Undergraduate Program in Central European Studies

CERGE-EI and the School of Humanities at Charles University
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Environmental Policy in the Central European Context

Time: Thursday 3pm
Location: at CERGE-EI, Room # 9…
…or some nice coffee place??? ☺

Professor: Jana Krajcova (JK), email: jana.krajcova@cerge-ei.cz
Guest Professor: Andreas Ortmann (AO), email: aortmann@yahoo.com
See also: http://home.cerge-ei.cz/richmanova/TeachingUPCES.html
(and http://home.cerge-ei.cz/ortmann/UpcesCourse/UpcesCourse.html for Spring 2009 course)

What is your background?

- **environmental?**
- **economic (statistical/econometric analysis)?**
- **environmental economics?**
- **experimental economics?**

What do you expect from this course?

OUTLINE OF THE COURSE:
The aim of this course is to introduce students to some basic economic principles and theories explaining environmental issues and problems today and to explore existing policies at the national, international, and world level. Students will learn about concepts such as externalities, the tragedy of the commons, enforcement as a public good, interventionist solutions to the externality problem such as taxes and marketable pollution permits, as well as non-interventionist solutions to the externality problem such as the Coasian solution and self-regulation. Students will also review the debate over the environmental Kuznets curve. Because experimental evidence complements theoretic insights, field data and simulating models nicely, review some research articles that draw on the experimental methodology.

GRADING POLICY:
Final exam: to be agreed upon, we either do a written exam, or a term paper, or both (paper for bonus points ☺)

WEEK: TOPIC: DATE: INSTRUCTOR

1 Introduction (history/outline) *Oct 1* (JK)
2 Market failures: externalities, tragedy of the commons, enforcement as public good (river experiment) *Oct 8* (JK)
3 Interventionist solutions to the Externality problem – Pigouvian taxes and standards and charges *Oct 15* (JK)
4 Non-Interventionist solutions to the Externality problem – The Coasian solution *Oct 22* (JK)
5 Interventionist solutions to the Externality problem – Marketable pollution permits *Oct 29* (AO)
6 Non-interventionist solutions to the Externality problem – Self-regulation *Nov 5* (JK)
7 Contingent valuation/the greens and Czech politics *Nov 12* (AO)
8 Environmental Policy in the Czech Republic – History and current issues *Nov 19* (JK)
9 Environmental Policy in the EU – History and current problems *Nov 26* (JK)
10 Environmental Policy in the world context – History and Current problems *Dec 3* (JK)
11 To be determined by the interests of the class *Dec 10* (JK)
12 Final exam (*Dec 14-Dec 17*)

Some useful links

CENIA (www.cenia.cz) – website of the Czech Ministry of the Environment's information agency.

Environment Center of Charles University (http://www.cuni.cz/COZPENG-5.html)

European Environment Agency (http://www.eea.europa.eu/) - environment agency of the EU

http://ec.europa.eu/environment/enveco/index.htm - web site of the EC

READINGS list contains both required and optional readings. It will be revised as we go, always check out the website for updates)… see the syllabus/website; for the first part of the course follow **Schotter, Andrew (1997), Microeconomics. A Modern Approach.** Second Edition. Addison-Wesley. Of particular importance: **Chapter 17** in that book.

Introduction

Why do we care about the environment?

- life supporting function (location and the basic conditions for the existence of life)
- natural resources (inputs for consumption and production)
- amenity values (natural beauty)

Natural resources:

- flow resources (solar radiation, wind or water energy – the current use does not affect the future availability)
- stock resources (the current use affects future availability)
    - renewable resources (forests, stock of fish, etc…)
    - non-renewable (fossil fuels, mineral ores)

Nature of environmental problems

- nature degradation due human activity (deforestation, pollution)
- conflicting usage of the natural resource (e.g. amenity vs. production)
- distribution of usage over time (this or future generation?)
- distribution among agents (too many fishermen)

Current issues in Europe and the CR

- water and air pollution, greenhouse effect (industry, transportation)
- soil pollution (industrial fertilizers)
- decrease in biological diversity and ecological stability (due agricultural production and fragmentation of the landscape due transportation)
- energy intensity
- noise (transportation air/road/railway)
- waste management

Instruments of environmental protection

- regulations
- economic and financial (standards and charges, marketable pollution permits, taxes, fines, tax reliefs and subsidies, property rights)
- voluntary programs (environmental labeling), environmental education and public awareness

From Wikipedia, the free encyclopedia

Environmental economics is a subfield of economics concerned with environmental issues.

