Lecture 6 (AO, March 26)

Environmental Policy in the Central European Context

Time: Thursdays 3 p.m. – 6 p.m.
Location: at CERGE-EI, Room # 7

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Undergraduate Program in Central European Studies

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WEEK: TOPICS: DATE: INSTRUCTOR
1 Introduction (history/outline) Feb 19 JK/AO
2 Market failures: externalities, tragedy of the commons, enforcement as public good, also, (rise and fall) of the environmental Kuznets Curve February 26 AO
3 Interventionalist solutions to the Externality problem – Pigouvian taxes and standards and charges, also environmental labeling and incomplete consumer information in laboratory markets March 5 JK
4 Interventionalist solutions to the Externality problem – Marketable pollution permits March 12 AO
5 Non-Interventionalist solutions to the Externality problem – The Coasian solution March 19 JK
6 Non-interventionalist solutions to the Externality problem – Self-regulation March 26 AO
7 *Mid-term exam April 2*
8 Environmental Policy in the Czech Republic – History and current issues April 9 JK
9 Environmental Policy in the EU – History and current problems April 23 (April 16 falls into Semester break and on Easter Holiday) AO
10 Environmental Policy in the world context – History and Current problems April 30 JK/AO
11 Contingent valuation and related issues May 7 AO
12 To be determined by the interests of the class
Final exam: to be determined (according to schedule May 18 – 21)

Non-Interventionalist solutions to the Externality problem – Self-regulation

Readings for Lecture 6:

Lecture 6 (March 26) - AO

Required readings

Cason, Gangadharan, Auction Design for Voluntary Conservation Programs (to be discussed later)

Evans, Gilpatric, McKee, Vossler, Managerial Incentives for Compliance with environmental information disclosure programs (Cherry, Chapter 13)

Potoski, Prakash, Green Clubs and Voluntary Governance: ISO 14001 and Firms' Regulatory Compliance

Potoski, Prakash, Covenants with Weak Swords: 1001 and Facilities' Environmental Performance

Optional readings

Clark, Friesen, Muller, The Good, The Bad, And The Regulator: An Experimental Test of Two Conditional Audit Schemes

Prakash, Potoski, Racing to the Bottom? Trade, Environmental Governance, and ISO 14001 (to be added presently)

A little review:

COASE - THE PROBLEM OF SOCIAL COST

- a free market solution for the externality problem
- Coase – the agents are able to correct the effects of the externality by private agreement if they can costlessly negotiate among themselves a mutually beneficial arrangement to split the gains (thereby achieving the Pareto-efficient outcome)
- Water-paper society example: Water treatment plant could pay paper mill not to pollute (or, more realistically, pollute less) by reducing the production …
- Obviously the assignment of the initial property right has distributional consequences but:
  - Even if paper mill owns the property rights for the river, it still has an incentive to forgo $1 in revenues and accept an amount > $1 in exchange
  - If the water treatment plant owns the property rights for the river, the mill has an incentive to buy "permits" to pollute and the water treatment plant has an incentive to issue them as long as MR>MC.

COASE THEOREM In markets with externalities, if property rights are assigned unambiguously and if the parties involved can negotiate costlessly, then the parties will arrive at a Pareto-optimal outcome regardless of which one owns the property rights.

Coase, R. (1960), The problem of social cost. Journal of Law and Economics 3, 1 – 44.

Costly negotiation:

- *"Once the costs of carrying out market transactions are taken into account it is clear that such a rearrangement of rights will only be undertaken when the increase in the value of production consequent upon the rearrangement is greater than the costs which would be involved in bringing it about. When it is less, the granting of an injunction (or the knowledge that it would be granted) or the liability to pay damages may result in an activity being discontinued (or may prevent its being started) which would be undertaken if market transactions were costless. In these conditions the initial delimitation of legal rights does have an effect on the efficiency with which the economic system operates. One arrangement of rights may bring about a greater value of production than any other."*

EXPERIMENTAL EVALUATION

I. Hoffman, E., Spitzer, M. - The Coase Theorem: Some Experimental Tests. JLE 25, 1982

Experimental testing of Coase's main idea that rational individuals, if allowed to negotiate costlessly, will find a way to rectify the damage done by the externality

Their results provide a overwhelming support the Coasian solution. Moreover, subjects do not seem to behave selfishly (or, rationally in economic sense)

FORMALIZATION OF COASE THEOREM SCENARIO:

- *"Ronald Coase investigated the economic effects of liability rules for externalities when the affected parties can bargain with each other. Coase posited that a change in a liability rule will leave the agents' production and consumption decisions both unchanged and economically efficient within the following (implicit) framework:*
  (a) two agents to each externality (and bargain),
  (b) perfect knowledge of one another's (convex) production and profit or utility functions,
  (c) competitive markets,
  (d) zero transactions costs;
  (e) costless court system,
  (f) profit-maximizing producers and expected utility-maximizing consumers,
  (g) no wealth effects,
  (h) agents will strike mutually advantageous bargains in the absence of transactions costs."

- *"Coase's Theorem is much more a proposition than a typical economic theorem. Once the analyst fully accepts this point, the Coase Theorem's appeal depends on the reasonableness of assumption **h** in a typical Coase Theorem setting. In other words, one must know whether two people who are in a situation satisfying assumptions **a** through **g** will tend to act in accordance with assumption **h**."*

- …and that's what they were testing. And some more…

Existing (experimental) literature, issues, and new questions

- large and growing experimental literature exists on 2- and 3-person bargaining games, the main issue often is whether parties to a bargain will choose a Pareto optimal allocation
- 2 main questions
  - Pareto Optimality
  - Division of profits

Pareto Optimality

- (Existing) *"experimental evidence suggests that "Pareto optimal choices seem to be more frequent under the following conditions:*
  *(1) When subjects play for significant **amounts of real money**,*
  *(2) when all parties can engage in **free face-to-face communication***
  *(3) when parties can make **enforceable contracts** with one another*

(4) when there is (=”exists”) *an **equal-split allocation** among the Pareto optimal allocations*
*(5) when all parties have **full information** about one another's payoffs, and*
*(6) when **prizes are paid in public**.*

The first five conditions are all clearly contained in the Coase axioms. The last condition seems to be a natural extrapolation from Coase's perfect information and zero transaction costs assumptions.”

