EXTENDED ABSTRACT

Title: Impact of Environmental Regulation on Cross-Border M&A for high and low pollutant sectors

Authors and e-mail of all:
Federico Carril-Caccia (University of Granada) federicocarril@gmail.com
Juliette Milgram Baleix (University of Granada) JMILGRAM@UGR.ES

Department:
Economía internacional y de España
Teoría e Historia económica
University: Granada

Subject area: *(please, indicate the subject area which corresponds to the paper)*
Localización de las actividades económicas.

Abstract: *(minimum1500 words)*

This study contributes to the literature seeking to test the pollution haven's hypothesis (PHH), by focusing on the influence of environmental policy on the location's decision of cross-border Mergers and Acquisitions (M&As). To this end, we build an original database for M&As for 34 host countries, 100 source countries, 54 sectors during the period 1995-2015. An important contribution of the study is to implement a structural gravity approach that accounts for omitted bias, border effects and simultaneity bias. This is the first study applying this method to bilateral FDI at the sector level. Our aim is to test whether laxer environmental regulation may favour inward M&As in general or in more polluting sectors in particular. Our preliminary results confirm that more stringent environmental policies make countries less attractive to foreign investors planning to invest through M&As. This especially the case, as expected, when sectors of destination contaminate more than the average as measured by greenhouse gases emissions per employee. Finally, the effect of more stringent environmental policy does not significantly affect the amount invested (intensive margin).

Keywords: *(maximum 6 words)* Environmental stringency, pollution havens, M&As, structural gravity, pollutant sectors.
JEL codes: F23 Q5

1. Introduction

One of the most challenging Sustainable Development Goals adopted by all UN Member States in 2015 is to diminish emission of carbon dioxide substantially. To encourage these changes, a more stringent regulation appears indispensable (but not sufficient). In this regard, one heavily debated issue concerns whether this shift toward "green" policies would provoke a relocation of activity in countries with laxer regulation of the most polluting firms, a phenomenon known among academics as the pollution haven hypothesis (PHH).

Many researchers have intended to check if such fear was supported by evidence. Results are far from unanimous, but tend to conclude that environmental measures usually do not increase sufficiently the costs to provoke *per se* massive relocations. The choice of locations would imply a trade-off between the advantages and disadvantages displayed by the distinct locations, compared with the firm's home country. Obviously, investors would take into consideration a wide range of factors such as the quality of institutions, market access, availability of capital and skilled labour, infrastructure and regulations, including environmental measures. Furthermore, more stringent environmental policies may even attract some Multinationals (MNEs) if the location offers also a transparent and secured environment for doing business, or if "being green" is part of their strategy. In particular, countries with extremely lax environmental policies (usually developing countries) have not been all successful at attracting FDI, while countries with more stringent policies (developed and emerging countries) are those that attract more FDI worldwide.

Previous research on the PHH has mostly focused on FDI flows regardless the mode of entry. The present article contributes to the literature by considering the case of cross-border M&As which represent 70% of total inward and outward FDI capital flows in developed countries. (Carril-Caccia and Pavlova, 2018). The case of M&A has been overlooked in the FDI-Environment literature. The exceptions are the studies of Leon-Gonzalez and Tole (2015) on M&A in the mining industry and Bialek and Weichenrieder (2015) on German M&A and greenfield investments but they do not account for multiple home and host and hence, reduce the possibility to explore the variations of regulations among countries. Carril-Caccia and Milgram (2020) overcome these limitations by relying on a bilateral dataset with a wide sample of countries. Carril-Caccia and Milgram (2020) is a first step in accounting for heterogeneity among countries. However, the same environmental measures may not have the same effect on all industries and on all MNE. There is obviously a huge heterogeneity among industries and firms.

This study examines if M&A across nations and in different sectors are influenced by environmental stringency. To this end, we estimate a structural gravity model using an original bilateral database for M&As originating from 100 countries and flying into 34 destination's countries, during the period 1995-2015. An additional originality of our dataset is to disentangle projects by sectors of origin of the investors and sectors of destination of the acquired firms. We test whether countries with laxer environmental regulation attract more cross-border M&As and with larger amounts. We additionally test if the effects differ among sectors depending on their pollution level.

We tend to confirm the PHH: adopting "green" policies could be less attractive in the eye of potential foreign acquirers of local firms. In other words, laxer environmental regulation attract more cross-border M&As. This is especially the case, as expected, in

the most pollutant sectors of destination. Finally, the effect of more stringent environmental policy does not significantly affect the amount invested (intensive margin).
The following section provides a brief literature review on the FDI-environment relationship. Section 3 explains the empirical strategy and section 4 discusses the results. Finally, the article ends with some concluding remarks.

2. Literature review

According to the PHH, in response to a shift toward more stringent environmental policy and, in order to maximise profits, firms would be pulled to relocate in countries with looser environmental regulation. Hence, countries with lax environmental regulations would acquire comparative advantage, in particular in polluting industries (Pearson, 1987; Baumol and Oates, 1988). Accordingly, weak environmental regulations could enhance incoming FDI.
The first generation of studies that intended to test the PHH, failed to find conclusive results (see Cole et al 2017) due to several limitations. Indeed, most of these studies were conducted on country or industry basis with aggregated FDI. Focusing on a specific host country obviates the alternative locations, while separating industries according to their pollution intensity can lead to biased results due to other industry specific trends.
This lack of robust evidence gave rise to a new generation of empirical models intending to overpass the methodological challenges that make difficult to capture the effect of environmental measures on FDI, while other authors have drawn the attention to other mechanisms that could counteract the rationale underlying the PHH. In particular, some authors have challenged the idea that investors would consider stringent environmental regulation as harmful. In contrast, they argue that some MNEs may consider environmental strictness as beneficial. Tougher policies regarding environment may induce several greening transfers both of environment-friendly technology (Gallagher and Zarsky, 2007) and management practices (Poelhekke and van der Ploeg, 2015; Jin et al., 2019). Hence, MNE could upgrade local environmental standards contributing to a positive "pollution halo" effect[1]. Zugravu-Soilita (2017) advocates that the overall result may depend on the capital or skilled level abundance of countries along with the stringency of the environmental policy. Given the growing demand for environmentally friendly products and services, firms may also be interested in being the first in accessing environmentally sensitive consumers, located in markets with stricter environmental regulations in order to obtain price premiums, hence leading to a "win-win" situation (Rivera and Oh, 2013). Moreover, several theoretical models have considered an endogenous market structure where foreign firms benefit from a better technology than domestic firms (Dijkstra et al., 2011) or from a first-mover advantage (Elliott and Zhou, 2013) leading to a situation in which a more stringent policy confers advantage to foreign firms. All in all, whether the pollution haven effect or the pollution halo effect dominates remains an empirical question with discrepant answers.
Another important flaw of the PHH is the one related with other important determinants of FDI that, if omitted could lead to a spurious relationship between FDI and environmental stringency. One noticeable determinant of FDI highlighted by economic

[1] Cheng et al. (2018) cite several works that confirm that management and innovation compensation effects could offset compliance costs.

geographic model is market size for horizontal FDI and transport costs for re-exporting FDI. In this line, Sanna-Randaccio and Sestini (2012) extend Markusen et al. (1993)'s model to take into account changes in environmental policy. The authors conclude that firms would relocate only if the regulation's gap is large enough to offset re-exporting costs to the market of origin. Tang (2015) predicts that export-orientated FDI is more sensitive to stricter environmental regulations than local-market orientated FDI. For the case of European firms, Candau and Dienesch (2017) show that a better access to a large market of origin from the host country may outset the cost of tougher environmental regulation for export platform FDI.

