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MULTINATIONAL COMPANIES AND THE NATURAL ENVIRONMENT: DETERMINANTS OF GLOBAL ENVIRONMENTAL POLICY STANDARDIZATION

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This study analyzes the determinants of global standardization of multinational companies' environmental policies. Survey data from the chemical industry show that MNCs standardize different environmental policy dimensions in response to pressures from different external stakeholders. MNC characteristics also affect environmental policy standardization. Findings demonstrate that the nature of stakeholder demands affects firms' responses to stakeholder pressures. Because environmental policy standardization reduces MNCs' ability to exploit cross-country differences in environmental regulations, these findings also have important implications for the self-regulation of MNCs' environmental conduct.

The environmental conduct of multinational companies (MNCs) is very controversial. On the one hand, it has been argued that MNCs exploit cross-country differences in environmental regulations by locating dirty operations in countries with lax environmental regulations and by adapting their subsidiaries' environmental policies, technologies, and standards to local country conditions (Gladwin, 1987; Korten, 1995; Vernon, 1998). On the other hand, it has been suggested that MNCs increasingly self-regulate their environmental conduct (Christmann & Taylor, 2001; Rappaport & Flaherty, 1992; United Nations, 1993). Self-regulation refers to a firm's adoption of environmental policies or performance standards that exceed the requirements of government regulations. MNCs can self-regulate their environmental conduct by standardizing their environmental policies worldwide, thus reducing their ability to exploit cross-country differences in environmental regulations. Although evidence from the 1970s and 1980s supports the adaptation of MNCs' environmental policies and standards to local conditions (Gladwin, 1987; United Nations, 1988), more recent evidence suggests that MNCs are increasingly implementing more globally uniform environmental policies (Brown, Derr, Renn, & White, 1993; Dowell, Hart, & Yeung, 2000; Rappaport & Flaherty, 1992). How-

ever, little is known about the factors that cause MNCs to standardize their environmental policies on a global basis, and more research is needed to address this question (Dowell et al., 2000). In this paper, I identify determinants of MNCs' global environmental policy standardization and empirically analyze their importance.

To address this issue, I drew on the international management and environmental management literatures. The international management literature suggests that MNCs can implement strategies that range from nationally responsive and adapted to country markets to globally integrated and standardized (Bartlett & Ghoshal, 1989; Prahalad & Doz, 1987; Yip, 1992). Empirical studies have analyzed determinants of global standardization for MNCs' overall strategies as well as for different functional strategies (Hannon, Huang, & Jaw, 1995; Johansson & Yip, 1994; Kobrin, 1991; Laroche, Kirpalani, Pons, & Zhou, 2001). In the environmental management literature, studies have examined determinants of firms' environmental conduct in single-country settings (Aragón-Correa, 1998; Arora & Cason, 1995; Christmann & Taylor, 2001; Henriques & Sadosky, 1996; Sharma, 2000). Both external stakeholders and internal firm characteristics have been identified as determinants of firms' global strategy standardization and environmental conduct. Consequently, I included both sets of variables in my study.

My analysis of external stakeholder pressures addresses an important research question that has not yet received attention in the stakeholder management and environmental management literatures: How does the nature of pressures applied by different external stakeholders affect firms' responses? The stakeholder management literature has been

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concerned with identifying stakeholders (Mitchell, Agle, & Wood, 1997). Although the ability to influence firms is widely considered an important stakeholder attribute (Brenner, 1995; Freeman, 1984; Starik, 1994), very little empirical research has investigated how firms respond to different stakeholders' demands (Berman, Wicks, Kotha, & Jones, 1999). In the environmental management literature, studies of determinants of environmental conduct have operationally defined environmental conduct as a unidimensional construct, using variables such as environmental commitment (Henriques & Sadosky, 1996), overall environmental strategy (Sharma, 2000), or adoption of voluntary environmental initiatives such as the ISO 14001 environmental management system (Christmann & Taylor, 2001). An assumption in these studies is that firms respond to the demands by each stakeholder included in the study by manipulating the chosen measure of environmental conduct. The present study identifies three distinct dimensions of global environmental policy standardization, which allowed me to analyze how the nature of demands imposed by different stakeholders affects firm responses.

Distinguishing three dimensions of environmental policy standardization also allowed me to refine my investigation of MNCs' responses to pressures for global environmental policy standardization. I investigated whether MNCs respond to different pressures for global environmental policy standardization with self-regulation policies, by globally standardizing policy dimensions that can reduce their environmental impact, or whether they respond with public relations policies, by standardizing policy dimensions that are intended to influence public perception of the MNCs' global environmental conduct? A better understanding of the factors that contribute to global environmental self-regulation by MNCs can help businesses, governments, and other stakeholders to work toward more effectively protecting the natural environment.

THEORY AND HYPOTHESES

Dimensions of Global Environmental Policy Standardization

I identified three dimensions of global environmental policy standardization from a review of the literature on the cross-country organization of MNCs' environmental policies: (1) the level at which an MNC sets minimum worldwide environmental performance standards; (2) the extent to which an MNC standardizes its operational envi-

ronmental policies globally; and (3) the extent to which an MNC standardizes the content of its environmental communication globally.