Quoting from the National Bureau of Economic Research Environmental Economics program:

Environmental Economics undertakes theoretical or empirical studies of the economic effects of national or local environmental policies around the world. Particular issues include the costs and benefits of alternative environmental policies to deal with air pollution, water quality, toxic substances, solid waste, and global warming.

Externality

An externality arises anytime when someone's economic (or other) activity imposes a cost on someone else.

Typical scenario for situations involving "common goods" such as water, air, etc…

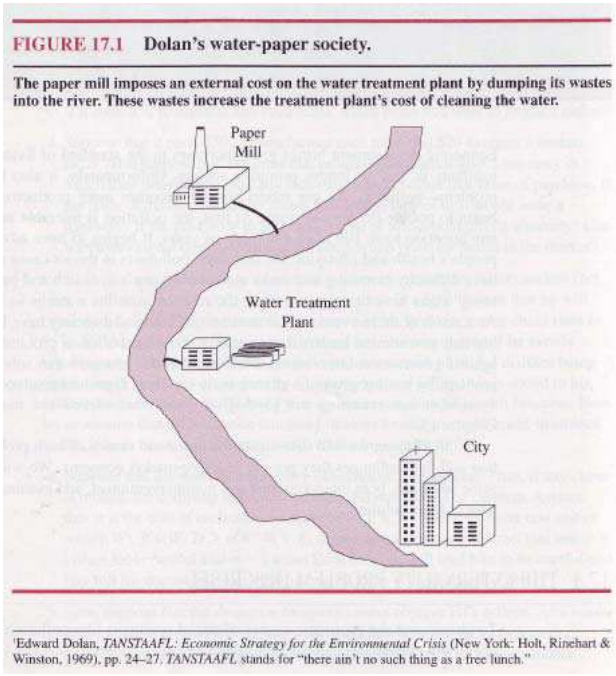

FIGURE 17.1 Dolan's water-paper society.

The paper mill imposes an external cost on the water treatment plant by dumping its wastes into the river. These wastes increase the treatment plant's cost of cleaning the water.

[1]Edward Dolan, *TANSTAAFL: Economic Strategy for the Environmental Crisis* (New York: Holt, Rinehart & Winston, 1969), pp. 24–27. *TANSTAAFL* stands for "there ain't no such thing as a free lunch."

Paper mill produces

- paper at private cost
- waste at a cost to be borne by the society (here represented by a water treatment plant that provides drinkable water to the city), i.e. a cost external to the paper mill

Water treatment plant produces

- clean water

In terms of the Dolan's water – paper society:

Given the externality created by the paper mill's wastes, can we expect our model society to produce Pareto-optimal amounts of clean water and paper? (Recall that a Pareto-optimal outcome requires that there be no other amounts of clean water and paper that, if produced, would make someone in the society better off without making anyone worse off.)

Intuitively, we might expect the answer to be NO.
The paper mill is imposing an additional cost on the water treatment plant, but there is no mechanism to make the mill accountable for this cost, so it seems unlikely that the outcome for society will be Pareto-optimal. Indeed it is not …

Three conditions must be fulfilled for a perfectly competitive economy to produce Pareto-optimal outcomes:

- the marginal rate of substitution (the ratio of the MU (paper) to the MU (water), which in equilibrium has to be equal to the price ratio of the price of paper and the price of water) of paper for water has to be the same for all consumers.
- the marginal rates of technical substitution of paper mill and water treatment plant ought to be the same (this is about production inputs and we can ignore it for now)
- the marginal rate of substitution of water for paper must be equal to the marginal rate of transformation of water for paper, which in equilibrium is supposed to be equal to the ratio of the marginal cost of producing paper to the marginal cost of producing clean water

But … the (private) marginal costs of paper and water are not what their (social) marginal costs, and the marginal utilities are … PROBLEM

There are essentially three "corrective policies "

- Pigou taxes
- Standards
- Tradable permits

Here they are (well, one of them), in Figures from Plott's article:

