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Racing to the bottom or seeking legitimacy? National environmental performance and the location strategies of Chinese MNEs

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ABSTRACT

This paper studies the extent to which the international location patterns of Chinese MNEs privilege economies with environmentally sustainable practices. We develop a theoretical framework confronting the traditional race-to-the-bottom arguments with the Chinese MNEs' need to gain legitimacy abroad and signal their global citizenship. We also examine a set of conditioning factors pertaining to the heterogeneity of both host countries and firms, to explore potential sources of ethical pluralism in Chinese MNEs' location strategies. Empirically, we study 948 greenfield investments in manufacturing undertaken by Chinese companies in 82 countries over the 2013–2019 period. Our results suggest that Chinese MNEs may feed a downward spiral by favouring locations with fragile ecosystem vitality, that is, a weak sustainable use of natural resources with the consequent erosion of environmental quality. This result is driven by Chinese FDI in developing countries and locations with fragile institutional setting. Furthermore, the attracting force of a degraded environmental situation holds especially for Chinese MNEs operating in most polluting sectors and with private ownership.

1. Introduction

Outward foreign direct investment (OFDI) of emerging markets' multinational enterprises (EMNEs) has exponentially grown in recent years. At the same time, both policy and academic debates place emphasis on inward foreign direct investment (FDI) as a channel for enhancing development opportunities, restructuring, and upgrading industrial sectors, acquiring new technologies, exploring new business ventures, and securing participation in global value chains (e.g., Giuliani, 2008; Iammarino and McCann, 2013; Van Assche and Brandl, 2021). While the competitive bidding to attract FDI together with the rapid growth of EMNEs' participation in global markets surely open new economic opportunities, it may also hide the risk of triggering a downward trend in key global societal goals. A primary concern in this sense is that the international activities of EMNEs might increase the environmental pressure in recipient economies. This may be due to the combination of two factors: a) the lack of sustainable business models and practices in EMNEs and their foreign operations (Wang and Elliot, 2014), and b) the fiercer competition between countries to attract EMNEs' activities by offering lower constraints and regulatory standards (Madsen, 2009; Duanmu, 2014). At the same time, some

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EMNEs may instead develop strategies of corporate social responsibility (CSR) or corporate environmental responsibility (CER) aimed at building their pragmatic and moral legitimacy in foreign locations (Holtbrügge and Dögl, 2012; Zyglidopoulos et al., 2016). In this context, the international business and management literature implies that EMNEs are not only subject to the liability of foreignness when operating abroad (Zaheer, 1995), but they also face a liability of 'emergingness', especially when investing in developed economies (Madhok and Keyhani, 2012). To overcome the burdens, challenges, and deficits connected with these conditions, EMNEs may enhance their conduct and choices as a strategy to signal their positive corporate citizenship to different local and global stakeholders (Gardberg and Fombrun, 2006; Fiaschi et al., 2017).

Nonetheless, despite the increasing attention to environmental principles in the global public opinion and among governments, the ecological transition to a green (or greener) economy seems to be mostly associated with the experience of companies and consumers in advanced countries, where technological opportunities and market conditions are overall more conducive to green reforms (Pegels and Altenburg, 2020). Emerging and developing economies, instead, are often more cautious or tend to consider green reforms as a threat to their possibilities to follow a conventional trajectory of economic growth (OECD, 2012).[1] Hence, the patterns of internationalization of EMNEs may reflect the latecomer inability to realize the economic and business opportunities associated with the most recent environmental paradigm of economic development.

Furthermore, adopting green practices and objectives represents a core element in the framework of the 2030 Agenda for the UN 17 Sustainable Development Goals (SDG). The extent to which and how multinational corporations in general, and EMNEs in particular, are aligning to the SDG agenda, however, remains an open and urgent area of inquiry (Fiaschi et al., 2017; Giuliani, 2018; van Tulder et al., 2021). In this context, our study meets the growing scholarly interest to understand the environmental implications of cross-border activities with specific reference to EMNEs (e.g. Bu and Wagner, 2016; Li and Zhou, 2017; Wettstein et al., 2019). We contribute to the debate by focusing on a scarcely investigated area of research that represents a concern for international business and management scholarship interested in how and under which circumstances EMNEs run sustainable business in different contexts. Our focus is on how the localisation strategies of EMNEs are shaped by country-specific advantages in terms of environmental performance, a subject largely overlooked by the extant literature, but potentially possessing deep managerial and ethical implications for both business practices (Doh et al., 2010; Elms et al., 2010) and the policy regulation of global capitalism (e.g. Giuliani, 2018). We focus on the specific case of Chinese MNEs, since China became the second largest global investor in 2016 (UNCTAD, 2018), and the first in 2020 amidst the COVID-19 pandemic, with a total OFDI volume of $133 billion (UNCTAD, 2021). Considering the intensified role of China in the global economy, the environmental implications of its economic growth and international expansion are very relevant (Tan-Mullins and Mohan, 2013). Although still showing significant weaknesses (e.g., van der Kamp et al., 2017), environmental regulation in China has gradually become stricter in recent years, producing a relocation of activities from coastal to western provinces and abroad (Wang, 2010; Wu et al., 2017). Given the increasing go-global attitude of Chinese MNEs, therefore, an urgent question arises on whether and to what extent their internationalization is considering the environmental contexts of the recipient locations.

To answer this question, we develop a conceptual framework on the relationship between the international location decisions of Chinese MNEs and the environmental performance of host economies. This is achieved by combining the traditional race-to-the-bottom arguments with the idea that Chinese MNEs may also enhance their legitimacy through signalling their systematic adherence with strong environmental performances in host locations. Our conceptual framework highlights the heterogeneity of both recipient economies and MNEs activities on a number of key dimensions, such as countries' level of economic development and institutional structures as well as subsidiaries' degree of mobility, sensitivity to environmental standards and ownership type. These sources of location and individual heterogeneity can ultimately shape the relationship between Chinese MNEs' activities and local environmental performance, extending our understanding of the boundary conditions of EMNEs' ethical considerations in their internationalization strategies.

From the empirical standpoint, we collect information on 948 greenfield investments in manufacturing undertaken by Chinese MNEs in 82 countries over the 2013–2019 period, from the Bureau van Dijk Orbis Crossborder Investment database. With respect to countries' environmental performance, we use the well-known composite Environmental Performance Index (EPI) which provides a direct and unequivocal indication of how green and sustainable practices are executed at the national level. Methodologically, we perform a Poisson fixed effects estimation by controlling for a large number of concurrent factors motivating Chinese OFDI, as identified in the existing literature (Buckley et al., 2007). Furthermore, we consider the potential endogeneity affecting the reliability of our estimations by extending the empirical analysis to an exponential mean model with endogenous regressors and instrumenting the environmental performance of the recipient economies.

Our results suggest the existence of a negative link between the location strategies of Chinese MNEs and the environmental performance of host economies, indicating that China's greenfield investment abroad may feed a race to the bottom by systematically favouring locations with less diligent practices leading to environmental degradation. More specifically, Chinese MNEs seem to privilege locations with scarcer ecosystem vitality (EV), that is, a weakly sustainable use of local natural resources and the consequent erosion of the quality of natural ecosystems. Consistent with our conceptual framework, this negative link is conditioned by key contextual and corporate differences, suggesting the existence of a degree of managerial and ethical pluralism underpinning the strategies of Chinese companies depending on their target locations and individual features.

[1] Some evidence, however, suggests that in specific circumstances and sectors Chinese firms are quickly adopting green practices (Lin and Ho, 2011; Li et al., 2019).

2. Conceptual background and hypotheses development

In the face of highly pressing environmental issues worldwide, green development objectives have recently become a priority for many national and international actors (OECD, 2012). The UN SDGs incorporate clear green aims for the next decades and MNEs are called to align their corporate practices to these SDG-inspired ambitions (Van Tulder et al., 2021). In this setting, the transition to a novel paradigm of economic growth based on the sustainable use of natural resources and ecosystems is a necessary step towards a global ecological pathway. Besides the obvious environmental benefits, a swift turn to a green economy has many other appealing features, ranging from the generation of new technological and employment opportunities to the exploitation of new markets and trade networks (e.g. Pegels and Altenburg, 2020; Lema et al., 2020).

Nonetheless, not all countries or economic agents have the same capacity to exploit these opportunities or the willingness to implement green-oriented reforms and business models. Specifically, latecomer economies often lack the appropriate structural and institutional conditions to reap these potential benefits, and pursuing a path of green development may be perceived as an obstacle to their immediate growth prospects (OECD, 2013; Barbier, 2015). Similarly, companies from emerging countries aiming at internationalising their activities face very peculiar conditions when operating on global markets, mostly related to their laggard status, their inexperience in foreign settings, and the need to generate their competitive assets (Fu et al., 2018). Thus, their strategies may be differently responsive to the environmental performance and standards of different locations. In the reminder of this section, we elaborate on how and under which conditions the status of EMNEs can relate to the environmental practices of host countries.

