PARIS SCHOOL OF ECONOMICS
ÉCOLE D'ÉCONOMIE DE PARIS

Environmental Responsibility and FDI: Do Firms Relocate Their Irresponsibilities Abroad?

Rémi BAZILLIER
LEO
University Orléans
CNRS

Sophie HATTE
University Rouen
Paris School of Economics

Julien VAUDAY
University Paris 13
CEPN
CNRS

May 2013

G-MonD

Working Paper n°32

For sustainable and inclusive world development

Environmental Responsibility and FDI: Do Firms Relocate Their Irresponsibilities Abroad? *

Rémi BAZILLIER[†], Sophie HATTE[‡] and Julien VAUDAY[§]

April 2013

Abstract

The goal of this paper is to study the influence of corporate environmental responsibility (CER) and national environmental standards on the location choices of the 600 biggest European firms. By using the environmental score provided by Vigeo , we are able to test the influence of the environmental performances of firms. We find a negative interaction effect between these environmental performances and national environmental regulations. Thus, we argue that national standards can be a substitute for CER. All things being equal, firms with better environmental performances tend to be located in dirtier countries. CER can therefore be seen as an answer to the location choices of firms which invest in countries with poor environmental policies. This result is only valid when considering *de facto* environmental standards, not *de jure* environmental standards. It suggests a possible strategic behavior of firms which exploit these differences between formal environmental regulations and their effective enforcement.

J.E.L: D22 ; F23 ; M14 ; Q56
Keywords: Corporate Social Responsibility, Environment, Location decision, Regulation, Multinational Firms, Firm Heterogeneity

*__Acknowledgments:__ We would like to thank Vigeo which provided us the data on the level of Corporate Social Responsibility. A partnership agreement which includes the present paper has been signed between Vigeo and the LEO (University of Orléans). We also would like to thank Mathieu Couttenier and Farid Toubal for their comments and advice, and Carlo Altomonte and Armando Rurgi for providing us with Orbis data.

[†]LEO, Université d'Orléans, CNRS, remi.bazillier@univ-orleans.fr
[‡]Université de Rouen and Paris School of Economics, sophie.hatte@gmail.com
[§]Université Paris 13 - CEPN and CNRS, julien.vauday@univ-paris13.fr

1 Introduction

The media, public opinion as well as researchers have been showing an increasing interest for the question of Corporate Social Responsibility (CSR). Growing concerns about climate change, and more generally about the environment, have changed the perception of the responsibility of multinational companies. On the one hand, they are officially part of international discussions on this topic. The World Business Council for Sustainable Development aims at promoting their initiatives, while the United Nations encourages their involvement through the Global Compact, and the 2002 Earth Summit put a strong emphasis on their possible contribution towards sustainable development. But on the other hand, multinational companies have also been accused of exporting their pollution to developing countries, or relocating when environmental regulations become too tight. This is the so-called pollution haven hypothesis (PHH). Their responsibilities are therefore discussed as their goodwill is questioned, and many of these companies suffer from a negative image in public opinion. The location decisions of firms may have a strong impact on this image, but Corporate Environmental Responsibility (CER) can also influence it and therefore contribute to changing this perception. It is therefore important to study the interactions between CER and national environmental standards in the location choices made by firms.

Two alternative possibilities emerge with respect to this issue. Either CER and national environmental standards are *substitutes* or *complements*. If they are substitutes, firms with a high level of CER will locate their foreign activities in countries with low environmental standards; if they are complements, they will do so in countries with high environmental standards. This paper aims at disentangling these two possibilities.

If the hypothesis of complementarity is verified, it implies that firms consider their location choices as part of their CER, depending on the level of a country's standards. The substitution hypothesis implies disentangling the link between CER and national standards. Several implications can follow. First, it is worth noticing that a firm locating its activities in a dirty country can actually have good environmental performances. This may be the case if it decides to keep implementing its home country's environmental standards, whatever the level of the standards in the country where it is investing. Second, one important feature of CER (as of all components of CSR) is to go beyond (environmental) legislation. If the legal standards are weak, it is easier for firms to practice CER. Investing in dirty countries can then be used as a means to minimize the marginal cost of going *beyond the legislation* in terms of the environment. Third, and this is related to the previous point, there may be significant gaps between the legislation and its effective enforcement. In other words, it is important to explore the differences between *de jure* and *de facto* environmental standards. A firm investing in countries where *de facto* standards are low, while *de jure* standards are high can minimize its cost, while benefiting from a positive image. Fourth, firms investing in dirty countries may compensate for this location choice by good environmental performances, or firms which already have good CER may consider that it is not risky to invest in such countries.

In order to know which hypothesis fits the data, we analyze the determinants of location choices in 2010 for the 600 biggest European firms taking both the CER of firms and the countries' environmental standards into account. We use a unique database provided by Vigeo in order to assess their level of CER. The choice of location is provided by Orbis. Dealing with the *de facto*

/ *de jure* issue requires two distinct measures of environmental standards. As for the empirical methodology, we rely heavily on the Foreign Direct Investment (FDI) literature and we run many robustness tests to assess the quality of the results.

We show that countries' environmental standards have a negative impact on the probability for firms with good environmental responsibility of being located abroad. This result clearly supports the *substitution hypothesis*. Firms located in countries with weak environmental regulation are also more likely to be active in CER. However, this negative interaction effect is only significant in the case of *de facto* environmental standards. This result is obtained while controlling for an extensive set of firm characteristics and is robust to the use of different estimation techniques and changes of sample. More specifically, we show that our results are not driven by one specific sector or by firms coming from, or investing in, one specific country or group of countries. We also find that firms with higher environmental responsibility tend more to be located abroad, all things being equal.

The literature on the subject is still quite recent. An abundant literature has tried to deal with the pollution haven hypothesis. According to Copeland & Taylor (2004), the PHH is verified when pollution-intensive industries tend to move from countries with stringent environmental regulations to countries with weaker ones. The problem is that it can be one determinant among many others and it is very difficult to isolate the effect. The empirical evidence is therefore very mixed. List & Co (2000) or Keller & Levinson (2002) find negative effects for the stringency of environmental regulation on inbound FDI in the US. However, Eskeland & Harrison (2003) find no robust correlation between environmental regulation in industrialized countries and foreign

investment in developing countries. Cole *et al.* (2006) argue that one has to take the possible influence of foreign firms on national environmental regulations into account, which would have consequences on the identification of the PHH. They found that environmental regulations are indeed positively influenced by the presence of foreign firms, at least when corruption is not too high. Cole & Fredriksson (2009) show that environmental regulations are found to have a negative impact on FDI only when treated as endogenous. It may explain why we cannot verify the PHH in this paper.

