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MODERN METHODS OF ECONOMIC RESEARCH: THE USE OF EXPERIMENTS IN ECONOMICS

Roman M. Sheremeta [a,b,*]
[a] ***Weatherhead School of Management, Case Western Reserve University***
11119 Bellflower Road, Cleveland, OH 44106, USA
[b] ***Economic Science Institute, Chapman University***
One University Drive, Orange, CA 92866, USA
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Abstract

Contests are commonly used in the workplace to motivate workers, determine promotion, and assign bonuses. Although contests can be very effective at eliciting high effort, they can also lead to inefficient effort expenditure (overbidding). Researchers have proposed various theories to explain overbidding in contents, including mistakes, systematic biases, the utility of winning, and relative payoff maximization. Through an eight-part experiment, we test and find significant support for the existing theories. Also, we discover some new explanations based on cognitive ability and impulsive behavior. Out of all explanations examined, we find that impulsivity is the most important factor explaining overbidding in contests.

Keywords: research methods, economics, experiments

1. Economics and causal inferences

Economics is the study of how people make choices under conditions of scarcity, and how these choices impact society. A distinguishing feature of economics in comparison with other social sciences is a strong focus of economic research on causal relationships as distinct from correlation. Any student who has taken an introduction to economics or a statistics class heard that "correlation does not imply causation." Just because the two variables are correlated (that is, they fluctuate in tandem), does not itself prove that they are meaningfully related to one another, or that one is causing another.

Let us consider the following example: if you saw the statistics that for each year of education a person in the United States earns approximately $4,000 more per year, you might be tempted to conclude that education leads to higher earnings. However, it could be the case that smarter people choose to go to the university, and

* Corresponding author: Roman Sheremeta, rms246@case.edu and rshereme@gmail.com
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smarter people will be able to find better jobs not necessarily because of their education but simply because they are smarter. So, how can we find out if the value added by education is specifically beneficial for future earnings?[1] To answer this, and other questions, economists rely on various methods of econometric analysis, which allow them to make not only correlational but also causal inferences.

2. Three econometric methods to identify causal relationships

The three most commonly used econometric methods to identify causal relationships are: (1) regression discontinuity, (2) instrumental variables, and (3) difference in differences.

The first method is regression discontinuity. The basic idea behind this method is to estimate causal effects by comparing outcomes on each side of a threshold. Carpenter and Dobkin (2011) use this method to show that minimum legal drinking age has a significant impact on mortality in the US. Specifically, they show that there is a major jump in motor vehicle accidents when moving from 20.5 year old to 21 year old. Given that someone who is 20.5 year old is not that different from someone who is 21 y old, it is very likely that the minimum drinking age increases motor vehicle accidents. Another example is the study by Angrist and Lavy (1999), who use regression discontinuity to examine the impact of class size on scholastic achievements. Specifically, they employ the fact that Israel has a mandatory policy of splitting classes larger than 40 students. A class with 40 students is not that different from a class with 41 students, but according to the policy a class with 41 students has to be split into two smaller classes. Overall, the main idea behind regression discontinuity is to find an appropriate threshold and estimate the impact of a treatment around this threshold.

The second method is instrumental variables. The idea behind this method is somewhat more complicated, but mainly it comes to finding the right instrumental variable – a variable that is correlated with the independent variables and is not correlated with the error term (or a dependent variable) in the explanatory regression. Suppose a researcher wishes to estimate the causal effect of smoking on health (Angrist and Krueger, 2001). Correlation between health and smoking does not imply that smoking causes poor health because other variables may jointly affect both health and smoking, or because health may affect smoking. To estimate the causal effect of smoking on health one can use the tax rate for tobacco products as an instrument for smoking. The tax rate for tobacco products is correlated with health only through its effect on smoking.