Global standardization of all aspects of an MNC's environmental policy is complicated by differences among the countries in which it operates, which include differences in environmental regulations, in existing environmental infrastructure, and in education of the workforce (Brown et al., 1993; Rappaport & Flaherty, 1992). Therefore, many MNCs aim at standardizing the environmental impact of their operations across countries, while allowing their country subsidiaries to adapt policies, procedures, and technologies to local conditions. MNCs can achieve these goals by setting minimum environmental performance standards for all their operations worldwide.

Alternatively, MNCs can focus on standardizing the content of their environmental policies. My review of the literature revealed two content dimensions of environmental policies that MNCs can standardize globally (Brown et al., 1993; Rappaport & Flaherty, 1992; United Nations, 1993). The first dimension includes operational environmental policies, such as environmental management practices, environmental control and auditing procedures, management incentives for environmental performance, and environmental technologies used in operations (Rappaport & Flaherty, 1992). The second dimension includes the content of environmental messages in advertising and in communications to the public (United Nations, 1993).

MNCs can implement each of these environmental policy standardization dimensions on a continuum ranging from national differentiation, in which country subsidiaries determine their environmental standards and policies, to global standardization, in which corporate headquarters set high global environmental performance standards and establish environmental policies for all facilities worldwide.

Only two of these three global environmental policy standardization dimensions—setting stringent minimum global environmental performance standards and standardizing operational environmental policies—reduce MNCs' ability to take advantage of cross-country differences in environmental regulations, and thus constitute self-regulation. The third dimension, global standardization of environmental communication, aims to inform and influence external constituencies but does not affect the environmental impact of operations. Thus, standardization of communication can be seen as a public relations strategy rather than a self-regulation strategy.

External Stakeholder Pressures for Global Environmental Policy Standardization

I included three types of external stakeholders—governments, industry participants, and customers—in my study. Existing research in domestic settings has shown that these three types of stakeholders influence firms' environmental conduct, especially in the industry selected for this study, the chemical industry. This suggests that firms perceive these stakeholders and their demands to be salient (Mitchell et al., 1997). In addition, these stakeholders are not only concerned about firms' domestic environmental conduct, but also care about MNCs' global environmental conduct. Furthermore, the natures of these stakeholders' demands for global environmental policy standardization differ, so that I could analyze whether firms responded to different stakeholders' pressures with different policies. Of course, other stakeholders, such as environmental interest groups, also aim to affect firms' environmental conduct. As I discuss below, these other stakeholders affect firms' environmental conduct indirectly, by shaping the demands that the stakeholders included in my study impose on firms.

Government pressures. Governments aim to control the environmental conduct of firms under their jurisdiction by imposing and enforcing environmental regulations. Empirical studies have identified regulatory pressures as a main determinant of firms' domestic environmental conduct in various countries (Dasgupta, Hettige, & Wheeler, 2000; Henriques & Sadosky, 1996).

Although most environmental regulations are still designed, implemented, and enforced at the level of nation states, international government cooperation in the area of environmental protection has increased (Rugman & Verbeke, 1998). Most of the more than 200 multilateral environmental treaties came into existence after the United Nations Conference on the Human Environment in 1972 (United Nations, 2000). Environmental cooperation has become an important element of regional economic and trade blocks, such as the European Union and NAFTA (Rugman, Kirton, & Soloway, 1999; Vernon, 1998). Countries have also agreed on global environmental treaties that are open to any country, such as the 1987 Montreal Protocol for the Protection of the Ozone Layer and 1997 Kyoto Protocol. This rise in international government cooperation contributes to harmonization of environmental regulations across countries, which reduces opportunities for MNCs to take advantage of cross-country differences in regulations and thus may

contribute to global standardization of MNCs' environmental policies.

Most multilateral environmental treaties specify desired environmental goals in terms of outcomes, such as percentage reductions in emissions of certain substances (Levy, 1997), but they leave discretion as to how to incorporate these goals into national regulations to national governments. Thus, MNCs that face international regulatory pressures can be expected to design global environmental policies that focus on performance outcomes rather than on standardizing their environmental policy content globally. They can do this by setting high global environmental performance standards for all their operations, thus assuring some minimum level of global environmental performance that is consistent with international treaties, while at the same time allowing national subsidiaries flexibility to adjust the content of local environmental policies to differences in national implementations of international treaties. For example, the seven MNCs in the Partnership for Climate Action have voluntarily adopted stringent emission reduction standards for greenhouse gases in anticipation of global regulation by the Kyoto Protocol.

Hypothesis 1. There is a positive relationship between an MNC's management's expectations about the international harmonization of environmental regulations and the company's level of minimum internal global environmental performance standards.