Including CER in the analysis is even more recent. A seminal paper by Dam & Scholtens (2008) is the first to study the relationship between the pollution haven hypothesis and the environmental responsibility of firms. The authors show that firms exhibiting the highest environmental responsibility levels tend to locate in less dirty countries. In another paper (Dam & Scholtens, 2012), they show that firms which pollute more are located relatively more often in countries with weak environmental regulations and that multinational firms do not significantly influence local environmental regulations.

Hence, we complement their study by arguing that there is an important distinction to make between CER improvement and current CER policies on the one hand and current environmental *performances* on the other hand. While Dam & Scholtens (2008) focused on the former, we analyze the effect of the latter. A firm which has a strong experience with environmental responsibility is less likely to exhibit a high dynamic of *improvement*, as we may expect that the cost of improving CER increases marginally. Hence the firms which are currently improving their CER the most are probably those that have the lowest starting point. The effects are therefore

very likely to differ.

Whereas Dam and Scholtens find that firms which currently implement policies aiming at improving their CER tend to avoid dirty countries, we show that firms that already have relatively high environmental performances tend to locate in dirtier countries. One potential explanation to the difference with their result is as follows. Firms which aim at improving their image through CER may find that investing in dirty countries is risky. Indeed, any public information disclosing such behavior would be extremely harmful to their reputation and the image of environmental responsibility which they wish to promote. On the contrary, it is much easier to invest in dirty countries for firms that have more experience in CER and that may be much more credible when claiming that they behave well even in dirty countries. However, this effect is only significant when taking *de facto* standards and not *de jure* ones into account.

The remainder of the paper is organized as follows. Section 2 presents the data and section 3 exposes the empirical strategy. The results are presented in section 4. Lastly, section 5 concludes.

2 Data

2.1 Measuring the Environmental Responsibility of Firms

2.1.1 The Vigeo Environmental Score

To assess the level of environmental responsibility of firms, we use the data provided by Vigeo, the extra-financial rating agency. This environmental rating takes the following into account: *"the protection, safeguard, prevention of attacks on environment, implementation of an adequate*

managerial strategy, ecodesign, protection of biodiversity and reasonable control of environmental impacts on the overall life cycle of products and services".[1] These objectives are evaluated by Vigeo analysts according to 33 *principles for action.*[2] Vigeo is the leading European expert in the assessment of the practices and performances of firms on social, environmental and governance issues. Their rating received the CSRR-QS 2.1 certification of quality developed by the Association of Independent Corporate Sustainability and Responsibility Research.

The extra-financial rating by Vigeo covers the 600 biggest European firms listed on DJS-toxx600, EuroStoxx, SBF250, SBF120 or CAC40. Therefore, the span of our study is not limited to voluntary firms, which would introduce a major selection bias in the analysis.[3] We combine our Vigeo dataset with Orbis, the ownership database provided by the Bureau van Dijk.[4] We use the procedure developed by Altomonte & Rungi (2013) to define the location of the firms in the Vigeo dataset. The Vigeo sample of firms represents 11.80% of the Orbis database in terms of total assets, but only 2.27% when we exclude financial firms. This can be explained by the fact that firms in the financial sector are over-represented in our sample, and those firms have very large total assets compared to firms in other sectors. Table 1 shows the share of firms by

[1]See `http://www.vigeo.com/csr-rating-agency/en/2-2-referentiel-d-analyse` for an explanation of the research framework of Vigeo.

[2]Such principles for instance include the "identification, evaluation, and reduction of the risks of environmental accidents", the "avoidance or reduction of the exploitation of sensitive ecosystems", the "reduction of water consumption", or "the effective management of energy consumption and atmospheric emissions".

[3]Since 2003, Vigeo has also been offering audit services to firms. But these two activities (the rating which concerns all firms, and the audit which is a service provided to voluntary firms) are fully separated. Since 2010, this separation between these two activities has been formally reinforced by the creation of two distinct business brands: Vigeo rating and Vigeo enterprise. As mentioned on the Vigeo website, *"The teams dedicated to SRI research (Vigeo rating) and to audits on social responsibility (Vigeo enterprise) are clearly separated, so are their workplaces. Less than 1% of the companies rated by Vigeo rating are clients of Vigeo enterprise".*

[4]Orbis covers around 100 million companies worldwide and provides information on shareholder links.

sector, in our sample and in the total population of Orbis firms. As Vigeo scores the largest firms in terms of market capitalization, some sectors (such as "Manufacturing" or "Financial and Insurance Activities") are obviously over-represented in our sample. However, these firms are also the ones that are more likely to be located abroad, which is consistent with the purpose of this paper.[5]

Table 1: Distribution of the Vigeo Sample

NACE 2-digit industry	**% of firms**		**% of total assets**	
	Vigeo	**Orbis**	**Vigeo**	**Orbis**
Financial and Insurance Activities	20.33	6.06	80.81	70.34
Manufacturing	37.21	11.97	7.89	8.20
Electricity, Gas, Steam and Air Conditioning	4.72	0.58	3.25	2.18
Mining and Quarrying	3.27	0.31	2.46	1.70
Information and Communication	9.98	4.58	2.43	1.92
Construction	4.54	12.93	0.81	1.53
Wholesale and Retail Trade	4.54	20.14	0.75	2.81
Transportation and Storage	2.90	3.25	0.43	1.45
Administrative and Support Service Activities	2.72	5.46	0.28	1.41
Professional, Scientific and Technical Activities	2.18	12.30	0.25	4.46
Real Estate Activities	2.36	7.53	0.19	1.71
Water Supply, Sewerage, Waste Management	0.91	0.48	0.17	0.27
Accommodation and Food Service Activities	1.81	3.74	0.14	0.33
Other Service Activities	0.18	3.07	0.06	0.63
Arts, Entertainment and Recreation	0.91	1.54	0.02	0.16
Public Administration and Defence	0.18	0.13	0.01	0.18
Agriculture, Forestry and Fishing	0.18	2.02	0.01	0.17
Others	0.00	3.93	0.00	0.56

Note: The data in the *Vigeo* sample are calculated on the sample of the 551 firms for which we have firm-level characteristics from *Orbis*. The data from the *Vigeo* and the whole *Orbis* samples are for the year 2010.

Within this 600-firm sample, we work with 551 firms for which we have data on other firm characteristics thanks to the Orbis database. Those firm-level characteristics are presented in subsection 2.3. We observe a huge heterogeneity across these 551 multinational firms, but also

[5]Notice that Vigeo does not do a systematic country by country audit when evaluating their CSR.

across and within sectors. Table 2 presents the descriptive statistics for the whole sample and for each of the Nace 2-digit sectors. The "Transportation and Storage" sector has the highest mean score (0.43), while the "Administrative and Support Service Activities" industry is the dirtiest on average (0.279) when we exclude sectors with only one firm. These stylized facts highlight the need to control for sector characteristics in our empirical work.

