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Host-country climate risk and the expansion of emerging market firms: a strategic tripod application

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ABSTRACT

Climate risk is a pressing global concern that affects multinational enterprises in manifold ways. Yet this has received less attention in international management literature. To address the gap, this study examines the impact of climate risk on the expansion and performance of emerging multinational enterprises (EMNEs) and tests the moderating effects of industry and institutional factors on the relationships. Using a dataset comprising the international acquisitions initiated by MNEs from emerging markets in 1998–2018, we find that host-country climate risk negatively affects the firms' expansionary entries and is detrimental to firm performance. In addition, we find that firms from high-polluting industries are likely to show greater environmental awareness and increase their commitment to climate-risk countries. At the country level, our results show that home-host country political ties reduce the negative impact of climate risk on firms' expansion and performance. The findings contribute to the literature on environmental management in an international business context and offer important practical implications for managers and government agencies.

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Climate risk; international expansion; performance; high-polluting firms; political partnership

1. Introduction

Climate risk is the consequence of weather shocks, climate change, and natural hazards that adversely affect the interests of a region and the active participation of individuals in that region (Carter et al. 2021; Hahn, Reimsbach, and Schiemann 2015; Huang, Kerstein, and Wang 2018). It generates a risk of abrupt changes to societies and disrupts global business in varying ways (Howard-Grenville et al. 2014; Sarasini and Jacob 2014; Stead and Stead 2013). For instance, research shows that cloudy, sunny, and overcast weather affects firm productivity and stock market performance (Burke, Hsiang, and Miguel 2015). The global stock market loses value when warming increases by 4°C or more (Huang, Kerstein, and Wang 2018), and firms are required to fundamentally change their business-as-usual approach when the average temperature increases by more than 2°C (IPCC 2014). With

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increased societal and economic developmental concerns around climate risk, firms that are involved in international business must consider host-country climate risk and take necessary precautions in their expansion strategies due to unpredictable climate changes (Pinkse and Kolk 2012; Tschakert et al. 2019; Verbeke, Coeurderoy, and Matt 2018). Yet existing studies have focused their attention on investigating local participants' responsive actions toward climate events, rather than identifying host-country climate-risk impacts on cross-border businesses (Carter et al. 2021), despite the hidden 'grey rhino' effects.[1]

Since the early twenty-first century, researchers have conceptualized climate risk as a product of institutional void (Pinkse and Kolk 2012), or, to be more precise, as 'a market failure on the greatest scale the world has seen' (Stern 2006, 27). Considering this, climate risk is more salient for emerging countries due to their underdeveloped institutions and ineffective monitoring mechanisms (Khanna and Palepu 1997). In the 2021 Global Climate Risk Index Report, the majority of countries most vulnerable to extreme climate events are fast-growing emerging countries such as Bangladesh, Pakistan, Thailand, and the Philippines. Although there has been a spirited and lively conversation about the internationalization of emerging market multinational enterprises (EMNEs) (Cui et al. 2017; Elia and Santangelo 2017; Wu, Fan, and Chen 2022; Wu, Fan, and Soo 2024), we still know little about the expansion path and performance of these global market latecomers that are moving to becoming climate-risk countries. To address the research gaps, this study asks a question: *How does host-country climate risk affect EMNEs' expansionary entries and post-entry performance?*

In addition, we suggest that the EMNEs' strategic positioning does not merely consider resource-seeking in the host country but is also affected by the industry and institutional conditions (He, Rizov, and Zhang 2022; Lahiri, Mukherjee, and Peng 2020; Peng et al. 2009). The industry-based view underscores how the industrial structure affects firms in developing strategies. In a climate risk context, high-polluting firms are relative to environmental changes due to their reliance on natural resources and economic survival. Further, the third leg of the strategy tripod, i.e. an institution-based view, indicates that the interplay between institutions affects the EMNEs' legitimation and thus shapes their strategic decision-making and performance (He, Rizov, and Zhang 2022; Peng et al. 2009). Following this logic, this study examines the moderating effects of high-polluting industries and home-host country political partnerships on the EMNEs' expansionary entries in climate-risk countries.

We test the predictions using a matched dataset of EMNEs' international acquisitions from 1998 to 2018. This study makes two main contributions to the internationalization literature. First, it opens new areas of inquiry by considering the impact of climate risk on firms' international behaviour (Howard-Grenville et al. 2014). We enrich the EMNE literature and shed light on how host-country climate risk affects EMNEs' expansion trajectories and performance outcomes (Nippa, Patnaik, and Taussig 2021). Second, we explore the underlying disadvantage-transformation mechanisms in a climate-risk context by jointly considering the influences of industrial and institutional conditions, as the other two forces of the strategy tripod (Lahiri, Mukherjee, and Peng 2020; Peng et al. 2009), on EMNEs' expansion and performance. In this vein, we provide a comprehensive explanatory framework to predict the EMNEs' strategic positioning in climate-risk countries. The finding generates fresh insights into the environmental management literature and contributes to the ongoing discourse on climate-related issues in internationalization.

2. Literature review and hypotheses development

2.1. The disadvantage-transformation view in a climate-risk context

There are two research streams exploring the disadvantage-transformation capability of EMNEs, with a consensus that a difficult home environment enables EMNEs to hone their adaptability, resource configurations, and responsiveness in ways that prepare them for foreign expansion (Arikan, Arikan, and Shenkar 2022; Cuervo-Cazurra and Genc 2008). One research stream explores the antecedents for the EMNEs' catch-up and leapfrog expansion without competitive advantages (Li et al. 2021; Luo and Tung 2007). Scholars use different theoretical approaches to acknowledge that home-country institutional disadvantages play a critical role in stimulating EMNEs to actively expand overseas, such as the springboard perspective (Luo and Tung 2007), institutional escapism postulates (Witt and Lewin 2007), the composition-based view (Luo and Child 2015), the ambidexterity view (Luo and Rui 2009), and compositional springboarding view (Li et al. 2021; Li et al. 2023). The second research stream emphasizes the post-entry performance of EMNEs, positing that the home country's underdeveloped institutions can lead to EMNEs developing enhanced market intelligence to identify and integrate resources in uncertain environments, thereby improving performance (Arikan, Arikan, and Shenkar 2022; Cuervo-Cazurra and Genc 2008). Yet very little attention has been devoted to the climate-risk context or explained how EMNEs transform competitive disadvantages into advantages in diverse and challenging environments.

Host-country climate risk is an urgent global issue common to multinational enterprises, given the significant economic shocks impacting international business security, management efficiency, and operational costs of MNEs (Huang, Kerstein, and Wang 2018; Pulver 2007). Records of major climatic extremes show that the casualties and losses in emerging countries are more serious than those in developed countries[2], owing to their increasing urbanization progress, rapid industrialization activities, and general unpreparedness for climatic extremes. In 2011 Thailand experienced the worst and longest flood event (Carter et al. 2021). Because the government and related parties were unprepared and the public was not well-informed, this disaster caused more than 800 deaths, which further led large industrial manufacturers to experience enormous economic losses (Carter et al. 2021). In 2019, increased temperatures and deadly heatwaves in India and Pakistan hit their economies, leading to a severe loss of human life and social cohesion, which triggered firms' awareness of the need for disaster response (Tschakert et al. 2019). Statistics provided by the Goddard Institute for Space Studies (GISS) and the United Nations Conference on Trade and Development (UNCTAD) also reflect that climate change leads to more volatile international economic activities launched by EMNEs compared with those on a global scale (see Figure 1). Due to the inadequate policy responses in emerging countries that have intensified the impact of climate risks (Pinkse and Kolk 2012), EMNEs are more aware of climate issues and more cautious in cross-border acquisitions than their advanced market counterparts.

Despite the disadvantage-transformation view highlighting the unique firm-level attributes that enable EMNE's expansion, these unique factors are likely to interact with industry-based and institution-based environmental conditions to jointly influence their probability of initiating multiple acquisitions in an environmentally vulnerable country (He, Rizov, and Zhang 2022; Lahiri, Mukherjee, and Peng 2020). Following