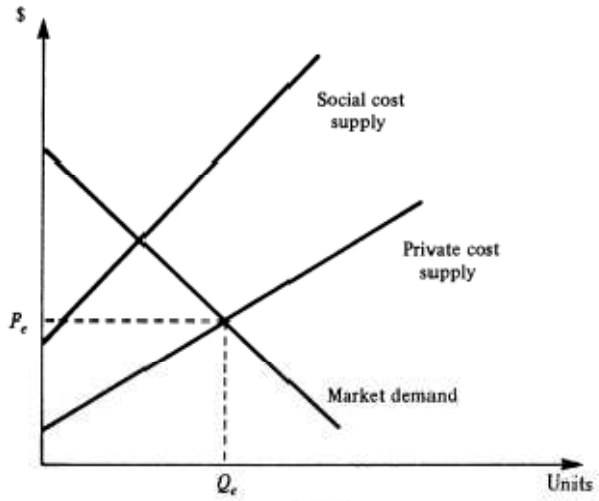

Fig. 1

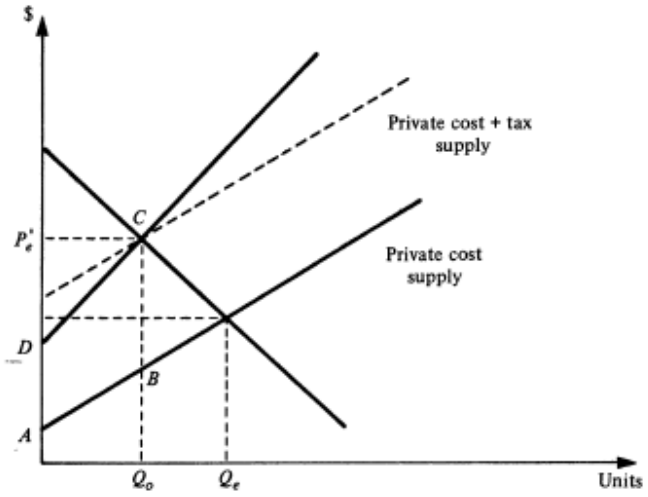

Fig. 2

Note the informational requirements – taxes may not be that practical !

Hoyt, Ryan, Houston, The Paper River: A Demonstration of Externalities and Coase's Theorem

- A classroom simulation designed to examine a negative externality generated by a productive process that elicits a Coasian solution.

"It is necessary to know whether the damaging business is liable or not for damage caused since without the establishment of this initial delimitation of rights there can be no market transactions to transfer and recombine them. But the ultimate result (which maximizes the value of production) is independent of the legal position if the pricing system is assumed to work without cost."

R. H. Coase

- Students create and experience an externality first hand and then conceptualize a correction procedure that is consistent with Coase's Theorem.

[Give out pencils with eraser to all students]
"Clear your desks except for a pencil. Each person on the right side represents Firm A, and each person on the left side represents Firm B. No calculators of any kind and no scratch paper please."

[Give five pieces of paper and a record sheet to each Firm A student.]
[Explain (have assistant explain) to Firm B students how to build a paper plane (that can fly)]

"Here are 10 multiplication problems (production tasks) for Firm A students:
1. 376x92=? 2. 987x11=? 3. 454x76=? 4. 345x98=?
5. 444x89=? 6. 321x45=? 7. 789x65=? 8. 465x87=?

9. 842x35=? 10. 876x54=?

You will get one bonus point for each problem solved correctly. The Firm A student with the most correct answers will earn [REWARD]. You may only use the pieces of papers that were distributed and the pencil. This round of production is over when the first Firm A student has finished all problems."

[Check solutions for multiplication problems (production tasks)]
[Have Firm A students record their performance on the record sheet. Then have them give their five pieces of paper and record sheet to a Firm B student.]

"You will receive two bonus points for each paper airplane you can produce in two minutes using the paper that was just given to you from Firm A. If you wish to use your own airplane design, you will get paid as long as it is the required size, can fly, and has not writing on it. You are allowed to completely erase pencil marks, but you are not allowed to tear off portions of the paper to remove pencil marks. "

[Announce end of production period.]
[Check which airplanes are acceptable.]