2.1. Location strategies of Chinese MNEs, environmental pressure, and legitimacy

In their international locational strategies, MNEs are concerned not only with the subsidiary-level decision of establishing a specific operation in one location or another, but also with the organization of their global configuration, encompassing all their units abroad. MNEs are complex organizations connecting multiple recipient contexts that are collectively functional to their corporate efficiency, competitiveness, and responsibility (Kostova and Zaheer, 1999; Iammarino and McCann, 2013). In this complex decision-making process, the tangible costs of doing business in foreign locations also represent a crucial consideration. An environmentally sustainable locational configuration of MNE activities may imply relatively higher costs of operating abroad, when compared to investing in locations where the local environmental awareness is less developed. This is the case, for example, if locations with a better environmental performance impose specific requirements and standards that translate into higher operational costs for manufacturers (Baumol and Oates, 1988). Thus, MNEs may face lower hassles in locations with environmentally loose business practices, as compared to places where sustainability represents a stringent societal goal. This echoes the notion of pollution havens, intended as places where the pressure of the environmental regulation is low. Global FDI and offshoring may be attracted to these locations to minimize production costs and shift pollution-intensive activities away from home (e.g. Kellenberg, 2009; Pinkse and Kolk, 2012; van der Kamp et al., 2017). In this sense, some locations can have a comparative advantage in their low environmental performance, as the (re) location of manufacturing activity can respond differently to geographical differentials in the attainment of environmental sustainability. Importantly, this mechanism can generate an environmental race to the bottom, whereby environmental standards can be hindered by local authorities in an attempt to attract larger inflows of international production capitals (Konisky, 2007; Madsen, 2009). As many emerging economies are taking gradual steps towards more sustainable business practices domestically (Wang, 2010), also due to local legitimacy pressures, some of their companies may be incentivised to relocate subsidiaries in foreign locations with lower environmental demands. From the perspective of Chinese MNEs, because they lack at least partially the initial firm-specific advantages for the exploitation of global markets, and are instead driven by the need to construct and cement such advantages via investment abroad (Yiu et al., 2007), locations with weaker environmental performance can be rather attractive due to short term cost reduction advantages. This may be interpreted as a type of international location strategy that penalises the sustainable use of natural ecosystems and resources in destination countries, as a result of the constant need of Chinese MNEs to accrue their global competitiveness. Extant research provides consistent evidence on various forms of exploitative attitude of some EMNEs investing in Europe (e.g., Giuliani et al., 2014).[2] Other studies highlight that MNEs from advanced countries also can offshore polluting activities to foreign locations under conditions of institutional pressure at home (Li and Zhou, 2017). We thus formulate the following baseline hypothesis:

H1a. A negative relationship exists between the international location of manufacturing greenfield investment projects of Chinese MNEs and the environmental performance of recipient economies.

This hypothesis implies the prevalence of an environmentally unsustainable locational strategy of Chinese MNEs, seeking to strengthen their global advantage and to reduce operational costs.

However, existing research also suggests cases of MNEs being attracted to locations with stronger environmental standards and performances. For instance, even when faced with higher costs of production due to sustainability regulations in a specific location, MNEs may find it convenient to invest in that location if there is the availability of better technology than at home. In this context, in fact, MNEs might face relatively lower obstacles as compared to local incumbents, thus experiencing a potential cost advantage due to

[2] Another strand of work, nonetheless, suggests that FDI can also trigger an environmental race to the top (Palmer et al., 1995). This can happen, for instance, through induced innovation mechanisms, whereby foreign MNEs have superior environmental capabilities that allow them to meet more stringent environmental regulations at lower cost (e.g. Bu and Wagner, 2016). This literature, however, focuses predominantly on MNEs from developed economies.

the higher environmental demands (Zeng and Zhao, 2009). Therefore, stronger environmental rules in a recipient location would allow MNEs to displace local competition, thus attracting their foreign investment. Nevertheless, since EMNEs might lack prior firm-level advantages and technologies (Mathews, 2006), which would make it problematic to compete with local competitors, this might not easily be the case. An alternative motivation for Chinese MNEs to invest in locations characterised by higher environmental requirements might instead be their need to acquire environmental legitimacy (e.g., Fiaschi et al., 2017). The international reach, relevance, and visibility of MNE activities and operations, that make them fundamental actors of the globalization process, can also imply corporate strategies aimed at self-representing as global business citizens, broadly intended as companies that carry out their operations responsibly in the eyes of local and global stakeholders (Logsdon and Wood, 2005). Importantly, this global citizenship of EMNEs can function as a catalyst of corporate practices in favour of environmental sustainability and CSR more in general (Miska et al., 2016; Preuss et al., 2016; Zyglidopoulos et al., 2016). In fact, environmental objectives within EMNEs can emerge because of external forces, such as the legitimacy pressure to meet sustainability standards, the public scrutiny to disclose carbon emissions, or the compliance with green regulations (Hahn et al., 2015). These factors tend to be considered as a-spatial drivers of environmental legitimacy influencing firms' activities at the subunit level. Nevertheless, a global environmental legitimacy-seeking strategy of Chinese MNEs can extend to their spatial configuration at the international level, embracing the patterns of localisation of their FDI abroad. Chinese companies can define and orient their location and re-location strategies towards environment-friendly contexts to signal their corporate awareness for sustainability issues and accumulate global environmental legitimacy. This can be interpreted as a form of corporate isomorphism with respect to the growing global demand for more adequate sustainable operations and green practices (Deephouse, 1996). Such a process can be particularly relevant in the case of EMNEs, as their reputational assets in environmental and sustainability terms can be initially weak (Arrive and Feng, 2018) and, therefore, their need to gain global environmental legitimacy can be large. In fact, while the rapid growth of emerging economies entails that their companies are gaining importance in the international market, they are still far from gaining full global acknowledgement due to their incapacity to address major environmental and social issues (Fiaschi et al., 2017). Hence, increasing their credibility in sustainability and environmental terms can plausibly be a relevant goal for Chinese MNEs. We then formulate the following alternative hypothesis:

H1b. A positive relationship exists between the international location of manufacturing greenfield investment projects of Chinese MNEs and the environmental performance of recipient economies.

This hypothesis implies the prevalence of an environmentally sustainable locational configuration of Chinese MNEs, potentially seeking global environmental legitimacy.

2.2. Countries' heterogeneity in economic development and institutional frameworks

We extend our conceptual framework by contemplating the role of country heterogeneity, with the idea that this crucially conditions the strategic location behaviour of Chinese cross-border operations in relation to the environmental performance of host economies. The level of economic development of recipient countries is a key conditioning factor in this sense, as sustainability and environmental concerns as well as green policy objectives are not uniform across locations with unequal resources and financing opportunities (Claessens and Feijen, 2007). In advanced economic systems, attaining environmental targets is more frequently part of green standards and regulations than in developing countries, and companies can more easily access capital and react to environmental incentives, either by changing their production structures or through innovation (Tamazian et al., 2009). At the same time, developing countries experience ecological marginalisation, strong pressures on natural resources, and fragile environmental practices more often due to unresolved developmental issues connected to low income, lack of market and non-market institutions to promote sustainable practices, poverty, and a generally low environmental awareness in both public and private sectors (e.g., Watmough et al., 2016). In addition, the cross-border activities of EMNEs in many developing countries have increased in recent years and are often directed towards locations with considerable access to natural resources (Athreye et al., 2021).

In this context, both the rationale to lower operating costs, that underpins the race-to-the-bottom argument, and the pressure towards generating a sufficient degree of legitimacy in global markets, may vary in relevance depending on the economic development of recipient economies. In locations where gaining legitimacy constitutes a fundamental step to overcome the business challenges faced by Chinese MNEs and obtain acceptance by local stakeholders, these companies may systematically orient their location strategies towards destinations with strong environmental performance and public attention towards sustainable economic activities. In these settings, hence, Chinese investment may address their liability of emergingness by minimizing the perception that they operate according to lax environmental standards (Zyglidopoulos et al., 2016). On the contrary, if sustainability does not represent a core societal value for local stakeholders, the locational configuration of Chinese MNEs may be oriented towards economies with relatively poor environmental performance as a strategy to avoid the potential costs of adopting green practices or norms. This is often the case of developing countries, where the adherence to sustainable business models may be lacking or relatively weaker.

Taken together, these elements imply that, while legitimacy pressures can be present in the case of Chinese MNEs operating in advanced countries, their investment might be directed towards locations with poorer environmental practices among the developing countries more often than among the developed ones. Therefore, the negative or positive link between the location of Chinese greenfield operations and the environmental performance of host economies envisaged in our baseline hypotheses H1a and H1b could be reasonably influenced by the level of economic development of the recipients. We then formulate the following two hypotheses:

H2a. The negative relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of investment in developing countries.

H2b. The positive relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of investment in advanced countries.

Furthermore, we posit that countries' heterogeneity in institutional quality also plays a central role in conditioning the relationship under study. The bulk of the literature acknowledges that good institutional structures favour capital accumulation and investment, by providing predictable and stable markets and reducing business risks, thus facilitating the attraction of foreign MNEs (Bénassy-Quéré et al., 2007). Nonetheless, other evidence suggests that in some cases MNEs, even from the most advanced economies, may prefer locations with deficient institutional settings as a strategy to circumvent transparent market mechanisms and regulations when investing abroad (e.g. Giuliani and Macchi, 2014; Ascani et al., 2016). Studies on Chinese MNEs highlight how they can be less risk averse than advanced countries' MNEs as they more systematically tend to locate in contexts with weaker institutions and higher corruption rates (Buckley et al., 2007). One recurring explanation for this finding is the idea that Chinese MNEs possess a comparative advantage in operating within flawed institutional frameworks due to their home experience in terms of weaker governance (e.g., Morck et al., 2008). It is thus possible that companies from China are able to either efficiently cope with the risks associated with uncertain institutional environments or exploit more fragile settings to gain an advantageous business position. Within these contexts, legitimacy pressures are obviously less prominent for Chinese firms than in economic systems endowed with institutional structures based on accountability and transparency. In the latter, Chinese MNEs may instead be prone to build a positive corporate reputation for their activities: local institutional pressure can push towards the adoption of specific measures to increase MNE social acceptance in the host location (Husted and Allen, 2006; Beddewela and Fairbrass, 2016). Hence, the institutional heterogeneity across recipient countries may give rise to different strategies of Chinese MNEs in terms of signalling legitimacy (Rathert, 2016; Fiaschi et al., 2017). These arguments suggest that while the legitimacy pressures given by strong host-country institutions can produce location strategies oriented towards locations with a good environmental performance, fragile institutions can instead attract investment in places with less diligent environmental practices. Hence, we formulate the following hypotheses:

H3a. The negative relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of investment in countries with weaker institutions.

