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Investing Up: FDI and the Cross-Country Diffusion of ISO 14001 Management Systems[1]

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Competition to attract foreign direct investment (FDI) creates opportunities for multinational enterprises (MNEs) to diffuse corporate management practices from their countries-of-origin (home countries) to countries hosting their foreign operations. We examine conditions under which MNEs transfer corporate environmental practices from home countries to host countries. Our focus is on ISO 14001, the most widely adopted voluntary environmental program in the world. We examine inward FDI stocks and ISO 14001 adoption levels for a panel of 98 countries, and a subset of 74 developing countries, for the period 1996–2002. We find support for the country-of-origin argument in that inward FDI stocks are associated with higher levels of ISO 14001 adoption in host countries only when FDI originates from home countries that themselves have high levels of ISO 14001 adoption. Countries' ISO adoption levels are associated not with *how much* FDI host countries receive overall but *from whom* they receive it. Three implications emerge from this study: (1) FDI can become an instrument to perpetuate divergence in corporate practices across the world; (2) economic integration via FDI can create incentives for firms to ratchet up their environmental practices beyond the legal requirements of their host countries; (3) instead of racing down to match the less stringent corporate practices prevalent in developing countries, developed countries can employ FDI outflows to ratchet up corporate practices abroad given that developing countries are net recipients of developed countries' FDI outflows.

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Competition to attract foreign direct investment (FDI) creates opportunities for multinational enterprises (MNEs) to diffuse corporate practices, technologies, and norms from their countries-of-origin (home countries) to host countries in which their foreign operations are located. The processes by which this diffusion occurs, and the consequences for host countries, have interested International Political Economy (IPE) scholars for quite some time. This paper examines conditions under which MNEs transfer via FDI corporate environmental practices from home countries to host countries, focusing on ISO 14001, the most widely adopted voluntary environmental program in the world. Firms participating in ISO 14001 pledge to adopt environmental programs that are beyond the host governments' regulatory requirements. Our analyses suggest that while overall FDI stocks are not associated with host countries' ISO 14001 adoption levels, host country firms are more likely to join ISO 14001 when their country receives FDI from home countries where ISO 14001 has been widely adopted. The broader implication is that FDI may serve as a conduit for diffusing home country corporate practices to host countries. Inasmuch as practices, institutions, and norms vary across home countries where MNEs are headquartered, economic integration via FDI tends to reproduce divergence in ways in which firms across countries organize economic activities.

Our study of the role of FDI in the diffusion of ISO 14001 contributes to the IPE literature in three ways. First, we provide an important corrective to convergence theories which suggest that economic integration coupled with functionalist requirements of managing modern economies (Galbraith 1967; Bell 1973; Ohmae 1991) induces countries to adopt ''common ways of producing and organizing economic life'' (Berger 1996:1). We demonstrate that high levels of economic integration of host countries via FDI need not necessarily lead to a convergence in their corporate environmental programs. Because corporate practices (ISO adoption levels in our case) in MNEs' home countries continue to differ (Berger and Dore 1996; Pauly and Reich 1997; Hall and Soskice 2001), FDI serves to reproduce home countries' institutional and policy diversity in host countries.[2]

Our second contribution is to extend the convergence debate to the study of micro-level institutions (corporate practices and management systems) codified in private regulatory programs. Convergence scholars typically treat as dependent variables macro institutions stipulated in governmental policies (such as welfare expenditures, environmental regulations, exchange-rate policies, etc.). Our paper challenges scholars to examine how economic integration shapes firms' corporate practices. Further, by introducing a new dependent variable (micro-level institutions prescribed in private regulations), our paper links the emerging private authority scholarship (Cutler, Haufler, and Porter 1999; Mattli and Büthe 2003) to the broader debates on the policy consequences of economic integration.

Third, we contribute to the race-to-the-bottom debates (Kahler 1998; Spar and Yoffie 2000; Murphy 2004) by demonstrating that under certain conditions, economic integration may create incentives for firms to ratchet up their corporate environmental practices. Globalization critics contend that competition for FDI pressures governments to weaken domestic regulations (Collinsworth, Goold, and Harvey 1994; Gill 1995; but see Drezner 2001) which allow firms to adopt lax corporate practices. This argument is often made for environmental regulations in terms of the ''pollution haven'' and the ''industrial flight'' hypotheses (Leonard 1988; Charnovitz 1993; Daly 1993; Jaffe, Peterson, Portney, and Stavins 1995; Mani and Wheeler 1998). The wide-spread diffusion of ISO 14001 suggests

[2] The notion that economic integration leads to the cross-national diffusion of norms, practices, and lifestyles is not new. Early references to the country-of-origin effects can be found in the works of Thorstein Veblen (1899) and Adolph Berle (1959).

that firms may sometimes improve their environmental practices beyond the domestic regulatory requirements, even in developing countries. While FDI serves as an important mechanism for diffusing ISO 14001 to host countries, the salience of its effect is contingent on the ISO 14001 adoption levels in foreign investors' home countries. Analogous to Vogel's (1995) notion of the ''trading up'' of environmental regulations via foreign trade, our paper suggests that FDI may serve as a mechanism for the ''investing up'' of corporate environmental practices.

We examine ISO 14001 adoption for a panel of 98 countries, and a subset of 74 developing countries, for the period 1996–2002. Our empirical analyses suggest that countries' ISO adoption levels are associated not with *how much* FDI host countries receive but *from whom* they receive it. These empirical results persist even after controlling for the host countries' domestic institutions and their embeddedness in international economic and sociological networks.

ISO 14001 was launched by the International Standards Organization in 1995. So far, we have described ISO 14001 and voluntary programs in complimentary terms. However, many environmentalists have been quite skeptical of voluntary regulations (Steinzor 1998), suggesting they 'greenwash' firms' poor environmental performance. Indeed, there is evidence that at least some voluntary programs have been ineffective (King and Lenox 2000). Recent studies suggest ISO 14001 improves firms' environmental and regulatory performance, as we will discuss shortly. While ISO 14001 has its limitations and is not a panacea to the world's environmental challenges, it is reasonable to assert that ISO 14001 is a progressive private regulation that encourages firms to adopt environmental practices which are beyond the regulatory requirements of their host economies.

Our paper has several policy implications. Actors in (home) developed countries can leverage economic integration to transfer corporate practices—from environmental stewardship to labor standards—to (host) developing countries, given that developing countries are net recipients of developed countries' FDI. Along with employing traditional policy instruments such as foreign aid, home countries can strategically leverage outflows of foreign direct investment to project domestic practices, norms, and ideas (''soft power,'' in short) abroad. On the same count, host governments should appreciate that along with capital, FDI brings home countries' practices and norms. Consequently, host governments may want to attract FDI from home countries whose norms and practices are most valuable for their specific needs.

While many NGOs working to safeguard the environment and improve labor standards are troubled by the rising tide of FDI (Wallach and Sforza 1999), our paper suggests that NGOs should appreciate FDI's ''investing up'' potential.[3] Instead of opposing international investment and trade agreements such as the WTO and the NAFTA, environmental groups should examine how these agreements might be leveraged to maximize MNEs' potential environmental multipliers in host economies. After all, most MNEs are headquartered in developed countries where environmental NGOs tend to be well established political actors. By strategically 'lobbying the corporation' (Vogel 1978) in their home turf, NGOs can utilize MNEs' supply-chain networks to diffuse environmental practices in host countries where they may not have the political muscle to lobby the corporation or the government (but see Sasser, Prakash, Cashore, and Auld 2006). Thus, economic integration via FDI provides NGOs with an opportunity to employ a type of ''boomerang effect'' (Keck and Sikkink 1998) to influence corporate practices in the developing world.

[3] While some well established NGOs have begun working with firms to explore how the profit motive can be employed to protect the environment (Bendell 2000), it is fair to say that most environmental NGOs remain suspicious, if not antagonistic, toward businesses.

ISO 14001

The mandate of the International Organization for Standardization (ISO) is to promote international trade by developing international standards. ISO has created about 15,000 standards since its inception in 1946. While ISO is not an NGO in the sense of being an activist group, it is a nongovernmental actor whose members are private sector national bodies, such as the American National Standards Institute and the Deutsche Institut für Normung (Mattli and Büthe 2003). In its recent *World Trade Report*, the World Trade Organization (2005) discusses the importance of private and public standards, highlighting ISO's role in this regard and explaining the rationale for effective global standards:

> As a network of national standards institutes of 148 countries, ISO is the world's largest developer of standards. Its scope extends to all fields except electrical and electronic engineering, the IEC's [(International Electrotechnical Commision)] domain, and telecommunications, that of the ITU [(International Telecommunication Union)] (2005:119)…. Whether as end consumers or as producing firms acquiring inputs, buyers may be at a significant disadvantage compared to sellers because the latter possess information about the good or service not available to the buyer. This asymmetry can significantly hamper the efficient functioning of markets, and standards can help solve the problem and increase efficiency (2005:xxvi)... Among the factors accounting for heightened standardization activity are demands by consumers for safer and higher quality products, technological innovations, the expansion of global commerce and increased concern over social issues and the environment (2005:26).