Division of profits

- *“A second issue, which Coase himself does not raise but which has troubled some commentators, is how parties to a bargain typically divide the profits from a joint decision.”*
- *“The experimental literature differs on this issue. On the one hand, many articles conclude that subjects divide profits either equally or in proportion to the effort each party expends. On the other hand, an almost equally large literature concludes that subjects try to maximize their own profits and refuse to settle for less than they could command by operating alone.”*
- *In general, the following experimental conditions seem to be associated with more equal splitting of profits:*
  *(1) **repeated, face-to face negotiations***
  *(2) the ability to choose a Pareto optimal allocation which is also an **equal split;***
  *(3) **public payoffs**; and*
  *(4) **full information** about one another's profits*

New questions

- **Bargaining with side payments allowed** – *“There have been very few experiments which have both required subjects to bargain over a variety of different discrete choices and allowed them to make side payments to one another at the same time*
- **Extension to larger (>2) groups** – *“Another important question raised by Coase's critics is whether a proposition describing two-person bargaining can be extended to larger groups. Experiments with three- and four-person games suggest that Pareto optimal outcomes can be achieved, but experiments with larger groups have generally concluded that free-rider problems take over unless special allocation mechanisms are imposed. However, **these larger group experiments have not allowed open communication, side payments, and enforceable contracts**.”*

Results (of a set of controlled experiments designed to test the Coase proposition in 2- and 3-person bargains, full and limited information, repeated and one-shot interactions)

- the results strongly favor the Coase proposition
- the results also strongly suggest that parties engaging in repeated negotiations with one another may split profits equally even though in single-shot negotiations they are more likely to choose individually rational (“selfish”) divisions
- of the 114 experimental decisions, 89.5 percent were Pareto optimal, in 62 of those payoffs were divided nearly equally

II. Harrison, G., McKee, M., - Experimental Evaluation of the Coase Theorem. JLE 28, 1985

- replication and modification of the H&S experimental design
- to get further insights on that part of H&S results that suggests non-selfishness (which clearly contradicts the results of Plott 1982, or example)

- **WHY?**

⇨ *"The Coase Theorem….. irrespective of which party has the unilateral property right (UPR) to impose the externality on the other party, we should find the Pareto-optimal level of externality generation. The compelling feature of this Coasian result is that it is brought about by the self-interest of each party and does not rely on their altruism with respect to one another or the visible hand of the state."*

⇨ H&S focus on the behavioral implications of assumption h, which implies two distinct behavioral outcomes:

(i) that the two parties will agree on a Pareto- optimal level for the externality; and

(ii) that any such agreement will be attained by means of a mutually advantageous bargain between the two parties.

⇨ H&S present experimental results that overwhelmingly support the first outcome but reject the second outcome. Pooling over all their experiments, 89.5 percent of all bargains resulted in a Pareto optimal solution. However, in 60.8 percent of those solutions the two parties essentially agreed to split the total payoff equally, even though this represented a disadvantageous bargain for one of the parties (the "controller," or holder of the UPR) relative to the payoff attainable without any bargaining.

⇨ H&S explicitly recognize the problem with their results:

A core allocation is individually rational, Pareto optimal, and rational for every possible winning coalition of players. Some might argue that our results do not support Coase's hypothesis because so many subjects split equally instead of bargaining to a core allocation. It seems to us, however, that Coase's efficiency prediction has been the crucial part of his hypothesis in shaping legal and economic policy. It is on that basis that we claim our results support the Coase Theorem. We recognize that Coase expected the income distribution would favor the controller. That expectation is, of course, not confirmed in general by our results.

⇨ Ignoring the exegetical issue of what Coase "really meant," we can argue that the policy significance of the Coase Theorem derives primarily from the view that **the delimitation of UPR serves to facilitate the internalization of externalities through individually rational bargaining…**

⇨ … **The critical behavioral presumption, then, is that the affected parties act in a self-interested fashion in the bargaining** context defined by the initial property rights assignment. This presumption is **not supported by the results of H&S**. An alternative line of defense of their results is offered by Hoffman and Spitzer, based on the interpretation of their results as reflecting the altruism of their subjects:

Indeed, to the extent that the sharing behavior indicates that either the subjects were failing to profit maximize or were maximizing interdependent utility functions which might violate one of the axioms of the Coase Theorem, our results cannot be taken to verify the theorem. Since the initial conditions were not all satisfied, assumption h might not have received a good test. However, if our assumption regarding individual motivations were incorrect, then these results may take on even more significance, for they seem to indicate that the Coase Theorem's prediction about production still has great power; the Pareto optimum was chosen almost 90

percent of the time. These experiments would seem to say that in two- and three-person situations a scholar might be able to assert with some confidence that groups will behave as if all of the Coase Theorem's assumptions were satisfied.

⇨ In short, the Coase Theorem is behaviorally "right for the wrong reasons." Moreover, if we can rely on economic agents to be altruistic with respect to the generation of externalities, why do we need UPR (or Pigouvian taxes, for that matter) to internalize the problem? In this light, the Coase Theorem is rendered behaviorally vacuous for policy purposes.

So, what do H&M do?

- they develop an experimental design that allows further careful evaluation of the Coase Theorem in the simplest possible context:
  - two parties
  - full information concerning each other's payoffs
  - non-sequential bargaining (no continuing experimental relationships)
- they find that the comparable H&S results that are inconsistent with individual rationality are attributable to a lack of understanding by certain subjects of the meaning of UPR.
- Moreover, they demonstrate that the Coase Theorem is not behaviorally vacuous for policy purposes, by illustrating the necessity of an initial assignment of property rights for mutually advantageous bargaining to produce an efficient outcome.