Industry pressures. Various stakeholders aim to influence firms' environmental conduct by pressuring them to legitimize their behavior and conform to social norms (DiMaggio & Powell, 1983). In the chemical industry, industry associations play an important role in setting industry norms for environmental conduct; the goal of these norms is to protect the collective reputation of the industry (Hoffman, 1999; King & Lenox, 2000). Industry pressures for environmental responsibility can also result from competitors' actions. Firms aim to enhance their legitimacy by imitating successful competitors (Abrahamson & Rosenkopf, 1993), especially when faced with high uncertainty (DiMaggio & Powell, 1983). Many managers are not certain how to best respond to environmental issues (Jennings & Zandbergen, 1995). Accordingly, it is not surprising that research confined to domestic settings has shown imitation of competitors' environmental conduct to be the dominant approach for firms that wanted to assure that their responses met the norms required to maintain legitimacy (Bansal & Roth, 2000).

MNCs operate in a complex legitimating environ-

ment that includes all home and host country institutional environments and supranational institutions (Kostova & Zaheer, 1999). Within this legitimating environment, country-based and supranational industry associations have proposed various voluntary environmental codes of conduct for firms (United Nations, 2000). The term "voluntary" refers here to initiatives that are not directly mandated by government regulations. In recent years, many of these codes of conduct have started to explicitly advocate MNC adoption of global environmental policies. For example, the International Chamber of Commerce's Business Charter for Sustainable Development, which appeared in 1991, requires firms subscribing to its principles to "apply the same environmental criteria internationally" (International Chamber of Commerce, 1991). Other voluntary initiatives have been adopted by national partner organizations in various countries. For example, the Responsible Care Program, originally launched by the Canadian chemical industry association in 1985, had been adopted by chemical industry associations in 39 countries by 1996. The absence of specific requirements for global adoption of the Responsible Care principles creates uncertainty for chemical industry MNCs about whether they should be implemented in all country subsidiaries. Therefore, chemical industry MNCs can be expected to also be influenced by the global standardization of their competitors' environmental policies, and they can be expected to imitate competitors' actions.

Industry associations' codes of conduct specify guidelines for firms' environmental conduct. For example, Responsible Care includes ten guiding principles and six codes of management practices; these address how a firm interacts with its community, its suppliers, and its customers and how it manages its facilities. The Business Charter for Sustainable Development lays out 16 similar principles. Thus, industry codes of conduct address mainly operational aspects of environmental policies and do not specify performance targets. In the absence of specific outcome measures, firms can be expected to comply with "sound practices" to demonstrate that they are making good faith efforts to meet external demands (Scott, 1992). This argument suggests that MNCs whose decision makers perceive industry pressures for global environmental policy standardization to be strong are likely to standardize their operational environmental policies worldwide.

Hypothesis 2. There is a positive relationship between the strength of industry pressures for environmental policy standardization per-

ceived by an MNC's management and the company's global standardization of operational environmental policies.

Customer pressures. As public concerns about environmental degradation rise, customers increasingly consider environmental factors in their purchasing decisions. Empirical studies have shown that customer pressures are an important determinant of firms' environmental conduct in domestic settings (Arora & Cason, 1995; Christmann & Taylor, 2001; Henriques & Sadorsky, 1996).

More and more customers are assessing MNCs' environmental responsibility on the basis of the companies' global environmental conduct. Even if the actions of an MNC subsidiary in one country do not influence the natural environment in other countries, these actions may affect the firm's reputation for environmental responsibility in foreign countries. The Brent Spar incident illustrates that customers react to corporate mismanagement of environmental issues in foreign countries. The decision of the British Shell subsidiary to dispose of the oil platform Brent Spar by sinking it in the Atlantic Ocean in 1995 led to protests organized by Greenpeace in Germany, which caused a significant drop in the sales of German Shell gas stations. Global standardization of an MNC's environmental policies can prevent a subsidiary in one country from making unilateral environmental policy decisions that may be costly for subsidiaries in other countries or for the entire MNC.

A firm's reputation for environmental responsibility with its customers is based on the information about the firm's environmental conduct that customers can obtain. Although information on firms' environmental conduct and performance is readily available in many industrialized countries, for example from the U.S. Toxic Release Inventory (TRI) and from rankings in popular magazines such as *Fortune*, such information is not available for MNC subsidiaries in many foreign countries, especially in developing countries (Dowell et al., 2000). Thus, the transparency of MNCs' global environmental conduct is low. In the absence of transparency, firms may use public relations strategies rather than self-regulation strategies to address customer concerns, because customers cannot verify the veracity of firms' claims about their environmental conduct. MNCs can influence public perceptions about their global environmental conduct by standardizing environmental messages in their communication to the public across countries, which may give the appearance that the MNCs are following similar environmental policies across countries.

Hypothesis 3. There is a positive relationship between the extent to which an MNC's management perceives that customers consider global environmental conduct in forming their opinion about the MNC's reputation for environmental responsibility and the global standardization of the company's environmental communication content.

MNC Characteristics That Affect Environmental Policy Standardization

The ease with which an MNC can globally standardize its environmental policies can be expected to depend on characteristics of the worldwide organization of the MNC's operations. I include two aspects of MNC organization in this study.

