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Voluntary Environmental Regulation in Developing Countries

Fad or Fix?

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RESOURCES
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Abstract

Hamstrung by weak institutions that undermine conventional environmental regulatory tools, policymakers in developing countries are increasingly turning to voluntary approaches. Yet the evaluative literature on the topic is thin. To help fill this gap, we review arguments for and against the use of voluntary regulation in developing countries and present three case studies: a series of agreements negotiated between regulators and leather tanners in Guanajuato, Mexico; a national environmental audit program in Mexico; and a national public disclosure program in Indonesia. Admittedly few in number, these case studies nevertheless suggest that although voluntary environmental regulation in developing countries is a risky endeavor, it is by no means doomed to failure. The risks can be minimized by emphasizing the dissemination of information about pollution and pollution abatement options and by avoiding voluntary tools in situations where regulatory and nonregulatory pressures for improved environmental performance are weak and where polluters can block quantified targets, individual sanctions for noncompliance, and other widely accepted prerequisites of effective initiatives.

Key Words: voluntary regulation, environment, developing country, Mexico, Indonesia

JEL Classification Numbers: Q28, O13

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Allen Blackman*

1. Introduction

The conventional approach to industrial pollution control is to establish laws requiring firms to cut emissions. Voluntary regulation, by contrast, provides incentives—but not mandates—for pollution control. The main types are environmental agreements negotiated between regulators and industry, programs developed by regulators in which individual firms are invited to participate, unilateral commitments made by firms, and public disclosure initiatives that collect and disseminate information on participants' environmental performance. In industrialized countries, such regulation has become quite popular (OECD 1999, 2003). Less well known is that environmental authorities in developing countries, particularly those in Latin America, also have embraced this approach and are rapidly putting new initiatives in place. For example, over the past decade, regulatory authorities in Colombia, Chile, and Mexico have negotiated dozens of high-profile voluntary "clean production agreements" with dirty industrial sectors (Jiménez 2007; Hanks 2002). Other types of voluntary regulation, including state-run voluntary audit, labeling, and public disclosure programs, are also increasingly common (e.g., Rivera 2002; Blackman et al. 2007).

Although voluntary environmental initiatives in industrialized countries share many feature with those in developing countries, their objectives are generally different. Policymakers in industrialized countries typically use voluntary regulation to encourage firms to overcomply with mandatory regulations; those in developing countries generally use it to help remedy rampant non-compliance with mandatory regulation. For example, an explicit goal of the national clean production initiatives in both Chile and Colombia has been to "normalize" compliance with mandatory regulation (Jiménez 2007; Blackman et al. 2006a). Given that voluntary regulation in developing countries is usually a frontline compliance strategy rather than an effort to move beyond compliance, the stakes for its success are high.

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But is voluntary regulation likely to have substantive environmental benefits in developing countries? Two opposing views are emerging in the nascent literature on the topic.

Some argue that voluntary regulation holds considerable promise for developing countries (Hanks 2002; World Bank 1999). As is well known, policymakers in the global south face an array of barriers to enforcing mandatory regulation including weak institutions, incomplete legal foundations, and limited political will (Russell and Vaughn 2003; Eskeland and Jimenez 1992). According to its proponents, voluntary regulation sidesteps these constraints because, by definition, it does not depend directly on mandatory regulation to motivate polluters to improve their environmental performance. Rather, it relies on at least two other types of incentives. First, by raising the profile of firms' environmental performance, voluntary regulation can boost both positive and negative pressures placed upon polluters by consumers, capital markets, nongovernmental organizations, and community groups. For example, a firm participating in a negotiated voluntary agreement could, in principle, receive positive publicity that increases its sales, enhances its access to financial capital, and deflects criticism from environmental advocates. Second, voluntary initiatives often subsidize investments in pollution abatement. These subsidies can be pecuniary—for example, grants or loans for pollution control equipment—but more often they are informational—for example, seminars, brochures, and one-on-one interactions that provide technical assistance in pollution abatement. Such nonpecuniary subsidies are reputed to be a leading "soft" benefit of voluntary regulation.

Notwithstanding those arguments, there are several reasons to doubt that voluntary regulation can be effective in developing countries. First, the literature suggests that a "background threat" of mandatory regulation is often a critical motivation for firms to participate in and comply with voluntary regulatory initiatives (Khanna 2001; Lyon and Maxwell 2002). This finding implies that voluntary regulatory instruments are unlikely to perform well in countries where mandatory regulation is weak.

Second, many of the nonregulatory factors that reputedly motivate firms to participate in and comply with voluntary regulation—including pressure from consumers, capital markets, non-governmental organizations, and community groups—are relatively anemic in developing countries. Niche markets for "green" products are smaller than in the West, capital markets, including stock markets, are thinner, and environmental nongovernmental organizations and

advocacy groups are relatively weak and scarce (Fry 1988; Blackman et al. 2006a; Wehrmeyer and Mulugetta 1999).