The literature also emphasised the role of institutions in attracting FDI. In particular, corruption can be a mechanism that promotes lax environmental standards (Fredriksson et al., 2003 and Javorcik and Wei, 2003)[2]. Then, these authors suggest that not accounting for the link between institutional quality and environmental regulation could explain why previous literature failed to find empirical support for the pollution haven hypothesis. Candau and Dienesch (2017) present a theoretical model and empirical evidence for the case of European MNEs investment decisions that supports the pollution haven hypothesis for those countries which have intermediates levels of corruption, while it does not apply for those countries with the lowest or highest levels of corruption. Similarly, but more generally, Contractor et al. (2020) demonstrate that MNEs take into account different aspects of regulations and governance all together when choosing where to invest. MNEs are willing to trade-off less efficient entry and exit regulations in exchange for stronger contract enforcement. Following this approach, this study investigates whether MNEs are willing to accept stricter environmental regulation in exchange of better environment for business.

Another concern in order to accurately assess the impact of environmental regulations on FDI is the possibility of a reverse causality that might arise if governments relax the stringency in order to attract pollutant firms, or if the increase in FDI gives foreign investors sufficient power to negotiate pollution levies with local authorities. Instead, some authors found contrary evidence. Cheng et al. (2018) emphasise that FDI inflows have increased both the number and severity of local environmental regulations. Brucal et al. (2019) conclude that FDI increases the overall energy usage due to expansion of output while it decreases the plant's energy intensity. All in all, such effects (pressures to lessen the measures or increase stringency in response to growing FDI) are exerted once the MNE is operating in the country, what would reduce the case for a two-way causality in location's choice models.

Almost all the previously mentioned studies focus on FDI, regardless the entry mode. To the best of the authors' knowledge, there are only two exceptions. Leon-Gonzalez and Tole (2015) that study M&As in the mining industry, at the world level between 1994 and 2006 and find no evidence of pollution havens in this industry. If anything, buyers from countries with high levels of environmental stringency are more likely to invest and make larger investments in countries with similar requirements' level. Bialek and Weichenrieder (2015) gain robust support for PHH for greenfields invetsments from Germany in polluting industries. In turn, M&A investments in low polluting industries seem to be attracted by stricter environmental regulation, this could be explained by competitiveness effects associated with grandfathering[3] as well as the

[2] Likewise, Rivera and Oh (2013) and Javorcik and Wei, (2003) also show that democratic level moderates the relationship between environmental stringency and FDI.

[3] They argue that greenfield projects usually need to obey all the latest environmental requirements whereas M&As involve local firms that usually, due to grandfathering policies, remain unaffected by the latest rules and need to adhere to the older regulations only. Moreover, in the case of an M&A project,

"green image" that German firms are trying to keep. Even if the specific contexts of their analysis do not allow to generalise their results, these two studies tend to refute the PHH hypothesis for M&As.

3. Empirical strategy

3.1. Empirical model

The present work relies on the structural gravity model to address the PHH for the case of cross-border M&As. Head and Ries (2008) have provided a theoretical background for using the gravity equation for analysing the drivers of M&As, and this empirical strategy has been widely followed by the previous literature (e.g. di Giovanni, 2005; Garrett, 2016; Hyun and Kim, 2010).

The basic intuition of the gravity model is that M&As are positively moderated by countries economic mass, and negatively by their bilateral costs (e.g. transport or language differences). In addition, outward M&As depend on firms (and countries) relative capacity of investing abroad, and inward M&As depend on firms (or countries) relative capacity of attracting them. If the PHH holds, stricter environmental regulation should limit countries relative capacity of attracting cross-border M&As. In other words, a country's firms should become less prone to be target of a foreign M&As. To model this, using a Poisson Pseudo-Maximum Likelihood estimator[4], we estimate the following equation with domestic investment:

$$MA_{iojdt} = \exp\left(\alpha Environment_{jt} x Int_{ij} + \beta X_{ijt} + \lambda_{iojd} + \lambda_{iot} + \lambda_{jdt} + Int_{ijp}\right) x\, \varepsilon_{iojdt} \quad (1)$$

where MA_{iojdt} is the number of M&As projects from country i originating from sector o to country j in sector d in year t. $Environment_{jt}$ refers to host countries' environmental policy. The index $Environment_{jt}$ is interacted with a dummy (Int_{ij}) that takes one whenever the investment is international and zero if investment is domestic (i.e. when i=j). As demonstrated by Heid et al. (2021), this strategy enables to estimate the effect of country-specific variables, such as environmental policy, at the same time that we fully control for the multilateral resistance term[5]. Also, Beverelli et al. (2018) points that this empirical strategy serves for limiting the potential endogeneity that might arise between M&As and countries' environmental policy. Assuming that domestic and foreign firms can influence environmental policy, interacting the potentially endogeneous variable by a strictly exogeneous variable (Int_{ij}), turns the new variable into a diff-in-diff that limits the potential endogeneity issue (Nizalova and Murtazashvili, 2016). Accordingly, the estimated coefficient of $Environment_{jt}$ (α) gauges the impact that environmental policy has on foreing M&As relative to domestic ones. A negative sign for α would support the PHH and would indicate that environmental regulation increases the border effect on M&As (Anderson et al., 2018).

---

the acquisition price may already be a function of the regulation faced by the company as the purchaser of the existing plant is only willing to pay the present discounted value of future profits.

[4] The Poisson Pseudo-Maximum Likelihood estimator overcomes the heteroskedasticity issues from OLS's estimates and include in the analysis the zeros usually present in bilateral FDI databases (Santos-Silva and Tenreyro, 2006).

[5] Indeed, without this interaction the time-varying country-specific variable is collinear with the destination-sector-year fixed effects (λ_{jdt}).

That is to say, that environmental regulation increases the propensity of investing domestically more than internationally.[6]

X_{ijt} refers to different bilateral time-variant determinants of M&As such as regional trade agreements, bilateral investment treaties and common currency. Bilateral investment treaties are expected to promote bilateral FDI between signing parties and to reduce expropriation risks (e.g. Bergstrand and Egger, 2013). Signing a bilateral trade agreement can incentivize vertical, export platform and export supporting FDI (e.g. Ekholm et al., 2007; Hanson et al., 2005; Krautheim, 2013). Nonetheless, in the context of horizontal FDI type, bilateral trade liberalization is expected to have a negative impact on FDI, since trade and FDI substitute each other as alternative strategies to serve a foreign market (e.g. Antras and Yeaple, 2014; Jang, 2011; Horstmann and Markusen, 1987). Sharing a common currency may also promote bilateral FDI as it reduces transaction costs, but the opposite effect can also occur as sharing a currency may foster bilateral trade that makes less likely the substitution of trade by FDI (De Sousa and Lochard, 2011; Garrett, 2016; Shiavo, 2007).