Global standardization of other functional strategies. Environmental policies tend to be closely integrated with other functional areas of a firm. This integration exists because implementing environmental policies requires support from functional areas, such as research and development, production, and marketing. Many resources and capabilities required for successful implementation of environmental policies are developed by other functions in the course of a firm's business strategy and leveraged in the firm's environmental policy (Christmann, 2000; Florida, 1996). For example, lean production practices contribute to environmental performance (King & Lenox, 2001). The close integration between environmental policies and other functions suggests that it is easier for MNCs with globally standardized strategies for other functions to standardize all of their environmental policy dimensions.

Hypothesis 4a. There is a positive relationship between the degree of global standardization of an MNC's functional strategies and its level of minimum internal global environmental performance standards.

Hypothesis 4b. There is a positive relationship between the degree of global standardization of an MNC's functional strategies and the global standardization of its operational environmental policies.

Hypothesis 4c. There is a positive relationship between the degree of global standardization of an MNC's functional strategies and the global standardization of the content of its environmental communication.

Subsidiary dependence. Resource dependence theory suggests that organizations that depend on external entities for critical resources are more sus-

ceptible than other firms to control and influence by these external entities (Pfeffer & Salancik, 1978). International business scholars have pointed out the relationship between a subsidiary's dependence on the rest of an MNC for resources, such as components, finished goods, funds, and technologies, and the control that the parent has over subsidiary decisions (Martinez & Ricks, 1989; Prahalad & Doz, 1981). The control of the parent over its subsidiaries' decisions is an important internal driver of the global standardization of various MNC activities, such as advertising and human resource practices (Hannon et al., 1995; Laroche et al., 2001).

One of the biggest challenges for a firm's environmental managers is to get the support of the line managers that are responsible for the implementation of the firm's environmental policy in their business units (Rappaport & Flaherty, 1992). In MNCs it is even more challenging for environmental managers at corporate headquarters to get subsidiary managers' support for implementing standardized environmental policies. Subsidiary managers in countries in which local pressures for environmental responsibility differ from the pressures in the home country may perceive headquarters-imposed stringent environmental policies as adding costs to their operations without any commensurate benefits. Dependence of subsidiaries on the rest of an MNC can be expected to reduce resistance to the adoption of corporate environmental standards and policies in country subsidiaries and, thus, contribute to global standardization of all environmental strategy standardization dimensions.

Hypothesis 5a. There is a positive relationship between the dependence of an MNC's subsidiaries on the rest of the company for resources and the MNC's level of minimum internal global environmental performance standards.

Hypothesis 5b. There is a positive relationship between the dependence of an MNC's subsidiaries on the rest of the company for resources and the MNC's global standardization of operational environmental policies.

Hypothesis 5c. There is a positive relationship between the dependence of an MNC's subsidiaries on the rest of the company for resources and the MNC's global standardization of the content of its environmental communication.

METHODS

The hypotheses were tested via multiple regression analysis of data collected through a mail questionnaire survey of MNCs in the chemical industry with operations in the United States.

Choice of Industry, Data Collection, and Sample

I chose the chemical industry (SIC code 28) to test my hypotheses because this industry is greatly affected by environmental issues (Hoffman, 1999; King & Lenox, 2000). In addition, the chemical industry is dominated by large MNCs, a situation that allowed for a large enough sample for this study.

Consistent data on MNCs' global standardization of environmental policies and on the pressures for global environmental policy standardization faced by different MNCs are not available from published sources. Therefore, I collected data for this study through a mail questionnaire survey of managers. The mail survey was administered at the business-unit level for multidivisional MNCs and at the corporate level for single-division MNCs. Choosing the business unit as the level of analysis allowed for a large enough sample for this study. My sample consisted of all 512 business units or headquarters that had operations in the United States chemical industry with sales of at least \$100 million in 1995. I identified all business units or headquarters with at least \$100 million in sales from *Ward's Business Directory* and used the *Directory of Corporate Affiliations* to identify those companies that had international operations. My target respondents were the heads of the business units of multidivisional MNCs and the CEOs of single-division MNCs. Interviews in the initial phase of the questionnaire design revealed that these individuals were most knowledgeable about the issues addressed in my survey. I identified their names from the *Directory of Corporate Affiliations*.

In administering the survey I followed Dillman's (1978) "total design method," including follow-up letters and conducting two follow-up mailings of the survey. Of the 512 mailed surveys, 25 were undeliverable, or were sent to companies that had left the chemical industry. Of the remaining 487 surveys, 98 were completed and returned; this figure represented a response rate of 20.1 percent, which is about the same as that obtained by other studies of environmental issues in MNCs (United Nations, 1993) and compares favorably to the 10 to 12 percent response rate typical for mailed surveys to top executives of American firms (Hambrick, Geletkanycz, & Fredrickson, 1993). Because of incomplete information, only 87 of the 98 responses could be included in this study. These 87 respondent business units belonged to 72 different companies.

Two tests indicated that the responding business units were representative of the mailing sample and that a self-selection bias was unlikely to exist.

First, a comparison of respondents to the mailing sample revealed no significant differences in business-unit sales and industry membership at the three-digit SIC-code level. Second, a wave analysis revealed no significant differences in mean scores and correlations for the survey items between respondents to the first mailing and the third mailing of my survey. Because late respondents to mail surveys tend to be more similar to nonrespondents than early respondents are (Fowler, 1993), significant differences could have indicated a response bias.