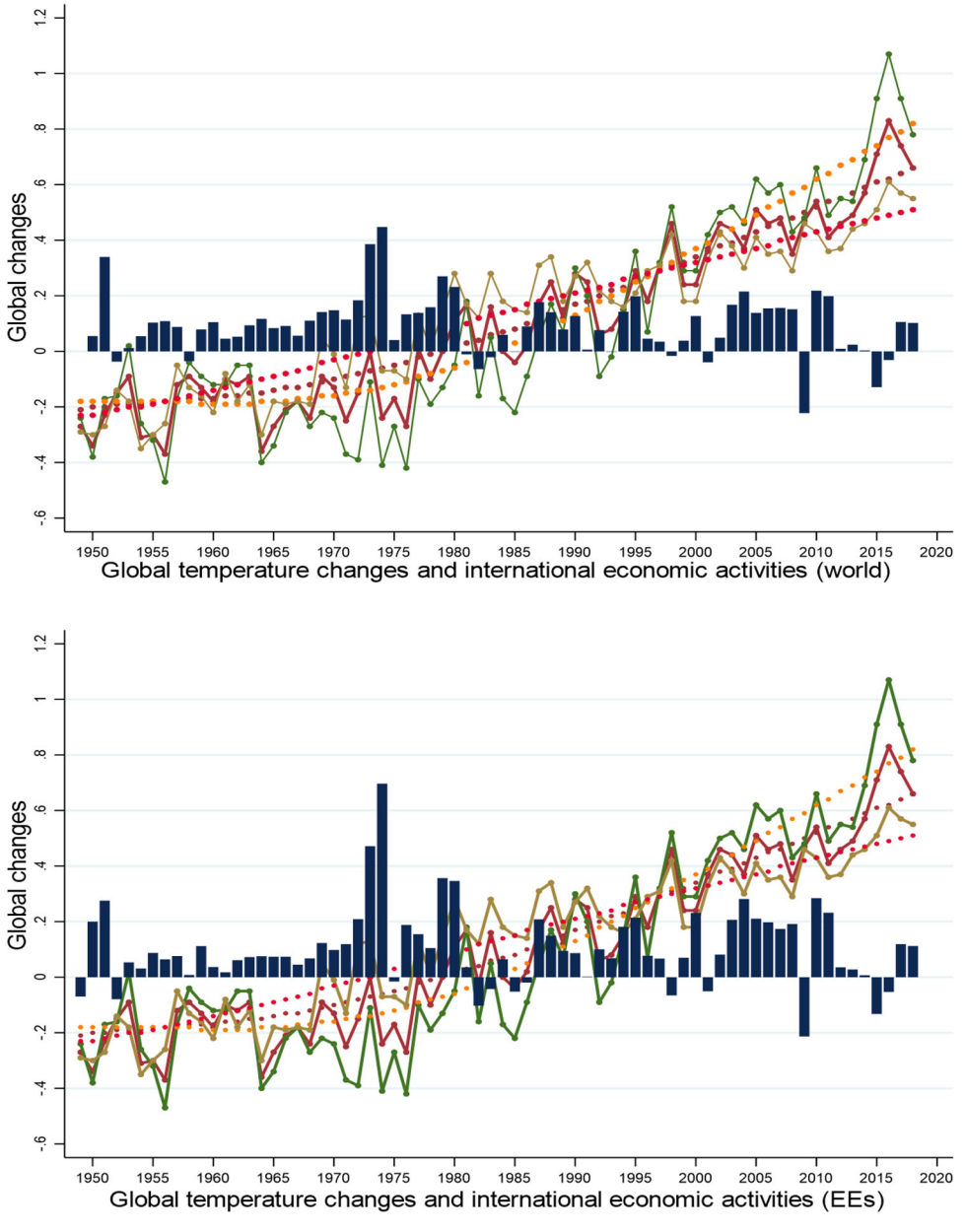

Figure 1. Global Temperature Changes and International Economic Activities.

Note: the upper part of the figure focuses on the international economic activities at the world level, while the lower part demonstrates the activities launched by emerging economies (EEs); the spike (dark) indicates international trade flows; the connected lines indicate global temperature changes measured via different standards. The first green-color connected line is the Land-Ocean: Global temperature average changes; the maroon-color line in Northern Hemispheric temperature average changes, the brown line is the Southern Hemispheric temperature average changes, and associated dots are the Locally Weighted Scatterplot Smoothing over 30 years; Data were collected from GISS and UNTCAD.

the strategy tripod framework (Peng et al. 2009), unstable market conditions give rise to the importance of integrating resource-based, industry-based, and institution-based influences to investigate a firm's strategies in a host country. Viewed this way, we

adopt the strategy tripod framework to explore how climate risk affects EMNEs' international expansion and performance consequences.

2.2. Host-country climate risk and EMNEs' expansionary entries

Expansionary entries, as a reflection of an escalation of commitment, are defined as a firm's increase in the times of acquisitions in a host country they have previously entered (Jiang, Holburn, and Beamish 2020). Existing studies have discussed the risks of international expansion under uncertain environments (Li, Guo, and Xu 2017; Wooster, Blanco, and Sawyer 2016; Wu and Fan 2023). On the one hand, a higher level of resource commitment to a specific host country indicates a relatively low level of geographic scope, which sustainably inhibits the benefits of diversification and reduces the flexibility for EMNEs to redirect their strategies when facing increased market uncertainty (Aybar and Ficici 2009; Bilgili, Kedia, and Bilgili 2016). On the other hand, even though the greater investment of resources to the host country can help firms overcome the liability of foreignness, it is often less reversible and may decrease the firms' efforts in seeking new market opportunities (Li, Guo, and Xu 2017; Wooster, Blanco, and Sawyer 2016). With concentrated resources investments, firms may find it difficult to cope with environmental disturbance and hard to develop alternative strategies because their investments lack flexibility.

In the literature, researchers argue that despite the lack of international experience and home-country institutional constraints, EMNEs exhibit strong motivation for seeking critical resources via a series of aggressive cross-border acquisitions in the international arena (Aybar and Ficici 2009; Kumar et al. 2020; Luo and Tung 2007). These firms often undertake large investments in order to catch up with advanced market players (Cuervo-Cazurra and Genc 2008). In a climate-risk context, we suggest that EMNEs may become wary of making subsequent acquisition decisions due to the increased risks and uncertainty associated with increasing resource commitments. First, due to climate disruptions, systematic risk (e.g. unemployment, price changes, inflation, and consumer preference) is intensified (Carter et al. 2021; Huang, Kerstein, and Wang 2018). To tackle that risk effectively and adapt to the host country, firms may move away from their existing business model to establish new but unrelated firm-specific advantages (Hrebiniak and Joyce 1985; Kolk and Pinkse 2008). Second, unsystematic risk (e.g. operational risk, employee turnover, liquidity risk) is escalated, because expansionary entries expose EMNEs to more sophisticated demand and greater operation complexity. Considering the potential loss from increased climate risk, EMNEs are less likely to increase resource commitment to the host country because of the pressing need to preserve financial slack for maintaining organizational resilience (Huang, Kerstein, and Wang 2018; Pinkse and Kolk 2012). Hence we propose:

> **Hypothesis 1a:** Host-country climate risk is negatively associated with EMNEs' expansionary entries.

Although the disadvantage-transformation view acknowledges that underdeveloped home-country institutions provide EMNEs with advantages to operate in countries with difficult conditions (Cuervo-Cazurra and Genc 2008), the finding may not hold in the context of climate risk. In the study, we suggest that, if EMNEs initiate

expansionary entries in climate-risk countries, they are less likely to achieve better performance due to the significant costs involved. Among the extant studies on the economic impact of climate risk, it is noted that operating in countries with higher climate risk and extreme weather is likely to result in poorer performance (Dell, Jones, and Olken 2014; Huang, Kerstein, and Wang 2018). Some studies emphasize the disrupting impact of climate risk on economic activities, such as negatively affecting production efficiency (Burke, Hsiang, and Miguel 2015), impacting investor sentiment and stock volatility (Novy-Marx 2014), and even destroying the value of firms' physical and financial assets (Huang, Kerstein, and Wang 2018). Many studies examine the social impact of climate change, providing experimental evidence to show that an increase in temperature will lead to higher crime rates, aggression by police officers, and spousal abuse (Anderson 1989; Ranson 2014), and thereby lead to more social and political conflicts. Consequently, foreign firms, especially those from emerging markets that suffer competitive disadvantages, may find more difficulties interacting and embedding in a climate-risk target country. In addition, increasing resource commitment to climate-risk countries requires EMNEs to continuously adjust their strategies to prepare for short-term and long-term environmental shocks (Dell, Jones, and Olken 2014; Huang, Kerstein, and Wang 2018). The increased market adaption costs and interaction barriers will result in EMNEs' poorer performance. Thus we propose:

Hypothesis 1b: EMNEs' expansionary entries in climate-risk countries are negatively associated with post-entry performance.

2.3. The moderating effect of high-polluting firms

The strategic tripod suggests that resources alone are insufficient to explain firms' complex decision-making, because industry and institutional environments also matter (Lahiri, Mukherjee, and Peng 2020; Peng et al. 2009; Xie et al. 2011). The industry-based view argues that the industry structure helps determine the 'dos' and 'don'ts' in making an international expansion decision. Specifically, in the climate-risk context, firms from high-polluting industries often attract greater public attention, as their operations heavily rely on natural resources and require a higher degree of energy demand (Cheng and Liu 2018; Heras-Saizarbitoria, Arana, and Boiral 2015; Zhang, Du, and Chen 2019). In the early phrase of internationalization, high-polluting firms are forced by the public to actively explore adaptive mechanisms to obtain legitimacy to locate in countries with high environmental pressure (Cheng and Liu 2018). After their initial entry, the industry effect will lead to the firms continuously exploring the same host country rather than changing the target location, because firms need to afford the high sunk costs of initial entry and environmental adjustment costs in new market entry (Ryan 2012). Also, due to the challenges in balancing various legitimacy requirements from different countries, high-polluting EMNEs are less willing to diversify their international destinations (Strike, Gao, and Bansal 2006). Therefore, high-polluting firms are likely to continue expansionary entries in these countries as a cost-effective strategy and as a means of maximizing consolidated economic returns. We propose:

Hypothesis 2a: High-polluting firms exert a positive moderating effect on the relationship between host-country climate risk and the expansionary entries of EMNEs.

In line with the logic that high-polluting firms devote more effort in their initial entry to the climate-risk country and the greater probability of their subsequent entries, such industry effect will further positively moderate the relationship between expansionary entries and performance. In the existing literature, researchers identify that climate-risk countries are usually associated with cheap labour, manufacturing of fertilizers, and using dirtier fuels such as oil and coal (cf. Pinkse and Kolk 2012), which are usually needed and favoured by firms from high-polluting industries. Because high-polluting firms are likely to be challenged by local stakeholders in their initial entry due to their operations relying heavily on natural resources, these firms will show a greater awareness of climate risk and environmental shocks in their subsequent entries. The climate risk context thus brings them new opportunities to reconfigure key strategic assets and transform their business for survival and more profitability (Kolk and Pinkse 2008). As Dell, Jones, and Olken (2014, 756) suggest, climate change 'could even be beneficial' when adaptation is possible. With the experience in environmental adaptation (obtained from their initial entry), the increased resource commitment in subsequent entries signals to local stakeholders that these EMNEs are committed to adapting, transforming, and being able to care for local well-being (Froese et al. 2021). Therefore, once high-polluting EMNEs pass the initial market-entry requirements and gain legitimacy, their expansionary entries will help reduce marginal costs and create more opportunities to profit. Therefore, we propose:

Hypothesis 2b: High-polluting firms exert a positive moderating effect on the relationship between EMNEs' expansionary entries in climate-risk countries and post-entry performance.

