

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

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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 cross-border mergers and acquisitions (M&As) and alliances conducted by US firms from 39 host countries over the last two decades, we show that US firms tend to prefer to choose cross-border M&As over alliances when the ER of foreign partners is high, consistent with the prediction of a mean-variance utility model. The propensity towards M&As is amplified by US firms' corporate governance quality, financial flexibility, and adherence to the host-country's sustainability disclosure reforms. Further, US firms experience high announcement abnormal returns 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 around 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 strategies (Bénabou and Tirole, 2010; Hart and Zingales, 2017) and face regulatory requirements to disclose sustainable activities and performance in their annual reports.² Further, environmental risk (ER) regularly appears on corporate board agendas due to the growing attention by stakeholders towards sustainable engagement.³ To reduce the adverse effect of investors' ER perception on firms' cost of capital and to mitigate the litigation risk from regulatory enforcement and stakeholders, environmental risk management (ERM) can be used as a crucial value-increasing device, given that traditional management practices are increasingly ineffective in addressing ER challenges.⁴

Despite the prevalence of ERM in firms' internal operations, little is known about what role ERM plays in external expansion decisions when a firm faces ER from foreign partners. In this paper, we investigate how a foreign partner's ER influences the important foreign venture 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 at the core of firm boundaries theory (Williamson, 1975, 1985). We posit and show that when a target country has high ER, an acquirer tends to choose cross-border M&As rather

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

² For example, the US Securities and Exchange Commission (SEC) proposes to require the US public companies to disclose a range of climate-related risk and greenhouse gas emissions; for details see <https://www.sec.gov/news/statement/gensler-climate-disclosure-20220321>.

³ For example, a survey by PwC (2019) shows that half of directors treat ER as part of enterprise risk management (PwC's 2019 Annual Corporate Directors Survey). A survey by Krueger et al. (2020) shows that institutional investors encourage firms to employ risk management approaches to address climate risk.

⁴ This is reported by Matten (1995), Sharfman and Fernando (2008), Aktas et al. (2011), Ghoul et al. (2011), Okereke et al. (2012), Koh et al. (2013), Chava (2014), Fernando et al. (2017), Breitenstein et al. (2021), and Huang et al. (2022), inter alia.

than strategic alliances to take greater control of the target's environmental engagement, thus mitigating the target's adverse environmental shocks and lack of ERM commitments.⁵ Accordingly, when the ER is low, the likelihood of selecting cross-border alliances tends instead to be higher due to the lack of ERM motivation for the acquirer to conduct M&As.

The key difference between M&As and alliances is whether firms decide to expand their boundaries through internalization or outsourcing (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 them through acquisition. For instance, cross-border M&As can lead to fundamental changes in firm nationality and corporate practices, such as their accounting standards, disclosure practices, shareholder protections, 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 codevelop or provide products, services, or technologies (Gulati, 1998), are preferred over acquisitions when deals involve serious integration problems or high financing and transaction costs (Balakrishnan and Koza, 1993; Hennart and Reddy, 1997; Huang et al., 2021). Further, to address "twin agency problems" (Stulz, 2005), firms are inclined to seek cross-border alliances to mitigate high expropriation risk from the indirect partner, namely the host country government, but they employ cross-border acquisitions to control any opportunistic behaviors from the direct partner (Bodnaruk et al., 2016).

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

⁵ Compared to M&A deals where the acquirer can manage the target's resource allocations, issues can arise from partners' willingness to contribute resources in alliance deals (Gundlach et al., 1995; Cabral et al., 2019).

their decision-making (Heinkel et al., 2001; Sharfman and Fernando, 2008). Further, reputational loss, legal costs, and litigation risk could be associated with any negative news of environmental non-compliance (Karpoff et al., 2005; Koh et al., 2013; Gillan et al., 2021).⁶ Thus, the adverse externalities of the partner's ER should play an important role in firms' decisions on cross-border acquisitions and alliances, the two major strategies for international expansion through either collaborating with or acquiring foreign firms.⁷

Examining a sample of 8,137 cross-border M&A and alliance deals entered into by US firms with partners from 39 host countries over nearly 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, a one standard deviation decrease in the host country ER leads to an average 7% increase in the ratio of M&As entered into by these US firms. This indicates that they choose cross-border M&As over alliances as a risk management device to control ER when the foreign partner has high ER, consistent with our prediction.

We further investigate the economic mechanisms behind the choice of cross-border M&As over alliances when the foreign partner carries high ER. First, target firms are likely to adopt the acquirers' corporate governance (Bris et al., 2008), and the 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 US firms' corporate

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, or physical risk.

⁷ Prior studies document the importance of managing ER from the business partners' supply chain (Dai et al., 2021; Tao et al., 2022). For instance, corporate customers are likely to be negatively affected when suppliers face negative shocks such as CSR-related scandals (Dai et al., 2021).

⁸ We measure the foreign firms' ER 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 ER and capitalize on environmental opportunities to generate long-term shareholder value. We use negative environmental scores to facilitate the interpretation of the results, so that the high value (i.e., low environmental score) indicates high environmental risk.

governance – measured by institutional ownership, independent directors, and the entrenchment index (E-index) – affects the EMR incentives in choosing the overseas expansion mode. We demonstrate that well-governed US firms are more likely to select cross-border M&As over alliances as their expansion strategy when facing foreign partners with high ER, highlighting the importance of M&As as an ERM device to address their partner’s ER.

Second, firms with financial constraints have less flexibility in selecting between M&As and alliances, as they have more 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 that optimize risk management policy, according to Bodnaruk et al. (2016) and Huang et al. (2021). Following these two 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 a US firm’s deal selection is more pronounced when the US firm is less financially constrained, highlighting the importance of financial slack in the relation between cross-border expansion modes 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), 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 any potential selection bias during the process of US firms’ international expansion and host country selection. The relation between the ER of the foreign partner in the host country and the ratio of cross-border M&A deals made by the US firms stands firm. Further, to address the US firm’s outsourcing concerns as the potential influential mechanism on its deal selection between cross-border M&A and alliance, we use the adoption of carbon tax legislation as an exogenous shock and compare the US firms’ selections of

domestic deals against cross-border ones. Our findings indicate that the incentives from outsourcing play an insignificant role in explaining our baseline results.

We also consider the impact of environmental regulations on a firm's deal selection, to further alleviate any potential endogeneity concerns. In particular, we use 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 sustainability disclosure reforms in host countries lead to a higher likelihood of cross-border alliances than M&As undertaken 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 legal system improvements can lead to a transition from "firm-like" arrangements (M&As) to arm's length "market-like" arrangements (alliances). The impact from our variable of interest, the foreign partner's ER, is still significantly positive. We further examine the moderation effect of 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 adoption of environmental regulations in the host country. Our results remain intact using the Paris Agreement as an alternative exogenous shock.

We also examine market reactions to cross-border M&A or alliance announcements in the presence of host country ER. We find that US firms experience higher deal announcement returns for choosing M&A deals than alliances when they face high ER from foreign partners, which suggests a 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 strategic acquisitions (Hoberg and Phillips, 2010). We, therefore, examine the market reactions to M&A or alliance decisions across high- and low-competition markets where 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 it is reported that firms are exposed to higher risk in horizontal deals than diversified deals (Gormley and Matsa, 2016), we also examine the heterogeneity of the deal attributes. We show that market reactions to M&As made with high ER are more pronounced when US firms undertake horizontal deals.

We present an analytical model (mean-variance utility or MVU model) to understand the empirical results.⁹ Specifically, an M&A or alliance deal entails a random lump-sum upfront cost to manage the target country-specific ER. Compared to an alliance deal, an M&A deal entails only a proportion of the lump sum yet a governance cost as well, related to the target environmental performance improvement of the target firm, owing to the acquisition. We then derive sufficiency conditions on the relative risk-return trade-offs for the optimal choices between an 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 lump-sum expectation increases. One is the wealth effect, which drives choosing M&As over alliances since the former entails only a proportion of the lump sum for ERM. The other is the risk effect, which drives the selection 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 excessively amplified with the possibility of a higher expected net

⁹ Prior studies use the MVU model in portfolio allocation (Eichner, 2008; Eichner and Wagener, 2009; Huang and Jiang, 2020), firms' export choices under risk (Mukherjee et al., 2021), and the supply-chain risk management literature (Mukherjee and Padhi, 2022).

efficiency gain, the wealth effect dominates the risk effect. Under such scenario, it is optimal to choose M&A over an alliance.