The third method is difference in differences. The idea of this method is to study the differential effect of a treatment on a 'treatment group' versus a 'control group' in a natural experiment. Difference in differences calculates the effect of a treatment (i.e., an independent variable) on an outcome (i.e., a dependent variable) by comparing the average change over time in the outcome variable for the treatment group, compared to the average change over time for the control group. A famous example of using

[1] The research on this subject finds that education indeed makes a causal impact on individual earnings (Card, 1999).

difference in differences is the study by Card and Krueger (1994) about the impact of minimum wages on employment. Specifically, Card and Krueger compare employment in the fast food sector in New Jersey and in Pennsylvania, before and after New Jersey's minimum wage rose from $4.25 to $5.05. Observing a change in employment in New Jersey after the treatment, would not be as informative because there could be omitted variables, such as weather and macroeconomic conditions of the region, causing this change. By including Pennsylvania (a neighboring state) as a control in a difference-in-differences model, one can eliminate any bias caused by omitted variables common to New Jersey and Pennsylvania. Assuming that New Jersey and Pennsylvania have similar trends over time, Pennsylvania's change in employment can be interpreted as the change New Jersey would have experienced, had they not increased the minimum wage.

3. The use of experiments in economics

The three methods that we have discussed in Section 2 are commonly used to identify causal relationship in economics. However, each of these methods have their limitations in terms of modeling and computational constrains (Varian, 2016). But the main challenge is in finding the right data set that would allow economists to answer the questions that they have. As a result, many economists have started to use controlled laboratory and field experiments (Smith, 1982; Harrison and List, 2004).

3.1. Why use experiments in economics?

Vernon Smith (1994) identifies seven reasons as to why economists conduct experiments:

1) To test economic theory. An untested theory is simply a hypothesis. Before considering any policy implications of an economic theory one has to make sure that such theory works in practice (Milgrom, 2000).

2) To uncover behavioral regularities that can lead to better theories. Models of loss aversion (Tversky and Kahneman, 1974), learning models (Camerer and Ho, 1999), models of social preferences (Fehr and Schmidt, 1999), and hyperbolic discounting models (Laibson, 1997) were developed as a response to experimental findings.

3) To guide the theory. Sometimes economic theory can provide ambiguous predictions. In such cases, laboratory experiments can help refine the set of possible outcomes, eliminating inferior predictions (Van Huyck et al., 1990).

4) To complement empirical studies. It is often hard to conduct an empirical study because there are many unobserved factors. For example, in contests we only observe performance which is a function of effort, ability, and random noise. Experiments can be used to separate these factors (Dechenaux et al., 2015; Rubin and Sheremeta, 2015).

5) To compare institutions. Sometimes it is hard to solve for an equilibrium if the environment is too complicated. In such a case experiments can help (Cason et al., 2010).

6) To evaluate policy proposals. Many policies regarding schooling curricula (Banerjee et al., 2017), microfinancing (Banerjee et al., 2015), and

emissions trading (Cason and Plott, 1996) have been evaluated using both laboratory and field experiments.

7) To design markets. Experiments have been used extensively to design matching markets for medical doctors (Roth, 2002), British spectrum auctions (Binmore and Klemperer, 2002), markets for electric power (Rassenti and Smith, 1998), and markets for water (Dinar et al., 1998).

3.2. Key features of economic experiments

There are four key features of economic experiments (Hertwig and Ortmann, 2001):

1) Rules are known to the subjects. When designing an economic experiment it is important to reduce the ambiguity of the environment, thus providing more control and the possibility of replicating the experiment. Indeed, laboratory experiments in economics are highly replicable (Camerer et al., 2016).

2) Repeated trials. Subjects need to adjust to the environment, which can take some time. One can also extract important economic lesson from observing how subjects learn and how experience changes the behavior (Smith, 1962).

3) Financial incentives. Most economic theory is based on the assumption that agents maximize the utility. To test this hypothesis financial incentives are essential (Smith, 1982).

4) No deception. The deception may jeopardize future research of the laboratory by creating a negative externality. When subjects make the decisions, it is important to make sure that they are motivated by induced monetary rewards and not by physiological factor of deception.

