regressions to estimate the probability of an M&A deal on Ln(Market Capitalization), Sales growth, Capital expenditure to asset, ROE, Debt to equity ratio, past 12-month stock return, past 12-month stock return volatility, and industry concentration. We then match each M&A to an alliance deal (without replacement) and require the propensity scores for each matched pair to be within 1% of each other. All regressions control for the host country, year, and US firm industry fixed effects. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: CARs(-5, +5)

	Full sample			PSM sample
	(1)	(2)	(3)	(4)
M&A dummy * Environmental risk	0.034** (2.03)	0.032** (2.03)	0.033* (1.90)	0.058** (2.10)
Environmental risk	-0.014 (-0.74)	-0.016 (-0.88)	-0.012 (-0.64)	-0.002 (-0.06)
M&A dummy	1.215 (1.40)	1.243 (1.54)	1.273 (1.44)	3.019** (2.17)
Firm controls	NO	YES	YES	YES
Country controls	NO	NO	YES	YES
Host Country, year FE, industry FE	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES
Observations	8,785	8,785	8,785	5,594
Adjusted R ²	0.00104	0.0151	0.0146	0.0164

Panel B: Post-diagnostic test for PSM sample

	Treated (M&A=1)		Control (M&A=0)		t-value	p-value
	Mean	Obs.	Mean	Obs.		
Ln(MktCap)	8.424	2,797	8.344	2,797	1.248	0.212
Sales growth	0.166	2,797	0.165	2,797	0.029	0.977
Capex	0.034	2,797	0.033	2,797	1.081	0.280
ROE	0.065	2,797	0.053	2,797	1.029	0.303
D/E	0.828	2,797	0.863	2,797	-0.744	0.457
Past return	0.144	2,797	0.147	2,797	-0.301	0.763
Volatility	0.026	2,797	0.026	2,797	1.471	0.141
Industry Concentration	0.141	2,797	0.145	2,797	-0.832	0.405

Table 9 Market competition and US firm performance

This table reports the abnormal return around the cross-border deals (i.e., M&A and alliance) considering the market competition of the US firms. The abnormal return is the 11-day cumulative abnormal returns ((-5, +5) days window) of the US firms around the announcement date of the deals, estimated by the Fama-French 4-factor model (market, size, value, and momentum factors). *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. We use the Herfindahl–Hirschman index and Hoberg and Phillips (2016) firm's total similarity in the product market to proxy for the market competition of the US firms. The US firms are in a competitive market if the HHI (total similarity) is above the median value in a given year in the sample. *Horizontal deal (vertical deal)* indicates that the US firm and the foreign counterparty are (not) in the same two-digit SIC code. All regressions control for the host country, year, and US firm industry fixed effects. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Market competition

	CARs(-5,+5)			
	High HHI	Low HHI	High Product similarity	Low Product similarity
	(1)	(2)	(3)	(4)
Environmental risk	0.007 (0.31)	-0.014 (-0.39)	-0.029 (-0.94)	0.022 (0.92)
M&A dummy	-0.457 (-0.32)	2.412* (1.82)	2.568* (1.90)	-0.680 (-0.55)
M&A dummy * Environmental risk	-0.008 (-0.34)	0.061** (2.54)	0.061** (2.49)	-0.008 (-0.33)
Firm controls	YES	YES	YES	YES
Country controls	YES	YES	YES	YES
Host Country, year FE, industry FE	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES
Observations	4,294	4,491	4,286	4,290
Adjusted R ²	0.0162	0.0157	0.0193	0.0123

Panel B: Horizontal partnership

	Horizontal deal	Vertical deal
	(1)	(2)
Environmental risk	-0.056 (-1.55)	0.016 (0.69)
M&A Dummy	3.672** (2.05)	0.214 (0.17)
M&A Dummy * Environmental risk	0.076** (2.23)	0.011 (0.45)
Firm controls	YES	YES
Country controls	YES	YES
Host Country, year FE, industry FE	YES	YES
Cluster Host Country	YES	YES
Observations	3,986	4,799
Adjusted R ²	0.0205	0.0144