Then, the model incorporates a wide range of fixed effects that control for different drivers of M&As. First, λ_{iojd} are fixed effects for any quadruple of country of origin, sector of origin, country of destination, sector of destination. These fixed effects account for the bilateral time-invariant determinants of FDI, such as geographic distance or common language that have been traditionally accounted for in the literature (e.g. di Giovanni, 2005; Head and Ries, 2008). Also, they control for the border effect (i.e. the extent to which domestic investment is larger than foreign one). Furthermore, the bilateral and sector perspective of these fixed effects partially control for the nature of the M&As transactions, that is to say, whether these investments are horizontal, vertical or conglomerate.[7] More generally, these fixed effects control for time-invariant productive links across different sectors among different countries. In addition, these fixed effects serve for overcoming the potential endogeneity issues present between our dependent variable and the X_{ijt} variables (Baier and Bergstrand, 2009; Bergstrand and Egger, 2013; De Sousa and Lochard, 2011).

Second, λ_{iot} (respectively λ_{jdt}) are fixed effects for any triple of country of origin, sector of origin and years (respectively for any triple of country of destination, sector of destination and years). They both control for the multilateral resistance term at the sectoral level, that is to say the relative capacity of investing abroad or the relative capacity of attracting M&As for firms from one sector and one country (Head and Ries, 2008). In addition, these fixed effects control for all country-sector time varying drivers of M&As, such as economic size or specific country and sector regulation.[8]

Third, Int_{ijp} is a set of indicators variables that turn one when investment are international (i≠j) in a given period of time (p). The periods are defined in 5 years intervals. The associated coefficients of these dummies quantify the change of the border effect during a given period relative to the base year (1995). Thus, this set of

[6] Based on the previous M&As literature, in the present work we assume that the border effect on M&As is positive. For instance, Carril-Caccia et al. (2022) show that within countries the number and value of M&As are five times larger than between countries.

[7] Correctly identifying the type of M&As is challenging in terms of data requirements. One would require more disaggregated sectoral data that the one available for the present analysis as well as data on firms' sales and purchases of goods and services (Ahn and Park, 2022). This is a potential source of omitted variable bias that we seek to minimize with fixed effects.

[8] Notice that these fixed effects control for a wide number of determinants of FDI that have been previously present in the literature (e.g. di Giovanni, 2005; Garrett, 2016; Hyun and Kim, 2010). For instance, GDP, institutional quality, taxes or exchange rate.

fixed effects control for the evolution of the border effect. Broadly speaking, these fixed effects control for the evolution of globalization (Bergstrand et al., 2015), the increasing or decreasing cost (or capacity) of investing abroad relative to investing domestically. Some works present evidence of a decreasing border effect on international trade (e.g. Anderson et al., 2018; Bergstrand et al., 2015). However, for the specific case of M&As, Carril-Caccia et al. (2022) find that border effect remains unchanged for a sample of 30 countries during the period 1995-2015.

Finally, ε_{iojdt} is the disturbance term. We cluster standard errors at the country of origin-sector-country destination-sector level. We use the PPML high-dimensional fixed effects estimator from Correia et al. (2020).

Equation 1 is our preferred specification. We modify the model in several ways. We estimate a model identical to the one specified in equation 1 but with only country-level data (we eliminate the sectoral perspective). Moreover, we interact our environmental policy index with two different dummies: one that takes one when the sector of investment is classified as intermediate in terms of pollution intensity (INTERMED), and another that takes one when the sector of investment is classified as high in terms of pollution intensity (HIGH). In addition, we replace λ_{iot} fixed effects by λ_{iodt} (fixed effects for any quadruple of country of origin, sector of origin, sector of destination and year). As in Bailey et al. (2021) we use these fixed effects to control for the propensity that a firm from country i in sector o has on investing in sector d. Furthermore, to further alleviate the potential endogeneity issues between M&As and countries' environmental policy, we lag our variable of interest in three periods ($t-3$).

3.2. Data overview

The M&As data are retrieved from Eikon Thomson Reuters, a database that covers domestic and international investments during the period 1995-2015. Due to data availability on environmental regulation and sectoral pollution, our analysis is limited to 34 host countries that receive investments from 100 source countries, and 54 sectors. A list of countries is available on the appendix, while a list of sectors is available in table 1. A common feature in M&As data, a large share of possible transactions display missing values and correspond with small transactions that are not fully publically disclosed. We replace these missing values by one million US dollars. Carril-Caccia et al. (2022) show that estimates related to the value of M&As are robust to this data imputation strategy.

Our M&As sectoral data follow the NACE rev. 2 classification. This merits some clarification regarding the construction of the database. Originally, Eikom Thomson Reuters provides its own sectoral classification; the TRBC sector classification identifies 841 different economic activities to which M&As may be directed. Although this is a significant level of granularity, it represents the limitation that the TRBC classification has, to the best of our knowledge, no direct conversion to other sectoral classification more commonly used by the literature or statistical offices (i.e. NACE rev. 2 or NAICS).

To overcome this caveat, we construct an equivalence between the TRBC sector classification and NACE rev. 2. First, we rely on the equivalence tables constructed by the European Commission (Hoepner, 2020; Slevin et al., 2020). This allows us to link 195 TRBC sectors to the NACE classification. The remaining sectors are matched based on name similarity between the TRBC and the NACE classification. When names are

not sufficiently informative, we look up for the firms involved in the M&As in ORBIS, and retrieve from the latter source the sector classification. Naturally, it is not always possible to match the TRBC economic activities classification to a four-digit sector; this has been possible only for 553 TRBC economic activities. Nevertheless, it was possible to match 97.7% of the TRBC economic activities to a NACE rev. 2 two digits classification. All in all, our database covers M&As that affect 85 different sectors according to the NACE rev. 2 at a level of two digits disaggregation.