2.4. The moderating effect of political partnership

Following the strategic tripod framework, an EMNE's strategic positioning is affected by its resource-seeking and industrial conditions and institutional factors (Peng et al. 2009; Xie et al. 2011). Research on climate change shows that governments play an important role in moderating the adaptation process (Dell, Jones, and Olken 2014). When a political partnership exists between the home and host countries, the relationship between host-country climate risk and the EMNEs' probability of expansionary entry will be revised. The political partnership serves as a bridge to connect firms and local market stakeholders (Kostova and Roth 2002; Li, Xia, and Zajac 2018). Leveraging the information platform offered by the partnership (Montiel et al. 2021), EMNEs can better access critical knowledge and complementary resources in adapting to climate-risk countries. In addition, partnership agreements can assist EMNEs in better understanding the host country's policy around carbon emissions and other environmental issues (Dell, Jones, and Olken 2014), allowing them to maintain their legitimacy for subsequent entries continuously. Hence EMNEs will become more willing to increase resource commitments to the host country despite higher climate risk. That is, the political partnership between the home and host countries will mitigate the negative impact of climate risk on EMNEs' expansionary entries. We propose the following hypothesis:

Hypothesis 3a: The political partnership between home and host countries exerts a positive moderating effect on the relationship between host-country climate risk and the expansionary entries of EMNEs.

We suggest that institutional advantages provided by the home-host country political partnership will positively moderate the relationship between expansionary entries and the performance of EMNEs. A close political relation often implies that firms are likely to obtain preferential resource allocations, favourable regulatory provisions, or tax incentives from the host country (Cuervo-Cazurra & Li, 2021; Lee and Lim 2001; Van der Heijden 2006), which are important for reducing adaptation costs in expanding in that country. Close political ties can also lead to positive public opinion and evaluation of the firm's investment plans (Chan and Makino 2007). Hence the EMNEs' increased commitment to the climate-risk country is less likely to be perceived as harmful to local stakeholders and indigenous firms. It reduces their competitive pressure and compliance costs (Ryan 2012), increasing the return on their expansionary entries. Moreover, EMNEs can leverage the partnership to cooperate with government agencies and local communities in expansion, which helps ensure the quality of their plans and stabilize their manufacturing and distribution networks in the climate-risk country (Buso and Stenger 2018; Montiel et al. 2021). The friendly political environment reduces the EMNEs' competitive pressure and compliance costs (Ryan 2012), thereby improving their performance in expansionary entries into climate-risk countries. Hence, we propose:

Hypothesis 3b. The political partnership between home and host countries exerts a positive moderating effect on the relationship between EMNEs' expansionary entries in climate-risk countries and post-entry performance.

3. Methods

3.1. Data collection

We focused on MNEs originating from emerging markets, using the market list provided by the International Monetary Fund (IMF)[3] and identified in the Emerging-Market Index by Morgan Stanley Capital International (MSCI).[4] We first collected the data on cross-border acquisitions initiated by EMNEs throughout the accessible period in the Thomson ONE database. We focused on the acquisitions announced by the publicly listed firms, since these firms have advantages in international expansion and their financial data are more accessible compared with those of their private counterparts (Yiu et al. 2021). We then removed all the financial firms based on the SIC code, as these firms are more affected by legal and institutional regulations and thus may show a unique growth path (Trichterborn, Zu Knyphausen-Aufseß, and Schweizer 2016). Focusing on exploring the expansionary expansion path of EMNEs, we followed Kumar, Dixit, and Francis (2015) in removing all firms that had only one deal throughout the accessible period, since these firms did not engage in risk-taking activities overseas and cannot be truly defined as MNEs (Rugman, Nguyen, and Wei 2016). We matched the dataset by collecting firm-level data from Refinitiv Eikon and country-level data from multiple data sources, including Germanwatch,[5] Macrotrends, CIA World Factbook, World Governance Index (WGI), CEPII database, and the EPI (environmental performance index) provided by Yale University. The whole process gave us 2198 deals. We then removed observations with missing data, resulting in a final sample comprising 2187 deals initiated by 816 EMNEs from 29 emerging markets in 1998–2018. For

all firm-level and country-level explanatory variables, we obtained data at t-1 year (1997–2017), and for performance, variables were measured at $t + 1$ year (1999–2019) (Kusewitt 1985). Our adoption of the lagged data structure aims to overcome the endogeneity issue and reverse causality concerns (Hamilton and Nickerson 2003).

3.2. Dependent variables

We aim to examine how host-country climate risk impacts EMNEs' *expansionary entries* at the first stage of regressions. In the literature, serial acquirers usually make multiple entries within a three – or four-year time range (Haleblian, Kim, and Rajagopalan 2006). We followed previous studies by using a three-year time frame to measure EMNEs' choice of expansionary entries. This equals 1 if the firm initiated more than one acquisition in the same host country at a time range [−1, 1] year, and 0 if the firm initiated fewer than two (not including two) acquisitions in the same target country (Haleblian, Kim, and Rajagopalan 2006; Jiang, Holburn, and Beamish 2020). *EMNE performance* is the second dependent variable used to capture the impact of expansionary entries on firm performance, which was measured by dividing the firm's net income by its total shareholder equity (Hoskisson et al. 2002). We used return on assets as an alternative measure to capture firm profitability in the robustness tests.

3.3. Independent variables

We used the Global Climate Risk Index (CRI) reports published by Germanwatch to measure host-country *climate risk* in the year before the acquisition; this is a composite indicator of socio-economic effects and mortality due to national disasters and climate change (Huang, Kerstein, and Wang 2018; Weiler, Klöck, and Dornan 2018). The climate-risk data are an authoritative indicator widely used in the literature for climate risk and changes (Huang, Kerstein, and Wang 2018). The reports provide two sets of the climate risk index, including the index in the respective year (2006–2018) and the long-term index (1996–2018) (Huang, Kerstein, and Wang 2018). The index includes the following indicators to reflect the impacts of weather-related loss events on countries: death toll, deaths per 100,000 inhabitants, absolute losses in million US$ at purchasing power parity (PPP), and losses per unit GDP in % (Germanwatch, 1999–2018). Lower index scores represent a higher level of climate risk. Following Huang, Kerstein, and Wang (2018), we used the available annual data for the period 2006–2018 and the long-term index for the period 1996–2006. We inverted the original index so that a higher index represents a higher risk (see Figure 2). The figures show some of the most affected countries in 2018, such as the Philippines, India, and Kenya. To emphasize the causality between climate risk and acquisition activities, we collected climate-risk data at t-1 year (Weiler, Klöck, and Dornan 2018).

Knill, Lee, and Mauck (2012) suggest that a significant trade partnership (both import and export partners) between two countries reflects strong political relations between countries. Hence we measured bilateral political relations between home and host countries using a binary variable, which equals 1 if the target country is recognized as an important partner of the home country in the CIA World Factbook and 0 otherwise (Knill, Lee, and Mauck 2012). If there is a *political partnership* between countries at year

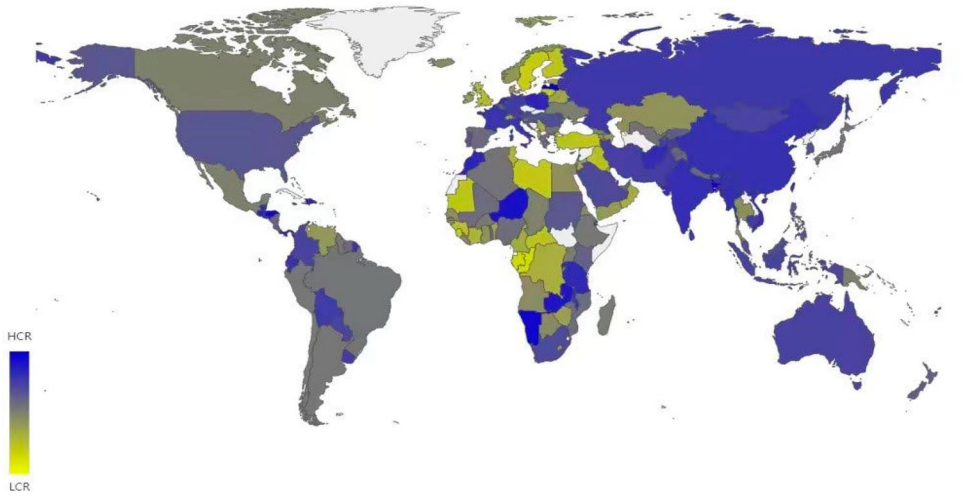

Figure 2. Climate Risk Index by Country.
Note: HCR indicates high climate risk, LCR means low climate risk (long-term index, 1999–2018).

t-1, we expect this can significantly increase the possibility for expansionary acquisitions in the same target country in the following years (Knill, Lee, and Mauck 2012). We also followed Yu, Cao, and Shi (2021) in distinguishing *high-polluting firms* based on the four-digit SIC codes of high-polluting industries. A binary variable is used to measure *high-polluting firms*, which equals 1 if the EMNEs are from high-polluting industries and 0 otherwise.

3.4. Control variables

We included a set of deal-level, firm-level, and country-level control variables in the year before acquisition, which show the potential to affect an EMNE's expansionary acquisitions and post-expansion performance. At the deal level, the percentage acquired by firms affects their control over target assets and capability to achieve strategic goals (Yiu et al. 2021). We adopted a *full ownership* dummy to indicate whether the EMNEs fully owned the foreign subsidiary after the acquisition. In addition, the relatedness between the acquirer and the target firm affects the level of information asymmetry, which affects whether the EMNEs better understand the acquired business and assess the true value of the deal (Malhotra and Gaur 2014; Reuer and Koza 2000). In line with existing literature, we controlled *related deal* by comparing the standard industrial classification (SIC) code of the acquirer and the target, where 1 means that the acquirer and the target are in the same industry and 0 otherwise (Malhotra and Gaur 2014).

At the firm level, we controlled *firm age* using the natural logarithm of the number of years that the firm had been in existence and *firm size* using the natural logarithm of the acquirer's total assets, as older and larger firms tend to have more experience and capabilities for expansionary acquisitions compared with small and young firms. An acquirer's *leverage ratio* (the debt-to-equity ratio) and *liquidity ratio* (current assets/current liabilities), which are important indicators of a firm's ability to raise funds and

fulfil obligations, also affect its environmental and market practices (Oates and Moradi-Motlagh 2016; Oyewo 2023). We also controlled the EMNEs' selling, general, and administrative costs (*SG&A costs*), using the firm's expenses in SG&A divided by its total operating expenses, because this affects the firm's ability to accommodate environmental changes and forecast future business (Nishitani et al. 2022).