Appendix Table A1: Variable definition

Variable	Definition
Main Variable of Interests	
Environmental Risk	Negative value of the average environmental performance of the firms from the host country each year. Environmental performance is the environmental pillar that measures a company's impact on living and non-living natural systems, including the air, land, water, and complete ecosystems. (<i>Data source: ASSET4</i>)
Dependent Variables	
MA / (MA + ALLIANCE)	Ratio of the number of cross-border M&A deals to the total number of cross-border M&A and alliance deals made by a US firm in a given host country in a given year. (<i>Data source: SDC</i>)
US Firm Characteristics	
Ln(MktCap)	Natural logarithm of the market capitalization. Market capitalization = close price of fiscal year-end (item 24) × common shares outstanding (item 25). (<i>Data source: Compustat</i>)
Ln(B/M)	Natural logarithm of book-to-market ratio, which is equal to book value of equity (item 60) divided by the market value of equity (item 24 × item 25). (<i>Data source: Compustat</i>)
Sales growth	Year-on-year growth of annual total sales (item 12). (<i>Data source: Compustat</i>)
Cash	Ratio of cash holdings (item 1) to total assets (item 6). (<i>Data source: Compustat</i>)
Capex	Ratio of capital expenditures (item 128) to total assets (item 6). (<i>Data source: Compustat</i>)
ROE	Ratio of earnings (item 20) to average book value of common equity for a fiscal year ((item 60 + item 60(t-1))/2). (<i>Data source: Compustat</i>)
D/E	Ratio of long-term debt (item 9) to the total book value of the equity (item 60). (<i>Data source: Compustat</i>)
Past return	The 12-month cumulative returns calculated using the 12 months leading up to the last month of the firm's fiscal year-end. (<i>Data source: CRSP</i>)
Volatility	Annualized standard deviation of daily stock returns over the previous 12 months. (<i>Data source: CRSP</i>)
Industry Concentration	Sum of squared market share (item 12) of each firm in the same industry (three-digit SIC code) during a year. (<i>Data source: Compustat</i>)
Host Country Variables	
Ln(GDP per capita)	Natural logarithm of GDP per capita in current U.S. dollars. (<i>Data source: World Bank</i>)
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency. (<i>Data source: World Bank</i>)
MktCap/GDP	Percentage ratio of market capitalization of listed domestic companies to GDP. (<i>Data source: World Bank</i>)
Stock turnover	Turnover ratio is the value of domestic shares traded divided by their market capitalization. The value is annualized by multiplying the monthly average by 12. (<i>Data source: World Bank</i>)
Ln(average B/M)	Natural logarithm of market capitalization weighted average book-to-market ratio (WC07220/WC07210) for all listed firms in the country. (<i>Data source: Worldscope</i>)
Average cash	Market capitalization weighted average ratio of cash to total assets (WC02003/WC02999) for all listed firms in the country. (<i>Data source: Worldscope</i>)
Average capex	Market capitalization weighted average ratio of capital expenditures to total assets (WC04601/WC02999) for all listed firms in the country. (<i>Data source: Worldscope</i>)