Third, because environmental management institutions and private sector advocacy groups are relatively weak, regulatory processes and programs in developing countries are often captured by industrial interests (Russell and Vaughn 2003; Blackman et al. 2006a). This is likely to be a particular problem with initiatives such as clean production agreements that are the outcome of a negotiation between regulators and industry. Where regulatory capture is a problem, polluters will be able to block monitoring and enforcement mechanisms, third party participation, individual penalties for non-compliance, quantified baselines and targets, and other design elements that are widely seen as prerequisites for success the efficacy of voluntary initiatives (see, e.g., OECD 1999).

A closely related concern is that in developing countries, voluntary regulation can be used to preempt or delay effective mandatory regulation by creating an "environmental Potempkin Village"—that is, a false impression that regulators and polluters are making progress on environmental problems. If this is the case, one can not argue that, whatever its weaknesses, voluntary regulation can only improve environmental quality. Rather, the risks of voluntary regulation must be weighed against any possible benefits.

Finally, using voluntary regulation to control pollution from small-scale and informal (unlicensed and unregistered) firms, which are more prevalent in developing countries than in industrialized countries (Blackman 2006), is problematic. Small firms may be less susceptible to many of the regulatory and nonregulatory pressures that create incentives for compliance with voluntary initiatives, including those generated by green consumers, capital markets, and nongovernmental organizations. Also, small firms may be more apt to free-ride on the activities of larger participants in voluntary initiatives.

How have the arguments for and against the use of voluntary regulation in developing countries played out in practice? The literature on the topic is quite thin.[1] To help fill the gap, this paper presents three recent case studies of voluntary initiatives and distills policy prescriptions. The case studies suggest that while voluntary environmental regulation in developing countries is a risky endeavor, initiatives that are carefully designed and deployed can

[1] See, e.g., World Bank (1999); Perry and Singh (2001); Hanks (2002); Rivera (2002); Blackman et al. (2004, 2006b, 2007); and Jiménez (2007).

be effective. The risks of failure can be minimized by emphasizing the dissemination of information about pollution and abatement options to participating firms and the public at large and by avoiding the use of voluntary tools in situations where both regulatory and nonregulatory pressures for improved environmental performance are weak, and where polluters can dictate the terms of the initiative.

The remainder of the paper proceeds as follows. The second section presents a case study of negotiated voluntary agreements between regulatory authorities and leather tanneries in Guanajuato, Mexico. The third section presents a case study of Mexico's Clean Industry program, a national voluntary audit program. The fourth section presents a case study of PROPER, a national public disclosure program in Indonesia. The last section compares the three initiatives and distills policy prescriptions.

2. Negotiated Voluntary Environmental Agreements in Mexico

This section presents a case study of four negotiated voluntary agreements used to control pollution generated by hundreds of tanneries in León, Guanajuato (Mexico).[2] As we shall see, the agreements amounted to an almost entirely unsuccessful effort to circumvent host of legal, institutional, and other barriers to enforcing mandatory regulation.

2.1. Background

León is a sprawling industrial city of some one million inhabitants located in the state of Guanajuato in north-central Mexico. Approximately 1200 tanneries are scattered throughout the city, which is Mexico's leather good capital. The vast majority of the tanneries employ fewer than 15 workers, and about a third are informal. The large number, small size, dispersion, and informality of the tanneries make them an exceptionally challenging target for environmental regulatory authorities. In addition, their status as an economic mainstay of the city affords them considerable political power.

Leather tanning generates organic liquid wastes, inorganic liquid wastes—notably sulfur and chromium—and solid wastes, mainly sludge infused with toxic chemicals. Since 2000, the organic liquid wastes have been treated by a municipal wastewater treatment plant. However,

[2] This section is drawn from Blackman and Sisto (In Press).

tannery solid wastes and inorganic liquid wastes remain uncontrolled and untreated and are a leading contributor to the severe degradation of one of Mexico's largest and most important watersheds—the Lerma-Chapala.

2.2. The Impetus for Voluntary Regulation

Although pollution from tanneries in León has been a serious problem at least 60 years, nothing was done about it until the mid-1980s when developments on the national, regional, and local level made continued inaction unacceptable. On the national level, an important stimulus for action was the passage of Mexico's first comprehensive federal environmental law in 1982 and the creation of its first national environmental ministry. On the regional level, an important driver was a movement to improve surface water quality in the Lerma-Chapala River basin and to restore Lake Chapala, Mexico's largest lake. On the local level, concern about tannery pollution was heightened by the establishment of a municipal water and sewer authority in 1985.