In addition, research shows that firms' ownership structures affect their adaptation and reconfiguration abilities, which are critical to reducing investment risks, and costs, and thus affect firm performance (Bakker 2016; Lawton, Rajwani, and Doh 2013). *Insider ownership* is often considered as a reverse proxy for agency costs. Hence we controlled it using the number of shares owned by insiders compared to total shares. As government-controlled firms are more likely to gain institutional support to access critical resources for reconfiguration and coping with environmental issues (Cuervo-Cazurra et al. 2014; Guerin 2007), we controlled the *state ownership* of the EMNEs. As previous studies suggest that EMNEs entering into advanced markets show greater *strategic asset-seeking* objectives (Cui et al. 2017; Elia and Santangelo 2017), we controlled the EMNEs' entry objective using a dummy variable (equals 1 if the destination of the acquired firms is an OECD member country, 0 otherwise).

At the country level, we included a set of bilateral variables controlling the distance between home and host countries in terms of geography, religion, historical relations, and institutions. *Geographical distance* affects the EMNEs' resource allocation and adaption costs, which was measured by the great circle distance (in 1000 km) between the capital city of home and host countries. Following Berry, Guillén, and Zhou (2010), we controlled *institutional distance* between home and host countries using the six institutional dimensions obtained from WGI: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. We controlled the *religious proximity* that affects the cross-border M&A flows between home and host country, using data collected from the CEPII Gravity Database. We used a binary variable to indicate whether the two countries have historical *colonial relations* or not, as historical issues can impact the MNEs' international decisions (Wu et al. 2024). We also controlled the host-country *economic growth* using the gross national income growth rate obtained from Macrotrends, which reflects the target market attractiveness that is an important factor in affecting EMNEs' entry decisions. Also, host-country *trade freedom* was collected from the Heritage Foundation's index of economic freedom, which represents the degree of business constraints in the host country and affects the EMNEs' expansion capability (Deng and Sinkovics 2018).

3.5. Model specification

To test our hypotheses about the EMNEs' expansionary entries (the first DV), the Probit regression approach is adopted, since the DV is a binary variable. Following previous studies (Ai and Norton 2003; Hoetker 2007), we used the formulas below:

$$E[\text{Expansion}]_t = \Phi\left(\beta_1 CR_{t-1} + \beta CV\right) \tag{1}$$

$$E[\text{Expansion}]_t = \Phi\left(\beta_1 CR_{t-1} + \beta_2 M + \beta_{12} CR_{t-1} * M + \beta CV\right) \tag{2}$$

Equation (1) is used for testing H1a, and Equation (2) takes the moderators into consideration (to test H2a and H3a). Φ refers to the standard normal cumulative distribution function, E[Expansion] is the probability of EMNEs making an expansionary entries decision and is limited to a value between 0 and 1. CR refers to climate risk, and CV represents the control variable. M denotes the Moderator, and β_{12} is the coefficient of the international term (between CR and Moderator).

In the second stage, in order to examine the EMNEs' performance consequences after their expansionary entries at year $t+1$, we used the ordinary least squares estimation with robust standard errors, which can mitigate the possibility of heteroskedasticity (Neelawala et al. 2015). We used the following formulas:

$$Y_{t+1} = \partial_0 + \partial_1 E[\text{Expansion}]_t + \partial CV + \sigma \tag{3}$$

$$Y_{t+1} = \partial_0 + \partial_1 E[\text{Expansion}]_t + \partial_2 M + \partial_{12} E[\text{Expansion}]_t * M + \partial CV + \sigma \tag{4}$$

Equation (3) is used for testing H1b, and Equation (4) takes the moderators into consideration (to test H2b and H3b). Y refers to EMNE performance, and $E[\text{Expansion}]_t$ is the estimated probability of expansionary entries in the Probit regression in Equation (1). CV represents all control variables, and ∂_{12} is the regression coefficient of the interaction term ($E[\text{Expansion}]_t$ and Moderator). σ denotes the error term. In presenting the results, Model (0) denotes a null model, which includes all control variables but with no predictors. Model (1a) is run using Equation (1), Models (2a) and (3a) use Equation (2). Model (4a) is a full model that includes all the predictors, moderators, and control variables. Similarly, Model (1b) runs based on Equation (3), and Models (2b) and (3b) use Equation (4). Model (4b) is a full model for predicting EMNE performance. The research model of this study is shown in Figure 3.

4. Results

Details of the descriptive statistics and correlations of the variables are shown in Table 1. There is a negative correlation between climate risk and expansionary entries ($r = -0.057$), and between expansionary entries and EMNE performance ($r = -0.063$). We used the variance inflation factor (VIF) to check for the multicollinearity issue (Kalnins 2018; Sawang and Kivits 2014). The average VIF value for all the models and all variables is lower than the benchmark value 5 (Kalnins 2018). Hence multicollinearity is not a concern in this study.

Table 2 reports the results of Probit regression models, where the dependent variable is expansionary entries. Model (1a) examines the impact of climate risk on the probability of EMNEs' expansionary entries, which aims to test the baseline hypothesis (H1a). The regression coefficient of climate risk is negative and significant, suggesting that the probability of EMNEs initiating an expansionary entry is negatively affected by the level of climate risk in the host country ($\beta = -0.084$, $p = 0.009$), which supports our prediction in H1a.

When adding the proposed moderators to Models (2a) and (3a), it is observed in Table 2 that the impact of climate risk changed. The negative impact of climate risk on expansionary entries is reduced if the EMNEs are from high-polluting industries. The coefficient of the interaction term between climate risk and high-polluting firms

Table 1. Descriptive statistics and correlations coefficients.

Variables	Mean	S. D	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) EMNE performance	0.137	0.328	1.000								
(2) Expansionary entries	0.451	0.498	−0.063	1.000							
(3) Climate risk	0.573	0.324	0.006	−0.057	1.000						
(4) Political partnership	0.478	0.500	−0.022	0.145	−0.279	1.000					
(5) High-polluting firms	0.460	0.498	0.039	0.027	0.112	−0.136	1.000				
(6) Firm age	3.451	0.540	0.117	−0.089	0.042	−0.093	0.157	1.000			
(7) Firm size	5.998	2.298	0.084	−0.001	0.007	−0.002	−0.031	0.027	1.000		
(8) Insider ownership	0.304	0.272	0.082	−0.016	0.001	−0.015	0.010	−0.018	0.031	1.000	
(9) State ownership	0.009	0.048	0.057	−0.034	0.098	−0.025	0.117	−0.036	0.013	−0.055	1.000
(10) Leverage ratio	0.008	0.009	−0.041	0.009	0.055	−0.064	0.136	0.082	−0.006	0.041	0.012
(11) Liquidity ratio	2.499	3.522	−0.035	0.029	−0.012	0.032	−0.140	−0.204	0.027	−0.012	−0.018
(12) SG&A costs	0.235	0.248	−0.069	0.004	−0.057	0.029	−0.248	−0.182	−0.008	0.012	−0.071
(13) Related deal	0.629	0.483	0.036	0.020	−0.016	−0.035	0.007	−0.015	−0.020	−0.044	0.047
(14) Full ownership	0.680	0.467	−0.004	−0.066	−0.068	0.087	−0.071	−0.006	0.002	−0.017	−0.036
(19) Strategic asset-seeking	0.474	0.499	0.013	−0.012	−0.177	0.076	−0.047	0.018	0.038	−0.038	−0.052
(15) Geographical distance	6.127	4.329	0.045	−0.056	−0.177	−0.053	−0.047	0.073	0.014	−0.034	−0.079
(16) Institutional distance	2.948	1.376	0.054	0.093	−0.113	0.212	−0.002	−0.048	0.031	0.093	−0.044
(17) Colonial relations	0.069	0.253	0.000	−0.046	0.361	0.045	0.033	−0.029	0.003	0.065	0.082
(18) Religious proximity	0.121	0.237	−0.014	−0.002	−0.066	0.058	0.006	−0.017	−0.014	0.003	−0.014
(20) Economic growth	0.058	0.079	−0.005	0.069	0.025	0.030	0.044	0.041	0.013	0.041	0.013
(21) Trade freedom	0.779	0.107	−0.042	−0.053	−0.056	0.020	−0.070	−0.068	0.021	0.002	0.013

Variables	(10)	(11)	(12)	(13)	(14)	(19)	(15)	(16)	(17)	(18)	(20)
(11) Liquidity ratio	−0.133	1.000									
(12) SG&A costs	−0.139	0.313	1.000								
(13) Related deal	−0.001	−0.046	0.043	1.000							
(14) Full ownership	−0.011	−0.007	0.001	−0.003	1.000						
(19) Strategic asset-seeking	−0.040	0.041	0.020	0.024	0.116	1.000					
(15) Geographical distance	0.020	0.026	0.030	−0.019	0.097	0.584	1.000				
(16) Institutional distance	−0.028	0.069	0.048	0.014	0.058	0.065	−0.040	1.000			
(17) Colonial relations	−0.006	0.059	0.020	−0.073	−0.031	−0.250	−0.213	−0.068	1.000		
(18) Religious proximity	0.008	−0.034	0.007	−0.010	0.014	0.058	0.041	0.052	0.017	1.000	
(20) Economic growth	0.018	−0.017	−0.038	−0.008	−0.049	−0.351	−0.252	0.102	−0.028	−0.024	1.000
(21) Trade freedom	−0.044	0.020	0.001	−0.036	0.091	0.433	0.276	0.017	−0.018	0.061	−0.276

Note: S.D = standard deviation; correlations >|0.045| are significant at $p < 0.050$.

Table 2. Probit Estimation on the Expansionary Entries of EMNEs.