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 demonstrates 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 firm 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 the ER associated with foreign partners. Specifically, cross-border M&As could provide an alternative operational hedging strategy for firms to address ER from partner firms. Our findings thus deepen the understanding of merger activities as an 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 takes a step further to investigate the role of environmental responsibility in a firm's choice of expansion strategies, namely between cross-border M&As and alliances. The findings also add to prior theoretical and empirical studies on this particular choice, in terms of 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

and 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 both top-down corporate management and policymakers. Given the overwhelming evidence of losses and damage caused by ER, our work, highlighting the role of ERM in foreign expansions, is helpful for senior management teams to make choices between M&A and alliance deals in the presence of foreign partners' ER. Further, our findings help alleviate their concerns on the implementation and effectiveness of ERM, as we show that investors react positively to the selection of M&As over alliances to manage foreign partners' ER. While there are increasing demands from investors and regulators for firms' ER disclosure, policymakers often aim to mitigate the detrimental effects of ER on local communities. Our study helps policymakers in host countries make well-informed decisions on disclosure requirements, in a broader sense, since we find that such regulations can affect their local firms' modes of 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 M&As lie at the core of corporate boundary theory (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, the partner's opportunistic behaviors given the monitoring difficulty, and host government expropriation or corruption in countries with low

institutional quality and limited investor protection (Joskow, 1987; Jandik and Kali, 2009; Bodnaruk et al., 2016; Li and Reuer, 2022).

Managing the potential costs and risk includes the selection decisions between cross-border M&As and alliances in each international venture. 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). Given the “twin agency problem” (Stulz, 2005), firms tend to prefer cross-border alliances to deal with any expropriation risk from the indirect partner, namely the host country government, but they tend to prefer cross-border acquisitions to scrutinize for opportunistic behaviors from the direct partner (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 such international investment (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 are gradually switching their priorities towards sustainability. ER exposure could be costly to firms since investors are likely to consider ER factors when making investment decisions and require high returns when perceiving risk (Heinkel et al., 2001; Sharfman and Fernando, 2008). There could also be reputational loss, legal cost, and litigation risk associated with any negative news of environmental non-compliance (Karpoff et al., 2005; Hong and Kacperczyk, 2009; Gillan et al., 2021).¹⁰

A firm’s international expansion extends its boundaries, awarding not only wider market access but also broader exposure to stakeholder demands for environmentally

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

responsible activities. However, given the potential costs of ER, the negative externalities from a partner's environmental underperformance cannot be neglected when firms make investment decisions involving such external entities.¹¹ In fact, many 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 reduce their exposure to adverse shocks through the supply chains (Tao et al., 2022). The customers also exert effort to have supplier CSR performance improved (Dai et al., 2021). As cross-border M&As and alliances are the two major alternatives for strategic international expansion, through either collaborating with foreign partners or acquiring foreign targets, it is critical to investigate how firms may make such choices specifically to manage foreign partners' ER.

A critical difference when choosing between M&As and alliances is the decision to expand the firm's boundary through internalization or outsourcing (William, 1975; Mathews and Robinson, 2008; Bodnaruk et al., 2016). Through acquisitions, firms can internalize the target firms' resources and costs and ultimately control their governance. As cross-border M&As entail a change in the nationality of the target firms, their corporate governance practices may be replaced. The acquirers' corporate governance policies and regulations (such as accounting standards, disclosure practices, and shareholder protections) will be applied to the combined firms (Bris and Cabolis, 2008; Bris et al., 2008).¹² Moreover, Wang and Xie (2009) find that M&As between well-governed acquiring firms and poorly governed target firms lead to the overall improvement of corporate governance of the target firms, resulting in

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)

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).

high deal synergy. Equally, Albuquerque et al. (2019) show that cross-border M&As lead to positive changes in corporate governance in the host country. Therefore, with the prevailing ERM in corporate governance, the target's environmental management could be consolidated in the combined firm, according to 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 such as strategic alliances in order to control the targets' environmental engagement and so mitigate any 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 enter into M&As to manage ER is low. Our conjecture is in line with the spirit of Fairhurst and Greene (2022) on the corrective motives of initiating M&A deals, in that 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 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). Conversely, alliances usually lack incentives to monitor management, especially when partners diverge in their business visions (Rey and Tirole, 2001). Furthermore, well-governed firms prefer to choose well-governed alliance partners of a similar size (Bodnaruk et al., 2013). Corporate governance also plays an important role in shaping ERM strategies (Huang et al., 2022). In aggregating this scholarship, we postulate that well-governed US firms are more likely to choose M&As rather than alliances to mitigate any negative externality from their partners with high ER.

Firms' overseas ventures are also affected by financial constraints. Indeed, more financially constrained firms have more limited resources to conduct cross-border M&As (Bodnaruk et al., 2016), so they are less likely to do so even when the counterparty has high ER. In contrast, alliances involve lesser financial resources than M&As since the firms can directly deploy capital mutually and diversify risk (Lerner et al., 2003; Reuer and Tong, 2005). For example, alliance partners can combine their existing resources and activities, enabling each to use the other firms' assets with fewer capital requirements and lower transaction costs (Balakrishnan and Koza, 1993). Resources shared by partners are conducive to easing financial constraint (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.

As sustainable investing proliferates worldwide, investors often find that there is less information on firms' ESG than they would like. Given these high demands from investors and resistance from firms, countries have adopted regulations making it mandatory for firms to disclose ESG information. Very recent studies show that ESG disclosure has an impact on credit default swaps (Kölbel et al., 2020), institutional investors (Ilhan et al., 2021), board structure (Iliev and Roth, 2021), the financial information environment (Krueger et al., 2021), and ESG rating disagreement (Christensen et al., 2022). Christensen et al. (2022) note that empirical study into the real effects of ESG disclosure remains largely underexplored.

Institutional theory (North, 1990; Williamson, 2000; Scott, 2001) demonstrates that firms' decisions, such as overseas expansion and entry mode (Henisz and Delios, 2001), are affected by policy regulations. Institutions, such as those centred on legislation and regulatory policy (Oliver, 1991), determine appropriate behaviors from social and legal perspectives (Meyer and Rowan, 1977; Scott, 2001) so they 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) demonstrate that the enhancement of a legal system can facilitate the transition from “firm-like” arrangements (M&As) to arm’s length “market-like” arrangements (alliances). Institutions also have a significant effect on firms’ ESG performance (Ioannou and Serafeim, 2012; Liang and Renneboog, 2017).

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). Indeed, environmental disclosure regulations and climate laws intensify the pressure on firms to reduce 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 may become less tempted by M&A after the emergence of environmental regulations. Overall, we conjecture that the adoption of environmental regulations can lead to a higher propensity for alliances over M&As in the presence of ER. Further, US firms are more likely to select cross-border M&As over alliances if the host country has high ER after such regulation shocks.

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

Hypothesis 3.2: US firms are more likely to select cross-border M&As over alliances if the host country has high ER after 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). Accordingly, many investors and analysts also make their investment decisions and recommendations largely based on ER (Hong and Kacperczyk, 2009; Bolton and Kacperczyk, 2021; Pástor et al., 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 a useful setting to examine how the financial markets react to such transactions in the context of ERM. The literature shows the role of ESG in market reactions to M&A. 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 enter cross-border M&As with partners in countries with weak environmental regulation.

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

Hypothesis 4: US firms experience high announcement abnormal returns 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 data from 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 more than 50% after completion. We exclude deals classified as recapitalization, exchange offers, buyback, and minority stake purchases, from our sample. For

cross-border alliances, we consider 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 host countries with at least 100 cross-border deals (alliances and M&As in total) involving US firms during our sample period. We then retain 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 completed 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 firms in the United Kingdom followed by Canada, during our sample period. The deal ratio for each country is comparable to Bodnaruk et al. (2016): 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 firms' selection between M&As and alliances in a given host country in a given year, we create 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 (either M&A or alliance) in a given host country in a given year.¹⁴ After incorporating the ESG performance data from the Thomson Reuters ASSET4 ESG database and control variables

¹³ Our M&A to total deal ratio in most countries is slightly higher than that of Bodnaruk et al. (2016). This could be due to different sample periods since the period 1990 to 2011 used by Bodnaruk et al. (2016) includes a surge of alliances in the 1990s. Thus, their M&A to total deal ratio is slightly lower. Our sample is from 2003 to 2020, which includes the global boom of M&A activity in the early 21st century. Another reason could be the construction of alliance deals; we only include deals with two alliance participants while 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 host countries in which the US firm has no interest in investing. 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 year, as we use the ratio of the cross-border M&A deals to the total cross-border deals (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.

from Compustat, CRSP, the 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

The key variable of interest in our study is the foreign partner's ER, measured by the average environmental performance of the foreign firm's domiciled country in a given year.¹⁶ To facilitate the interpretation of the results, we change the sign on environmental scores so that a high value is related to a high level of ER.¹⁷ Environmental performance captures a company's impact on living and non-living natural systems, including the air, land, water, and 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 US firm-level heterogeneity, we use the natural logarithm of market capitalization ($\ln(\text{MktCap})$), 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-month 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

¹⁵ Appendix Table A2 elaborates our sample selection.