Table 2: Descriptive Statistics of the Environmental Vigeo Scores

Nace 2-digit Industry	Obs	Mean	Std. Dev.	Min	Max
All	551	0.336	0.17	0	0.73
** Accommodation and Food Service Activities	10	0.328	0.116	0.13	0.57
Administrative and Support Service Activities	15	0.279	0.187	0	0.52
Agriculture, Forestry and Fishing	1	0.12	.	0.12	0.12
Arts, Entertainment and Recreation	5	0.198	0.18	0	0.45
Construction	25	0.400	0.129	0.15	0.73
Electricity, Gas, Steam and Air Conditioning	26	0.405	0.094	0.2	0.58
Financial and Insurance Activities	112	0.302	0.188	0	0.67
Information and Communication	55	0.321	0.175	0	0.62
Manufacturing	205	0.345	0.17	0.02	0.71
Mining and Quarrying	18	0.408	0.104	0.13	0.55
Other Service Activities	1	0.23	.	0.23	0.23
Professional, Scientific and Technical Activities	12	0.288	0.135	0.12	0.49
Public Administration and Defense	1	0.16	.	0.16	0.16
Real Estate Activities	13	0.28	0.172	0.02	0.53
Transportation and Storage	16	0.43	0.218	0.01	0.7
Water Supply, Sewerage, Waste Management	5	0.388	0.09	0.26	0.49
Wholesale and Retail Trade	25	0.331	0.144	0.05	0.59
Unclassified	6	0.317	0.126	0.14	0.48

Note: These statistics are calculated on the *Vigeo* scores of the 551 firms for which we have data from Orbis on firm characteristics.

Igalens & Gond (2005) have studied the relevance of Vigeo data.[6] They found that "*this benchmark constitutes a proxy that is particularly suitable for Corporate social performance, at least from a theoretical point of view*" (Igalens & Gond, 2005, p 143). They also consider that

[6]More precisely, they studied in 2000 the quality of ARESE data. Vigeo was founded in 2002, acquiring the activities of ARESE. They continue to use a very similar research framework.

these data are very similar to alternative measurements such as KLD indexes that have been used intensively in the Anglo-American literature (see for instance Siegel & Vitalino 2007 for an empirical analysis of CSR determinants using KLD data). The only differences are mainly explained by *"different cultural sensitivities (...) and differences in methodological orientation"*.[7] Chatterji *et al.* (2009) analyzes the relevance of KLD scoring. It includes measures of *strengths*[8] and *concerns*[9] that we meet in the 33 *principles of action* evaluated by Vigeo. Chatterji *et al.* (2009) conclude that KLD data are good predictors of past environmental performances , but much weaker predictors of future ones. If we assume that the results would be mostly similar for Vigeo data[10], our Vigeo rating of environmental responsibility is a good proxy for past environmental performances. However, a possible drawback is that it is less fitted to assess the evolution of these performances.

EIRIS data which are used by Dam & Scholtens (2008) may be more relevant if one wants to measure the evolution of environmental performances. If EIRIS use a methodology similar to KLD or Vigeo by looking at public data and relying on questionnaires sent to firms, they also *"** encourage the companies to address the issues of concern to investors and to* ***improve*** *their pub-*

[7]See Igalens & Gond (2005) for an overview of these methodological differences. The authors conclude that *"The method used to assess the criteria that ARESE developed seems relatively more finely-tuned than its Anglo-American counterpart"* (p. 145).

[8]Beneficial products and services, Pollution prevention, Recycling, Clean energy, Communications, Property, plant, and equipment, and Other strengths.

[9]Hazardous waste, Regulatory problems, Ozone-depleting chemicals, Substantial emissions, Agricultural chemicals, Climate change, and Other concerns.

[10] Chatterji *et al.* (2009) observe the "'real" environmental performance for US firms regulated by the US Environmental Protection Agency for which they have the real level of carbon emissions and the number and values of penalties associated with violations of major environmental laws. We do not have such information for European firms. However, Igalens & Gond (2005) noted the relative similarity between both ratings.

lic reporting".[11] The role of their scoring is not only to measure current performances , but also to play a role in the evolution of these performances. Also, among all the indicators published by EIRIS, Dam & Scholtens (2008) focus on four indicators of environmental responsibility: "environmental policy", "environmental management", "environmental reporting" and "environmental performance impact improvement". All these indicators measure current policies and the *evolutions* of environmental performances. The drawback is that this brings little information about *current* environmental performances.[12] Since we assume that the marginal cost of improving CER is increasing, it is easier for a "dirty" company to improve its environmental impact , while it is much more difficult to do so for a firm which has already invested a lot.

Vigeo and EIRIS therefore present different advantages , but also different drawbacks. As they measure different dimensions of environmental responsibility, it is not surprising to obtain different results. Our analysis is therefore complementary to that of Dam & Scholtens (2008). We focus on the effect of current environmental performances , while they mainly focus on the effect of the evolution of these performances.[13]

2.2 Measuring National Environmental Standards

There are two main approaches to measure the stringency of environmental standards: a *de jure* and a *de facto* approach. The goal of the former is to give a quantitative assessment of

[11] See the presentation of their research on their website: `http://www.eiris.org/managers/our_research.html`

[12] For instance, the environmental performance impact improvement is the score related to the following question: "What level of improvements in environmental impact can the company demonstrate?"

[13] In order to test this idea, we perform estimations using the *evolution* of the Vigeo environmental score between 2006 and 2009. When doing so, we obtain results which are similar to Dam & Scholtens (2008).

the stringency of environmental laws, whereas the goal of the latter is to assess the effects of environmental laws on environmental quality. If the environmental legislation is fully effective, any change in this legislation will have a direct impact on environmental quality. However, the effectiveness of environmental policies depends on various factors. First, if the institutional framework is too weak to ensure the effective enforcement of the law, legislation will have no impact on the practices of firms and thus on environmental quality. Also, the effectiveness of such legislation can be undermined by external forces such as tax evasion (in case of environmental taxation) or a strategic behavior of firms aiming at evading the law. Therefore, *de jure* environmental standards may not represent the real constraints which firms are facing.

