Field Experiments in Food and Resource Economics Research: Discussion

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Field experiments have become the fashion. The three papers discussed herein, Herberich, Levitt, and List (henceforth referred to as HLL); Roe and Just (RJ); and Toler, Briggeman, Lusk, and Adams (TBLA) attempt to make the case that field experiments have special advantages (and some disadvantages) which laboratory, natural, and uncontrolled experiments do not. However, before discussing each paper in turn, it is useful to present a brief summary of the scientific method itself. The reason for this is that, as Gauch (2003) argues, most scientists have a poor understanding of the scientific method with little or no formal training in it, and his book (from which the following discussion is drawn) provides a thorough summary of the literature in an attempt to remedy this problem.

First, the scientific method is based on faith that the world is orderly and comprehensible and that the world exists and our perceptions are generally reliable. Philosophy has shown that these presuppositions are unprovable. Science then relies on deductive reasoning (theory) and inductive reasoning (statistics) to attempt to falsify hypotheses.

This process is shown in figure 1. Starting with an initial hypothesis labeled i, deductive reasoning is applied to derive consequences. For example, if the hypothesis is that farmers are risk averse, the lower path in figure 1, deductive reasoning, implies that they should prefer to receive \$100 with certainty than outcomes of \$200 or \$0 each with probability one half. This is the consequence that follows from the hypothesis. The upper path would then design a laboratory or field experiment in which farmers are actually faced with this choice. The experimenter will then be careful to attempt to minimize noise (e.g., extraneous uncontrolled factors) in the data collection design and obtain new data that can be statistically compared to the consequence predicted by theory to determine if the hypothesis has been falsified. If the hypothesis has not been falsified, and if previously acquired old data also support the hypothesis, the hypothesis is temporarily supported but never proven to be true. Rather, the next step is to attempt to derive a new consequence of the theory and test that consequence with a new experiment. One such test of risk aversion would be to change the sign of the outcomes to −\$100 for sure versus a fair bet for −\$200 or \$0. Risk aversion would, of course, predict that farmers should choose a loss of \$100 in preference to a gamble for a \$200 loss versus a no dollar loss. Of course, as Kahneman and Tversky (1979) demonstrate, the vast majority of people (including economics PhD students as well as farmers) would choose the risky alternative, falsifying the risk aversion hypothesis. So, the next step is to generate a new hypothesis $i + 1$, risk seeking in losses, and design a new experiment to see if that hypothesis can be falsified. Given the presuppositions of science, this process can never prove a hypothesis to be correct or obtain ultimate truth but should improve our understanding of the world over time.

It is worth mentioning that most natural scientists believe that it is very difficult to falsify hypotheses with uncontrolled experiments. Edward Leamer (1983) concurs in his famous paper "Let's Take the Con out of Econometrics." If one accepts that controlled experiments are superior for testing theory, then the roles of laboratory, field, natural, and uncontrolled experiments become clear. An economic theory is by necessity a gross simplification of the world, so that testable consequences of the theory can be mathematically derived. The best place to test such a theory is in an environment that can exactly duplicate the theory. Only the laboratory can provide such control and is an ideal setting for testing. If the theory fails, despite using appropriate

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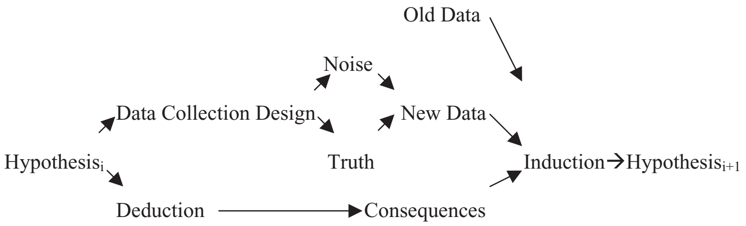

Figure 1. The scientific method

subjects and giving adequate training and learning time, that theory can be discarded before wasting resources on field, natural, or uncontrolled experiments. Thus, the laboratory represents a first step. Field and natural experiments represent a second step to see if the theory can stand the stress of real world contextual complexity. Finally, in an ideal world, if theory passes these tests, it is then reasonable to use uncontrolled data to estimate a model based on the theory for policy purposes.

The three papers in this session do fit into this scheme. HLL argue that, although the glory days of agricultural and resource economics seem to be gone, the field is uniquely and ideally positioned to lead the way again by employing field experiments. There is no question in this author's mind that an early advantage of agricultural and resource economists was that they were located in agricultural colleges with colleagues in the plant and animal sciences who were experts on the scientific method. As a result, they were exposed to the rigors of the scientific method and inevitably became the best scientists among economists, who mostly thought of themselves as philosophers. As to the claim that field experiments will return the agricultural economics to the glory days, time will tell. Economists as a whole are becoming better scientists. RJ explore the notion of internal versus external validity, arguing that laboratory experiments tend to have more internal validity and field experiments more external validity, the difference being that real world context is often not imported (although it can be) into the laboratory. This is consistent with the notion that field experiments represent a second step in testing theory to see if an abstract theory can survive the complexity of real world context. Finally, TBLA take a behavioral anomaly, the hypothesis that individuals have a preference for equity, that has been repeatedly tested and survived in the laboratory, and show that it survives in the more complex context of a field study. This is precisely the progression that efficient scientific research should take.

References

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