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), who 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 A7.

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 the 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 S&P 500 firms since 1991 and extended its coverage to Russell 1000 and Russell 3000 in the 2000s. As our study focuses on the ER of firms worldwide, we use environmental performance in ASSET4 as the proxy for a firm's ER.

same industry during a year (*Industry Concentration*). To capture host-country-level economic and financial development, we use the natural logarithm of GDP per capita of the host country ($\ln(\text{GDP per capita})$), GDP growth rate (*GDP growth*), stock market-to-GDP ratio (MktCap/GDP), and stock market turnover (*Stock turnover*). We also control for the average 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 (a market capitalization of 3,181 million US dollars, measured as $e^{8.065}$ with an approximate 16.9% sales growth rate and 18.2% annualized stock returns. These are consistent with Bodnaruk et al. (2016), who show that firms with overseas expansion have larger market values and higher sales growth than those without. Further, 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 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 for 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' domiciled countries 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, demonstrating 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, a one standard deviation increase in 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 that

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 $M\&A/(M\&A + Alliance)$.

when the foreign partner has a higher ER, multinational firms prefer to choose cross-border M&As over alliances as the ERM device to control the partner's environmental engagement, thus mitigating any negative spillover 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 lending (Goss and Roberts, 2011), supply chain trade credit (Zhang et al., 2020), and target selection in acquisition (Gomes, 2019).

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 choose M&As for external expansion.

[Table 2]

Since the risk from the partner's social and governance performance might also affect the deal selection of US firms, we control for these risks in the baseline model as a robustness check. The social and governance risks are proxied by the negative average social and governance 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 among these three risks.²⁰ We, therefore, separately add the social, governance, and overall ESG risks to the regressions. Columns (2) to (4) demonstrate that the standalone effects of these risks are significantly positive.

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% level.

We also use alternative proxies for foreign partners' ER, including the country-level Climate Change Performance Index (CCPI) and the Environmental Policy Stringency Index (EPSI) (Lin et al., 2022; Bose et al., 2021).²¹ Lower values of CCPI and ESPI indicate higher foreign partners' ER. Appendix Table A4 shows that our main results remain intact.

4.2 US Firm's Corporate Governance and Financial Constraints

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

Acquirers' corporate governance and management practices are usually embraced by their targets after acquisitions, leading to enhancements in the targets' corporate governance and management practices (Bris et al., 2008; Wang and Xie, 2009; Albuquerque et al., 2019; Bai et al., 2022) so it is reasonable to assume that well-governed US firms emphasizing environmental engagement are more likely to manage the ER of their counterpart firms. M&As rather than alliances would be employed to mitigate any negative externality from partners with high ER. Prior studies document a positive relationship between corporate governance and CSR performance, through external monitoring such as institutional ownership, and internal monitoring such as board independence (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) to measure corporate governance. We then partition the sample into high (low) governance quality groups by using the median value of the US firms' proxies in a given year in the sample. Specifically, firms with higher (lower) institutional ownership,

²¹ We obtain the Climate Change Performance Index (CCPI) from <https://ccpi.org/> and the Environmental Policy Stringency Index (EPSI) from the OECD.

higher (lower) proportions of independent directors on the board, and a 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 governance quality. The significant coefficient *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 their partners' ER.²² The results shown in columns (3) and (5) are also in line with our expectation: the impact of a foreign partner's ER is more pronounced for well-governed US firms with a higher proportion of independent directors on the board and lower E-index.

Next, we examine the impact of financial flexibility on US firms' deal selections. Firms with financial constraints have less flexibility in choosing between M&As and alliances, having more limited access to M&As that typically require substantial financial resources. Conversely, firms with financial slack have more capacity to select investment strategies with optimal risk management policies (Bodnaruk et al., 2016; Huang et al., 2021). Therefore, we expect that those US firms with lesser financial constraints will be more sensitive to their foreign partners' ER when selecting between M&A and alliance strategies. We use the Kaplan-Zingales index (KZ index) and S&P long-term credit rating to proxy for financial constraint (Farre-Mensa and Ljungqvist, 2016; Nguyen et al., 2018). Specifically, we classify the US firms into a financial constraints group (non-financial constraints group) if their KZ index is above (below) the sample yearly median value or whether the firm is without (with) an S&P long-term credit rating.

²² We also examine whether institutional investors who are active in environmental engagement could affect the holding firm's deal decisions for ERM. Following Azar et al. (2021), which documents the significant role of the "Big Three" (BlackRock, Vanguard, and State Street Global Advisors) in carbon emissions reduction, we use the shares held by the "Big Three" as a 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 their partners' ER. Results are reported in Appendix Table A5.

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 latter is less financially constrained. Overall, these results highlight the importance of financial slack in understanding the relation between cross-border expansion modes and partners' ERM.

[Table 3]

Further, we explore whether the environmental performance of US firms would affect their motivation to manage ER. We expect that US firms with good environmental performance would cherish their environmental reputation, thus being more cautious in making expansion decisions that consider partner ER. We measure this performance using the environmental strengths and concerns from the KLD Stats database.²³ We categorize the firms into two groups: green firms and non-green firms. Following Boone and Uysal (2020), we define them 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 A6 shows that green firms rather than non-green firms are more sensitive to their foreign partners' ER when making expansion decisions.²⁴

4.3 Further Analysis

²³ This measurement could also capture the US firms' ER, which is commonly used in prior studies focusing on ER. Our main variable of interest, the ER of the foreign firms, cannot be measured by using KLD data due to the database coverage, while using KLD data to measure the US firms' ER here reflects our aim for consistency with related prior studies.

²⁴ Additionally, we consider heterogeneity among the US firms in terms of the level of litigation risk, as firms with high litigation risk may face greater pressure to improve their ESG performance (e.g., Koh et al., 2014). We follow Francis et al. (1994) to identify the firms with high litigation risk in the biotechnology, computing, electronics, or retail industries. However, our untabulated empirical results suggest that there is no significant difference between firms with high and low litigation risk; both types tend to select M&As rather than alliances when facing high ER from their partners.

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 that country and the US firm's deal selection, thus biasing our results. For example, the quality of their legal systems not only affects cross-border M&A decisions (Jandik and Kali et al., 2009; Erel et al., 2012; Brockman et al., 2013) but influences local firms' ESG practice in the host country (Ioannou and Serafeim, 2012; Ghoul et al., 2017). To measure the institutional quality, we primarily 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). Specifically, we use two proxies: the average score of the six governance indicators (accountability, political stability, government effectiveness, regulatory quality, the rule of law, and corruption control) from the WGI, and the regulatory enforcement score from the World Justice Project, where a high value of the proxy indicates a 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 firms' deal selections when we control for the institution quality in the host country.

Moreover, Bodnaruk et al. (2016) find that any 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 capture 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 firms' selections between M&As and alliances are still consistent with Bodnaruk et al. (2016).

[Table 4]

We also examine the impacts of the host country's policy uncertainty, legal origin, and environmental litigation risk on the US firms' deal selections by controlling for these factors in the regression model.²⁵ Appendix Table A8 demonstrates that the impact of our variable of interest, foreign partner ER, remains significant.