This is why we propose to complement this analysis by focusing also on *de facto* standards. The outcome of these policies is therefore the general environmental quality. However, we must notice that environmental quality is not only determined by environmental policies , but of course also by economic development among other factors. Yet, depending on the type of environmental quality under consideration, the effect will be very heterogeneous. The effect is particularly strong when focusing on the case of carbon emission for instance.[14] For many other dimensions, economic development has the opposite effect. When considering wastes, the use of chemical products or water sanitation, economic development tends to be positively correlated with environmental quality, mainly because of the development of appropriate policies to tackle these issues. It is therefore very difficult to disentangle the effect of economic development and that of environmental policies that can be endogenous to the level of economic development. How-

[14]According to the environmental Kuznets curve (EKC), the effects are likely to be non-linear , but empirical evidence of such a relation is scarce, at least for carbon emissions.

ever, there is no doubt that an inefficient environmental policy has no impact on environmental quality , while an efficient one tends to improve this quality. Environmental policies are also very diverse and it is very difficult to assess their effective impact for a wide range of policies and countries. For all these reasons, the *de facto* approach of environmental standards will focus mainly on environmental quality. The underlying assumption is that this environmental quality is positively influenced by the effectiveness of environmental policies.

Concerning *de jure* environmental standards, a commonly accepted approach is to approximate the level of environmental regulation by the number of international environmental treaties ratified by a country and how many plans or strategies a country adopts.[15] This statistic is provided by the World Bank (World Development Indicators) and used by Dam & Scholtens (2008). Another limit of such a *de jure* approach should be pointed out. When focusing on international conventions, it is essential to bear in mind that most treaties define several levels of commitment depending on the level of development. For instance, the United Nations Convention on Climate Change (UNCCC) makes a distinction between annex 1 (mostly industrialized countries and countries in transition) and non-annex 1 countries. Only annex 1 countries have binding goals in terms of GHC reduction according to the Kyoto Protocol. Therefore for non-annex 1 countries, it is not costly to ratify such a protocol , as it does not imply any binding commitments to reduce emissions.

The second approach relies on *de facto* measurements. The goal is not to measure the strin-

[15]Standardized values of the count of "Participation in treaties (Climate change, Ozone Layer, CFC control, Law of the Sea, Biological diversity, Kyoto Protocol, CITES, CCD, Stockholm Convention)" and "Environmental strategies or action plans" and "Biodiversity assessments, strategies or action plans" .

gency of environmental regulations anymore, but to evaluate their real impact. As stated above, it is not possible to directly assess the effectiveness of environmental legislation pas de virgule for a wide range of policies and countries. We will therefore focus on the *outcome* of these policies which is environmental quality. We are aware that un espace de trop ici this quality can be influenced by many other aspects, but countries with more ambitious and effective environmental policies also tend to have better environmental quality. Therefore, we propose to use the Environmental Performance Index (EPI, 2008) built by the Yale Center for Environmental Law and Policy (YCELP) and the Center for International Earth Science Information Network (CIESIN, Columbia University). It provides "*quantitative metrics for evaluating a country's environmental performance in different policy categories relative to clearly defined targets*".[16] It covers environmental health, air quality, water resource management, biodiversity and habitat, forestry, fisheries, agriculture, and climate change. The goal of this index is explicitly to "*track policy effectiveness through measurable outcomes*". Each indicator included in the EPI is associated with a policy target. These policy targets are mainly drawn from international environmental treaties, echoing our *de jure* index. To the best of our knowledge, the EPI is the most complete index measuring real environmental performances for a large sample of countries.

Table 3 presents some descriptive statistics for these variables and Table 4 shows the correlation matrix between our two indexes of environmental standards, GDP and GDP per capita. We can observe a very weak correlation between the indexes of environmental standards, which justifies the use of both *de jure* and *de facto* indexes. We can also notice a weak correlation with

[16]** See `http://sedac.ciesin.columbia.edu/data/set/epi-environmental-performance-index-2010` for more details .

GDP and GDP per capita. It is very close to 0 for treaties and 0.17 for the correlation between GDP per capita and the EPI. If we have a look at some selected countries (see Table 5), we can see some examples of large disparities between the ratification of treaties and environmental performances. China for instance has ratified 11 treaties out of 12, but its EPI score is relatively low. On the contrary, Germany has only ratified 9 treaties , but its EPI score is much higher. It is noteworthy that a significant number of developing countries have excellent environmental performances according to the EPI. Costa Rica was for instance ranked third (after Iceland and Switzerland) in 2008. The position of the United States is ambivalent. Indeed, the number of treaties it has ratified is very low, but its EPI score is fair but below the level observed for other developed countries. This highlights the need to use different sets of indexes to assess the impact of environmental regulation on the location choices of firms.

Table 3: Descriptive Statistics of Environmental Indexes

Variable	Obs	Mean	Std. Dev.	Min	Max
Treaties	140	9.357143	1.383726	1	11
EPI	140	0.7196143	0.1282365	0.391	0.955

Note: Treaties is the standardized value of the count of "Participation in treaties", "Environmental strategies or action plans" and "Biodiversity assessments, strategies or action plans". It is provided by the World Bank (WB) for 2009. EPI is the Environmental Performance Index measured by the Yale Center for Environmental Law and Policy and the CIESIN, Columbia University for 2008.

Table 4: Cross-Correlation Table

Variables	Treaties	EPI	GDP	GDP p.c.
Treaties	1			
EPI	-0.09	1		
GDP	-0.1001	0.56	1	
GDP p.c.	-0.0713	0.1712	0.3576	1

Table 5: Environmental Country Indexes (Selected Countries)

Variables	Treaties	EPI
Argentina	10	81.8
Brazil	10	82.7
Canada	11	86.6
China	11	65.1
Costa Rica	11	90.5
France	10	87.8
Ghana	11	70.8
Germany	9	86.3
Japan	9	84.5
South Africa	10	69
South Korea	9	79.4
United Kingdom	11	86.3
United States	7	81
United Arab Emirates	8	64

To assess the robustness of our results, we also provide some robustness checks using alternative indexes both for *de jure* and *de facto* standards. The main problem with international treaties is the heterogeneity in their nature. Some treaties are binding (such as the Kyoto Protocol), some are not (the Ozone Layer Treaty or the 1992 Climate Change Treaty). Also , some treaties or environmental strategies are poorly connected with the stringency of regulations for firms. The link between the location of firms and the existence of a national biodiversity action plan or the country's participation in the Law of the Sea is more likely to be weak. In addition, we thus build two alternative indexes: the standardized value of the count of "participation in binding treaties" (CFC control, Law of the Sea, Biological diversity, Kyoto Protocol, CITES, CCD, Stockholm Convention) and the standardized value of the count of "participation in binding treaties related to air pollutants"[17]. The former variable is more likely to reflect the binding constraints on firms. We will see that the results are similar when using these different indexes.