Despite those pressures, in the 1980's and 1990s, local regulators faced severe constraints that more or less ruled out reliance principally on a conventional mandatory approach and made negotiated voluntary agreements a logical choice. Specifically, regulators lacked the legal, institutional, physical, and civic infrastructure needed to enforce mandatory regulations.

The requisite legal infrastructure included clear regulations governing the discharge of liquid wastes into municipal sewers and the classification, handling, and storage of hazardous wastes. The former were not promulgated until 1998. Although hazardous waste regulations were promulgated in 1993, written materials clarifying how they applied to tanneries were not available until 1997.[3]

The institutional infrastructure needed to regulate tanneries included capable state and municipal regulatory authorities. Yet Guanajuato's environmental regulatory agency was not

[3] Prior to the 1988 passage of the General Law of Ecological Balance and Protection of the Environment (LGEEPA), Mexico's second comprehensive federal environmental law, regulations governing both liquid and hazardous wastes were confused, incomplete and, at least in the state of Guanajuato, roundly ignored. LGEEPA assigned local governments the responsibility of regulating liquid discharges into municipal sewer systems, the main repository for tannery liquid effluents in León. However, it was not until 1998 that León finally promulgated regulatory standards for such discharges. LGEEPA charged the federal government with regulating hazardous wastes, but the federal government did not issue implementing regulations regarding hazardous wastes until 1993 and did not clarify how these regulations applied to tanneries until four years later.

established until the mid-1990s, León's sewerage authority was not founded until 1985, and municipal environmental authorities were not established until the next decade.[4]

The physical infrastructure needed to control tannery pollution included facilities to treat inorganic liquid wastes, organic liquid wastes, and hazardous solid wastes. Of these three types of infrastructure, to date, only one—a facility to treat organic wastes—has been built. It did not begin operating until 2000.

Finally, the civic infrastructure needed to control tannery pollution included public support for—or at least acquiescence to—regulating tanneries in León. This infrastructure is difficult to measure. That said, there is virtually no evidence that citizens of León—either individually as voters and consumers or collectively via nongovernmental and community organizations—have ever placed significant political pressure on tanners to improve pollution control. One reason is that, as the leading employer in the city, the leather good industry enjoys considerable political and popular support.

Given those gaps in regulatory infrastructure, local environmental management authorities lacked the capacity to enforce mandatory regulation in the 1980s and 1990s. Voluntary regulation likely represented the only alternative means of addressing an urgent environmental problem

2.3. The Four Agreements

Starting in 1987, Mexican regulatory authorities negotiated a series of four voluntary environmental agreements with leather tanners in León. The agreements had several common characteristics. Each was signed by tannery trade associations and by federal and local regulators and each was administered by local regulators. Each agreement committed the tanners to completing specified pollution control measures within two to four years, and each committed regulators to granting tanners an enforcement amnesty during this period, making investments

[4] Historically, administrative and regulatory power in Mexico has been concentrated at the national level, a situation that created bottlenecks and inefficiency. Beginning in the early 1980s, Mexico set in motion a process of transferring a wide range powers, including environmental regulatory authority, to states and municipalities. Environmental decentralization has proceed slowly, however, as a result of the low priority that most states give to environmental issues, a lack of experience, and limited budgets. It was not until 1996, that Guanajuato established an environmental regulatory institution—the State of Guanajuato Ecology Institute (IEEG). By all accounts, IEEG has been chronically underfunded and undermanned. For example, from 1997 to 2002, it employed seven inspectors for all media and had an operating budget of less than $500,000 per year.

needed to fill gaps in regulatory infrastructure, and providing tanners with pecuniary and nonpecuniary subsidies to pollution abatement. Unfortunately, the outcome of each negotiated agreements was also the same. Tanners—and to a lesser extent regulators—abrogated virtually all of their commitments.

Signed in July 1987, the first agreement committed the tanners to installing low cost pollution prevention and control measures—namely, recycling of tanning baths and sedimentation tanks—within two years. For their part, regulators agreed to promulgate standards needed to control discharges into the local sewer system. Of these provisions, only one was carried out: most tanners installed sedimentation tanks, which were urgently needed to prevent the city's sewers from clogging. The agreement was originally scheduled to last two years, but given the decided lack of progress by 1989, was extended for an additional two years.

In light of the failure of the first voluntary agreement, regulators negotiated a second agreement in October 1991. It focused on a new pollution control strategy: building a series of common effluent treatment plants to control inorganic liquid wastes. Tanners committed to relocating to a series of industrial parks where the plants would be built. The city of León agreed to pass new zoning legislation that would facilitate relocation, register all tanneries, and build municipal solid and organic liquid waste treatment facilities. The agreement did not specify who would pay for relocating the tanneries and the building common effluent treatment plants. The second tannery agreement spurred only one real accomplishment—city authorities set aside a plot of unimproved land for the creation of a large tanning industrial park. However, basic infrastructure including electricity and sewerage, was not installed on the site for more than a decade. By 1993, efforts to control tannery pollution had once again come to a standstill.