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,²⁶ and whether host countries' ER might also be affected after the emergence of environmental regulations. To rule out any potential estimation bias, we add the host country 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 reports; the reforms could either be newly introduced laws, policies, or regulations on sustainability disclosure requirements (Schiller, 2018; Iliev and Roth, 2021; Hsu et al., 2021; Christensen et al., 2022).²⁷ We define a dummy variable (*Shock*) to indicate the completion of environmental-related disclosure reforms at the foreign-country-

²⁵ We use the economic policy uncertainty index as the proxy for the host country's policy uncertainty, taken from <https://www.policyuncertainty.com/index.html>. The number of environmental related lawsuits is used to capture the environmental litigation risk in the host country. We obtain the climate change litigation cases from the Global Climate Change Litigation database at the Grantham Research Institute at the London School of Economics and Political Science (LSE).

²⁶ For instance, the US firms might outsource their carbon emissions obligations to foreign suppliers (Dai et al., 2022) or to foreign acquisition targets (Bose et al., 2021) in countries with weak environmental regulatory standards due to the lower carbon emission costs there.

²⁷ 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; see <https://www.carrotsandsticks.net/regulations>. Our results remain consistent if we use the ESG-related regulations shown in Iliev and Roth (2021) as the shocks.

level, which is equal to one if the foreign country has the rules in place in year t , and zero otherwise.²⁸

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

Next, as the adoption of sustainability disclosure reforms is the exogenous shock to the different host countries, we conduct difference-in-differences tests to validate the parallel trend assumption for the exogenous shock. A series of dummy variables are added to the model, where $DR (-1)$, $DR (0)$, $DR (+1)$, and $DR (2+)$ indicate whether the deal is in the year before, the year of, the year after, or 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 moderates the relationship between a US firm’s deal selection and the ER of the foreign partner. We define a dummy variable *High Environmental Risk* to indicate whether the host country has high ER and thereby lower environmental performance. The variable equals one if the host country’s average environmental score is lower than the yearly median value in the sample, and zero otherwise. Column (3) reports the results. We find that the coefficient of the interaction

²⁸ 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.

term between *High Environmental risk* and *Shock* is significantly positive, suggesting that the US firms' preference on M&As over alliances in high ER countries is more pronounced after the emergence of environmental regulation.²⁹

Recent studies show that empirical estimations with multiple time periods and variation in treatment timing (the staggered DID method) can lead to 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 stacked DID tests. Our results (untabulated) remain consistent.

[Table 5]

Finally, we use the adoption of the Paris Agreement among all the host countries as the alternative exogenous shock from a change in 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 their operations to achieve a net-zero emissions goal. Those with high carbon emissions are expected to pay higher premiums to stockholders and lenders since investors demand a higher 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 the attention of various stakeholders, managing the carbon risk deriving from counterparties becomes increasingly important for inter-firm partnerships. For instance, environmental scandals associated with suppliers can increase reputational risk with customers, 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 potential issues with ESG

²⁹ The estimated regression equation is $(0.105 \text{ Shock} + 0.008) \times \text{High environmental risk} - 0.127 \text{ Shock}$.

scores. Using CO2 emissions to capture ER can help alleviate measurement issues. Overall, we surmise that high carbon emissions from foreign partners can amplify a 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 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.³⁰ 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* 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 US firms entering into cross-border M&As is higher if the direct carbon emissions are higher in the host country. Further, the interaction term between *Scope 1* carbon emissions and the environment score is significantly positive, consistent with our conjecture that US firms' preference for M&As due to their concern over high ER of their 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).³¹

³⁰ Scope 1 and 2 emissions are a mandatory part of reporting for many organizations across the world while scope 3 emissions mostly remains voluntary to report. Our focus is scope 1 emissions as the firm has the most direct control over this type. We also use the sum of scope 1 and scope 2 to capture the total carbon emission of the firm (Seltzer et al., 2022).

³¹ We also examine the heterogeneity of biodiversity, the Climate Vulnerability Index, and climate disaster in the host countries by conducting subsample tests. We obtain the biodiversity data, which is a sub-index of the Environmental Sustainability Index, from Passport (Euromonitor International). The Climate Vulnerability Index

[Table 6]

4.3.4 *The Endogeneity Problem*

One concern with 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 its partner's ER. One plausible explanation might be that other intentions dominate the US firm's selection of partners, such as markets and access to complementary resources, exploiting geographic distance, or other observed or unobserved determinants. Therefore, using a sample only based on foreign partners engaging in deals with 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, where the US firms choose whether to expand internationally and conduct cross-border deals regardless of the host country; second, where the US firms who expand internationally choose which foreign country to enter, regardless of entry modes; and third, where the US firms, given the selected foreign country, choose either cross-border M&As or alliances to manage the foreign partners' 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, where 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

is obtained from the sub-index Notre Dame-Global Adaptation Index (ND-GAIN). For details see <https://gain.nd.edu/our-work/country-index/>. We collect the climate disaster data, including droughts, extreme temperatures, floods, landslides, storms, and wildfires from EM-DAT. Appendix Table A9 shows that the impact of the foreign partner's ER on the US firm's deal selection is more pronounced when the host country has low biodiversity, high climate vulnerability, and has experienced significant climate disasters in the previous three years.

the natural logarithm of one plus the total number of cross-border deals (both 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 paid by the US firm to its total assets (*Foreign Tax*) as the identification variable in the first stage regression. Foreign taxes may capture the firm's overall international exposure and activity engagement. However, it is less likely to affect a US firm's host country selection in the second stage and entry modes in the third stage. We also control for the number of cross-border M&A and alliance deals the US firm has conducted in the previous year and the number of deals its 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 reveals a significantly positive relationship between the US firms' foreign tax and international expansion decisions, consistent with our conjecture. Further, we find that the US firms' previous experience on cross-border deals facilitates them to engage in more international deals in the future.

Next, in the second stage, we examine the US firms' selection of host countries conditional on the firm investing abroad. The sample consists of US firms which have formed at least one cross-border alliance or 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 a 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 I*), estimated from a stage one regression shown in Panel A, is also included in the stage two regression. The movement in 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 US dollar appreciation and depreciation against the foreign currency could affect a US firm's expansion activities in a given foreign country. The foreign partner's 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 movement in the exchange rate is significantly positive, suggesting that US dollar appreciation could promote more US firms' investment activity in a given foreign country. However, the results demonstrate that the foreign partners' ER coefficient is insignificant. This is consistent with our expectation that the foreign partners' ER should not affect the US firms' choice of specific foreign countries. Instead, it is supposed to directly influence the US firms' entry mode at the third stage.

Finally, in the third stage, we examine the US firms' entry modes (M&As versus 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 in Table 7. Our variable of interest, the foreign partners' ER, still significantly impacts the US firms' deal selection between M&As and alliances after the Heckman correction.

[Table 7]

4.3.5 *The Outsourcing Argument*

A US firm's preference for a cross-border M&A over an alliance when the foreign partner has high ER might be due to outsourcing firms' emissions abroad instead of other more immediate ERM purposes.³² For example, Bose et al. (2021) document that firms with higher emissions tend to acquire foreign targets located in countries with weak environmental standards, to reduce their own carbon risk through being located there. For instance, Dai et al. (2021) reveal that US firms tend to outsource some of their polluting to overseas suppliers. To disentangle the ERM motives from the outsourcing objectives, we conduct two types of

³² Cross-border M&As might provide for better outsourcing than cross-border alliances can.

experiment, examining whether the outsourcing incentives play a role in a firm's deal selections.

First, we use the passing of carbon tax legislation in the foreign country as an exogenous shock to the US firms' outsourcing incentives. Bose et al. (2021) find that the market notably reacts more positively when acquirers outsource their carbon emissions following the enactment of carbon tax legislation in the adopted countries, implying that carbon tax can increase firms' outsourcing incentives. However, under our empirical settings, carbon tax legislation has not been introduced in the US, the acquirer's country, during our sample period; we therefore focus on the passing of carbon legislation in the host countries, instead.³³ We conjecture that if US firms' outsourcing objectives are in play, the introduction of carbon tax legislation in the target country would also affect the US firms' deal selections between M&As and alliances.

