

Helping Russian Students See the Invisible Hand

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Abstract

The purpose of this paper is to describe a laboratory approach to teaching market economic theory and to highlight its application to Russian students. This approach encourages student involvement, creates an active learning environment, provides classroom generated data for instruction, and has appeal for economics instruction in former planned economies.

Helping Russian Students See the Invisible Hand

A healthy market economy provides consumers with a wide array of goods. Those producers who can provide the goods wanted by consumers for the least cost can prosper. Those who can't, go out of business. The market place gives both producers and consumers the chance to agree on price. Adam Smith, more than 200 years ago, observed the power of the market in what he called the Invisible Hand Principle. This principle refers to the tendency of market prices to motivate people to coordinate their buying and selling activities in a manner which promotes the well being of society.

During the spring of 1996, we were involved with a U.S. Information Agency funded exchange between faculty from the University of Wyoming and academic institutions in Saratov, Russia. The focus of this exchange, in part, was directed toward teaching market economics. A challenge we faced was to provide effective methods which can help Russian students and faculty adapt to a market economy. How can we help Russian (and U.S.) students understand market economics and the Invisible Hand Principle? The purpose of this paper is to briefly describe a laboratory approach to teaching market economic theory and to highlight its application to Russian students.

While the teaching of economic theory is important, if students of economics are not exposed to applications of theory, learning becomes sterile and the understanding of the principles of economics remains at a very abstract level. One approach to reinforce the understanding of economic theory, and to heighten interest in studying course content is to use experimental laboratory data in the classroom. These data are generated by students, who act as economic agents, under controlled processes. Laboratory data also

provide opportunities for meaningful demonstrations of economic concepts and principles. This approach, as applied in economics, is commonly referred to as experimental economics.

Experimental Economics in the Classroom

Experimental economics methods can be used to demonstrate to students the workings of economic principles. This approach is an experiential learning tool, but does not attempt to duplicate the intricacies of specific markets to the extent contained in market simulators (Koontz et al.). Experimental economics is the study of individual choice in the context of an economic institution in a laboratory setting (Smith, 1982). The objective is to set up a laboratory which will create a manageable model of a real-world phenomenon (e.g., a market) where adequate control can be maintained and accurate measurements of relevant variables (e.g., price) guaranteed (Wilde). Using laboratory experiment methods has become increasingly popular in microeconomic analyses (Smith, 1992) and also has been applied in marketing research (e.g., Menkhaus and et al. and Hoffman et al.).

The experimental economics approach can be an effective and efficient method of obtaining data for as yet unobserved economic phenomena, and for demonstrating economic principles and concepts in the classroom. For the latter, many of the demonstration and application data can be “generated” by the students. Thus, field data are not required. Moreover, this approach provides better opportunities for learning than using textbook data or using a strictly theoretical and abstract development of the course materials.

In 1948 Chamberlin reported the use of laboratory experiments for teaching purposes. However, the use of classroom experiments did not become popular among teachers of economics until recently. The growth in the use of economic experiments for teaching purposes followed the research efforts in experimental economics and its growth as a field of research (Fels). The technique holds appeal for demonstrating applications of economic theory, particularly in cases where data may be such that applications are difficult, e.g., because appropriate data are not available. This is not uncommon in Russia. Participating in classroom experiments (training sessions) can enhance students' understanding of economic principles.

The advantages of teaching economic principles using data obtained in a controlled laboratory environment can be substantial. Market structures can be designed to match exactly those required by the theory being demonstrated or tested in the classroom. Availability of data does not constrain the teacher (or researcher) because a laboratory experiment can be replicated. The ability to rerun experiments allows instructors to demonstrate special cases of a general theory, to demonstrate alternative theories against one another, and also to demonstrate the robustness of a theory under different market structures (DeYoung). Moreover, the important *ceteris paribus* condition required for many of the concepts in economics can be maintained.

The experimental approach allows students to verify theory for themselves. This parallels the teaching approach used in the physical and natural sciences. Fundamentally, students learn from participating in the experiments. As economic agents, students test assumptions about human behavior that are built into the economic models. Market

results are generated by the actions and decisions of experiment participants. Experiments also allow the instructor to collect information about the ability of students to apply economic analyses and to gain insight into their thinking process (Walker).