"Record your earnings based on the number of acceptable airplanes that you have produced."
"How much of a cost was imposed on you in terms of the number of bonus points you were prevented from earning?"

[Discuss externality problems in the present context.]

- two firms located along a river in which one firm (A) pollutes the water used by another firm (B) downstream
- river water is represented by small sheets of papers that are given to firm A students (upstream firm) who use them to generate answers to math problems
- used paper is then passed on to firm B students (downstream firm) who must clean up the "pollution" before using the paper to produce paper airplanes

"What could be changed in order to make Firm A take into account not only its costs but also the costs it is imposing on Firm B?"
"How much did Firm A have to pay to use the paper?"
"How does the lack of a private cost to Firm A for using the paper influence its decision regarding paper utilization?"
"How could society insure that a firm takes into account not only its private costs but also the social costs of production?"
"Should Firm A pay? Should Firm B pay? How should it pay? Who should it pay?"

" Students typically assign the property rights to Firm B by suggesting that Firm A pay Firm B one or two bonus points for each piece of paper that has been used in order to compensate them for the lost resource. Occasionally, students will grant the property rights to Firm A by suggesting that Firm B pay to get the blank pieces of paper from Firm A. However, it should be noted that to make a profit Firm B would have to pay a price lower than two bonus points per sheet. Regardless, Firm A will now have an incentive to use the paper more efficiently and as a result will conserve the resource."

Then the experiment is repeated in round 2, with chosen payment scheme…

"Would the outcome of the last round have changed if Firm B/A had bought the pieces of paper from Firm A/B? "

Coase's Theorem is illustrated at this point by explaining that regardless of which firm receives the property rights, the externality is internalized. For instance, the instructor can ask the class the following question, Because Firm A knows it will be able to sell unused pieces of paper to Firm B; it will tend to conserve the resource just as it did when Firm A had to pay for using the resource. One could use Coase's example of the farmer and rancher to further illustrate that regardless of which party is granted the property rights , the problem is corrected assuming transaction costs are sufficiently low (Coase 1960).

Use of Experimental Methods
(OPTIONAL READINGS)

(G&G) Greenstone, M., Gayer, T., (2007), Quasi-Experimental and Experimental Approaches to Environmental Economics, RFF Discussion Paper 07-22.

(L&L) Levitt, S., D., List, J., A. (2009), Field experiments in economics: The past, the present, and the future, European Economic Review 53, 1-18

Wikipedia:

*In scientific inquiry, an **experiment** (Latin: ex- periri, "to try out") is a method of investigating particular types of research questions or solving specific problems. An experiment is a cornerstone in the empirical approach to acquiring deeper knowledge about the world and is used in both natural sciences as well as in social sciences. An experiment is defined, in science, as a method of investigating less known fields, solving practical problems and supporting or negating theoretical assumptions.*

Brief History (L&L)

1) **Natural science experiments:** Among the first experimenters

    - **Galileo Galilei** in the 17th century: The falling bodies experiment (dropping objects from the leaning tower of Pisa in order to prove that all objects fall at the same rate, whatever their mass to disprove Aristotle's assertion that heavier bodies fall faster than light ones.),
    - **Sir Isaac Newton** showed that the white light is a mixture of colored lights and shattered down another Aristotle's theory that the white light is equal to purity,
    - **Pasteur** rejected the theory of spontaneous generation with an experiment – he showed that microorganisms grow in boiled nutrient broth when exposed to the air, but not when exposed to the carefully filtered air.

2) **"The dawn of field experimentation" in 1920s - 1930s:** Experiments were used to help to answer important economic questions. None of those studies involved human subjects. Via experimentation with agricultural plots Neyman and Fisher conceptualized RANDOMIZATION as a mean to achieve identification.

3) **Large-scale social experiments in mid 20th century** conducted by government agencies that involved individuals to evaluate employment programs, electricity pricing schemes, housing allowances … Experiments were used to test new programs later also reforms to existing programs – important influence on policy making.

    Social Experiment:

    Ferber and Hirsch (1982,p.7) '' a publicly funded study that incorporates a rigorous statistical design and whose experimental aspects are applied over a period of time to one or more segments of a human population, with the aim of evaluating the aggregate economic and social effects of the experimental treatments.''