Construction of Measures

Some of my survey items were adopted from the literature, and others were original. I identified existing measurement scales through a review of prior research and adjusted them to fit the variables included in my study. All the measurement scales used here were rated on a seven-point Likert scale. Although my sample size precluded utilizing confirmatory factor analysis based on structural equation modeling, maximum likelihood factor analysis with "promax" rotation confirmed the anticipated factor structure of each set of variables. Scales and reliabilities are presented in the Appendix. Factor loadings and additional evidence of the validity of the measures are available from the author. Table 1 presents correlations and descriptive statistics for the variables.

Global environmental policy standardization. I developed measures for the three dimensions of global environmental policy standardization through a factor analysis of seven survey items and assessed the convergent validity of two of these measures using secondary data on constructs that logically should be related to these dimensions. The level of internal global environmental performance standards was measured with two items that are similar to the variable used by Dowell et al. (2000). Because consistent data on MNCs' global environmental performance do not exist (Dowell et al., 2000), I evaluated the convergent validity of this measure using data on toxic releases in the United States from the TRI database. My expectation that firms with high global environmental performance standards would have significantly lower toxic releases per dollar of sales in the United States was confirmed, which increased my confidence in this measure.

Global operational environmental policy standardization was measured with three items. (Sample: "To what extent are your business unit's environmental control and auditing procedures standardized at a global [worldwide] level?") An

TABLE 1
Descriptive Statistics and Correlations^a

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11
1. Level of internal global environmental performance standards	5.36	1.27											
2. Global operational environmental policy standardization	4.23	1.45	.40***										
3. Global environmental communication standardization	3.55	1.54	.36***	.48***									
4. Government pressures	5.14	1.13	.32**	.31**	.13								
6. Industry pressures	4.15	1.20	.13	.31**	.02	.49***							
5. Customer pressures	3.49	1.64	.22*	.21 [†]	.27*	.53***	.45***						
7. Global standardization of other functional strategies	4.28	1.45	.21 [†]	.36***	.41***	-.05	.10	.08					
8. Subsidiary dependence	4.05	1.67	.16	.56***	.37***	.25*	-.02	.07	.23*				
9. Firm size	7.37	1.64	-.08	.27*	.08	.18 [†]	.12	.04	.07	.19 [†]			
10. U.S. headquarter/subsidiary ^b	0.21	0.41	-.26*	-.07	-.09	.05	-.05	-.09	-.00	-.02	.19 [†]		
11. Local adaptation pressures	5.23	1.03	.08	-.22*	-.06	.05	-.04	.19 [†]	-.11	-.09	-.12	-.01	

^a For variables constructed via factor analysis, the means and standard deviations are for the raw scores of all the survey items that "loaded" on the factor. The means of the factor scores that were included in the regression analysis were all very close to 0, with a standard deviation of about 1.

^b "Subsidiary" = 1.

[†] $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

assessment of convergent validity revealed that my measure was consistent with publicly stated company policies, which increased my confidence in this self-reported measure.

Global environmental communication standardization was measured with two items. Because indicators for the extent of standardization of environmental communication were not available from other sources, I was not able to assess convergent validity for this measure.

External stakeholder pressures for global environmental policy standardization. I developed measures for government, customer, and industry pressures for global environmental policy standardization as well as for the control variable pressures for local adaptation of environmental policies through a factor analysis of ten survey items.

MNC characteristics. I developed measures of the global standardization of other functional strategies and for subsidiary dependence through a factor analysis of seven survey items. Items relating to the centralization of value chain activities from Johansson and Yip (1994) were used as indicators for subsidiary dependence, because in MNCs with high levels of centralization, subsidiaries are likely

to depend on other parts of the MNCs for resources (Kobrin, 1991).

Control variables. Firm size is an important determinant of environmental conduct (Aragón-Correa, 1998) as well as of MNC strategy standardization (Yip, Johansson, & Roos, 1997). To control for firm size, I used the logarithm of annual business-unit sales, obtaining the latter from *Ward's Business Directory*.

MNCs face not only pressure for global standardization of their environmental policies, but also pressure to adapt their environmental policies to different countries. Cross-country differences in environmental regulations and in consumers' environmental preferences are two sources of these pressures. I included a survey-based control variable for these pressures for local adaptation of environmental policies in my analysis.

The management of an MNC's headquarters and the managements of its foreign subsidiaries may have different perceptions about the extent of to which the MNC's strategies are standardized, about pressures for standardization, and about subsidiary dependence. I used a dummy variable that took the value 1 for subsidiaries to control for this difference.

