Corporate social responsibility and financial markets

Dam, Lammertjan

Chapter 5

Corporate Social Responsibility and Multinational Enterprises' Location Decisions

5.1 Introduction

This chapter addresses the relation between the responsibility of the firm and its international locational choices based on countries' environmental regulation. Becchetti et al. (2005) show that large and international operating firms are more sensitive to demands from stakeholders to take account of many non-financial issues when conducting their business. It appears that they are urged to behave in a more socially responsible manner. Heal (2005) defines corporate social responsibility (CSR) as the extent to which firms internalize externalized costs and avoid distributional conflicts.[1] Companies are assumed to be socially responsible because they anticipate a net benefit from these actions. Examples of such benefits might include reputation enhancement, the ability to charge a premium price for their output, or the use of CSR to recruit and retain high quality employees. These benefits are presumed to offset the higher costs associated with CSR, since resources must be allocated to allow the firm to achieve CSR status. Theoretical studies emphasize how CSR activity is to be matrixed into a firm's strategy. We explore whether any 'res-

This chapter is based on Dam and Scholtens (2008).

[1] While definitions for CSR vary, the term generally refers to actions taken by firms with respect to their employees, communities, and the environment, which go beyond what is legally required of a firm. Recent theories of CSR (P. Bansal and Roth, 2000; Baron, 2001; McWilliams and Siegel, 2000, 2001; Bagnoli and Watts, 2003; Heal, 2005) assert that firms engage in "profit-maximizing" CSR.

ponsible' behavior can be found in the internationalization patterns of firms. In this respect, our research focuses on the so-called Pollution Haven Hypothesis (PHH). The PHH states that due to stronger environmental regulations in developed countries, firms in dirty sectors migrate toward poor countries with low environmental regulation (Mani and Wheeler, 1997). Various studies test the PHH and link foreign direct investment to environmental regulation (Sorsa, 1994; Levinson, 1996; Janicke et al., 1997; List and Co, 2000; List, 2001; Antweiler et al., 2001; Talkukdar and Meisner, 2001; Cole and Elliott, 2003; Damania et al., 2003; Eskeland and Harrison, 2003; Cole et al., 2006). We analyze how social responsibility of international firms interacts with environmental regulation, governance, and wealth of target countries.

International location decisions by MNE's are complex corporate decisions. For a brief review on international location decisions, see e.g. Dam et al. (2007). The economic rationale of the PHH is usually explained from a comparative advantage perspective: countries with little regulations put fewer restrictions on a firm's operations and fewer restrictions reduce non-market/indirect costs. The empirical evidence of the relevance of the PHH is at best mixed. Some studies present evidence in favor of the PHH (Low and Yeats, 1992; Xing and Kolstad, 2002; Mani and Wheeler, 1997). There are also arguments against the PHH, stating that due to an increase in "global eco-consciousness", multinationals are induced to innovate in cleaner production instead of migrating toward countries with poor environmental standards (Letchumanan and Kodama, 2000). Other studies find no evidence in favor for or against the PHH (Sorsa, 1994; Repetto, 1995). Data on regulation are often lacking, though. Therefore, proxies for environmental regulation such as corruption indices have been used to test the PHH (Smarzynska Javorcik and Wei, 2004). However, this complicates the interpretation of results.

If multinational enterprises apply their domestic standards in their overseas operations, we increasingly may expect that the poverty characteristics of a country will have less impact on firms' internationalization policies. Weak environmental regulation will not be regarded as a comparative advantage from the socially responsible firm's perspective. Then, the main hypothesis tested in this chapter is that socially responsible firms will be less likely to be located in countries with lax environmental regulations. We are well aware of the fact that the presence of a firm in a country may be the result of investment decisions made long ago, under possibly different regimes. The inertia would seem to blur the effects of regulation on the probability of firms having presence in those countries. However, we also witness that there is inertia in regulation and, especially, in its enforcement. Given that both

processes are slow, we expect that our analysis about regulatory quality and firms' social responsibility is informative in connection with the internationalization behavior of the firm.

Our study uses firm level data by Ethical Investment Research Services (EIRIS) on CSR and by AMADEUS on subsidiary location of 540 large European MNEs. We consider 44,149 subsidiaries located in 188 different countries. Apart from using the traditional proxies, such as corruption indices or wealth measures (e.g. GDP per capita), we also use more direct measures of country environmental regulation from the World Business Environment Survey (WBES) and from the World Development Indicators (WDI). We estimate a binary choice model to test whether firms that adopt a less stringent environmental standard are relatively more likely to be present in developing countries or countries with weak environmental regulation. As such, we investigate the relationship between CSR, wealth, and environmental quality by taking the international location behavior of large multinationals into account. We find that firms with low social responsibility locate their operations more often in countries with weak environmental regulation. The PHH-literature also focuses on unobserved heterogeneity and endogeneity of pollution regulations. For example, countries that receive lots of investment in polluting industries may levy strict regulations as a consequence. Countries that become richer as a consequence of investment may in turn levy stricter regulations. As our data about CSR are only available on a cross-section basis, we are unable to investigate the causal relation. Therefore, we provide preliminary evidence about the interaction between corporate social responsibility and the international location behavior of firms

This chapter adds to the existing literature in various ways. First of all, we test the PHH using actual location data of Multinational Enterprises. By using firm-level data we adopt a more direct analysis compared to other studies that test the PHH. Furthermore, we use country-level data that are a better indication of environmental regulation compared to the Pollution Abatement and Control Expenditures surveys of the OECD or other proxies used. We also shed some new light on whether poverty and poor environmental regulation are related. Finally, since we have firm-level data on corporate environmental standards, we add to the debate whether there is a technological shift due to increased responsibility or that there is migration behavior in line with the PHH. If we consider countries with high corruption or high poverty as being "havens" we do not find similar evidence. Thus, using corruption indices and income as proxies for the quality of environmental re-

gulation is not helpful as it leads to the wrong conclusions. The major finding of this study is that firms with good social responsibility tend to avoid locating their operations in countries where environmental regulation is weak. However, firms with poor social responsibility appear to move their operations to these countries. The structure of the remainder of this chapter is as follows. In section 5.2, we present our model and introduce our data. The results of our analysis and the discussion are in section 5.3. We conclude in section 5.4.