    Greenberg and Shroder (2004) define a social experiment as having at least the following four features: (i) random assignment, (ii) policy intervention, (iii) follow-up data collection, and (iv) evaluation.

4) **Growing popularity and expansion to diverse areas of interest over the past decade** economists have increasingly used the field experiments and controlled small(er)-scale experiments to explore economic phenomena.

Use of experimental methods in economics:

- education and training, public finance, industrial organization, labor and public economics, consumer behavior, game theory, development economics, **environmental economics** (see more in L&L and G&G)

Benefits of employing Experimental Methods

- A new drug is tested to make sure that it has the expected effect and at the same time that it is not outweighed by possible side-effects – to minimize potential cost on public health
- The effect of planned policy change can be tested at relatively low cost (compared to allocation of much larger resources to an inefficient program; e.g. training program for the unemployed, new pricing scheme for electricity,…)
- Explaining or predicting non-experimental outcomes (e.g. Barr and Serneels 2004: correlation of wage outcomes of employees with their behavior in a trust game experiment) – again, relevant policy/strategy implications at relatively low cost
- Testing theoretical predictions at relatively low cost (economic theory)
- Help to generate the data which are difficult to be obtained from "the field"
- Estimation of a cost that the firm which produces pollution should internalize so that the (socially) more efficient outcome can be achieved **-> ENVIRONMENTAL ECONOMICS**

Externalities -> correction? -> Environmental Economics -> (G&G)

- air or water pollution as a byproduct of the production of marketable good
- imposes health costs on inhabitants and/or costs on the down-the-river company not internalized by the firm which is responsible for producing the pollution
- government intervention might help to maximize net (social) benefits/welfare – require reliable estimates of the costs and benefits => ENVIRONMENTAL ECONOMICS
- **EE** addresses the inefficiencies resulting from production externalities –> experimental and quasi-experimental methods
- hinge upon proper design, implementation, appropriate approach to the data analysis

Possible Difficulties when employing Experimental Methods

L&L:
"The aim of the researcher is to estimate a causal effect of some action (a new government program, change in price,…), i.e. how outcomes differ when the action is taken vs. when it is not."

"The fundamental difficulty that arises is that either the action is taken or it is not—we never directly observe what would have happened in an alternative universe where a different action is taken. Thus, the construction of a control group becomes critical. Although we cannot observe what your outcome would have been had you not been treated, we can, for instance, observe outcomes for other similar individuals who were not treated."

G&G:
Causal Hypothesis

Illustrative Examples:
1) observational study analyzing the use of estrogen replacement therapy (ERT) to maintain the menopausal symptoms and their potential dangers such as higher incidence of heart disease

2) testing impact of a new regulation which restricts pollution that can be produced by a company; what is the impact on health

- want to test a treatment effect (like e.g. receiving drug vs. placebo, exposure to high vs. low pollution)
- outcome may or may not respond to the treatment(=drug/high pollution) effect (heart disease/ other health problems) - > every individual has two potential outcomes but only one can be in fact observed
- to isolate the effect of treatment – all other factors need to be held constant (ideally, we would want to observe the outcome for the same individual in both treatments – with and without drug/ exposed to high and to low pollution – not possible -> Fundamental problem of Causal Inference)

➔ can observe the health outcome for treated individuals (with ERT/high pollution = TREATMENT GROUP) and for not-treated (no ERT/low pollution = CONTROL GROUP) -> average difference in health outcome treated vs. untreated

➔ PROBLEM -> SELECTION BIAS: our individuals might have some "special characteristics" that affect both, selection to treatment AND the outcome of the treatment (women with healthier lifestyles/ people with lower income living in more polluted areas) -> the effect of special characteristics can be, in some situations validly assumed zero, in other situations it can be controlled for -> the researchers need to be aware of it to be able to make valid inferences!