EXPERIMENTAL DESIGN

- instructions follow Hoffman & Spitzer as closely as possible.
- neutral instructions
- each subject participated in 3 bargaining sessions (or, periods), each time different co-player
- in addition, they run a **"No Property Rights" session** (NPR), with no side-payments possible
- possible outcomes "agreement" vs. "disagreement" (on number chosen and corresponding payoffs);
- **3 alternative "disagreement" outcomes**: random (number is drawn and implemented), zero (zero payoff to both), controller (1 player is randomly designated controller, he decides, side-payments possible except of NPR session), learned at the beginning of each session
- SERIES OF EXPERIMENTS:
  1) replication of H&S, with unilateral property rights (UPR)
  2) no property rights (NPR)
  3) joint property rights (JPR)
  4) unilateral property rights, modified

EXPERIMENTAL RESULTS:

- **H2 CONFIRMED**
  H2: *The altruistic divisions of the joint payoff are an artifact of a small social surplus (that is, increasing the surplus from $1.00 to $2.00 will reduce the number of observed altruistic divisions).*

- ⇨ increasing the social surplus significantly reduced altruistic divisions from 60% to 11.1%;
- ⇨ might indicate that the individual irrationality in H&S may be due in part to small social surplus

- **H6 firmly SUPPORTED**
  H6: *The establishment of unilateral property rights increases the number of joint maximum payoff outcomes.*
  - ⇨ 88.2% of decisions that establish UPR in session 3 are P-O; difference in efficiency of JPR and UPR not significant (follows from strong acceptance of H4)

- **H7 cannot be rejected**
  H7: *The establishment of unilateral property rights increases the number of individually rational bargains by the property right holder.*
  - ⇨ UPR with trained subjects (trained under JPR) 76.5% outcomes individually rational, while in the initial UPR (replication) generated only 40% individually rational outcomes for the controller; dramatic support for the Coase Theorem

CONCLUSION

- strong support for the Coase Theorem
- in contrast to H&S results, which violate the individual rationality requirement of the Coase Theorem (as well as game theory).
- It would be interesting to undertake the boundary experiments identified by H&S (limited information concerning opponent payoffs and/or larger bargaining groups) with H&M experimental design, given that the Coase Theorem has now been established for the bargaining environment in which it was originally presented (full-information, two-person bargaining, individual rationality)

On to self-regulation and related issues …

Journal of Policy Analysis and Management [JPAM] vol. 24, no. 4, 745 – 769 (2005), relatedly

American Journal of Political Science [AJPS], vol. 49, no. 2, 235 – 248 (2005)
… the two articles have lots of overlap … will focus on the JPAM article …

Voluntary programs … tools for governments and nongovernmental actors to improve the environmental and regulatory performance of firms …

What is ISO 14001? [See JPAM 751 – 753; AJPS 237 – 239]

- a program launched in 1996 by the International [non-profit?] Organization for Standardization, an international body of national standards institutions
- "the largest and most widely recognized voluntary environmental program in the world" (AJPS 238)
- about 50,000 certified facilities in about 120 countries (AJPS 238)
- original program that established its brand was called ISO 9000 (aimed at quality control)

- ISO 14001 program is part of the 14000 series and aimed at environmental concerns
    - 14001 guidelines standard must be adopted
    - 14020 and 14021 non-mandatory guidelines governing environmental labeling
    - 14030 non-mandatory guidelines governing environmental performance evaluations
    - 14040-43 and 14048-49 non-mandatory guidelines governing life-cycle assessment
- ISO 14001 program requires firms to
    - undertake initial comprehensive review of environmental practices and systems
    - formulate an action plan for environmental management
        - assign responsibilities
        - say who is in charge in case of problems

Appendix 1

A Check List for Implementing ISO 14001 Management Systems

Policy

- Does the company have a documented environmental policy?
- Has the policy been approved by the top management? Is there a designated top manager in-charge of overseeing its implementation?
- Is the success in meeting policy objectives periodically reviewed?
- Does the policy require employees to adopt best available technology and commit to continual improvement?
- Does the policy meet or exceed legal requirements?

Environmental Impact

- Has the company assessed the environmental impact of its operations and products in terms of their likelihood and severity?
- Does the location of any facility require specific environmental consideration?
- Has the facility assessed the environmental impact if the production processes were to malfunction?

Environmental Objectives

- Have specific and measurable environmental targets been established?
- Is there a system for documenting relevant EMS and the targets they intend to achieve?
- Is progress towards various targets periodically tracked? Is there a system to take corrective action in the event targets are not being met?
- Is there a process to assess resources required to meet these targets?
- Does the facility identify specific personnel at various levels and make them responsible for achieving environmental targets?
- Do they have adequate resources to fulfill their responsibilities?
- Are employees directly and indirectly involved in the EMS implementation?

Environmental Plan

- Does the environmental planning involve stakeholders within and outside the firm?
- Is the plan periodically reviewed?
- Are there identified personnel who maintain the list of all applicable laws and regulations that pertain to facility operations?
- Is there a system of tracking compliance with these laws?

Organizational Alignment

- Is the EMS integrated with the organization's strategic plan and business plan?
- Is there a process to resolve conflicts between environmental and non-environmental objective?
- Does the top management regularly communicate to organizational personnel about environmental issues?
- Does the organization recognize and reward contribution to establishing and implementing EMS?

Source: Sayre (1996).

- ISO 14001 program recommends strongly third-party audits and certification (by qualified certifiers)

Remarkably, the direct and indirect costs are non-trivial:

- direct costs:
  - $25,000 - $100,000 per facility for preparation of initial paperwork
- indirect costs:
  - ongoing costs of maintaining ISO 14001 certification are “substantial”

Given these costs, what are the benefits?