We define *Post* as a dummy variable to indicate whether the host country has adopted carbon tax legislation or not. It equals one if there is legislation in place in a given year, and zero otherwise. We first add *Post* to our baseline regression model. Columns (1) and (2) in Panel A of Table 8 show that the impact of carbon tax legislation on US firms' deal selection between cross-border M&As and alliances is insignificant. However, the foreign partners' ER coefficients remain significantly positive. We also examine the dynamic effect of this exogenous shock, and include four dummies to capture different time periods: *Post(-1)*, *Post(0)*, *Post(+1)*, and *Post(2+)*. The impact of the legislation dummies shown in column (3) is again insignificant. Further, we interact the *Post* dummy with the foreign partners' *Environmental risk* to examine whether the US firms' selection of M&A over alliances when foreign partners

³³ Following Bose et al. (2021), we identify the following countries which have introduced and enacted carbon tax legislation: Australia, 2021; China, 2013; Costa Rica, 1997; Denmark, 2002; Finland, 1990; France, 2014; Germany, 1999; India, 2010; Ireland, 2010; Japan, 2012; South Korea, 2008; the Netherlands, 1990; Norway, 1991; New Zealand, 2005; Singapore, 2017; Slovenia, 1997; South Africa, 2015; Sweden, 1991; Switzerland, 2008; and the United Kingdom, 2001.

have high ER would be more pronounced if the host country enacted the carbon tax legislation. However, the results in column (4) lend no support to our assumption. Overall, the results shown in Panel A of Table 8 suggest that the US firms' outsourcing incentives play an insignificant role in their deal selections.

[Table 8]

Second, to further address the concerns of outsourcing as a potential influential mechanism, we compare the US firms' domestic with cross-border deal selections. Specifically, if there is an outsourcing objective for the selection between cross-border M&As and alliances, it should have no effect on the selection between domestic M&As and alliances, as outsourcing emissions normally targets overseas markets. To examine this, we construct two subsamples: (1) US firms conducting domestic deals; (2) US firms conducting cross-border deals. We also use the US firm's own ER as the proxy for its outsourcing incentives, where higher ER of a US firm indicates higher outsourcing incentives.³⁴ Panel B of Table 8 presents the results. The sample in column (1) includes those US firms that conduct at least one domestic deal (either M&A or alliance) in a given year. The dependent variable is the ratio of the number of domestic M&A deals to the total number of domestic M&A and alliance deals made by the US firm in a given year. The sample in column (2) includes those US firms that make at least one cross-border deal (either cross-border M&A or alliance) in a given year. The dependent variable is the ratio of the number of cross-border M&A deals to the total number of cross-border M&A and alliance deals made by the US firm in a given year. The results in columns (1) and (2) show that US firms with high ER are equally likely to select M&As over alliances, no matter whether

³⁴ We use the negative value of the firm's environmental score collected from ASSET4 to measure the US firm's ER.

they enter deals in a domestic or international market.³⁵ Therefore, the findings lend little support to the outsourcing explanation.

Further, to address the endogeneity concern that US firms conducting domestic deals might be different from US firms conducting cross-border deals, we use the US firms with at least one domestic deal and at least one international deal as the alternative sample. Columns (3) and (4) draw consistent conclusions.

Overall, these tests suggest that outsourcing plays an insignificant role in US firms' deal selection between cross-border M&As and alliances. However, it is plausible that there is an outsourcing incentive when firms make decisions about whether to invest domestically or internationally, or when they select a country to invest in. In other words, outsourcing might play a role in Steps 1 and 2 as we elaborated in Table 7, but have an insignificant effect in Step 3, namely determining the specific deal type given that the US firms have already selected a host country to invest in.

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 choosing 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).

³⁵ Interestingly, the standalone effect of US firms' ER is positive, indicating the US firm tends to select an M&A over an alliance when it has higher ER. While, in the cross-sectional tests shown in Table 3 and Appendix Table A6, we find a US firm's preference for M&A over an alliance to deal with higher foreign partner ER is more pronounced when the US firm is well-governed and green. These two conclusions are not contradictory. Although the former shows that generally US firms with high ER tend to pursue M&As over alliances, the latter proves that among such types of firm the ones with high environmental engagements tend to care more about ERM when selecting between M&As and alliances. It further highlights the theme of our study, that incentives for ERM do matter.

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).³⁶ 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 a 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 in deal announcement returns between M&A and alliances for a given level of foreign partners' ER.

Table 9 reports the results. Columns (1) to (3) show that the interaction term coefficient between the M&A dummy and the partner ER is significantly positive. However, the foreign 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&As are more beneficial than cross-border alliances for the US firms.³⁷ It implies that using M&As to manage partners' ER is value-increasing for firms' international expansion.

[Table 9]

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 this endogeneity concern, we use the alternative sample with matched M&A and alliance deals based on the US firms' characteristics.

³⁶ 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/>.

³⁷ The model with estimates shown in column (1) should be $CARs = (0.034 \text{ M\&A dummy} - 0.014) \text{ Environmental risk} + 1.215 \text{ M\&A dummy}$.

Specifically, we first use a logistic regression to estimate the probability of choosing M&A deals (the treated group) on a series of US firm fundamental characteristics, namely 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-month 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 9 presents the post-diagnostic test for the matched sample. As can be seen, the means of the fundamental characteristics of the US firms are not significantly different between M&A and alliance deals, implying that our matched sample is reliable. Column (4) in Panel A of Table 9 shows that our results remain robust using the matched sample.

Further, we investigate whether the increase in 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 US firms in competitive markets 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 US firms as in a high competition market if their HHI (total similarity) is below (above) the mean of HHI (total similarity) in each year. Panel A of Table 10 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 firms in more competitive markets.

Finally, we explore the heterogeneity in deal attributes since horizontal deals are riskier than diversified deals (Gormley and Matsa, 2016). Thus, we conjecture that markets would react well to deals involving ERM. Panel B of Table 10 shows that the market reaction to M&A deals made with high ER is more pronounced when the US and foreign firms are in the same industry (with the same two-digit SIC code).

[Table 10]

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:

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

We assume a single-period model with two dates: $t = 0$ and $t = 1$. The investment cost of a representative 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, 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 the source

country's currency units (USD).³⁸ Given the total capital investment (I) in the joint venture from the two participant firms, the total terminal (uncertain) net income under alliances is

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

\widetilde{F}_1 represents the ER in the source country, subsumed under the random upfront cost that 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 \widetilde{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&A or alliance) with the partner firm, capturing the asymmetric information between the two firms.

When the US firm's foreign target is ultimately acquired, the US firm only bears an $\alpha \in (0,1)$ 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 acquisition.

The total net earnings under M&As are

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

where γ is the governance cost related to the environmental performance improvement of the target firm owing to an 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 , 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, namely $\theta > \beta\delta$. In other

³⁸ We denote all random variables by a tilde (~), while their realisations are not denoted as such.

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 that 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 relatively corrupt legal and institutional structures, 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

$$\begin{aligned}y^{\widetilde{MA}} &= I \left\{ A - \frac{(c-s)I}{2} - \tau - \widetilde{F}_1 - \widetilde{F}_2(\alpha + \beta) - \theta + \beta\delta \right\}, \text{ if } \theta < \widetilde{F}_2; \\ &= I \left\{ A - \frac{(c-s)I}{2} - \tau - (\widetilde{F}_1 + \alpha\widetilde{F}_2) - \theta \right\}, \quad \text{if } \widetilde{F}_2 \leq \theta.\end{aligned}\tag{4.1}$$

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

$$\widetilde{D} = y^{\widetilde{MA}} - y^{\widetilde{V}}.\tag{5}$$

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.

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

Hence, the mean of \widetilde{D} is

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

Similarly, the variance of \widetilde{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 measure (Arrow, 1965; Pratt, 1964) of absolute risk aversion.³⁹ We solve the following problem,

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

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

³⁹ $U(v_D, \mu_D)$ 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 maximization yields

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

The 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^* corresponding to the interior solution of Eq. (8).⁴⁰ 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:

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

Maximizing (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) characterizes the relative welfare implication of signing an M&A as opposed to the alliance deal. The term [1] is negative and represents the wealth effect of signing an M&A deal. 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 an increase in α . This effect is therefore positive for a risk-averse source country firm,

⁴⁰ See, for example, Eichner (2008) and Mukherjee et al. (2021). The second-order condition of $\frac{\partial \varphi(I^*, \Theta)}{\partial I} < 0$ 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 .

namely 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^* .

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&A, compared to under an alliance. 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 a higher risk-premium, so it 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 an increasing absolute risk preference (IARA) (i.e., the likelihood of lower risk-taking, or, equivalently, higher risk aversion, signified by $S_{\mu_D}^* > 0$), it does not preclude the possibility of having a DARA preference structure (the likelihood of higher risk-taking, or, equivalently, lower risk aversion, signified by $S_{\mu_D}^* < 0$) with the possibility of higher expected return 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 characterized by "properness"), having a strictly quasi-concave mean-variance utility function necessitates a DARA preference pattern (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 $S_{\mu_D}^*(.) \leq (1/2v_D^*)$.⁴¹ Overall, US firms with a DARA preference structure are more likely to choose M&As over alliances under the conditions of higher expected ER in the partner country.

