THE POTENTIAL FOR ECONOMICS RESEARCH

By Clark Edwards*

Realizing the potential for economics research depends on the successful completion of several interdependent tasks:

- A problem is identified,
- Data related to the problem are collected,
- Description transforms data into useful information,
- Theory is brought to bear so that the problem can be understood and analyzed,
- Explanation involves interaction between data and theory in order to make clear that which needs to be understood,
- Prescription points to actions which can alter the course of events and deal with the problem.

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Researchers in economics seek to describe and explain certain social problems and to prescribe remedies based on available data and theory. For the potential of economics research to be realized, tasks must be performed relating to six areas: problems, data, description, theory, explanation, and prescription. Together, these six represent a framework for understanding what researchers do, but do not make clear how they do it. Such clarification would be the subject of a paper on scientific method. My purpose here is to illuminate the six elements.

In the discussion, each area is treated independently as an expository device. In use, the six tasks are interdependent. A researcher may specialize and become an expert practitioner of any one of the six tasks without necessarily acquiring facility in the other five. However, the potential for economics research is realized only when the six tasks are performed in balance, either by the researcher or by a team.

PROBLEM

Economics research does not make sense to me unless it seeks solutions to social problems. Some readers may find this remark obvious and trivial. Others of you may object because you see reasons for engaging in research other than solving problems. You may argue that only applied research involves problem solving, and that basic research can have other purposes, such as satisfaction of curiosity or knowledge for its own sake. Or, you might contend that research is not always necessary and could be an encumbrance—that many economic problems are resolved adequately and appropriately without research. If so, our differences of opinion about the potential for economics research may stem more from the meanings we attach to words such as "problems," "useful," and "research" than from an underlying conflict of opinion.

A far more disconcerting objection—that research often is not useful to problem solvers—has been raised in the economics literature by calling attention to the extensive body of published research that has not proven useful for solving relevant problems (*12*).[1] However, unused research may simply represent failure to help solve a problem rather than evidence of an alternative purpose.

It is not necessary to become an economist or an economics researcher before developing interest in economic problems. All concerned citizens are interested in the ways society and individuals cope. Let us look at two examples of people dealing with economic problems centuries before economics was established as a discipline.

Xenophon wrote one of the first economic tracts over 2,000 years ago (*22*). The problem he addressed, household management, is comparable today to that of maximizing the welfare of members of an agriculturally-oriented commune. At about the same time, Aristotle brought several economic issues into focus (*1*). He maintained that a cultivated, leisure class would be more likely to achieve the good life in a relatively small city-state than in an extensive empire. He supported private property in preference to communal property. He condoned the slave economy on the dubious grounds of natural inequalities among men. Aristotle defended the farmer who fed the leisure class while attacking the money lender who exploited it. And he addressed the problem of natural or fair market prices.

Since economics came into its own as a discipline some 200 years ago, considerable attention has been given to defining its scope; there has been much argument about which social problems belong to economics and which to other sciences. Within economics, problems have been subclassified further among the various subdisciplines of the science as illustrated below.

Macroeconomists study inflation, unemployment, growth, and international balance of payments. Microeconomists examine prices and quantities for various commodities and resources; labor economists, employment, wages, and working conditions; land economists, availability and use

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[1] Italicized numbers in parentheses refer to items in References at the end of this article.

of natural resources. Management economists concentrate on profit maximization strategies for firms, while consumer economists focus on allocation of limited income among alternative consumer goods and services. Regional economists emphasize location of economic activity and regional variations in economic growth.

In recognizing that something needs to be done, whether the problem is in economics or in another area, one's view reflects the needs of an individual or a group; a situation is seen not to be what it ought to be. The divergence of "what is" from "what ought to be" may be seen in terms of factual evidence, logical consistency, values of what is best, or emotional needs. It is frequently said that if one can state a problem clearly, the solution will not be far away. To the extent that this is so, members of Congress can prescribe useful legislation to cope with social problems and members of cabinets can implement meaningful programs, even though neither group has carefully described the situation or explained it. Similarly, managers can make meaningful decisions and issue orders without first developing a research project. And interested citizens can state problems and point toward their resolution in, for example, letters to the editor.

Sighting the problem is the first step toward a solution, and a researcher's subjective feeling for the importance of the problem is no doubt a part of that step. A prescription of what needs to be done is the end for the sake of which economics research is initiated. Thus, the economics researcher must spend much time thinking about problems such as those cited above. And the researcher who is interested in a problem is likely to do a better job of solving it.

One who grapples with economics problems by simply sighting them and jumping to the rescue may be successful. But if other steps of the research process are left out, there is a strong likelihood of failure. Immediate solutions may create additional problems. The full research process examines problems in the light of data and theory. The process can lead to improved descriptions of the problems and to greater understanding. It increases the likelihood that workable prescriptions will be found.