H3b. The positive relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of investment in countries with stronger institutions.

2.3. Subsidiaries' heterogeneity in mobility, environmental sensitivity and ownership type

The heterogeneity across Chinese MNEs can also give rise to specific patterns of subsidiary localisation. We consider three distinctive features of Chinese companies that can condition their locational strategy in relation to the environmental performance of host markets: namely, their mobility, their degree of sensitivity to environmental practices and their ownership. The ease of mobility of subsidiaries is a key element in our framework because companies operating in more footloose industries, that are characterised by relatively lower initial sunk costs, are more likely to rapidly relocate elsewhere if local costs of production increase (e.g., Konings and Murphy, 2006). On the contrary, subsidiaries operating within less footloose industries, that are associated with relatively higher initial sunk costs of establishment, may find it more costly to move when incurring higher costs in their current location (Ederington et al., 2005; Kellenberg, 2009). Interestingly, recent evidence on Chinese companies indicates that their location choices are particularly susceptible to increased costs associated with tighter environmental requirements (Wu et al., 2017). These arguments provide the basis for conceptualising the role of Chinese MNEs' degree of mobility as an element conditioning their strategic location behaviour in response to countries' environmental performance. Specifically, companies operating in more footloose manufacturing industries face easier relocation opportunities than those active in less mobile sectors. Hence, the former should be more able to systematically sort destinations and locate where environmental concerns are reflected less strongly in regulations and societal objectives. This may produce short-termism in their location strategies, given the relative ease of relocation. On the contrary, firms operating in less footloose manufacturing industries tend to have longer term perspectives of investment in host countries. For these reasons, they may be more prone to draw on strategies signalling the legitimacy of their operations. Our fourth hypothesis is therefore:

H4a. The negative relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of investment in footloose industries.

H4b. The positive relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of investment in non-footloose industries.

Nonetheless, firms operating in manufacturing can be subject to varying degrees of sensitivity to environmental standards, mostly depending on the nature of production and the predominant technology adopted in a given industry (Ford and Despeisse, 2016; Marzucchi and Montresor, 2017). This aspect becomes a key element, then, to understand the location configuration of Chinese subsidiaries abroad. Companies operating within sectors where the production process rests on more polluting technologies may plausibly be more sensitive to the environmental requirements and standards in foreign locations, as compared to firms operating under technological regimes that are less polluting (Chen et al., 2020; Wang et al., 2021). In fact, firms in sectors based on the more intensive use of polluting technologies may actively select destinations based on their weak environmental performance. Hence, the degree of sensitivity of Chinese MNEs to recipient locations' environmental standards can generate strong contingencies in their global strategies (Javorcik and Wei, 2003). On these premises, we formulate the following hypotheses:

H5a. The negative relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of investment in more polluting sectors.

H5b. The positive relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of investment in less polluting sectors.

Finally, we scrutinize the ownership type of Chinese MNEs as an additional source of heterogeneity in their location strategies, by considering State-owned and private companies. One fundamental aspect associated with ownership type pertains to their uneven access to credit and the related diverse business opportunities, especially in the context of emerging economies' imperfect capital markets and financial constraints (Voss et al., 2010; Gaur et al., 2018). Consistently, extant evidence highlights that private companies in emerging economies such as China face more severe access constraints to finance for supporting their operations as compared to State-owned enterprises (SOEs) (Poncet et al., 2010). With respect to operations abroad, these constraints can also be tighter due to the control system run by the China State Administration and Foreign Exchange (SAFE) to authorise OFDI of Chinese companies, whereby the stringent prerequisites in terms of financial security amply favour SOEs (Buckley et al., 2018). Contrary to government-created advantages for SOEs, the more limited financing opportunities of private companies could suggest that they are more sensitive to cost conditions when investing abroad. On the other hand, it has also been shown that SOEs are subject to higher institutional pressures by host governments, which can push them to adapt their location strategies to reduce potential conflicts and enhance their legitimacy in the recipient contexts (Meyer et al., 2014). In these circumstances, for instance, corporate legitimacy can be enhanced by SOEs abroad by adjusting their practices to local norms and regulations (Kostova and Roth, 2002). In this respect, private companies can more systematically regard the environmental situation of recipient countries as a potential area for decreasing production costs, as compared to SOEs, thus favouring locations that allow the implementation of less diligent environmental business practices. On these premises, we formulate the following hypotheses:

H6a. The negative relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of private companies.

H6b. The positive relationship between the international location of manufacturing greenfield investment projects by Chinese MNEs and the environmental performance of recipient economies characterises the case of SOEs.

3. Data description

We test our hypotheses by combining different sources of information to generate a panel dataset covering the presence of 948 new greenfield investment in manufacturing undertaken by Chinese MNEs in 82 countries over the 2013–2019 period, as well as the environmental performance of these locations and other relevant country characteristics potentially motivating Chinese OFDI. Data on Chinese new greenfield investment is taken from the Bureau van Dijk Orbis Crossborder Investment database. This is a restricted access database containing information on the international investment of companies. We consider the "new" investments undertaken by Chinese-owned companies, thus isolating greenfield operations and excluding expansion investment, joint-ventures and M&A.[3] Table 1 shows the geographical distribution of the greenfield manufacturing investment projects of Chinese MNEs in our sample.

Not surprisingly, the majority of them are located in Europe, with slightly more than one-third of total greenfield investment, followed by the East Asia & Pacific region and North America. Table 2 offers a more detailed geographical snapshot of the top-ten destination countries of Chinese greenfield operations during the sample period. This ranking is led by Germany and the US, with the highest numbers of Chinese new FDI (187 and 98 respectively). Among the top destinations we also find a solid presence of other emerging and developing countries, including South and South-East Asian countries such as India (56), Vietnam (41), Thailand (25) and Indonesia (23), as well as Central and Latin American countries such as Mexico (40) and Brazil (28).

Table 3 provides the sector breakdown of Chinese FDI during the period under analysis. Large differences exist across manufacturing industries, with about 23% of Chinese greenfield operations in "Manufacture of computer, electronic and optical products", followed by "Manufacture of motor vehicles" with about 15% of total, "Manufacture of machinery and equipment n.e.c." (11%) and "Manufacture of electrical equipment" (10%). The sectoral heterogeneity in the frequency of Chinese greenfield investment suggests that Chinese MNEs internationalization through greenfield FDI as an entry mode mostly concern activities that may have a different degree of sensitivity to the environmental performance of host locations.

With respect to the host countries' environmental performance, we use the Environmental Performance Index (EPI) produced by the Yale Center for Environmental Law & Policy and The Center for International Earth Science Information Network at Columbia University, in collaboration with the World Economic Forum. This is a composite index based on 24 specific metrics grouped into 10 issue categories, of which 7 cover the notions of environmental health (EH) and 3 refer to ecosystem vitality (EV), thus providing a comparable and exhaustive picture of countries' performance in terms of environmental sustainability policy objectives (see Wendling et al., 2018 for more details). The notion of EH captures the threats to public health deriving from human activities, while EV measures the intensity of natural resources' use and the consequent quality of the ecosystems.

The 7 issue categories considered for EH are: (i) biodiversity & habitat, (ii) forests health, (iii) fisheries, (iv) climate & energy, (v)

[3] The choice of focusing on new greenfield investments is motivated by the fact that we are interested in exploring the initial choice of investment of Chinese MNEs, while other forms of cross-border activity, such as expansion investment and M&A, imply that the location decision is predetermined by an already existing plant or activity.

Table 1
Global distribution of new Chinese greenfield manufacturing investment.

Region	# of greenfield projects	%
East Asia & Pacific	186	19.6
Europe	337	35.6
Central Asia	37	3.9
Latin America & Caribbean	99	10.4
Middle East & North Africa	61	6.4
North America	108	11.4
South Asia	72	7.6
Sub-Saharan Africa	48	5.1

Table 2
Top-ten destinations of new Chinese manufacturing greenfield investment, 2013–2019.

Rank	Country	# of greenfield projects
1	Germany	187
2	United States	98
3	India	56
4	Vietnam	41
5	Mexico	40
6	Brazil	28
7	Thailand	25
8	Russian Federation	24
9	France	23
10	Indonesia	23

Table 3
Sector distribution of new Chinese manufacturing greenfield investment, 2013–2019.