Average ROA	Market capitalization weighted average return on assets (WC08326) for all listed firms in the country. (<i>Data source: Worldscope</i>)
<i>Additional Variables</i>	
Institutional ownership	Year-end fraction of shares outstanding owned by institutional fund managers. (<i>Data source: Institutional (13f) Holdings</i>)
Independent director	Percentage of independent directors on the board in a given year, where missing values are set to zero. (<i>Data source: ISS database</i>)
E-index	Firm's entrenchment index in a given year. (<i>Data source: Bebchuk et al., 2009</i>)
KZ index	Kaplan-Zingales' (1997) Index = $- 1.001909 \times (\text{income before extraordinary items} + \text{depreciation and amortization}) / \text{lagged property, plant, and equipment} + 0.2826389 \times ((\text{total assets} + \text{close price at the fiscal year end} \times \text{common shares outstanding} - \text{common equity} - \text{deferred taxes}) / \text{total assets}) + 3.139193 \times ((\text{long-term debt} + \text{debt in current liabilities}) / (\text{long-term debt} + \text{debt in current liabilities} + \text{stockholders' equity})) - 39.36780 \times (\text{common share dividend} + \text{preferred share dividend}) / \text{lagged property, plant and equipment} - 1.314759 \times (\text{cash and short-term investments} / \text{lagged property, plant, and equipment})$. (<i>Data source: Compustat</i>)
Credit rating	Dummy variable which equals one if the firm is with S&P long-term credit rating during the sample period, zero otherwise. (<i>Data source: S&P Credit Ratings</i>)
Governance indicator	The average score of six governance indicators from World Bank's Worldwide Governance Indicators (WGI): accountability, political stability, government effectiveness, regulatory quality, rule of law, and corruption control. (<i>Data Source: World Bank</i>)
Regulatory enforcement	Factor 6 Regulatory Enforcement scores (<i>Data Source: World Justice Project</i>)
Legal formalism	The index measures substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts, and is formed by adding up the following indices: (i) professionals vs. laymen, (ii) written vs. oral elements, (iii) legal justification, (iv) statutory regulation of evidence, (v) control of superior review, (vi) engagement formalities, and (vii) independent procedural actions. The index ranges from 0 to 7, where 7 means a higher level of control or intervention in the judicial process. (<i>Data Source: Acemoglu and Johnson (2005)</i>)
Constraints on executive power	A seven-category scale, from 1 to 7, with a higher score indicating more constraint: 1 indicates unlimited authority; 3, slight to moderate limitations; 5, substantial limitations; 7, executive parity or subordination; 2, 4, and 6, intermediate values (Polity IV dataset). We reported with the negative sign to facilitate the interpretation of results, so that the higher value indicates high indirect partner risk. (<i>Data Source: Acemoglu and Johnson (2005)</i>)
Procedural complexity	Index of complexity in collecting a commercial debt and resolving the case of an unpaid commercial debt. Original date range from 0 to 100, and here divided by 10. (<i>Data Source: Acemoglu and Johnson (2005)</i>)
Protection against expropriation	Index of protection against government expropriation (1-lowest, 10-highest) to measure the risk of expropriation of private foreign investment, where the higher score means less risk (Polity Risk Service). We reported with the negative sign to facilitate the interpretation of results, so that the higher value indicates high indirect partner risk. (<i>Data Source: Acemoglu and Johnson (2005)</i>)
Direct CO2 Emission (Scope 1)	The ratio of firm's direct emission in thousands of tons (e.g., from the firm's own fossil fuel usage) divided by the sales in millions of dollars. (<i>Data Source: ASSET4</i>)
Indirect CO2 Emission (Scope 2)	The ratio of firm's indirect emission in thousands of tons (e.g., from purchased energy such as electricity) divided by the sales in millions of dollars. (<i>Data Source: ASSET4</i>)

Indirect CO2 Emission (Scope 3)	The ratio of firm's other indirect emission in thousands of tons divided by the sales in millions of dollars (<i>Data Source: ASSET4</i>)
Total CO2 Emission	The ratio of the sum of firm's direct emission (scope 1) and indirect emission (scope 2) in thousands of tons divided by the sales in millions of dollars. (<i>Data Source: ASSET4</i>)
HHI	Herfindahl-Hirschman Index in 3-digit sic industry based on firm sales. (<i>Data Source: Compustat</i>)
Product similarity	Firm's total similarity in the product market, measured as the sum of the pairwise product similarities between a firm and all other firms in the given year. (<i>Data source: Hoberg and Phillips (2016)</i>)

Internet Appendix

Appendix Table A2: Sample selection criteria

This table reports the sample selection criteria and the number of M&A deals (Panel A) and alliance deals (Panel B).

Panel A: M&A Deals

Selection Criteria	Deal Number
1. All M&A deals announced between 2003 and 2020	854,064
2. Acquirers own less than 50% of the target before the announcement and own more than 50% after the completion	459,348
3. M&A deals are defined as “completed”	449,152
4. The acquirer is a US firm, and the target is a non-US firm	21,600
5. Exclude deals classified as a recapitalization, exchange offers, buyback, and minority stake purchase	21,437

Panel B: Corporate Alliance Deals

Selection Criteria	Deal Number
1. All alliance deals announced between 2003 and 2020	101,246
2. Alliance deals are defined as “completed”	59,810
3. Alliance deals with only two participants	56,752
4. Alliance deals where one is a US firm, the other is a non-US firm (Joint venture: 2,078; Strategic alliance: 14,816)	15,433

Panel C: M&A and alliance deals

Selection Criteria	Deal Number
1. Host countries with at least 100 deals (alliance and M&As) involving US firms over the sample period	34,208 (Alliances: 14,138; M&A: 20,070, from 39 countries)
2. US partners/acquirers incorporated with CRSP and Compustat	13,145 (Alliances: 5,116; M&A: 8,029)

Panel D: Generate US firm-host-country-year panel data

Selection Criteria	No. of Observations
1a. Number of observations at the US firm-host-country level (at least one cross-border M&A deals for a given US firm-host-country observation) (Based on the deal number shown in step 2 of Panel C)	5,672
1b. Number of observations at the US firm-host-country level (at least one cross-border alliance deals for a given US firm-host-country observation) (Based on the deal number shown in step 2 of Panel C)	4,110
2. Combine 1a. and 1b., generate observations at US firm-host-country level (Therefore, at least one deal, either M&A or alliance, in a given US firm-host-country observations)	9,152
3. Year 2003-2020	18
4. US firm-host-country-year panel observations	164,736