- Being certified means you can attach a positive label (the “ISO 14001 brand”)
- The working assumption is that this benefit (which is hypothesized to lead to shift in the demand curve, or some other positive reputational externalities with stakeholders; it is “an important external relations tool” (AJPS 238)) outweighs the considerable costs …

The idea of certification is also used in other areas … ☺ :

CERTIFICATION AS A VIABLE QUALITY ASSURANCE MECHANISM IN TRANSITION ECONOMIES: EVIDENCE, THEORY, AND OPEN QUESTIONS

Andreas Ortmann, Katarína Svítková*

Abstract:
Traditionally, enforcement of (consumer protection) laws meant to provide quality assurance of goods and services was considered a responsibility of the state in its various guises. Unfortunately, enforcement is an expensive, and hence particularly problematic proposition in transition economies that have many competing demands on their very scarce resources. An alternative mode of enforcement is through reputation. Yet for reputation to be able to fulfill this disciplining role, a high degree of information flow, or transparency, is imperative. Transparency, of course, is not something that transition economies typically excel in. In this article we discuss a third form of enforcement that relies much less, or not at all, on the state, and that relies on the market only indirectly: Certification agencies force their members to reveal their (good) type through costly signals that can be "engineered" to induce a separating equilibrium. We discuss the viability of this system of enforcement in an environment (namely, fundraising) where state and market have failed to deliver a satisfying degree of quality assurance.

Keywords: experience goods, quality assurance, certification, self-regulation, enforcement, transition economies

JEL Classification: C72, D21

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We are grateful to Rene Bekkers, Andrew Reading, Buzz Schmidt, Burkhard Wilke, Martina Ziegerer, and Jos Zwartjes for lengthy conversations and discussions. We also thank participants at the ICFO annual meeting 2004 in Vienna for their willingness to share freely with us their insights on certification issues. None of them should be held responsible for any of the views expressed here (especially, if they concern the organizations they are affiliated with.) An earlier version of this article listed as co-author Adriana Krnacova. We thank her for her input at the early stages of this project.

PP conceptualize voluntary programs as “clubs” – associations of firms that receive excludable and non-rivalrous club benefits such as affiliation with the club’s “brand name”

An interesting question is: How can that “brand-name” be maintained ? (I.e., how can it be made sure that the brand-name is not being exploited (“milked”?)

This is a question of institutional design …

I.e. the way it is assured “that members comply with program obligations, particularly if they contain three central components: third-party monitoring, public disclosure of audit information, and sanctioning by program sponsors. … Table 1 summarizes the different monitoring and enforcement programs.” (JPAM 748)

Table 1. Voluntary programs and firms' environmental performance.

	Program Features			
Program Type	Monitoring	Public Disclosure	Sanctioning	Effect on Participants' Environmental Performance
No swords Responsible care	No	No	No	No improvement (King & Lenox, 2000)
Weak swords ISO 14001	Yes	No	No	Improved performance as reported in this paper
Medium swords 33/50, EMAS	Yes	Yes	No	Improved performance for 33/50 (Khanna & Damon, 1999). Likely improved performance for other programs
Strong swords Performance track	Yes	Yes	Yes	No empirical study yet, improved performance is very likely

Examples:

Strong sword: the EPA’s Performance Track (JPAM 748)

Medium sword: the EPA’s 33/50 program and the European Union’s Environmental Management and Audit System (EMAS) … (JPAM 748 – 9)

Weak sword: ISO 14001 – “The ISO, the sponsoring organization, is not known to aggressively sanction the shirkers. Importantly, the absence of public disclosure of audit information weakens stakeholders’ ability to sanction shirking. The key question is: Can a ‘weak sword’ program that provides only for third-party audits create incentives for participating firms to improve their environmental performance?” (JPAM 749) [See the answer in Table 1 seems affirmative which prompts the interesting question, how can that be? What are the mechanisms that seem to make people to engage in compliance when non-compliance seems costless.]

The goods we are dealing with are here called “post-experience goods” with “Potemkin attributes” – consumers (stakeholders) experience the consequences of the goods belatedly [not at the time when they experience them] and they want assurance that the production process that firms have adopted is not (environmentally) problematic. But consumers (stakeholders) cannot find out by themselves …

So what audit and certification schemes are there?

First-party – self-certification
Second-party – certification from other unit within company
Third party – certification by an external auditor but paid for by the company
Fourth party – certification by an external auditor but not paid for by the company

“First-party is the least credible, while fourth party the most credible. In reality, very few voluntary programs have fourth-party oversight; third-party is considered the ‘best practice’. In reality, very few voluntary programs have fourth-party oversight; third party is considered to be the ‘best practice’.” (JPAM 750)

Given that a third-party weak sword seems to have no external consequences, why – assuming for now that the regressions results summarized in Table 1 are sound (about which later) – would it be effective?

- the outside observer changes performance of team members (who might not want to look bad to other internal members of the organization)
- the outside observer might induce a “Hawthorne effect”

From Wikipedia, the free encyclopedia

The **Hawthorne effect** is a form of reactivity, The term was coined in 1955 by Henry A. Landsberger[1] when analyzing older experiments from 1924-1932 at the Hawthorne Works (outside Chicago). Landsberger defined the *Hawthorne effect* as:

- a short-term improvement caused by observing worker performance.

Earlier researchers had concluded the short-term improvement was caused by teamwork when workers saw themselves as part of a study group or team. Others have broadened the definition to mean that people's behavior and performance change following any new or increased attention. Hence, the term *Hawthorne effect* no longer has a specific definition.