NACE code	NACE description	# of greenfield projects	%
10	Manufacture of food products	34	3.59
11	Manufacture of beverages	9	0.95
13	Manufacture of textiles	18	1.90
14	Manufacture of wearing apparel	13	1.37
15	Manufacture of leather and related products	4	0.42
16	Manufacture of wood and wood products	1	0.11
17	Manufacture of paper and paper products	14	1.48
18	Printing and reproduction of recorded media	1	0.11
19	Manufacture of coke and refined petroleum products	7	0.74
20	Manufacture of chemicals and chemical products	51	5.38
21	Manufacture of pharmaceutical products	23	2.43
22	Manufacture of rubber and plastic products	46	4.85
23	Manufacture of other non-metallic mineral products	31	3.27
24	Manufacture of basic metals	42	4.43
25	Manufacture of fabricated metal products, exc. Machinery	33	3.48
26	Manufacture of computer, electronic and optical products	217	22.89
27	Manufacture of electrical equipment	98	10.34
28	Manufacture of machinery and equipment n.e.c.	107	11.29
29	Manufacture of motor vehicles	142	14.98
30	Manufacture of other transport equipment	25	2.64
31	Manufacture of furniture	11	1.16
32	Other manufacturing	21	2.23
Total		948	100.00

air pollution, (vi) water resources, and (vii) use of nitrogen in agriculture. The 3 categories for EV are: (i) air quality, (ii) water & sanitation, and (iii) exposure to heavy metals. The EPI ranges from 0 to 100, with higher values indicating a better environmental performance, and scores also comparable over time. The EPI scores are available for the two EPI components, EH and EV, thus allowing a more focused analysis of specific environmental domains in relation to firm location behaviour.

The use of the EPI as a measure of environmental performance also has the advantage of providing a direct and unequivocal indication of how green and sustainable practices are actually executed in a country, beyond local regulations and standards. The latter, in fact, can notably vary across countries, together with the degree of monitoring, enforcement, and compliance of economic actors (Luxmore et al., 2018). Therefore, it is possible that a highly environmentally regulated country with inadequate governance and enforcement exhibits a weak environmental performance, which can in turn influence firm location behaviour (Kolk and van Tulder, 2010). This seems to be in line with recent scholarly evidence that Chinese OFDI is attracted to locations characterised by weaker institutional conditions (e.g., Kolstad and Wiig, 2012; Buckley et al., 2018). This evidence therefore supports our choice of

considering the environmental performance of OFDI recipients by means of the EPI and its components in the investigation of the location behaviour of Chinese MNEs. Unfortunately, the EPI is produced as a back casted time series only until 2015, while more recent yearly editions cannot be used in a panel analysis due to changes in the methodology employed to construct more recent versions of the index. Therefore, we consider the period 2008–2015 for the environmental performance of host countries. This implies a four-years lag between the EPI and the greenfield investment data from Orbis Crossborder Investment. Fig. 1 below shows that the EPI time trends by World region do not exhibit yearly fluctuations but remain stable over the sample period considered. This reassures us on the use of EPI with a four-years lag, as the environmental performance of countries (grouped by macro-region) tend to be stable from year to year.

Table 4 shows the ranking of the ten top and bottom countries in our sample with respect to the EPI as well as its EH and EV components in 2015. Not surprisingly, the highest EPI scores characterise Scandinavian and other European countries, plus New Zealand (Panel A). As far as the EH domain is concerned, the ranking is led by Australia and New Zealand, followed by Scandinavian and other European countries, plus Canada. With respect to the EV, the ranking is led by Switzerland and there is a general shift in the top ten towards some Eastern European Union (EU) countries, such as Slovenia, Czech Republic, Hungary, and Slovak Republic, and some of the largest EU economies, such as Germany, France, and Italy. Turning to the bottom ten ranking in terms of the three indicators, the list mostly includes developing economies in Africa and Asia, such as Kenya, Bangladesh, Myanmar, and Burkina Faso, and some emerging countries, such as Indonesia and Turkey (Panel B).

The only European country in this list is Bosnia and Herzegovina, performing particularly low in terms of EV. We also collect data from the World Development Indicators (WDI) on other country features that can influence the location of Chinese FDI. A full account of variables and data sources is provided in Table A in the Appendix.

Firstly, we consider both the market size of destination countries by using GDP data and their level of income proxied by GDP per capita, as is customary in the literature. Extant studies on Chinese MNEs generally find that market access considerations can drive these companies towards larger markets (e.g., Buckley et al., 2007; Quer et al., 2018), although the empirical evidence is not always consistent (Kang and Jiang, 2012). Second, we consider the institutional conditions of the recipient economies, using indicators of both rule of law and political stability from the World Governance Indicators. As mentioned above, OFDI from China appears to be attracted to weaker institutional environments (e.g. Buckley et al., 2007; Buckley et al., 2018), even though some contributions offer mixed evidence (e.g., Ramasamy et al., 2012). Third, we include some labour market characteristics in the host destinations potentially influencing foreign MNEs via different mechanisms: (i) industry employment as a percentage of total employment, as an indicator of size and availability of labour in the macro-sector here under investigation, (ii) unemployment rate, as a proxy for the functioning of labour markets, and (iii) duration in years of compulsory education, as an indication of the education level.

Fourth, we include a measure of urban population, in order to capture the agglomeration effect of cities, which is often considered a driver of firm location choice (Hilber and Voicu, 2010). Fifth, the innovation capabilities of host economies are proxied by patents, as MNEs from emerging countries are believed to target locations endowed with more advanced knowledge bases as an asset-seeking strategy. Sixth, we consider each country's average income taxes on profits and capital gains, as elements that can influence the costs faced by MNEs. Finally, we account for countries' heterogeneity in their endowments of natural resources using data on natural resource rents. Existing studies offer ambiguous evidence regarding this driver of Chinese OFDI (Kolstad and Wiig, 2012), as this may more plausibly be a motive related to activities in developing countries only (Kang and Jiang, 2012). Table B in the appendix reports the correlation matrix and summary statistics.

4. Methodology

In our econometric approach we follow Cameron and Trivedi (1998) and Wooldridge (1999). We use the number of Chinese greenfield investment in each host country as dependent variable. Considering its nature as a count variable, we assume a Poisson distribution with the following density:

$$f(Y_{it} = y_{it}|\boldsymbol{x}_{it}) = \frac{e^{-\mu_{it}}\mu_{it}^{y_{it}}}{y_{it}!} \tag{1}$$

where Y_{it} is a random variable and its realisation y_{it} indicates the frequency of Chinese greenfield investment varying across recipient country i and year t; x_{it} is a vector of independent variables and μ_{it} is the conditional mean of the Poisson distribution. With the longitudinal data at hand, we consider the following Poisson model with exponential mean function and a multiplicative individual term:

$$y_{it} \sim P[\mu_{it} = \alpha_i\lambda_{it}] \tag{2}$$

where α_i indicates country specific effects and λ_{it} is the exponential mean depending on explanatory variables x_{it} and parameters β:

$$\lambda_{it} = exp(\boldsymbol{x}_{it}^{'}\beta) \tag{3}$$

Hence, by exploiting the panel nature of our dataset, we eliminate unobserved time-invariant country attributes and estimate the Poisson fixed effects model given by Eqs. (2) and (3) by means of Maximum Likelihood. In the context of our study, the advantage of this approach is that the estimation of the role of countries' environmental performance in attracting Chinese FDI fully accounts for countries' unobserved heterogeneity that can affect investment location decisions.

However, a relevant concern with this approach could be that our covariates are simultaneously determined with the dependent variable, thus potentially generating biased estimates. For instance, Chinese MNEs' foreign activity can be endogenously determined

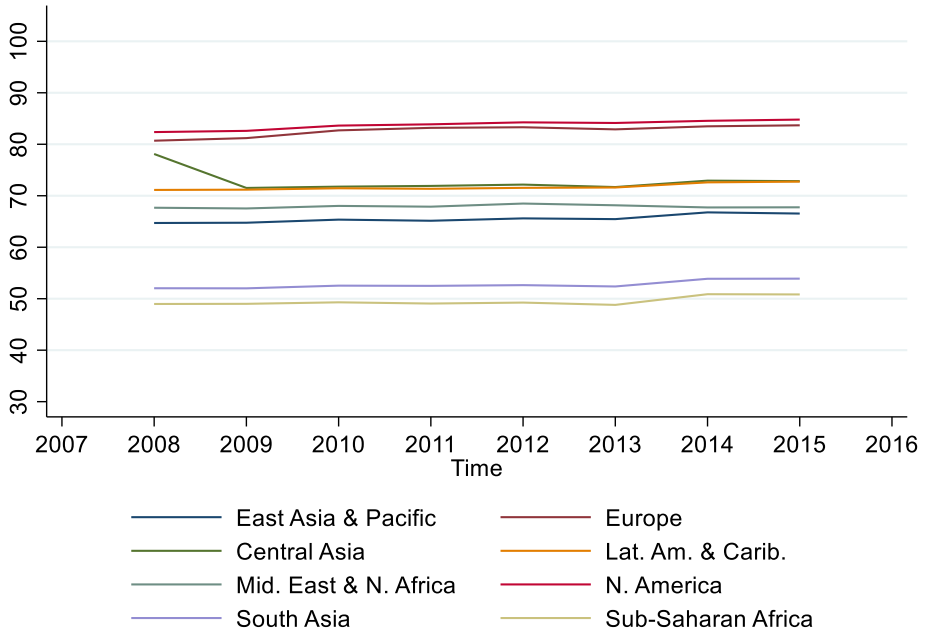

Fig. 1. Time trends of median EPI values by World region.

Table 4
Top- and bottom-ten countries by environmental performance, 2015.