While ISO 14001 may come across as a technocratic regime, it does serve a political purpose, one that MNEs tend to favor. MNEs' generally favor ISO's regulatory harmonization agenda because variations in regulations across countries may increase regulatory compliance costs. By demonstrating that businesses can credibly self-regulate, international standards such as ISO 14001 may preempt or dampen demand for new domestic regulations, a form of regulatory harmonization via nongovernmental regimes, grounded largely on MNEs' terms.

ISO 14001 prescribes the broad principles for firms' environmental management systems; it does not mandate specific environmental standards for firms' products, technologies firms must adopt in their production processes, or even environmental outcomes firms must achieve. The rationale for focusing on management standards instead of products standards or technologies is that if appropriate processes are in place, desired outcomes will follow (ISO 2005a). Firms that wish to join ISO 14001 must establish a written environmental policy that the senior management approves. To comply with ISO 14001 standards, firms must specify quantifiable environmental targets, regularly review their progress, and designate a top manager to oversee implementation of the firms' environmental programs. In practice, ISO 14001 typically commits member firms not only to comply or exceed domestic laws, but also to adopt the best available environmental technologies, assess the environmental impact of their operations, and establish programs to train their personnel in environmental management systems.[4] For most firms, these management systems are quite extensive, requiring substantial investments in personnel, training, and most critically, in establishing paper documentation for their environmental operations (Sayre 1996; Prakash 2000).

[4] <http://www.iso.org/iso/en/iso9000-14000/index.html> (2006, Jan. 1).

Unlike some other voluntary environmental programs, ISO 14001 requires participants to receive an initial certification audit, conducted by certified external auditors who themselves are audited and approved by their domestic national-standards body. Firms must then receive annual recertification audits to verify that their management systems continue to meet ISO 14001's standards (ISO 2005b). These audit and certification measures are designed to prevent participants from shirking their program responsibilities as ISO 14001 members. Receiving and maintaining ISO 14001 certification carries nontrivial costs (Prakash 2000): for example, Kolk (2000) estimates that ISO 14001 certification can cost from $25,000 to over $100,000 per facility.

While some NGOs suggest that voluntary regulatory programs such as ISO 14001 are smokescreens for firms to disregard the law and pollute more, recent research suggests that ISO 14001 certification improves firms' environmental and regulatory performance. In a study of 236 Mexican firms in the food, chemical, nonmetallic minerals and metal industries (which together generate 75–95 percent of Mexico's industrial pollution), Dasgupta, Hettige, and Wheeler (2000) find that ISO 14001 adopters show superior compliance with government environmental regulations. This is important because developing-country governments often find it difficult to enforce their own regulations. Instead of undermining public regulation, ISO 14001 may improve firms' compliance with them, even when firms are located in alleged pollution havens. Echoing Dasgupta et al. (2000) in an analysis of over 3000 US facilities, Potoski and Prakash (2005b) find that ISO 14001 certification improves regulatory compliance among U.S. facilities regulated under the Clean Air Act. There is also evidence that firms joining ISO 14001 also pollute less. In an analysis of 316 U.S. electronics facilities, Russo (2001) finds that ISO 14001 membership is associated with decreased toxic emissions. Potoski and Prakash (2005a) report that ISO 14001 adopters reduce pollution as recorded in the EPA's Toxics Release Inventory. In sum, while it is true that ISO 14001 alone does not solve all industrial pollution problems, there is some evidence that ISO 14001 adoption leads to lower facility-level pollution and improved facility-level compliance with public law.

Theoretical Perspectives

IPE scholars have debated the consequences of economic integration in terms of engendering policy convergence[5] and regulatory races to the bottom. Some argue that economic integration leads to the emergence of a common model to organize economic activities across the world. Convergence theorists claim that ''competition, imitation, diffusion of best practices, trade, and capital mobility naturally operate to produce convergence across nations in the structures of production and in the relations among economy, state, and society'' (Berger 1996:1). In the context of micro corporate institutions, convergence would be observed if MNE subsidiaries begin to conform to uniform, global corporate practices rather than tailoring them to home or host country idiosyncrasies (Ohmae 1991; Friedman 2005).

While the convergence thesis predicts that FDI is likely to encourage the adoption of common corporate practices across firms, it does not adequately recognize that such practices often differ across countries where MNEs are headquartered. If macro regulatory styles (Vogel 1986) and micro-level corporate practices (Hall and David 2001) differ across MNEs' home countries, then FDI

[5] Convergence can be observed at different levels: setting objectives, establishing practices and management systems, adopting technologies, and achieving outcomes (Bennett 1991). We examine cross-border convergence in corporate environmental practices and management systems.

reproduce home countries' heterogeneity rather than promoting convergence to a single model. After all, as Pauly and Reich note:

> …(R)ecent evidence shows little blurring or convergence at the cores of multinational corporations based in Germany, Japan, and the United States. They continue to diverge fairly systematically in their internal governance and long-term financing structures, in their approaches to research and development as well as in the location of basic research facilities… (1997:1).

Divergence theorists emphasize the continued resilience of varying country-level practices and institutions (Berger and Dore 1996; Gourevitch and Shin 2005). Convergence is not a technocratic process. Institutions and social practices take time to evolve and often represent historic struggles and compromises among different domestic interests. The status quo has incentives to oppose convergence if it harms its economic interests or undermines its norms. While economic integration can create new beneficiaries that push for change, it also breeds the politics of resistance (Boyer and Drache 1996).

Instead of convergence, FDI can lead to cross-country divergence in corporate practices in two ways. First, MNE subsidiaries may seek to adapt their corporate practices to the varying requirements of their host countries (Hofstede 1980). Simply put, when in China or India, do as the Chinese or Indians do. Second, given that home (country-of-origin) practices shape MNEs' activities (Porter 1990; Sethi and Elango 1999; Van Tulder and Kolk 2001) and these differ across home countries (Pauly and Reich 1997), FDI may create divergence by transferring *varying* home country practices to host countries.

Furthermore, while MNEs can certainly mold their subsidiaries' corporate practices in the image of their home country operations, the effect of MNEs on host economies may be larger because MNE subsidiaries can create externalities for other host firms.[6] MNEs can diffuse their home country practices through a host country by mandating them for their local suppliers, by demonstrating their efficacy, and by training workers in mobile labor environments. Indeed, a substantial literature documents that the effects of MNEs on host countries extend beyond their subsidiaries (Hymer 1976; Li and Resnick 2003; Jensen 2005). For examples, Aitken and Harrison (1999) suggest that MNEs transfer technology to local firms and Javorcik (2004) finds evidence that FDI increases the productivity of local firms via backward linkages, as well as direct support by training their employees (Javorcik and Spatareanu 2005).

A study of cross-country ISO 14001 adoption is helpful to investigate the role of FDI in creating divergence in corporate practices across countries primarily because ISO 14001 adoption levels vary across MNEs' home countries. To illustrate, Japan with 10,620 ISO 14001 registrations is a leader while the United States with only 2620 ISO 14001 registrations is a laggard.[7] Thus Japanese FDI is likely to encourage ISO 14001 adoption in host economies more forcefully in relation to American multinationals. We, therefore hypothesize:

[6] On the effect of FDI on economic development, see the volume edited by Moran, Graham, and Blomstrom (2005) especially the chapters by Lipsey and Sjoholm (2005) on FDI-induced wage and productivity spillovers in host economies.

[7] While Japanese adoption levels are about four times that of the American ones, the size of the Japanese economy is about one-third of the American economy. On a per dollar GDP basis, Japan has 12 times the number of ISO 14001-registered facilities in relation to that of America.

Hypothesis 1: *ISO 14001 adoption rates are higher in host economies that receive FDI from home countries having a high number of ISO 14001-certified facilities.*

Our discussion on the convergence debate also bears upon a related debate on whether economic integration abets regulatory races to the bottom. Instead of MNEs shopping around for the jurisdiction with the least stringent regulations, FDI may create incentives for host economy firms to improve environmental practices beyond regulatory requirements. The literature on jurisdictional competition to retain mobile factors of production is well established in political economy (Tiebout 1956). Spurred by declining barriers to international trade and investment and the consequent increases in cross-border economic flows, popular media, activists groups, and populist politicians have argued that mobile capital is likely to gravitate toward jurisdictions that offer the lowest levels of regulatory costs. Anticipating the demands of capital, governments are likely to supply such policies. Regulatory races to the bottom will follow:

> [G]lobal economy has allowed multinational companies to escape developed countries' hard-won labor standards. Today these companies choose between workers in developing countries that compete against each other to depress wages to attract foreign investment. The free trade philosophy for creating a prosperous global economy is in practice denying workers their share of the fruits of wealth creation. First World components are assembled by Third World workers who often have no choice but to work under any conditions offered them. Multinational companies have turned back the clock, transferring production to countries with labor conditions that resemble those in the early period of America's own industrialization (Collinsworth et al. 1994:8).