Table 1: Sectors' classification and GHG per employee

High		Middle		Low	
Manufacture of coke and refined petroleum products	1531	Manufacture of textiles, wearing apparel and leather products	6.7	Manufacture of furniture; other manufacturing	3.6
Electricity, gas, steam and air conditioning supply	409.0	Manufacture of machinery and equipment n.e.c.	5.2	Legal and accounting activities; activities of head offices; management consultancy activities	2.5
Crop and animal production, hunting and related service activities	312.9	Manufacture of fabricated metal products, except machinery and equipment	4.9	Architectural and engineering activities; technical testing and analysis	2.3
Manufacture of basic metals	243.1	Manufacture of electrical equipment	4.5	Activities of membership organisations	2.2
Manufacture of other non-metallic mineral products	208.8	Repair of computers and personal and household goods	4.4	Wholesale and retail trade; repair of motor vehicles and motorcycles	2.1
Mining and quarrying	152.7	Manufacture of motor vehicles, trailers and semi-trailers	3.7	Accommodation and food service activities	2.1
Water supply; sewerage, waste management and remediation activities	132.5	Repair and installation of machinery and equipment	3.7	Telecommunications	2.0
Manufacture of chemicals and chemical products	129.3	Travel agency, tour operator reservation service and related activities	3.7	Motion picture, video, television programme production; programming and broadcasting activities	1.8
Fishing and aquaculture	126.9	Printing and reproduction of recorded media	3.5	Advertising and market research	1.8
Transportation and storage	74.8	Sports activities and amusement and recreation activities	3.3	Publishing activities	1.5
Manufacture of paper and paper products	45.4	Other personal service activities	3.3	Financial service activities, except insurance and pension funding	1.4
Forestry and logging	30.2	Manufacture of computer, electronic and optical products	3.1	Human health activities	1.4
Manufacture of food products, beverages and tobacco products	18.2	Public administration and defence; compulsory social security	2.8	Activities auxiliary to financial services and insurance activities	1.3
Rental and leasing activities	17.8	Other professional, scientific and technical activities; veterinary activities	2.7	Employment activities	1.2
Manufacture of basic pharmaceutical products and pharmaceutical preparations	8.8	Manufacture of other transport equipment	2.6	Residential care activities and social work activities without accommodation	1.0
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	8.2	Scientific research and development	2.5	Education	0.9
Manufacture of rubber and plastic products	7.2	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	2.2	Insurance, reinsurance and pension funding, except compulsory social security	0.9
Construction	7.2	Security and investigation, service and landscape, office administrative and support activities	1.6	Real estate activities	0.6

Note: own's calculations based on Eikom Thomson Reuters, OECD's Air Emissions Accounts database and the Structural Analysis Database (STAN)

For the present analysis, we aggregate our data to the 54 sectors (NACE rev. 2) presented in table 1. We do this in order to classify sectors into three levels of pollution[9]: High, Intermediate and Low. To this end, we combine the OECD's Air Emissions Accounts database and the Structural Analysis Database (STAN). We retrieve sectoral data on greenhouse gases emissions (GHG) in tonnes of C02-equivalent from the first, and the number of employees from the latter. For the year 2015[10], we calculate the GHG emissions per employee in each sector and country. This leaves us with a sample of 29 countries with information regarding GHG per employees at the sectoral level. Afterwards, we calculate each country's median GHG emissions per employee, and identify those sectors whose GHG emissions per employee are equal or above the median. We consider a sector to be highly pollutant if at least for 70% of the countries in the sample its GHG per employees are above the median. Then, the sectors classified as Middle are the ones that are above the national median for the 24% to 69% of the considered countries, while the remaining sectors are classified as Low.

Table 1 presents the list of sectors together with their classification and average GHG per employee. As it can be gathered, the proposed classification identifies those sectors with highest average as High pollutant. In the case of those sectors classified as Middle and Low, we find that some sectors that are classified as Low have a higher average than those that are classified as Middle. This is to be expected, since our identification strategy is based on the frequency (not on the average) for a sector to be above the median in each country.

In order to measure countries' environmental policy strigency, we use the index proposed by Botta and Koźluk (2014). This index has the advantage to be available since 1990 until 2015, a period in which there have been substantial changes in governments' environmental policy. Furthermore, this index has been widely used by the previous literature that address the implications of environmental policy (e.g. Garsous and Kozluk, 2017; Martínez-Zarzoso and Oueslati, 2018; Mavisakalyan and Tarverdi, 2019; Wang et al., 2019). For testing the PHH, EPS is considered as a more appropriate indicator than CO2 or SO2 emissions (used for example in Kahouli and Omri (2017) and Xing and Kolstad (2002)). Since the level of greenhouse gases emission is determined by economic activity, and thus is prone to be endogenous to FDI. In addition, if a positive relationship between FDI and countries' emissions were found, it wouldn't be clear whether this positive link is due to M&As being directed toward those countries which have laxer environmental regulation, or if its driven by MNEs seeking to benefit from agglomeration economies (Wagner and Timmins, 2009). Alternatively, some studies use pollution abatement costs; this is a more precise measure but unfortunately with a limited country and period coverage (see Cole et al 2017). An even more precise measure consists in studying the impact of a specific change in environmental regulations (Hanna, 2010; Nuñez-Rocahs and Martínez-Zarzoso, 2019) but these natural experiments are scarce, and would considerably limit the group of countries and period subject of study.

In addition, environmental regulation is less prone to be endogenous if we consider bilateral M&As instead of aggregate M&A. Indeed, it is little likely that M&As projects from a specific country-sector influence the environmental regulation of the host before investing[11]. In comparison with other measure, the main limitation of the EPS index

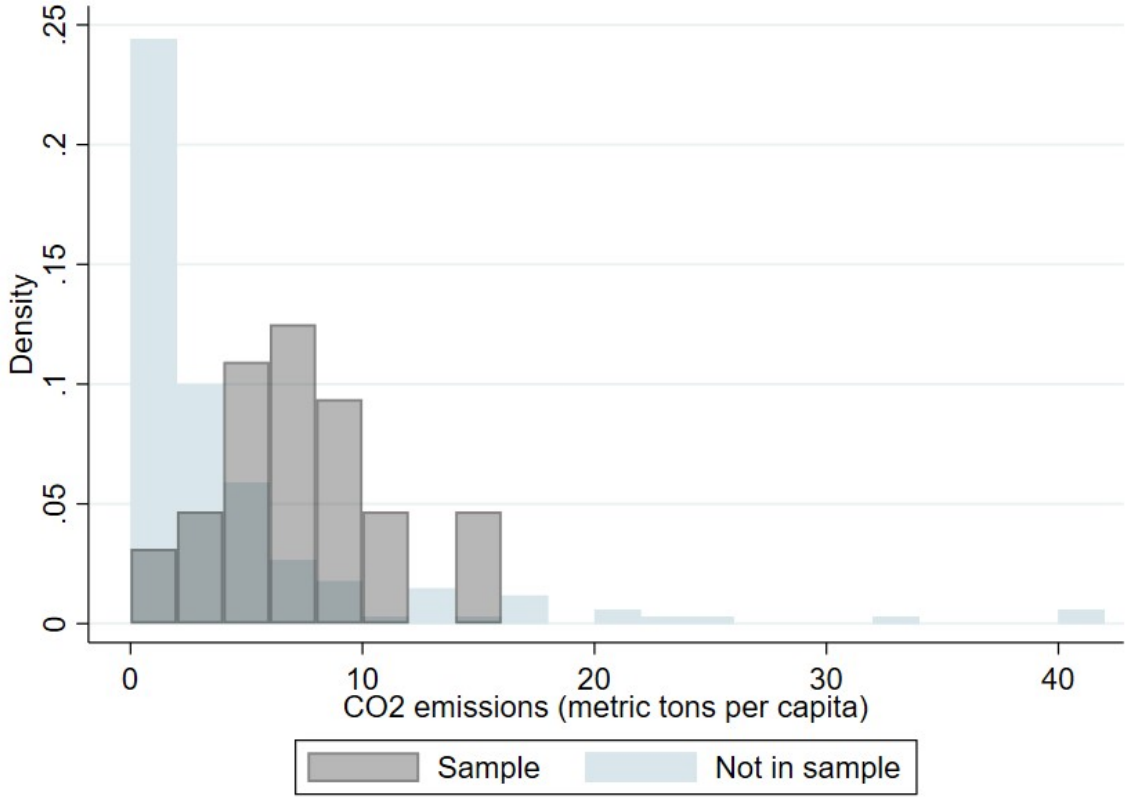
[9] Data availability on pollution at the sectoral level hampers our capacity of using a more disaggregated sectoral classification.