<p>5. Incorporate variables from Compustat and CRSP for US firm-year records (lagged), Asset 4 ESG for the host country (lagged), and other country-level factors for the host country (lagged, from Worldscope and the World Bank). Excluding observations with missing variables</p>	87,353
<p>6. There is at least one deal (either M&A or alliance) in a given host country in a given country (the reason is that our observation is at the US-host-country-year level, and our dependent variable is M&A/(M&A+Alliance), the denominator should be non-zero)</p>	8,137

Appendix Table A3: Additional tests

This table reports the Tobit regression results considering the host country-level risk from social and governance performance on the US firms' choice between alliances and M&As. The sample includes firms that have made at least one alliance or M&A in a given host country in a given year. The dependent variable is $MA / (MA + ALLIANCE)$, which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. *Social risk* (*Governance risk*) is the negative average social performance score (governance performance score) of the foreign partner's domiciled country each year. *Overall ESG risk* is the negative ESG performance score of the foreign partner's domiciled country each year. All regressions control for the host country, year, and US firm industry fixed effects. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	M&A/(M&A+Alliance)			
	(1)	(2)	(3)	(4)
Environmental Risk	0.004*** (2.88)			
Social Risk	0.000 (0.24)	0.004** (2.44)		
Governance Risk	0.006 (0.96)		0.012* (1.88)	
Overall ESG Risk				0.008*** (3.18)
Ln(MktCap)	-0.052*** (-8.87)	-0.053*** (-8.82)	-0.053*** (-8.82)	-0.053*** (-8.83)
Ln(B/M)	0.012 (0.91)	0.012 (0.91)	0.011 (0.83)	0.013 (0.93)
Sales growth	0.064*** (4.36)	0.064*** (4.38)	0.064*** (4.40)	0.064*** (4.38)
Cash	-0.464*** (-6.70)	-0.467*** (-6.72)	-0.467*** (-6.78)	-0.465*** (-6.69)
Capex	-0.694** (-2.08)	-0.702** (-2.11)	-0.703** (-2.14)	-0.695** (-2.09)
ROE	0.130*** (4.07)	0.130*** (4.06)	0.130*** (4.09)	0.130*** (4.05)
D/E	-0.030*** (-4.80)	-0.030*** (-4.82)	-0.030*** (-4.83)	-0.030*** (-4.79)
Past return	0.141*** (7.12)	0.140*** (7.06)	0.139*** (7.02)	0.141*** (7.13)
Volatility	-0.569*** (-8.11)	-0.569*** (-8.08)	-0.569*** (-7.99)	-0.569*** (-8.11)
Industry Concentration	0.029 (0.81)	0.029 (0.79)	0.029 (0.80)	0.029 (0.79)
Ln(GDP per capita)	-0.177** (-2.29)	-0.171* (-1.85)	-0.126 (-1.43)	-0.184** (-2.17)
GDP growth	0.004 (0.92)	0.005 (1.13)	0.002 (0.46)	0.005 (1.14)
MktCap/GDP	-0.000 (-1.57)	-0.000* (-1.94)	-0.000 (-1.46)	-0.000* (-1.77)
Stock turnover	-0.001	-0.001	-0.001	-0.001

	(-1.43)	(-1.58)	(-1.28)	(-1.59)
Ln(average B/M)	0.050	0.038	0.011	0.049
	(0.92)	(0.66)	(0.17)	(0.91)
Average cash	-0.857	-0.779	-0.744	-0.856
	(-1.36)	(-1.28)	(-1.13)	(-1.43)
Average capex	2.687**	2.967**	2.816**	2.820**
	(2.45)	(2.44)	(2.56)	(2.39)
Average ROA	0.000	0.000	0.000	0.000
	(0.97)	(0.49)	(0.39)	(0.82)
Constant	3.429***	3.003***	3.038***	3.318***
	(3.87)	(3.41)	(3.22)	(3.96)
Host Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
US firm industry FE	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES
Observations	8,137	8,137	8,137	8,137
Pseudo R ²	0.1849	0.1844	0.1841	0.1848