6. Conclusion

ER has an important impact on corporate strategies, and the choices around cross-border M&As and alliances are critical decisions for international ventures. Examining a sample of the cross-border M&A and alliance deals conducted by US firms entering 39 host countries over the last two decades, we show that firms choose cross-border M&As over alliances when the partner firm has high ER. This preference 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. Sustainability disclosure reforms in the host countries and the Paris Agreement increase the likelihood of US firms choosing cross-border alliances over M&As. Further, M&A deals rather than alliances could yield higher CARs when 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 high ER of the foreign partner firm. The

⁴¹ Internet Appendix Model provides the details for the first-order conditions.

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 gains of M&As over alliances, it is optimal to select M&As.

Our work contributes to a growing body of literature on the importance of ER in firm strategy. It is among 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 statistics

This table reports the descriptive statistics of our data. Panel A presents the distribution of US firms involved in cross-border M&A and alliance deals by 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 |
| Germany | 689 | 371 | 0.650 |
| Hong Kong | 64 | 90 | 0.416 |
| India | 209 | 383 | 0.353 |
| Ireland | 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 |
| United Arab Em. | 19 | 65 | 0.226 |
| United Kingdom | 1,640 | 659 | 0.713 |
| 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 firm choice between alliances and M&As

This table reports the regression results of foreign partners' environmental risk on US firms' choice between alliances and M&As. The sample includes firms that have entered into 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 undertaken M&As in a given host country in a given year, two if it undertook both alliances and M&As, and zero if it only entered into alliances (the baseline group is those who only undertook alliances). Column (5) shows the Logit regression. The dependent variable is a dummy variable which equals one if the firm undertook M&As, and zero otherwise. The regressions in columns (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 their corporate governance and financial constraints. We use institutional ownership, the ratio of independent directors, and the entrenchment index (E-index) as proxies for the US firms' corporate governance quality and use the KZ index and S&P long-term credit rating to proxy for the US firms' financial constraints. The sample is split into groups for those US firms with high corporate governance quality and those with low corporate governance quality, and accordingly, those financially constrained and those financially unconstrained, 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 (-0.28) | -0.021 (-0.28) | -0.129* (-1.87) | 0.064 (0.80) | 0.091 (1.17) | -0.084 (-1.32) |
| Ln(GDP per capita) | -0.081 (-1.38) | -0.265*** (-2.60) | -0.067 (-0.75) | -0.134 (-1.49) | -0.149* (-1.68) | -0.167* (-1.82) |
| GDP growth | 0.004 (0.55) | 0.002 (0.32) | 0.010 (1.24) | -0.016** (-2.18) | 0.002 (0.32) | 0.001 (0.08) |
| MktCap/GDP | 0.001 (1.30) | -0.001*** (-3.51) | -0.000 (-0.65) | -0.000 (-0.13) | 0.001 (1.33) | -0.000 (-0.93) |
| Stock turnover | -0.000 (-0.44) | -0.001 (-1.49) | -0.001 (-1.19) | -0.000 (-0.61) | 0.000 (0.25) | -0.001 (-1.51) |
| Ln(average B/M) | 0.115 (1.47) | 0.075 (0.89) | 0.044 (0.56) | -0.016 (-0.12) | -0.014 (-0.27) | 0.096*** (3.02) |
| Average cash | 0.807 (0.81) | -3.269*** (-2.87) | 0.836 (0.79) | -1.005 (-0.68) | 0.695 (1.40) | -2.393** (-2.12) |
| Average capex | 1.932 (1.13) | 1.833 (1.29) | 2.081 (0.99) | 5.428*** (3.36) | 4.113** (2.30) | 2.186 (1.52) |
| Average ROA | 0.000 (1.29) | 0.001** (2.08) | 0.000 (0.22) | 0.001* (1.89) | -0.000 (-0.20) | 0.001*** (4.15) |
| Constant | 2.283*** (3.80) | 4.218*** (4.16) | 2.586** (2.57) | 2.988*** (3.62) | 2.920*** (3.27) | 3.941*** (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*** (4.27) | 0.003 (1.48) | 0.006** (2.10) | 0.004 (1.32) |
| Ln(MktCap) | -0.055*** (-6.94) | -0.059*** (-6.10) | -0.082*** (-3.11) | -0.018 (-1.53) |
| Ln(B/M) | 0.042*** (2.73) | -0.028 (-1.36) | 0.019 (0.54) | 0.025 (0.99) |

| | | | | |
|------------------------|----------------------|----------------------|----------------------|----------------------|
| Sales growth | 0.062*** (2.60) | 0.090*** (2.81) | 0.015 (1.28) | 0.003 (1.13) |
| Cash | -0.520*** (-8.66) | -0.678*** (-4.97) | -0.014 (-0.11) | -0.552*** (-3.41) |
| Capex | -0.085 (-0.16) | -0.957** (-2.45) | -0.152 (-0.22) | -0.625 (-1.50) |
| ROE | 0.028 (0.78) | 0.182*** (4.48) | -0.026 (-0.85) | 0.000 (0.00) |
| D/E | -0.022** (-2.36) | -0.031*** (-4.22) | -0.001 (-1.02) | -0.005 (-0.92) |
| Past return | 0.123*** (5.20) | 0.149*** (6.02) | 0.089** (2.11) | 0.106*** (4.86) |
| Volatility | -0.541*** (-6.15) | -0.579*** (-5.57) | -0.844*** (-3.92) | -0.397*** (-4.68) |
| Industry Concentration | -0.079 (-1.10) | 0.058 (0.97) | 0.059 (0.37) | 0.034 (0.23) |
| Ln(GDP per capita) | -0.250** (-2.48) | -0.185* (-1.89) | -0.055 (-0.93) | -0.290** (-2.55) |
| GDP growth | -0.000 (-0.04) | 0.012 (1.37) | -0.002 (-0.33) | 0.012** (2.01) |
| MktCap/GDP | -0.000 (-1.64) | -0.001*** (-2.82) | -0.000 (-0.93) | -0.000 (-0.98) |
| Stock turnover | -0.001 (-1.47) | -0.000 (-0.17) | 0.000 (0.23) | -0.001 (-1.12) |
| Ln(average B/M) | 0.110 (1.18) | -0.082 (-1.24) | 0.048 (0.61) | 0.070 (1.44) |
| Average cash | -0.523 (-0.52) | -0.252 (-0.22) | -1.219* (-1.66) | 0.327 (1.11) |
| Average capex | 1.948 (1.40) | 2.038 (1.20) | 5.229** (2.24) | 0.068 (0.05) |
| Average ROA | 0.001*** (2.88) | -0.000 (-0.52) | 0.001 (0.89) | 0.001 (1.02) |
| Constant | 3.949*** (4.00) | 2.970*** (2.99) | 2.432*** (3.29) | 3.747*** (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 foreign partners' ER 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* are two proxies for direct partner risk, and *Constraints on Executive Power* and *Protection Against Expropriation* are 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 undertaken 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 host countries

This table reports the impact of environmental regulation shocks in host countries on the US firms' choices between alliances and M&As. We use sustainability disclosure reforms and the Paris Agreement as proxies for environmental regulation. *Disclosure Reform* indicates whether the host countries have introduced sustainability disclosure reforms, which 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 undertaken 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 (scope 2) CO2 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 undertaken 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 firms' 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 (M&As and alliances) the firm has undertaken 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. Outsourcing concerns