Country	EPI	Country	Environmental Health (EH)	Country	Ecosystem Vitality (EV)
A. Top-ten countries					
Finland	90.74	Australia	98.79	Switzerland	90.05
Sweden	89.74	New Zealand	97.96	Slovenia	88.81
New Zealand	89.73	Norway	97.81	Czech Republic	88.73
United Kingdom	89.33	Finland	97.44	Luxembourg	88.27
Denmark	88.78	Sweden	97.07	Slovak Republic	87.39
Spain	88.73	Portugal	96.63	Hungary	87.30
Portugal	88.71	Ireland	95.80	Austria	86.85
Estonia	88.24	Estonia	95.35	France	86.27
France	87.87	Canada	95.15	Germany	85.76
Norway	87.78	Spain	94.67	Italy	85.76
B. Bottom-ten countries					
Indonesia	65.90	South Korea	67.68	Turkey	55.07
Kenya	62.55	Egypt	66.64	Indonesia	54.89
Bosnia and Herz.	61.44	Zambia	59.49	Burkina Faso	49.79
Cote d'Ivoire	59.89	Cambodia	59.25	Mauritius	49.72
Barbados	56.95	Kenya	58.73	Lao PDR	49.43
Cambodia	51.42	Cote d'Ivoire	56.64	Myanmar	45.80
Lao PDR	50.04	Myanmar	51.56	Bangladesh	45.44
Myanmar	48.68	Lao PDR	50.64	Cambodia	43.60
Burkina Faso	43.76	Bangladesh	41.87	Bosnia and Herz.	38.06
Bangladesh	43.66	Burkina Faso	37.74	Barbados	27.00

with countries' environmental performance and GDP. To address this potential issue, we first consider time lags of the EPI and GDP in the Poisson fixed effects estimation. As anticipated in the data section, we adopt a four-years lag in the EPI, thus implying that within-country changes in environmental performance at time *t-4* influence the location of new Chinese greenfield investment at time *t*. Besides allowing us to exploit a longer time dimension in our panel dataset, using a four-years lag between the EPI and Chinese greenfield investment can also alleviate the concern related to the potential reverse causation in the relationship under analysis, which would entail an endogeneity issue. Therefore, by exploiting within-country variation in the EPI four years before Chinese greenfield investments are undertaken, we can analyse how country changes in their environmental performance can influence the prospects of receiving these investments, without confounding the variation in EPI with a potential effect caused by Chinese FDI occurrences. In a robustness check, nevertheless, we also consider a simple one-year lag by limiting the analysis to a sub-sample with a shorter time span. Our second strategy to deal with endogeneity is to test the robustness of our baseline estimates by considering an exponential mean

model with endogenous regressors. This is a Poisson model estimated with Generalized Methods of Moments (GMM) techniques in presence of explanatory variables with endogenous nature (Windmeijer and Santos Silva, 1997; Wooldridge, 2010). We take a similar approach to Kellenberg (2009) in the choice of instruments, by primarily using the characteristics of the agricultural sector of each country *i*. The economic reasoning motivating this choice is that the agricultural sector can indirectly affect the location of inward FDI in manufacturing via both its contribution to national GDP and its impact on a country environmental performance. According to the United Nations Food and Agriculture Organization (FAO), agricultural activities can have a multifaceted effect on the environment, ranging from their impacts on water quality and air pollution to that on biodiversity, fertility of soils, and more generally, environmental sustainability (Alexandratos and Bruinsma, 2012). Furthermore, agricultural activities also contribute to the national GDP. For these reasons, GDP, GDP per capita and the EPI enter the exponential mean model specification as endogenous regressors. For each country *i*, we also consider as instruments the characteristics of the agricultural sectors of its neighbouring countries *j* within each of the world regions reported in Table 1, as there may be interactions between neighbours in terms of common environmental objectives and practices. As agricultural sector characteristics for our instruments, we use both the capital-labour and land-labour ratio of countries' agricultural sector. Data for agricultural land and agricultural machinery come from the WDI, while data on the agricultural employment come from the International Labour Organization (ILO) database.[4] Essentially, these ratios provide a measure of the agricultural technology level in each country, which directly influences national GDP and environmental performance. For each country *i*, we also consider other exogeneous characteristics of neighbouring countries *j*, which can be added as instruments, such as their urban population and taxation rate. These instruments can alternatively influence a country GDP and its environmental performance within each world region, but remain exogeneous to the characteristics of a country *i*. All the instruments based on the characteristics of third countries *j* are also normalised by a GDP weighted average including all the countries in each World region.

5. Results and discussion

5.1. Baseline results

The baseline estimates of the relationship between the international location of the subsidiaries of Chinese MNEs and the environmental performance of countries are presented in Table 5. We gradually enter our regressors in order to test the sensitiveness of our estimates to the model specification. We start by exploring the relationship between the location of Chinese subsidiaries and the EPI, without controlling for other confounding factors (column 1). The coefficient on the lagged EPI remains weak and insignificant ($\beta = -0.02$; $p = 0.25$), thus suggesting that the global configuration of Chinese OFDI is unrelated to the environmental practices of destination countries. Next, we take advantage of the characteristics of the EPI by unpacking the index into its two main components, EH and EV. In fact, it is possible that the insignificant relationship detected in column 1 hides a more articulated link between the location of Chinese greenfield investment and the local natural environment. The estimates in column 2 show a negative and significant association between Chinese MNE location choices and country performance in terms of EV ($\beta = -0.14$; $p = 0.00$), while the role of EH remains irrelevant (with the exception of weakly significant coefficients in columns 3 and 4). Thus, if a location increases its EV score by one point, the difference in the logs of expected number of greenfield FDI would decrease by 0.11 units, ceteris paribus. This coefficient corresponds to an incidence-rate ratio of about 0.85 ($e^{-0.14}$), suggesting that when the EV of a country increases by one point, the number of Chinese greenfield FDI decreases by 15 %. This is a nonnegligible effect. Going back to Table 4, a one unit increase in EV would imply an improvement in this indicator from the level of Italy to that of Austria, approximately.

This result suggests that Chinese MNEs tend to direct their international operations towards economies characterised by a weakly sustainable use of local natural resources and the consequent erosion of the quality of the natural ecosystems, consistently with H1a and with recent evidence on the predatory strategies of EMNEs when engaging in activities abroad (Giuliani et al., 2014). In columns 3 to 8 we gradually enter all covariates as identified in the literature and discussed in the Data description section.

Across specifications, the negative coefficient of the EV indicator remains significant and stable, indicating that this variable substantially captures some variation in our dependent variable that is accounted for by neither the controls, nor the fixed effects. Other significant relationships emerge in the baseline estimates. Chinese greenfield FDI is positively associated with larger markets and weaker rule of law in host economies, in line with previous studies (Buckley et al., 2007). However, no relevant association emerges between their location and the recipients' political stability. With respect to the host labour market characteristics, Chinese companies are unsurprisingly attracted to more dynamic labour markets, as indicated by the negative coefficient on unemployment rate. As far as the other controls are concerned, we detect strongly negative coefficients on both urban population and high taxation levels, although they remain rather insignificant. In column 9, we re-run the most extended specification by entering the aggregate EPI, rather than its components, and we find a negative and statistically significant coefficient in this case ($\beta = -0.06$; $p = 0.01$). In terms of magnitude, this result suggests that a one unit increase in the aggregate EPI is associated with a decrease of 6 % in the number of Chinese greenfield investment (i.e. the incidence-rate ratio is 0.94), ceteris paribus. Overall, the evidence emerging from the baseline results suggests that a negative relationship exists between the international location of Chinese FDI and the environmental performance of recipient economies, thus providing support for H1a and rejecting H1b. Table C in the Appendix provides estimates on a sub-sample of Chinese greenfield FDI limited to the years 2013–2016, regressed on the EPI, EH and EV taken with a one-year lag only, as anticipated in the Methodology section. While the results are consistent with those of Table 5 in terms of statistical significance, we notice that the

[4] Unfortunately, this data does not cover the full sample of 82 countries under analysis, but only 54 countries. Therefore, we adopt this methodology only as a robustness check, rather than as the main estimation method.

Table 5
Poisson fixed effects estimates.

Dep. var.: Chinese greenfield FDI	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EPI_{t-4}	−0.02								−0.06***
	(0.02)								(0.02)
Environmental $health_{t-4}$		0.07	−0.10*	−0.10*	−0.09	−0.09	−0.09	−0.10	
		(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.09)	(0.09)	
Ecosystem $vitality_{t-4}$		−0.14***	−0.14***	−0.13***	−0.12***	−0.11***	−0.09**	−0.11**	
		(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.05)	
ln GDP_{t-1}			2.63*	2.73*	5.30**	1.74**	3.15*	3.22**	3.22**
			(1.50)	(1.55)	(2.25)	(0.80)	(1.74)	(1.53)	(1.53)
ln GDP per $capita_{t-1}$			0.18	0.74	−2.50	0.64	−0.28	−0.33	−0.32
			(2.99)	(3.02)	(3.48)	(5.84)	(1.53)	(1.53)	(1.53)
Rule of law				−1.04**	−0.99*	−1.09**	−1.76***	−1.74***	−1.75***
				(0.48)	(0.52)	(0.54)	(0.67)	(0.67)	(0.67)
Political stability				0.28	0.23	0.21	0.16	0.15	0.15
				(0.29)	(0.29)	(0.29)	(0.32)	(0.32)	(0.32)
Industry employment					0.02	0.01	0.10	0.10	0.10
					(0.07)	(0.07)	(0.09)	(0.10)	(0.10)
Unemployment rate					−0.08**	−0.10**	−0.11*	−0.11*	−0.11*
					(0.04)	(0.05)	(0.07)	(0.07)	(0.06)
Education					0.15	0.17	0.18	0.18	0.18
					(0.20)	(0.20)	(0.29)	(0.29)	(0.29)
Patents						0.67	0.54	0.53	0.48
						(0.55)	(0.49)	(0.49)	(0.47)
ln Urban population						−3.38	−4.26	−4.39	−4.35
						(5.07)	(6.05)	(6.06)	(6.05)
Taxation							−0.01	−0.01	−0.01
							(0.03)	(0.03)	(0.03)
Natural resource rents								0.01	0.01
								(0.03)	(0.03)
Observations	574	574	574	574	574	574	574	574	574
Number of countries	82	82	82	82	82	82	82	82	82
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
log likelihood	−520.76	−520.33	−515.42	−513.03	−510.16	−509.94	−510.87	−511.01	−510.87
Wald chi2	82.63	83.11	93.31	97.26	102.21	102.50	103.02	103.41	103.52