	(0)		(1a)		(2a)		(3a)		(4a)	
Models	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Climate risk			−0.084**	*0.009*	−0.154***	*0.000*	−0.077†	*0.068*	−0.156**	*0.004*
			(0.032)		(0.043)		(0.042)		(0.054)	
Climate risk × High-polluting firms					0.130*	*0.021*			0.133*	*0.020*
					(0.056)				(0.057)	
Climate risk × Political partnership							0.122*	*0.049*	0.140*	*0.026*
							(0.062)		(0.063)	
High-polluting firms					0.100†	*0.090*			0.131*	*0.028*
					(0.059)				(0.059)	
Political partnership							0.318***	*0.000*	0.327***	*0.000*
							(0.061)		(0.062)	
Firm age	−0.140***	*0.000*	−0.140***	*0.000*	−0.146***	*0.000*	−0.131***	*0.000*	−0.139***	*0.000*
	(0.029)		(0.029)		(0.030)		(0.030)		(0.030)	
Firm size	−0.009	*0.733*	−0.009	*0.748*	−0.006	*0.828*	−0.009	*0.750*	−0.006	*0.830*
	(0.028)		(0.028)		(0.028)		(0.028)		(0.028)	
Insider ownership	−0.036	*0.195*	−0.038	*0.175*	−0.038	*0.173*	−0.032	*0.250*	−0.033	*0.244*
	(0.028)		(0.028)		(0.028)		(0.028)		(0.028)	
State ownership	−0.062*	*0.033*	−0.060*	*0.040*	−0.069*	*0.019*	−0.056†	*0.055*	−0.067*	*0.024*
	(0.029)		(0.029)		(0.029)		(0.029)		(0.029)	
Leverage ratio	0.029	*0.291*	0.034	*0.222*	0.031	*0.276*	0.039	*0.158*	0.035	*0.214*
	(0.028)		(0.028)		(0.028)		(0.028)		(0.028)	
Liquidity ratio	0.013	*0.656*	0.013	*0.667*	0.016	*0.580*	0.013	*0.666*	0.017	*0.567*
	(0.029)		(0.029)		(0.030)		(0.029)		(0.030)	
SG&A costs	−0.024	*0.423*	−0.027	*0.364*	−0.019	*0.540*	−0.024	*0.416*	−0.013	*0.670*
	(0.030)		(0.030)		(0.030)		(0.030)		(0.030)	
Related deal	0.028	*0.631*	0.026	*0.647*	0.025	*0.665*	0.046	*0.431*	0.045	*0.435*
	(0.058)		(0.058)		(0.058)		(0.058)		(0.058)	
Full ownership	−0.090***	*0.001*	−0.094***	*0.001*	−0.094***	*0.001*	−0.101***	*0.000*	−0.100***	*0.000*
	(0.028)		(0.028)		(0.028)		(0.028)		(0.028)	
Strategic asset-seeking	0.114	*0.149*	0.097	*0.224*	0.095	*0.234*	0.061	*0.448*	0.058	*0.471*
	(0.079)		(0.080)		(0.080)		(0.080)		(0.080)	
Geographical distance	−0.077*	*0.025*	−0.085*	*0.015*	−0.087*	*0.012*	−0.051	*0.148*	−0.052	*0.145*
	(0.035)		(0.035)		(0.035)		(0.036)		(0.036)	
Institutional distance	0.094***	*0.001*	0.087**	*0.002*	0.086**	*0.003*	0.073*	*0.013*	0.073*	*0.014*

	(0.028)		(0.029)		(0.029)		(0.030)		(0.030)	
Colonial relations	−0.232*	*0.049*	−0.129	*0.297*	−0.146	*0.241*	−0.307*	*0.019*	−0.333*	*0.012*
	(0.118)		(0.124)		(0.125)		(0.131)		(0.132)	
Religious proximity	0.012	*0.667*	0.009	*0.747*	0.009	*0.743*	0.005	*0.857*	0.005	*0.862*
	(0.028)		(0.028)		(0.028)		(0.029)		(0.029)	
Economic growth	0.070†	*0.069*	0.060	*0.121*	0.054	*0.168*	0.063	*0.107*	0.057	*0.147*
	(0.039)		(0.039)		(0.039)		(0.039)		(0.039)	
Trade freedom	−0.015	*0.661*	−0.010	*0.771*	−0.009	*0.799*	−0.018	*0.606*	−0.016	*0.640*
	(0.034)		(0.034)		(0.034)		(0.034)		(0.035)	
Observations	2,187		2,187		2,187		2,187		2,187	
χ^2	114.47***		121.25***		129.51***		151.15***		161.46***	
Prob > χ^2	0.000		0.000		0.000		0.000		0.000	
Log-likelihood	−1448.094		−1444.703		−1440.571		−1429.753		−1424.600	

Note: Standard errors in parentheses; *P* values in italics; *** $p < 0.001$ ** $p < 0.010$, * $p < 0.050$, † $p < 0.100$.

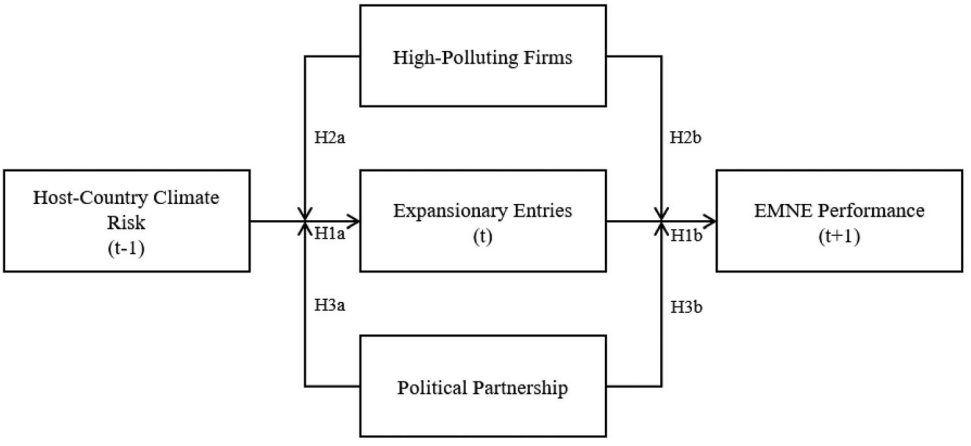

Figure 3. Research framework.

is positive and significant ($\beta = 0.130$, $p = 0.012$). In addition, the negative impact of climate risk is also reduced if the home and host country of EMNEs have established a political partnership. The interaction term coefficient between climate risk and political partnership is positive and significant ($\beta = 0.122$, $p = 0.049$). The relationships also hold in the full Model (4a). Therefore, H1a, H2a, and H3a are supported. Figure 4 plots the moderating effects on the relationship between climate risk and EMNEs' expansionary entries.

Table 3 presents the regression results where EMNE performance is the dependent variable. The regression coefficient of expansionary entries in Model (1b) is significantly negative ($\beta = -0.143$, $p = 0.001$), showing that it is difficult for emerging market firms to initiate multiple market entry activities in environmentally vulnerable countries. Hence H1b is supported.

When considering the industry effect in Model (2b), we find that high-polluting firms exert a positive and significant impact on the relationship between expansionary entries and performance ($\beta = 0.176$, $p = 0.047$). This indicates that high-polluting firms are more likely to pay additional attention to environmental pressures due to a high level of public

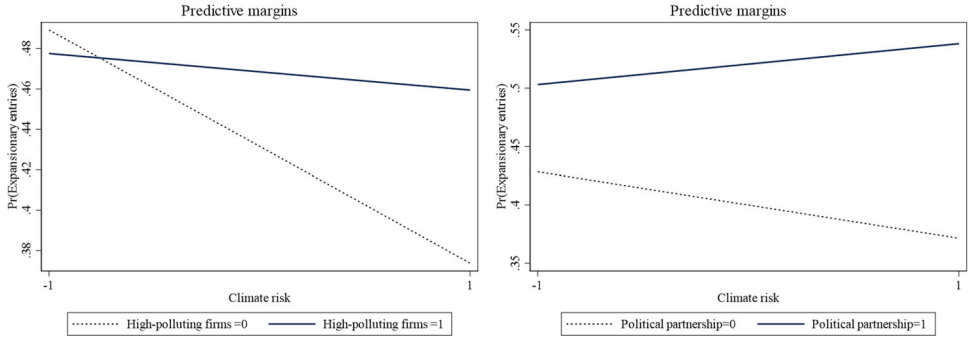

Figure 4. The moderating effects of high-polluting firms (left) and political partnership (right) on the relationship between climate risk and EMNEs' expansionary entries.

Table 3. Regression estimation on the performance consequences of expansionary entries.

