

Cambridge University Press

978-0-521-28507-0 - Social Experimentation and Economic Policy

Robert Ferber and Werner Z. Hirsch

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## Introduction

Economists have long faced the problem of how to measure the effect of changes in policy variables on the behavior of economic units and particularly of changes that have been merely contemplated. How low-income households will use cash subsidies for housing, for example, and what effect these subsidies will have on the quality and price of housing are key questions that would help to determine whether such subsidies are desirable.

A variety of techniques have been used for estimating such effects in the past, including econometric models, surveys of past and present behavior, simulation models of artificial populations, surveys with questions about behavior under hypothetical conditions, and demonstration projects. Each of the methods yields estimates of these effects.

Because the true response remains unobservable until the policy under consideration is actually put into effect, the accuracy of these estimates remains an unknown quantity, especially on a micro basis. That it might be possible to measure these effects directly by the use of controlled experiments, as is so frequently done in such fields as biology and agriculture, seemed too farfetched to merit serious consideration.

Social experimentation, however, does just that. It seeks to measure the effects of changes in policy variables by applying these changes to human populations under conditions of controlled exper-

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imentation similar to that used in the physical and biological sciences. Whereas controlled experiments in the physical and biological sciences are usually designed to test the effects of particular substances, social experiments are designed to measure the effects of new or potential social programs. By testing different policies on human populations with experimental controls, or by testing variations of the same policy (such as different amounts of housing subsidies) with experimental controls, a great deal of information is obtainable on the effects of these programs that may then serve as a basis for informed policy formation.<sup>1</sup>

What differentiates the economics experiments from those in the physical and biological sciences is the use of the real world as a laboratory; this introduces a major new dimension to the methodology of experimentation because humans, unlike other animate or inanimate objects, are very likely to react to the conditions of the experiment and thereby confound the results. For this reason, social experimentation, especially in economics, faces a very different set of problems from other types of experimentation, problems that may be so severe as to vitiate many of the advantages of this approach, as is discussed at length in the later chapters.

Expectations about the usefulness of social experimentation have been so great that in the past 10 years in the United States hundreds of millions of dollars have been spent or committed on them (they have been of interest in other countries but have been used there to a lesser extent).<sup>2</sup> Although these are huge sums in terms of economic or any other type of social research, the justification is that the results are to serve as the basis for national programs that will ultimately involve hundreds of billions of dollars, not to mention their political and social risks. Hence, even these seemingly large research outlays are small if they help policy makers to avoid errors in the later implementation of the national programs.

Still, the experience with these social experiments has exposed many problems relating to design, implementation, and interpretation of the results. It has led to many questions about the validity and the value of these experiments, and the controversy is likely to continue for many years to come. This is particularly so because only in the

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last few years have the first few social experiments been completed and the data become available for study and reflection. For this reason also, this would seem to be a propitious time to evaluate this emerging analytical tool of economic analysis and to consider its implications for economic research and for public policy. The considerable material that is just now beginning to become available makes it possible to conduct such an evaluation, to place social experimentation in proper perspective and provide a fairly good idea of what it can do for economic policy making.

For the purposes of this evaluation, this book is organized into three major parts. The first part, Chapters 1–3, provides a general introduction to what social experimentation is all about and how it operates. Chapter 2 outlines what is meant by a social experiment, discusses the rationale for having social experiments, and considers how they differ from other tools of economic analysis and to what extent these other tools may serve as alternatives to social experiments.

An overview of the problems encountered in the planning and conduct of social experiments is provided in Chapter 3. Also considered in that chapter are ethical and moral questions that arise in the experimental manipulations of human populations, as well as the problems of planning and administering such experiments.

The second and largest part of the book, Chapters 4–9, is devoted to a review of the principal social experiments that have been conducted or are currently underway in economics, mainly in the United States. This includes the four sets of income maintenance experiments, the experiments on supported work, the Health Insurance Study, the experiments with electricity pricing, and the cash housing allowance experiments. For each of these experiments, information is provided on the rationale for the experiment; its basic design, from both an experimental and a survey point of view; the manner in which it was implemented; and the nature of the results obtained so far. In addition, the discussion of each experiment closes with an evaluation that considers how well it seems to have been carried out and how well it seems to have met the original objectives of providing a firm basis for the formulation of economic policy.

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The final part of the book, consisting of a single chapter, returns to the questions raised at the outset of this section and considers the value of social experimentation as an economic tool in the light of the experiences and the results obtained so far through its use. In effect, based on these experiences, we ask what has been learned about social experimentation both as a research approach and as a tool for economic policy. A set of recommendations on the conditions under which social experimentation might or might not be used and on ways in which further evaluations might be made of this tool close out this book.

