



United States Department of Agriculture

Assessing How Well Students in Economics Experiments Model Decision-Making for Non-Student Populations

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Outline

1. Experiments to inform policy-making
2. Selection of subjects
 - a. Challenges of experiments with farmers
 - b. Potential for using model populations
3. Research agenda on students as models for non-student populations in economic experiments
4. Measuring “representativeness”



Benefits of Using Experimental Data

- Complement survey and administrative data
- Identify causal responses to policy changes
- Isolate behavioral mechanisms, such as:
 - How insurance demand changes with differences in risk exposure
 - How auction bidding strategies change with differences in the numbers of competing bidders



Using Experiments to Inform Policy-Making

- Experimental evidence can be useful in answering many policy-relevant questions:
 - Test new auction mechanisms for the Conservation Reserve Program
 - Measure voter outreach methods for county commissioner elections
 - Measure the impact of subsidies for the Federal Crop Insurance Program
 - Assess consumer response to new food labeling information



Three Key Tradeoffs in Experiments

- Construct validity:
Does the experiment adequately replicate the real-world **context** such that behaviors within the experiment reflect behaviors in the real world?
- Internal validity:
Does the experiment adequately **control** for potential confounding factors?
- External validity:
Do the results generated by the experimental subjects **represent** other populations?



Preferred Experimental Subjects

- Policy-relevant populations, such as:
 - Conservation programs => eligible landowners
 - Crop insurance => eligible farmers
 - County commissioner elections => rural voters
 - Nutrition labels => consumers
- Just as with surveys, collecting experimental data from these populations requires costs to the government and imposes burdens on participants



Example: Challenges of Recruiting Farmers for Experiments

- Logistically difficult to recruit farmers
- Limited availability for experiments
- Require high participation fees
- In fact, relatively few published economic experiments used farmer subjects:
 - 73 studies used farmer subjects
 - 9 studies sampled US farmers
 - 6 of the 9 studies with US farmers had less than 70 subjects



What About Using a Model Population?

- Examples of model populations:
 - Animals for testing of new medications
 - Airplane prototypes used for wind tunnel testing
- College students are used by academic researchers to model non-student populations:
 - Businesses responses to new emissions trading platforms (Cason and Plott, 1996)
 - Stock traders responses to new information (Lei et al, 2001)
 - Public officials incentives to behave corruptly (Drugov et al, 2014)



Advantages to Using Students as Experimental Subjects

- Farmers:
 - **Policy-relevant population**
 - **Understand context**
 - Difficult to recruit
 - Require high participation fees
 - Limited time for the experiment
- College Students:
 - Not necessarily policy-relevant
 - Less familiar with context
 - **Easy to recruit**
 - **Low participation fees**
 - **More time for experiment**

But what can experiments with student samples tell us about farmer behaviors?



Comparing Experiments with Student and Farmer Subjects

- 8 published studies directly replicated with students and farmer samples
- Studies sample farmers from 4 different countries, involve many different methods, and investigate widely different topics
- Mixed outcomes:
 - 2 studies found different results between students and farmers for all tests
 - 1 study found no differences between students and farmers for all tests
 - 2 studies found some differences between students and farmers
 - 3 studies did not compare results between students and farmers



No Answers Yet...

- Insufficient data to assess students' abilities to model farmers' decision-making
 - Average behavior of farmers
 - Heterogeneity of farmer behaviors



... And What about Students' Abilities to Model
Other Populations of Interest? ...



... More Research is Needed!

- Questions about external validity of model populations can only be answered with more experiments
- Use clues from studies comparing students and non-students in general to prioritize a research agenda:
 - Meta-analysis found 9 out of 13 experiments have “similar” results for student and non-student subjects (Frechette, 2011)
 - One study found differences between student and non-student subjects vary by type of economic game used (Belot et al, 2015)
 - Another study found differences in trust attitudes for student and non-student subjects correlates with differences in demographic characteristics (Falk et al, 2013)



Next Research Goals

- Measure how representative are students' and non-students' experimental results
- Characterize the conditions which influence how well students model decision-making for non-student populations
 1. Are there any **types of experiments** where student results are more likely to be similar to results from non-student subjects?
 2. Are there **characteristics of student subjects** that improve the generalizability of their results to non-student populations?



Several Challenges to Resolve

1. Inclusion and exclusion criteria for studies
2. Categorizing types of experiments
3. Defining “representativeness”
4. Selection of demographic characteristics



Defining Representativeness

1. Strongly representative model populations
 - average treatment effect for students has the **same sign** and a **similar magnitude** to the average treatment effect for non-students
2. Partially representative model populations
 - students and non-students have treatment effects that **correlate** with a population characteristic **in a similar way**
3. Unrepresentative model populations
 - average treatment effect for students **is not similar** to the average treatment effect for non-students, and correlations between observable demographic characteristics and treatment effects **are not similar**



Defining Similar

- Non-statistical test:
 - Same order of magnitude
- Tests of statistical significance:
 - Paired tests (e.g. paired t-test for independent samples)
 - Confidence intervals of bootstrapped differences
 - Convolutions approach (Poe et al, 1994)
 - Other?



Current Progress

- Still in the early stages of preparing first drafts
- Expected outputs:
 - Report for Office of Management and Budget
 - Academic version for publication
- Feedback on assumptions and approaches is most welcome!





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