DATA

One can sense an economic problem without using data to describe it. Before present-day economic data systems existed, economists did not have many quantitative records showing the state of the economy. Instead, there were mostly subjective, qualitative impressions of businessmen, consumers, and financial reporters. These impressions aided decisionmaking by indicating that business was good or bad, or that prices were rising or falling. Some economists, both in earlier centuries and now, choose to spurn available data. For example, Adam Smith explained the wealth of nations and prescribed for its increase without using the population and income data available to him to describe that wealth. He said, "I have no great faith in political arithmetic" (*18*, p. 501).

Even so, gathering data is an important step in researching social problems. During the second half of the 17th century, Sir William Petty (*13*) was interested in to what extent revenues might be raised through taxation, and Gregory King (*10*) was concerned with England's capacity to wage war. These political arithmeticians developed series on income and on national expenses as a step toward solving problems. The economic tables prepared by the 18th century Physiocrats in France were early efforts at a national system of accounts. Early in this century, two groups developed a number of important economic data series which were not tied to economic theory. One was the Harvard University Committee on Economic Research; the other, the National Bureau of Economic Research.

After Keynes introduced what has since been called macroeconomics, theoretical considerations influenced much of the data collection (*9*). Today, in the United States, the core of the data base used in national economic analysis includes the national income and product accounts, interindustry flows of input and output, flows of funds, and the wealth accounts.

Theory, discussed later, affects the kinds of data collected and the way they are used. But data without theory can help to illuminate a problem and increase the likelihood of finding a workable prescription. Economics has never been a purely speculative science, regardless of what has been said on the subject from time to time. An important proportion of the energies of the discipline has always been focused on gathering facts and on tracing the history of economic activity.

Awareness of a problem stimulates the data collecting activity, but it is not a one-way street. Data collection can also affect our perception of a problem. For example, suppose we believe that unemployment is greater than it ought to be. Before we can collect data, there are many decisions to make and many intermediate problems to solve. Simply defining what is meant by the terms labor force, employment, and unemployment—a necessary step prior to data collection—can influence the way the problem is stated and understood, even before any data are collected. The term "full employment" does not mean the same thing to persons familiar with current unemployment statistics based on a household survey, as it does to economists who define the term using classical concepts drawn from competitive equilibrium theory. And a definition of unemployment based on household data is not the same as one based on establishment data. The light cast by the data on subsets of the problem—such as variations in the unemployment rate by industry, occupation, race, gender, and region—provides further feedback which is likely to modify the statement of the overall social problem of unemployment.

Even though resolution of social problems is the ulti-

mate end for the sake of which the data are collected, what must be done first to provide the data is interesting, important, and difficult enough to become intermediate ends which warrant specialization, providing full-time employment for census takers, statisticians, and others. Collecting and distributing economic data can be an absorbing career. Examination of collected data can surface problems that might otherwise have gone undetected; sometimes the data point directly to a solution. However, data collection can become specialized and institutionalized and, consequently, unresponsive to changing problems and changing data needs.

DESCRIPTION

In the descriptive process, people arrange the available data to tell a story and to illuminate a problem. Data have a way of mindlessly piling on top of one another. The person who understands the ultimate social problem must sift through, classify, aggregate, and rearrange the data and reduce large volumes of miscellaneous facts to manageable information. This interaction between unorganized data and social problems results in meaningful descriptions. It carries us beyond vaguely felt needs toward precise conceptualizations of a problem and provides for measures of its nature and extent.

The descriptive process may require modification of concepts that influence our statement of the problem or our collection of the data. It may lead, to continue with the example used earlier, to a redefinition of the concept of "unemployment." It relates our image of the world to our measures of reality, bringing increased accuracy in both the image and the data (*3*).

Many problems can be examined using the ingredients of research discussed so far: problem statements, data, and description. Other ingredients of the complete research process—theory, explanation, and prescription—can be, or at least can appear to be, absent in the solution of certain kinds of problems. They may appear to be absent, for example, when a decisionmaker informally interprets and analyzes data. And they are, for all practical purposes, absent when the result would be the same were the theory, explanation, or prescription different.

As an example, consider that over 3,000 years ago the Babylonians collected data, described change in the heavens, accurately predicted the apparent motion of the stars and planets, and knew when to expect an eclipse (*19*). They described association of the moon with the tides. Their "explanations" of celestial motion were mythical. These were not relied on in descriptions and forecasts; thus, the explanatory myths could have been changed without altering the forecasts. Actions based on such explanations would not be likely to change the actual course of events.