- it seems important that the outside observer is a third party that itself receives accreditation (JPAM 752)

Whether third-party audits succeed in mitigating shirking and improving members' environmental performance is examined empirically below. Our central concern is to examine whether joining ISO 14001 improves facilities' environmental performance (reduces pollution emissions). Thus:

> *H_o (Null Hypothesis): Facilities with and without ISO 14001 certificates will demonstrate comparable levels of improvements in environmental performance.*
>
> *H_a (Alternative Hypothesis): Facilities with ISO 14001 certificates will demonstrate superior environmental performance to non-participants.*

DATA AND MEASURES

To test our central hypothesis, we compare the environmental performance of ISO 14001-certified and non-certified facilities, controlling for non-random assignment between certification and non-certification along with other intervening factors. Our focus is on facilities regulated under U.S. state and federal air pollution regulations. Facilities in our sample meet air pollution emissions thresholds in order to be tracked by the EPA's Toxics Release Inventory (TRI) program and are classified as "major sources" under federal clean air laws. Information on facilities' regulatory compliance comes from the Aerometric Information Retrieval System (AIRS) subsystem of the EPA's Integrated Data for Enforcement Analysis (IDEA) system. Emissions data are from the TRI database. Other measures are drawn from Dun and Bradstreet's Million Dollar Directory and other sources as discussed below. Our sample contains 3,709 facilities, 151 (4%) of which were ISO 14001-certified as of December 2001. Almost 90% of the facilities list a manufacturing code as their primary Standard Industrial Classification (SIC) code, with about 18% in chemical manufacturing (SIC 28).[10]

(JPAM 753)

For definition of (the four) dependent and the many independent variables, see the text …

Essentially they weigh the emissions data with two measures of toxicity (following two precedents, see p. 754 top paragraph), and they do it for emissions reductions directly (the two columns to the right in Tables 2 and 3) and also for logged emissions reductions) the two columns to the left in Tables 2 and 3).

The authors use four dependent variables to show the robustness of their results (ideally, they would like to get the same results for all of their four dependent variables …)

They also use all kinds of independent variables …

- facility and industry characteristics
  - facility size
  - dummy (company headquarters = 0) for single site or branch
  - emissions at t (initial level is obviously important)
  - emissions squared (to control whether the decision to join ISO 14001 varies across emission levels)
  - dummies for two-digit SIC code
- compliance history
  - inspections at t
  - enforcement actions at t
  - rate of regulatory compliance
  - rate of regulatory compliance squared (to control whether … across levels of compliance)
- regulatory and social context
  - state audit protection (will you be punished if you rat on yourself?)
  - state litigiousness
  - dummy hazardous air regulations (1 if tougher than EPA min criteria)
  - presence of environmental groups
  - residents' education
  - minorities
  - percentage of population making more than $75,000

The authors face two important problems …

- the number of certified sites in their sample is about 4 percent only (that means a matching procedure – where you match similar companies of one kind with similar companies of the other kind – is not possible)
- in addition, facilities' decisions about whether to participate in ISO 14001 are likely to be endogenous to their environmental performance … that is, "some of the observed and unobserved factors that influence joining ISO 14001 are also likely to influence the amount of pollution facilities emit … " (p. 756)
-

… fortunately, econometricians have found ways to get a handle on those issues … (well, at least to some extent)

One consequence is that Tables 2 and 3 both show two kinds of analyses for the four dependent variables

- at the top is always the "treatment effects" (or, outcome) analysis (which is what we are ultimately interested in) – for this they use essentially OLS regressions
- at the bottom there is always the "selection equation" for joining ISO 14001 – for this they use a probit model

Some key results … (drawing on pp. 759 – 763 and in particular Table 2)

- selection equation model
  - compliance coefficients jointly significant
    - compl positive
    - compl squared negative
    - interpretation: you are least likely to join if you are always in, or always out, of compliance; for those out of compliance about half of the year, predicted probability of joining ISO 14001 doubles (?)
  - emissions coefficients jointly significant
    - emissions positive
    - emissions squared negative
    - interpretation: low-pollution facilities least likely to join, moderate and high-polluting facilities more likely (with about the same probability)
  - inspections significant
    - a two-standard deviation increase in the number of inspections doubles predicted probability of joining ISO 14001
  - regulatory enforcement actions
    - seems to crowd out willingness to join …
  - "For the most part, government policies do not have strong effects on which facilities join ISO 14001 … " (p. 762)
  - "Facility and neighborhood characteristics are significant … " (p. 762)

- treatment effects
  - coefficient on ISO 14001 significant in 3 out of 4 cases considered
    - "These analyses provide some evidence that, compared to non-certified facilities, ISO 14001-certified facilities experienced significantly *larger* reductions in pollution emissions, controlling for other factors and the endogeneity between facilities' decisions to join ISO 14001 and their environmental performance." (p. 763)
  - not surprising some of the other factors have explanatory power, somewhat in line of the results for the selection model

American Journal of Political Science [AJPS] vol. 50, no. 2, 350 – 364 (2006)

Racing to the Bottom? Trade, Environmental Governance, and ISO 14001

Aseem Prakash University of Washington
Matthew Potoski Iowa State University

Globalization critics argue that international trade spurs a race to the bottom among national environmental standards. ISO 14001 is the most widely adopted voluntary environmental regulation which encourages firms to take environmental action beyond what domestic government regulations require. Drawing on a panel study of 108 countries over seven years, we investigate conditions under which trade linkages can encourage ISO 14001 adoption, thereby countering environmental races to the bottom. We find that trade linkages encourage ISO 14001 adoption if countries' major export markets have adopted this voluntary regulation.

- an empirical test for Vogel's (1995) "California effect" where trade serves as a vehicle for transmitting importing countries regulatory standards to exporting countries
- their results suggest high levels of adoption of ISO 14001 in the importing countries encourage firms in the exporting countries to adopt this voluntary environmental program (that's a confirmation, with qualification, of the Vogel' conjecture hence fears of a regulatory race to the bottom where developing countries' exporters exploit their allegedly less stringent environmental standards to capture markets in developed countries seem unwarranted)

from the Cherry et al handbook …

13 Managerial incentives for compliance with environmental information disclosure programs

Mary F. Evans, Scott M. Gilpatric, Michael McKee, and Christian A. Vossler

Voluntary programs … one the hand …
On the other hand … mandatory information disclosure programs such as The EPA's Toxics Release Inventory (TRI)

Mandatory information disclosure programs require that the firm report information that could be damaging … (e.g., reputationally).