Appendix Table A4: Subsample test: The “Big Three” ownership

This table reports the subsample regression analysis of US firms’ expansion choices by considering the impacts from the “Big Three” institutional investors. We use the shares held by the “Big Three” as the proxy for institutional investors’ environmental engagement in a given firm. The sample is split into the group of US firms with high “Big Three” ownership and the group of US firm with low “Big Three” ownership. Column (1) and (2) show the results of the subsample groups split by the yearly median value of the proxy, and column (3) and (4) show the results of subsample firms whose “Big Three” ownership are above 25 top and bottom percentile of the distribution. The dependent variable is MA / (MA + ALLIANCE), which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. *Environmental risk* is the negative average environmental performance score of the foreign partner’s domiciled country each year. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	M&A/(M&A+Alliance)			
	(1)	(2)	(3)	(4)
	High	Low	Top 25	Bottom 25
Environmental risk	0.006*** (2.71)	0.005*** (3.41)	0.005** (2.38)	0.006** (2.30)
Ln(MktCap)	-0.083*** (-8.31)	-0.019*** (-3.45)	-0.080*** (-7.54)	0.008 (1.17)
Ln(B/M)	0.026 (1.53)	0.014 (0.83)	0.049 (1.39)	0.010 (0.49)
Sales growth	0.041 (0.64)	0.052*** (2.68)	0.086 (1.30)	0.066*** (3.07)
Cash	-0.373*** (-5.41)	-0.510*** (-6.13)	-0.250* (-1.77)	-0.493*** (-4.61)
Capex	-1.058** (-2.44)	-0.442 (-1.37)	-0.679 (-1.11)	-0.478 (-1.28)
ROE	0.243*** (3.78)	0.110*** (3.22)	0.279** (2.46)	0.132*** (3.86)
D/E	-0.055*** (-4.62)	-0.017** (-2.19)	-0.053*** (-3.80)	-0.005 (-0.66)
Past return	0.131*** (4.58)	0.132*** (5.76)	0.120*** (3.11)	0.110*** (3.04)
Volatility	-0.601*** (-4.68)	-0.482*** (-6.64)	-0.643*** (-3.45)	-0.326*** (-4.96)
Industry Concentration	0.033 (0.50)	0.025 (0.48)	-0.052 (-0.58)	0.119 (1.62)
Ln(GDP per capita)	-0.103 (-1.43)	-0.293** (-2.34)	-0.131** (-2.05)	-0.328** (-2.26)
GDP growth	-0.006 (-0.88)	0.016** (2.22)	-0.009 (-1.00)	0.022* (1.84)
MktCap/GDP	0.000 (0.23)	-0.001*** (-3.17)	-0.000 (-1.33)	-0.001*** (-2.87)
Stock turnover	-0.001 (-1.32)	-0.000 (-0.70)	0.000 (0.17)	-0.000 (-0.57)
Ln(average B/M)	-0.028 (-0.40)	0.125* (1.78)	-0.075 (-0.95)	-0.022 (-0.20)
Average cash	-0.800	-0.955	-0.528	0.154

	(-1.02)	(-1.07)	(-0.34)	(0.15)
Average capex	3.831***	1.227	5.410**	-0.204
	(2.63)	(0.95)	(2.25)	(-0.10)
Average ROA	0.000	0.001	-0.001	0.001
	(0.13)	(1.12)	(-1.59)	(1.03)
Constant	2.760***	3.914***	2.862***	3.555***
	(3.57)	(3.30)	(4.00)	(2.60)
Host Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
US firm industry FE	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES
Observations	4,048	4,089	2,054	2,046
Pseudo R ²	0.1796	0.2115	0.1666	0.2066

Appendix Table A5: Subsample test: US firm's environmental risk

This table reports the subsample regression analysis of US firms' expansion choice by considering the impacts of US firms' environmental risk. We use the environmental strengths and environmental concerns in the KLD database to categorize the US firms into two groups: green firms and non-green firms. Green firms are the firms which have at least one environmental strengths while having no environmental concerns. The dependent variable is $MA / (MA + ALLIANCE)$, which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. Environmental risk is the negative average environmental performance score of the foreign partner's domiciled country each year. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	M&A/(M&A+Alliance)	
	(1)	(2)
	Green firms	Non-green firms
Environmental risk	0.007*	0.001
	(1.80)	(0.32)
Ln(MktCap)	-0.101***	-0.087***
	(-5.64)	(-5.24)
Ln(B/M)	0.022	0.026
	(0.61)	(0.47)
Sales growth	0.178*	0.280**
	(1.66)	(2.23)
Cash	-0.312**	-0.226
	(-2.15)	(-0.77)
Capex	0.469	-0.276
	(0.72)	(-0.36)
ROE	-0.057	0.157
	(-0.62)	(1.06)
D/E	-0.072***	-0.026
	(-4.51)	(-1.47)
Past return	0.038	0.107
	(0.57)	(1.32)
Volatility	-1.190***	-0.753***
	(-4.60)	(-3.13)
Industry Concentration	0.077	-0.092
	(0.68)	(-0.61)
Ln(GDP per capita)	-0.042	-0.467**
	(-0.32)	(-2.57)
GDP growth	0.019	0.012
	(1.53)	(0.74)
MktCap/GDP	0.003***	-0.002
	(3.03)	(-0.93)
Stock turnover	-0.001	-0.000
	(-0.86)	(-0.09)
Ln(average B/M)	0.264*	-0.231
	(1.72)	(-1.28)
Average cash	-0.534	-1.459
	(-0.27)	(-0.54)
Average capex	2.983	7.000**