Early scientific theories, such as that of Ptolemy, also explained celestial motion. These theories were a significant change from the Babylonian myths because they provided a nonmythical, scientific explanation of appearances (*21*). In such theories, the sun was assumed to orbit around the earth. Today we consider these early theories "incorrect." However, they did not interfere with the accuracy of the early celestial descriptions and forecasts.

Now we have the "correct" theory, which explains celestial motion, and, as a bonus, also explains the tides. Such a theoretical advance will be shown later to be an important step in the total research process. However, the advance was not necessary for the solution of certain types of problems. In dealing with many problems today, we use the same descriptive methods that the Babylonians used. As an example, consider shipping problems associated with the rise and fall of the tides. The tide tables appearing in our daily newspapers are still based on empirical, descriptive methods, sans theory. These forecasts are relied upon by ships' captains, fishermen, and others in planning arrival and departure schedules, for instance.

In economics, descriptions and forecasts of population, income, and employment, using Babylonian methods, are helpful to persons who deal with national growth, inflation, and unemployment. This helps to explain why policymakers have accomplished much of value by basing their actions on descriptions and descriptive forecasts, without access to theoretical explanations and analyses (or sometimes by making use of theories which economists consider "incorrect").

The important descriptive step in the research process can become a full-time career. It is true that one person can (and often does) sense and state problems, collect data, and describe the situation; however, these can be three separate occupations. A politician specializes and ensures elections by astutely identifying and stating problems affecting constituents. The politician may depend upon another specialist to gather data. Statistical agencies provide full-time employment to statisticians. A third specialty can evolve in which one descriptively links appropriate data to relevant problems. A person who finds a full-time career in descriptive work may be a consultant who translates problem statements into demands for data, transforms data into telling descriptions, and aids interaction resulting in reconceptualization of the problem and refinements of the data.

Stating problems, collecting data, and developing meaningful descriptions are useful in dealing with economic problems. But these three steps do not constitute what we call economic science; they do not comprise the full process of economic research. Going back to the celestial example, the Babylonian descriptive methods solve certain kinds of problems, such as when to launch an ocean-going vessel, but not others, such as how to probe Mars. The descriptive process helps us anticipate a result, but it does not provide an explanation which allows us to intervene and influence the result. That is the role of theory.

THEORY

The Babylonians apparently made no effort to understand celestial motion beyond a belief that the gods moved things as they saw fit. The idea of finding natural explanations of events is attributed to the Greeks (*21*) and led to the Ptolemaic geocentric theory. Babylonian, Ptolemaic, and modern ideas about celestial motion are equivalent for descriptive purposes, but not until the Copernican heliocentric theory was developed could we intervene, say, with a space probe to Mars.

Theory allows us to make natural explanations of economic phenomena. When economic theories have been "incorrect," they have been of little more use than the myths they replaced. But to the extent that they have been "correct," they have provided understanding of why social problems developed, and they have pointed to remedies.

If economists expect to understand and influence the course of events, they first need theory. Adam Smith wove many threads of economic thought into a theoretical pattern (*16*) and, as a result, he became known as the father of economics. Once the logical relationships among economic ideas were established in theory, it was possible to imagine future events which were more than extrapolations of descriptive history. Alternative futures could be examined and a choice could be made. Smith prescribed policies which would alter the course of events and lead toward a desired outcome because, for example, he could predict alternative levels of national wealth that would result if more people were to enter the labor force, or to specialize through division of labor. Today, macroeconomic theory explains unemployment in a way which can guide a government in monetary and fiscal policies. Microeconomic theory explains profit-maximizing principles which can guide a manager in allocation of scarce resources.

Economic theory represents for a social science researcher what a good novel can represent for the alert reader. Economic theory and the novel abstract from reality to set up ideal types, give them rules for behavior, and play them out in imagination. Each helps us understand social problems. Each has intrinsic value providing interest and, perhaps, entertainment for the creator and the user. And each suggests alternative modes of behavior which might be used to change society.

Theories can be simple, such as the ones based on principles of comparison and classification which underpinned farm management analyses during the early decades of this century. A body of economic theory can also be complex, requiring years of study before it is mastered, such as the neoclassical microeconomic theory now used in farm management analysis.

Economic theory as abstraction—a system of logical rather than factual relations—forms a model. We want theoretical models to be as close to reality as possible, and we like to think that when they are not, we revise them. Of course, it does not always work that way.

For one thing, we do not always know what "reality" is. For another, theories are blatantly at odds with reality when they incorporate assumptions that preference patterns are fixed, markets are perfectly competitive, government spending is autonomous, and resources are mobile among regions. But we do not always modify such theories or scrap them. We tend to keep using them as long as they appear to satisfy our needs for explanation better than available alternative theories.