In the environmental policy field, numerous studies examining ''pollution havens'' and ''industry flight'' investigate whether ''environmentally dirty'' industries are migrating to pollution sanctuaries located in developing countries (Leonard 1988; Daly 1993; Jaffe et al. 1995; Mani and Wheeler 1998). Because businesses tend to portray the alleged industrial flight problem as a symptom of a broader over-regulation phenomenon, they demand the scaling back of domestic regulations. Blaming free trade for regulatory races (Charnovitz 1993; Daly 1993), environmentalists demand ''fair trade'' so that domestic firms are not disadvantaged in the world market by stringent domestic regulations. The problem is that ''fair trade'' requires developed countries to either subject their imports to process-based standards (which the WTO disallows) or to persuade developing countries to strengthen their alleged lax standards (which is politically difficult).

In contrast to the race-to-the-bottom argument, globalization optimists point out that instead of creating incentives for host governments to dilute regulatory standards, MNEs have incentives to transfer technologies and management practices, such as those codified in ISO 14001, that are significantly influenced by, if not comparable to, the ones adopted in the home country.[8] This increases regulatory predictability and reduces the costs of managing operations in different locations. Further, given the legal issues about ''due diligence'' subsequent to the 1984 Bhopal incident,[9] by adopting common corporate practices such as ISO 14001 world-wide, MNEs could demonstrate ''due diligence'' in their environmental operations (Monshipouri, Welch, and Kennedy 2003). Not surprisingly

[8] The ''postimperialism'' literature also suggests that multinationals may seek to become responsible corporate citizens in their host countries (Sklar 1976; Becker and Sklar 1999). This includes the transfer of the state-of-art management practices—ISO 14001 in our case—from home to host countries.

[9] In 1984, the Bhopal (India) facility of Union Carbide accidentally released 40 tons of methyl isocyanate, a very poisonous gas used in pesticide production. This resulted in the death of over 3000 people living in the vicinity of the facility. This incident had ramifications on environmental politics and policy worldwide and led the U.S. Congress in 1986 to enact the Emergency Planning and Community Right-to-Know Act.

then, MNE subsidiaries typically have superior environmental practices in relation to local firms because they have better access to such technologies and practices (Eskeland and Harrison 2003). In addition to advantages for the ''supply'' of superior practices, MNEs may also encounter ''demands'' from host country stakeholders that they employ such practices. MNE subsidiaries face greater scrutiny from local governments and NGOs and may therefore feel coercive pressures to be greener than their local counterparts (King and Shaver 2001). As a second-order effect, FDI's influence may then spread through host economies as MNE subsidiaries encourage and sometimes even require their suppliers to adopt ISO 14001 (Christmann and Taylor 2001), a phenomenon that is occurring in the automobile industry (Hutson 2004).

Thus, ISO 14001 is a prime case for examining the race-to-the-bottom argument. If MNEs are always seeking to minimize costs, FDI should create disincentives for ISO 14001 adoption. After all, why should profit-seeking actors voluntarily take on additional costs of ISO 14001 which is not required by host countries' regulations?

Hypothesis 2: *More FDI is associated with lower levels of ISO 14001 adoption.*

Data

To investigate how inward FDI influences country-level ISO 14001 adoption rates, we examine a panel of 98 developing and developed countries for the period 1996–2002. In addition, we examine a panel of 74 developing countries for the same period. Because critics of FDI allege that multinational corporations are migrating to developing countries due to its lax environmental regulations, a focus on developing countries alone provides a more compelling test for the ''investing up'' argument.[10]

The dependent variable is the number of ISO 14001-certified facilities in each country from 1996 through 2002 as reported in the 12th cycle of the ISO 9000/14000 census (ISO 2003).[11] In 1996 there was an average of about 13.2 ISO 14001-certified facilities per country in our total sample; by 2002 the number had grown to about 447 with Japan having the highest number of certified facilities at 10,620. As to be expected with a count variable such as this, the data are not normally distributed: in 1996 about half of the countries in the sample did not yet have an ISO 14001-certified facility; by 2002 only two countries had no ISO 14001-certified facilities.

We employ two measures to examine the effect of inward FDI stocks on countries' ISO 14001 adoption levels. First, we measure a host country's overall dependence on FDI (*Overall FDI*) based on the argument that, irrespective of the FDI's source, higher levels of FDI discourage host countries' ISO 14001 adoption (Hypothesis 2). Unlike trade, FDI accumulates over time. Thus, the potential influence MNEs exercise in host economies depends not only on the FDI inflow in a given year but on MNEs' accumulated inward FDI stock. *Overall FDI* is therefore calculated as a country's total inward FDI stock as a proportion of GDP.

[10] This also responds to the concern that wealthy and poor countries should not be pooled together in empirical studies on FDI (Blonigen and Wang 2005).

[11] Ideally, our dependent variable would measure the number of ISO 14001 facilities as a proportion of the total number of facilities that could potentially subscribe to this voluntary regulation. Because data on the total number of certifiable facilities across a large number of countries are not available, we take GDP adjusted for purchasing power parity (PPP) as a proxy. Because economic systems organize their production processes differently, facilities per dollar of GDP are likely to vary cross-nationally. Assuming variations in purchasing power capture (however, imperfectly) the variations in production systems, we control for PPP adjusted GDP. In addition, by including country fixed effects, our model captures, among other things, variations in production structures that other covariates do not control.

From the country-of-origin school's perspective, a host country's ISO 14001 adoption is influenced not so much by overall FDI but by the ISO 14001 adoption levels in the home countries from which FDI has originated (Hypothesis 1). We measure each country's bilateral FDI context based on its inward FDI stock from various home countries, weighted by home countries' ISO 14001 adoption levels (*Bilateral FDI Weighted by ISO Adoption*). We calculate each country's bilateral FDI context as:

$$\text{Bilateral FDI weighted by ISO adoption}_{it} = \sum_{j} \text{ISO}_{jt} \times (\text{FDI}_{ij}/\text{FDI}_{i})^{2},$$

where ISO_{jt} is the number of ISO-certified facilities in country j at time t, FDI_{ij} is country i's FDI stock in country j, and FDI_{i} is country i's total inward FDI stock. FDI stock data were downloaded from the UNCTAD (http://www.unctad.org) and OECD (http://www.sourceoecd.org) databases (see Appendix 1 for the description of these databases).

Akin to the bilateral FDI context, following Prakash and Potoski (2006b),[12] we control for countries' *bilateral exports, weighted by ISO 14001 adoption*:

$$\text{Bilateral exports weighted by ISO adoption}_{it} = \sum_{j} \text{ISO}_{jt} \times (\text{Exports}_{ij}/\text{Exports}_{i})^{2},$$

where ISO_{jt} is the number of ISO-certified facilities in country j at time t, Exports_{ij} is country i's exports to country j, and Exports_{i} is country i's total exports. We also control for exports as a percentage of host GDP (*exports*). Trade data were downloaded from the United Nations Statistics Division's Comtrade database (United Nations 2004).

Our analyses include several control variables that might influence countries' ISO 14001 registrations. Countries' ISO 14001 adoption rates could also be influenced by normative and ideational pressures emanating from the ''world society'' (Meyer, Boli, Thomas, and Ramirez 1997). If ISO 14001 represents a normatively appropriate environmental governance approach that fits with prevailing international environmental stewardship norms, firms may join the program to the extent that they are located in countries embedded in networks that transmit such international norms. Ideas and norms about business responsibility toward the natural environment may flow through networks of international intergovernmental organizations (IGO) and regimes (Krasner 1983) and international nongovernmental organizations (INGO) (Boli and Thomas 1999). The variable *INGO* is the total number of nongovernmental international organizations a country's citizens have joined, and *IGO* is the number of intergovernmental international organizations a country's government has joined, as reported in various years by the *Yearbook of International Organizations* (Union of International Associations 1997).

Linguistic networks can be an important conduit for ideas and norms regarding ISO 14001. The costs of transmitting ideas and norms such as those embedded in ISO 14001 are likely to be low when actors share a common language. Linguistic brethrens are also likely to take cues from one another regarding the normative appropriateness of management practices. Our model controls for the language effect (*Language*), which we capture in terms of the average number of ISO 14001-certified facilities per capita in countries that share a common language with a given country. Data on countries' primary language(s) are from the CIA *World Factbook* (CIA 2004).

Geography may also influence ISO adoption levels (Kopstein and Reilly 2000). Information and norms flow more readily between contiguous entities than between noncontiguous ones simply because neighbors are likely to have more

[12] Also see, Guler, Guillen, and Muir MacPherson (2002) in the context of ISO 9000.

opportunities to exchange information and to observe one another. Our model controls for the neighborhood effect, which we capture in terms of the average number of ISO 14001-certified facilities per capita in countries that share contiguous borders (*Neighbors*). Data on geography are from O'Loughlin, Ward, Lofdahl, Cohen, Brown, Reilly, Gleditsch, and Shin (1998).