	(1.42)	(2.03)
Average ROA	-0.002*	0.000
	(-1.73)	(0.24)
Constant	3.557***	1.656
	(2.84)	(0.88)
Host Country FE	YES	YES
Year FE	YES	YES
US firm industry FE	YES	YES
Cluster Host Country	YES	YES
Observations	1,389	786
Pseudo R ²	0.2168	0.2830

Appendix Table A6: The environmental risk of the individual foreign firm

This table reports the regression results of foreign individual firms' environmental performance on the US firms' choice between alliances and M&As. The sample includes all the M&A and alliance deals the US firms conducted during the sample period. Columns (1), (2), and (3) show the Logit, Tobit, and OLS regression, respectively. The dependent variable is a dummy variable which equals one if the deal is the M&A and zero if the deal is the alliance. Individual environmental risk is the negative environmental performance score of the individual foreign firm one year before the deal announcement. All regressions control for the host country, year, and US firm industry fixed effects. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	M&A dummy		
	Logit	Tobit	OLS
Individual environmental risk	0.124** (2.48)	0.028*** (4.25)	0.002** (2.17)
Ln(MktCap)	-0.005 (-0.01)	0.022 (0.18)	0.000 (0.06)
Ln(B/M)	0.830 (1.12)	0.421** (2.16)	-0.003 (-0.34)
Sales growth	-4.826* (-1.69)	-1.132 (-1.27)	-0.001 (-1.30)
Cash	-2.336 (-0.53)	-0.326 (-0.26)	0.003 (0.06)
Capex	64.171** (2.39)	13.462** (2.32)	-0.223 (-0.55)
ROE	0.444 (0.58)	0.055 (0.32)	-0.007* (-1.75)
D/E	-0.366 (-0.97)	-0.056 (-0.57)	-0.002 (-1.47)
Past return	-0.169 (-0.08)	-0.316 (-0.36)	-0.016 (-0.62)
Volatility	-4.330 (-0.68)	-1.897 (-1.07)	-0.068 (-1.21)
Industry Concentration	-2.321 (-0.63)	-0.049 (-0.04)	-0.152** (-2.04)
Ln(GDP per capita)	25.899*** (2.89)	5.333* (1.78)	0.125 (1.19)
GDP growth	-0.271 (-0.58)	-0.026 (-0.22)	-0.000 (-0.03)
MktCap/GDP	-0.044 (-1.01)	-0.001 (-0.05)	-0.000 (-1.03)
Stock turnover	0.230*** (5.87)	0.051*** (3.76)	-0.000 (-0.25)
Ln(average B/M)	-3.159 (-0.28)	-1.353 (-0.58)	0.017 (0.19)
Average cash	-17.188 (-0.18)	2.143 (0.07)	0.155 (0.72)
Average capex	-143.864 (-1.59)	-25.444 (-0.94)	-0.655 (-0.38)
Average ROA	0.527	0.090	0.001

	(0.98)	(0.87)	(0.17)
Constant	-287.143***	-57.077**	-0.835
	(-3.05)	(-2.21)	(-0.90)
Host Country FE	YES	YES	YES
Year FE	YES	YES	YES
US firm industry FE	YES	YES	YES
Cluster Host Country	YES	YES	YES
Observations	239	595	595
Pseudo R ²	0.5945	0.5499	0.169

Appendix Table A7: Subsample tests: Biodiversity, climate vulnerability, and climate disaster