After an international incident involving the death of thousands of migratory birds wintering at a reservoir polluted by tannery wastes in the winter of 1994–1995, pressure for tannery pollution control was revived and a third voluntary tannery agreement was signed in June 1995. It more or less repeated the provisions of the first two agreements: tanneries were to relocate to industrial parks and register with city authorities and regulators were to promulgate standards for discharges into municipal sewers and build a municipal treatment plant for organic wastes. In addition, federal, state and municipal authorities were to finance an education and research center to build public support and scientific foundation for tannery pollution control. Again, none of these commitments were kept.

The fourth and final negotiated voluntary agreement to control tannery wastes was signed in March 1997. It included a new twist on the usual strategy for controlling tannery liquid

wastes: the city would build a series of common effluent treatment plants as well as segregated sewer systems to transport wastes to these plants and would charge tanners fees to pay for this infrastructure. Individual tanners instead of trade association representatives were required to sign the agreements. The signatories of the fourth voluntary agreement ignored virtually all its terms, with two exceptions: city authorities built a municipal wastewater treatment plant to treat organic (but not industrial) wastes, and dug an unimproved pit for the disposal of tannery sludge. Stakeholders in León have not negotiated a fifth agreement, and the environmental problems generated by tanneries persist.

3. Voluntary Audits in Mexico

This section presents a case study of the Clean Industry program (also know as the National Environmental Auditing Program), Mexico's flagship national environmental program.[5] The case study suggests that, contrary to what some critics have charged, the program does not attract only already-clean plants seeking positive publicity. Rather, it attracts a significant number of relatively dirty firms and, therefore, likely has a positive impact on environmental quality.

3.1. Background

Established in 1992 as a branch of the national environmental ministry, the Federal Environmental Attorney General's Office (PROFEPA) is charged with monitoring and enforcing environmental regulations in most areas where the federal government has jurisdiction, including particularly dirty industrial sectors (e.g., petroleum), certain pollutants (e.g., air emissions), and certain geographic regions (e.g., the U.S.-Mexico border). This broad mandate is exceptionally challenging given PROFEPA's limited human and financial resources.

To help overcome these challenges, in its first year of operations, PROFEPA created the Clean Industry program. It was designed to leverage PROFEPA's limited resources by shifting some of the burden for monitoring onto the private sector. It operates as follows. Plants volunteering to join the program pay for an environmental audit by an accredited third-party private sector inspector. The audit determines what pollution control and prevention procedures the plant has in place and what additional procedures are required to comply with all existing

[5] This section is based on Blackman et al. (2007).

environmental regulations. Following the audit, the plant agrees in writing to correct all violations or deficiencies by a specified date. PROFEPA, in exchange, agrees not to penalize the plant for the identified violations until that date has passed. If the plant abides by this agreement, it is awarded a Clean Industry certificate that exempts it from regulatory inspections for two years. Akin to a seal of good housekeeping, this certificate is commonly used in marketing campaigns.

Hence, the Clean Industry program provides a basket of incentives for participation and compliance that includes both "carrots" and "sticks." The main carrots are an enforcement amnesty and the Clean Industry certificate, which can be used as a marketing tool. The main stick is the threat of enforcement of mandatory environmental regulations for plants not in the program. The Clean Industry program is now quite popular. The number of participating plants grew from 77 in 1992 to roughly 3,500 in 2005.

3.2. Do Only Clean Plants Join?

A pervasive concern about voluntary regulatory programs, in both industrialized and developing countries, is that they may not actually generate significant environmental benefits. Critics argue that they mostly attract participants that are already relatively clean because such participants pay a minimal cost to meet the programs' environmental performance targets but can reap significant benefits. Therefore, it is said the programs do not improve environmental quality and primarily serve as public relations vehicles—for both industry and regulators. Not surprisingly, this criticism has been leveled at the Clean Industry program.

Unfortunately, credible, complete plant-level data on the environmental performance of Mexican firms simply do not exist. Therefore, we use a proxy: records of PROFEPA fines. To determine whether relatively clean plants are joining the Clean Industry program, we examine the relationship between PROFEPA fines and participation in the Clean Industry program.

We construct a plant-level data set by merging registries of manufacturing plants compiled by the Mexican Ministry of Economics and PROFEPA. The result is a sample of 61,821 plants of which 541 participated in the Clean Industry program and 61,280 did not. Variables include the dates and amounts of fines from 1987 through 2004 as well as the plants' geographic location, sector, scope of market, gross sales, equity, and whether it exports, imports and is a government supplier.