The use of economic experiments in instruction enables students to experience the functioning of markets and to discover economic principles in a laboratory setting (Wells). If an equilibrium price emerges from the actions of student participants, e.g., in a double oral auction experiment, the credibility of other theoretical models is substantially enhanced, even when these models are presented without using experiments (Joseph; Joseph and Saunders).

Finally, the use of classroom experiments involves some costs. These include: start-up costs when a particular experiment is implemented for the first time; generating materials for the experiment; learning the experimental procedures; and lecture time that must be sacrificed in order to conduct experiments in the classroom (Delemeester and Neral). Regarding the latter, we have found that experiments nicely complement classroom lectures and provide depth to students' understanding of concepts covered in lectures.

Market Experiment in Russia

We first used formal experiments in our agricultural economics classes at the University of Wyoming during the fall 1995 semester. The types of experiments which can be used to demonstrate the application of economic theories are broad and encompass a variety of relevant problems faced by economic agents. We demonstrated several major topic areas in economics using this approach in our classes. These included individual

consumer demand, market demand, production and cost relationships, markets, pricing by a monopolist, and behavior in oligopolies. In general our students seemed to like the approach and were receptive to its use to enhance learning economic principles.

With a seemingly successful experience with our own students, we decided to try the experimental economics approach in Russia. During the spring of 1996, classroom demonstrations using student generated data from experiments were part of the focus of a U.S. Information Agency funded exchange between faculty from the University of Wyoming and academic institutions in Saratov, Russia. In the case of former planned economies, instructors and students generally lack first hand experience with a market economy. It is not uncommon to hear comments like - "Teach us the principles of coping in a market economy - not the abstract theory which we know. Help us understand the power of market forces and how enterprises and people respond in a market economy."

One experiment we conducted in Russia was a market experiment. This seemed appropriate for this new and evolving market economy. This experiment powerfully illustrates the workings of the Invisible Hand.

In this experiment there are six consumer (buyers) and six producers (sellers). Each consumer is provided a set of values for which they can redeem two units of a product which they might purchase. Producers, on the other hand, are given costs for each of two units which they might produce and sell. When aggregated, these values (Table 1) yield the market supply and demand schedules.

Table 1. Buyers' Values and Sellers' Costs for the Market Experiment.

Buyers' Values			Sellers' Costs		
<u>Buyer</u>	<u>Unit 1</u>	<u>Unit 2</u>	<u>Seller</u>	<u>Unit 1</u>	<u>Unit 2</u>

B1	1.40	1.40	S1	1.0	1.40
B2	1.50	1.30	S2	1.20	1.50
B3	1.60	1.20	S3	1.10	1.60
B4	1.70	1.10	S4	1.00	1.70
B5	1.80	1.00	S5	0.90	1.80
B6	1.90	0.90	S6	0.80	1.30

Source: Davis and Holt, p. 10.

When a trading period begins, buyers and sellers announce bids and asks which are recorded on the chalkboard. New bids must be higher than the previous, and new asks must be lower than the previous ask. Once a unit is traded, it is no longer available for trading and the consumer/producer refers to the value/cost of the next unit for the remainder of the trading period. Trading continues until bids, asks and acceptances close. The goal of each participant is to maximize the net benefit from selling or buying units. This procedure characterizes a double auction. Monetary incentives are sometimes used, particularly in research, to elicit behavior consistent with economic motives. In this classroom setting, however, we did not use monetary or other rewards.

Even without monetary incentives, this experiment nicely demonstrates whether and how competitive markets reach equilibrium. During the experiment, students observe the market's tendency to converge to a stable equilibrium without any direction from the instructor (central authority). Each buyer (seller) has the incentive to negotiate a low (high) price, thus maximizing the buyer's (seller's) well being. This is the price discovery process. The market experiment enables students to learn that societal benefit is maximized in a competitive equilibrium. The sum of each student's payoffs plus those of

other participants grows to a maximum as the market clears. Again, this is the Invisible Hand at work.

From the data in Table 1 and the resulting market relationships, the competitive equilibrium model predicts that seven units will be traded in each period at prices between 1.30 and 1.40 (ten thousand rubles). While the prices from the Russian experiment indicate a tendency toward the competitive equilibrium (Table 2), they are consistently above that which is predicted. Caution must be exercised in interpreting these results because class time was limited to two periods and neither monetary nor grade incentives were offered to participants. Thus, buyer and sellers had no real incentives to maximize the net benefits from selling and buying units. Nevertheless, these results have interesting implications.