Reporting, while being done on the firm level to EPA etc., is initiated within firms by individuals … clearly, that means there is all kinds of potential for moral and other dilemmas.

This is what this chapter is about …

Do firms report?

- Old Government Accountability Office data from 1991 suggest that about one third of firms that should have reported did not
- Intentionally or unintentionally (they did not know) – see Brehm & Hamilton's (1996) analysis of TRI compliance of facilities in Minnesota
    - Facility size may be important factor in compliance (evidence is not quite clear)

" … the literature has overlooked the possible role of a firm's internal organizational structure in creating a divergence between manager incentives and the objectives of an information disclosure program. " (p. 245)

- many (most?) internal reward structures (including promotion ladders) imply that
    - division managers are playing a rank-order tournament game
    - division managers are being evaluated relative to others' performance
    - give incentives to move ahead via malfeasance such as cost savings through unreported toxics releases: "if managers can increase their *apparent* output (such as profits from their division) by increasing emissions or reducing care (and thus increasing the probability of accidental emissions) and if this behavior is sufficiently costly for the firm to monitor and prevent such that monitoring is imperfect, then any compensation that rewards managers for higher output will generate both the intended incentive for them to exert greater work effort, but also an incentive to engage in malfeasance." (p. 246)
    - give incentives to undermine information disclosure programs

- "malfeasance in the form of non-compliance with regulatory mandates, including failing to disclose information accurately, imposes directly costs on the firm that may significantly exceed those resulting from dulled incentives." (p. 246)

- "environmental malfeasance of course also entails important social costs that do not arise from influence activities within a firm and that are clearly of significant concern to regulators." (p. 246)

An experimental test of malfeasance and compliance based on Gilpatric (2005), one of the authors of this chapter.

Malfeasance = a behavior that is inconsistent with the firm's objectives

x - the firm's (= owner-manager's) optimal total emissions level
z - level of emissions that is optimal (at the firm level) to report to the environmental authority, $z \leq x$.
N divisions, each of which has a designated manager, who also is in charge to report her division's emissions to the owner-manager
x^*_i - optimal level of emissions from the perspective of the manager of division i
z^*_i - level of emissions reported by the manager of division i, $z^*_i \leq x^*_i$

The owner-manager reports what has been reported to by the managers of the divisions, z^*
x^* - actual level of emissions (the owner-manager may not know this, or may not want to know this)

Opportunities for non-compliance:
- may result from false reporting of owner-manager
- may result from false reporting of division managers

An aside … (ever heard about the U.S. Sentencing Commission?

http://www.ussc.gov/orgguide.htm

Organizational Guidelines

Chapter Eight Guidelines

- An Overview of the Organizational Sentencing Guidelines.

- CHAPTER EIGHT - SENTENCING OF ORGANIZATIONS - Federal Sentencing Guidelines Manual and Appendices (2007). This manual contains the federal sentencing guidelines and policy statements effective November 1, 2007.

Effective Compliance and Ethics Program: 8B2.1

Reason for 2004 Amendments to Chapter Eight (*Amendment 673 from the Supplement to Appendix C, Guidelines Manual*)

Historical Development of Chapter Eight

- Supplementary Report on Sentencing Guidelines for Organizations (August 30, 1991). This Supplementary Report on Sentencing Guidelines for Organizations supplements and further explains the sentencing guidelines for organizational defendants (proposed Chapter Eight of the Guidelines Manual) submitted to Congress on May 1, 1991, as Amendment 60, by the United States Sentencing Commission. (.PDF)

An Overview of the Organizational Guidelines

Paula Desio, Deputy General Counsel, United States Sentencing Commission

Organizations, like individuals, can be found guilty of criminal conduct, and the measure of their punishment for felonies and Class A misdemeanors is governed by Chapter Eight of the sentencing guidelines. While organizations cannot be imprisoned, they can be fined, sentenced to probation for up to five years, ordered to make restitution and issue public notices of conviction to their victim and exposed to applicable forfeiture statutes. Data collected by the Sentencing Commission reflect that organizations are sentenced for a wide range of crimes. The most commonly occurring offenses (in order of decreasing frequency) are fraud, environmental waste discharge, tax offenses, antitrust offenses, and food and drug violations.

The organizational sentencing guidelines (which apply to corporations, partnerships, labor unions, pension funds, trusts, non-profit entities, and governmental units) became effective November 1, 1991, after several years of public hearings and analyses. These guidelines are designed to further two key purposes of sentencing: "just punishment" and "deterrence." Under the "just punishment" model, the punishment corresponds to the degree of blameworthiness of the offender, while under the "deterrence" model, incentives are offered for organizations to detect and prevent crime.

Effective Compliance Programs

Criminal liability can attach to an organization whenever an employee of the organization commits an act within the apparent scope of his or her employment, even if the employee acted directly contrary to company policy and instructions. An entire organization, despite its best efforts to prevent wrongdoing in its ranks, can still be held criminally liable for any of its employees' illegal actions. Consequently, when the Commission promulgated the organizational guidelines, it attempted to alleviate the harshest aspects of this institutional vulnerability by incorporating into the sentencing structure the preventive and deterrent aspects of systematic compliance programs. The Commission did this by mitigating the potential fine range - in some cases up to 95 percent - if an organization can demonstrate that it had put in place an effective compliance program. This mitigating credit under the guidelines is contingent upon prompt reporting to the authorities and the non-involvement of high level personnel in the actual offense conduct.

Chapter Eight outlines seven key criteria for establishing an "effective compliance program":

Compliance standards and procedures reasonably capable of reducing the prospect of criminal activity—

- Oversight by high-level personnel
- Due Care in delegating substantial discretionary authority
- Effective Communication to all levels of employees
- Reasonable steps to achieve compliance, which include systems for monitoring, auditing, and reporting suspected wrongdoing without fear of reprisal
- Consistent enforcement of compliance standards including disciplinary mechanisms
- Reasonable steps to respond to and prevent further similar offenses upon detection of a violation

The organizational guidelines criteria embody broad principles that, taken together, describe a corporate "good citizenship" model, but do not offer precise details for implementation. This approach was deliberately selected in order to encourage flexibility and independence by organizations in designing programs that are best suited to their particular circumstances.