Simple summary statistics indicate a strong correlation between PROFEPA fines and participation in the Clean Industry program (Table 1). Plants that participated in the program

were fined far more often and far more heavily than nonparticipants. Twenty percent of participants were fined versus only 4% for nonparticipants and the average fine was 89,923 pesos for participants versus 36,530 pesos for nonparticipants.

Although suggestive, this simple correlation does not prove causation. It may just reflect differences in underlying characteristics of plants. For example, it could be that large plants are more likely to be fined by PROFEPA and are also more likely to participate in the Clean Industry program. This correlation also does not indicate whether the timing of PROFEPA fine and participation suggests causation. For example, it does not say anything about the lag between the two events or even which comes first.

To control for plant characteristics and timing, we employ an econometric (duration) model described in detail in Blackman et al. (2007). The results are summarized in Figure 1, a graph of the relationship between the effect on the probability of joining the Clean Industry program of a PROFEPA fine—the hazard ratio—and the number of years that have elapsed since the most recent fine. (More precisely, the hazard ratio is the ratio of the conditional probability of joining the program given a fine to the conditional probability of joining absent a fine.) The figure also includes 95% confidence intervals. The hazard ratio is positive and significantly different than unity (i.e., no effect on the probability of joining the program) for t between one and three. The appropriate interpretation is that a PROFEPA fine raised the probability that a plant would join the Clean Industry program for three years following the fine. Figure 1 shows that, on average, the likelihood of joining the Clean Industry program more than doubles for three years after a fine.

This graph provides compelling evidence of a causal relationship between PROFEPA fines and participation in the Clean Industry program. In particular the intertemporal pattern of the effect—the fact that the closer one is in time to a fine, the greater the probability of participation—suggests that regulatory activity causes participation.

3.3. Impacts on Environmental Quality

Our results suggest that the Clean Industry program is not simply a public relations scheme that primarily attracts already-clean firms. Rather, its participants include a significant number of dirty firms under pressure from regulatory authorities.

Official records indicate that the vast majority of firms that joined the Clean Industry program signed agreements with PROFEPA to eliminate deficiencies identified in their audits, complied with these agreements, and were ultimately awarded a Clean Industry certificates.

However, our analysis cannot say whether the Clean Industry program actually motivated these improvements in environmental performance. It could be that the plants that joined the program would have taken the same or similar actions even if they had not joined (presumably because they were being fined by PROFEPA and wished to avoid further sanctions). Hence, our results can be interpreted as a preliminary indication—but by no means proof—that the Clean Industry program has generated environmental benefits

4. Voluntary Public Disclosure in Indonesia

This section presents a case study of the Program for Pollution Control, Evaluation and Rating (PROPER), a widely acclaimed public disclosure pollution control program in Indonesia.[6] We present data that suggest the program has had a significant environmental benefit, but for somewhat surprising reasons. Although the literature on public disclosure programs suggests they enhance pressures to abate placed on firms by external agents such as community groups, our research indicates that a key means by which PROPER spurs abatement is improving factory managers' information about their own plants' emissions and abatement opportunities.

4.1. Background

Indonesia has had a system of mandatory environmental regulation in place since the early 1980s. Compliance has been limited, however, mainly because monitoring and enforcement has been virtually nonexistent. In 1995, Indonesia's Environmental Impact and Management Agency (BAPEDAL) established PROPER to overcome pervasive institutional barriers to enforcement. The idea was to collect, verify, and disseminate information on participating plants' environmental performance and thereby "create incentives for compliance through honor and shame."[7]

PROPER employs a color-based single-index rating system. Plants that volunteer to participate are assigned one of five ratings—black, red, blue, green and gold—based on their compliance or overcompliance with command-and-control emissions standards (Table 2). This

[6] This section is drawn from Blackman et al. (2004).

[7] PROPER is being widely imitated. The Philippines introduced a similar program called EcoWatch in 1997 and China introduced pilot programs called GreenWatch in several cities in the late 1990s. Mexico, India, Bangladesh, and Thailand have also experimented with PROPER-like programs.

rating system was designed to be simple enough to be easily understood by the public but precise enough to provide incentives for firms to move from one category to the next.

In developing its first set of ratings, BAPEDAL relied on plant-level data from preexisting voluntary pollution control programs, self-reported survey data, and inspection data. Subsequently, ratings have been based on monthly emissions reports filed by participating plants. Emissions reports are checked against past reports and against current reports from similar plants. When discrepancies arise, BAPEDAL conducts inspections to resolve them.

BAPEDAL attempts to ensure that both participating firms and the public have easy access to ratings. Typically, ratings are released at a formal press conference and posted on the Internet.[8] In addition, for each participating plant, BAPEDEL issues a one-page report on environmental performance. This report serves as an information resource for the plant's managers and environmental engineers.