[10] We choose the year with highest data availability.

[11] However, environmental policy is not fully exogeneous to FDI (e.g. Dam and Scholtens, 2008). Our empirical strategy partially address this issue and we tackle the potential endogeneity bias in the robustness analysis.

proposed by Botta and Koźluk (2014) is that it only covers 34 countries[12]. Nevertheless, this is not a significant restriction for our analysis, since these 34 economies are the source and host of 90% of global cross-border M&As projects during the period 1995-2015. Moreover, as illustrated in Figure 2, our sample covers countries whose levels of pollution are relatively high in comparison with those which are not included in the analysis. Finally, this group of countries represents 81% of the global CO2 emissions[13].

Figure 1: Density of countries by level CO2 emissions per capita in2015



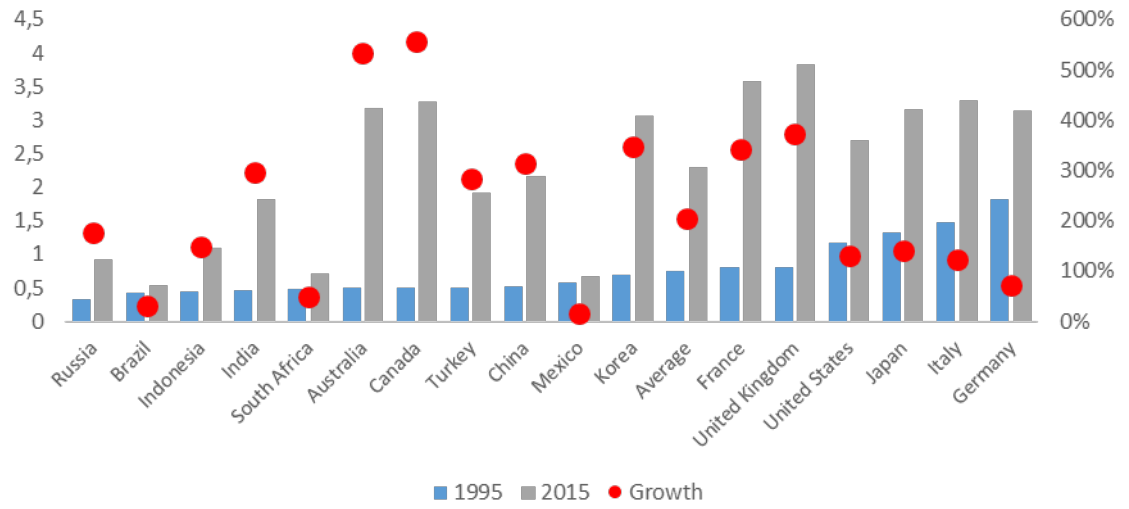
Note: Authors' own elaboration. Data for 202 countries in the year 2015. Retrieved from World Bank's Development Indicators.

Even when considering countries with similar levels of development, the levels of strictness of environmental regulation differ widely among them. **¡Error! No se encuentra el origen de la referencia.** depicts the levels of the Environmental Policy Stringency (EPS) for 17 countries. On average, the policies have become tougher but the disparities remain high, echoing the fact that not all the countries jump to the green policies at the same rhythm.

[12] For instance, the World Economic Forum survey on perceived environmental stringency by managers covers more than 140 countries, but it would limit our period of analysis to years 2008, 2009, 2011, 2013 and 2015.

[13] Calculations based on the CO2 emissions data from World Bank's Development indicator in year 2015 for 204 countries.

Figure 2 EPS 1995 and 2015 in OECD and non-OECD countries



Source: OECD's EPS index (Botta and Koźluk, 2014) Authors' own elaboration. We present only the countries for which the EPS was available in both 1995 and 2015.

4. Results

Results from our empirical analysis are presented in table 2 (without sectoral desegregation) and results of estimations at the sectoral levels are presented in tables 3 and 4. Overall, the goodness of fit if very good thanks to the wide range of fixed effects with very high R^2 , in particular on the intensive margin.

4.1. Results at the aggregated level

Results at the aggregated level (Table 2) shows that determinants of M&As are different on the extensive and on the intensive margins however countries with more stringent environmental regulation attract less M&As projects and projects with lower amounts.
Concerning the general determinants included in the model, they have different influence on the extensive and on the intensive margins. On the extensive margins, trade agreements exerts a positive and significant impact This results would match with *vertical, export platform and export supporting FDI. However,* Common currency has a negative effect suggesting that reducing costs associated with exchange rate makes less likely to start cross borders M&A in such a country what fit well with horizontal M&As where trade is substitute of FDI. Finally, investment treaties do not significantly influence M&As decisions. This could point out a significant failure of these agreements to reach their goals. However, this result is common in the literature since these treaties can vary a lot in nature and in contents. Finally, since our sample include OECD as a host countries, they may well have institutions they may have characteristics to attract investors wherever they are from that go beyond the usual coverage of investment treaties.
Results on the intensive margin are quite different. Neither trade agreement nor common currency significantly influence the amount invested. This can be explained by the fact that these variables have a more obvious influence on the decision to invest depending on the vertical or horizontal nature of M&As but the amount is more related with firm-specific strategies. Unexpectedly, the coefficient of Investment agreements is negative. More work is needed to explain this but may be related with the heterogeneity

of countries pairs signing these type of agreements such as agreements signed among countries with very few FDI transactions in order to encourage investments.
Turning to our variable of interest, the coefficient of the indicator of EPS in host countries is negative both on the extensive and on the intensive margins. Then, more stringent environmental policies tend to reduce the number of new M&As in the host compared to domestic M&As and to reduce the average amount invested. This would corroborate the PHH.
Table 2: The impact of EPS on cross-border M&As (no sectors)

	(1) Extensive	(2) Intensive
Environmental Policy Stringency Index (host)	-0.038*	-0.142*
	(0.020)	(0.078)
Investment agreement	0.019	-1.100**
	(0.087)	(0.472)
Trade agreement	0.195***	0.039
	(0.062)	(0.134)
Common currency	-0.138***	0.009
	(0.050)	(0.217)
Observations	30996	30996
Origin country x Year FE	X	X
Destination country x Year FE	X	X
Destination country x Origin country	X	X
International-year FE	X	X
Pseudo R2	0.975	0.963

4.1. Results by sectors

We then analyse results of the estimations that take into account the sector of origin and the sector of destination of M&As. Table 3 corresponds to specification 1 that includes a wide range of fixed effects and table 4 to specification 2 with a different set of fixed effects even more disentangled. In each table, columns (1) and (2) display results on the extensive margins and columns (3) and (4), results for the intensive margins. Results for bilateral investment agreements, trade agreements and common currency follow the same scheme as obtained at the aggregate level. In particular, the positive effect of trade agreements on the extensive margin appears clearly while the negative effect of common currency is no longer significant.
Our coefficient of interest is the one associated with the EPS index in the host countries. Columns 1 and 3 correspond to specifications without the interactions terms for high and middle polluting sectors and display the average effect among sectors of more stringent environmental policies in the host on the capacity to attract M&As. Columns 2 and 4 include the interacted terms to explore whether PHH apply more for more polluting sectors.
Results point out a negative, but not always significant, relationship between the capacity of attracting M&As and the degree of EPS in the host. At first sight, this result would confirm the second part of the PHH since a more stringent environmental regulation would reduce the incentives for new inward M&As project (column 1). However, it would have no effect on the amounts invested (column 3).
We turn to explore the heterogeneity among sectors. On the extensive margin (column 2), we observe a more significant and negative impact of EPS in high and middle

polluting sectors. A stringent environmental policy would reduce the capacity of country to attract M&A in the more polluting sectors. Surprisingly, the impact is larger in middle polluting sectors than in high.