Sharing "Best Practices" Ideas

The innovative approach put forward in the sentencing guidelines has spawned complementary efforts by a number of regulatory and law enforcement authorities, Executive agencies such as the Environmental Protection Agency, the Department of Health and Human Services, and the Department of Justice's Antitrust Division have developed, or are developing model compliance programs, programs for self-reporting, and programs for amnesty - all of which are modeled after some aspect of the organizational sentencing guidelines. Industry and peer organizations are forming to share ideas on "best practices" for compliance training and ethics awareness.

The Commission will continue to study the effectiveness of these efforts to implement the compliance criteria of Chapter Eight. In particular, the Commission is interested in assessments of the viability of its efforts to encourage organizations - from large corporations to non-profits organizations to governmental units - to develop institutional cultures that discourage criminal conduct. ■

For more information, contact the United States Sentencing Commission, One Columbus Circle, N.E., Suite 2-500, Washington, DC 20002-8002.
Phone: 202-502-4500; FAX: 202-502-4699

CHAPTER EIGHT - PART B - REMEDYING HARM FROM CRIMINAL CONDUCT, AND EFFECTIVE COMPLIANCE AND ETHICS PROGRAM

2. EFFECTIVE COMPLIANCE AND ETHICS PROGRAM

***Historical Note*: Effective November 1, 2004 (see Appendix C, amendment 673).**

§8B2.1. Effective Compliance and Ethics Program

(a) To have an effective compliance and ethics program, for purposes of subsection (f) of §8C2.5 (Culpability Score) and subsection (c)(1) of §8D1.4 (Recommended Conditions of Probation - Organizations), an organization shall—

(1) exercise due diligence to prevent and detect criminal conduct; and

(2) otherwise promote an organizational culture that encourages ethical conduct and a commitment to compliance with the law.

Such compliance and ethics program shall be reasonably designed, implemented, and enforced so that the program is generally effective in preventing and detecting criminal conduct. The failure to prevent or detect the instant offense does not necessarily mean that the program is not generally effective in preventing and detecting criminal conduct.

(b) Due diligence and the promotion of an organizational culture that encourages ethical conduct and a commitment to compliance with the law within the meaning of subsection (a) minimally require the following:

(1) The organization shall establish standards and procedures to prevent and detect criminal conduct.

(2) (A) The organization's governing authority shall be knowledgeable about the content and operation of the compliance and ethics program and shall exercise reasonable oversight with respect to the implementation and effectiveness of the compliance and ethics program.

(B) High-level personnel of the organization shall ensure that the organization has an effective compliance and ethics program, as described in this guideline. Specific individual(s) within high-level personnel shall be assigned overall responsibility for the compliance and ethics program.

(C) Specific individual(s) within the organization shall be delegated day-to-day operational responsibility for the compliance and ethics program. Individual(s) with operational responsibility shall report periodically to high-level personnel and, as appropriate, to the governing authority, or an appropriate subgroup of the governing authority, on the effectiveness of the compliance and ethics program. To carry out such operational responsibility, such individual(s) shall be given adequate resources, appropriate authority, and direct access to the governing authority or an appropriate subgroup of the governing authority.

(3) The organization shall use reasonable efforts not to include within the substantial authority personnel of the organization any individual whom the organization knew, or should have known through the exercise of due diligence, has engaged in illegal activities or other conduct inconsistent with an effective compliance and ethics program.

(4) A) The organization shall take reasonable steps to communicate periodically and in a practical manner its standards and procedures, and other aspects of the compliance and ethics

program, to the individuals referred to in subdivision (B) by conducting effective training programs and otherwise disseminating information appropriate to such individuals' respective roles and responsibilities.

(B) The individuals referred to in subdivision (A) are the members of the governing authority, high-level personnel, substantial authority personnel, the organization's employees, and, as appropriate, the organization's agents.

(5) The organization shall take reasonable steps—

(A) to ensure that the organization's compliance and ethics program is followed, including monitoring and auditing to detect criminal conduct;

(B) to evaluate periodically the effectiveness of the organization's compliance and ethics program; and

(C) to have and publicize a system, which may include mechanisms that allow for anonymity or confidentiality, whereby the organization's employees and agents may report or seek guidance regarding potential or actual criminal conduct without fear of retaliation.

(6) The organization's compliance and ethics program shall be promoted and enforced consistently throughout the organization through (A) appropriate incentives to perform in accordance with the compliance and ethics program; and (B) appropriate disciplinary measures for engaging in criminal conduct and for failing to take reasonable steps to prevent or detect criminal conduct.

(7) After criminal conduct has been detected, the organization shall take reasonable steps to respond appropriately to the criminal conduct and to prevent further similar criminal conduct, including making any necessary modifications to the organization's compliance and ethics program.

(c) In implementing subsection (b), the organization shall periodically assess the risk of criminal conduct and shall take appropriate steps to design, implement, or modify each requirement set forth in subsection (b) to reduce the risk of criminal conduct identified through this process.