Notes: Standard errors in parentheses; significance levels.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

magnitude of the coefficients on EPI, EH and EV is larger than that reported in Table 5. This may suggest either that the results in Table C catch an anticipation effect of the announcement of some Chinese greenfield FDI on local environmental performance, or that a simple one-year lag in EPI, EH and EV is a better predictor of a larger volume of Chinese greenfield FDI than a four-years lag. While disentangling these potential alternative mechanisms remains beyond the scope of the present article, we consider the estimates in Table 5 (with a longer time lag) our preferred choice because (i) they allow us to exploit a longer time dimension in our panel dataset, (ii) they are less subject to reverse causality given the longer time lag adopted and (iii) because they provide more conservative results in terms of magnitude of the estimated effects.

5.2. *Endogeneity of environmental performance*

The main test for the robustness of our baseline estimates is reported in Table 6, where we present the results for the exponential mean model with endogenous regressors explained in Section 4. Column 1 replicates the most extended baseline specification reported in column 8 of Table 5. The main results remain stable, with EV exhibiting a strongly significant and negative coefficient, while EH is not statistically relevant.

While the use of this econometric strategy should provide a more solid estimation of the impact of countries' environmental performance on the location choices of Chinese MNEs, it is still conceptually possible that the agricultural sector characteristics used as instruments in this model are correlated with some omitted variables. For instance, the agricultural capital-labour and land-labour ratios can depend on the capacity of an individual economy to accumulate capital, on the size of its labour force, and on the availability of land.

Hence, we gather data from the WDI on countries' total labour force, total land area, and fixed capital, and re-estimate the model of column 1 by considering these elements separately (from columns 2 to 4) and collectively (in column 5). Across all these specifications, the results regarding EH and EV remain very stable from both the quantitative and qualitative standpoints. These estimates, therefore, provide further support for the previous results, whereby the international configuration of Chinese subsidiaries is driven by low scores

Table 6
Exponential mean model with endogenous regressors.

Dep. var.: Chinese greenfield FDI	(1)	(2)	(3)	(4)	(5)
Environmental health $_{t-4}$	−0.03	−0.06	−0.03	−0.04	−0.07
	(0.06)	(0.07)	(0.06)	(0.07)	(0.08)
Ecosystem vitality $_{t-4}$	−0.18**	−0.16***	−0.11**	−0.15**	−0.18***
	(0.09)	(0.05)	(0.05)	(0.07)	(0.06)
ln GDP $_{t-1}$	1.54**	1.49**	1.47*	1.55**	1.38**
	(0.68)	(0.69)	(0.76)	(0.71)	(0.65)
ln GDP per capita $_{t-1}$	0.89	0.97	1.01	1.06	0.99
	(0.88)	(0.90)	(0.92)	(0.98)	(0.89)
Rule of law	−1.08**	−1.03**	−1.03**	−1.05**	−1.04**
	(0.53)	(0.51)	(0.51)	(0.53)	(0.51)
Political stability	0.22	0.23	0.29	0.28	0.25
	(0.32)	(0.32)	(0.32)	(0.32)	(0.31)
Industry employment	0.21	0.19	0.18	0.26	1.67**
	(0.34)	(0.29)	(0.24)	(1.04)	(0.84)
Unemployment rate	−0.20***	−0.18***	−0.15**	−0.18**	−0.12**
	(0.07)	(0.06)	(0.07)	(0.09)	(0.06)
Education	0.08	0.12	0.13	0.14	0.09
	(0.11)	(0.12)	(0.11)	(0.13)	(0.10)
Patents	0.76	0.79	0.77	0.77	0.76
	(0.60)	(0.68)	(0.67)	(0.67)	(0.62)
ln urban population	−1.21	−1.34	−1.41	−1.37	−1.29
	(1.01)	(1.09)	(1.12)	(1.13)	(1.09)
Taxation	−0.11	0.02	−0.07	−0.09	0.12
	(0.33)	(0.32)	(0.34)	(0.29)	(0.22)
Nat. resource rents	0.09	−0.12	−0.14	0.02	0.12
	(0.07)	(0.16)	(0.10)	(0.03)	(0.08)
ln Tot. labour force		3.56			5.41**
		(4.31)			(2.51)
ln land area			0.22**		−0.78***
			(0.11)		(0.28)
ln fixed capital				0.88	1.01*
				(0.91)	(0.53)
Observations	378	378	378	378	378
Regional dummies	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes
Overidentification test (Chi2)	14.31	14.56	17.76	14.83	16.68

Notes: Robust standard errors in parentheses; significance levels. Endogenous regressors are EH, EV, ln GDP and ln GDP per capita.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

in the environmental vitality of countries. With respect to the diagnostics of this model, the overidentification tests in all columns indicate that the null hypothesis that the instruments are valid (i.e. uncorrelated with the error term) cannot be rejected.

5.3. Heterogeneity in country and subsidiary characteristics

We extend our investigation by studying whether and how the specific characteristics of recipient economies and Chinese MNEs alter the relationship identified in the empirical analysis. We account for country differences in terms of their development level (i.e. advanced vs. developing countries, taken from UNCTAD) and institutional quality. As hypothesized in our conceptual framework, the negative link between the location of Chinese MNEs and the environmental performance of host economies could potentially be prevalent in countries where sustainability does not represent a stringent societal goal or else, is impaired either by the lack of resources to implement green business practices or by a fragile institutional framework (Lu et al., 2015). On the contrary, Chinese MNEs may tend to target advanced countries with more diligent environmental practices or stronger institutions in order to signal their adherence to green standards and accumulate legitimacy. Table 7 presents our estimates for two categorisations of recipient countries in terms of their levels of GDP (columns 1 and 2) and rule of law (columns 3 and 4).

The significant negative association between EV and the location of Chinese MNEs endures in the case of developing countries ($\beta = -0.10$; $p = 0.05$), while it completely loses its statistical relevance for advanced economies. These results are consistent with H2a, rather than H2b. Therefore, the overall wealth of destination countries can be a source of heterogeneity in the relationship between the location choices of Chinese MNEs and the environmental quality of host locations. A more nuanced explanation for the lack of evidence in favour of H2b could be that most Chinese OFDI directed towards advanced economies is motivated by market-access considerations or asset-seeking strategies. This type of operations may be disconnected from the environmental performance of the host economy, thus explaining the lack of significance on the EV coefficient. Interestingly, this conjecture is supported in column 1 by the positive and

Table 7
Host countries' heterogeneity.

Dep. var.: Chinese greenfield FDI	(1) Advanced countries	(2) Developing countries	(3) Strong Rule of Law	(4) Weak Rule of Law
Environmental health $_{t-4}$	−0.12	−0.10	−0.09	−0.12**
	(0.09)	(0.09)	(0.07)	(0.07)
Ecosystem vitality $_{t-4}$	−0.14	−0.10**	−0.09*	−0.19**
	(0.11)	(0.05)	(0.05)	(0.09)
ln GDP $_{t-1}$	2.21**	1.72	2.23	2.87
	(1.59)	(1.55)	(1.98)	(2.03)
ln GDP per capita $_{t-1}$	1.12	0.91	1.19	0.86
	(0.98)	(0.76)	(1.01)	(0.81)
Rule of law	0.40***	−0.31***	−0.31	−0.83***
	(0.11)	(0.09)	(0.19)	(0.24)
Political stability	0.31*	−0.20	0.11	0.12
	(0.17)	(0.18)	(0.07)	(0.08)
Industry employment	0.09	0.63**	0.90***	0.89***
	(0.27)	(0.31)	(0.31)	(0.30)
Unemployment rate	0.13	0.04	−0.10	−0.21
	(0.12)	(0.06)	(0.08)	(0.19)
Education	0.14	0.51**	−0.19	−0.24
	(0.12)	(0.24)	(0.16)	(0.32)
Patents	1.20**	0.70	0.79	0.55
	(0.59)	(0.59)	(0.67)	(0.51)
ln urban population	−2.48	−1.43	−2.06	−1.12
	(2.21)	(1.34)	(1.90)	(2.01)
Taxation	−0.09**	−0.18	−0.19**	−0.32**
	(0.04)	(0.13)	(0.09)	(0.15)
Natural resource rents	0.45	0.28	0.19	0.27
	(0.87)	(0.34)	(0.21)	(0.28)
Observations	280	294	286	288
FEs	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
log likelihood	−521.5	−518.2	−522.2	−515.4
Wald chi2	83.90	88.45	91.34	89.45

Notes: Standard errors in parentheses; significance levels.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

statistically coefficients on GDP and patents, that typically proxy market- and asset-seeking motives of FDI. On the contrary, Chinese subsidiaries in developing countries could be predominantly involved in production operations, which are more intimately connected to environmental considerations, especially if they are motivated by an efficiency-seeking rationale. The coefficients for industry employment in column 2 support this idea. Another interesting result stands in the different role played by the rule of law between advanced and developing countries: a negative and significant coefficient is found in the case of less developed economies, where Chinese MNEs may take advantage of local weaknesses and reinforce their position, consistent with other empirical evidence (Ascani et al., 2016), while a more certain and predictable institutional setting attracts Chinese greenfield investment in advanced economies. To some extent, this dualism can also explain the mixed evidence on the role of institutions in determining the location behaviour of EMNEs (Ramasamy et al., 2012; Quer et al., 2018). In columns 3 and 4 of Table 7 we re-run our model by dividing recipient countries based on whether their rule of law score is above or below the median.