TABLE 2
Results of Regression Analyses^a

Independent Variables	Dependent Variables		
	Model 1: Level of Internal Global Environmental Performance Standards	Model 2: Global Operational Environmental Policy Standardization	Model 3: Global Environmental Communication Standardization
Intercept	0.62 (0.44)	-0.52 (0.38)	-0.06 (0.43)
Stakeholder pressures			
Government pressures	0.41** (0.13)	0.07 (0.11)	0.01 (0.13)
Industry pressures	-0.08 (0.12)	0.22* (0.10)	-0.14 (0.11)
Customer pressures	-0.03 (0.15)	0.05 (0.13)	0.34* (0.14)
MNC characteristics			
Global standardization of other functional strategies	0.27* (0.11)	0.22* (0.09)	0.34** (0.10)
Subsidiary dependence	0.02 (0.11)	0.47*** (0.09)	0.26* (0.10)
Control variables			
Firm size	-0.06 (0.06)	0.08 (0.05)	0.01 (0.06)
U.S. headquarter/subsidiary	-0.63 (0.23)	-0.18 (0.20)	-0.18 (0.23)
Local adaptation pressures	0.09 (0.11)	-0.16 [†] (0.09)	-0.06 (0.11)
<i>R</i> ²	0.26	0.50	0.32
Adjusted <i>R</i> ²	0.18	0.45	0.25
<i>F</i>	3.39**	9.74***	4.60***

^a Standard errors are in parentheses.

[†] $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

Data Analysis and Checking Data Quality

I used ordinary least squares regression analysis to test my hypotheses. Before testing my hypotheses, I assessed the likely extent of common method variance, the conformity of my data's distribution to the assumptions of my analytic tools, and the extent of multicollinearity among the independent variables. Common method bias can be a problem when dependent and independent variables are collected from a single informant. According to Harman's single factor test (Podsakoff & Organ, 1986), if common method variance exists, a single factor will emerge from a factor analysis of all survey items, or one general factor that accounts for most of the variance in an unrotated factor structure will result. My analysis revealed four factors with eigenvalues greater than 1.0. The first factor accounted for only 36 percent of the variance, a result that did not indicate a problematic level of common method variance in my data set. Examinations of Kolmogorov-Smirnov and Anderson-Darling goodness-of-fit tests indicated that the distributions of the variables generally conformed to the

normality assumption of regression analysis. Although some of the correlations between my independent variables shown in Table 1 were quite high, examinations of condition indices and variance inflation factors (Belsley, Kuh, & Welsch, 1980) indicated that multicollinearity was not a problem.

RESULTS

Regression results can be seen in Table 2. Models 1, 2, and 3 tested the hypotheses about the determinants of the level of global environmental performance standards, global operational environmental policy standardization, and global environmental communication standardization, respectively.

Hypothesis 1, stating that government pressures for global environmental policy standardization are positively related to adoption of high internal global environmental performance standards, was supported by the data. Model 1 shows that expectations of cross-country harmonization of governments' environmental regulations significantly

contributed to MNCs' setting higher levels of internal global environmental performance standards ($p < .01$).

Hypothesis 2, according to which industry pressures for global environmental policy standardization are positively related to MNCs' global standardization of operational environmental policies, was supported by the data. Model 2 shows that perceived industry pressures contributed significantly to global standardization of operational environmental policies ($p < .05$).

The data also supported Hypothesis 3, stating that customer pressures for global environmental policy standardization are positively related to MNCs' environmental communication standardization. Model 3 shows that an MNC's leaders' perceptions of the extent to which customers consider global environmental conduct in forming their opinions about the MNC's reputation for environmental responsibility significantly contributed to global environmental communication standardization ($p < .05$).

The data also supported Hypotheses 4a, 4b, and 4c, respectively stating that global standardization of MNCs' other functional strategies is positively related to global standardization of the three environmental policy dimensions identified in this study. Standardization of MNCs' other functional strategies contributed significantly to setting higher internal global environmental performance standards ($p < .05$, model 1), supporting Hypothesis 4a; to global operational environmental policy standardization ($p < .05$, model 2), supporting Hypothesis 4b; and to global environmental communication standardization ($p < .05$, model 3), supporting Hypothesis 4c.

Hypotheses 5a, 5b, and 5c state that dependence of an MNC's subsidiaries on the rest of the MNC contributes to the global standardization of all three environmental policy dimensions. The data supported two of these hypotheses, but not the third. Subsidiary dependence contributed significantly to global standardization of operational environmental policies ($p < .001$, model 2), supporting Hypothesis 5b, and to global standardization of environmental communication ($p < .05$, model 3), supporting Hypothesis 5c. However, Hypothesis 5a, which states that subsidiary dependence contributes to setting higher levels of global environmental performance standards, was not supported by the data (model 1).

DISCUSSION

The objectives of this study were to investigate the determinants of self-regulation of MNCs' envi-

ronmental conduct in the global economy and to add to the limited empirical research that investigates how firms respond to stakeholder demands (Berman, Wicks, Kotha, & Jones, 1999). I pursued these objectives by identifying three distinct dimensions of global environmental policy standardization in MNCs and analyzing which external and internal factors contributed to global standardization of each of these dimensions. My findings showed that MNCs focused on standardizing different environmental policy dimensions in response to pressures from different external stakeholders. I also found that internal MNC characteristics affected the extent to which MNCs standardized their environmental policies globally. These findings have important implications for the self-regulation of MNCs' environmental conduct in the global economy. Moreover, these results provide important insights into the complex relationships between the nature of external stakeholder demands and firm responses to stakeholder pressures.