5.2 Data and methodology

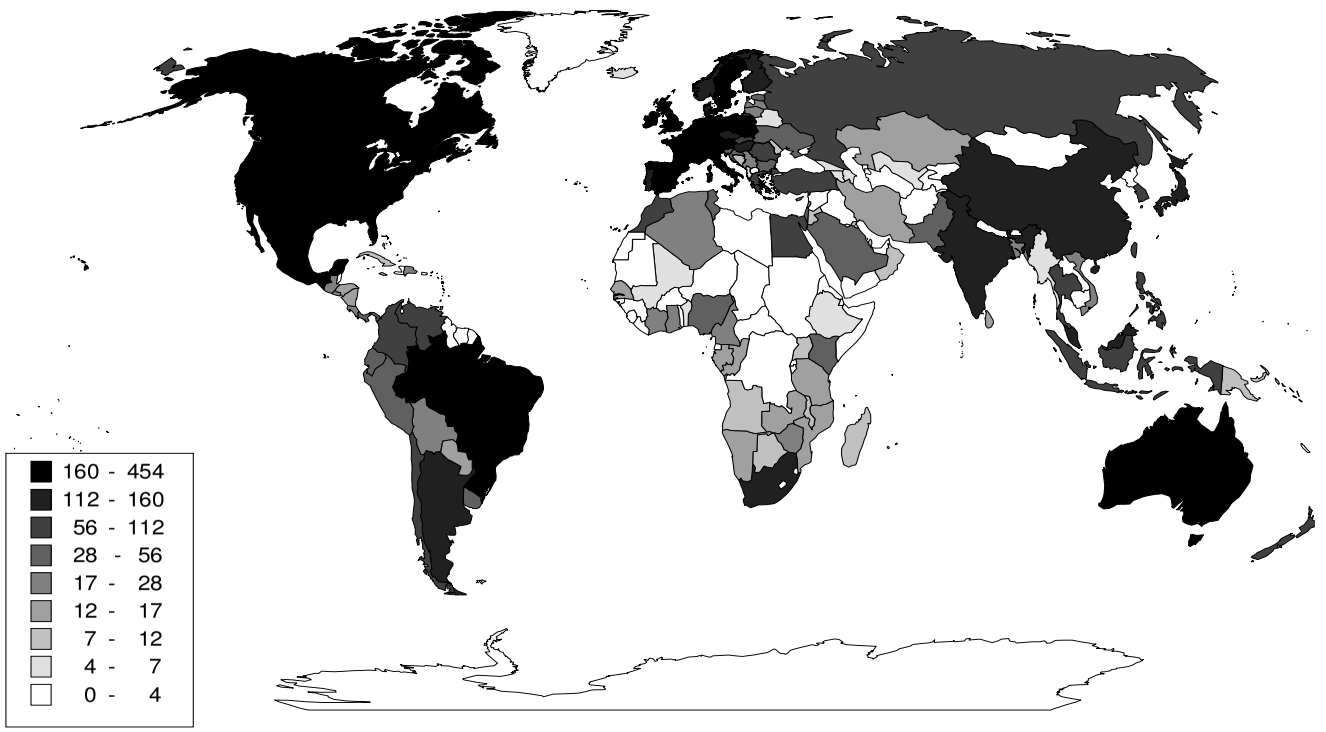
EIRIS has composed a cross-sectional dataset which covers 2685 MNEs, located world-wide and which contains information on company policy, reporting as well as on breaches by or convictions of the MNE. The topics that are dealt with are environmental issues, stakeholder issues, business ethics, and genetic engineering. Accordingly, for each topic ratings between -2 and 3 are assigned to individual companies. The details on CSR scoring are in the Appendix. (For detailed studies on country and industry differences based on the CSR scores, see Dam and Scholtens, 2005, 2006a, 2007). We used four variables as indicators of environmental quality: "Environmental Policy", "Environmental Management", "Environmental Reporting" and "Environmental Performance Impact Improvement". The descriptive statistics of these variables are reported in table 5.1. Since the variables take discrete values between -1 and 3, there is little variation in each individual variable. Therefore, we consider these indicators to have an underlying latent variable which measures a firm's environmental responsibility. We applied factor analysis to these four indicators to generate a single 'common' factor. Accordingly, we named the resulting factor scores "Environmental Responsibility" and used this variable in our econometric analysis.[2] Table 5.1 also shows that there is a high correlation between the four indicators of corporate environmental responsibility.

From the dataset, we selected companies that are in the Dow Jones Stoxx 600 selection list, a list of the largest publicly quoted European companies. Note that AMADEUS only covers Europe. We disregard financial institutions such as banks or insurance companies. Table 5.2 gives an overview of the number of multinational enterprises, classified by the country in which the company is chartered and by industry. We also visualize the global presence of the firms in figure 5.1.

Overall, it appears that most MNEs are based in the UK and a ranking of the

[2] The results of the factor analysis are comparable to the findings in Table 3.2.

Figure 5.1. Global presence of European based multinational enterprises



Number of Multinational Enterprises present in each country in in 2004, in the sample of the 540 largest European Multinational Enterprises.
Source: AMADEUS and own calculations.

Table 5.1. Descriptive statistics of variables representing environmental responsibility of multinational enterprises

			Correlations			
Variable	Mean	Standard Deviation	*Environmental Policy*	*Environmental Management*	*Environmental Reporting*	*Environmental Performance Impact Improvement*
Environmental Policy	0.26	1.41	1			
Environmental Management	0.41	1.71	0.79	1		
Environmental Reporting	−0.39	1.08	0.7	0.67	1	
Environmental Performance Impact Improvement	−0.16	1.18	0.72	0.68	0.69	1

Source: EIRIS.
For definitions of the variables see the Appendix

number of MNEs in each country is in accordance with what one would expect on the basis of population sizes of the countries. An exception, however, is Switzerland, which is relatively overrepresented in the sample. We observe that some countries are dominantly active in certain industries. For example, Spain and Italy have a relatively large share of companies in utilities, the Netherlands in the oil and gas industry and the UK dominates in consumer services.

Data on the international location of firms is extracted from reported subsidiaries of firms. To this extent, we have used AMADEUS, a large database that contains accounting information of European firms. Note that a subsidiary can have subsidiaries itself. Accordingly, AMADEUS classifies subsidiaries at different accounting levels, where each subsidiary level is divided into sublevels. Since there are various complex and exotic subsidiary structures, we only look at the subsidiaries at the highest reported level and use information on the country location of the subsidiary and the most recent information on sales and assets of the subsidiary (2004-2005). We created a balanced cross-section data set of 540 companies.

For each company we have information on presence in 233 countries (for a list of included countries see the Appendix), yielding vectors of 125,820 observations. Surely, not every individual firm has operations in each country. Impressively however, in 188 of the 233 countries at least one multinational is present. Table 5.3 gives an overview of the average number of countries an MNE is operating in by region and industry. It shows that, on average, an MNE is active in 17 countries. Firms

Table 5.2. Number of multinational enterprises by industry and home country.