This table reports the subsample regression analysis of US firms' expansion choices. We divide the sample into two groups of host countries with high or low biodiversity (climate vulnerability index) by using the median value of each proxy. We also divide the sample into two groups of host countries with (without) significant disasters in the previous three years. The dependent variable is $MA / (MA + ALLIANCE)$, which is the ratio of the number of M&A deals to the total number of M&A and alliance deals made by a US firm in a given host country in a given year. *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. Standard errors are clustered at the host country level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	M&A/(M&A+Alliance)					
	(1)	(2)	(3)	(4)	(5)	(6)
	Low Biodiversity	High Biodiversity	High vulnerability	Low vulnerability	With disaster	Without disaster
Environmental risk	0.004* (1.72)	0.001 (0.23)	0.005*** (3.34)	-0.002 (-0.83)	0.006*** (3.12)	-0.000 (-0.08)
Ln(MktCap)	-0.051*** (-7.72)	-0.054*** (-4.53)	-0.055*** (-5.38)	-0.047*** (-8.86)	-0.053*** (-8.34)	-0.046*** (-4.71)
Ln(B/M)	-0.006 (-0.37)	0.042** (2.31)	0.009 (0.40)	0.010 (0.93)	0.019 (1.34)	-0.006 (-0.15)
Sales growth	0.059*** (4.66)	0.078** (2.34)	0.076*** (2.96)	0.053*** (4.01)	0.048*** (2.95)	0.164*** (4.01)
Cash	-0.373*** (-4.67)	-0.621*** (-4.94)	-0.539*** (-6.32)	-0.393*** (-4.46)	-0.460*** (-6.24)	-0.505*** (-4.05)
Capex	-0.408 (-1.30)	-1.225* (-1.70)	-0.625 (-1.33)	-0.774** (-2.32)	-0.725** (-2.09)	0.711 (1.19)
ROE	0.086** (2.06)	0.198*** (4.93)	0.115** (2.25)	0.141*** (4.45)	0.136*** (4.24)	0.110 (1.32)
D/E	-0.028*** (-3.76)	-0.034*** (-2.94)	-0.028*** (-2.98)	-0.033*** (-3.75)	-0.031*** (-4.42)	-0.017 (-1.26)
Past return	0.126*** (5.19)	0.153*** (4.57)	0.142*** (4.26)	0.130*** (8.06)	0.136*** (6.24)	0.196*** (3.97)
Volatility	-0.558*** (-5.42)	-0.597*** (-9.89)	-0.639*** (-7.10)	-0.490*** (-5.22)	-0.551*** (-7.15)	-0.693*** (-5.79)
Industry Concentration	0.052 (1.56)	0.018 (0.20)	0.007 (0.11)	0.059** (2.03)	0.049 (1.19)	-0.092 (-0.79)
Ln(GDP per capita)	-0.073 (-0.60)	-0.301*** (-5.55)	-0.109* (-1.75)	0.364*** (2.77)	-0.197** (-2.38)	-0.047 (-0.27)
GDP growth	-0.002 (-0.33)	0.018** (1.96)	0.005 (0.63)	0.008 (1.59)	0.008 (1.20)	0.002 (0.16)
MktCap/GDP	-0.001 (-1.00)	-0.001** (-1.99)	-0.002*** (-3.45)	0.000 (0.12)	-0.002** (-2.50)	0.000 (0.51)
Stock turnover	-0.001 (-0.77)	-0.001* (-1.80)	-0.000 (-0.70)	0.001 (1.03)	-0.000 (-0.87)	0.001 (0.77)
Ln(average B/M)	0.030 (0.21)	-0.062 (-0.91)	-0.115 (-1.39)	0.068 (0.64)	0.017 (0.23)	0.074 (0.38)
Average cash	-0.818 (-0.90)	-0.018 (-0.02)	-0.577 (-0.63)	-0.157 (-0.11)	-1.085 (-1.01)	-0.819 (-0.54)
Average capex	4.487***	-1.075	2.512*	-5.124***	2.861*	-0.900

	(3.06)	(-0.49)	(1.79)	(-3.24)	(1.91)	(-0.33)
Average ROA	0.000	0.003	0.001*	-0.000	0.000	-0.002
	(0.62)	(0.63)	(1.92)	(-0.79)	(1.00)	(-0.22)
Constant	1.891	4.893***	-2.797	-3.821*	3.294***	2.241
	(1.53)	(7.38)	(-1.14)	(-1.81)	(3.82)	(1.20)
Host Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
US firm industry FE	YES	YES	YES	YES	YES	YES
Cluster Host Country	YES	YES	YES	YES	YES	YES
Observations	4,619	3,365	4,443	3,573	6,759	1,177
Pseudo R ²	0.1421	0.2168	0.1989	0.1525	0.1934	0.1850

Appendix Model

In this appendix, we derive the first-order conditions of Case2.