[17]CFC control, Kyoto Protocol, Stockholm Convention

Concerning *de facto* standards, the alternative would be to focus on the subjective impact of environmental legislation on firms , based on surveys of entrepreneurs. The World Business Economic Survey (WBES) conducted by the World Bank in various countries identifies the percentage of firms considering environmental regulation as a major constraint. The problem of such a variable, used by Dam & Scholtens (2008), is that the country coverage is low , with a bias towards poor countries. Also , there are inherent error margins associated with any single survey results that may alter the ability to compare across countries.[18]

2.3 Other Control Variables

We control both for firm and country characteristics that may explain the decision for a firm to locate in a given country. To define such a set of control variables, we mainly follow Blonigen & Piger (2011) whose goal is to define robust determinants of FDI. When country fixed effects are not included, we use GDP and GDP per capita to control for the size of the market. We also add a measure of market potential in the neighboring countries.[19] All these variables come from the World Development Indicators database. We also add a variable corresponding to the number of business days it takes to obtain legal status to operate a firm (in 2008), from the World Bank Doing Business database. Finally, we use the distance between the country of the holding and the subsidiary and a dummy variable taking the value of 1 when both countries share the same language. Both variables are from CEPII (Mayer & Signago, 2006).

[18]This point is clearly mentioned in the condition of use of the WBES.

[19]This measure was firstly proposed by Harris (1954). Country i's market potential is measured as $MP_i = \sum \frac{x_j}{d_{i,j}}$ where x_j is the GDP of country j and $d_{i,j}$ is a measure of the geographical distance between countries i and j.

At the level of the firm, we rely on variables used by Hakkala *et al.* (2008) and also propose a specification close to the one used by Dam & Scholtens (2008). All variables are from Orbis. We control for the assets, the age, the operating revenue, the liabilities, the liquidity and the total number of employees. Compared with the specification of Dam & Scholtens (2008), we prefer to use the asset level rather than the market capitalization , as the former is more stable than the latter, especially in times of crisis. We also use the operational revenue rather than the level of sales. The variable of sales is not available for banks and the financial sector. Using this variable would introduce a sectoral bias in the analysis.

3 Hypotheses and Empirical Strategy

Our goal is to study the interaction between the level of environmental performance of a firm (measured by the Vigeo CER score) and national environmental standards (measured by a set of *de facto* and *de jure* indexes) to explain the location choices of European firms. Arguably, two main hypotheses can be made on this relation.

Hypothesis 1 *Complementarity between CER and environmental standards: firms with a better environmental performance invest more in countries with high environmental standards.*

Hypothesis 2 *Substitution between CER and environmental standards: firms with a better environmental performance invest less in countries with high environmental standards.*

In order to discriminate between these two possible hypotheses, we estimate the effect of both country-specific and firm-specific environmental practices on the location decision of a firm and

the country of destination. The location decision is a discrete variable, which is equal to 1 if a firm i is located in destination country d, and to 0 otherwise. Thus, the use of a probit model is particularly appropriate.[20] The probability of a firm i to be located in a destination country d is

$$Prob(Y_{id} = 1) = \begin{cases} 1 & \text{if} \quad \alpha CER_i + \beta Env.Std_d + \gamma CER_i * Env.Std_d + \mathbf{Ctrl} + \epsilon_{\mathbf{id}} > \mathbf{0} \\ \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

where CER_i is the *Vigeo* environmental performance of firm i and $Env.Std_d$ is the environmental standard in destination country d. $CER_i * Env.Std_d$ is the interaction between both firm-specific and destination country measures of environmental performance. We then include a vector of control variables, **Ctrl**, which aims at capturing firm and destination country variables that influence the location decision of firm i in country d. Firm-level controls include the logarithm of total assets, the operating revenue, liabilities, the number of employees, the age and the liquidity ratio of the headquarters. We control for country characteristics such as the logarithm of GDP, GDP per capita, market potential and the number of days needed to build up a firm. We also include origin and destination country-specific variables to control for the

[20] We are aware that the inclusion of fixed effects in non-linear models can bias the results due to the problem of incidental parameters. However , we introduce these fixed effects to control for unobserved heterogeneity which can be important among countries and sectors. Furthermore, this bias seems to be large for samples with small T which is not the case here. Hsiao (1996) has shown that the bias can be as much as +100% for $T(i) = 2$. However, Heckman (1981) found in a Monte Carlo study that the bias was towards zero and the order of 10% when $T(i) = 8$ and $N = 100$. This result has been widely discussed. Greene (2004) showed for instance that the bias was more important even for T(i)=8 , but he found that this bias decreased strongly when T increased. Also, the bias is much lower for marginal effects (on which we focus here). Fernández-Val (2009) showed that "the bias [in average marginal effects] *is negligible relative to the true average marginal effect for a wide variety of distributions of regressors and individual effects and is identically zero in the absence of heterogeneity.*" (p.72). Considering the structure of our data, we therefore consider that the possible bias introduced by the inclusion of fixed effects is more likely to be negligible and much less problematic than the omitted variable bias and problems of unobserved heterogeneity that we will face if we do not include these fixed effects. Furthermore, as a robustness check, we ran logit regressions and obtained perfectly similar results.

effect of the distance and the common language between both countries on the location decision of multinational firms. We finally also control for industry-specific and origin country-specific potential omitted variables , including NACE 2-digit industry and origin country fixed effects.

If the *complementarity hypothesis* is verified, we expect a positive estimated coefficient for interaction term (γ). For a given level of environmental standard, this would mean that firms with a higher environmental performance tend to be located in countries with better environmental performances. On the contrary, if the *substitution hypothesis* is verified, we expect the estimated γ to be negative. Firms with a higher level of environmental performances would then tend to be located in countries with lower environmental standards.

4 Results

De Jure Standards

Table 6 represents the result using the number of environmental treaties ratified as a proxy for environmental policy.

We first estimate the effect of the environmental performance of a firm on the probability of location abroad. We find that the effect of the CER index of environmental performance for a firm is positive and significant, as shown in column (1) of Table 6. This specification includes destination country, origin country, and NACE 2-digit industry fixed effects. These fixed effects aim at controlling for the omitted variable bias, taking the potential difference in the origin and destination country regulations into account, but also industry specificities that affect the

location of firms. This last set of controls allows to control for the fact that for instance firms in the *Mining and Quarrying* sector are more often located in countries with natural resources. In column (2), we include our set of firm-level variables that control for firm characteristics influencing the location decision, as their size and age. We also use bilateral control variables for the distance and the common language between the origin and destination country, which are known to significantly influence the location decision of firms in the FDI literature. We find that the marginal effect of the environmental performance of a firm is lower (0.0227 against 0.2151), but is still positive and highly significant. This first result suggests that the environmental behavior of a firm is a significant determinant of its location decision.