Country	Basic Materials	Consumer Goods	Consumer Services	Health Care	Industrials	Oil & Gas	Technology	Telecommunications	Utilities	*All*
Austria	1	0	0	0	2	0	0	1	1	*5*
Belgium	2	1	2	1	1	0	0	2	1	*10*
Switzerland	5	4	1	8	10	0	2	1	0	*31*
Germany	5	9	7	7	14	0	3	1	2	*48*
Denmark	0	2	0	5	3	0	0	1	0	*11*
Spain	0	2	10	1	8	3	2	2	6	*34*
Finland	3	2	2	0	2	1	2	1	0	*13*
France	2	12	14	2	13	2	8	1	2	*56*
United Kingdom	15	32	73	9	61	7	19	6	12	*234*
Greece	0	1	2	0	1	1	0	2	1	*8*
Italy	0	4	7	0	4	2	1	3	6	*27*
Luxembourg	0	0	0	0	1	0	0	0	0	*1*
Netherlands	2	5	4	1	4	4	5	1	0	*26*
Norway	2	1	0	0	1	1	1	1	0	*7*
Portugal	0	0	1	0	1	0	0	1	1	*4*
Sweden	3	4	2	3	9	1	1	2	0	*25*
All	*40*	*79*	*125*	*37*	*135*	*22*	*44*	*26*	*32*	*540*

Source: AMADEUS.

that produce basic materials are active in more countries than firms from other industries and conduct most of their activities in Europe. It appears the oil and gas industry is most evenly scattered over the globe. The utilities industry scores the lowest on international presence. Moreover, most MNEs in the data set are active in the US and Canada, which explains the average of around two for the region Central and North America. The Eastern Asian, European and North American markets are by far the most attractive in absolute as well as in relative numbers. We also extracted firm specific control variables from the AMADEUS database. These are age of the MNE in years, number of employees, leverage as measured by debt divided by total assets, and liquidity as measured by liquid to total assets.

Table 5.3. Average number of countries in which MNEs are operating by industry and region

	Industry									
Region (Total #Countries)	Basic Materials	Consumer Goods	Consumer Services	Health Care	Industrials	Oil & Gas	Technology	Telecommunications	Utilities	*Average*
Africa (58)	2.1	2.1	0.7	0.8	1.5	3.4	0.5	0.5	0.3	*1.3*
Antarctica (4)	0	0	0	0	0	0	0	0	0	*0*
Caribbean & Bahamas (21)	0.4	0.5	0.1	0.2	0.3	1	0.2	0.7	0.1	*0.3*
Central & North America (13)	2.6	2.2	0.9	2.4	1.8	2.5	1.7	1.2	1	*1.7*
Eastern Asia (25)	4.3	3.6	1.2	3.9	2.4	2.1	2.6	0.8	0.4	*2.4*
Europe (45)	12	11.2	6.2	12	9.3	8	8.3	7.4	4.6	*8.7*
Middle East (15)	0.6	0.8	0.3	0.5	0.6	1	0.3	0.3	0.2	*0.5*
Oceania (29)	1	0.8	0.3	1	0.6	0.6	0.4	0.1	0.2	*0.6*
South America (13)	2.8	2.1	0.7	1.7	1.6	2.3	1.1	0.9	1.3	*1.5*
Western Asia (10)	0.2	0.2	0.1	0.1	0.1	0.3	0.1	0	0	*0.1*
World (233)	**25.8**	**23.4**	**10.5**	**22.6**	**18.3**	**21.1**	**15.3**	**12**	**8**	**17**

Source: AMADEUS and own calculations.
The entries are industry averages of the number of countries an MNE is operating in per region. Total number of countries per region is in parentheses. A list of countries included is in the Appendix. The column Average MNE is a sample average irrespective of industry and the row World is a sample average irrespective of Region.

Furthermore, we extracted market capitalization in billions of euros from the Dow Jones Stoxx 600 selection list. An overview of the descriptive statistics is in table 5.4. If one compares the median values to the mean of the variables age, employees, leverage, and the liquidity ratio in table 5.4, it becomes clear that these variables have a heavily skewed distribution. For example, an MNE has 35,048 employees on average, whereas an MNE has a median of 12,854 employees. To account for the skewness we calculated the natural logarithm of the variables. As expected, employees and market capitalization are highly correlated (correlation coefficient equals 0.61) as larger firms require both more capital and more labor in general. Age shows some correlation with employees and market capitalization. One can argue that the growth of MNEs is initially high, but as a certain level of size is reached, the additional years will not matter much to size. The liquidity ratio and leverage show no correlation with the other firm characteristics. Interestingly, the larger MNEs show behavior which is more environmentally responsible, as the variable environmental responsibility has a positive and relatively large correlation

Table 5.4. Descriptive statistics of multinational enterprises

						Correlations[a]					
Variable	Min	Max	Mean	Standard Deviation	Median	*Age*	*Employees*	*Market Capitalization*	*Liquidity*	*Leverage*	*Environmental Responsibility*
Age in Years	0	171	46	40	31	1					
Employees (1000s)	0.04	419.20	35.04	60.99	12.85	0.26	1				
Market Cap.(bEU)	0.13	155.89	6.37	14.75	1.95	0.15	0.61	1			
Liquidity (%)	0.08	16.72	1.3	1.22	1.01	−0.04	−0.08	−0.02	1		
Leverage (%)	0.05	1.51	0.62	0.18	0.63	0.03	0.26	0.03	−0.23	1	
Environmental Responsibility[b]	−1.5	1.82	0	0.97	0.2	0.12	0.36	0.47	−0.04	0.04	1

Source: EIRIS, AMADEUS and own calculations.
a In these correlations and all subsequent calculations, natural logarithms have been taken of Age, Employees, Market Cap. and Liquidity to account for the skewed distribution.
b Factor scores of the four environmental responsibility indicators listed in table 5.1.
For variable Definitions see the Appendix.

with employees and market capitalization.