3.3. How to conduct economic experiments?

There are various ways in which economists conduct economic experiments, but the essential elements are the same (Croson, 2002):

1) Research objective. A researchers has to decide upon the objective for the experiment – to test the theory, to design a market, to evaluate the policy, etc.

2) Designing of an experiment. Keeping in mind the objective of the experiment, the researcher designs the experiment – experimental treatments, written instructions, software (Fischbacher, 2007), etc.

3) Choosing the subject pool. The important questions that need to be addressed are – what pool of subjects to use (e.g., students, employees, professionals), how many people to employ for the experiment (List et al., 2011), and how to assign them to experimental sessions (Fréchette, 2012).

4) Conducting experiments. When the experiment is designed, the researcher uses commonly employed procedures to recruit subjects (Greiner, 2015). Upon arrival, subjects are assigned to treatments. The experimenter distributes the instructions to all subjects. After reading the instructions, subjects make decisions.

5) Payments. Upon completing the experiment, subjects are privately compensated based on their earnings in the experiment. Financial incentives are the key feature of economic experiments (Hertwig and Ortmann, 2001).

4. Conclusions

To study causal relationships, economists commonly employ three econometric methods: (1) regression discontinuity, (2) instrumental variables, and (3) difference in differences. However, given the limitations of these methods and the lack of data, many economists have started to use controlled laboratory and field experiments.

Economic experiments are used to (1) test economic theory, (2) uncover behavioral regularities, (3) guide the theory, (4) complement empirical studies, (5) compare institutions, (6) evaluate policy proposals, and (7) design markets. There key features of economic experiments are (1) transparency of rules, (2) repeated trials, (3) financial incentives, and (4) no deception.

When conducting an economic experiment, researchers should (1) set a clear research objective, (2) design the experiment, (3) choose the subject pool, (4) conduce the experiment, and (5) incentivize subjects financially.

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ФІНАНСОВА БЕЗПЕКА ПІДПРИЄМСТВА: СУТНІСТЬ ТА ОСОБЛИВОСТІ ЗАБЕЗПЕЧЕННЯ

У. Б. Бережницька, В. А. Лагдан

Івано-Франківський національний технічний університет нафти і газу

e-mail: bi_if@ukr.net

Забезпечення економічної безпеки суб'єктів підприємницької діяльності є чи не найважливішим завданням підприємств в сучасних умовах господарювання, а основної її складової – фінансової безпеки – першочергово. Належний рівень фінансової безпеки підприємства свідчить про його фінансову стійкість, платоспроможність, ліквідність активів, оптимальну структуру капіталу, прибутковість та рентабельність діяльності.

Актуальність даної проблематики підсилюється в умовах розвитку кризових явищ в економіці, що передбачає зростання рівня загроз та ризиків зовнішнього середовища. В даному контексті цілком виправданими і логічними є узагальнення проф. О. Амосова щодо необхідності вивчення значно ширшого кола питань при дослідженні фінансової безпеки підприємства, оскільки її слід розглядати «…як можливість забезпечення його стійкості в різноманітних, в тому числі і в несприятливих умовах, які складаються у зовнішньому середовищі…» [1].

Теоретичну базу фінансової безпеки підприємства досліджували багато вчених, зокрема: О.Амосов [1], В.Ареф'єв [2], О.Барановський [3], М.Бердар [4], О.Біломістний [6], І.Бланк [16], А.Вергун [7], К.Горячева [8], Є.Картузов [9], Д.Коваленко [10], Л.Крючко [11], Н.Михаліцька [12], Я.Мулик [13], В.Мунтіян [14], Л.Некрасенко [15]. Проте, незважаючи на численні праці, присвячені даній проблематиці, досі не існує єдиного, загальноприйнятого визначення фінансової безпеки підприємства, а кожен з авторів і далі пропонує власне, достатньо дискусійне та часто не узгоджене з іншими, трактування. Це суттєво перешкоджає введенню даної економічної категорії в науково-