This table reports the regression results of examining outsourcing incentives on the US firms' choice between alliances and M&As. Panel A presents the results for the impact of carbon tax legislation in the host country on the US firms' selection between cross-border M&As and alliances. *Post* is a dummy variable which equals one if the legislation is in place in a host country in a given year, and zero otherwise. *Environmental risk* is the negative average environmental performance score of the foreign partner's domiciled country each year. Panel B presents the results for the impact of US firms' ER on the domestic deal selections and cross-border deal selections. *US firm environmental risk* is measured as the negative value of the US firm's environmental score in a given year. All regressions control for the host country, year, and US firm industry fixed effects. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Carbon tax legislation

| | M&A/(M&A+Alliance) | | | |
|--------------------------|--------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) |
| Environmental risk | 0.004** (2.07) | 0.005*** (3.66) | 0.005*** (3.53) | 0.006*** (3.83) |
| Post | -0.084 (-1.29) | -0.022 (-0.61) | | -0.080 (-0.84) |
| Post(-1) | | | -0.052 (-0.97) | |
| Post(0) | | | 0.016 (0.23) | |
| Post(1) | | | 0.021 (0.68) | |
| Post(2+) | | | -0.063 (-1.29) | |
| Environmental risk* Post | | | | -0.001 (-0.60) |
| Ln(MktCap) | | -0.052*** (-8.86) | -0.053*** (-8.84) | -0.052*** (-8.86) |
| Ln(B/M) | | 0.013 (0.94) | 0.012 (0.91) | 0.013 (0.95) |
| Sales growth | | 0.064*** (4.35) | 0.065*** (4.40) | 0.064*** (4.35) |
| Cash | | -0.465*** (-6.68) | -0.466*** (-6.70) | -0.464*** (-6.68) |
| Capex | | -0.695** (-2.09) | -0.702** (-2.10) | -0.697** (-2.08) |
| ROE | | 0.130*** (4.03) | 0.130*** (4.02) | 0.130*** (4.03) |
| D/E | | -0.030*** (-4.77) | -0.030*** (-4.75) | -0.030*** (-4.77) |
| Past return | | 0.141*** (7.14) | 0.141*** (7.09) | 0.141*** (7.13) |
| Volatility | | -0.569*** (-8.10) | -0.570*** (-8.11) | -0.569*** (-8.12) |
| Industry Concentration | | 0.030 (0.82) | 0.031 (0.86) | 0.030 (0.82) |
| Ln(GDP per capita) | | -0.177** (-2.33) | -0.170** (-2.29) | -0.171** (-2.19) |
| GDP growth | | 0.005 (1.05) | 0.004 (1.00) | 0.005 (1.04) |
| MktCap/GDP | | -0.000* (-1.85) | -0.000* (-1.92) | -0.000* (-1.81) |
| Stock turnover | | -0.001 (-1.40) | -0.001 (-1.34) | -0.001 (-1.39) |
| Ln(average B/M) | | 0.049 | 0.044 | 0.056 |

| | | | | |
|------------------------|----------|----------|----------|----------|
| | | (0.89) | (0.79) | (0.99) |
| Average cash | | -0.760 | -0.754 | -0.781 |
| | | (-1.28) | (-1.27) | (-1.34) |
| Average capex | | 2.558** | 2.428** | 2.482** |
| | | (2.19) | (2.20) | (2.10) |
| Average ROA | | 0.000 | 0.000 | 0.000 |
| | | (1.12) | (1.08) | (1.18) |
| Constant | 0.807*** | 3.129*** | 3.058*** | 3.105*** |
| | (9.02) | (4.17) | (4.21) | (4.10) |
| Firm Controls | NO | YES | YES | YES |
| Host country, Yeas, US | YES | YES | YES | YES |
| Cluster Host country | YES | YES | YES | YES |
| Observations | 8,137 | 8,137 | 8,137 | 8,137 |
| Pseudo R ² | 0.1496 | 0.1848 | 0.1851 | 0.1849 |

Panel B: Domestic deal selection vs. cross-border deal selection

| | Domestic M&A/(domestic M&A+alliance) | Cross-border M&A/(cross-border M&A+alliance) | Domestic M&A/(domestic M&A+alliance) | Cross-border M&A/(cross-border M&A+alliance) |
|------------------------|--|--|--|--|
| | (1) | (2) | (3) | (4) |
| US firm | | | | |
| environmental risk | 0.002*** | 0.002*** | 0.002*** | 0.002** |
| | (7.91) | (2.94) | (3.84) | (2.17) |
| Ln(MktCap) | -0.042*** | -0.089*** | -0.031*** | -0.089*** |
| | (-6.64) | (-7.44) | (-2.82) | (-6.23) |
| Ln(B/M) | -0.005 | 0.028 | 0.020 | 0.045* |
| | (-0.52) | (1.63) | (1.01) | (1.81) |
| Sales growth | 0.030 | 0.094* | -0.015 | 0.110* |
| | (0.99) | (1.78) | (-0.23) | (1.77) |
| Cash | -0.272*** | -0.339*** | -0.233** | -0.368*** |
| | (-3.86) | (-3.00) | (-2.20) | (-2.98) |
| Capex | -0.164 | -0.555 | -0.514 | -0.697 |
| | (-0.77) | (-1.39) | (-1.06) | (-1.24) |
| ROE | 0.057* | 0.226*** | 0.074 | 0.133* |
| | (1.92) | (4.64) | (1.24) | (1.89) |
| D/E | -0.015*** | -0.025*** | -0.017** | -0.020* |
| | (-4.53) | (-3.15) | (-2.08) | (-1.93) |
| Past return | 0.063*** | 0.126*** | 0.095** | 0.117** |
| | (2.84) | (3.01) | (2.44) | (2.16) |
| Volatility | -0.489*** | -0.841*** | -0.506*** | -0.725*** |
| | (-6.63) | (-6.75) | (-4.19) | (-4.63) |
| Industry Concentration | 0.010 | 0.070 | -0.051 | 0.105 |
| | (0.27) | (1.06) | (-0.71) | (1.23) |
| Constant | 1.423*** | 1.850*** | 1.279*** | 1.796*** |
| | (19.27) | (12.55) | (9.20) | (9.84) |
| Year FE | YES | YES | YES | YES |
| US firm industry FE | YES | YES | YES | YES |
| Cluster industry&Year | | | | |
| Observations | 6,097 | 3,051 | 1,834 | 1,834 |
| Pseudo R ² | 0.1187 | 0.1256 | 0.1501 | 0.1355 |

Table 9. US firm performance

This table reports the abnormal return around the cross-border deals (M&As and alliances) considering the impact of foreign partners' ER. The abnormal return is the 11-day cumulative abnormal returns ((-5, +5) day 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., an 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 the logarithm of market capitalization, sales growth, capital expenditure to asset, ROE, debt to equity ratio, the past 12-month stock return, the 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 10. Market competition and US firm performance

This table reports the abnormal return around the cross-border deals (M&A and alliance) considering the market competition of the US firms. The abnormal return is the 11-day cumulative abnormal returns ((-5, +5) day 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 a firm's total similarity in the product market (Hoberg and Phillips, 2016) 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 (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 definitions

| 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 being 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 completed 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 the 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 US 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 being the value of domestic shares traded divided by their market capitalization; the value 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, and zero otherwise. (<i>Data source: S&P Credit Ratings</i>) |
| Governance indicator | The average score of six governance indicators from the 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 measuring substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts, and 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. Ranging 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). 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). 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 a firm's direct emissions in thousands of tons (e.g., from the firm's own fossil fuel usage) divided by their sales in millions of US dollars. (<i>Data Source: ASSET4</i>) |
| Indirect CO2 Emission (Scope 2) | The ratio of a firm's indirect emissions in thousands of tons (e.g., from purchased energy such as electricity) divided by their sales in millions of US dollars. (<i>Data Source: ASSET4</i>) |

| | |
|---------------------------------|--|
| Indirect CO2 Emission (Scope 3) | The ratio of a firm's other indirect emissions in thousands of tons divided by their sales in millions of US dollars (<i>Data Source: ASSET4</i>) |
| Total CO2 Emission | The ratio of the sum of a firm's direct emissions (Scope 1) and indirect emissions (Scope 2) in thousands of tons divided by their sales in millions of US dollars. (<i>Data Source: ASSET4</i>) |
| HHI | Herfindahl-Hirschman Index as 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 pair-wise 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 completion | 459,348 |
| 3. M&A deals defined as “completed” | 449,152 |
| 4. The acquirer a US firm and the target a non-US firm | 21,600 |
| 5. Excluded deals classified as recapitalization, exchange offer, buyback, or 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 defined as “completed” | 59,810 |
| 3. Alliance deals with only two participants | 56,752 |
| 4. Alliance deals where one a US firm, the other 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 (alliances 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: Generation of 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 deal 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 deal for a given US firm-host-country observation) (Based on the deal number shown in step 2 of Panel C) | 4,110 |
| 2. Combining 1a. and 1b., generated observations at US firm-host-country level (Therefore, at least one deal, either M&A or alliance, in a given US firm-host-country observation) | 9,152 |
| 3. Year 2003-2020 | 18 |
| 4. US firm-host-country-year panel observations | 164,736 |

| | |
|---|--------|
| <p>5. Incorporated 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. At least one deal (either M&A or alliance) in a given host country in a given country (the reason being 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 foreign partners' risk from social and governance performance on the US firms' choice between alliances and M&As. The sample includes firms that have undertaken 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 undertaken 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 (-1.43) | -0.001 (-1.58) | -0.001 (-1.28) | -0.001 (-1.59) |
| Ln(average B/M) | 0.050 (0.92) | 0.038 (0.66) | 0.011 (0.17) | 0.049 (0.91) |
| Average cash | -0.857 (-1.36) | -0.779 (-1.28) | -0.744 (-1.13) | -0.856 (-1.43) |
| Average capex | 2.687** (2.45) | 2.967** (2.44) | 2.816** (2.56) | 2.820** (2.39) |
| Average ROA | 0.000 (0.97) | 0.000 (0.49) | 0.000 (0.39) | 0.000 (0.82) |
| Constant | 3.429*** (3.87) | 3.003*** (3.41) | 3.038*** (3.22) | 3.318*** (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: Alternative measurements for foreign partners' environmental risk