Host-country institutions could influence ISO 14001 adoption via firms' perceptions of ISO 14001's instrumental and normative dimensions. Host-country subsidiaries and other firms are likely to view the usefulness of voluntary regulations in terms of their compatability with domestic institutions. Accordingly, our model controls for theoretically important domestic variables that are likely to affect ISO 14001 adoption levels. We take GDP adjusted for purchasing power parity (*GDP*) as a proxy for the total number of certifiable facilities in a country. Citizens may demand more environmental protection if they are located in countries with high pollution levels. We capture the pollution effect in terms of a country's total sulfur dioxide (SO_2) emissions (in tons), as reported in Stern (2005). ISO 14001 adoption levels may also respond to citizens' demand that firms adopt environmentally progressive policies.[13]

If the demand for environmental amenities has positive income elasticity (Grossman and Krueger 1995), ISO 14001 adoption rates should be higher in wealthier countries, where ISO 14001 would signal firms' commitments to safeguard the environment (Inglehart 1977). We control for this wealth effect by including *per capita GDP* (adjusted for purchasing power parity) as a covariate. Data on *per capita GDP* are from the *World Development Indicators* (World Bank 2004). The effect of wealth on macro level environmental indicators may be nonlinear, as the debate on the so-called environmental Kuznet curve suggests (Grossman and Krueger 1995). To model such potential nonlinearity, our model includes per capita GDP squared (*per capita GDP*^{2}) as a covariate.

More competitive market economies can create incentives for firms to differentiate themselves on a variety of counts, including environmental stewardship (Porter and van der Linde 1995). Arguably, this may be an effect of postmaterialism (Inglehart 1977). ISO 14001 can serve as a branding mechanism that signals a firm's commitment to environmental policies and is likely to appeal more to firms operating in competitive markets. We capture the competition effect on ISO 14001 adoption by controlling for the regulatory context as reflected in countries' property rights and regulatory policies (*Regulations*). To do so, we draw on the Heritage Foundation's *Index of Economic Freedom* (Heritage Foundation 2003).[14] Finally, we recognize that the ISO 14001 management system approach is modeled around the ISO 9000. To control for such dependencies, our model includes previous ISO 9000 (*ISO 9000*) adoption levels. Data are from the 12th cycle of the ISO 9000/14,000 census (ISO 2003).[15]

Our data were not complete for all variables for all countries in our sample. While measures of the number of IGOs a country's citizens has joined (*IGO*) and the number of INGOs a country's government has joined (*INGO*) were only

[13] To the best of our knowledge, SO_2 emission is the only cross-national indicator of pollution available for a *large* number of countries. Not surprisingly, it has been employed in several studies on growth and the environment (Ansuategi 2003) as well as on the so-called environmental Kuznet curve (Grossman and Krueger 1995). Further, unlike carbon dioxide (CO_2) emissions, most countries regulate SO_2 emissions. As a result, SO_2 serves as a good proxy for the demand for environmental protection in specific countries.

[14] This index may control for another motivation: firms may believe that the relative lack of public regulation may create demand for new regulation. Hence by joining ISO 14001, firms seek to preempt the emergence of new public regulation.

[15] We also experimented with several variables that could bear upon ISO 14001 adoption levels in the host country. These include the litigious context, the share of manufacturing in the GDP, and the government's share of GDP, portfolio inflows, embeddedness in colonial and religion-based networks, tourism inflows, and internet connections. Because these variables were not significant and their exclusion did not affect our substantive results, we did not include them in the final model.

71.0 percent complete and the SO_2 emissions variable was 75 percent complete, other variables were at least 80 percent complete. Instead of list-wise deletion via dropping countries with missing data, we imputed the missing data and generated seven data sets using the Amelia program (Honaker, Joseph, King, Scheve, and Singh 2001). The results presented below are the adjusted averages from analyses of seven data sets with missing values imputed via Amelia.

Empirical Model

This paper seeks to model the effects of inward FDI stock and other covariates on host countries' ISO 14001 adoption. To do so, we estimate the following equation:

$$h(\mu_{it}) = x'_{it}\beta \quad \text{and} \quad \text{var}(y)_{it} = g(\mu_{it})\cdot\alpha, \tag{1}$$

where μ_{it} is the marginal expectation of y $[E(y_{it})]$, and x'_{it} are the covariates of the number of ISO 14001-certified facilities (y) for each country (i) over each year (t). The variables in x'_{it} are the measures of FDI plus control variables, including fixed effects. All independent variables other than the scale parameter GDP are lagged by 1 year to account for response time in the variables' effects.[16] The forms of h, g and α represent the canonical structure for negative binomial event count models (Cameron and Trivedi 1998), where g represents the negative binomial distribution, h is a natural log link function for transforming the expectation of y, and α is the dispersion parameter.

We chose a binomial event count model due to the distribution of the dependent variable.[17] Clearly, zero is the lower bound for any country's ISO 14001 adoption. Indeed, in our sample countries and years, we find a large number of zeros and the standard deviation greater than the mean. Because there is no reason to suggest that different factors drive any country's first ISO 14001 adoption in relation to its subsequent ones, we decided not to employ zero-inflated models.[18] Further, the dispersion in our data suggests a negative binomial specification should be preferred over a Poisson specification.

Firms that seek ISO 14001 certification in a given year are likely to continue with this program in subsequent years. Thus, past ISO 14001 certification levels in a given country are likely to be correlated with its current certification levels. As a result, our dependent variable, the number of ISO 14001-certified facilities, is likely to be serially correlated within countries, leading to biased coefficient estimates. To address this issue, our model includes an Autoregressive (AR) (1) within-observation (country) correlation matrix such that the correlation between y_{it} and y_{is} (where $t > s$) is $\rho^{|t-s|}$ (Zorn 2001). To check whether this correction is adequate, following Wooldridge (2003), we regressed the residuals from our analysis on all covariates, the lagged dependent variables, and the lagged residuals. Because we are working with a count model, we first normalized the residuals to have a mean of zero and a standard deviation of one (Cameron

[16] Our calculations of the bilateral FDI and bilateral exports measures take a 1-year lag in the number of ISO 14001-certified facilities into account, although the export measures used as scales are not lagged.

[17] One could specify the dependent variable as the number of facilities per dollar of GDP and employ an OLS type model based on the assumption of a normally distributed dependent variable. The issue is that even in its transformed form, the dependent variable persists with a non-normal distribution. Further, because such a dependent variable would still be skewed and have a large number of zeros and a long ''tail'' of positive values, models based on normality assumptions would yield inefficient and biased results.

[18] We are thus assuming that for ISO 14001, the factors that influence the adoption of the first ''event'' in a country have proportional influence on subsequent adoptions in the country. Joining ISO 14001 requires adding broad requirement parameters to the particular management practices at a facility. There are important upfront costs to membership, not only in terms of learning for the specific facility, but also in terms of paperwork, hiring additional personnel, etc.

and Trivedi 1998). The coefficient for the lagged residual was not significant, suggesting the absence of serial correlation.

Finally, we need to address three other statistical issues. First, while we have assumed that observations across countries are independent, we recognize that observations within countries are not independent, leading to potential heteroskedasticity across countries and inefficient parameter estimates. To deal with this issue, our model employs robust standard errors adjusted for clustering within countries (Williams 2000).[19] Second, because countries may differ in ways not fully captured by the covariates (Green, Yeon Kim, and Yoon 2001), we include ''country fixed effects'' to better specify our model and take care of the omitted variable bias. While this strategy has been criticized (Beck and Katz 2004), not having sticky institutional covariates in our model gives us additional confidence about employing country fixed effects. Third, we recognize that ISO 14001 adoption may be subject to spatial correlation if countries exert influence on each others' ISO 14001 adoption levels through their geographical proximity and common cultural connections. The variables measuring whether or not the host and home countries share a common border (*Neighbor*) or a common language (*Language*) seek to control for such influences.

Results

The results of our analyses of the number of certified facilities in 98 countries between 1996 and 2002 are presented in Table 1, Column 1, and in 74 developing countries is reported in Table 1, Column 2. For the full panel, we report the discrete changes in our key explanatory variable. By discrete change we mean a change in the ISO 14001 adoption associated with a change in an independent variable from one standard deviation below its mean to one deviation above its mean, holding all other variables at their means (Long 1997). We interpret the effects size of negative binomial event count models relative to the median value of the dependent variable. For reference, the median number of certified facilities is four across the entire sample of years and countries, and 24 in 2002.

As shown in Table 1, FDI influences ISO 14001 adoption through *bilateral FDI, weighted by ISO 14001 adoption* (Hypothesis 1) but not via a country's total inward FDI stock as a proportion of GDP, or *overall FDI* (Hypothesis 2). This holds for the full panel as well as for the panel comprising developing countries only. Host countries whose inward FDI stock originates from home countries that have a high number of ISO 14001-certified facilities tend to have higher levels of ISO 14001 adoptions (Hypothesis 1). Hence, FDI tends to reproduce home-country diversity in the adoption of ISO 14001 levels in host countries. In the full model, an increase in the *bilateral FDI* context from one standard deviation below its mean to one standard deviation above increases the number of ISO 14001 certified facilities by about 22.7, holding the effects of other variables constant at their means. Note that holding all other variables constant at their means reduces the apparent size of the predicted effect for the *bilateral FDI weighted by ISO 14001 adoption* variable, particularly the per capita GDP measure because the bulk of ISO 14001 registrations occur among wealthy nations. In other words, the predicted effect of *bilateral FDI weighted by ISO 14001 adoption* is much higher when the per capita GDP measure is set at its 75th percentile and the other variables are set at their means.