Sources of the data (or, types of experimental approaches) (L&L, Harrison and List 2004)

- Naturally occurring data (identification assumptions) – selection into treatment is not up to researcher (e.g. ex-post examination of ERT, pollution regulation)
- Controlled data - selection into treatment is up to researcher (e.g. drug vs. placebo)
    - Field experiments -
        - Artefactual - departure from laboratory experiments; use "non-standard" subjects, or experimental participants from the market of interest, subjects understand that they are participating in an experiment
        - Framed - same as an artefactual field experiment but with field context
        - Natural - same as a framed field experiment but in the natural environment (where the subjects naturally undertake such tasks); the subjects do not know that they are participants in an experiment
    - Lab experiments (in laboratory setting, often using student subjects, randomization to identify the treatment effect)

A. Natural experiments = Quasi-experimental approaches (G&G)

SELECTION BIAS:

The researcher also compares the outcomes between the treatment and the control group. The difference is that the selection for the treatment is not up to the researcher – individuals are exposed (to treatment) by nature, politics, accident … -> NON-RANDOM ASSIGNMENT => possible source of SELECTION BIAS

- ➔ Still can make VALID inferences under the assumption that the assignment to the treatment is not related to any determinant of the outcome
    - **Neg. Exmample 1:** Observational studies of ERT concluded no direct causality between ERT and heart disease. **Problem:** Maybe women with healthier life style were more likely to participate, take ERT and therefore per se less likely to have heart problems (reasons to believe that -> self-selection -> special characteristics that might affect the results of an observational study **Solution:** A randomized study -> Concluded that ERT substantially contributes to heart disease

    - **Neg. Example 2:** similarly, in the pollution example if the housing prices are significantly lower in the affect area and therefore it is colonized by poorer people with less healthy lifestyles, less resources to spend on healthcare

    - **Pos. Example:** If e.g. the government decides to enroll the unemployed in a special training program and selects randomly (or by some other rule, completely unrelated to their profession, abilities, education… anything that might affect their probability of success on the job market after the training) a half of the currently unemployed to receive the training (only a half for e.g. budgetary reasons, randomly to avoid e.g. accusations of discrimination) – their success after the training (if received) is not correlated with their selection for the group even though the assignment to treatment is not in the control of the researcher who will analyze the data

MEASUREMENT ERRORS:

- more sensitive people (health wise) might have migrated from the more polluted area – the time of their exposure is shorter than of individuals that stayed

- difficult to measure exact "exposure to pollution" (if interested in long term effects) over time (it might have varied)

- exposure to pollution might also vary location-vise (some people live closer to the source than other)

⇨ need to be very careful and employ proper techniques for data analysis, taking into consideration all possible biases and errors resulting from the nature of the experiment, concerned individuals and their selection for the experiment, their unobservable characteristics that might affect their "outcome"

Possible threats to the validity of the Q-E methods and generalization of the results:

- Internal validity: treatment status can be related to the outcome for reasons other than treatment (selection bias)

- External validity: Heterogeneity of the treatment effect – possible problems with generalization of the result and application to other context. The estimated treatment effect might be different…
    - … from the overall population (perhaps the subjects are more sensitive to pollution)
    - … across geographic settings
    - … across institutional settings
    - … across years

  Example: If a government implements a program that improves the quality of air only in some regions, some individuals might change their location. If we estimate a short-run treatment effect before the re-location that would likely be different from the estimated long-run treatment after the re-location (large-scale experiment).

- Construct validity: the research must understand the experiment and the possible effects very well. In the pollution example, if the implemented program reduces the concentration of a specific air pollutant but at the same time has some other effect on health, positive or negative, the researcher is not aware of then he cannot separate the two (or more) effects by looking at the impact on health. Still can analyze the effect of the program on overall improvement in health. The researcher just has to be very careful in the specification of his research question and choose an appropriate methodology to get valid answer to that question.

What can we do to maximize the probability of the Q-E's validity

- To check the distribution of the observable covariates – if they are balanced than it may be reasonable to assume that also the unobservables are balanced in our sample
- Test whether the estimated effect is sensitive to a change in specification

➔ Still not a guarantee because the unobservables may still differ across the treatment and the control groups – therefore good understanding of the data (and their source) and economic intuition, reasoning or underlying model are very important and helpful!

B. **Controlled Experimends (Field and Lab)**

Use **RANDOMIZATION** to avoid the problem of **SELECTION BIAS** -> **Randomized experiments**

So what if there are problems with the data analysis that cannot be solved by a choice of proper approach to the data analysis? (e.g. we do not know what is it, what unobservable characteristic different than the exposure to treatment makes the women in our medical trial who take ERT less susceptible to heart disease -> therefore we cannot control for that factor).