This table reports the regression results on the US firms' choice between alliances and M&As by using alternative measurements of foreign partners' ER. *Low CCPI*(*Low EPSI*) is the dummy variable, which equals one if the foreign partner's country has a lower CCPI score (lower EPSI score) than the median value of the sample, 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 undertaken 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) |
| Low CCPI | 0.079** (2.41) | |
| Low EPSI | | 0.084*** (2.85) |
| Ln(MktCap) | -0.046*** (-5.97) | -0.054*** (-8.77) |
| Ln(B/M) | 0.027** (2.34) | 0.020 (1.32) |
| Sales growth | -0.006 (-1.47) | 0.055*** (3.71) |
| Cash | -0.322*** (-3.99) | -0.475*** (-6.22) |
| Capex | -0.092 (-0.31) | -0.567* (-1.70) |
| ROE | -0.004 (-1.30) | 0.170*** (5.28) |
| D/E | -0.001 (-1.17) | -0.027*** (-3.58) |
| Past return | 0.120*** (5.52) | 0.135*** (6.21) |
| Volatility | -0.552*** (-4.69) | -0.558*** (-7.35) |
| Industry Concentration | -0.018 (-0.38) | 0.027 (0.73) |
| Ln(GDP per capita) | -0.370*** (-3.39) | -0.172** (-2.16) |
| GDP growth | 0.009*** (3.20) | 0.004 (0.72) |
| MktCap/GDP | -0.001 (-1.15) | -0.001** (-2.06) |
| Stock turnover | 0.001* (1.71) | -0.000 (-0.72) |
| Ln(average B/M) | 0.048 (0.39) | -0.009 (-0.12) |
| Average cash | -1.032* (-1.95) | -1.351 (-2.51) |

| | | |
|-----------------------|----------|----------|
| | (-1.85) | (-1.51) |
| Average capex | 0.741 | 3.421** |
| | (0.39) | (2.40) |
| Average ROA | 0.001*** | -0.000 |
| | (4.51) | (-0.63) |
| Constant | 5.056*** | 3.195*** |
| | (4.48) | (3.66) |
| Host country FE | YES | YES |
| Year FE | YES | YES |
| US firm industry FE | YES | YES |
| Cluster Host country | YES | YES |
| Observations | 4,528 | 7,411 |
| Pseudo R ² | 0.2440 | 0.1926 |

Appendix Table A5: 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 shares held by the “Big Three” as a proxy for institutional investors’ environmental engagement in a given firm. The sample is split into two groups of US firms, those with high and those with low “Big Three” ownership. Columns (1) and (2) show the results of the subsample groups split by the yearly median value of the proxy. Columns (3) and (4) show the results of subsample firms whose “Big Three” ownership are above the 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 undertaken 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 A6: Subsample test: US firms' environmental risk

This table reports the subsample regression analysis of US firms' expansion choices by considering the impact of US firms' ER. We use the environmental strengths and environmental concerns in the KLD database to categorize the US firms into two groups: green and non-green firms. Green firms are those with at least one environmental strength and 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 undertaken 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* (1.80) | 0.001 (0.32) |
| Ln(MktCap) | -0.101*** (-5.64) | -0.087*** (-5.24) |
| Ln(B/M) | 0.022 (0.61) | 0.026 (0.47) |
| Sales growth | 0.178* (1.66) | 0.280** (2.23) |
| Cash | -0.312** (-2.15) | -0.226 (-0.77) |
| Capex | 0.469 (0.72) | -0.276 (-0.36) |
| ROE | -0.057 (-0.62) | 0.157 (1.06) |
| D/E | -0.072*** (-4.51) | -0.026 (-1.47) |
| Past return | 0.038 (0.57) | 0.107 (1.32) |
| Volatility | -1.190*** (-4.60) | -0.753*** (-3.13) |
| Industry Concentration | 0.077 (0.68) | -0.092 (-0.61) |
| Ln(GDP per capita) | -0.042 (-0.32) | -0.467** (-2.57) |
| GDP growth | 0.019 (1.53) | 0.012 (0.74) |
| MktCap/GDP | 0.003*** (3.03) | -0.002 (-0.93) |
| Stock turnover | -0.001 (-0.86) | -0.000 (-0.09) |
| Ln(average B/M) | 0.264* (1.72) | -0.231 (-1.28) |
| Average cash | -0.534 (-0.27) | -1.459 (-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 A7: 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 regressions, respectively. The dependent variable is a dummy variable which equals one if the deal is an M&A, and zero if the deal is an 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 (0.98) | 0.090 (0.87) | 0.001 (0.17) |
| Constant | -287.143*** (-3.05) | -57.077** (-2.21) | -0.835 (-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 A8: Controlling for policy uncertainty, environmental litigation risk, and legal origin

This table reports the regression results of foreign partners' ER on the US firms' choice between alliances and M&As by controlling for the effect of policy uncertainty, environmental litigation risk, and legal origin in the host country. *Policy uncertainty* is the economic policy uncertainty of the host country in a given year. *Legal origin* is the dummy variable which equals one if the foreign partners are from the English common origin, and zero otherwise. *Environmental litigation risk* is the annual number of environmental related lawsuits in the host country. 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 undertaken 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) |
| Environmental risk | 0.006*** (4.69) | 0.005*** (3.72) | 0.005*** (3.78) |
| Policy uncertainty | 0.001** (2.22) | | |
| Legal origin | | -0.411*** (-2.80) | |
| Environmental litigation risk | | | -0.001 (-0.17) |
| Controls | YES | YES | YES |
| Host country, Yeas, US firm industry FE | YES | YES | YES |
| Cluster Host country | YES | YES | YES |
| Observations | 6,850 | 8,137 | 8,137 |
| Pseudo R ² | 0.1885 | 0.1848 | 0.1848 |

Appendix Table A9: 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, those with and 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 undertaken 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*** (3.06) | -1.075 (-0.49) | 2.512* (1.79) | -5.124*** (-3.24) | 2.861* (1.91) | -0.900 (-0.33) |
| Average ROA | 0.000 (0.62) | 0.003 (0.63) | 0.001* (1.92) | -0.000 (-0.79) | 0.000 (1.00) | -0.002 (-0.22) |
| Constant | 1.891 (1.53) | 4.893*** (7.38) | -2.797 (-1.14) | -3.821* (-1.81) | 3.294*** (3.82) | 2.241 (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 Case 2.

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

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

$$\text{s.t. (6.1), (7.1), and } \tilde{D}^* > 0$$

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, maximizing 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 *wealth effect of signing an M&A deal*, 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 deal 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 $S_{\mu_D}^* > 0$.

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

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

$$\partial \alpha^*/\partial \mu_{F_2} = (-1 + 2v_D^*S_{\mu_D}^*(\alpha^*, \dots)), \quad (16.1)^{42}$$

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 a DARA preference structure of the US firm.

⁴² We have for the 2nd term in the RHS of (16.1) as: $2I^*v_{F_2}(1 - \alpha)S_{\mu_D}^*(\partial \mu_D^*/\partial \mu_{F_2}) = 2I^{*2}v_{F_2}(1 - \alpha)^2S_{\mu_D}^* = 2v_D^*S_{\mu_D}^*(.)$.