In column (3), we then introduce the interaction term between the CER index and the *de jure* index of environmental standards. We find no evidence that the effect of the environmental performance of a firm on its location decision is conditional to environmental standards in destination countries, measured at the *de jure* level. To test the robustness of our result on the interaction term, we do not include the CER variable in column (4), and then introduce firm, destination country fixed effects and bilateral country control variables. Even in this specification that controls for firm and destination country omitted variables, the interaction term is estimated to have no significant effect.

In column (5), we introduce destination country variables instead of fixed effects. The goal is to be able to compute the magnitude of the interaction effect properly. In non-linear models, the magnitude does not equal the marginal effect and can be of opposite sign. The Ai & Norton (2003) procedure is then needed to correctly estimate these effects , but we need to include the

two variables composing the interaction variable in the specification. This is not possible when we include destination country fixed effects, so we introduce the main country characteristics influencing FDI instead: GDP per capita, GDP, market potential and the number of business days it takes to obtain legal status to operate a firm. Our main result holds. The interaction effect is not significant , while the environmental responsibility has a positive and significant impact on the probability of being located abroad. It is noteworthy that our index of environmental standards is positively correlated with the probability of being located in a country. This result would invalidate the pollution haven hypothesis. It should however be interpreted very carefully. As noticed by Cole *et al.* (2006) and Cole & Fredriksson (2009), environmental policies are likely to be endogenous to FDI. Dealing with the endogeneity of environmental standards goes beyond the goal of this paper.

All in all, we find no significant effect of *de jure* environmental standards on the effect of the environmental responsibility of firms on their location choices. One potential explanation is the gap between legislation and effective enforcement. Also, and as mentioned already, countries have different commitments when ratifying an international treaty. Within the framework of the UNCCC, non-annex 1 countries have no obligation to reduce their emissions. We should therefore look at the possible effect of *de facto* environmental standards.

De Facto Standards

We now analyze the potential conditional effect of CER on *de facto* standards in the destination country. Column (1) of Table 7 shows that the effect of the environmental performance of a

firm is conditional on *de facto* standards. Indeed, the interaction term between CER and the EPI measure of regulation has a negative and significant effect on the location of firms. This negative effect of the interaction term is robust to the inclusion of a firm fixed effect, instead of the firm-level control variables and industry and origin country fixed effects (column (2)). This specification allows to ensure that the effect of the interaction term is not driven by firm or destination country omitted variables.

Then we introduce destination country variables instead of fixed effects as we did in the previous set of estimates. The main result holds. The interaction effect is still negative and highly significant. The estimated impact of corporate environmental responsibility remains very stable with a positive coefficient of 0.03. The estimated coefficient for the EPI is positive and significant again, suggesting that firms locate in countries with higher environmental performances. However, as noted above, great caution should be used in interpreting this result since we have not controlled for the possible endogeneity of these standards. All other control variables have the expected sign.[21]

Finally, we introduce conjointly the number of treaties and the EPI in columns (4) to (6). The results are not affected by the common inclusion of both variables of countries' environmental standards. The interaction is still not significant for $CER * \#treaties$, while it is negative and significant for $CER * EPI$. This last result confirms the heterogeneous effect of *de jure* and

[21]It is noteworthy that the sign of the GDP per capita coefficient has changed compared with the one obtained in Table 6. The lack of stability of the estimated effect of GDP per capita is common in the literature. Blonigen & Piger (2011) do not include it in the set of robust determinants of FDI which they elaborate. The main problem of this variable is that it reflects two dimensions: consumers' living standards , but also labor costs. Depending on the main force driving FDI, the sign of the coefficient can either be positive or negative, but this would not affect our results concerning our variables of interest. As shown in Table 4, the correlation between the EPI and GDP per capita is very low (0.17).

de facto standards. It is worth noticing that the estimated effect of national standards remains positive and significant both for the number of treaties and the EPI. All other control variables keep the same sign and significance.

All in all, we find that the environmental performance of a firm has a significant and positive impact on its location abroad. However, this effect is conditional on *de facto* environmental regulations in the destination country, not on *de jure* ones. More precisely, the country's environmental performance has a negative impact on the probability of environmentally responsible firms locating abroad. This result validates the substitution hypothesis in opposition to the complementary hypothesis.

Robustness Checks

We first test the robustness of our results running the specification presented in Tables 6 and 7 , but dropping one industry each time. The aim of this exercise is to test whether a sector is driving our result. We find that the results obtained with both *de jure* and *de facto* measures of environmental standards hold in all of these specifications. Similarly, we run regressions excluding firms from one of the origin countries each time, and find that our results still hold in each of the specifications, and are thus not driven by firms from a particular country. Finally, we run regressions excluding destination countries by group each time. We consider 12 groups of countries here, defined on a geographical basis.[22] In the case of *de jure* standards, our result

[22]We classify countries as being part of one of the following groups: Europe, North America, South America, Central America, Middle East, Northeast Asia, Southeast Asia, South Asia, Central Asia, North Africa, Rest of Africa and Pacific.

holds for all specifications. However, we find that in the case of *de facto* standards, our results are robust in all of these specifications, except for the specification in which we exclude Europe from the list of potential destination countries. In this case, the effect of the environmental performance of firms is not estimated to be conditional on destination country regulations. All of these results are robust when we use logit or nested logit estimations, and when we run the Ai & Norton (2003) procedure. We lastly use alternative indexes of countries' environmental performances in our estimations. The results concerning "Air pollutant treaties" and "binding treaties" are perfectly similar. However, when using WBES, the interaction variable is not significant, but this can easily be explained by the strong reduction in the sample size and the problems of international comparability mentioned in the condition of use of this database.

All results are available upon request.

Further Analysis

We calculate the estimated marginal effects for both the EPI and CER. The effect of a one standard deviation increase in the CER index on the probability that a firm be located in a given country when the EPI is at its mean (0.72) is 0.006 (= 0.0349∗0.17). Furthermore, we find that the estimated marginal effect of a one standard deviation increase in the environmental responsibility of a firm on its probability of being located in a country decreases with the country's EPI. More precisely, the positive estimated marginal effect of the CER index becomes negative for countries with an EPI score of 0.8874 or more. The first country that has an EPI score greater than 0.8874 is Latvia (0.888). The group of countries for which the marginal effect of the

CER index is negative represents 5% of our sample of 140 countries. Furthermore, 5 of the 7 countries in that group which are above this threshold are located in Europe. This could explain why we do not find that the effect of the CER index is conditional on the destination country's EPI score when we exclude European countries from the analysis. Similarly, we calculate the estimated marginal effect of the EPI and find that it decreases with the CER index , but that it is positive on the whole distribution of CER indexes. The estimated marginal effect of a one standard deviation increase in the EPI when the CER index is at its mean (0.336) is 0.03.