External Stakeholder Pressures

My results show that pressures by different external stakeholders contribute to global standardization of different dimensions of MNCs' environmental policies. Perceived government pressures contribute to adoption of high internal global environmental performance standards; perceived customer pressures contribute to standardization of environmental communication; and perceived industry pressures contribute to standardization of operational environmental policies. None of the stakeholder pressures contributes significantly to standardization of any of the other environmental policy dimensions.

These variations in the responses to stakeholder pressures can be attributed to differences in the nature of stakeholder demands. International environmental treaties signed by governments tend to focus on performance outcomes by demanding specific emission reductions in participating countries but give national governments discretion about how to incorporate these targets into national laws. Accordingly, MNCs that expect increased international harmonization of environmental government regulations respond by setting high internal global environmental performance standards but do not standardize the content of their environmental policies globally. This policy allows country subsidiaries flexibility to choose the most appropriate environmental practices to comply with the MNCs' environmental performance standards, given the prevailing national environmental regulations. Industry associations influence their members' envi-

ronmental conduct by establishing codes of conduct, which tend to spell out broad environmental practices but do not include specific performance requirements. Consequently, MNCs respond to industry pressures for global environmental policy standardization by globally standardizing their operational environmental policies. Customers impose pressures for environmental policy standardization on MNCs by considering the corporations' global environmental conduct in their purchasing decisions. Purchasing decisions are based on the information that customers can obtain. In many countries, firms' environmental conduct is not transparent, which makes it difficult for customers to obtain information about an MNC's global environmental conduct. Therefore, MNCs respond to customer pressures by globally standardizing the content of their environmental communication, which may give the appearance that they are pursuing similar environmental policies across their country subsidiaries.

The important role of the nature of stakeholder demands in determining how firms respond to stakeholder pressures has important implications for further research on environmental and stakeholder management. Researchers conducting empirical studies of the determinants of environmental responsibility need to pay more attention to their choices of measures of environmental conduct and consider more explicitly how the nature of stakeholder demands affects the chosen measures. For example, considering the nature of stakeholder demands provides an alternative interpretation of King and Lenox's (2000) finding that firms participating in the Chemical Manufacturers Association's Responsible Care initiative had poorer environmental performance, as measured by TRI emissions, than other firms in the chemical industry. The poor environmental performance may be a consequence of the nature of the Responsible Care requirements rather than the result of opportunism, as King and Lenox suggested. Participating firms may have focused on complying with the Responsible Care principles, which specify operational guidelines, at the expense of focusing on reducing their emissions, which are measured by the TRI. This argument is consistent with my finding that firms respond to industry pressures by standardizing operational environmental policies but not by setting higher environmental performance standards. This example illustrates the importance of selecting appropriate measures of environmental conduct. Studies of stakeholders' impact on other social responsibility dimensions can likely also benefit from addressing how the nature of stake-

holder demands affects the chosen measure of social conduct.

MNC Characteristics

My results show that internal firm characteristics are also important determinants of MNCs' global environmental policy standardization. As hypothesized, global standardization of MNCs' functional strategies contributes to global standardization of all three environmental policy dimensions. In keeping with my expectations, I found that MNCs in which country subsidiaries depend on other parts of the companies for resources standardize both content dimensions of their environmental policies globally. All of these results suggest that MNCs tend to implement uniform environmental policies to reduce complexity, just as they implement other functional policies on a global scale.

In contrast to expectations, subsidiary dependence did not contribute to setting higher internal global environmental performance standards. This finding may be due to the fact that levels of internal global environmental standards are more determined by an MNC's environmental capabilities than by its internal organization.

The important role of MNCs' global business strategy standardization in determining the level of global environmental standards indicates that adopting stringent global environmental performance standards may not increase firm market value, as suggested by Dowell and colleagues (2000). Global strategy standardization is an important element of global strategies (Kobrin, 1991; Yip, 1992), and implementation of global strategies has been shown to directly contribute to MNC performance (Johansson & Yip, 1994). Thus, the superior market value of the MNCs in Dowell and colleagues' (2000) study may have been a result of their global business strategies, rather than of their high environmental standards. Further research on the relationship between global environmental policy standardization and firm performance needs to control for the globalization of firms' business strategies.

Limitations and Implications for MNC Self-Regulation in the Global Economy

This study is not without limitations. First, my sample included business units operating in only the focal industry, chemicals, an industry that is dominated by MNCs and for which environmental protection costs are very high (U.S. Department of Commerce, 1996). Further research needs to investigate whether the relationships uncovered in my

study hold in industries characterized by different conditions. In addition, my sample includes only firms with operations in the United States—a country with stringent environmental regulations. Thus, the sample firms could transfer environmental knowledge they had needed to comply with U.S. regulations to operations in countries with less stringent regulations. My results may not hold for firms that only have operations in countries with low levels of environmental regulations. Second, I cannot exclude the possibility of reverse causality. Because MNCs can affect demands of external stakeholders through political and other influence activities, it is feasible that MNCs with standardized environmental policies have influenced external stakeholders to increase their pressure in order to put competitors with nonstandardized policies at a disadvantage. However, it is not likely that single firms are able to influence stakeholder demands to this extent, so that it is more plausible that causality runs from external pressures to environmental policy standardization. Third, this study only identifies factors that determine whether corporate global environmental policies or standards exist, not the factors that determine whether country subsidiaries adhere to corporate policies. Effective self-regulation requires implementation of corporate policies in all subsidiaries. Further research is needed to examine what determines the quality of implementation of corporate environmental policies in country subsidiaries.