<u>Unit</u>	<u>Trade Prices</u> <u>Period 1</u> (10,000 rubles)	<u>Trade Prices</u> <u>Period 2</u> (10,000 rubles)
1	1.30	1.60
2	1.80	1.55
3	1.90	1.50
4	1.80	1.60
5	1.75	1.35
6	1.65	1.60
7	1.55	1.35
8	1.55	

In general, the behavior during the two trading periods reflected eager buyers and reluctant sellers. Individuals living in a shortage economy, where sellers have short-side

power, may result in eager buyers paying reluctant sellers more than the equilibrium price (Hicks).

Alternative Market Designs

In our experiment, we conducted transactions by means of a double oral auction (Smith, 1962). In this market design, bids and offers are made publicly and all transactions are cleared through a central auctioneer, usually the instructor in a classroom setting. When Smith (1962) first conducted these experiments, he ran multiple rounds, which repeated the same trading environment. This procedure enables participants to use their experience of market outcomes from previous rounds in deciding their action in later rounds. As a result, prices and quantities are strikingly close to the competitive equilibrium values, usually by the second or third round. Double auction experiments have been replicated hundreds of times with many variations in the shapes of demand and supply curves. In general, experiments have found a close correspondence between the experimental results and the predictions of competitive equilibrium theory (Bergstrom and Miller).

Other market designs also might be utilized, e.g., a basic oral negotiation or a Walrasian auction. For the former, students are provided information sheets (similar to those used in the double auction experiment) indicating individual buyers' and sellers' values. Students then negotiate with each other until they agree upon a price. When such a contract is made, the instructor is informed. After a specified time period, the number of

contracts, average contract prices, and profits can be calculated and compared to the predicted competitive equilibriums.

In the Walrasian auction market, after providing participants with the individual buyers' and sellers' values, the instructor announces a price at which contracts may be made. Buyers are asked to raise their hands if they wish to enter into a contract. Potential purchases at this price are then recorded. Sellers are similarly asked if they wish to enter into a contract at this price, and then numbers are recorded. If the supply of units at the announced price is greater (smaller) than the demand for units, the price is lowered (raised). The process is repeated until a price is reached for which the number of units traders are willing to supply is equal to the number of units traders wish to purchase. When the price is realized, each of the buyers and sellers involved complete the information sheets, indicating their earnings.

Evaluation and Concluding Observations

The Russian students exhibited some reluctance to participate in the experiments. Reward incentives, perhaps grade related, and/or allowing participation in small groups could have been helpful. Forced participation may lead to minimal effort during the experiment and tainted results. In cases where full class participation is not possible, care should be taken in selecting classroom experiment participants. Nevertheless, experimental economics is an effective way for instructors to communicate and teach the principles which explain the forces driving a market economy. It encourages student involvement, creates an active learning environment, and provides classroom generated

data for instruction. The approach has particular appeal for instructors in former planned economies.

Students appreciate the confirmation and demonstration of the lecture/textbook presentation whenever possible. The benefit is especially great for those who have not experienced economic principles applied in the real world, such as students in the evolving market economy of Russia. The classroom experiment reinforces theoretical principles that students are just beginning to master. Moreover, discussing the results of the classroom experiments and the underlying model of the experiment can be useful and instructive. A comment we have heard from students is “Difficult concepts are easier to understand if they are demonstrated through experiments.”

In recent years, there have been several experiments developed for use in the classroom. Compilations of these experiments are only now beginning to appear, e.g., Delemeester and Neral. Even though several experiments exist, only a few need be used for each course during the semester, perhaps no more than four or five. These, of course, should be chosen to demonstrate the primary subject matter emphasized in the course. The basic supply-demand model, which was the primary focus here, can be used in a variety of courses - economic theory, marketing, and price analysis.

From our experiences in both the U.S. and Russia, the use of classroom experiments is an effective means of getting students involved and of increasing their understanding of economic concepts and principles. Experiments create an active learning environment in the classroom, and students generally enjoy them. For the instructor, the

classroom experience is more rewarding than trying to teach uninterested students abstractions with which they have little or no experience.

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