The negative relationship between EV and the location of Chinese MNEs is persistent across samples, although it emerges as more relevant in the case of countries with weak rule of law, which attract Chinese MNEs that respond to a poor environmental performance also in terms of EH. This new finding is in line with H3a.

It indicates that the global configuration of Chinese subsidiaries is associated with weak environmental practices, and that the more fragile a country's institutional structure is, the more pervasive and stronger this relationship becomes. We then account for core characteristics of Chinese MNEs which may influence the link between their location choice and the EPI of host economies. Hence, we first examine the capital-intensity of subsidiaries, as companies operating in less capital-intensive industries are more footloose due to lower initial sunk investment costs (Ederington et al., 2005).

Capital-intensity is calculated with Orbis data for NACE 4-digit industries and the distinction between high and low capital-intensity is based on the median of capital intensity. For the degree of sensitivity of Chinese MNEs' sector of activity to host markets' environmental practices we use data on CO_2 emissions from the World Input-Output Database Environmental Accounts (Corsatea et al., n.d.). We consider the emissions of NACE 2-digit manufacturing sectors in China and connect them to the sector of activity of each greenfield investment undertaken by Chinese MNEs, distinguishing high and low CO_2 emissions sectors based on the median value of CO_2 emissions. By considering the CO_2 emissions of Chinese (rather than global) sectors we explicitly account for the specific

level of production technology in China, which is plausibly connected to that of Chinese MNEs. We then account for type of ownership, by identifying whether subsidiaries are either part of SOEs or private companies. We posited that the negative link emerging in the analysis above may characterise the location behaviour of private MNEs; at the same time, it is possible that SOEs may be more sensitive to legitimacy pressures.

The results for these sources of heterogenous effects are presented in Table 8. In columns 1 and 2, the relationship between EV and Chinese FDI remains significant and negative irrespective of the capital-intensity of the subsidiaries (columns 1: $\beta = -0.12$; $p = 0.00$; column 2: $\beta = -0.11$; $p = 0.00$), thus suggesting that this distinction does not capture any relevant condition that influences Chinese MNE behaviour in our data. Whether or not Chinese MNEs operate in footloose industries does not differentiate the relationship between their location strategies and the environmental practices of host markets. Regarding the sensitivity of different sectors of activity to the environmental performance of host locations, in columns 3 and 4 the negative relationship between the location of Chinese greenfield investment and the environmental performance of host economies characterises the case of firms operating in more polluting sectors, consistent with H5a. Furthermore, this effect emerges as relevant for both components of the EPI, that is EH and EV. This implies that Chinese greenfield investments in more polluting sectors are attracted to locations with both weaker environmental health and ecosystem vitality. These tend to be locations characterised by both threats to public health deriving from human activities as well as an unsustainable use of natural resources. Therefore, the degree of sensitivity of different manufacturing sectors to environmental practices constitutes a very relevant contingency that influences the location strategies of Chinese MNEs.

With respect to ownership (columns 3 and 4), in line with H6a, the results indicate that countries' poor environmental performance in terms of EV is connected to the strategies of private MNEs only ($\beta = -0.32$; $p = 0.00$), reflecting the fact that these companies may be more concerned with the costs of production related to environmental standards, thus privileging locations where these costs are lower or absent. Interestingly, the different nature of the institutional preference of private companies and SOEs shows that the former pick locations with poor rule of law while the latter are associated with more politically unstable countries. In other words, while Chinese private MNEs may have an advantage in operating in contexts where rules and regulations are weakly enforced, Chinese SOEs may be oriented towards less stable countries for political reasons (Li et al., 2018).

Table 8
Subsidiaries' heterogeneity.

Dep. var.: Chinese greenfield FDI	(1) High capital intensity	(2) Low capital intensity	(3) High CO_2 emissions	(4) Low CO_2 emissions	(5) State-owned enterprises	(6) Private companies
Environmental health$_{t-4}$	0.12	−0.09	−0.14**	−0.10	−0.45	−0.32
	(0.12)	(0.11)	(0.03)	(0.12)	(0.44)	(0.24)
Ecosystem vitality $_{t-4}$	−0.12***	−0.11***	−0.19***	−0.09	−0.98	−0.32***
	(0.03)	(0.03)	(0.06)	(0.07)	(1.02)	(0.11)
ln GDP $_{t-1}$	1.88**	1.47**	1.27**	1.47*	3.34**	2.23**
	(0.91)	(0.69)	(0.62)	(0.72)	(1.61)	(1.01)
ln GDP per capita $_{t-1}$	2.34	1.92	0.87	1.32	1.65	2.21
	(2.12)	(1.57)	(1.11)	(1.41)	(1.23)	(1.99)
Rule of law	−0.31***	−0.23**	−0.55**	−0.12**	0.67	−0.19***
	(0.10)	(0.11)	(0.27)	(0.06)	(0.70)	(0.06)
Political stability	0.09*	−0.12	0.10	−0.34	−0.05**	0.01
	(0.5)	(0.13)	(0.13)	(0.29)	(0.02)	(0.01)
Industry employment	0.98	1.23	1.45	0.63	−2.52	0.09*
	(1.15)	(1.56)	(1.66)	(0.59)	(2.04)	(0.05)
Unemployment rate	−0.32	−0.24	−0.06	−0.21**	−0.39	−0.08**
	(0.29)	(0.28)	(0.09)	(0.10)	(0.54)	(0.04)
Education	0.70	0.23**	0.97	0.56	−0.87	0.91**
	(0.82)	(0.11)	(0.91)	(0.68)	(1.10)	(0.46)
Patents	0.98**	0.52	0.56	0.75*	0.67	0.89
	(0.44)	(0.45)	(0.49)	(0.40)	(0.58)	(0.76)
ln Urban population	−3.01	−2.65	−2.22	−0.99	−3.89	−3.21
	(2.89)	(2.32)	(2.30)	(1.06)	(5.01)	(2.92)
Taxation	0.90	−0.42**	−0.04	−0.02	−0.66	−0.87**
	(0.91)	(0.20)	(0.03)	(0.03)	(0.92)	(0.44)
Natural resource rents	−0.04	−0.04	−0.06	−0.07	−0.09	−0.12
	(0.03)	(0.03)	(0.08)	(0.07)	(0.20)	(0.14)
Observations	486	464	512	496	134	574
FE	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
log likelihood	−567.7	−541.2	−612.8	−602.5	−98.2	−587.5
Wald chi2	76.45	69.74	97.23	94.82	56.76	84.53

Notes: Standard errors in parentheses; significance levels.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

6. Concluding remarks

This paper has offered an investigation of the strategic location decisions of Chinese MNEs in response to the environmental performance of recipient economies. Understanding these dynamics is urgent not only in consideration of the exponential growth of the role of EMNEs in the world economy, but also given the potentially profound environmental implications of their international expansion in a time of strong affirmation of the UN SDGs. The alignment of EMNEs' strategies and practices to SDG ambitions appears as a critical dimension of the relationship between international business activity, managerial ethics, and the geography of development (Lema et al., 2020; Van Tulder et al., 2021). This paper, therefore, focuses on the fundamental issue connected to the broader debate about whether and to what extent corporate strategies and the attainment of the SDGs can be interrelated.

From the theoretical standpoint, we offer a conceptual framework where the relationship between the international location decisions of Chinese MNEs and the environmental performance of countries integrates traditional race-to-the-bottom arguments with the need to signal positive corporate citizenship to different local and global stakeholders in order to acquire legitimacy (Gardberg and Fombrun, 2006). Furthermore, we consider different sources of host country and MNE heterogeneity, consistent with the idea that a number of crucial conditions can filter firms' strategies. Our empirical analysis unveils a nuanced set of results. Firstly, we highlight a persistent negative link between the location behaviour of Chinese MNEs and the environmental performance of host countries, in line with the view that EMNEs may sustain a race-to-the-bottom by privileging locations with looser green practices. Secondly, this relationship mostly pertains to lower EV in recipient countries, rather than their EH, indicating that a weakly sustainable use of local natural resources and the subsequent erosion of the quality of the natural ecosystems is one of the factors behind Chinese firms' location patterns. Thirdly, consistent with our conceptual framework, the level of economic development of recipient economies represents a key driver of OFDI, as the attracting force of a degraded environmental situation holds for developing economies only. Furthermore, weak green practices drive the strategies of Chinese MNEs exclusively in locations where local institutions are more fragile, suggesting that these companies positively respond to environmental laxity in economic systems where there is low monitoring or it is relatively easier to circumvent regulations. Also, the environmental race-to-the-bottom characterises private firms rather than SOE, as well as MNEs operating in more polluting sectors. Contrarily to our expectations, instead, subsidiaries operating in more or less footloose industries exhibit similar location patterns when it comes to the environmental performance of host economies. Importantly, our results are very stable and robust due to the inclusion of a wide number of co-variates and several endogeneity checks, thus reassuring us on the appropriateness of the empirical setting.