On the opposite, results on the intensive margin (column 4) are at odds with the PHH. The coefficient is only significant for high polluting sector and is positive and larger than the average effect. At first sight, this is a counterintuitive result since it suggests that stringent environmental policy would increase the amount invested through cross border M&A in the high polluting sector. More work is needed to be able to clarify this point. One hypothesis is that change in environmental policies may force MNEs to adapt their technology and production especially in high polluting sectors and hence requires higher investments.

Table 3: The impact of EPS on cross-border M&As by sectors (Specification 1)

	(1) Extensive	(2) Extensive	(3) Intensive	(4) Intensive
Environmental Policy Stringency Index (host)	-0.036**	-0.010	-0.028	-0.107
	(0.017)	(0.019)	(0.088)	(0.097)
x High		-0.043**		0.149**
		(0.018)		(0.072)
x Middle		-0.055***		0.075
		(0.019)		(0.100)
Investment agreement	0.124	0.125	-0.627*	-0.639**
	(0.081)	(0.081)	(0.321)	(0.321)
Trade agreement	0.211***	0.210***	0.098	0.096
	(0.038)	(0.038)	(0.145)	(0.147)
Common currency	-0.071*	-0.070*	0.301	0.318*
	(0.039)	(0.039)	(0.184)	(0.184)
Observations	891819	891819	891819	891819
Origin country x Origin sector x Year FE	X	X	X	X
Destination country x Destination sector x Year FE	X	X	X	X
Destination country x Destination sector x Origin country x Origin sector FE	X	X	X	X
International-year FE	X	X	X	X
Pseudo R2	0.697	0.697	0.901	0.901

Note: PPML estimator. Robust standard error in parenthesis. * p<0.10, **p< 0.05, *** p<0.01

Table 4: The impact of EPS on cross-border M&As by sectors (Specification 2)

	(1) Extensive	(2) Extensive	(3) Intensive	(4) Intensive
Environmental Policy Stringency Index (host)	-0.043**	-0.022	0.014	-0.161
	(0.018)	(0.020)	(0.127)	(0.136)
x High		-0.033*		0.290***
		(0.019)		(0.107)
x Middle		-0.061***		0.152
		(0.021)		(0.136)
Investment agreement	0.049	0.049	-0.729	-0.751
	(0.093)	(0.093)	(0.517)	(0.514)
Trade agreement	0.252***	0.251***	-0.240	-0.224
	(0.043)	(0.043)	(0.218)	(0.234)
Common currency	-0.057	-0.057	0.449*	0.482*
	(0.043)	(0.043)	(0.253)	(0.251)
Observations	376810	376810	376810	376810
Origin country x Origin sector x Destination sector x Year FE	X	X	X	X
Destination country x Destination sector x Year FE	X	X	X	X
Destination country x Destination sector x Origin country x Origin sector	X	X	X	X
International-year FE	X	X	X	X
Pseudo R2	0.766	0.766	0.963	0.963

Note: PPML estimator. Robust standard error in parenthesis. * p<0.10, **p< 0.05, *** p<0.01

5. Conclusions

The present work is one of the few empirical tests of the PHH for a sample of 100 source countries, 34 host countries and 54 sectors for the period 1995-2015. Moreover, the present work contributes to the literature by focusing on the case of cross-border M&As, which is quite relevant considering that environmental policy can affect differently greenfield investment and M&As, and since most FDI flying from and to developed countries consist in M&As.

An important contribution of the study is to implement a structural gravity approach that accounts for omitted bias, border effects and simultaneity bias. Additionally, to the best of our knowledge this is the first study applying this method to bilateral FDI at the sector level. Thanks to a rich dataset of M&As disaggregated by country and sector of origin and of destination, we test the sensitivity of M&As to environmental stringency

We tend to confirm the PHH: adopting "green" policies could be less attractive in the eye of potential foreign acquirers of local firms. Our preliminary results confirm that more stringent environmental policies make countries less attractive to foreign investors planning to invest through M&As. This especially the case, as expected, when sectors of destination contaminate more than the average as measured by greenhouse gases emissions per employee. Finally, the effect of more stringent environmental policy does not significantly affect the amount invested (intensive margin).

This study is a first step in accounting for heterogeneity among sectors. This study could be extended in several directions. For instance, we could check if the difference in the levels of stringency between the host and the source countries have a more obvious effect than the level of EPS in the host. However, such an exercise would reduce the sample to 54 source countries for which the EPS is available. This is an important question since there is a fear that more stringent environmental measures could lead to massive relocation of polluting economic activity abroad. In this preliminary study, we measure stringency at the country level and assume that stringency of environmental policies are identical for all sectors. Considering sector specific measure is challenging due to the difficulty to find accurate country-sector measures for a wide sample of countries.

6. Appendix

Table A: Country sample

Argentina	Egypt	Liechtenstein	Saudi Arabia
Australia	Estonia	Lithuania	Serbia
Austria	**Finland**	Luxembourg	Seychelles
Bahamas	**France**	Macedonia	Singapore
Bahrain	Georgia	Malaysia	**Slovakia**
Belarus	**Germany**	Malta	**Slovenia**
Belgium	Ghana	Mauritius	**South Africa**
Bermuda	**Greece**	**Mexico**	**South Korea**
Bolivia	Guatemala	Morocco	**Spain**
Bosnia and Herzegovina	Hong Kong	Namibia	Sri Lanka
Botswana	**Hungary**	**Netherlands**	**Sweden**
Brazil	Iceland	New Zealand	**Switzerland**
Bulgaria	**India**	Nigeria	Thailand
Canada	**Indonesia**	**Norway**	Trinidad and Tobago
Cayman Islands	**Ireland**	Oman	Tunisia
Chile	Israel	Pakistan	**Turkey**
China	**Italy**	Panama	Ukraine
Colombia	Jamaica	Papua New Guinea	United Arab Emirates
Costa Rica	**Japan**	Peru	**United Kingdom**
Croatia	Jordan	Philippines	**United States**
Cyprus	Kazakhstan	**Poland**	Uruguay
Czech Republic	Kenya	**Portugal**	Venezuela
Denmark	Kuwait	Puerto Rico	Vietnam
Dominican Republic	Latvia	Qatar	Zambia
Ecuador	Lebanon	**Russia**	Zimbabwe

Note: Countries in bold are the 34 possible host countries for which the OECD's EPS index is available.