5 Discussion and Conclusion

Focusing on the current environmental performances of firms rather than on their current managerial decisions gives a completely different picture from the one described by Dam & Scholtens (2008). Our main result is that firms with good environmental performances tend to be located in "dirtier" countries, at least pas de virgule when considering *de facto* national performances in terms of environment. More precisely, we show that national environmental performances play a negative role in the positive effect of the environmental responsibility of firms on their probability of being located abroad. This result is robust to various specifications and econometric methods. This result tends to confirm the *substitution hypothesis* between CER and environmental standards.

It is worth noticing that the negative interaction term which we found between CER and national standards is only significant when considering *de facto* standards, but is not significant

when considering *de jure* ones. One may think that being located in countries with very weak environmental legislation is counterproductive for a firm which aims at improving its environmental responsibility. However, as it is much more complicated to observe a country's real environmental performance, this limitation is raised for countries which have a good environmental legislation, but enforce it poorly. One possible explanation is that firms which invest in dirty countries must have a higher level of CER to minimize the risk of reputation loss.

Two main conclusions can be drawn from this result; advocating one or the other is left for future research. The first hypothesis is that firms may compensate for their investments in CER in developed countries by adopting a pure cost minimizing behavior when locating abroad. In other words, firms may relocate their irresponsibility abroad and try to hide it. Ratifying environmental agreements to improve a country's image or reputation without ensuring that these agreements are respected may then be a deliberate strategy for states, thus offering firms an apparently clean image with significant tolerance in fact in day to day business.

However, the other hypothesis is that these firms actually perform well in these countries. This would be consistent with the general observation that foreign firms tend to perform better than local ones. This can be positive for these countries, as it may reinforce their environmental performances in the long run. It may explain why we found a positive relation between a country's environmental performance and the probability for a firm of being located in this country. Nevertheless, it raises the issue of the motivation of firms that deliberately choose to invest in countries with poor environmental performances, even if these firms actually perform well in terms of environment.

More generally, we have shown that firms with relatively good environmental performances tend to be located abroad more often than other firms, all other things being equal. There is no apparent contradiction for a firm between being responsible and being multinational.

This paper has shown that good CER firms can either be angels, locating in dirty countries and thus allowing these countries to improve their environmental standards; or demons, trying to hide their negative environmental behaviors abroad by exploiting the difference between *de facto* and *de jure* standards. Further investigations are therefore needed, in particular to explain the motivations of firms that both invest in CER and locate in dirty countries.

References

Ai, Chunrong, & Norton, Edward C. 2003. Interaction terms in logit and probit models. *Economics Letters*, **80**(1), 123–129.

Altomonte, C., & Rungi, A. 2013. *Business Groups as Hierarchies of Firms: Determinants of Vertical Integration and Performance.* mimeo - ÒPaolo BaffiÓ Centre Research.

Blonigen, Bruce A., & Piger, Jeremy. 2011 (Jan.). *Determinants of Foreign Direct Investment.* NBER Working Papers 16704. National Bureau of Economic Research, Inc.

Chatterji, Aaron K., Levine, David I., & Toffel, Michael W. 2009. How Well Do Social Ratings Actually Measure Corporate Social Responsibility? *Journal of Economics & Management Strategy*, **18**(1), 125–169.

Cole, Matthew A., & Fredriksson, Per G. 2009. Institutionalized pollution havens. *Ecological Economics*, **68**(4), 1239–1256.

Cole, Matthew A., Elliott, Robert J. R., & Fredriksson, Per G. 2006. Endogenous Pollution Havens: Does FDI Influence Environmental Regulations? *Scandinavian Journal of Economics*, **108**(1), 157–178.

Copeland, Brian R., & Taylor, M. Scott. 2004. Trade, Growth, and the Environment. *Journal of Economic Literature*, **42**(1), 7–71.

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

Dam, Lammertjan, & Scholtens, Bert. 2012. The curse of the haven: The impact of multinational enterprise on environmental regulation. *Ecological Economics*, **78**(C), 148–156.

EPI. 2008. *2008 Environmental Performance Index (EPI).* Yale Center for Environmental Law and Policy (YCELP)/Yale University, Center for International Earth Science Information Network (CIESIN)/Columbia University, World Economic Forum (WEF), Joint Research Centre (JRC)/European Commission. 2010. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). http://sedac.ciesin.columbia.edu/data/set/epi-environmental-performance-index-2010.

Eskeland, Gunnar S., & Harrison, Ann E. 2003. Moving to greener pastures? Multinationals and the pollution haven hypothesis. *Journal of Development Economics*, **70**(1), 1–23.

Fernández-Val, Iván. 2009. Fixed effects estimation of structural parameters and marginal effects in panel probit models. *Journal of Econometrics*, **150**(1), 71–85.

Greene, William. 2004. Fixed Effects and Bias Due to the Incidental Parameters Problem in the Tobit Model. *Econometric Reviews*, **23**(2), 125–147.

Hakkala, Katariina Nilsson, Norbäck, Pehr-Johan, & Svaleryd, Helena. 2008. Asymmetric Effects of Corruption on FDI: Evidence from Swedish Multinational Firms. *The Review of Economics and Statistics*, **90**(4), 627–642.

Harris, Chauncy D. 1954. The Market Factor in the Localization of Industry in the United States. *1nnals of the Association of American Geographers*, **64**, 315–348.

Heckman, J.J. 1981. The incidental parameters problem and the problem of initial conditions in estimating a discrete-time data stochastic process. *In:* Manski, C.F., & McFadden, D. (eds), *Structural Analysis of Discrete Data with Econometric Applications*. New York: MIT Press.

Hsiao, C. 1996. Logit and probit models. *In:* Matyas, L., & Sevestre, P. (eds), *The Econometrics of Panel Data: Handbook of Theory and Applications. Second Revised Edition*. Dordrecht: Kluwer Academic Publishers.

Igalens, J., & Gond, J.P. 2005. Measuring Corporate Social Performance in France: A Critical and Empirical Analysis of ARESE Data. *Journal of Business Ethics*, **56(2)**, 131–148.

Keller, Wolfgang, & Levinson, Arik. 2002. Pollution Abatement Costs and Foreign Direct Investment Inflows to U.S. States. *The Review of Economics and Statistics*, **84**(4), pp. 691–703.