Nonetheless, our analysis is not immune from limitations. First, we only focus on the case of Chinese MNEs, so whether and to what extent other emerging or advanced countries' MNEs follow similar strategies remain to be ascertained. It is possible that other EMNEs may adopt locational configurations in line with our findings, given that they share some characteristics and liabilities with Chinese MNEs, as discussed in our Conceptual section. However, from the empirical point of view this remains an open area of inquiry. Second, in our analysis we only consider new greenfield investment because they provide a picture of the initial location strategies of MNEs. Nonetheless, other modes of entry, such as joint-ventures or M&A, may be considered in future research to understand whether the role of host environmental performance changes across different typologies of cross-border engagement of MNEs. Last but not least, it is possible that we are underestimating the number of Chinese greenfield investment as some Chinese companies are not formally controlled by a Chinese parent firm (Sutherland et al., 2019). This is a typical strategy of many Chinese corporations to circumvent domestic restrictions and raise capital (Buckley et al., 2015). This can especially be the case of private MNEs, including manufacturers (Nine Dragons Paper, Mindrary Medical International, Shenzhou International, BYD Electronics, to mention a few) which are incorporated offshore (Ning and Sutherland, 2012).

In general, our results are consistent with the extant general evidence that the implementation and execution of SDG-related business practices remain marginal and fragile around the world (WBCSD &amp and DNV-GL, 2018; UN Global Compact, 2020). From the point of view of business and managerial ethics, our findings suggest that the international strategies of Chinese MNEs may be subject to a degree of ethical pluralism connected to the characteristics of the host locations. From a policy perspective, these results specifically suggest that the wider international spread of FDI from emerging economies – and possibly of FDI more generally – may represent a threat in terms of environmental sustainability through a race-to-the-bottom between countries. To avoid this downward spiral in a key area of the SDGs, it is paramount that national governments and international organizations coordinate internationally to set clear and stringent environmental objectives, with associated monitoring and sanctions, for both domestic and foreign companies. This should be aimed at (i) improving the national environmental performance, (ii) promoting environmental protection as a societal value, and (iii) restraining an environmentally detrimental territorial competition to attract FDI.

The current global division of labour requires public intervention of various kinds at various levels of governance, and internationally coordinated in its regulatory framework, monitoring due diligence, and sanctioning behaviours associated to serious negative externalities. It also entails corporate executives to be accountable at the global, national, and local levels, as CSR alone cannot be a substitute for harmonized public policies generating standards “to which all societies can be held” at the global and local community level (Husted and Allen, 2006). Once developed, such standards will push firms to strengthen their legitimacy building processes across space (Fiaschi et al., 2017; Wettstein et al., 2019). A renewed and reinforced multilateral arena of global discussion and policy-making should also be promoted to allow the governments of developing nations and/or countries afflicted by institutional deficiencies not to face these challenges in isolation. Last but not least, future research should inspect how corporate ethical pluralism across space arises as a result of both stakeholder expectations in different locations and individual firm objectives in terms of profit-seeking behaviour. In this sense, a fundamental step can be to analyse the ethical implications of corporate behaviour at different stages of global value chains, by considering whether and to what extent offshoring specific business functions entail individual firm advantages at the cost of collective negative externalities in host locations.

Declaration of competing interest

None.

Data availability

The authors do not have permission to share data.

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Appendix A

Table A
Variables description.

Variable	Description	Source
Dependent variable		
Chinese greenfield investment	Number of greenfield investment by Chinese MNEs	Bureau van Dijk Orbis Crossborder Investment
Independent variables		
EPI	0–100 Index	Columbia University
Environmental health	0–100 Index	Columbia University
Ecosystem vitality	0–100 Index	Columbia University
ln GDP	Log of Gross Domestic Product	World Development Indicators
ln GDP per capita	Log of GDP on population	World Development Indicators
Rule of Law	0–100 Index	World Governance Indicators
Political stability	0–100 Index	World Governance Indicators
Industry employment	% of employment in industry	World Development Indicators
Unemployment rate	Unemployment rate	World Development Indicators
Education	Compulsory years of schooling	World Development Indicators
Patents	Number of patents by residents	World Development Indicators
ln Urban population	Log of urban population	World Development Indicators
Taxation	Taxes on income (% of revenue)	World Development Indicators
Nat. resource rent	Total resource rent, % GDP	World Development Indicators
Instruments		
Agriculture capital-labour ratio	Ratio of Agricultural machinery (n of tractors) and Agricultural land (sq. km)	World Development Indicators
Agriculture land-labour ratio	Ratio of Agricultural employment and Agricultural land (sq. km)	International Labour Organization and World Development Indicators
Additional controls		
Ln Tot. labour force	Log of total labour force	World Development Indicators
Ln Land area	Log of agricultural land (sq. km)	World Development Indicators
Ln Fixed capital	Log of gross fixed capital formation	World Development Indicators

Table B
Summary statistics and correlation coefficients.

Variables	Mean	Std. dev.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) EH $_{t-4}$	79.04	14.46	27.91	98.79	1												
(2) EV $_{t-4}$	72.51	13.23	24.48	90.28	0.57	1											
(3) ln GDP $_{t-1}$	26.09	1.92	20.28	30.44	0.31	0.45	1										
(4) ln GDP per capita $_{t-1}$	8.65	1.41	5.72	12.03	0.25	0.36	0.23	1									
(4) Rule of law	65.14	26.96	7.69	100	0.67	0.66	0.37	0.43	1								
(5) Political stability	54.6	28.47	2.84	100	0.59	0.53	0.1	0.21	0.79	1							
(6) Industry employment	3.07	0.33	1.72	3.83	0.4	0.32	0.26	0.33	0.29	0.21	1						
(8) Unemployment rate	7.68	5.44	0.16	31.38	0.25	0.12	−0.07	−0.21	0.11	0	0.27	1					
(9) Education	9.58	2.09	5	16	0.7	0.67	0.31	0.29	0.64	0.6	0.34	0.19	1				
(10) Patents	22,741	144,008	0	2,207,100	0.34	0.44	0.56	0.63	0.23	0.34	0.21	−0.11	0.57	1			

(*continued on next page*)

Table B (*continued*)

Variables	Mean	Std. dev.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(11) ln Urban population	16.23	1.66	10.51	19.83	−0.12	0.06	0.73	0.65	−0.15	−0.37	0.1	−0.13	−0.10	0.53	1		
(12) Taxation	3.15	0.57	0.32	4.2	0.09	0.05	0.32	0.45	0.32	0.16	−0.18	−0.11	0.02	0.02	0.23	1	
(13) Natural resource rent	4.64	7.54	0	57.37	−0.38	−0.43	−0.34	−0.05	−0.49	−0.30	−0.34	−0.18	−0.39	0.09	−0.05	−0.09	1

Table C
Baseline estimates on sample with a one-year lag in the EPI, EH and EV.

Dep. var.: Chinese greenfield FDI	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EPI $_{t-1}$	−0.09								−0.11**
	(0.06)								(0.05)
Environmental health $_{t-1}$		0.13	−0.17	−0.19*	−0.19	−0.16	−0.19	−0.18	
		(0.10)	(0.11)	(0.10)	(0.13)	(0.12)	(0.11)	(0.12)	
Ecosystem vitality $_{t-1}$		−0.33***	−0.31***	−0.29***	−0.25***	−0.23**	−0.21**	−0.21**	
		(0.12)	(0.11)	(0.11)	(0.09)	(0.11)	(0.10)	(0.10)	
ln GDP $_{t-1}$			2.03	2.44*	3.41**	2.11**	2.98*	3.02*	3.13*
			(1.42)	(1.44)	(1.72)	(1.02)	(1.59)	(1.62)	(1.63)
ln GDP per capita $_{t-1}$			0.32	0.89	0.22	0.45	−0.12	−0.22	−0.27
			(0.66)	(1.24)	(0.47)	(0.49)	(0.39)	(0.58)	(0.67)
Rule of law				−1.87**	−1.89*	−1.98*	−2.29**	−2.35**	−2.38**
				(0.93)	(1.04)	(1.15)	(1.16)	(1.18)	(1.21)
Political stability				0.99	0.93	0.87	0.86	0.76	0.71
				(0.67)	(0.62)	(0.60)	(0.60)	(0.57)	(0.54)
Industry employment					0.09*	0.09	0.08	0.08	0.08
					(0.05)	(0.06)	(0.06)	(0.06)	(0.06)
Unemployment rate					−0.12***	−0.13***	−0.13**	−0.13**	−0.12**
					(0.04)	(0.05)	(0.05)	(0.05)	(0.06)
Education					0.87*	0.86*	0.75	0.72	0.70
					(0.52)	(0.50)	(0.50)	(0.48)	(0.47)
Patents						1.17	1.24	1.31	1.30
						(0.74)	(0.82)	(0.88)	(0.88)
ln urban population						−6.21	−5.56	−5.44	−5.11
						(4.78)	(4.39)	(4.21)	(4.10)
Taxation							−0.13*	−0.10	−0.09
							(0.07)	(0.07)	(0.06)
Natural resource rents								0.02	0.02
								(0.03)	(0.03)
Observations	328	328	328	328	328	328	328	328	328
Number of countries	82	82	82	82	82	82	82	82	82
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
log likelihood	−591.22	−589.29	−585.75	−582.89	−580.46	−578.54	−577.36	−576.95	−576.71
Wald chi2	95.45	98.23	99.66	101.98	104.38	105.81	107.11	107.35	107.67

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