

Introduction to the Special Issue on Experimental Economics

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As advertised, the papers in this issue all fall within the realm of experimental economics, the subdiscipline within the field of economics devoted to laboratory methods. This is a particularly exciting time. Experimental economics is in transition—and the papers in this issue reflect this. Investigators are working on a brand new set of questions that aspire to a new and ambitious goal. The aim is to weave what not too long ago seemed to be disjoint phenomena into one fairly broad mosaic of economic behavior. The new work involves model building, as well as laboratory testing. There are exciting opportunities for research that bridge the divide between psychology and economics. Needed are theories that meld economic principle with cognitive limitation, laboratory designs capable of comparing radically different understandings of behavior, and innovative approaches to data analysis.

The papers in this issue were chosen to be representative of the field. As such, they exhibit, along certain dimensions, a strong commonality, and along others, sharp diversity. Some of the commonalities have to do with experimental methods. Others have to do with the themes behind the research questions being pursued. The diversity has mostly to do with the types of theories being pursued, the economic games examined, and sometimes the methods of data analysis being used.

The experiments reported in this issue share three methods that are common to most laboratory work in economics.

First, economic experiments almost always involve situations in which experimental subjects make decisions that have material consequences. The opportunity to earn cash—where earnings are strongly correlated with performance—is the standard incentive offered for participation in an economics experiment (including all the experiments described in this issue). Emphasis on material rewards is in keeping with the subject matter. While some experimentalists would argue that other factors play a role too, I think it fair to say that virtually all experimental economists agree that material rewards are a strong influence on behavior, and one that cannot be neglected.

Second, game theory plays a prominent role in the economist's laboratory. Game theory, with its crisply defined concepts of strategy, information, and payoffs,

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provides a relatively unambiguous framework for structuring and studying strategic interaction. There are both empirical and theoretical advantages to this approach. For one, the precision of game theory's structure tends to crystallize differences across experiments. The structural characteristics that distinguish different games can be clearly delineated, to the point that it is sometimes possible to "transform" one game into another, one component at a time. This is very useful when one is trying to isolate the trigger of a particular behavior. Also, game theory solution concepts provide a ready-made theoretical backdrop for laboratory study. Some of the papers in this issue, such as Hoffman, Liebcap, & Shachat's (this issue) study of a market pool model, test the predictions of standard game theory. Even where the theory is known to be incorrect, it can provide a useful touchstone for organizing and analyzing the data. Standard theory provides a benchmark of this sort for Güth & van Damme's (this issue) bargaining game study.

Third, information given to subjects is carefully controlled. What a subject knows about his playing partners' identities, about his partners' payoffs, as well as what a subject knows that his partners know, are all closely monitored. Here, too, we see the influence of game theory, which emphasizes the strategic influence of information. Several of the papers in this issue serve to document the influence of information. For example, Croson & Marks (this issue) examine how information about others' contributions affects behavior in a threshold public goods game, while Cason & Mui (this issue) study the influence of similar information in the context of the dictator game.

Devotion to laboratory testing of well-defined strategic games with carefully controlled information and meaningful monetary payoffs; this is the common experimental method shared by all the papers in this issue. There are also, as I mentioned, commonalities of theme, albeit these are somewhat less uniform. Moreover, the thematic commonalities are relatively new—or perhaps it is more accurate to say that the *recognition* of these thematic commonalities is relatively new. Let me explain.

The first *Handbook of Experimental Economics* was released in 1995. It is a marvelous summary of the work done in experimental economics up to that point in time. The manner in which the *Handbook* is organized is revealing of how experimental economists thought about the investigations going on in their field: there is a chapter on public goods games, another on coordination games, one on bargaining games, one on asset markets, etc. In other words, the *Handbook* is essentially organized by the type of economic game being investigated. This is perfectly consistent with the manner in which knowledge was gathered by experimenters: public goods experimenters debated and assembled knowledge about behavior in public goods games; bargaining experimenters did the same for negotiation games; etc. I doubt, however, that the next edition of the *Handbook* will be organized in the same manner. The reason is that two new themes are now emerging, themes that cut across the traditional categories and actually represent an ambitious new research agenda aimed at unifying our knowledge of the various games. These two new themes are "learning" and "motivation."

Experimental economists have recognized for a long time that learning is an important factor in many of the games they study. What is new is the hypothesis

that a deeper understanding of learning might explain many of the apparent *differences* in behavior we see across types of games. This hypothesis has led to a burst of both empirical and theoretical work on learning. The economics literature on learning is not as deep as it is in psychology. It is also more specialized. Economists are interested in learning as it pertains to a particular subset of human activity, economic transactions.

Many of the papers in this volume are devoted to learning. They represent the wide diversity of views that experimental economists hold on the subject. Selten (this issue) describes a nonoptimizing bounded rationality theory of learning that revolves around the notion of aspiration adaptation. Bereby-Meyer & Erev (this issue) describe a reinforcement type of learning model and compare its predictive power to a number of other learning models in the context of a probability learning task. Daniel, Seale, & Rapoport (this issue) fit an adaptive learning model to data from an experiment on sealed bid auctions. Camerer & Ho (this issue) extend an experience-weighted attraction model of learning that can be thought of as an intermediate construct between reinforcement and belief-based learning. Nagel & Tang (this issue) describe an experiment on the centipede game that is designed to compare several theories of learning. Kitzis, Kelley, Berg, Massaro, & Friedman (this issue) compare several learning theories, including some from the psychology literature, in the context of a simulated medical diagnosis task.

As mentioned, virtually all experimental economists would agree that material rewards are a strong influence on behavior. That said, the data from several games suggest that it may not be the only important influence. The results from many bargaining games suggest that subject perceptions of what is fair influence outcomes. Behavior in public goods games suggests that reciprocity sometimes plays a role. Experimental economists have very recently begun to construct models intent on capturing these diverse influences as an expression of a single set of motives.

Several of the papers in this issue are dedicated to characterizing or theorizing about motivation. Cason & Mui (this issue) explore how social influence affects contributing behavior in the dictator game, a situation in which one person decides how a fixed sum of money should be divided between one self and another. Croson & Marks (this issue) characterize how information influences the contributing behavior in a threshold public goods games. Güth & van Damme (this issue) demonstrate that neither standard game theoretic concepts nor simple hypotheses about fairness can explain the results of their three-person bargaining game. Bolton & Ockenfels (this issue) show that a model built on the supposition that both pecuniary gain and relative payoff standing motivate behavior can account for most of Güth & van Damme's observations.

What is the relationship between the work being done on learning and that being done on motivation? As it stands now, this is an open question. There are those who argue that learning may be sufficient to explain at least some of what motivation seeks to explain. There are also those who would argue that some of what learners are trying to explain is better understood in terms of motivation. I suspect that, in the end, learning and motivation will both turn out to be important pieces of the puzzle. But teasing the two apart in the lab, let alone capturing both in a single model, will require much further study.

As you read through this issue you will discover many other issues and debates. For example, some investigators are using dynamic models while others refer to static-equilibrium models. How does one compare performance across these classes? Some of the models suppose nonoptimizing bounded rationality, while other suppose optimizing, albeit sometimes with nonstandard motives. What are the substantive differences between these approaches, and how can we distinguish them in the lab? Some learning investigators use standard regression techniques, while others test learning predictions using simulation techniques. Which, if either, is better?

When taken together, the papers in this issue constitute a group snapshot of a field in flux. It is my hope that this issue will stand as strong evidence that there is much to be gained from economists and psychologists forging a closer working relationship.

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Received March 3, 1998