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### Nature of social experimentation

#### What are social experiments?

Social scientists can choose from a large menu of research alternatives, one of which is the social experiment. It is akin to the controlled experiments used for many years by physical and natural scientists as well as medical researchers and agronomists. They have in common reliance on a careful statistical design that seeks to isolate the effect of a single factor or group of factors – often referred to as treatment variables – on specified outcomes. Thus, the statistical design makes possible estimation of this effect distinct from other factors.

Chemists' test-tube experiments are perhaps the best-known controlled experiments. For a long time, also, agronomists have carried out experiments that apply different amounts of water or fertilizer to specified crops under controlled circumstances. Medical researchers, too, particularly those in the field of public health, have often engaged in controlled experimentation with humans as their subjects. Whereas these experiments on humans have focused on health matters, social scientists more recently have undertaken controlled experiments on humans to learn about their behavior. Such social experiments have been defined by R. F. Boruch as requiring "that experimental units are assigned randomly to one or more treatment conditions, that one or more outcomes are measured, and that relative

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differences in outcomes form a basis for making evaluative judgments about the effectiveness of the treatments.”<sup>1</sup>

Among the first to carry out social experiments were psychologists, and indeed the literature of psychology is replete with reports of such experiments. One of the most notable is that done with factory workers in 1928 at Hawthorne, New Jersey. This famous experiment has been of particular interest because of its substantive bearing on social experimentation. It brought out that the mere fact that people know they are being experimented upon can have an effect in itself independent of the nature of the treatment.<sup>2</sup> This so-called Hawthorne effect has important ramifications for all sorts of experiments, including social experiments.

Experiments with human subjects are legion in various other social sciences and related fields – for example, experiments with teaching practices in education and experiments on the effectiveness of different advertising and communications media carried out often on broad (and sometimes undefined) segments of the population. The latter type of experiment, especially those carried out in the last decade in other countries to promote the adoption of birth control methods, comes very close to the social experiments covered in this paper.

The social experiments in economics may be said to have two broad objectives: to contribute to knowledge about a question of interest to economic theory; and to furnish a basis for evaluation of the desirability of a proposed social program. Although the funding agencies are obviously more concerned with the second objective, considerations relating to the first play a major role in the design of the experiments and the resulting analysis. In either event, what distinguishes the social experiments in economics from others is the focus on aggregate economic and social effects of changes in certain policy variables and the long time needed for measurement. The time element is of key importance in view of the fact that people do not adjust instantaneously to changes in the economic environment. Such adjustments require considerable time, not only for this reason but also because adjustment is not likely to be the same when the change is temporary as when it is permanent. Thus, a family's consumption responses are not likely to be the same if it knows that its income will

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be supported at a minimum level for one year as if it knows that the income support will last for ten years.

The type of social experiment being carried out in economics may be defined as a publicly financed study that incorporates a rigorous statistical design and whose experimental aspects are applied over a period of time to one or more segments of a human population, with the aim of evaluating the aggregate economic and social effects of the experimental treatments.

Certain elements of this definition should be stressed. One is the rigorous design feature, meaning that certain treatments are to be applied to one or more human populations, making full use of the principles of statistical experimentation. In other words, allowance has to be made for control groups, for randomization in the selection of subjects, for measurement of sampling errors, for provision for adequate sample sizes to detect effects if they exist, for detection and correction of bias due to the experiments, for control of the process through time, and for collection of the necessary data.

It seems needless to say that the populations covered in these experiments are those that would be directly affected if the particular treatments were adopted as national policy. Still, for example, one of the major criticisms of the New Jersey Negative Income Tax Experiment was that its eligibility requirements were so narrow as to exclude the majority of low-income families who would be beneficiaries of such a negative income tax plan.<sup>3</sup> The remedy in this case was to launch other experiments covering other types of families, a remedy that may be unavoidable in many of these instances.

One other key aspect of the definition of these experiments is the *search for information* to serve as a basis not only for economic policy but for social policy as well. It is here that economics has to interact with other social sciences, for there is no question that broad policy measures such as a guaranteed annual income or housing allowances affect not only behavior in the labor markets or with regard to housing but many other aspects of life as well. Thus, if a low-income family uses housing allowances to obtain living quarters with adequate heat, sickness may be reduced and the children might then attend school on a more regular basis. In other words, a social ex-

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periment has to be designed to measure not only direct economic effects of the particular treatment but also numerous indirect effects, which could conceivably have ramifications as important as the direct effects themselves. Thus, ideally, the economist should use a general model that allows for the direct and indirect relationships among all relevant variables rather than a partial model that focuses on only the direct response effects on the key variables.