We use three pairs of variables on the country level. We use two distinct sources each to measure environmental regulation, corruption, and poverty. To measure a country's environmental regulation standard, we use the World Business Environment Survey (WBES) 2000 by the World Bank Group, which contains information on financial and legal constraints for 79 countries. This data set is also used in the study by Beck et al. (2005). The advantage of this survey is that it measures the stringency of regulations that businesses experience in practice. A country can have very strict environmental laws, but these are not effective when they are not enforced. We also extracted the perceived corruption in a country from this dataset. We also use the World Development Indicators (WDI), e.g. we counted in how many international environmental treaties such as the Kyoto protocol a country is participating and how many international plans or strategies a country adopted. We also used the WDI dataset to get information on poverty. We first used a national poverty measure, namely the percentage of the population that is below the national poverty line. We also used an international poverty measure, namely the percentage of the population that has an income of less than 2 US$ a day (in

Table 5.5. Correlations of country characteristics

	Environmental Regulation	*Environmental Plans and Treaties*	*Control of Corruption*	*Corruption Perception*	*International Poverty*	*National Poverty*
Environmental Regulation	1					
Environmental Plans and Treaties	0.22	1				
Control of Corruption	0.11	0.05	1			
Corruption Perception	0.04	−0.01	0.97	1		
International Poverty	0.04	0.13	−0.5	−0.49	1	
National Poverty	0.05	−0.03	−0.41	−0.44	0.54	1

Sources: Transparancy International, World Development Indicators, World Business Environment Survey, Kaufmann et al. (2005). For variable definitions see the Appendix.

2005). The data on corruption is by Transparency International (TI). TI constructs a so-called Corruption Perceptions Index (CPI) 2004, rating 146 countries from 1 to 10 measuring corruption, with 1 being the most corrupt and 10 the least. In this index, Finland is the least corrupt and Haiti and Bangladesh are the most corrupt countries. Alternatively, we also use the Kaufmann et al. (2005) dataset. This set presents estimates of six dimensions of governance covering 209 countries and territories for five time periods: 1996, 1998, 2000, 2002 and 2004. The dimensions are Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. For robustness checks, we use the measure of corruption of this data set. We provide detailed variable definitions in the Appendix. An overview of the correlations of the country indicators is in table 5.5.

In table 5.5 we see that the three pairs of measures of corruption, environmental regulation, and poverty all are positively correlated. Higher values of Environmental Regulation and Corruption indicate better regulation and/or more favorable conditions. The correlation of poverty with control of corruption has the expected negative sign. However, the correlation with Environmental Regulation is weak for both Corruption and Poverty and differs in sign for the various combinations. To this extent, it appears that it matters which variable one uses to test the PHH. Is the pollution haven a haven of high corruption (as tested by Smarzynska Javorcik and Wei, 2004), a haven of low regulation, or is the haven to be associated with poverty?

We will consider all three variables in our analysis in the next section.

The methodology in this chapter is similar to Dam et al. (2007) and Dam and Scholtens (2006b). We estimate a binary location choice model, namely a conditional logit model (See McFadden, 1974). For a more detailed discussion on binary choice models we refer to Greene (2000). We assume that the choice of the subsidiary location is the dependent variable. For each firm, we try to explain the choice of whether or not to be present in a country. We constructed a binary variable Y_{ij} which is equal to 1 if company i has at least one subsidiary in country j. We assume that the benefits B_{ij} to MNE i, $(i = 1, ..., N)$ of locating in country j, $(j = 1, .., J)$ is a latent variable:

$$B_{ij} = D_{ij} + \epsilon_{ij} \tag{5.1}$$

Here, D_{ij} is the deterministic part and ϵ_{ij} an error term. D_{ij} is related to country characteristics z_j and parent-level firm group characteristics x_{kj} in the following way:

$$D_{ij} = x_{kj}\beta + z_j\gamma \tag{5.2}$$

Here we put a subscript j in the term x_{kj} , since we do not a priori exclude possible interaction between parent-level firm group characteristics and country characteristics. The MNE chooses the location if the benefits are high enough, say higher than $B*$, and we only observe this outcome. The probability of observing MNE i choosing location j is:

$$P_{ij} = P(Y_{ij} = 1) = P(B_{ij} > B*)$$

The actual outcome given D_{ij} eventually depends on the distribution of the error terms ϵ_{ij}.

We test whether there is a significant interaction effect between a firm's CSR score and a country's environmental regulation. We add the following control variables: age in years, number of employees, leverage as measured by debt divided by total assets, liquidity and market capitalization. We took the logarithm of all of these variables, except for leverage. We did this as the distribution of these variables is skewed. Theoretically, skewness is not a problem, since the model is still well-specified. However, due to a few very "large" observations the variation in the independent variables will be relatively small, especially if such variables are

interacted. We therefore smooth the skewed variables. Furthermore, we created a "home" dummy, which is equal to one if we consider subsidiaries located in the same country as where the MNE is based. We omitted the observations for which this dummy was equal to one. There has been some debate whether cultural distance is an important determinant in international diversification, e.g. a meta-analysis by Tihanyi et al. (2005) indicates that these differences do not seem to matter, particularly for firms based outside the US. Nonetheless, we add a colonial dummy variable, which is equal to one if the country where the subsidiary is located in is a former colony of the country where the MNE is headquartered. As such, we control for common language advantages, historical ties, or advantages of similarities of regulatory systems. Usually, a measure of Euclidian distance to the home country is also added as a control variable in spatial models. However, since all our firms are European-based the distances on a global scale will not vary that much and the country dummy will also account for spatial effects. We therefore estimate the following model:

$$E[Y_{ij}] = P(Y_{ij} = 1) = \Lambda(\alpha_j Country_j + \beta_k Industry_k + \eta FormerColony + \gamma_i Firm_i + \delta(EnvironmentalResponsibility_i \times CountryHaven_j)) \quad (5.3)$$

Here, Country and Industry are the country and industry fixed effects. Again, we omit the observation if firm i is based in country j, since in this case Y_{ij} is always equal to one. $FormerColony = 1$ if the country is a former colony of the country where the MNE is based. $EnvironmentalResponsibility_i$ is company i's environmental responsibility score. To account for potential clustering effects, we calculate t-values using the Huber-White robust standard errors. The models differ with respect to the operationalization of $CountryHaven_j$. In models 1 and 2, $CountryHaven_j$ is an indicator of country j 's Environmental Regulation. In models 3 and 4 we used a measure of Corruption in country j. In models 5 and 6 $CountryHaven_j$ is an indicator of country j 's Poverty. Λ is the logistic distribution. Higher values of $Responsibility_i$ indicate higher social responsibility, higher values of $CountryHaven_j$ indicate better perceived environmental regulation, lower levels of corruption, and higher levels of poverty. We are specifically interested in the sign and magnitude of the parameter δ of the interacted term, $Responsibility_i \times CountryHaven_j$. If polution havens exist, we expect to find a positive value for δ.