In spite of these limitations, my findings have important implications for the regulation of environmental conduct in the global economy. Perceived international government cooperation in environmental issues and perceived industry pressures both contribute to MNC environmental self-regulation. International government cooperation contributes to higher internal global performance standards, which reduces MNCs' ability to take advantage of cross-country differences in environmental regulations. Industry pressures lead to global standardization of operational environmental policies within MNCs, which alleviates concerns that MNCs transfer inferior environmental technologies and practices to their developing country subsidiaries. Industry pressures for self-regulation would become more effective if industry associations focused not only on establishing guidelines for operational environmental conduct, but also on setting environmental performance requirements.

In contrast, MNCs respond to perceived customer pressures with public relations strategies by standardizing their environmental communication rather than by self-regulating their environmental

conduct. My finding that customer pressures do not contribute to self-regulation differs from the findings of studies that examined determinants of self-regulation in industrialized countries (e.g., Arora & Cason, 1995; Henriques & Sadorsky, 1996). This difference may arise because firms' environmental conduct in industrialized countries is more transparent than MNCs' global environmental conduct is. This argument suggests increased transparency of MNCs' global environmental conduct is required to make customer pressures for MNCs' global environmental self-regulation more effective. One means to increase transparency is the establishment of certifiable international environmental standards such as the ISO 14001 Environmental Management System standard (Christmann & Taylor, 2002). Independent auditors can certify firms' compliance with such standards in various countries, which helps to overcome transparency problems in the global economy and increases customer power. Governments can also promote transparency by collecting and disseminating environmental performance data for firms, as for example in the U.S. TRI database. Further research is needed to identify other ways to increase the transparency of global environmental conduct. An interesting extension of my study would be to examine whether different types of customers, such as downstream business customers and end users, differ in the degrees to which they have access to information about their suppliers' environmental conduct.

My findings show that firms pursuing global strategies are more likely to self-regulate their environmental conduct by standardizing their environmental policies. This observation suggests that even if an MNC's management does not intrinsically value responsible environmental conduct, strategic reasons exist for subsidiaries to exceed local government regulations. These results imply that MNCs are less likely to exploit cross-country differences in environmental regulations and seek out countries with lax regulations for their dirty operations than antiglobalization critics suggest.

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Appendix

Survey-Based Measures^a

Level of Internal Global Environmental Standards $\alpha = .80$

1. Relative to our competitors with similar standards our internal standards are tougher.
2. Our internal standards are set at the level of environmental regulations in the country with the toughest regulations in which we are operating.

Global Operational Environmental Policy Standardization $\alpha = .87$

To what extent are the following elements of your business unit's environmental strategies standardized at a global (worldwide) level?

1. Pollution abatement technologies.
2. Environmental control and auditing procedures.
3. Management incentives for environmental performance.

Global Environmental Communication Standardization $\alpha = .84$

To what extent are the following elements of your business unit's environmental strategies standardized at a global (worldwide) level?

1. Environmental message in advertising.
2. Environmental message in communication to public.

Global Standardization of Other Functional Strategies $\alpha = .77$

To what extent are the following elements of your business unit's competitive strategy standardized at a global level?

1. Products.
2. Production technologies.
3. Marketing.

Subsidiary Dependence $\alpha = .83$

Indicate *where* your business conducts each of the following activities in relation to the geographic markets

^a All items had seven-point response formats.

in which the products are sold. To what extent is each activity performed at the local level (i.e. within each country where the product is sold), or at the global (i.e. worldwide) level?

1. Research.
2. Process development.
3. Product development.
4. Production.

Government Pressures $\alpha = .80$

1. I expect that in ten years, environmental regulations affecting this industry will be more similar across countries than today.
2. I expect that in the next ten years, global environmental standards (such as the Montreal Protocol) will gain in importance for this industry.
3. I expect that in the next ten years, regional environmental standards (such as EU standards) will gain in importance for this industry.

Customer Pressures

1. Environmental strategies that we implement in one country affect considerably our environmental reputation with customers in other countries.

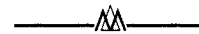
Industry Pressures $\alpha = .77$

1. Industry initiatives/associations advocate the implementation of worldwide environmental standards by firms.

2. Our major competitors set worldwide environmental standards for their operations and products.
3. Our major competitors implement environmental strategies on a worldwide basis.

Local Adaptation Pressures $\alpha = .67$

1. Environmental regulations affecting this industry differ widely between countries.
2. Customer concerns about the impact of our industry's products on the environment are very different between countries.
3. Customer concerns about the impact of our industry's manufacturing operations on the environment are very different across countries.



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