Participation in PROPER was initially limited to several hundred relatively large water polluters.[9] One hundred and eighty-seven plants participated in the first two rounds of PROPER ratings in June and December 1995.[10] PROPER conducted two more ratings more in October 1996 and July 1997.[11] 75 plants joined the program during this time. Although the program was shuttered in the fall of 1998, a casualty of the political instability that accompanied the fall of the Suharto regime, it was restarted in 2004 and expanded to cover hazardous waste and air pollution.

4.2. PROPER's Impact

To assess PROPER's impact on environmental performance, we observe how participating plants' ratings changed between the first rating and the fourth rating—the final public rating before PROPER ceased operating in fall 1998. Our sample consists of 146 of the 233 plants that were participating in PROPER in July 1997, the time of the fourth rating—

[8] www.bapedal.go.id

[9] Water pollution was the initial focus because BAPEDAL had the more experience regulating it than any other media.

[10] Of these plants, 176 had participated in the Clean River Management Program (PROKASIH), a voluntary pollution control program established in 1989.

[11] PROPER actually conducted a fifth rating in June of 1998, but the ratings were never publicly disclosed.

essentially all those plants that were rated at least two times, and that responded to a survey, discussed below.[12]

Table 3 gives the first rating (June or December 1995) and the last rating (July 1997) for these 146 plants. Ratings improved for more than a third of the plants.[13] Note that the percentage of plants whose ratings improved—hereafter "improvers"—was much higher among plants initially rated black and red than among plants initially rated blue and green. The two plants initially rated black both improved as did 46% of the 90 plants initially rated red. However, only 11% of the 47 plants initially rated blue improved, and none of the plants initially rated green improved (BAPEDAL has yet to assign a gold rating). The reason that plants initially rated black and red were more likely to have improved is probably that for such plants, marginal abatement costs were relatively low and the marginal benefits of improvement were relatively high. Hence, the data strongly suggest that for plants that are not in compliance with regulatory standards—that is, those initially rated black or red—PROPER motivated significant emissions reductions.

4.3. Drivers of Impact

In fall 1998, BAPEDAL administered a survey to PROPER participants to determine how PROPER ratings create incentives for improved environmental performance. Specifically, the survey asked respondents to rank the importance of 18 different types of incentives—which, we will call channels—listed in Table 4. The table presents the survey results for 146 respondents that were rated at least two times, and whose responses were complete and internally consistent.

The survey results are somewhat surprising. The existing literature on public disclosure and related topics has focused on sources of pressure to improve environmental performance that are external to the firm (e.g., capital markets, the threat of future regulation, discretionary enforcement of existing laws, and product markets), but most of our respondents did not view such channels as most important. Rather, the majority indicated that PROPER ratings spur improved performance by providing information to plant managers and owners about their own

[12] Since we require at least two ratings to assess PROPER's impact, we eliminated 42 plants that joined the program in July 1997 and, therefore, were only rated once. In addition, for the sake of consistency with the analysis in the next section, we eliminated 12 plants that returned incomplete survey responses and 33 plants that returned inconsistent survey responses. Thus, 146 plants comprise our sample.

[13] Ratings for all but one of these improvers were non-decreasing over time. That is, all but one were assigned a 1996 rating that was at least as high as its 1995 rating, and a 1997 rating that was at least as high as its 1996 rating.

plant's emissions and abatement opportunities. Sixty percent of the respondents ranked channel t_1 (PROPER ratings provide clear information about how to improve environmental performance) or channel t_2 (PROPER ratings make owners and senior managers aware of the environmental performance of the factory) as most important or second most important. Thus, in the eyes of most of our survey respondents, PROPER ratings serve principally as an environmental audit.

This is not to say that our survey respondents dismissed factors external to the firm. Channels ranked as first or second most important by more than 10% of the respondents included: c (bad PROPER ratings increase pressure from communities living around the factories) which was ranked as first or second most important by 36% of the respondents; m (PROPER ratings increase pressure from the news media) which was ranked as first or second most important by a quarter of the respondents; and g_4 (good PROPER ratings will help in obtaining ISO 14001 certification), which was ranked as first or second most important by 11% of the respondents.[14]

5. Conclusion

We have presented three case studies of the use of voluntary regulation in developing countries. Before considering the policy implications, two caveats are in order. First, our sample of voluntary initiatives is obviously small and nonrandom and tells us nothing about how frequently similar programs and outcomes are observed in practice. Second, the relative success of the Clean Industry program and PROPER do not necessarily demonstrate that voluntary regulation can spur improved environmental performance because we can not be sure that participant firms would not have made the same improvements in environmental performance absent the programs. This is the usual problem that confounds the evaluation of voluntary programs—a counterfactual "business-as-usual" scenario is not observed.