5.3 Results

The estimation results are in table 5.6. Note that differences in sample sizes due to data availability of some countries can explain the differences in the coefficients of the various models. For brevity sake, we do not report the country and industry fixed effects. Models 1 to 6 test for three possible "Havens". Models 1 and 2 directly test the classical pollution haven hypothesis, namely that low country environmental regulation is a haven for "dirty" industries. Models 3 and 4 test whether the same relation can be observed when countries are classified by corruption levels and models 5 and 6 test the relation when countries are classified by poverty levels.

We find a positive and significant parameter estimation of the interaction between *Environmental Responsibility* and *Environmental Regulation*, and *Environmental Responsibility* and *Environmental Plans and Treaties*, supporting the PHH. So, for both measures, we find evidence in favor of the PHH. It could be that this is just a tip of the iceberg and perhaps it is in fact the corrupt countries to which firms are transferring their operations. In this perspective, models 3 and 4 test whether there is an interaction effect between *Corruption* and *Environmental Responsibility*. Here, we do find a negative significant interaction effect for both corruption measures, indicating that less responsible firms are less present in corrupt countries. For models 5 and 6, in which the supposedly haven is one of poverty, we find weak positive to no significant interaction. Nonetheless, the main message of our analysis is that we find support for the PHH in connection with firms' CSR. Furthermore, we establish that using proxies for environmental regulation, such as corruption and poverty, instead of direct measures of environmental regulation, can possibly lead to the wrong conclusions.

The analysis does not acknowledge the situation that for so-called dirty industries the notion of a pollution haven might be more relevant than for clean industries. We therefore conducted the same analysis for a subset of firms, namely those that operate in dirty industries, which are Basic Materials, Consumer Goods, Oil & Gas, and Industrials. The estimation results are in table 5.7. We find a positive and significant interaction effect for *Environmental Plans and Treaties*, supporting the PHH. We do not find a significant effect for the interaction with *Environmental Regulation*, but this could be due to the reduced number of observations. The regression results of the subset of firms in clean industries (not reported), show no significant interaction effect with *Environmental Plans and Treaties*, making a stronger case for the PHH in relation to firms' responsibility. Thus, again, we see a negative effect

Table 5.6. Country presence of multinational enterprises and possible havens

Coefficient	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
(P-value)	The "Haven" in this model is:					
Control Variables	*Environmental Regulation*		*Corruption*		*Poverty*	
Log Market Capitalization	0.329^{***}	0.307^{***}	0.291^{***}	0.299^{***}	0.317^{***}	0.324^{***}
	(15.07)	(17.64)	(17.69)	(17.67)	(14.22)	(12.36)
Log Age	0.340^{***}	0.316^{***}	0.308^{***}	0.310^{***}	0.329^{***}	0.365^{***}
	(17.22)	(20.00)	(20.23)	(20.16)	(15.65)	(15.47)
Log Liquidity	0.244^{***}	0.242^{***}	0.237^{***}	0.248^{***}	0.159^{***}	0.139^{***}
	(6.60)	(8.31)	(8.76)	(8.95)	(4.85)	(3.56)
Leverage	-0.326^{**}	-0.333^{***}	-0.320^{***}	-0.279^{**}	-0.832^{***}	-0.891^{***}
	(-2.16)	(-2.76)	(-2.83)	(-2.46)	(-5.33)	(-4.92)
Log employees	0.457^{***}	0.444^{***}	0.436^{***}	0.438^{***}	0.517^{***}	0.507^{***}
	(18.70)	(22.65)	(23.57)	(23.01)	(24.31)	(18.53)
Former Colony	0.679^{***}	0.661^{***}	0.690^{***}	0.651^{***}	0.790^{***}	0.815^{***}
	(4.18)	(5.69)	(5.77)	(5.59)	(4.30)	(4.16)
Environmental Responsibility	-0.229^{***}	-0.231^{***}	-0.170^{***}	-0.179^{***}	-0.177^{***}	-0.172^{***}
	(-9.54)	(-11.19)	(-7.76)	(-8.08)	(-6.46)	(-5.69)
"Haven" interaction term						
Environmental Responsibility	0.045^{*}					
× Environmental Regulation	(1.94)					
Environmental Responsibility		0.066^{***}				
× Environmental Plans and Treaties		(4.30)				
Environmental Responsibility			-0.080^{***}			
× Control of Corruption			(-4.81)			
Environmental Responsibility				-0.079^{***}		
× Corruption Perception				(-4.64)		
Environmental Responsibility					0.047^{*}	
× International Poverty					(1.73)	
Environmental Responsibility						0.00
× National Poverty						(0.26)
Number of observations	36949	65923	81597	65001	69611	37802

The estimated logit model is: $Presence = E[Y_{ij}] = P(Y_{ij} = 1) = \Lambda(\alpha_j Country_j + \beta_k Industry_k + \eta FormerColony + \gamma_i Firm_i + \delta(EnvironmentalResponsibility_i \times CountryHaven_j))$. $Y_{ij} = 1$ if MNE i is present in country j. Λ is the logistic function, conditional on Country fixed effects. $FormerColony = 1$ if the country is a former colony of the country where the MNE is based. $Firm_i$ are the reported firm characteristics. $Industry$ are industry dummies. For $CountryHaven_j$ we used *Environmental Regulation*, *Environmental Plans and Treaties*, *Control of Corruption*, *Corruption Perception*, *International Poverty*, and *National Poverty* respectively. Higher values of *Environmental Responsibility* indicate higher social responsibility, higher values of *CountryHaven* indicate better regulation or higher levels of poverty. For brevity sake, the country and industry fixed effects are not reported. Definitions of the variables are in the Appendix. The t-values are calculated using the Huber-White robust standard errors.* indicates significance at ten, ** at five, and *** at one percent, respectively.

for the corruption measures, indicating that responsible firms are relatively more often located in corrupt countries. Finally, it appears that poverty has no significant effect on location behavior conditional on corporate environmental responsibility.