Back to the Gilpatric (2005) model …

x - the firm's (= owner-manager's) optimal total emissions level
(x_i - optimal level of division i from the firm's perspective)
z - level of emissions that is optimal (at the firm level) to report to the environmental authority, $z \leq x$.
N divisions, each of which has a designated manager, who also is in charge to report her division's emissions to the owner-manager
x^*_i - optimal level of emissions from the perspective of the manager of division i
z^*_i - level of emissions reported by the manager of division i, $z^*_i \leq x^*_i$

The owner-manager reports what has been reported to by the managers of the divisions, z^*
x^* - actual level of emissions (the owner-manager may not know this, or may not want to know this)

Table 13.1 summarizes … the possible cases:

Table 13.1 Potential cheating and non-compliance cases

Case	*Relationship between x and $\hat{x}$*	*Relationship between $\hat{x}$ and $\hat{z}$*	*Are managers cheating?*	*Is firm compliant with reporting requirement?*
1	$\hat{x} > x$	$\hat{z} = \hat{x}$	Yes	Yes
2	$\hat{x} > x$	$\hat{z} < \hat{x}$	Yes	No
3	$\hat{x} = x$	$\hat{z} < \hat{x}$	Yes	No
4	$\hat{x} = x$	$\hat{z} = \hat{x}$	No	Yes

Cases 2 and 3 trivial (and it is second case that the authors study in their experiment)
"Note that even in cases 1 and 4 where the firm is compliant with the reporting requirements, the level of emissions need not equal the socially optimal level." (p. 247)

Hypotheses about managerial behavior are derived from Gilpatric (2005), assumptions:

- Division managers are told to emit no more than x_i
- Division managers can improve their output by $x^*_i > x_i$
- Since audits are costly they are done with probability η
- Managers found to have emitted $x^*_i > x_i$ or to have misreported, are disqualified from winning the tournament (ha!) and may face additional sanctions (e.g., being fined or fired)

"Because managers face the same penalty if found to have cheated regardless of the magnitude of cheating there is no marginal deterrent and the manager's decision reduces to choosing x_i (as directed by the firm or cheating by choosing x^*_i. In this setting malfeasance always consists of both emitting more than is optimal for the firm and failing to truthfully report emissions (case 2 above)." (p. 248)

With cheating being modeled as increasing output by a constant (scaling up), the model makes some intuitive comparative-static predictions:

- the likelihood of cheating depends on
    - the payoffs of the tournament
    - the variance of output
    - the probability of cheating being detected (something that's being tested in the experiment)
    - number of contestants
    - the penalty for cheating (something that's being tested in the experiment)
- (what does your intuition tell you about the causalities?)

The model making intuitive comparative-static predictions is one thing,
people acting accordingly is possibly another … hence an experiment …

… again .., if we find that subjects' behavior gives us some confidence that the model's predictions are reasonable for some parameterizations, then we might confidence in implementing other parameterizations …

Of course, the standard concern of calibration ("parallelism") comes up again … "
"We establish parallelism through ensuring that the essential features of the field environment are captured in the laboratory." (p. 251)

The experiment implements one specific parameterization:

- three contestants compete in a rank-order tournament
- players choose whether or not to "cheat"
- players choose the "high" or the "low" distribution of outputs (p. 252: "the choice of a draw from the high distribution corresponds with the decision to cheat, for example by emitting more than permitted in order to increase productivity but falsely reporting lower emissions." (p. 252)
- random audits
- outside penalty
- the non-disqualified participant with the highest output wins the tournament and receives the highest payoff (19 lab-dollars, vs 7 dollars or less if they are caught cheating)

… etc.

Here is the design matrix:

Table 13.2 Design parameters by treatment

Treatment	*N per contest*	*Audit prob. η*	*Payoffs: (Win, not win, ineligible)*	*Payoff spread (s)*	*Penalty (r)*	*Predicted prob. of cheating (ρ)*
1	3	0.10	(19,7,7)	12	0	1.00
2	3	0.20	(19,7,7)	12	0	0.76
3	3	0.32	(19,7,7)	12	0	0.29
4	3	0.20	(19,7,2)	12	5	0.27
5	3	0.30	(19,7,2)	12	5	0.00
6	3	0.50	(19,7,7)	12	0	0.00

Implementation details:

- participants are randomly and anonymously reassigned to tournament groups (so as to get close to the one-shot nature of the theory)
- the instructions use neutral language (e.g., no talk here about environmental compliance, audits, or the like – audits, for example, are represented as computer "checks"; p. 253)
- average earnings $`15 for 30 – 60 minutes

The results are summarized here …

("our results are generally supportive of the theory as it predicts responses to changes in the audit probability"; p. 254)

Table 13.3 Observed cheating in experiments

Treatment	*No. of subjects*	*No. of periods*	*Observed prob. of cheating*	*Predicted Prob. of cheating*	*Wilcoxon Test: observed vs. predicted (z-statistic)*
1	15	30	0.74	1.00	–3.26
2	18	20	0.63	0.76	–1.55
3	18	20	0.42	0.29	2.16
4	18	20	0.53	0.27	2.94
5	12	30	0.54	0.00	3.07
6	15	30	0.46	0.00	3.41

Audit prob goes from 20 % (treatment 2) -> 32 % (treatment 3) => Observed prob of cheating does what? (This effect also confirmed and quantified in the regression results .. .)

"The effect of an outside penalty appears to be less pronounced." (p. 254; see also discussion of regression on p. 255: "Consistent with our non-parametric test results, the presence of the penalty has no statistically significant effect in the law and economics literature where some studies find that increased penalties for criminal offenses (such as the death penalty), have little or no deterrent effect on crime rates.")

More on this …

MANAGERIAL AND DECISION ECONOMICS
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Extending the Lessons of Laboratory Experiments on Tax Compliance to Managerial and Decision Economics

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In this paper we examine what experiments on tax compliance have revealed about compliance behavior, and we discuss what these experiments can reveal about managerial and decision economics. We draw two general conclusions from this discussion. First, compliance is a complicated decision, one that depends upon the financial incentives facing the decision-maker, including detection and punishment, but one that also depends upon many other factors that have not been considered by the standard economics-of-crime paradigm. Second, and as a consequence, broader approaches to the compliance decision are needed, ones that involve enforcement but that also encompass more complete models of behavior. Put differently, any company strategy based only on detection and punishment may well be a reasonable starting point for compliance but not a good ending point. Instead, what is needed is a multi-faceted approach that emphasizes enforcement, but that also emphasizes the broad range of motivations that explain why people obey rules and regulations. © 1998 John Wiley & Sons, Ltd.