➔ A classical experiment where subjects are randomly selected for treatment -> on average, individuals in treatment and in control group have (statistically) the same characteristics except of exposure to the treatments -> it is no longer the women themselves that decide whether to take the ERT or not, now it becomes to be under the control of the experimenter (like in the medical trials they accept the patients but part of them, randomly selected, receives the real drug, the rest receives placebo -> the **selection bias** disappears and the comparison of the outcomes in the two groups gives a credible estimate of the average effect of the treatment.

The use of randomized experiments in economics is growing rapidly.

Possible problems:

RANDOMIZATION BIAS (L&L)

- some individuals might be reluctant to subject themselves to a random assignment =>

  experimental sample might differ from the population of interest because of randomization. For example, in medical trials, it is typically more difficult to persuade patients to participate in randomized than non-randomized studies; in social experiments difficult (this could be a problem in both large and small-scale field experiments)

- participants in small-scale experiments might not be representative of individuals that would participate in a large-scale study; Heckman (1992), Heckman and Smith (1995), Manski (1995) (lab experiments, not natural field exp, when subjects are not aware of their participation)

SUBSTITUTION BIAS (L&L)

- subjects in the control group might seek available substitutes for treatment (large-scale experiments, NOT lab or framed experiments)

ATTRITION BIAS (L&L)

- within-subject design => some social experiments can be going on for several years during which subjects are surveyed – subjects might become tired of keeping detailed records, some might move,... (large-scale social experiments, not lab or framed experiments which are typically short-term)

GENERALIZATION OF THE RESULTS (L&L)

- even with proper estimation of the treatment effect, the generalizations of the results to other domains might prove difficult (lab experiment, framed experiments, NOT natural field experiments)
    - lab experiments: student subjects, relatively small-scale
    - subjects are aware that they are monitored and recorded
    - psychological effect of being in the experiment, expecting the experimenter to expect specific result (see e.g. List 2006, or Benz and Meter 2008 for the difference in behavior when subjects are and are not aware they are participating in an experiment)

PUBLICATION BIAS (G&G)

- researchers more likely to submit, and journals are more likely to accept, for publication the studies that confirm the "expected results" (e.g. pollution is detrimental to health) – solution in leading medical journals, the researchers have to register their clinical trials, their study before knowing the results

REGULATORY BIAS (G&G)

- regulators put more weight on results that find a negative impact on health (to protect the public they require stronger evidence to support the " no risk to health" than the "risk to health" results -> overestimated risk than reduces the chances to achieve the most efficient outcomes (risk-aversion is reflected in the willingness to pay and thereby effect the policy benefit calculations -> over-regulation -> E.g. pollutant A may be more risky than pollutant B, but if studies over-estimate the riskiness of B at the end the policy maker might not choose the most efficient allocation of resources to reduce the pollution.

Cherry, Kroll, Shogren - Environmental Economics, Experimental Methods

Introduction

Environmental economists quickly adopted the methods of the newly emerging area of experimental economics in the 1970s and 1980s; in fact, "some of the earliest work in experimental economics was done by environmental economists." (Kling; see also Plott article assigned as required reading for lectures 1 – 3 and articles by Hoffman & Spitzer and Harrison & McKee lecture 5)

Today, the experimental method is commonly applied to environmental economic questions, as evidenced by the research in this book and in the general economics literature." (p.1)

"A reader might be asking him- or herself whether such small scale experiments are the appropriate tool to test large-scale environmental policy. … Do the attempts to use the experimental method to understand better the micromotives that underpin the theory of environmental economics have anything to say about the efficiency and fairness of global environmental policy?
…
Yes, it does, would be our answer.
…
By supplying information on the behavioral link between incentives, values, and choice, experiments might affect how policy is formed and evaluated. … Experimental evidence complements theoretical insight, field data, and simulation models to improve our understanding of the underlying assumptions and incentives that drive behavioral responses to policy." (pp. 1 - 2)

Experiments – "a useful tool to stress-test theory, look for empirical patterns of behavior, and testbed new institutions designed to protect nature. … laboratory experiments are used as a testbed for institutional design, markets, and mechanisms designed to improve resource allocation