Table 5.7. Country presence of multinational enterprises in dirty industries and possible havens

Coefficient	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
(P-value)	The "Haven" in this model is:					
Control Variables	*Environmental Regulation*		*Corruption*		*Poverty*	
Log Market Capitalization	0.379^{***}	0.349^{***}	0.328^{***}	0.333^{***}	0.406^{***}	0.434^{***}
	(11.30)	(13.22)	(13.12)	(12.83)	(12.85)	(12.31)
Log Age	0.351^{***}	0.331^{***}	0.322^{***}	0.326^{***}	0.340^{***}	0.376^{***}
	(14.15)	(17.34)	(17.51)	(17.41)	(11.87)	(11.67)
Log Liquidity	0.288^{***}	0.297^{***}	0.291^{***}	0.305^{***}	0.182^{***}	0.160^{***}
	(6.35)	(7.67)	(8.02)	(8.17)	(4.05)	(3.15)
Leverage	-0.295^{**}	-0.390^{***}	-0.390^{***}	-0.311^{***}	-0.684^{***}	-0.813^{***}
	(-1.98)	(-3.16)	(-3.25)	(-2.66)	(-3.83)	(-3.82)
Log employees	0.387^{***}	0.381^{***}	0.379^{***}	0.376^{***}	0.421^{***}	0.401^{***}
	(13.85)	(16.22)	(16.70)	(16.18)	(14.63)	(11.80)
Former Colony	0.286^{**}	0.359^{***}	0.403^{***}	0.366^{***}	0.333^{**}	0.421^{***}
	(2.49)	(3.55)	(3.86)	(3.60)	(2.17)	(2.66)
Environmental Responsibility	0.01	-0.005	0.046^{*}	0.049^{**}	0.067^{**}	0.065^{*}
	(0.36)	(-0.22)	(1.90)	(2.01)	(2.24)	(1.83)
"Haven" interaction term						
Environmental Responsibility	0.031					
× Environmental Regulation	(1.23)					
Environmental Responsibility		0.065^{***}				
× Environmental Plans and Treaties		(4.22)				
Environmental Responsibility			-0.083^{***}			
× Control of Corruption			(-4.98)			
Environmental Responsibility				-0.081^{***}		
× Corruption Perception				(-4.92)		
Environmental Responsibility					0.04	
× International Poverty					(1.42)	
Environmental Responsibility						0.00
× National Poverty						(-0.09)
Number of observations	19161	33938	41108	33460	22226	19598

The estimated logit model is: $Presence = E[Y_{ij}] = P(Y_{ij} = 1) = \Lambda(\alpha_j Country_j + \beta_k Industry_k + \eta FormerColony + \gamma_i Firm_i + \delta(EnvironmentalResponsibility_i \times CountryHaven_j))$. The regression is conducted for a sub-sample of MNEs in dirty industries. $Y_{ij} = 1$ if MNE i is present in country j. Λ is the logistic function, conditional on Country fixed effects. $FormerColony = 1$ if the country is a former colony of the country where the MNE is based. $Firm_i$ are the reported firm characteristics. $Industry$ are industry dummies. For $CountryHaven_j$ we used *Environmental Regulation*, *Environmental Plans and Treaties*, *Control of Corruption*, *Corruption Perception*, *International Poverty*, and *National Poverty* respectively. Higher values of *Environmental Responsibility* indicate higher social responsibility, higher values of *CountryHaven* indicate better regulation or higher levels of poverty. For brevity sake, the country and industry fixed effects are not reported. Definitions of the variables are in the Appendix. The t-values are calculated using the Huber-White robust standard errors.* indicates significance at ten, ** at five, and *** at one percent, respectively.

As a last robustness check, we estimate the model for a subset of non-OECD and other non-high income countries. The estimation results are in table 5.8. Again

we find support for the PHH, as reflected by the positive and significant interaction of environmental responsibilities with both measures of environmental standards. For the corruption measures, we do not find a significant interaction effect, as opposed to the previous steps in the analysis. This could be due to the little variation in corruption for the subset of poor countries. Finally, the fact that poverty is not a potential haven seems to be a robust result as we do not find a significant interaction effect with either measure. However, there is also little variation in poverty levels for the subset of poor countries, which could explain the insignificance.

Thus, although the effect we find about firms' responsibility in relation to their presence in countries with particular characteristics is statistically significant, one might question whether the effect is economically large enough to speak of true pollution havens. However, measuring this is a general problem, not just in our analysis. Note that the evidence is based mainly on firm policy, not on firm performance, given the nature of our responsibility indicators. The actual differences in levels of pollution associated with differences in environmental responsibility scores might be considerable. So, on the one hand, there might even be a stronger "haven" effect than we observe. Then again, details on how "irresponsible" firms diversify their operations in every country are not in our dataset. We can only note that certain types of firms are relatively more present in countries with low regulation; we do not know the exact nature of their activities. It could be that these 'dirty' MNEs are abusing low regulation countries. On the other hand, for instance, they might produce their goods in the home country and simply distribute through the subsidiaries in the other countries. One has to be careful to conclude that firms with lower responsibility are actually conducting PHH behavior without knowing the exact levels and location of pollution. Furthermore, our analysis is merely descriptive, as with a cross-sectional dataset we cannot account for endogeneity problems or causal relations on which the recent literature (e.g. Cole et al., 2006) has focused. Elaborating on the dataset is a major challenge in our future research. Nevertheless, we would like to classify our findings about the locational behavior of MNEs in connection with their corporate social responsibility as "strong circumstantial evidence" in favor of the PHH.

5.4 Conclusion

This chapter investigates the relationship between the corporate social responsibility and location choices of Multinational Enterprises (MNEs) and environmental

Table 5.8. Country presence of multinational enterprises and possible havens in poor countries

Coefficient	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
(P-value)	The "Haven" in this model is:					
Control Variables	*Environmental Regulation*		*Corruption*		*Poverty*	
Log Market Capitalization	0.338***	0.325***	0.318***	0.328***	0.326***	0.324***
	(13.31)	(14.24)	(14.17)	(14.34)	(13.87)	(12.36)
Log Age	0.335***	0.336***	0.339***	0.335***	0.332***	0.365***
	(14.41)	(15.83)	(16.43)	(16.08)	(14.78)	(15.47)
Log Liquidity	0.169***	0.149***	0.160***	0.162***	0.157***	0.139***
	(4.58)	(4.47)	(4.96)	(4.97)	(4.54)	(3.56)
Leverage	−0.692***	−0.866***	−0.829***	−0.764***	−0.814***	−0.891***
	(−4.22)	(−5.28)	(−5.19)	(−4.90)	(−4.96)	(−4.92)
Log employees	0.507***	0.517***	0.513***	0.507***	0.514***	0.507***
	(20.54)	(23.59)	(24.03)	(23.47)	(22.54)	(18.53)
Former Colony	0.808***	0.788***	0.811***	0.801***	0.793***	0.815***
	(3.80)	(4.53)	(4.72)	(4.58)	(4.30)	(4.16)
Environmental Responsibility	−0.207***	−0.227***	−0.192***	−0.199***	−0.179***	−0.172***
	(−7.13)	(−7.38)	(−7.01)	(−6.96)	(−6.59)	(−5.69)
"Haven" interaction term						
Environmental Responsibility	0.071***					
× Environmental Regulation	(3.18)					
Environmental Responsibility		0.057*				
×Environmental Plans and Treaties		(1.83)				
Environmental Responsibility			0.02			
× Control of Corruption			(0.59)			
Environmental Responsibility				0.01		
× Corruption Perception				(0.18)		
Environmental Responsibility					0.03	
×International Poverty					(1.21)	
Environmental Responsibility						0.00
× National Poverty						(0.26)
Number of observations	32270	53015	61313	49788	41951	37802