7. References

Adam, A., & Filippaios, F. (2007). Foreign direct investment and civil liberties: A new perspective. *European Journal of Political Economy*, 23(4), 1038-1052.

Ahn, J., & Park, J. H. (2022). Identifying FDI types: Watch what they do, not what they say or look like. *Economics Letters*, *213*, 110346.

Anderson, J. E. and van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, 93(1), 170-192.

Antras, P., & Yeaple, S. R. (2014). Multinational firms and the structure of international trade. In G. Gopinath, E. Helpman, & K. Rogoff (Eds.), Handbook of international economics (pp. 55–130). Amsterdam, Netherlands: Elsevier.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2), 277-297.

Baier, S. L. & Bergstrand, J. H. (2009). Estimating the effects of free trade agreements on international trade flows using matching econometrics. *Journal of International Economics*, 77(1), 63-76.

Bailey, M., Gupta, A., Hillenbrand, S., Kuchler, T., Richmond, R., & Stroebel, J. (2021). International trade and social connectedness. *Journal of International Economics*, *129*, 103418.

Baumol, W. J., & Oates W. E. (1988). The Theory of Environmental Policy. Cambridge, UK: Cambridge Univ. Press. 2nd ed.

Bergstrand, J. H., & Egger, P. (2013). What Determines BITs?. *Journal of International Economics*, 90(1), 107-122.

Bialek, S. & Weichenrieder, A. J. (2015). Environmental Regulation and Foreign Direct Investment: The Role of Mode of Entry. CESifo DICE Report, ISSN 1613-6373, ifo Institut - Leibniz-Institut für Wirtschaftsforschung an der Universität München, München, Vol. 13, Iss. 4, pp. 41-47

Botta, E. & Koźluk, T. (2014). Measuring Environmental Policy Stringency in OECD Countries: A Composite Index Approach. OECD Economics Department Working Papers, No. 1177, OECD Publishing, Paris. http://dx.doi.org/10.1787/5jxrjnc45gvg-en

Brucal, A., Javorcik, B., & Love, I. (2019). Good for the environment, good for business: Foreign acquisitions and energy intensity. *Journal of International Economics*, 121, 103247.

Candau, F., & Dienesch, E. (2017). Pollution haven and corruption paradise. *Journal of Environmental Economics and Management*, 85, 171-192.

Carril-Caccia, F. Garmendia-Lazcano, A. & Minondo, A. (2022), The border effect on mergers and acquisitions, Empirical Economics, 62, 1267-1292. https://doi.org/10.1007/s00181-021-02050-2

Carril-Caccia, F., & Milgram Baleix, J (2020) The Impact of Environmental Regulation on Location's Choice of Cross-Border Mergers and Acquisitions, Cuadernos Económicos ICE. 100.

Chen, V. Z., Li, J., & Shapiro, D. M. (2015). Subnational institutions and outward FDI by Chinese firms: The mediating role of firm-specific advantages. *Multinational Business Review*, 23(4), 254-276.

Cheng, Z., Li, L., & Liu, J. (2018). The spatial correlation and interaction between environmental regulation and foreign direct investment. *Journal of Regulatory Economics*, 54(2), 124-146.

Cole, M. A., Elliott, R. J., & Zhang, L. (2017). Foreign direct investment and the environment. *Annual Review of Environment and Resources*, 42, 465-487.

Contractor, F. J., Dangol, R., Nuruzzaman, N., & Raghunath, S. (2020). How do country regulations and business environment impact foreign direct investment (FDI) inflows? *International Business Review*, 29(2), doi:10.1016/j.ibusrev.2019.101640

Correia, S., P. Guimarães, and T. Zylkin. 2020. "Fast Poisson estimation with high-dimensional fixed effects." The Stata Journal 20 (1): 95–11.

Cuadros, A., Martín-Montaner, J., & Paniagua, J. (2016). Homeward bound FDI: Are migrants a bridge over troubled finance?. *Economic Modelling*, 58, 454-465.

Dam, L., & Scholtens, B. (2008). Environmental regulation and MNEs location: Does CSR matter?. *Ecological Economics*, 67(1), 55-65.

De Sousa, J., & Lochard, J. (2011). Does the single currency affect foreign direct investment?. *The Scandinavian Journal of Economics*, *113*(3), 553-578.

Di Giovanni, J. (2005). What drives capital flows? The case of cross-border M&A activity and financial deepening. *Journal of International Economics*, 65(1), 127–149.

Dijkstra, B.R., Mathew, A. J., & Mukherjee A. (2011). Environmental regulation: an incentive for foreign direct investment. *Review of International Economics*, 19(3), 568–78

Egger, P., & Winner, H. (2005). Evidence on corruption as an incentive for foreign direct investment. *European Journal of Political Economy*, 21(4), 932-952.

Ekholm, K., Forslid, R., & Markusen, J. R. (2007). Export-platform foreign direct investment. *Journal of the European Economic Association*, 5(4), 776–795.

Elliott, R. J. R. & Zhou, Y. (2013). Environmental regulation induced foreign direct investment. Environmental and Resource Economics, 55(1), 141–158

Erel, I., Liao, R. C., & Weisbach, M. S. (2012). Determinants of cross-border mergers and acquisitions. The Journal of Finance, 67(3), 1045-1082.

Fredriksson, P. G., List, J. A., & Millimet, D. L. (2003). Bureaucratic corruption, environmental policy and inbound US FDI: theory and evidence. *Journal of public Economics*, *87*(7-8), 1407-1430.

Gallagher, K. P., & Zarsky, L. (2007). The enclave economy: foreign investment and sustainable development in Mexico's Silicon Valley. Mit Press.

Garrett, J. Z. (2016). Explaining asymmetries in bilateral FDI flows. *International Review of Economics & Finance*, *41*, 155-171.

Garsous, G., & Kozluk, T. (2017). Foreign Direct Investment and The Pollution Haven Hypothesis. OECD Economics Department Working Papers, No. 1379, OECD Publishing, Paris. https://doi.org/10.1787/18151973

Hanna, R. (2010). US environmental regulation and FDI: evidence from a panel of US-based multinational firms. *American Economic Journal: Applied Economics*, 2(3), 158-89.

Hanson, G. H., Mataloni, R. J., & Slaughter, M. J. (2005). Vertical production networks in multinational firms. *Review of Economics and Statistics*, 87(4), 664–678.

Head, K., & Ries, J. (2008). FDI as an outcome of the market for corporate control: Theory and evidence. *Journal of International Economics*, 74(1), 2–20.

Head, K., Mayer, T., & Ries, J. (2010). The erosion of colonial trade linkages after independence. *Journal of International Economics*, 81(1): 1-14.

Hoepner, A. G. F. (2020). The EU Taxonomy for Sustainable Activities: forward looking incentives for green disclosure. EU TECHNICAL EXPERT GROUP ON SUSTAINABLE FINANCE. Brussels: European Commission.

Hofmann, C., Osnago, A., & Ruta, M. (2017). Horizontal depth: a new database on the content of preferential trade agreements. Policy Research Working Paper, WPS 7981, World Bank.

Horstmann, I. J., & Markusen, J. R. (1987). Strategic investments and the development of multinationals. *International Economic Review*, 109-121.