List, John A., & Co, Catherine Y. 2000. The Effects of Environmental Regulations on Foreign Direct Investment. *Journal of Environmental Economics and Management*, **40**(1), 1 – 20.

Mayer, T., & Signago, S. 2006. *Note on cepii's distances measures.* mimeo.

Siegel, D.S., & Vitalino, D.F. 2007. An empirical analysis of the strategic use of Corporate Social Responsibility. *Journal of Economics and Management Strategy*, **16(3)**, 773–792.

6 Tables

Table 6: Location Determinants: Effect of CER and *De Jure* Standards

Dependant Variable	Location				
Specifications	(1)	(2)	(3)	(4)	(5)
CER	0.2151***	0.0227***	0.0220***		0.0259***
	(0.0081)	(0.00740)	(0.00742)		(0.00786)
CER * # of Treaties			0.00494	0.00213	0.00810
			(0.00488)	(0.00257)	(0.00524)
# of Treaties					0.0150***
					(0.00156)
Distance		-0.0838***	-0.0839***	-0.0481***	-0.0353***
		(0.00704)	(0.00704)	(0.00441)	(0.00311)
Com. Language		0.0428***	0.0428***	0.0294***	0.0503***
		(0.00724)	(0.00724)	(0.00485)	(0.0108)
Assets		0.0122**	0.0122**		0.0129**
		(0.00532)	(0.00532)		(0.00620)
Age		0.0129***	0.0129***		0.0147**
		(0.00189)	(0.00189)		(0.00218)
Op. Revenue		0.0485***	0.0485***		0.0550***
		(0.00255)	(0.00255)		(0.00324)
Liabilities		-0.0268***	-0.0268***		-0.0294***
		(0.00456)	(0.00456)		(0.00535)
Liquidity		0.00777***	0.00778***		0.00948***
		(0.00247)	(0.00247)		(0.00292)
# of Employees		0.00395***	0.00395***		0.00436***
		(0.000424)	(0.000424)		(0.000473)
GDP per Capita					0.0150***
					(0.00231)
GDP					0.0496***
					(0.00183)
Market Potential					0.00769
					(0.00783)
# of Days					-0.00650***
					(0.00241)
Observations	51,649	51,649	51,649	51,649	48,256
Pseudo R2	0.382	0.443	0.443	0.567	0.401

Note: Robust standard errors clustered at the origin-destination country pair level in parentheses,*** significant at 1%, ** at 5%, * at 10% level. Probit estimations including origin country, destination country, and NACE industry fixed effects in specifications 1 to 4. Specification 5 includes origin country and NACE industry fixed effects. Marginal effects computed at means. *CER* is the firm-level *Vigeo* score of *Corporate Environmental Responsibility*. *# of Treaties* is the destination country-specific standardized values of the count of "Participation in treaties (Climate change, Ozone Layer, CFC control, Law of the Sea, Biological diversity, Kyoto Protocol, CITES, CCD, Stockholm Convention)" and "Environmental strategies or action plans" and "Biodiversity assessments, strategies or action plans", provided by the World Bank. Both *CEP* and *# of Treaties* are centered.

Table 7: Location Determinants: Effect of CER and *De Facto* Standards

Dependant Variable	Location					
Specifications	(1)	(2)	(3)	(4)	(5)	(6)
CER	0.0305***		0.0349***	0.0345***		0.0374***
	(0.00694)		(0.00786)	(0.00756)		(0.00841)
CER * EPI	-0.168***	-0.0831***	-0.208***	-0.186***	-0.0449**	-0.219***
	(0.0485)	(0.0274)	(0.0585)	(0.0533)	(0.0210)	(0.0622)
EPI			0.231***			0.195***
			(0.0585)			(0.0283)
CER * # Treaties				0.00377	0.00179	0.00599
				(0.00501)	(0.00174)	(0.00511)
# Treaties						0.0116***
						(0.00156)
Distance	-0.0796***	-0.0439***	-0.0316***	-0.0856***	-0.0377***	-0.0331***
	(0.00669)	(0.00414)	(0.00302)	(0.00722)	(0.00348)	(0.00303)
Com. Language	0.0403***	0.0272***	0.0514***	0.0436***	0.0298***	0.0539***
	(0.00698)	(0.00457)	(0.0107)	(0.00750)	(0.00436)	(0.0109)
Assets	0.0121**		0.0122**	0.0121**		0.0125**
	(0.00507)		(0.00559)	(0.00551)		(0.00599)
Age	0.0121***		0.0131***	0.0132***		0.0141***
	(0.00178)		(0.00195)	(0.00195)		(0.00209)
Op. Revenue	0.0458***		0.0495***	0.0502***		0.0531***
	(0.00434)		(0.00305)	(0.00264)		(0.00319)
Liabilities	-0.0257***		-0.0270***	-0.0275***		-0.0285***
	(0.00434)		(0.00482)	(0.00473)		(0.00517)
Liquidity	0.00735***		0.00398***	0.00791***		0.00926***
	(0.00236)		(0.00265)	(0.00258)		(0.00282)
# of Employees	0.00369***		0.00398***	0.00400***		0.00423***
	(0.000402)		(0.000426)	(0.000438)		(0.000456)
GDP per capita			-0.00526**			0.00248
			(0.00266)			(0.00307)
GDP			0.0484***			0.0494***
			(0.00667)			(0.00177)
Market Potential			0.00667			0.00706
			(0.00722)			(0.00763)
# of Days			-0.00901***			-0.00738***
			(0.00226)			(0.00234)
Observations	51,649	51,649	49,764	49,387	49,387	48,256
Pseudo R2	0.445	0.569	0.405	0.442	0.570	0.404

Note: Robust standard errors clustered at the origin-destination country pair level in parentheses,*** significant at 1%, ** at 5%, * at 10% level. Probit estimations including origin country, destination country, and NACE industry fixed effects in specifications 1, 2, 4 and 5. Specifications 3 and 6 include firm and destination country fixed effects. Marginal effects computed at means. CER is the firm-level $Vigeo$ score of $Corporate\ Environmental\ Responsibility$. EPI is the destination country-specific $Environmental\ Performance\ Index$ provided by the Yale Center for Environmental Law and Policy (YCELP) and the Center for International Earth Science Information Network (CIESIN), Columbia University. $\#\ of\ Treaties$ is the destination country-specific standardized values of the count of "Participation in treaties" and "Environmental strategies or action plans" and "Biodiversity assessments, strategies or action plans", provided by the World Bank. Both CER, EPI and $\#\ of\ Treaties$ are centered.