The estimated logit model is: $Presence = E[Y_{ij}] = P(Y_{ij} = 1) = \Lambda(\alpha_j Country_j + \beta_k Industry_k + \eta FormerColony + \gamma_i Firm_i + \delta(EnvironmentalResponsibility_i \times CountryHaven_j))$. The regression is conducted for a sub-sample of non-OECD countries and other non-high-income countries. $Y_{ij} = 1$ if MNE *i* is present in country *j*. Λ is the logistic function, conditional on Country fixed effects. $FormerColony = 1$ if the country is a former colony of the country where the MNE is based. $Firm_i$ are the reported firm characteristics. $Industry$ are industry dummies. For $CountryHaven_j$ we used *Environmental Regulation*, *Environmental Plans and Treaties*, *Control of Corruption*, *Corruption Perception*, *International Poverty*, and *National Poverty* respectively. Higher values of *Environmental Responsibility* indicate higher social responsibility, higher values of *CountryHaven* indicate better regulation or higher levels of poverty. For brevity sake, the country and industry fixed effects are not reported. Definitions of the variables are in the Appendix. The t-values are calculated using the Huber-White robust standard errors.* indicates significance at ten, ** at five, and *** at one percent, respectively.

regulation, governance, and wealth of countries. More specifically, we address the question whether MNEs transfer their "dirty" operations toward poor countries, corrupt countries or countries with low environmental regulation; the so-called Pollution Haven Hypothesis (PHH). We relate this issue to the responsibility of the firm. In this perspective, we regard corporate social responsibility as the extent to which a firm internalizes market costs. Firms that set high internal environmental standards will not experience a supposedly comparative advantage when locating in countries with poor environmental regulation. On the other hand, firms with little environmental responsibility might have incentives to engage in PHH behavior. Using firm level data and direct measures of a country's environmental regulation, we find new evidence that for firms with weak environmental standards PHH behavior can be observed. However, if we consider countries with high corruption or high poverty as being "havens" we do not find similar evidence. Thus, we establish that it is predominantly firms with poor social responsibility that appear to move their operations to countries with weak regulation. The 'good', i.e. most responsible firms tend to avoid locating their operations in these countries. As such, we conclude that CSR does matter with respect to MNEs locational behavior.

5.A Appendix

Table 5.A.1. Variable definitions and sources

Variable	Definition	Source
Environmental Performance Impact Improvement	"What level of improvements in environmental impact can the Company demonstrate?" (No data or inadequate data=-1, No improvement=0, Minor improvement=1, Significant improvement=2, Major improvement=3).	EIRIS
Environmental Reporting	"How does EIRIS rate the company's environmental reporting?" (Inadequate = -1, Weak = 0 Moderate = 1, Good =2, Exceptional = 3).	EIRIS
Environmental Management	"How does EIRIS rate the company's environmental management system?" (Inadequate = -1, Weak = 0, Moderate = 1, Good =2, Exceptional = 3).	EIRIS
Environmental Policy	"How does EIRIS rate the company's environmental policy and commitment?" (Inadequate = -1, Weak = 0, Moderate = 1, Good =2, Exceptional = 3).	EIRIS
Environmental Responsibility	Factor Scores based on a factor analysis of the above four Corporate Environmental responsibility indicators.	Own Calculations
Total Assets	Reported total assets as of 2004 in thousands of U.S. dollars.	AMADEUS
Leverage	Ratio of (current liabilities + non-current liabilities)/total assets $\times$ 100 as of 2004.	AMADEUS
Age	Age in years of the company as of 2004, based on the reported date of incorporation.	AMADEUS
Employees	Number of reported employees as of 2004.	AMADEUS
Liquidity	Reported Liquidity ratio (%) as of 2004.	AMADEUS
Market Cap	Free Float MCap (in Billion euros) as of 03-01-2005.	Dow Jones Stoxx
International Poverty	Percentage of the population below $2 a day.	World Development Indicators
National Poverty	Percentage of the population below the national poverty line.	World Development Indicators
Environmental plans and Treaties	Standardized values of the count of "Participation in treaties (Climate change, Ozone Layer, CFC control, Law of the Sea, Biological diversity, Kyoto protocol)" and "Environmental strategies or action plans" and "Biodiversity assessments, strategies or action plans".	World Development Indicators

Table 5.A.1. Variable definitions and sources (continued)

Variable	Definition	Source
Corruption Perception Index (CPI)	Standardized values of 2004 Corruption Perceptions Index (CPI) (CPI Score relates to perceptions of the degree of corruption as seen by business people and country analysts and ranges between 10 (highly clean) and 0 (highly corrupt)).	Transparency International
Environmental Regulation	Standardized country averages of : "Please judge on a four point scale how problematic are these different regulatory areas for the operation and growth of your business; Environmental regulations: 1 = No Obstacle, 2 = Minor Obstacle, 3 = Moderate Obstacle, 4 = Major Obstacle".	World Business Environment Survey (WBES)
Control of Corruption	Based on several hundred indicators, drawn from 37 separate data sources constructed by 31 different organisations. Compiled using an unobserved component technique by Kaufmann et al. (2005).	Worldbank, see Kaufmann et al. (2005)

Table 5.A.2. List of included countries and region according to the World Bank classification

Country Name	**Region**
Andorra	Europe
United Arab Emirates	Middle East
Afghanistan	Western Asia
Antigua and Barbuda	Carribean and Bahama Islands
Anguilla	Carribean and Bahama Islands
Albania	Europe
Armenia	Western Asia
Netherlands Antilles	Carribean and Bahama Islands
Angola	Africa
Antarctica	Antarctica
Argentina	South America
American Samoa	Oceania
Austria	Europe
Australia	Oceania
Aruba	Carribean and Bahama Islands
Azerbaijan	Western Asia
Bosnia and Herzegovina	Europe
Barbados	Carribean and Bahama Islands
Bangladesh	Eastern Asia
Belgium	Europe
Burkina Faso	Africa
Bulgaria	Europe
Bahrain	Middle East
Burundi	Africa
Benin	Africa
Bermuda	Central and North America
Brunei Darussalam	Eastern Asia
Bolivia	South America
Brazil	South America
Bahamas	Carribean and Bahama Islands
Bhutan	Eastern Asia
Bouvet Island	Antarctica
Botswana	Africa
Belarus	Europe
Belize	Central and North America
Canada	Central and North America