	(0)		(1b)		(2b)		(3b)		(4b)	
Models	*B*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Expansionary entries			−0.143***	*0.001*	−0.225***	*0.000*	−0.265***	*0.000*	−0.383***	*0.000*
			(0.045)		(0.060)		(0.072)		(0.088)	
Expansionary entries × High-polluting firms					0.176*	*0.047*			0.220**	*0.015*
					(0.089)				(0.090)	
Expansionary entries × Political partnership							0.258**	*0.004*	0.294***	*0.001*
							(0.089)		(0.090)	
High-polluting firms					−0.066	*0.236*			−0.084	*0.137*
					(0.056)				(0.057)	
Political partnership							−0.155**	*0.007*	−0.168**	*0.004*
							(0.058)		(0.059)	
Climate risk			−0.014	*0.617*	−0.014	*0.597*	−0.023	*0.432*	−0.023	*0.417*
			(0.027)		(0.027)		(0.029)		(0.029)	
Firm age	0.094***	*0.001*	0.084***	*0.001*	0.085***	*0.001*	0.081**	*0.002*	0.153**	*0.002*
	(0.027)		(0.026)		(0.026)		(0.026)		(0.049)	
Firm size	0.078***	*0.001*	0.077***	*0.001*	0.077***	*0.001*	0.078***	*0.001*	0.078***	*0.001*
	(0.023)		(0.023)		(0.023)		(0.023)		(0.023)	
Insider ownership	0.080***	*0.000*	0.078***	*0.000*	0.076***	*0.000*	0.076***	*0.000*	0.075***	*0.000*
	(0.021)		(0.020)		(0.020)		(0.020)		(0.020)	
State ownership	0.057***	*0.000*	0.054***	*0.000*	0.056***	*0.000*	0.054***	*0.000*	0.056***	*0.000*
	(0.014)		(0.014)		(0.014)		(0.015)		(0.015)	
Leverage ratio	−0.060	*0.135*	−0.058	*0.150*	−0.061	*0.135*	−0.060	*0.141*	−0.063	*0.122*
	(0.040)		(0.040)		(0.041)		(0.040)		(0.041)	
Liquidity ratio	−0.008	*0.665*	−0.008	*0.693*	−0.006	*0.764*	−0.007	*0.721*	−0.005	*0.813*
	(0.019)		(0.020)		(0.020)		(0.020)		(0.020)	
SG&A costs	−0.065*	*0.023*	−0.066*	*0.019*	−0.066*	*0.023*	−0.069*	*0.015*	−0.069*	*0.017*
	(0.028)		(0.028)		(0.029)		(0.028)		(0.029)	
Related deal	0.074†	*0.095*	0.076†	*0.088*	0.076†	*0.086*	0.073	*0.101*	0.074†	*0.097*
	(0.044)		(0.044)		(0.044)		(0.044)		(0.044)	
Full ownership	−0.003	*0.895*	−0.008	*0.705*	−0.007	*0.748*	−0.009	*0.680*	−0.008	*0.719*
	(0.022)		(0.022)		(0.022)		(0.022)		(0.022)	
Strategic asset-seeking	−0.072	*0.228*	−0.068	*0.253*	−0.073	*0.226*	−0.064	*0.289*	−0.070	*0.250*
	(0.059)		(0.060)		(0.060)		(0.060)		(0.061)	
Geographical distance	0.062**	*0.009*	0.056*	*0.022*	0.058*	*0.019*	0.061**	*0.010*	0.064**	*0.008*
	(0.024)		(0.025)		(0.025)		(0.024)		(0.024)	
Institutional distance	0.059**	*0.007*	0.063**	*0.004*	0.063**	*0.003*	0.062**	*0.003*	0.063**	*0.003*

(*Continued*)

Table 3. Continued.

	(0)		(1b)		(2b)		(3b)		(4b)	
Models	*B*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
	(0.022)		(0.022)		(0.021)		(0.021)		(0.021)	
Colonial relations	−0.018	*0.859*	−0.015	*0.887*	−0.022	*0.834*	0.020	*0.851*	0.013	*0.903*
	(0.103)		(0.105)		(0.106)		(0.108)		(0.108)	
Religious proximity	0.005	*0.802*	0.005	*0.797*	0.006	*0.757*	0.004	*0.844*	0.005	*0.802*
	(0.020)		(0.021)		(0.021)		(0.020)		(0.021)	
Economic growth	−0.066†	*0.060*	−0.064†	*0.076*	−0.064†	*0.076*	−0.060†	*0.092*	−0.059†	*0.094*
	(0.035)		(0.036)		(0.036)		(0.035)		(0.036)	
Trade freedom	−0.032	*0.248*	−0.032	*0.248*	−0.029	*0.297*	−0.026	*0.354*	−0.021	*0.443*
	(0.027)		(0.027)		(0.028)		(0.028)		(0.028)	
Observations	2,187		2,187		2,187		2,187		2,187	
R^2	0.082		0.087		0.091		0.091		0.094	

Note: Standard errors in parentheses; *P* values in italics; *** $p < 0.001$ ** $p < 0.010$, * $p < 0.050$, † $p < 0.100$.

concern (Primc and Čater 2016; Sutantoputra, Lindorff, and Johnson 2012). Hence they may invest additional efforts, such as in environmental disclosure or engaging local stakeholders, for legitimacy maintenance and better performance (Sutantoputra, Lindorff, and Johnson 2012). The positive moderating effect of political partnership in Model (3b) of Table 3 ($\beta = 294$, $p = 0.001$) also shows that the political partnership between the home and host country is likely to assist EMNEs in advancing environmental management and deal with project implementation challenges (Hemming et al. 2019; Ross and Carter 2013). The results also hold when putting all predictors into the full Model (4b). Therefore, all our hypotheses are supported. In Figure 5, we plotted the moderating effects on the relationship between EMNEs' expansionary entries and their performance.

5. Robustness tests

The Probit and Logistic estimations have been recognized as important methods for regression analysis when the dependent variable is binary (Allison 1999). However, research shows that, when the interaction terms of explanatory variables are involved in regression models, these two approaches may yield significantly different results (Allison 1999). Hence we revised our models to estimate the probability of expansionary entries by using logistic regression. The results in Appendix 1 show that using the Logistic models will not change our findings about EMNEs' expansionary entries.

We then conducted a set of tests to check the robustness of the results, considering using alternative methods, revising the measurement of variables, and focusing on different samples. The results of these additional tests are presented in Appendix 2. Due to the space limit, full details are available upon request. In Test 1, considering major economic and financial shocks on firms (e.g. the post-9/11 economic impact and the 2007–2009 global financial crisis) (Wenzel, Stanske, and Lieberman 2021), we removed deals that occurred in 2008 and 2009 and re-tested our hypotheses. In Test 2, we revised the measurement of climate risk by using losses per unit GDP (%), as research shows that climate risk can be captured by investigating losses in relation to a country's gross national product (GDP) (Harmeling 2008; Hunt 2004). The findings in Appendix 2 also support our hypotheses.

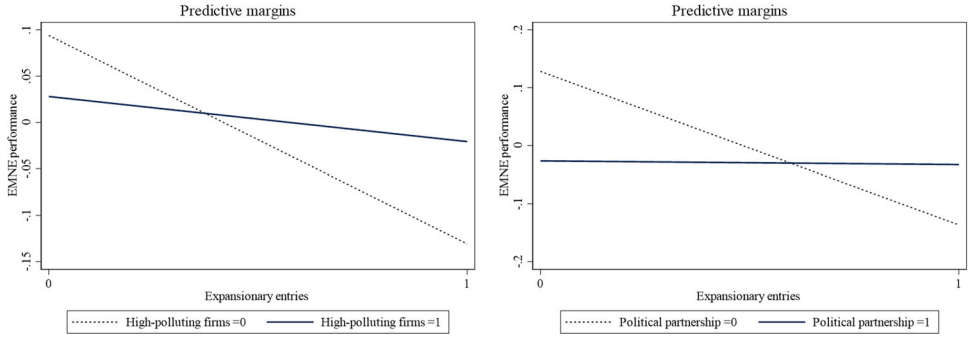

Figure 5. The moderating effects of high-polluting firms (left) and political partnership (right) on the relationship between EMNEs' expansionary entries and performance.

In Test 3, we reran all the models considering the speed of EMNEs' expansionary entries. Previous studies suggest that due to changes in external environments, the increase/decrease of firms' resources and capabilities, or the revised objectives for market expansion (Powell 2014; Zahoor and Al-Tabbaa 2021), the EMNEs are likely to show different speeds in post-entry. Hence we considered a slower speed of expansionary entries, which equals 1 if the EMNEs initiated more than two deals in a specific country within two years and 0 otherwise. The results in Test 3 show that climate risk negatively affects EMNEs' expansionary entry, and that high-polluting firms and political partnerships between the home and host country exert positive moderating effects on the relationship between climate risk and expansionary entries. In addition, using the revised measurement of expansionary entries, the impact on performance remained negative, and the moderating effect of high-polluting firms and political partnerships on the expansionary entries-performance relationship remained unchanged.

Fourth, we considered the heterogeneity among firms, and removed those government-controlled due to their unique government support and reconfiguration abilities in managing environmental hazards (Cuervo-Cazurra et al. 2014; Guerin 2007). The results in Test 4 of Appendix 2 also support our predictions and show that our findings are robust. Taking a step further, we investigated the heterogeneity among high-polluting firms, particularly focusing on those from the energy and power sectors due to their dependence on energy consumption and being the major contributors to carbon emissions (Cheng et al. 2016; da Silva, Moreno, and Figueiredo 2016). Our results in Appendix 3 show that, although the moderating effect of high-polluting firms on the relationship between climate risk and expansionary entries remained unchanged in the Probit and Logistic models, the moderating effect on the relationship between expansionary entries and performance is insignificant. The finding indicates that, although high-polluting firms, in general, may expend more effort to address environmental issues due to public concerns over their expansion (Primc and Čater 2016; Sutantoputra, Lindorff, and Johnson 2012), those higher-polluting firms may be less motivated to commit to being green due to higher cost and more difficulties (Ambec and Lanoie 2008). Hence not all types of firms are able to enhance their performance when expanding in environmentally vulnerable countries.

6. Discussion

The objective of this study is to spotlight the impact of climate risk on emerging market firms via expansionary entries and their subsequent performance. Following the strategy tripod framework (Peng et al. 2009), we tested how industrial and institutional conditions affect EMNEs' disadvantage-transformation capability in climate-risk countries. Our findings show that host-country climate risk is negatively associated with EMNEs' expansionary entries and performance. However, high-polluting firms, due to more public attention on their expansion and experience in environmental issues (in their initial entry), will be more likely to increase resource commitments to climate-risk countries. In addition, we find that the political partnership between home and host countries can help EMNEs reduce barriers to expansionary entries and gain better performance in expanding in adverse environments. The results indicate that EMNEs'

disadvantage-transformation capacity is contingent upon their resource commitment, industry conditions, and institutional influence.

6.1. Theoretical implications

Our work offers two main contributions to the literature on environmental management in an international business context. First, researchers often claim how weak informal institutions or deficiencies of formal institutions in the home country affect EMNEs' internationalization (Arikan, Arikan, and Shenkar 2022; Jabbour et al. 2020; Mair and Marti 2009). Yet much less attention has been paid to the influences of host-country climate risks, as a crucial element of institutional voids, in affecting EMNEs' international decisions (Huang, Kerstein, and Wang 2018; Kolk and Pinkse 2008). In this study, we address research gaps and extend EMNE expansion research into a climate-risk context. We argue that the warming effects, unpredicted weather patterns, and intense climatic extremes have taken the firms far away from stable supply chains and industrial conditions (Howard-Grenville et al. 2014). The increasing climate risk around the globe is generating more systematic and unsystematic uncertainties to disrupt the activities of MNEs, particularly those fast-growing and leapfrogging EMNEs.