The coefficient for a country's total inward FDI stock as a proportion of GDP (*overall FDI*) is not statistically significant in either the full panel or for the panel comprising developing countries only. Our analysis, therefore, suggests that the

[19] Heteroskedasticity, where the model ''fits'' better for some countries than for others, is widely known to cause inefficient coefficient estimates for the independent variables in the model. While we use robust standard errors to deal with heteroskedasticity across countries, our key results hold without them as well.

TABLE 1. Country-Wide ISO 14001 Adoption Levels, 1996–2002

Independent Variables	*All Countries*	*Developing Countries Only*
Overall FDI	−1.248e−11 (4.644e−11)	−1.061e−11 (5.019e−11)
Bilateral FDI weighted by ISO adoption	0.302** (0.075)	0.202** (0.064)
International Controls		
Exports	−0.046 (0.598)	−0.179 (1.020)
Bilateral exports weighted by ISO adoption	0.143* (0.081)	0.191* (0.091)
Language	0.018 (0.016)	0.015 (0.015)
Neighbor	−0.010 (0.27)	−0.014 (0.026)
IGO (intergovernmental organizations)	−0.321 (0.341)	−0.298 (0.387)
INGO (nongovernmental organizations)	0.175 (0.188)	0.259 (0.257)
Domestic Controls		
GDP	0.771 (0.593)	0.972 (1.030)
Per capita GDP	1.986e−4* (8.677e−5)	0.00,018** (0.00,010)
Per capita GDP^2	−3.144e−9** (1.248e−9)	−2.739e−9** (1.217e−9)
Pollution	−0.016 (0.015)	−0.017 (0.021)
Regulations	0.167* (0.087)	0.153 (0.117)
ISO 9000	0.354** (0.141)	0.531** (0.104)
Fixed effects	Yes	Yes
Constant	−22.139 (14.832)	−28.906 (26.373)
n	98 countries, 6 years	74 countries, 6 years
χ^2	1007	463

**$p < .01$, *$p < .05$, one-tailed test.

levels of FDI a host economy receives over time do not have a statistically significant influence on host country firms' corporate environmental practices as reflected in ISO 14001 (Hypothesis 2). This implies that the race-to-the-bottom argument that high levels of FDI stocks will be associated with low ISO 14001 adoption levels does not hold in our case. Instead, the ''investing up'' argument holds because the levels of ISO 14001 adoption in home countries from which FDI stock has originated influence its adoption in host economies (Hypothesis 1).

The amount of exports as a percentage of host GDP (*exports*) is not significant in either panel analysis, an issue we further investigate in the next section. However, we find that in both panels *bilateral exports weighted by ISO 14001 adoption* have statistically discernable effects on host countries' ISO 14001 adoptions—a result that coheres with Prakash and Potoski (2006b). This suggests that two key commercial networks in which host countries are embedded, foreign direct investment and international trade, can serve to encourage the adoption of corporate environmental practices. FDI transmits corporate practices of home countries to host countries, while foreign trade transmits the corporate practices of the export destinations to the exporting countries. What matters for ISO 14001 adoptions is: (1) the home countries from which the host country receives its FDI overtime and (2) the destinations to which the host-country exports. In sum, contrary to the convergence argument, international economic integration via FDI and trade may create incentives for host-country firms to mimic *varying* environmental practices of home countries (and export destinations).

Our analyses suggest that sharing common borders and a common language (*Neighbors* and *Language*) are neither individually nor jointly significant ($p > .10$) in either panel, suggesting that geography and common cultural values do not influence the diffusion of corporate environmental practices that are embodied in ISO 14001. The insignificant results for the language variable may be due to the fact that English has become the de facto language of global commerce, the language of the elite who manage business firms. Language solidarity may therefore not tie countries more closely together and therefore create normative pressures to join ISO 14001. Regarding the international sociological network

variables, again the total number of nongovernmental organizations a country's citizens has joined (*IGOs*) and the number of intergovernmental international organizations a country's government has joined (*INGOs*) are neither individually nor jointly significant ($p > .2$). Our analysis does not find evidence that sociological networks serve as conduits of ideas and norms that lead to the adoption of common organizational practices across countries, as the World Society argument posits (Boli and Thomas 1999). Arguably, in our case, FDI networks and trading networks (which World Society models ignore as conduits for ideas) may serve to diffuse norms about corporate environmental responsibility as enshrined in ISO 14001. It is possible that in addition to creating instrumental incentives for local firms to join ISO 14001, FDI and trading networks may also transmit normative models about the relationship between businesses and their natural environment. As postimperialism literature suggests (Sklar 1976; Becker and Sklar 1999), scholars interested in studying the role of ideas and norms in international political economy will need to examine the role of both commercial and noncommercial networks as conduits for the international diffusion of ideas.

The analyses control for several domestic variables. We find that a country's regulatory context (*Regulations*) is statistically significant and its coefficient is in the expected direction in the full model but not in the developing-country only model. Competitive markets may encourage firms to differentiate themselves and ISO 14001 becomes an instrument firms could employ in this regard. *GDP,* a proxy for the total number of facilities, and a country's amount of SO_2 emissions are not statistically significant. We do find that countries with more *ISO 9000* registrants tend to have higher levels of ISO 14001 adoption. We speculate that the management system approach prescribed by both ISO 9000 and ISO 14001 reduces the costs for local firms to understand the pros and cons of ISO 14001, and given the reported success of ISO 9000 in improving quality control practices (Rao, Raghunathan, and Solis 1997), has persuaded them to join ISO 14001. We also find support for the argument that the relationship between wealth (*per capita GDP*^{2}) and the number of ISO 14001-certified facilities is nonlinear. In the full model, the number of ISO 14001-certified facilities increases slowly at the low percentiles of per capita income (the expected number of registration is 3.4 at the 10th percentile and only 8.9 at the 50th), increase sharply for countries that fall up to the 90th (47.2) percentile, and then decline for countries at the top percentiles of per capita income.

While overall the fixed effects are jointly significant, only about fifteen percent of the countries had statistically significant, fixed-effects coefficients. This suggests the other independent variables (including the serial correlation correction) in the model are predicting ISO 14001 levels fairly well. If there are patterns in the fixed effects coefficients, there are perhaps two worth noting. The model over predicts certification for some post-Soviet countries (Russia, Ukraine, Kazakhstan) and under predicts for several Middle Eastern countries (Syria, Jordan, Lebanon, Egypt, although Saudi Arabia is over predicted).

Alternative Specifications

We examined different specifications of our model and find that our key findings hold across specifications. That is, *Bilateral FDI Weighted by ISO Adoption* retains statistical and substantive significance across specifications (Hypothesis 1). The other key independent variable, a country's overall dependence on FDI (*Overall FDI*), is not significant in any specification but for the specification where we drop country fixed effects (Appendix 2, Column 3). Even in this specification, its directionality is opposite to that predicted in Hypothesis 1; that is, higher levels of overall FDI are *positively*, not negatively, associated with ISO adoption.

European Union (EU) countries have been in the forefront of several environmental issues. Germany and the United Kingdom also exhibit high levels of ISO 14001 certification. Given the high levels of FDI flows within EU countries, it is plausible our results are driven by an ''EU effect.'' To check for the ''EU effect,'' we simply dropped the EU countries from our model and re-ran the analysis. As shown in Appendix 2, Column 1, the results are consistent with the full model, thereby leading us to conclude that an ''EU effect'' is not driving our results regarding the effect of FDI on ISO 14001 adoption. We tested for a similar argument for Japan, which has the highest levels of ISO 14001 adoption and is a major source of outward FDI to the rest of the world. We dropped Japan from the model and re-ran the analysis. As reported in Appendix 2, Column 2, we find that our results are consistent with the full (including Japan) analysis, suggesting that our conclusions are not driven by a ''Japan effect.''

Our model has included fixed effects to control for unit heterogeneity (Green et al. 2001). While the fixed effects are statistically significant in our main analyses reported in Table 1, given the criticism of this approach (Beck and Katz 2004), we ran our model without fixed effects. As reported in Appendix 2, Column 3, in this specification as well, *Bilateral FDI Weighted by ISO Adoption* is statistically significant and positive. While a country's overall dependence on FDI (*Overall FDI*) is also significant, its coefficient is positive and contrary to the prediction of the race-to-the bottom thesis. In fact, the positive directionality of this variable reinforces the broader claim that inward FDI supports ISO 14001 adoption in host countries.

One might argue that FDI would influence ISO 14001 adoption directly and indirectly via its effect on countries' per capita income. Given the possible endogeneity issue between FDI stock, ISO 14001 adoption and wealth, we employed a two-stage, instrumental variable approach. The first-stage equation contains per capita income as the dependent variable and FDI and other control variables as the independent variables. In the second-stage equation, we replaced the actual values of per capita income with the predicted values for per capita income. As reported in Appendix 2, Column 4, our key results for this specification are consistent with those reported in Table 1.