Table 5.A.2. List of included countries (continued)

Country Name	Region
Cocos Islands (or Keeling Islands)	Oceania
Congo (Democratic Republic of)	Africa
Central African Republic	Africa
Congo	Africa
Switzerland	Europe
Cte dIvoire	Africa
Cook Islands	Oceania
Chile	South America
Cameroon	Africa
China, Peoples Republic of	Eastern Asia
Colombia	South America
Costa Rica	Central and North America
Serbia and Montenegro	Europe
Cuba	Carribean and Bahama Islands
Cape Verde	Africa
Christmas Islands	Oceania
Cyprus	Europe
Czech Republic	Europe
Germany	Europe
Djibouti	Africa
Denmark	Europe
Dominica	Carribean and Bahama Islands
Dominican Republic	Carribean and Bahama Islands
Algeria	Africa
Ecuador	South America
Estonia	Europe
Egypt	Africa
Eritrea	Africa
Spain	Europe
Ethiopia	Africa
Finland	Europe
Fiji	Oceania
Falkland Islands	South America
Micronesia (Federated States of)	Oceania
Faroe Islands	Europe
France	Europe
Gabon	Africa

Table 5.A.2. List of included countries (continued)

Country Name	Region
United Kingdom	Europe
Grenada	Carribean and Bahama Islands
Georgia	Western Asia
Ghana	Africa
Gibraltar	Europe
Greenland	Central and North America
Gambia	Africa
Guinea	Africa
Equatorial Guinea	Africa
Greece	Europe
Sth. Georgia and Sandwich Isl.	Antarctica
Guatemala	Central and North America
Guam	Oceania
Guinea-Bissau	Africa
Guyana	South America
Hong Kong	Eastern Asia
Heard Island and McDonald Isl.	Oceania
Honduras	Central and North America
Croatia	Europe
Haiti	Carribean and Bahama Islands
Hungary	Europe
Indonesia	Eastern Asia
Ireland	Europe
Israel	Middle East
India	Eastern Asia
British Indian Ocean Territory	Africa
Iraq	Middle East
Iran (Islamic Republic of)	Middle East
Iceland	Europe
Italy	Europe
Jamaica	Carribean and Bahama Islands
Jordan	Middle East
Japan	Eastern Asia
Kenya	Africa
Kyrgyzstan	Western Asia
Cambodia	Eastern Asia
Kiribati	Oceania

Table 5.A.2. List of included countries (continued)

Country Name	Region
Comoros	Africa
St Kitts and Nevis	Carribean and Bahama Islands
Korea, Democratic People's Rep.	Eastern Asia
Korea, Republic of	Eastern Asia
Kuwait	Middle East
Cayman Islands	Carribean and Bahama Islands
Kazakhstan	Western Asia
Lao, People's Democratic Republic	Eastern Asia
Lebanon	Middle East
St Lucia	Carribean and Bahama Islands
Liechtenstein	Europe
Sri Lanka	Eastern Asia
Liberia	Africa
Lesotho	Africa
Lithuania	Europe
Luxembourg	Europe
Latvia	Europe
Libyan Arab Jamahiriya	Africa
Morocco	Africa
Moldova (Republic of)	Europe
Madagascar	Africa
Marshall Islands	Oceania
Macedonia	Europe
Mali	Africa
Myanmar	Eastern Asia
Mongolia	Eastern Asia
Macao	Eastern Asia
Northern Mariana Islands	Oceania
Mauritania	Africa
Montserrat	Carribean and Bahama Islands
Malta	Europe
Mauritius	Africa
Maldives	Eastern Asia
Malawi	Africa
Mexico	Central and North America
Malaysia	Eastern Asia
Mozambique	Africa

Table 5.A.2. List of included countries (continued)

Country Name	Region
Namibia	Africa
New Caledonia	Oceania
Niger	Africa
Norfolk Island	Oceania
Nigeria	Africa
Nicaragua	Central and North America
Netherlands	Europe
Norway	Europe
Nepal	Eastern Asia
Nauru	Oceania
Niue	Oceania
New Zealand	Oceania
Oman	Middle East
Panama	Central and North America
Peru	South America
French Polynesia	Oceania
Papua New Guinea	Oceania
Philippines	Eastern Asia
Pakistan	Western Asia
Poland	Europe
St Pierre and Miquelon	Central and North America
Pitcairn	Oceania
Porto Rico	Carribean and Bahama Islands
Occupied Palestinian Territory	Middle East
Portugal	Europe
Palau	Oceania
Paraguay	South America
Qatar	Middle East
Romania	Europe
Russian Federation	Europe
Rwanda	Africa
Saudi Arabia	Middle East
Solomon Islands	Oceania
Seychelles	Africa
Sudan	Africa
Sweden	Europe
Singapore	Eastern Asia

Table 5.A.2. List of included countries (continued)

Country Name	Region
Saint Helena	Africa
Slovenia	Europe
Slovakia	Europe
Sierra Leone	Africa
San Marino	Europe
Senegal	Africa
Somalia	Africa
Suriname	South America
Sao Tome and Principe	Africa
El Salvador	Central and North America
Syrian Arab Republic	Middle East
Swaziland	Africa
Turks and Caicos Islands	Carribean and Bahama Islands
Chad	Africa
French Southern Territories	Antarctica
Togo	Africa
Thailand	Eastern Asia
Tajikistan	Western Asia
Tokelau	Oceania
Timor-Leste	Eastern Asia
Turkmenistan	Western Asia
Tunisia	Africa
Tonga	Oceania
Turkey	Middle East
Trinidad and Tobago	Carribean and Bahama Islands
Tuvalu	Oceania
Taiwan	Eastern Asia
Tanzania (United Republic of)	Africa
Ukraine	Europe
Uganda	Africa
U. S. Minor Outlying Islands	Oceania
United States	Central and North America
Uruguay	South America
Uzbekistan	Western Asia
Holy See (Vatican)	Europe
St Vincent and Grenadines	Carribean and Bahama Islands
Venezuela	South America

Table 5.A.2. List of included countries (continued)

Country Name	**Region**
Virgin Islands (British)	Carribean and Bahama Islands
Virgin Islands (US)	Carribean and Bahama Islands
Viet-Nam	Eastern Asia
Vanuatu	Oceania
Wallis and Futuna	Oceania
Samoaemen	Oceania
Ceuta	Africa
Melilla	Africa
Yemen	Middle East
Mayotte	Africa
South Africa	Africa
Zambia	Africa
Zimbabwe	Africa