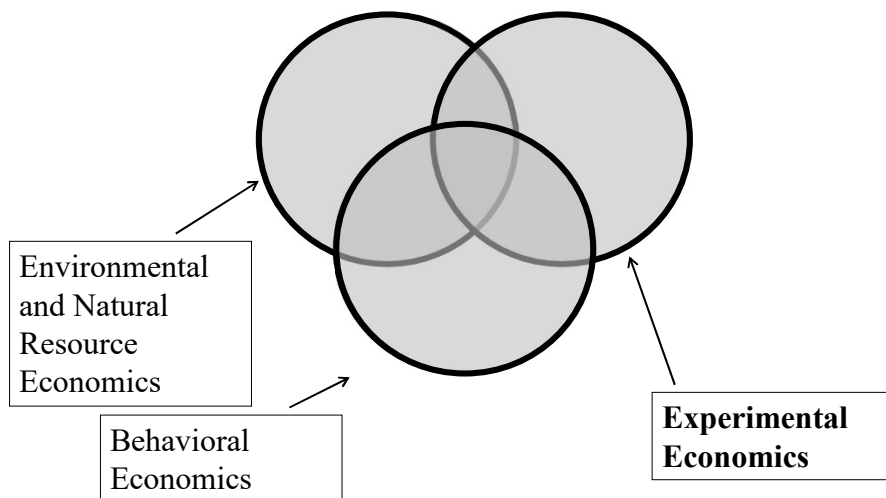


Experiments for Environmental, Climate and Agricultural Economics

1

Three “New” Fields in Economics



2

Types of Experiments

Simplicity
and Control

Lab experiment

Survey experiment

Lab-in-the-field experiment

Randomized controlled trial

Natural field experiment

Complexity and
“Ecology”

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Falk Heckman (2009)

- Paper’s title conveys its central message: “Lab Experiments Are a Major Source of Knowledge in the Social Sciences.”
- Last paragraph:
- “Causal knowledge requires controlled variation. In recent years, social scientists have hotly debated which form of controlled variation is most informative. This discussion is fruitful and will continue.
- In this context it is important to acknowledge that empirical methods and data sources are complements, not substitutes.
- Field data, survey data, and experiments, both lab and field, as well as standard econometric methods can all improve the state of knowledge in the social sciences.
- There is no hierarchy among these methods and the issue of generalizability of results is universal to all of them.”

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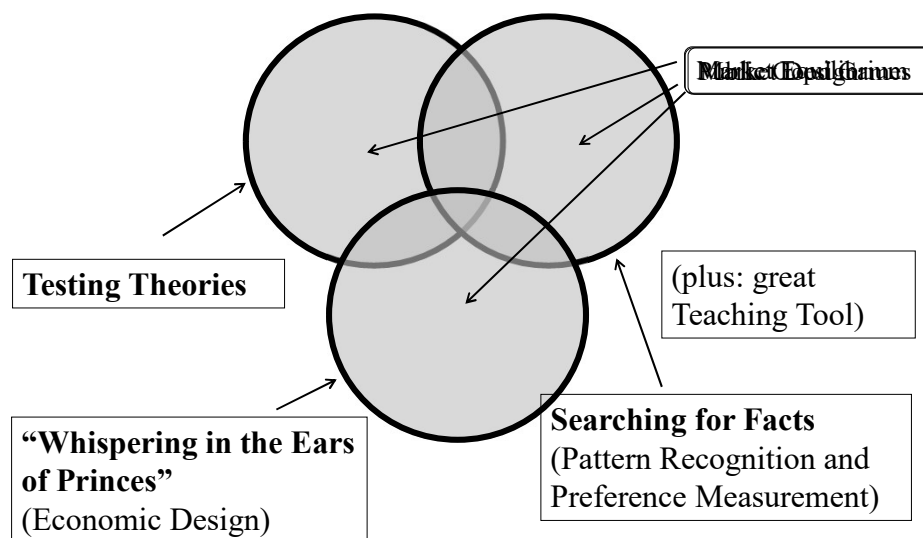
Maturity of Experimental Economics

- Many labs and experimental economists around the world
- Experimental work published in high-ranked general journals (plus specific journals)
- Experimental economists in top departments
- Nobel Prize in Economics:
 - 1988 Maurice Allais
 - 1994 John Harsanyi, John Nash, Reinhard Selten
 - 2002 Daniel Kahneman and Vernon Smith
 - 2009 Elinor Ostrom
 - 2012 Al Roth
 - 2017 Richard Thaler

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How to Categorize Experiments

(according to Alvin Roth, 2012 Nobel Prize Winner in Economics)



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What do you need to conduct a lab experiment in economics?