We also checked our results by employing a lagged dependent variable instead of an AR1 correction for serial correlation. As Cameron and Trivedi (1998) recommend, the lagged dependent variable was logged, the zeros were replaced with .05, and a dummy variable was included which was scored one for the zeros, and scored zero for all other values. As shown in Appendix 2, Column 5, our substantive results were consistent with those presented in Table 1.

Finally, while employing stock data mitigates the simultaneity issues between trade and FDI (Hejazi and Safarian 2001), given that more than half of world trade is intra-firm (that is, it takes place within the value chains of MNEs), our model may not have correctly estimated the total effect of FDI on country-level ISO 14001 adoption. Therefore, we estimated a model that allowed us to examine the full impact of FDI (Hypothesis 2) while allowing the correlated variance between trade and FDI to be discounted. To do so, we first regressed FDI on trade, saved the residual trade, and then employed residual trade and FDI as covariates in our model to predict ISO 14001 adoption. In this specification also, a country's overall dependence on FDI (*Overall FDI*) is not significant while *Bilateral FDI Weighted by ISO Adoption* is significant (Appendix 2, Column 6). In sum, across all specifications, *Bilateral FDI Weighted by ISO Adoption* retains a positive and statistically significant relationship with the dependent variable, *ISO Adoption*, while *Overall FDI* remains statistically insignificant but for the specification without fixed effects.

Conclusion

Convergence theories assert that economic integration coupled with functionalist requirements of modern economies lead countries to adopt similar institutions and practices to organize economic life. While much of the convergence literature focuses on macro institutions established by governments, we test this argument in the context of micro-level corporate practices advocated in a nongovernmental, private regulatory program. We find FDI tends to reproduce in host countries the variance found in home countries' corporate environmental practices (ISO 14001 adoption levels). Further, we demonstrate that instead of leading to regulatory races to the bottom in corporate environmental practices, economic integration via FDI can create incentives for host-country firms to ratchet up their corporate practices beyond the regulatory requirements.

From a policy perspective, it is important to know not only how much FDI a country receives but from where. The effect of inward FDI needs to be appreciated beyond its usual role of alleviating resource scarcity and creating jobs in host countries. FDI is a conveyor of norms, technologies, and corporate practices, and its impact on the host economy is likely to extend well beyond the activities of its subsidiaries. If public policy can influence FDI's sources, policy makers can indirectly influence the technologies and practices that are likely to be diffused to their country. If free-trade and investment agreements such as NAFTA privilege FDI from signatory countries, then policy makers should carefully choose their partner countries.

FDI's critical role can also create new opportunities for nongovernmental organizations to influence environmental, labor, and social practices in the developing world. If nongovernmental organizations can target key MNEs that have extensive foreign operations, they can leverage MNE networks to spread their preferred norms. If nongovernmental organizations can persuade MNEs to adopt progressive environmental policies, such as ISO 14001, their efforts will be multiplied through FDI. Thus, instead of blanket opposition to ''globalization,'' ''multinationals,'' or ''foreign investment,'' nongovernmental actors need to think strategically and use globalization to their own advantage.

Our paper has extended the convergence debate to the study of micro-level institutions in the form of corporate practices. The next step would be to study conditions under which the convergence/divergence argument holds for nonprofits or nongovernmental organizations. Major nongovernmental organizations such as Amnesty International, Greenpeace, and the World Wildlife Fund have country-level chapters. The emergence of NGOs as important political actors warrants the study of their organizational practices across country chapters and how they are informed by practices adopted in countries where the NGOs are headquartered. This extension would enable scholars to study the convergence thesis across organizational forms: governmental, for profit, and nonprofits.

Appendix 1

Databases for Bilateral FDI flows

OECD (http://titania.sourceoecd.org/vl=1609981/cl=61/nw=1/rpsv/ij/oecdstats/16081080/v45n1/s5/p1)

Database coverage extends (in theory at least) back to 1980. Flows are reported in US dollars. The database covers flows from OECD members to other OECD members and about 30 non-OECD countries (includes China, India, Brazil, Malaysia). Since data on inflows in OECD countries are available, it would be possible to get data on flows from these countries to OECD (China to Australia for example), but not possible to get developing-country flows. Data coverage

varies among OECD countries (for example, there were only three partner countries listed for Canada). **UNCTAD** (http://www.unctad.org/Templates/Page.asp?intItemID=3198&lang=1)

Data coverage rarely extends back before 1990. Flows from OECD countries and a handful of other countries are reported in national currencies, developing country flows in US dollars. There are country reports for (an estimate) around 120 countries; some of these do not provide the relevant FDI data, however. There are not country reports for all of the industrialized countries (France and US, for example, are not listed), so getting data on flows from these countries requires looking at inflows in the other country reports. Partner countries covered in the country reports vary: the longest lists may include as many as 70 countries (with OECD countries well represented), while only two or three partners might be listed for some developing countries. Currency conversion is necessary for the industrialized country data, and in a few cases a double conversion is required (for a few Euro zone countries, pre-1999 data was listed in euros, so it was necessary to convert the euro to national currency and then the national currency to US dollars).

Appendix 2

Alternative Model of ISO 14001 Certification Rates, 1996–2002

Independent Variables	*Model Without OECD Countries*	*Model Without EU*	*Model Without Japan*
Overall FDI	−9.061e−12 (5.096e−11)	2.561e−11 (8.310e−11)	1.276e−11 (5.759e−11)
Bilateral FDI weighted by ISO Adoption	0.200** (0.066)	0.297** (0.072)	0.301** (0.073)
International Controls			
Exports	−0.275 (1.002)	−0.205 (0.703)	−0.050 (0.622)
Bilateral exports weighted by ISO adoption	0.191* (0.091)	0.168* (0.087)	0.141* (0.084)
Language	0.015 (0.015)	−0.004 (0.031)	0.020 (0.017)
Neighbor	−0.013 (0.027)	0.013 (0.032)	−0.011 (0.027)
IGO (intergovernmental organizations)	−0.346 (0.433)	−0.491 (0.433)	−0.332 (0.381)
INGO (nongovernmental organizations)	0.279 (0.267)	0.196 (0.252)	0.174 (0.207)
Domestic Controls			
GDP	0.860 (1.157)	0.055 (0.279)	0.771 (0.594)
Per capita GDP	1.942e−4* (1.135e−4)	5.918e−4** (1.784e−4)	2.002e−4* (8.749e−4)
Per capita GDP^2	−2.863e−9* (1.299e−9)	−1.206e−8** (4.759e−9)	−3.155e−9* (1.260e−9)
SO_2	−0.017 (0.022)	−0.018 (0.014)	−0.016 (0.017)
Regulations	0.147 (0.116)	0.169* (0.090)	0.176* (0.094)
ISO 9000 ISO 14001 (t-1)	0.532 ** (0.106)	0.324* (0.139)	0.355** (0.135)
Fixed effects	Yes	Yes	Yes
Constant	−25.643 (29.567)	−5.065 (6.706)	−22.174 (14.884)
n	74 countries 6 years	83 countries 6 years	97 countries 6 years
χ^2	570	1072	952

Standard errors in parentheses.
**$p < .01$, *$p < .05$, one-tailed test.

Appendix 2 (Continued)

	Event Count Without Fixed Effects	*Two-Stage Instrumental Variable Model*	*Event Count with Lagged Dependent Variable Instead of AR1*	*FDI Plus Residual Trade*
Overall FDI	4.393e−11* (3.929e−11)	−1.248e−11 (4.644e−11)	2.370e−11 (2.719e−11)	−1.011e−11 (8.907e−11)
Bilateral FDI weighted by ISO Adoption	0.206** (0.055)	0.302** (0.075)	0.093* (0.025)	0.328** (0.070)
International Controls				
Residual exports				−7.727 (4.142)*
Exports	0.271 (0.409)	−0.046 (0.597)	0.293 (0.392)	
Bilateral exports weighted by ISO adoption	0.020 (0.025)	0.143* (0.081)	0.091** (0.041)	2.584e−4 (2.447e−4)
Language	0.014 (0.019)	0.018 (0.016)	0.016* (0.009)	0.025 (0.020)
Neighbor	0.073* (0.036)	−0.010 (0.027)	−0.013 (0.017)	0.002 (0.027)
IGO (intergovernmental organizations)	−0.564* (0.282)	−0.321 (0.341)	−0.398* (0.199)	−0.290 (0.318)
INGO (nongovernmental organizations)	0.321* (0.161)	0.175 (0.188)	0.094 (0.121)	0.078 (0.174)
Domestic Controls				
GDP	0.624** (0.127)	0.771 (0.593)	0.569* (0.245)	1.461* (0.799)
Per capita GDP	9.384e−5* (4.116e−5)	1.986e−4* (8.677e−5)	9.970e−5* (3.967e−4)	1.207e−3 (2.068)
Per capita GDP^2	−1.892e−9* (8.190e−10)	−3.144e−9** (1.242e−9)	−1.496e−9** (5.518e−0)	−2.411e−9 (2.666e−9)
SO_2	−0.004 (0.010)	−0.016 (0.014)	−0.009 (0.009)	−0.023 (0.018)
Regulations	0.014 (0.057)	0.167* (0.087)	0.089* (0.049)	0.196* (0.098)
ISO 9000	0.194* (0.112)	0.354** (0.141)	0.256** (0.040)	0.393** (0.152)
ISO 14001(t−1)			0.335** (0.033)	
ISO 14001(dummy) (t−1)			0.229 (0.158)	
Fixed effects	No	Yes	Yes	Yes
Constant	−15.206** (2.766)	−22.139 (14.832)	−13.258* (5.763)	−36.401** (18.732)
n	98 countries, 6 years	98 countries, 6 years	98 countries, 6 years	98 countries, 6 years
χ^2	831	1007	2091	1426

Standard errors in parentheses.
**$p < .01$, *$p < .05$, one-tailed test.