In this case, we have

$$\tilde{D} = I[\widetilde{F}_2(1 - \alpha) - \theta]$$

Therefore,

$$\mu_D = I[\mu_{F_2}(1 - \alpha) - \theta] \quad (6.1)$$

$$v_D = I^2(1 - \alpha)^2 v_{F_2} \quad (7.1)$$

Now the vector of the appropriate parameters (other than the primary decision (endogenous) variable, I) for our model is

$$\Phi = (\mu_{F_2}, v_{F_2}, \alpha).$$

We define the MRS between risk and return as:

$$S(v_D(I, \Phi), \mu_D(I, \Phi)) = -\frac{U_v(v_D(I, \Phi), \mu_D(I, \Phi))}{U_\mu(v_D(I, \Phi), \mu_D(I, \Phi))} > 0, \text{ for risk aversion}$$

Solving

$$\begin{aligned} & \max_{I^* > 0} U(v_D, \mu_D) \\ & \text{s.t. (6.1), (7.1), and } \tilde{D}^* > 0 \end{aligned}$$

We obtain,

$$\frac{[\mu_{F_2}(1 - \alpha) - \theta]}{2I^*(1 - \alpha)^2 v_{F_2}} = S(v_D(I^*, \Phi), \mu_D(I^*, \Phi)) \quad (12.1)$$

Given (12.1), for risk aversion, $\mu_{F_2} > \{\theta/(1 - \alpha)\} > 0, \because 0 < \alpha < 1$.

Substituting the optimal I^* from (12.1) into the MV utility function, maximising it w.r.t. α , and applying envelope theorem, we obtain

$$\partial U^*(.)/\partial \alpha = -(\partial U^*(.)/\partial \mu_D)I^*\mu_{F_2} - 2(\partial U^*(.)/\partial v_D)I^{*2}v_{F_2}(1 - \alpha) = 0$$

$$\partial U^*(.)/\partial \alpha U_{\mu_D}I^* = \underbrace{-\mu_{F_2}}_{[1]} + \underbrace{2\{S^*(v_D(\alpha^*, \dots), \mu_D(\alpha^*, \dots))\}}_{[2]}I^*v_{F_2}(1 - \alpha) = 0 \quad (15.1)$$

Term [1] indicates the *income effect of signing the M&A deals*, which is negative; and term [2] indicates the *risk effect or substitution effect*, which is positive. Hence, the total welfare effect of signing the M&A rather than alliance deals is ambiguous, depending on the relative strength of the two opposite effects.

Implicitly differentiating Eq. (15.1) w.r.t. μ_{F_2} ,

$$\left(\frac{\partial \alpha^*}{\partial \mu_{F_2}}\right) = \left[\underbrace{-1}_{\text{Wealth Effect}} + \underbrace{2S_{\mu_D}^*I^{*2}v_{F_2}(1 - \alpha^*)^2}_{\text{Risk Effect}} \right] < 0;$$

The risk-effect, in case -2 is positive, if and only if $S_{\mu_D}^* > 0$.

Let's look at Eq. (12.1). As μ_{F_2} rises, the risk-premium in the numerator, $[\mu_{F_2} - \{\theta/(1 - \alpha^*)\}]$ rises. The risk-averse source country firm, under ceteris paribus, would optimally respond by choosing lower α^* , thereby ensuring even higher risk-premium at the optimal. This is Wealth Effect.

The risk effect, $2v_D^*S_{\mu_D}^*(.)$, is positive if and only if $S_{\mu_D}^*(.) > 0$.

$$\partial \alpha^*/\partial \mu_{F_2} = (-1 + 2v_D^*S_{\mu_D}^*(\alpha^*, \dots)), \quad (16.1)^{37}$$

Hence, $\partial \alpha^*/\partial \mu_{F_2} \leq 0$, if and only if $S_{\mu_D}^*(.) \leq (1/2v_D^*)$. This sufficiency condition for $\partial \alpha^*/\partial \mu_{F_2} \leq 0$ already includes the possibility of DARA preference structure of the US firm.

³⁷ We have for the 2nd term in the RHS of (16.1) as: $2I^*v_{F_2}(1 - \alpha)S_{\mu_D}^*(\partial \mu_D^*/\partial \mu_{F_2}) = 2I^{*2}v_{F_2}(1 - \alpha)^2S_{\mu_D}^* = 2v_D^*S_{\mu_D}^*(.)$.