- Money
In the U.S. subjects get about \$25 per hour on average, but **individual payments depend on performance** (and luck)
- Subjects
Often students from WEIRD countries in lab (WEIRD = Western Educated Industrialized Rich Democratic), but also non-students in lab or field and mechanical turks
How many subjects? It depends. 100+
- Design
Often 2x2: hold all variables constant, except for 2.
- Computer program (zTree), internet program (oTree) or pen-and-paper
Depends on complexity of design.
- Approval from Institutional Review Board/Human Subjects Committee.
No deception.
- Pre-registration?!
For example, American Economic Association Registry for Randomized Controlled Trials

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Examples from DARE research in experimental economics: Testing Theories

- **Janusch, Goemans and Kroll** (2021 *Experimental Economics*, chapter of Janusch's dissertation): Do congestion fees move "commuters" to better equilibria?
- Baik, Cherry, **Kroll** and Shogren (1999 *Theory and Decision*): How well do people use backward induction?
- **Kroll**, List and Mason (2013, *Handbook of Experimental Economics and the Environment*): Do groups play the "Prisoners' Dilemma" according to theoretical predictions?
- **Hans, Goemans and Kroll** (2013 WP, chapter of Hans' dissertation): Do people respond to rate structure changes?
- **Maas, Goemans, Kroll, Manning and Brown** (2017, *Games and Economic Behavior*, chapter of Maas' dissertation): Effect of uncertainty on resource (groundwater) depletion

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Examples from DARE research in experimental economics: Searching for Facts

- Kallbekken, **Kroll** and Cherry (2011, 2017, *Journal of Environmental Economics and Management*, plus four other papers): What determines whether people are willing to accept (“efficient”) environmental policies?
- **Costanigro, Kroll, Thilmany McFadden** and Bunning (2014, *Food Quality and Preferences*): How much do people value organic and/or local items (here: apples) in a lab experiment?
- Cherry, **Kroll** and Shogren (2005, *Journal of Economic Behavior and Organization*): The impact of endowment heterogeneity and origin on public good contributions: Evidence from the lab
- Messer, **Suter** and Yan (2013, *Environmental and Resource Economics*): Context Effects in a Negatively Framed Social Dilemma Experiment.

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Examples from DARE research in experimental economics: Whispering in the Ears of Princes

- Hansen, Kaplan and **Kroll** (2014, *Environmental and Resource Economics*, chapter of Hansen’s dissertation): How would an options market work in addition to spot markets for water?
- Vossler, **Suter** and Poe (2013, *Journal of Economic Behavior & Organization*) Experimental Evidence on Dynamic Pollution Tax Policies.
- **Goemans** and **Kroll** (WP): How would a leasing market work in addition to markets for permanent water rights?
- Bahrs, **Kroll** and Sutter (2008, *American Journal of Agricultural Economics*): What happens in a market for tradable agricultural entitlements under different market institutions?

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Most Recent Project: Geoengineering

- Climate Change: Does the prospect of solar geoengineering as a quick (and relatively cheap) tech fix cause moral hazard in mitigation efforts...
... or do its potential side effects scare people into mitigating more now?
- Tough/impossible to test with real-world data.
- Results from survey experiment (*Climatic Change* 2021) and lab experiment (*Environmental Policy* 2022) indicate no moral hazard.

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Three Big Issues surrounding Geoengineering

- Scientific:
Side effects: Regional climate effects, ocean acidification, termination shock, etc.
Plus, unanticipated side effects?!
- Behavioral I:
 - Will the prospect of a technological solution lower the willingness to mitigate (“moral hazard”)?
 - Or will the prospect of its side effects increase the willingness to mitigate?
- Behavioral II:
Will there be “free-driving”?

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See you in the lab... and on the trails and roads!