In this study, we link foreign-market entry, expansion, and performance with the influence of climate change. We find that host-country climate risk fundamentally reshapes the latecomers' expansion propensity and performance consequences. We thus offer a unique perspective on testing the growth of EMNEs, which brings new insights into the nexus between climate risk and firm-level adaptation and outcomes (Howard-Grenville et al. 2014; Huang, Kerstein, and Wang 2018). Our study also responds to the call to explain how EMNEs neutralize threats in their changing environment (Arikan, Arikan, and Shenkar 2022) and to explore climate change issues affecting globalization (Verbeke, Coeurderoy, and Matt 2018). We conclude that climate influence should be a central concern for international management researchers (Howard-Grenville et al. 2014).

Second, in the extant literature, one inherent premise is that, compared with advanced-market MNEs, EMNEs are better at operating in countries with adverse conditions, because they can transform their competitive disadvantages into advantages when they operate in those countries (Arikan, Arikan, and Shenkar 2022; Cuervo-Cazurra and Genc 2008). Building on this premise, researchers often portray EMNEs as firms with superior market adaptability that can easily identify and capture business opportunities in institutional voids (Cuervo-Cazurra and Genc 2008; Jabbour et al. 2020). Yet not all EMNEs possess such disadvantage-transformation capability, and the underlying transformation mechanisms remain underexplored (Arikan, Arikan, and Shenkar 2022). Most importantly, the premise has not been tested in a climate-risk context, which, as an environmental change leading to global value chain disruptions, is very different from previous studies based on cultural or institutional settings (Huang, Kerstein, and Wang 2018; Kolk and Pinkse 2008).

In this research, we draw upon a strategy tripod framework to address the research gaps. We suggest that the EMNEs' expansionary momentum is not only affected by their needs for strategic resources, but also simultaneously affected by the industrial and political conditions within which they operate (Peng et al. 2009; Xie et al.

2011). We first illustrate how climate risk poses challenges to existing findings, such as the disadvantage-transformation view (Cuervo-Cazurra and Genc 2008). Then, by examining the influences of industrial and political conditions, we reveal the underlying disadvantage-transformation mechanisms, and answer the question of how EMNEs can transform themselves to an advantageous position in climate-risk countries. Our findings show that EMNEs need to leverage their accumulated knowledge of environmental issues and country-level political ties to explore adaptive mechanisms that enable them to expand and sustain their business in environmentally vulnerable countries (Chan and Makino 2007; Li, Xia, and Zajac 2018). Our study thus sheds light on the sustainable organizational development research in the internationalization field. We also call for more attention to exploring the green responses of EMNEs, particularly those of high-polluting firms, toward host-country climate challenges.

6.2. Practical implications

Our findings have practical implications for both managers and government agencies. Our findings indicate that increasing resource commitment to climate-risk countries requires managers to think innovatively and design proactive environmental initiatives to prepare for climate change and operation disruption. For instance, managers should consider developing environmentally friendly systems by increasing their resource commitments, incorporating clean technologies, and increasing the use of renewable energy to cope with climate-related issues in the host country (Primc and Čater 2016). Since climate risk could exert potential longer-term effects on adaptation (Dell, Jones, and Olken 2014), firms need to consider developing climate-induced specific assets and capabilities to cope with environmental issues and enhance their sustainability performance (Kolk and Pinkse 2008).

Our results also imply that managers in high-polluting firms need to make environmental protection their strategic priority and increase their environmental disclose in international expansion. These firms, due to a higher level of public attention, should concentrate their efforts on managing environmental risks and developing environmental practices that aim to substitute polluting materials. They can also hire local environmental experts to address adaptation difficulties and better prepare for weather shocks. Considering the influence of industry and institutional conditions, managers should develop their environmental activity management system to monitor their practices on a regular basis (Su, Tung, and Baird 2017). They should be familiar with the different regulatory requirements and policies on carbon emission in other countries to ensure each practice is suitable to be employed in different countries.

Our findings also reveal that it is necessary for government officials to cooperate with other countries to cope with climate constraints. In developing environmental policies and regulations, governments should learn from each other's experience to enhance the effectiveness of their policies. Since providing a stable institutional environment is critical to assisting firms' environmental management (Buso and Stenger 2018; Dell, Jones, and Olken 2014), government officials need to avoid launching sudden policy changes that are disruptive to firms' market adaptation. In addition, the findings in this study provide government officials with new insights on how they can promote

firms' environmental commitment. Considering the positive moderating effect of political partnership on the EMNEs' expansionary entries and performance, governments should consider providing funding or reward schemes to encourage firms to invest in environmental-related training or monitoring practices. Government and practitioners should work together to increase information channels for firms, thereby enabling firms to develop a broad range of environmental solutions to mitigate the negative impacts of climate risk.

6.3. Limitations and future research directions

This study contains several limitations that encourage future exploratory research in this field. Although we controlled the EMNEs' strategic asset-seeking objective and considered their expansion speed in the robustness check, the dataset only contains the firms' international acquisitions, which does not allow us to examine EMNEs' expansionary entries through greenfield FDI or strategic alliance. Considering that firms adopting different foreign entry modes generate various implications for interpreting their strategies of expansion (Chang and Rhee 2011), it would be fruitful for studies to further examine or compare different modes of expansionary entries to re-test our research framework.

In addition, future studies can consider examining other important factors that may impact the EMNEs' international strategies in operating in climate-risk countries. For example, how do EMNEs' TMT characteristics affect their expansionary entries propensity in the climate-risk context? Can EMNEs design a flexible entry or exit strategy or leverage home-country support to enhance their resilience to weather extremes? Can insurance coverage alleviate the adverse impacts of climate risk on firms' international growth? Answering these questions will help enhance our understanding of this topic. We also encourage future research to consider using long-term performance indicators, such as customer loyalty, innovation, new product activity, and capability upgrading (e.g. Wu and Fan 2024), to investigate broader firm performance indicators in climate-risk countries.

7. Conclusion

Host-country climate risk, expansionary entries, and performance of EMNEs are the three main elements in the present research. By integrating the theoretical rationale of the strategy tripod framework, this study presents fresh insights to illustrate the complexity of EMNEs' expansion path in climate-risk countries and to provide empirical evidence on how these latecomers transform competitive disadvantages into advantages in operating in such countries. We hope this research can stimulate deeper thinking on the link between climate-related issues and international expansion and trigger more research interest in coping with the sustainability paradox in the internationalization context.

Notes

1. Grey rhinos (or gray rhinos) are highly possible events yet conveniently ignored threats (Huang 2020). These are predictable events with high impact – people are sure that grey

rhinos will cause damage but lack knowledge about when such events will happen and how much damage they will cause. See https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/black-swans-gray-rhinos-and-silver-linings-anticipating-geopolitical-risks-and-openings
2. The major climatic disasters by death toll in the twenty-first century predominately occurred in emerging countries: for example, the '2005 Kashmir earthquake' (India and Pakistan), the '2009 Sumatra earthquake' (Indonesia), the '2013 Typhoon Haiyan' (Philippines, Vietnam, and China), and the '2019 Indian floods' (India); see https://ourworldindata.org/natural-disasters and the "List of natural disasters by death toll".
3. http://www.imf.org/external/pubs/ft/weo/2015/02/pdf/text.pdf.
4. https://www.msci.com/our-solutions/indexes/emerging-markets.
5. https://www.germanwatch.org/en.

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Appendix 1. Logistic estimation on the expansionary entries of EMNEs.

	(0)		(1a)		(2a)		(3a)		(4a)	
Models	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Climate risk			−0.135***	*0.000*	−0.252***	*0.000*	−0.125†	*0.068*	−0.254**	*0.004*
			(0.052)		(0.071)		(0.069)		(0.088)	
Climate risk × High-polluting firms					0.214*	*0.020*			0.217*	*0.020*
					(0.092)				(0.094)	
Climate risk × Political partnership							0.199*	*0.050*	0.228*	*0.027*
							(0.101)		(0.103)	
High-polluting firms					0.164†	*0.085*			0.215*	*0.026*
					(0.095)				(0.096)	
Political partnership							0.514***	*0.000*	0.530***	*0.000*
							(0.099)		(0.100)	
Firm age	−0.226***	*0.000*	−0.227***	*0.000*	−0.237***	*0.000*	−0.213***	*0.000*	−0.225***	*0.000*
	(0.048)		(0.048)		(0.048)		(0.048)		(0.049)	
Firm size	−0.015	*0.741*	−0.014	*0.761*	−0.009	*0.836*	−0.014	*0.761*	−0.009	*0.835*
	(0.045)		(0.045)		(0.045)		(0.045)		(0.045)	
Insider ownership	−0.059	*0.194*	−0.061	*0.177*	−0.062	*0.174*	−0.052	*0.258*	−0.052	*0.256*
	(0.045)		(0.045)		(0.045)		(0.046)		(0.046)	
State ownership	−0.099*	*0.037*	−0.096*	*0.045*	−0.110*	*0.022*	−0.091†	*0.061*	−0.108*	*0.027*
	(0.048)		(0.048)		(0.048)		(0.048)		(0.049)	
Leverage ratio	0.046	*0.308*	0.053	*0.240*	0.048	*0.293*	0.061	*0.179*	0.054	*0.238*
	(0.045)		(0.045)		(0.046)		(0.046)		(0.046)	
Liquidity ratio	0.021	*0.656*	0.021	*0.668*	0.027	*0.581*	0.021	*0.669*	0.027	*0.574*
	(0.048)		(0.048)		(0.048)		(0.048)		(0.048)	
SG&A costs	−0.037	*0.433*	−0.043	*0.372*	−0.029	*0.548*	−0.038	*0.430*	−0.020	*0.688*
	(0.048)		(0.048)		(0.049)		(0.048)		(0.049)	
Related deal	0.044	*0.633*	0.043	*0.643*	0.042	*0.653*	0.074	*0.431*	0.074	*0.430*
	(0.093)		(0.093)		(0.093)		(0.094)		(0.094)	
Full ownership	−0.145***	*0.001*	−0.151***	*0.001*	−0.150***	*0.001*	−0.163***	*0.000*	−0.161***	*0.000*
	(0.045)		(0.045)		(0.045)		(0.046)		(0.046)	
Strategic asset-seeking	0.188	*0.144*	0.160	*0.215*	0.161	*0.214*	0.103	*0.430*	0.101	*0.441*
	(0.128)		(0.129)		(0.129)		(0.131)		(0.131)	
Geographical distance	−0.127*	*0.024*	−0.139*	*0.014*	−0.144*	*0.011*	−0.086	*0.135*	−0.088	*0.128*
	(0.056)		(0.057)		(0.057)		(0.058)		(0.058)	

(*Continued*)

Continued.