Appendix 3

Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
ISO 14001	222.31	752.11	0	10,620
Overall FDI	2.82e8	8.67e8	−1.83e9	1.03e10
Bilateral FDI weighted by ISO adoption	3.93	3.00	−2.99	8.23
International Controls				
Exports	0.306	0.232	0.021	8.229
Bilateral exports weighted by ISO adoption	1.879	4.483	−2.995	7.983
Language	1.311	3.421	0.001	46.549
Neighbor	1.189	3.073	0.000	103.316
IGO (intergovernmental organizations)	3.897	0.291	3.089	4.742
INGO (nongovernmental organizations)	6.838	0.800	4.431	8.848
Domestic Controls				
GDP	24.628	1.916	20.254	29.852
Per capita GDP	11,142.22	9301.203	547.999	56,022.03
Per capita GDP^2	2.11e08	3.35e08	300,303.7	3.14e09
SO_2	10.009	9.165	0.621	117.161
Regulations	5.620	1.836	2	10.828
ISO 9000	5.052	3.311	−2.996	11.108

References

AITKEN, BRIAN J., AND ANN E. HARRISON. (1999) Do Domestic Firms Benefit from Direct Foreign Investment? *The American Economic Review* 89(3):605–618.

ANSUATEGI, ALBERTO. (2003) Economic Growth and Transboundary Pollution in Europe. *Environmental and Resource Economics* 26(2):305–328.

BECK, NATHANIEL, AND JONATHAN N. KATZ. (2004) Time-Series Cross-Section Issues. Draft Manuscript; Available at http://polmeth.wustl.edu/retrieve.php?id=36 (Accessed January 9, 2004).

BECKER, DAVID G., AND RICHARD L. SKLAR, EDS. (1999) *Postimperialism and World Politics*. Westport, CT: Praeger Publishers.

BELL, DANIEL. (1973) *The Coming of the Post Industrial Society*. New York: Basic Books.

BENDELL, JEM, EDS. (2000) *Terms for Endearment*. Sheffield, UK: Greenleaf.

BENNETT, COLIN. (1991) Review Article: What Is Policy Convergence and What Causes It? *British Journal of Political Science* 21(2):215–233.

BERGER, SUZANNE. (1996) Introduction. In *National Diversity and Global Capitalism*, edited by Suzanne Berger and Ronald Dore. Ithaca, NY: Cornell University Press.

BERGER, SUZANNE, AND RONALD DORE, EDS. (1996) *National Diversity and Global Capitalism*. Ithaca, NY: Cornell University Press.

BERLE, ADOLF A. (1959) *Power without Property*. New York: Harcourt, Brace & World.

BLONIGEN, BRUCE A., AND MIAO WANG. (2005) Inappropriate Pooling of Wealthy and Poor Countries in Empirical FDI Studies. In *Does Foreign Direct Investment Promote Development?*, edited by Theodore H. Moran, Edward M. Graham, and Magnum Blomstrom. Washington, DC: Institute for International Economics.

BOLI, JOHN, AND GEORGE M. THOMAS, EDS. (1999) *Constructing World Culture: International Non-Governmental Organizations Since 1875*. Stanford, CA: Stanford University Press.

BOYER, ROBERT, AND DANIEL DRACHE, EDS. (1996) *States Against Markets*. London: Routledge.

CAMERON, COLIN, AND PRAVIN TRIVEDI. (1998) *Regression Analysis of Count Data*. New York: Cambridge University Press.

CENTRAL INTELLIGENCE AGENCY. (2004) The World Factbook. Available at http://www.cia.gov/cia/publications/factbook/fields/2122.html (Accessed March 22, 2005).

CHARNOVITZ, STEVE. (1993) Environmentalism Confronts GATT Rules. *Journal of World Trade* 27(2):37–52.

CHRISTMANN, PETRA, AND GLENN TAYLOR. (2001) Globalization and the Environment: Determinants of Firm-Self Regulation in China. *Journal of International Business Studies* 32(3):439–458.

COLLINSWORTH, TERRY J., WILLIAM GOOLD, AND PHARIS J. HARVEY. (1994) Labor and Free Trade. *Foreign Affairs* 77(1):8–13.

Cutler, Claire A., Virginia Haufler, and Tony Porter, eds. (1999) *Private Authority and International Affairs*. Albany, NY: State University of New York Press.

Daly, Herman. (1993) The Perils of Free Trade. *Scientific American* 269(5):51–55.

Dasgupta, Susmita, Hemamala Hettige, and David Wheeler. (2000) What Improves Environmental Compliance? Evidence from Mexican Industry. *Journal of Environmental Economics and Management* 39(1):39–66.

Drezner, Daniel. (2001) Globalization and Policy Convergence. *International Studies Review* 3(1):53–78.

Eskeland, Gunnar, and Ann Harrison. (2003) Moving to Greener Pastures? *Journal of Development Economics* 70(1):1–23.

Friedman, Thomas. (2005) *The World Is Flat*. New York: Farrar, Straus and Giroux.

Galbraith, John K. (1967) *The New Industrial State*. Boston, MA: Houghton-Mifflin.

Gill, Stephan. (1995) Globalization, Market Civilization and Discliplinary Neoliberalism. *Millennium* 24(3):399–423.

Gourevitch, Peter A., and James Shin. (2005) *Political Power and Corporate Control*. Princeton, NJ: Princeton University Press.

Green, Donald P., Soo Yeon Kim, and David H. Yoon. (2001) Dirty Pool. *International Organization* 55(2):441–468.

Grossman, Gene M., and Alan B. Krueger. (1995) Economic Growth and the Environment. *Quarterly Journal of Economics* 110(2):353–375.

Guler, Isen, Mauro Guillen, and John Muir MacPherson. (2002) Global Competition, Institutions, and Organizational Change: The International Diffusion of the ISO 9000 Quality Standards. *Administrative Science Quarterly* 47:207–232.

Hall, Peter A., and David Soskice. eds. (2001) *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. New York: Oxford University of Press.

Hejazi, Walid, and A. Edward Safarian. (2001) The Complementarity between U.S. Foreign Direct Investment Stock and Trade. *Atlantic Economic Journal* 29(4):420–437.

Heritage Foundation. (2003) Index of Economic Freedom. Available at http://www.heritage.org/research/features/index/2003/IndexHistory95-03.xls (Accessed July 22, 2004).

Hofstede, Geert. (1980) *Culture's Consequences: International Differences in World-Related Values*. Beverly Hills, CA: Sage Publications.

Honaker, James, Anne Joseph, Gary King, Kenneth Scheve, and Naunihal Singh. (2001) *Amelia: A Program for Missing Data (Windows version)*. Cambridge, MA: Harvard University, http://GKing.Harvard.edu/ (Accessed September 21, 2005).

Hutson, Andrew M. (2004) Diffusion of Environmental Practices through Value Chain Relationships in the United States and Mexico. Paper prepared for the 26th Annual Research Conference of the Association for Public Policy and Management, October 29, 2004.

Hymer, Stephen H. (1976 [1960]) *The International Operations of National Firms*. Cambridge: MIT Press.

Inglehart, Ronald. (1977) *The Silent Revolution*. Princeton, NJ: Princeton University Press.

ISO. (2003) The ISO Survey of ISO 9000 and ISO 14000 Certificates – Twelfth Cycle. Available at http://www.iso.ch/iso/en/iso9000-14000/pdf/survey12thcycle.pdf (Accessed March 26, 2004).

ISO. (2005a) ISO 14001, Environmental Management Systems. Available at http://www.iso.org/iso/en/prods-services/otherpubs/pdf/survey2004.pdf (Accessed September 26, 2005).

ISO. (2005b) The ISO Directory of ISO 9000 and ISO 14000 Accreditation and Certification Bodies. Available at http://www.iso.org/iso/en/info/ISODirectory/countries.html (Accessed August 10, 2005).

Jaffe, Adam, Steven Peterson, Paul Portney, and Robert Stavins. (1995) Environmental Regulation and Competitiveness of US Manufacturing. *Journal of Economic Literature* 33(1):132–163.

