FREQUENTLY ASKED QUESTIONS
ABOUT EXPERIMENTAL ECONOMICS

Not long ago, conventional wisdom in the economic community held that, because economics is a science concerned with complex, naturally-occurring systems, laboratory experiments - traditionally reserved, for the `hard sciences'- were of little value to researchers. Today, after decades of research and development, the field known as experimental economics has become a well-established force in the academic community. Its father, Vernon Smith, is largely responsible for elevating the science from obscurity to popular acceptance.

What is the Interdisciplinary Center for Economic Science?

The Interdisciplinary Center for Economic Science (ICES) at George Mason University is a research center and laboratory specializing in experimental economics. Its director, Professor Vernon L. Smith, moved to George Mason with six colleagues to found the Center in 2001. It is located at George Mason University's Arlington, VA campus.

In addition to conducting an international research program, ICES faculty teach courses to undergraduate, graduate and law students at George Mason University. While all of ICES research employs the laboratory method of experimental economics, it additionally involves the fields of accounting, economics, finance, information systems, engineering, psychology, neuroscience, computer science and philosophy.

What is experimental economics?

Originally, economists focused on microeconomic theories relying heavily on assumptions about individual's preferences. The fact that these preferences are difficult to observe in natural environments led Vernon Smith to look to the laboratory to determine if the assumptions made about individuals were, in fact, descriptive of their behavior, and thus, provable in a scientific way.

By devising and running markets and electronic trading systems, and through the use of actual people as `market actors,' Smith established laboratory testing, as a means of determining the validity of various economic theories. Using cash-motivated students, Smith's experiments create real-world incentives to help researchers better understand why different markets work the way they do.

Why is experimental economics important?

Experimental economics allows for the controlled study of markets, environments (rules for trading), and the behavior of participants. Through rigorous testing and re-testing, Smith's experimental method allows researches to learn how and why markets react to changes in the `rules of the game' (laws, regulations, and institutional rules of exchange). The lessons of experimental economics are valuable for both researchers and policymakers, and can be applied widely to such areas as financial market theory and behavior, natural resource economics, and

the deregulation of formerly regulated industries.

Why is testing economic theory important?

Scientists from all disciplines believe the unique feature of science is theories, if they are to be accepted, require rigorous support from facts based on replicable observations. However, the way economics is currently researched, taught and practiced implies economic problems are understood simply by thinking about them.

Just as anthropologists do not try to generate all knowledge about social behavior by sitting in their offices, but by going out and living with the populations they are studying, experimental economists attempt to gather data about economic behavior in an effort to learn more about economic decision making.

The ability to test economic theory is applicable to a wide range of marketplaces and has the potential to change how goods are bought and sold, airlines price their tickets, pollution is reduced, state and federal regulations are promulgated, states structure their electric power industries, and companies manage their employees or reduce the volatility of stock trading.

How did Vernon Smith contribute to the field of experimental economics?

Vernon Smith conducted his first experiments in 1956 while teaching at Purdue University. Using his students as subjects, Smith found that even with very little information and a modest number of participants, subjects converge rapidly to create a competitive equilibrium.

Specifically, Smith's experiments proved large numbers of perfectly informed economic agents were not prerequisites for market efficiency - a radical departure from conventional economic thought. Smith compiled his early experiments and, in 1962, published his findings in the *Journal of Political Economy*. His article, "An Experimental Study of Market Behavior," is today considered the landmark paper on experimental economics.

The slow but steady development in experimental economics in the 1950s and 1960s was superseded by accelerated development in the 1970s and 1980s. After establishing himself as the field's preeminent researcher, Smith collaborated with several noted economists to refine and improve his subject.

From Smith's foundation of research, the modern experimental methods in economics began to gain acceptance. The research expanded to include the economic performance of many real-world institutions. Attempts to apply laboratory experimental methods to policy problems became systematic. The convergence properties of multiple markets were discovered. Conspiracy, price controls and other types of market interventions were examined experimentally for the first time. New forms of markets were studied, such as methods for deciding on programs for public broadcasting. All this research stems from the initial contributions of Vernon Smith.

Smith's groundbreaking work has led to an explosion in the application of laboratory experimental methods. Volumes of experimental papers are being published each year and the number of laboratories are rapidly growing around the world.

What types of experiments has Vernon Smith conducted?

ICES continues to conduct economic experiments and solidify the application of developed knowledge in the field of experimental economics and other disciplines. Current research is focused on the design and testing of markets for electric power, water and spectrum licenses.

ICES has also worked with the Australian and New Zealand governments on privatization issues, developed market designs for the Arizona stock exchange, and designed an electronic market for water in California.

The decision to move to George Mason University was based on its proximity to Washington, D.C. and ICES' desire to make more ripples in public policy circles and address policy questions faced by the U.S. government.

For example, ICES has designed an experiment to determine what would happen if airport landing and takeoff time slots were traded as commodities by airlines. If slots were tradable, prime-time landing spots might command premium price, in turn encouraging airlines to use those slots efficiently (e.g., with larger aircraft) and price tickets so that only those passengers who need to fly at those scarce times would pay the premiums to do so.

How are the experiments set up?

The majority of experiments take place in a laboratory setting where subjects sit at computer terminals and participate in different types of markets, but with real monetary rewards. Inside the laboratory, experimenters systematically observe groups of people buying, and selling in markets designed to provide environments analogous to those which individuals face in the real economy.

Most experiments last two or less hours per session, as subjects tire and become less attentive. Each experiment has three fundamental elements: A value/cost environment, an institution defining the rules of exchange, and the behavior or the participants. The experimenter controls the environment and the institution, and observes the behavior of the participants.

How do we know the results of an experiment will be replicated outside of the laboratory?

Laboratory experiments are enabling economists to test ideas and theories that might be impossible to test in the naturally occurring economy without disrupting an entire industry. It is not know with certainty that laboratory results will be replicated, which is why economic experiments are followed by field tests whenever results are applied to naturally occurring world markets.

Just as a wind tunnel allows engineers to test the design of an airframe before incurring the risk and expense of flight tests, the economics laboratory allows economists and policy-makers to test and fine-tune the rules of a market, before incurring the risk and expense of real-world application.

What does experimental economics contribute to education?

In addition to their value in research, experimental methods are changing the way economics is taught. Supply and demand curves can be too abstract a concept to provide students a grasp of how markets function. Participating in an experimental market allows students to more quickly comprehend economic principles and understand how market rules affect an individual's behavior.

What does experimental economics contribute to business?

Experimental economics allows market designs and procedures to be tested in the laboratory before being scaled up to become marketplaces in the field.

Businesses have also explored the ability of experimental markets to gather and process large amounts of information. Illustrating the technique the Iowa Political Market created a betting market, allowing people to buy and sell shares on the outcome of Iowa political elections. The market provided more accurate and less volatile forecasts of the election results than forecasts made by traditional polling methods.

In essence, in addition to other functions, markets constitute a means of aggregating information widely dispersed among individuals. Experimental economics provides a method to capture and process the information to improve business forecasting.

How does experimental economics contribute to public policy?

Experimental economics allows policy makers to 'bench-test' competing policy options. Based on experiments, economists can elucidate the different effects - anticipated and unanticipated - of alternative government policies.

Lab experiments do not provide policymakers, with iron-clad answers to pressing economic questions, but they do offer a quick, cost-effective way to identify market and policy flaws before ideas and theories become major public policy initiatives.