	(0)		(1a)		(2a)		(3a)		(4a)	
Models	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Institutional distance	0.151***	*0.001*	0.139**	*0.003*	0.137**	*0.003*	0.117*	*0.014*	0.116*	*0.015*
	(0.046)		(0.046)		(0.046)		(0.048)		(0.048)	
Colonial relations	−0.380*	*0.049*	−0.217	*0.284*	−0.243	*0.234*	−0.507*	*0.020*	−0.547*	*0.013*
	(0.193)		(0.202)		(0.204)		(0.217)		(0.219)	
Religious proximity	0.020	*0.663*	0.015	*0.746*	0.015	*0.741*	0.009	*0.851*	0.008	*0.858*
	(0.046)		(0.046)		(0.046)		(0.046)		(0.046)	
Economic growth	0.114†	*0.069*	0.097	*0.122*	0.088	*0.165*	0.101	*0.113*	0.093	*0.149*
	(0.063)		(0.063)		(0.063)		(0.064)		(0.064)	
Trade freedom	−0.023	*0.675*	−0.015	*0.777*	−0.015	*0.792*	−0.028	*0.612*	−0.026	*0.644*
	(0.054)		(0.055)		(0.055)		(0.055)		(0.056)	
Observations	2,187		2,187		2,187		2,187		2,187	
χ^2	114.43***		121.26***		129.67***		151.16***		161.57***	
Prob > χ^2	0.000		0.000		0.000		0.000		0.000	
Log-likelihood	−1448.110		−1444.696		−1440.493		−1429.747		−1424.544	

Note: Standard errors in parentheses; *P* values in italics; *** $p < 0.001$ ** $p < 0.010$, * $p < 0.050$, † $p < 0.100$.

Appendix 2. Results of Robustness checks

Test 1: Removed observations in the GFC period		β	S. E	p	N	Model fit
Baseline model	Climate risk → Expansionary entries (H1a)	−0.117***	(0.035)	*0.001*	1919	χ^2= 118.48***
	Expansionary entries → Performance (H1b)	−0.118**	(0.045)	*0.009*	1919	R^2= 0.094
Moderating effects of High-polluting firms	Climate risk × High-polluting firms → Expansionary entries (H2a)	0.121*	(0.062)	*0.050*	1919	χ^2= 123.42***
	Expansionary entries × High-polluting firms → Performance (H2b)	0.256**	(0.091)	*0.005*	1919	R^2= 0.099
Moderating effects of Political partnership	Climate risk × Political partnership → Expansionary entries (H3a)	0.158*	(0.069)	*0.021*	1919	χ^2= 154.73***
	Expansionary entries × Political partnership → Performance (H3b)	0.233**	(0.090)	*0.010*	1919	χ^2= R^2= 0.098
Test 2: Used losses per unit GDP in % as an alternative variable of climate risk index		β	S. E	p	N	Model fit
Baseline model	Climate risk → Expansionary entries (H1a)	−0.066*	(0.029)	*0.023*	2187	χ^2= 78.59***
	Expansionary entries → Performance (H1b)	−0.141**	(0.045)	*0.002*	2187	R^2= 0.087
Moderating effects of High-polluting firms	Climate risk × High-polluting firms → Expansionary entries (H2a)	0.149**	(0.055)	*0.007*	2187	χ^2= 88.84***
	Expansionary entries × High-polluting firms → Performance (H2b)	0.175*	(0.088)	*0.046*	2187	R^2= 0.089
Moderating effects of Political partnership	Climate risk × Political partnership → Expansionary entries (H3a)	0.133*	(0.062)	*0.032*	2187	χ^2= 113.76***
	Expansionary entries × Political partnership → Performance (H3b)	0.256**	(0.088)	*0.004*	2187	R^2= 0.091
Test 3: Revised the speed of expansionary entries		β	S. E	p	N	Model fit
Baseline model	Climate risk → Expansionary entries (H1a)	−0.106***	(0.030)	*0.000*	2187	χ^2= 111.66***
	Expansionary entries → Performance (H1b)	−0.118**	(0.043)	*0.006*	2187	R^2= 0.051
Moderating effects of High-polluting firms	Climate risk × High-polluting firms → Expansionary entries (H2a)	0.092†	(0.055)	*0.094*	2187	χ^2= 116.58***
	Expansionary entries × High-polluting firms → Performance (H2b)	0.139†	(0.085)	*0.100*	2187	R^2= 0.052
Moderating effects of Political partnership	Climate risk × Political partnership → Expansionary entries (H3a)	0.134*	(0.061)	*0.027*	2187	χ^2= 162.80***
	Expansionary entries × Political partnership → Performance (H3b)	0.157†	(0.087)	*0.072*	2187	R^2= 0.053
Test 4: Removed state-owned firms		β	S. E	p	N	Model fit
Baseline model	Climate risk → Expansionary entries (H1a)	−0.063†	(0.035)	*0.073*	1816	χ^2= 106.54***
	Expansionary entries → Performance (H1b)	−0.183***	(0.052)	*0.000*	1816	R^2= 0.089
Moderating effects of High-polluting firms	Climate risk × High-polluting firms → Expansionary entries (H2a)	0.091	(0.062)	*0.143*	1816	χ^2= 109.82***
	Expansionary entries × High-polluting firms → Performance (H2b)	0.153	(0.100)	*0.127*	1816	R^2= 0.090

(*Continued*)

Continued.

Test 1: Removed observations in the GFC period		β	S. E	p	N	Model fit
Moderating effects of Political partnership	Climate risk × Political partnership → Expansionary entries (H3a)	0.139*	(0.071)	*0.050*	1816	χ^2= 133.41***
	Expansionary entries × Political partnership → Performance (H3b)	0.379***	(0.102)	*0.000*	1816	R^2= 0.097

Note: Control variables are all included but not presented due to space limitations. Standard errors in parentheses; *P* values in italics; *** $p < 0.001$ ** $p < 0.010$, * $p < 0.050$, † $p < 0.100$.

Appendix 3: Focusing on high-polluting firms in the energy and power sectors

	(2a) Probit		(2a) Logistic		(2b) OLS	
Models	β	p	β	p	β	p
Climate risk × High-polluting firms	**0.205***	***0.011***	**0.337***	***0.011***		
	(0.081)		**(0.133)**			
Expansionary entries × High-polluting firms					**−0.013**	***0.927***
					(0.143)	
High-polluting firms	**0.369*****	***0.000***	**0.602*****	***0.000***	**−0.131**	***0.143***
	(0.090)		**(0.147)**		**(0.089)**	
Expansionary entries					**−0.134****	***0.003***
					(0.045)	
Climate risk	−0.120***	*0.000*	−0.196***	*0.000*	−0.011	*0.686*
	(0.034)		(0.056)		(0.026)	
Firm age	−0.140***	*0.000*	−0.228***	*0.000*	0.084***	*0.001*
	(0.030)		(0.048)		(0.026)	
Firm size	−0.013	*0.643*	−0.019	*0.669*	0.078***	*0.001*
	(0.028)		(0.045)		(0.023)	
Insider ownership	−0.050†	*0.074*	−0.082†	*0.074*	0.082***	*0.000*
	(0.028)		(0.046)		(0.021)	
State ownership	−0.083**	*0.005*	−0.135**	*0.006*	0.060***	*0.000*
	(0.030)		(0.049)		(0.015)	
Leverage ratio	0.021	*0.459*	0.033	*0.469*	−0.054	*0.195*
	(0.028)		(0.046)		(0.041)	
Liquidity ratio	0.012	*0.698*	0.019	*0.688*	−0.007	*0.730*
	(0.030)		(0.048)		(0.020)	
SG&A costs	−0.015	*0.608*	−0.024	*0.617*	−0.070*	*0.014*
	(0.030)		(0.048)		(0.029)	
Related deal	0.025	*0.667*	0.041	*0.665*	0.075†	*0.096*
	(0.058)		(0.094)		(0.045)	
Full ownership	−0.085**	*0.002*	−0.137**	*0.002*	−0.010	*0.631*
	(0.028)		(0.045)		(0.022)	
Strategic asset-seeking	0.101	*0.205*	0.168	*0.196*	−0.068	*0.260*
	(0.080)		(0.130)		(0.060)	
Geographical distance	−0.090**	*0.010*	−0.149**	*0.009*	0.057*	*0.021*
	(0.035)		(0.057)		(0.025)	
Institutional distance	0.093***	*0.001*	0.149***	*0.001*	0.061**	*0.005*
	(0.029)		(0.046)		(0.021)	
Colonial relations	−0.182	*0.150*	−0.303	*0.144*	−0.007	*0.945*
	(0.126)		(0.207)		(0.107)	
Religious proximity	0.008	*0.787*	0.013	*0.772*	0.006	*0.786*
	(0.029)		(0.046)		(0.021)	
Economic growth	0.045	*0.248*	0.073	*0.253*	−0.060†	*0.081*
	(0.039)		(0.064)		(0.034)	
Trade freedom	−0.006	*0.861*	−0.009	*0.868*	−0.034	*0.215*
	(0.034)		(0.055)		(0.027)	
Observations	2,187		2,187		2,187	
Model fit	χ^2=147.82***		χ^2=148.17***		R^2 = 0.089	

Note: Standard errors in parentheses; *P* values in italics; *** $p < 0.001$ ** $p < 0.010$, * $p < 0.050$, † $p < 0.100$.