Javorcik, Beata Smarzynska. (2004) Does Foreign Direct Investment Increase Productivity of Domestic Firms? *American Economic Review* 94(3):606–627.

Javorcik, Beata Smarzynska, and Mariana Spatareanu. (2005) Disentangling FDI Spillovers. In *Does Foreign Direct Investment Promote Development?*, edited by Theodore H. Moran, Edward M. Graham, and Magnum Blomstrom. Washington DC: Institute for International Economics.

Jensen, Nathan. (2005) The Multinational Corporation Empowers the Nation-State. *Perspectives on Politics* 3(3):548–551.

Kahler, Miles. (1998) Modeling Races to the Bottom. Unpublished manuscript. Available at http://irpshome.ucsd.edu/faculty/mkahler/RaceBott.pdf (Accessed February 2, 2004).

Keck, Margaret, and Kathryn Sikkink. (1998) *Activists Beyond Border*. Ithaca, NY: Cornell University Press.

KING, ANDREW, AND MICHAEL LENOX. (2000) Industry Self-Regulation without Sanctions: The Chemical Industry's Responsible Care Program. *Academy of Management Journal* 43(4):698–716.

KING, ANDREW, AND J. MYLES SHAVER. (2001) Are Aliens Green? Assessing Foreign Establishments' Environmental Conduct in the U.S. *Strategic Management Journal* 22(11):244–256.

KOLK, ANS. (2000) *The Economics of Environmental Management.* Essex, UK: Prentice Hall/Financial Times.

KOPSTEIN, JEFFREY S., AND DAVID A. REILLY. (2000) Geographic Diffusion and Transformation of the Postcommunist World. *World Politics* 53(1):1–37.

KRASNER, STEPHEN, ED. (1983) *International Regimes.* Ithaca, NY: Cornell University Press.

LEONARD, H. JEFFREY. (1988) *Pollution and the Struggle for a World Product.* Cambridge: Cambridge University Press.

LI, QUAN, AND ADAM RESNICK. (2003) Reversal of Fortunes: Democracy, Property Rights and Foreign Direct Investment Inflows in Developing Countries. *International Organization* 57(Winter):1–37.

LIPSEY, ROBERT E., AND FREDERIK SJOHOLM. (2005) The Impact of Inward FDI on Host Countries. In *Does Foreign Direct Investment Promote Development?*, edited by Theodore H. Moran, Edward M. Graham, and Magnum Blomstrom, Washington, DC: Institute for International Economics.

LONG, J. SCOTT. (1997) *Regression Models for Categorical and Limited Dependent Variables.* Thousand Oaks, CA: Sage Publications.

MANI, MUTHUKUMARA, AND DAVID WHEELER. (1998) In Search of Pollution Havens? *Journal of Environment and Development* 7(3):215–247.

MATTLI, WALTER, AND TIM BÜTHE. (2003) Setting International Standards: Technological Rationality or Primacy of Power? *World Politics* 56(1):1–42.

MEYER, JOHN W., JOHN BOLI, GEORGE M. THOMAS, AND FRANCISCO O. RAMIREZ. (1997) World Society and the Nation-State. *American Journal of Sociology* 103(1):144–181.

MONSHIPOURI, MAHMOOD, CLAUDE WELCH, AND EVAN KENNEDY. (2003) Multinational Corporations and the Ethics of Global Responsibility: Problems and Possibilities. *Human Rights Quarterly* 25(4):965–989.

MORAN, THEODORE, EDWARD M. GRAHAM, AND MAGNUS BLOMSTROM, EDS. (2005) *Does Foreign Direct Investment Promote Development?* Washington, DC: Institute for International Economics.

MURPHY, DALE. (2004) *The Structure of Regulatory Competition.* New York: Oxford University Press.

OHMAE, KENICHI. (1991) *The Borderless World.* New York: Harper.

O'LOUGHLIN, JOHN, MICHAEL D. WARD, COREY L. LOFDAHL, JORDIN S. COHEN, DAVID S. BROWN, DAVID REILLY, KRISTIAN S. GLEDITSCH, AND MICHAEL SHIN. (1998) The Diffusion of Democracy, 1946-1994. *Annals of the Association of American Geographers* 88(4):545–574.

PAULY, LOUIS, AND SIMON REICH. (1997) National Structures and Multinational Corporate Behaviors. *International Organization* 51(1):1–30.

PORTER, MICHAEL E. (1990) *The Competitive Advantage of Nations.* New York: Free Press.

PORTER, MICHAEL, AND CLAAS VAN DER LINDE. (1995) Toward a New Conception of the Environment-Competitiveness Relationship. *Journal of Economic Perspectives* 9(4):97–118.

POTOSKI, MATTHEW, AND ASEEM PRAKASH. (2005a) Covenants with Weak Swords: ISO 14001 and Firms' Environmental Performance. *Journal of Policy Analysis and Management* 24(4):744–769.

POTOSKI, MATTHEW, AND ASEEM PRAKASH. (2005b) Green Clubs and Voluntary Governance: ISO 14001 and Firms' Regulatory Compliance. *American Journal of Political Science* 49(2):235–248.

PRAKASH, ASEEM. (2000) *Greening the Firm.* Cambridge, UK: Cambridge University Press.

PRAKASH, ASEEM, AND MATTHEW POTOSKI. (2006a) *The Voluntary Environmentalists.* Cambridge, UK: Cambridge University Press.

PRAKASH, ASEEM, AND MATTHEW POTOSKI. (2006b) Racing to the Bottom?: Globalization, Environmental Governance, and ISO 14001. *American Journal of Political Science* 50(2):347–361.

RAO, S. SUBBA., T. S. RAGHUNATHAN, AND LUIS SOLIS. (1997) Does ISO 9000 Have an Effect on Quality Management Practices? *Total Quality Management* 8(6):335–346.

RUSSO, MICHAEL V. (2001) *Institutional Change and Theories of Organizational Strategy: ISO 14001 and Toxic Emissions in the Electronic Industry.* Available at http://lcb1.uoregon.edu/mrusso/ISO-study.htm (Accessed November 7, 2004).

SASSER, ERIKA, ASEEM PRAKASH, BENJAMIN CASHORE, AND GRAEME AULD. (2006) Direct Targeting as NGO Political Strategy: Examining Private Authority Regimes in the Forestry Sector. *Business and Politics* 8(3):1–32.

SAYRE, DON. (1996) *Inside ISO 14000.* Delray Beach, FL: St. Lucie Press.

SETHI, PRAKASH, AND B. ELANGO. (1999) The Influence of ''Country of Origin'' on Multinational Corporation Strategy: A Conceptual Framework. *Journal of International Management* 5(4):285–298.

Sklar, Richard L. (1976) Postimperialism: A Class Analysis of Multinational Corporate Expansion. *Comparative Politics* 9(1):75–92.

Spar, Debora, and David Yoffie. (2000) A Race to the Bottom or Governance from the Top? In *Coping with Globalization*, edited by Aseem Prakash and Jeffrey A. Hart. London: Routledge.

Steinzor, Rena. (1998) Reinventing Environmental Regulation: The Dangerous Journey from Command to Self-Control. *Harvard Environmental Law Review* 22:103–202.

Stern, David. (2005) Global Sulfur Emissions from 1850 to 2000. *Chemosphere* 58:163–175.

Tiebout, Charles. (1956) A Pure Theory of Local Expenditure. *Journal of Political Economy* 64(5):416–424.

United Nations. (2004) UN Commodity Trade Statistics Database (UN Comtrade). Available at http://unstats.un.org/unsd/comtrade/ (Accessed January 1–March 1, 2004).

Union of International Associations. (1997) *Yearbook of International Organizations*. Munchen, Germany: K. G. Saur.

Van Tulder, R., and Ans Kolk. (2001) Multinationality and Corporate Ethics. *Journal of International Business Studies* 32(2):267–283.

Veblen, Thorstein. (1994 [1899]) *The Theory of the Leisure Class*. New York: Dover Publications.

Vogel, David. (1978) *Lobbying the Corporation*. New York: Basic Books.

Vogel, David. (1986) *National Styles of Regulation*. Ithaca, NY: Cornell University Press.

Vogel, David. (1995) *Trading Up*. Cambridge, MA: Harvard University Press.

Wallach, Lori, and Michelle Sforza. (1999) *Whose Trade Organisation?* Washington, DC: Public Citizen.

Williams, R. L. (2000) A Note on Robust Variance Estimation for Cluster-Correlated Data. *Biometrics*, 56(2):645–646.

Wooldridge, Jeffrey. (2003) *Introductory Econometrics*, 2nd edition. Cincinnati, OH: South-Western College Publishing.

World Bank. (2004) World Development Indicators. Available at http://publications.worldbank.org/register/WDI (Accessed March 1, 2004).

World Trade Organization. (2005) World Trade Report. Available at http://www.wto.org/english/res_e/booksp_e/anrep_e/world_trade_report05_e.pdf (Accessed September 24, 2005).

Zorn, Christopher. (2001) Generalized Estimating Equation Models for Correlated Data: A Review with Applications. *American Journal of Political Science* 45(2):470–490.