It should be stressed that the focus of this volume is on social experiments having implications for broad changes in economic policy. In other words, we exclude those types of experiments, though they also are social in nature, that do not focus on providing direct economic benefits. An example is the 1972–3 experiment in Kansas City, Missouri, to ascertain the effect on crime, and on the perception of crime, of the use of marked and unmarked police patrol cars.<sup>4</sup>

Expenditure of public money is the only means of carrying out social experiments in view of the very substantial amounts that are involved. The total cost of all the negative income tax experiments, for example, was reported in 1975 to be already approaching \$70 million<sup>5</sup> and has since exceeded \$200 million.

Large public funds are needed because the cost per experimental unit tends to be so high. In the Denver–Seattle Income Maintenance Experiment, for example, the average cost per experimental family was about \$3,000 per year. Even the cost of a control family was about \$1,000 per year.<sup>6</sup> One of the experiments currently underway, the Health Insurance Study being carried out in six areas of the country with field work varying from three to five years, is estimated to cost approximately \$63 million by the time it is over; and the housing allowance experiments were estimated to amount to about \$200 million over their expected duration.<sup>7</sup>

In view of these amounts, it is clear that only government, probably only the federal government, can afford research of this magnitude. This serves to place policy makers in a unique position with regard to social experimentation, because they are the ones who can choose what policies are to be subjected to this type of experiment and in what manner. Given the fact that even with these huge outlays



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social experiments are of limited size and tend because of various design features (noted in Chapter 3) to lend support to the null hypothesis of lack of appreciable effects, this places a powerful weapon in the hands of a politically astute policy maker.

**Why social experiments?**

Given the long time and substantial funds involved and the many unresolved technical issues, one may well ask why social experiments of this type should be undertaken at all. From a theoretical point of view, the answer is clear. If a fundamental policy change is under consideration, and if there is no clear basis for estimating a priori the effect of this policy on economic behavior, then the only way to obtain this information is to put the policy into practice on a limited scale and see what happens. This is especially so if there is reason to believe the policy change could have strong negative as well as positive effects.

The question that led to the negative income tax experiments, for example, is how labor force participation would be influenced by a guaranteed minimum income. The fear was that such an income floor might reduce substantially the work incentives and behavior of the participants. As there was no way to answer this question without making some highly controversial and untested assumptions, it was felt that an experiment to obtain this information was crucial for deciding whether such a policy should be implemented.

Aside from the obvious intent to measure the economic effects of alternative policies, two other principal reasons might be cited in favor of social experimentation. One of these, alluded to earlier, is that with proper design a broad range of social effects can be monitored that could be obtained in no other way and that interrelate with economic variables. These include, for example, in relation to income maintenance experiments, education (both adult and child), labor force participation of secondary members, health, life style, and outlook on life.

Second, a social experiment provides, as a by-product, an invaluable opportunity to obtain information on the administrative aspects of the policies under consideration. In particular, it helps to highlight

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types of situations involving the treatment variables where special problems of an administrative nature may arise. Thus, the New Jersey Experiment brought out not only that administrative costs had been underestimated but, in addition, that there was need for auditing of income reports to check for underreporting, especially among the families most eligible to receive benefits.<sup>8</sup>

**Alternatives to social experiments**

Social experiments have certain advantages, as mentioned in the preceding section, but they are not devoid of shortcomings, as will be shown in the following chapters. But what are the alternatives?

There are a number of alternatives, the principal ones being use of theory, econometric analysis, and a demonstration project. Each of these is discussed in this section. Several other alternatives are also discussed, namely, simulation models, analysis of secondary data, or a specially designed survey.

*Use of economic theory*

In some instances, a theoretical model of response behavior will provide a basis for deducing the effect of a new policy. This can be illustrated with reference to the basic question in the negative income tax experiments of the effect on labor supply of a guaranteed income. A basis for this analysis was the application of a static theory of choice between work and leisure as presented by Albert Rees and as reproduced in Figure 2.1.<sup>9</sup> This figure depicts a hypothetical worker at an equilibrium point,  $X$ , on the indifference curve  $I_0$ . This equilibrium point is the tangent of the indifference curve,  $I_0$ , and the budget line  $OA$ , which represents the various combinations of income and leisure available to this worker. It is downward sloping because hours of work decline as one moves from left to right, the line showing that the worker has a choice between working 80 hours a week at \$4 an hour, with no leisure (other than time for necessities) but earning \$320 a week (point  $A$ ), and not working at all, thereby being free completely but receiving no income. At the equilibrium point,  $X$ , the worker has reached the maximum combination of work and leisure,