Notwithstanding those limitations, the three case studies offer several valuable insights about the prospects for voluntary regulation in the global south. The case study of negotiated

[14]The last channel concerns certification of the plant's environmental management system by the International Standards Organization (ISO). This endorsement is highly valued by firms that participate—or that seek to participate—in international markets. Often downstream buyers in international production chains favor upstream suppliers that are ISO 14001 certified. Anecdotal evidence suggests that survey respondents tied to such downstream buyers feared bad PROPER ratings would make it difficult for them to obtain or maintain ISO 14001 certification. Hence, this result likely reflects external pressures placed upon the firm by downstream buyers.

voluntary agreements in León paints a decidedly pessimistic picture of these prospects, while the case studies of the Clean Industry program and PROPER provide grounds for optimism. Why were the León negotiated agreements less successful?

We will argue that various characteristics of the tannery agreements made them more susceptible to the dangers of using voluntary regulation in developing countries that were discussed in the introduction. One such danger is that regulators in developing countries lack a credible threat of mandatory regulation, which according to many researchers, drives participation in and compliance with voluntary regulation. The León case study bears this prediction out. Regulatory authorities in León were not able to threaten mandatory regulation because the legal, institutional, civic, and physical infrastructure they needed for enforcement was riddled with gaps. By the time some of these gaps had been filled in the late 1990s, tanners had already abrogated three voluntary agreements without incurring serious repercussions and had little reason to believe that continued noncompliance would be punished.

Regulators that administered the Clean Industry program and PROPER, on the other hand, carried a much bigger enforcement "stick." Both programs focused on large-scale plants, which could be more easily identified and monitored than the small-scale tanneries covered by the León voluntary agreements. Also, both programs were run by the national rather than local environmental regulatory institutions. The former typically have more regulatory capacity—including human and financial resources and political will—than the latter. For example, PROFEPA, which runs the Clean Industry program, regularly levies hefty fines for non-compliance, whereas local environmental regulatory authorities in León have very infrequently fined or otherwise sanctioned tanneries. Thus, one could argue that the Clean Industry program and PROPER have been more successful than negotiated agreements in León because the regulatory authorities that ran these programs used voluntary regulation to leverage a credible enforcement threat, while the regulatory authorities in León used it to compensate for an inability to wield such a threat.

A second danger of using voluntary regulation in developing countries is that that weak nonregulatory pressures are unlikely to take up the slack for weak mandatory regulation. In León, this appears to have been the case. There is no evidence that non-regulatory actors, such as community groups and consumers, ever created significant incentives for tanners to improve their environmental performance.

By contrast, non-regulatory actors almost certainly generated such incentives in the Clean Industry program and PROPER. Both programs disseminate information about environmental

performance at the national level where pressures from external stakeholders are presumably stronger than at the local level. PROPER was designed expressly for this purpose. Although the Clean Industry program was not, it has a similar effect: participating plants that graduated from the program earn certificates and receive national publicity. In addition, both the Clean Industry program and PROPER focus on large-scale plants with national and international markets. Such plants are, arguably, more susceptible to non-regulatory pressures applied by consumers, capital markets, and non-governmental organizations. For example, a large pulp and paper plant that exports its products probably cares more about its environmental reputation with consumers and community groups than does a small-scale tannery that sells exclusively to local shoemakers.

A third danger of using voluntary regulation in developing countries is that it will be captured by private sector lobby groups and may even lower environmental quality by preempting or forestalling mandatory regulation. The characteristics of the four voluntary agreements in León suggest that they were, in fact, captured by the tannery lobby. The agreements were mostly toothless, lacking quantified baselines and targets, transparency, monitoring and enforcement mechanisms, and individual penalties for non-compliance. Moreover, since the four voluntary agreements coincided with a prolonged period of negligible progress, it is not unreasonable to suggest that they actually fostered this inactivity by creating the appearance—albeit less and less credible—of forward motion. In short, one could argue that the agreements did more harm than good.

Although regulatory capture cannot be completely discounted in the case of the Clean Industry program and PROPER (because it is not clear what strategies PROFEPA and BAPEDAL would have pursued absent these programs) the evidence for regulatory capture is much less compelling. The reason may be that both programs are administered by national-level institutions with more power relative to polluters than the local regulators that administered the León voluntary agreements.

A final reason that the tannery voluntary agreements were less successful than the Clean Industry program and PROPER relates not to the potential dangers of using voluntary regulation in developing countries but to one of the reputed benefits—disseminating information to firms about their emissions and the various options for abating it. Only the third tannery voluntary agreement contained explicit provisions for fostering such informational mechanisms and these provisions, like most others in the agreements, were more or less ignored.