Hyun, H. J., & Kim, H. H. (2010). The determinants of cross-border M&As: the role of institutions and financial development in the gravity model. *World Economy*, *33*(2), 292-310.

Jang, Y. J. (2011). The impact of bilateral free trade agreements on bilateral foreign direct investment among developed countries. *The World Economy*, 34(9), 1628–1651.

Javorcik, B. S., & Wei, S.-J. (2003). Pollution Havens and Foreign Direct Investment: Dirty Secret or Popular Myth? *Contributions in Economic Analysis & Policy*, 3(2). doi:10.2202/1538-0645.1244

Javorcik, B. S., Özden, Ç., Spatareanu, M., & Neagu, C. (2011). Migrant networks and foreign direct investment. *Journal of Development Economics*, 94(2), 231-241.

Jin, J., Du, J., Long, X., & Boamah, K. B. (2019). Positive mechanism of foreign direct investment enterprises on China's environment: Analysis of host country regulation and parent company management. *Journal of Cleaner Production*, 227, 207-217.

Kahouli, B., & Omri, A. (2017). Foreign direct investment, foreign trade and environment: New evidence from simultaneous-equation system of gravity models. *Research in International Business and Finance*, 42, 353-364.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The Worldwide Governance Indicators: Methodology and Analytical Issues. *Hague Journal on the Rule of Law*, 3(2), 220-246.

Krautheim, S. (2013). Export-supporting FDI. *Canadian Journal of Economics/Revue Canadienne D'economique*, 46(4), 1571–1605.

Leon-Gonzalez, R., & Tole, L. (2015). The Determinants of Mergers & Acquisitions in a Resource-Based Industry: What Role for Environmental Sustainability?. *Review of Economic Analysis*, 7(2), 111-134.

Markusen, J. R., Morey, E. R., & Olewiler, N. D. (1993). Environmental policy when market structure and plant locations are endogenous. *Journal of Environmental Economics and Management*, *24*(1), 69-86.

Martinez-Galan, E., & Fontoura, M. P. (2019). Global value chains and inward foreign direct investment in the 2000s. *The World Economy*, 42(1), 175–196.

Martínez-Zarzoso, I., & Oueslati, W. (2018). Do deep and comprehensive regional trade agreements help in reducing air pollution?. *International Environmental Agreements: Politics, Law and Economics*, 18(6), 743-777.

Mavisakalyan, A., & Tarverdi, Y. (2019). Gender and climate change: Do female parliamentarians make difference?. *European Journal of Political Economy*, 56, 151-164.

Millimet, D. L., & Roy, J. (2016). Empirical tests of the pollution haven hypothesis when environmental regulation is endogenous. *Journal of Applied Econometrics*, 31(4), 652-677.

Nizalova, O. Y., and I. Murtazashvili. (2016). "Exogenous treatment and endogenous factors: Vanishing of omitted variable bias on the interaction term." *Journal of Econometric Methods*, 5 (1): 71–77.

Nocke, V., & Yeaple, S. (2007). Cross-border mergers and acquisitions vs. greenfield foreign direct investment: The role of firm heterogeneity. *Journal of International Economics*, 72(2), 336-365.

Nuñez-Rocha, T., & Martínez-Zarzoso, I. (2019). Are international environmental policies effective? The case of the Rotterdam and the Stockholm Conventions. *Economic Modelling*, 81, 480-502.

Paniagua, J., & Sapena, J. (2014). Is FDI doing good? A golden rule for FDI ethics. *Journal of Business Research*, 67(5), 807–812.

Pearson CS. (1987). Multinational Corporations, Environment, and the Third World: Business Matters. Durham, NC: Duke Univ. Press

Poelhekke, S., & Van der Ploeg, F. (2015). Green havens and pollution havens. *The World Economy*, 38(7), 1159-1178.

Rivera, J., & Oh, C. H. (2013). Environmental regulations and multinational corporations' foreign market entry investments. *Policy Studies Journal*, 41(2), 243-272.

Rossi, S., & Volpin, P. F. (2004). Cross-country determinants of mergers and acquisitions. *Journal of Financial Economics*, 74(2), 277-304.

Sanna-Randaccio, F., & Sestini, R. (2012). The impact of unilateral climate policy with endogenous plant location and market size asymmetry. *Review of International Economics*, *20*(3), 580-599.

Santos-Silva, J., & Tenreyro, S. (2006). The log of gravity. *The Review of Economics and Statistics*, 88(4), 641-658.

Schiavo, S. (2007). Common currencies and FDI flows. *Oxford Economic Papers*, *59*(3), 536-560.

Slevin, D.; Hoerter, S; Humphreys, N.; Viñes Fiestas, H.; Lovisolo, S.; Wilmotte, J.-Y.; Latini, P.; Fettes, N.; Kidney, S.; Dixson-Decleve, S.; Claquin, T.; Blasco, J. L.; Kusterer, T.; Martínez Pérez, J.; Philipponnat, T.; Löffler, K.; Vitorino, E.; Pfaff, N.; Brockmann, K. L.; Redondo Pereira, P.; Coeslier, M.; Menou, V.; Aho, A.; Fabian, N.; Hartenberger, U.; Lacroix, M.; Baumgarts, M.; Bolli, C.; Philipova, E.; Pinto, M.; Bukowski, M.; Krimphoff, J.; Hoepner, A. G. F.; Masoni, P. & Kramer, B. (2020) 'Taxonomy: Final report of the Technical Expert Group on Sustainable Finance'. Brussels: European Commission.

Tang, J. (2015). Testing the pollution haven effect: does the type of FDI matter?. *Environmental and Resource Economics*, *60*(4), 549-578.

UNCTAD (2020), International Investment Agreements Navigator, available at https://investmentpolicy.unctad.org/international-investment-agreements/

United Nations, Department of Economic and Social Affairs, Population Division (2017). Trends in International Migrant Stock: The 2017 Revision (United Nations database, POP/DB/MIG/Stock/Rev.2017).

Wagner, U. J., & Timmins, C. D. (2009). Agglomeration effects in foreign direct investment and the pollution haven hypothesis. *Environmental and Resource Economics*, 43(2), 231-256.

Wang, H., Dong, C., & Liu, Y. (2019). Beijing direct investment to its neighbors: A pollution haven or pollution halo effect?. *Journal of Cleaner Production*, 239, 118062.

Wang, Y., Cheng, L., Wang, H., & Li, L. (2014). Institutional quality, financial development and OFDI. *Pacific Science Review*, 16(2), 127-132.

Wang, Y., Sun, X., & Guo, X. (2019). Environmental regulation and green productivity growth: Empirical evidence on the Porter Hypothesis from OECD industrial sectors. *Energy Policy*, 132, 611-619.

Wei, S. J. (2000). How taxing is corruption on international investors?. *Review of Economics and Statistics*, 82(1), 1-11.

Xing, Y., & Kolstad, C. D. (2002). Do lax environmental regulations attract foreign investment?. *Environmental and Resource Economics,* 21(1), 1-22.

Zugravu-Soilita, N. (2017). How does foreign direct investment affect pollution? Toward a better understanding of the direct and conditional effects. *Environmental and Resource Economics*, 66(2), 293-338.