63 researchers … their latest work … exploring the behavioral underpinnings of environmental economics … some are environmental economists … some are experimental economists … 24 chapters, divided in our topical parts that cover the range of ongoing research today – tradable permit markets, common property and public goods, regulation and compliance, and valuation and preferences -- … each part with a discussion chapter written by an environmental economist

"The one common thread through all four discussion chapters is the call for more context. Experimental economists traditionally use 'context-free' settings and instructions in their experiments to make the experiment as general and applicable as possible, and 'it is an accepted practice in economics experiments to strip away a lot of social context that is not an essential part of the theories being tested.' (Holt 2006, p. 13)" (p. 3)

"What other themes do the non-experimentalists address? … In his witty essay on the contributions in Part IV, "Valuation and Preferences," John C. Whitehead … states that despite their flaws due to the lack of context, economic experiments have done a reasonable job in getting contingent valuation economists 'out of their orbit around a far off hypothetical planet.' He sees laboratory experiments and stated preference surveys as complementary approaches, where one's strength can help to cover the other one's weaknesses." (p. 4)

" … the perpetual scientific tension between control and context. At the core, the experimental method is about control. One controls the experimental circumstances to avoid confounding; i.e. two or more elements change, which confounds our understanding of cause-and-effect. Without control, it is unclear whether unpredicted behavior is due to a poor theory or experimental design, or both. In contrast, others argue context is desirable to avoid a setting that is too sterile and too removed from reality … . All experiments face this challenge. Therein lies the beauty of the experimental method as applied to human beings rather than terrestrial plants or subatomic partials – one can use one's imagination to experiment with alternative degrees of control versus context." (pp. 4 – 5)

Horowitz, McConnell, Murphy, Behavioral Foundations of Environmental Economics and Valuation

"For at least 60 years, economists have worked on empirical approaches to measuring the value of non-market goods and services. In its beginnings, this research employed models of **revealed preferences**, such as the travel cost approach for recreation…"

Economists working on empirical approaches to measuring the value of nonmarket goods and services often cannot rely on revealed preferences (e.g., one could not have conducted a revealed preference study of the value of reducing pollution in Lake Erie in the 1970s because the lake was so polluted that there was little use, and no alternative, comparable, cleaner lake to observe. In this case, there is no revealed preference data on which to base valuation, and hence no ability to estimate the value of pollution reduction." (p.1)

"The failure of revealed preference methods for valuation tasks was the first impetus for developing **state preference methods**. The emergence of the notion of non-use values provided a second and perhaps more compelling motive for developing stated preference approaches. …

for example the existence of a fragile ecosystem is part of the real income of many individuals but does not contribute to the area under the demand curve for the resource. This came to be called existence value later. Pure public goods [common goods?] with substantial existence values such as visibility, regional air quality or pristine environments could not be valued with revealed preference approaches but were important for environmental policy. There is no better example than the damages from the Exxon Valdez oil spill." (p. 2)

"**Stated preference studies now make up a large proportion of valuation research.** This is not simply for the original reasons – the inability to observe some actions and the need to measure existence values – but the growing recognition that econometric problems compromise many preference studies
…
[here] we are concerned with **two problems** that have arisen as economists have applied stated preference approaches to valuation. In particular, we review **two issues** – **differences between values derived from real and hypothetical surveys** and **the gap between willingness to pay and willingness to accept** – that are crucial to the acceptance and advancement of stated preference techniques. [see lecture 11] The NOAA Blue Ribbon Panel identified both of these issues as problems for the use of **contingent valuation** in damage assessment." (pp. 2 – 3)

From Wikipedia, the free encyclopedia

Contingent valuation is a survey-based economic technique for the valuation of non-market resources, such as environmental preservation or the impact of contamination. While these resources do give people utility, certain aspects of them do not have a market price as they are not directly sold--for example, people receive benefit from a beautiful view of a mountain, but it would be tough to value using price-based models. Contingent valuation surveys are one technique which is used to measure these aspects. Contingent valuation is often referred to as a *stated preference* model, in contrast to a price-based *revealed preference* model. Both models are utility-based. Typically the survey asks how much money people would be willing to pay (or willing to accept) to maintain the existence of (or be compensated for the loss of) an environmental feature, such as biodiversity.