By contrast, both the Clean Industry program and PROPER emphasized disseminating information about environmental performance and abatement options to participating firms. The

Clean Industry program did this via a formal environmental audit and the PROPER program did it via a one-page report. As discussed in Section 4.3, this mechanism appears to be one of the most important drivers of PROPER's impact. In general, the provision of environmental information to the private sector is likely to fill an important gap in developing countries. Firms in industrialized countries typically pay consultants to perform environmental audits, a practice that implies it is costly to collect environmental performance data. In countries like Mexico and Indonesia where formal regulatory pressure is less stringent and factories have little incentive to pay these costs, one would expect polluters to be ill-informed about their emissions and options for reducing them.

The broad, if somewhat obvious policy prescription that follows from the case studies presented in this paper is that using voluntary regulation in developing countries is clearly risky—but not doomed to failure. The devil is in the details of the design and deployment of the initiatives. Our case studies allow us to make four broad recommendations in this regard.

First, programs are unlikely to be successful in situations where both regulatory and non-regulatory pressures for improved environmental performance are lacking. Second, the same is true of programs that, because of industry resistance, cannot incorporate the now widely accepted prerequisites for effective programs—quantified baselines and targets, transparency, monitoring and enforcement mechanisms, and individual penalties for non-compliance. Ultimately, a lack of these attributes may signal regulatory capture. Third, the case studies suggest that national programs are more likely to be effective than local ones because they tap into a broader and deeper set of non-regulatory pressures, target large-scale firms that are relatively easy to monitor, and are run by national-level environmental authorities that wield a more credible threat of enforcement than most local regulators. Finally, the case studies indicate that disseminating information about pollution and polluting abatement options to participating firms and the public at large can boost the effectiveness of voluntary initiatives.

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Tables and Figures

Table 1. PROFEPA Fines (1987 – 2004)

Sample ➔ ⬇		*Clean Industry participants + non-participants*	*Clean Industry participants*	*Clean Industry non-participants*
All plants		(n = 61,821)	(n = 541)	(n = 61,280)
	Fined	3.17%	20.15%	3.02%
Plants that were fined		(n = 1,611)	(n = 98)	(n = 1,513)
	Total fines (n)	2,658	155	2,503
	Average fines/plant (n)	1.50	1.43	1.50
	Average fine (pesos)	39,847.34	89,923.43	36,530.21

Table 2. PROPER Ratings Criteria

Rating	Criteria
Gold	Levels of pollution control for air and hazardous waste similar to those for water; extensive use of clean technology, pollution prevention; recycling, etc.
Green	Emissions 50% below regulatory standards; proper disposal of wastes; good housekeeping; accurate emissions records; reasonable maintenance of waste water treatment system.
Blue	Emissions below regulatory standards.
Red	Some pollution control effort but emissions exceed regulatory standards.
Black	No control pollution effort or serious environmental damages.

Table 3. 1995 and 1997 PROPER Ratings

		Black	Red	Blue	Green	Gold	All
1995 rating		2	90	47	7	0	146
	Gold	0	0	0	0	0	0
	Green	0	1	5	3	0	9
1997 rating	**Blue**	1	40	35	4	0	80
	Red	1	46	7	0	0	54
	Black	0	3	0	0	0	3
Improvers (%)		100	46	11	0	0	34

Table 4. How Do PROPER Ratings Create Incentives for Improved Environmental Performance? Survey responses and environmental performance for full sample (n = 146)

Channel		Description of channel in survey	% respondents ranking channel 1 or 2 in importance
Consumers	g_1	Bad PROPER ratings make our firm less competitive in international markets	6
	g_2	Bad PROPER ratings make our firm less competitive in domestic markets	1
	g_3	Good PROPER ratings help to differentiate our product from our competitors	7
	g_4	Good PROPER ratings will help in obtaining ISO 14001 certification	11
Information	t_1	PROPER ratings provide clear information about how to improve environmental performance	22
	t_2	PROPER ratings make owners and senior managers aware of the environmental performance of the factory	38
Financial capital	k_1	Bad PROPER ratings increase pressure from the shareholders	8
	k_2	Bad PROPER ratings make it difficult to obtain credit from banks	2
	k_3	Bad PROPER ratings make it harder to get capital from the International Finance Corporation	0
	k_4	Bad PROPER ratings reduce the market value of the company	4
Human capital	k_5	Bad PROPER ratings increase pressure from our firm's employees	7
Regulators	r_1	Good PROPER ratings improve our firm's relationship with BAPEDAL	4
	r_2	Good PROPER ratings will make it easier to comply with future regulations, which will be more strict	8
Communities	c	Bad PROPER ratings increase pressure from communities living around the factories	36
NGOs	n	Bad PROPER ratings increase pressure from non-governmental organizations	10
News media	m	Bad PROPER ratings increase pressure from the news media	25
Industry Associations	a	Bad PROPER ratings increase pressure from industry associations	2
Courts	j	Bad PROPER ratings increase the chances of court action by the government	8

Figure 1. Hazard Ratio (Hazard Rate with Fine/Hazard rate without Fine) as function of time since last fine