Pure theory—that is, theory applied to a problem without recourse to data—has proven useful (*7*). From pure theory and a few reasonable assumptions about reality, we can deduce, for example, that beef consumption will increase as a consequence of an increase in pork prices, other things being equal. From theory without data, we can compare the merits of a food stamp program with those of income supplements as alternative means of reaching social welfare objectives.

Pure theory can be used to explain how a system works, predict directions of change, and point to policy instruments that will induce society to move in a desired direction. It will not, however, estimate magnitudes of change or indicate the qualitative importance of alternative policies. It can suggest that a given relationship is theoretically valid, but pure theory cannot tell us whether it is empirically important.

Economic theory is a sufficiently complex and interesting subset of economics to attract persons to devote their careers to mastering existing theory, modifying it, and disseminating it. It can be treated as an end in itself and provide a useful and interesting area of specialization. Economists who make a lifetime career out of economic theory may become teachers and authors of textbooks. At the same time, it is just one ingredient in the total research process. "Theory," said Storey, "must be judged on the basis of its usefulness in solving relevant problems" (*18*).

EXPLANATION

Through the interaction between data describing what is, and theory relating one fact to another, our explanation of a social problem arises. As we have seen, one can sense a problem of unemployment, and data can illuminate the intensity and scope of the problem and serve as a basis for forecasting. Theory can illuminate the problem in a different way by suggesting possible causes of unemployment, such as insufficient aggregate demand, an energy shortage, or regional bottlenecks in the flow of materials.

Data and theory also illuminate one another. Their interplay helps to make clear that which is to be understood; reasons are found; validations are made. Theoretically possible causes can be evaluated with respect to the current situation. This may lead to an empirically valid explanation and may point to appropriate intervention.

When the hypotheses or deductions from theory are not accepted, reformulations of the theory may be

needed. Theory is also an important source of ideas for suggesting needed data revisions (2). In most research, we tend to accept both the theory and the data. The explanatory step merges them so that empirically useful policy prescriptions can be found.

Merging data and theory is possibly one of the more fascinating areas of specialization in economics research. While simple methods frequently serve for satisfactory classification and explanation, extremely complex methods can also be used. Intriguing problems arise when acquiring and operating computer hardware, devising and operating software packages, and developing models and data sets. Analysts find sufficient challenge to make full-time careers out of improving and refining methods of simulation, linear programming, regression, and other empirical research techniques.

This explanatory area of specialization attracts econometricians, model builders, computer specialists, and others who are interested in solving numerous interesting puzzles. Concern is sometimes expressed that too much time will be spent at this task at the expense of other parts of the research process, leading to rigorous but irrelevant research. However, it is sometimes said that this potential for rigor is a strength which distinguishes economics from the other social sciences (6).

PRESCRIPTION

Policy prescription is the end for the sake of which the research process was initiated. Research-based prescriptions presuppose descriptions and explanations. Policy prescriptions provide alternatives for action. National policymakers may be advised to deal with the unemployment problem with, say, a tax cut of $X billion coupled with an expansion in the money supply of $Z billion. Or, dairy farmers may be advised to plant small grain fields with pasture grasses, expand the dairy herd, and purchase feed grain rather than grow it. Prescription is the most important phase of the research process in the sense that, through actions based on prescriptions, social problems are solved.

Yet, many researchers spend little or none of their time advocating policy. One reason, evident from the above discussion, is that many other things need to be done first—each of which can become totally absorbing. It is easy (and useful) to become engrossed in identifying problems, or collecting data, or preparing descriptions, or developing theory, or seeking explanations. Each of these activities provides challenge, has its own interesting puzzles and problems to solve, and is rewarding. Those who specialize in these tasks may find little or no time or inclination to advocate solutions to the ultimate social problems from which these activities are derived.

Many research economists shy away from the precarious role of political advisor. When a research economist arrives at a policy prescription, it is based on an understanding of the problem, the data, and the theory. Much careful description and explanation presumably lies behind the conclusion. However, when a research economist becomes identified with a certain prescription, followers may be attracted for ideological reasons rather than for the compelling conclusions of the research process. By the same token, opposition may develop for ideological reasons.

For example, based on research findings, a researcher may advocate acreage controls and price supports as the solution to the farm income problem. Some of those who support this conclusion may do so not because they understand the research methods, but because they are attuned ideologically to government intervention and regulation as an expedient. Some of those opposed may be attuned ideologically to free market forces and the principle "that government is best which governs least." Both followers and opponents may want to solve the social problem, yet neither may understand the

In Earlier Issues Many of the important economic problems of farmers are associated with unstable incomes. A farmer who has a fluctuating income will pay a higher total income tax than one who has a relatively stable income. Individuals should be permitted to average their incomes over a period of years for tax purposes.

Daniel W. Burch
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economist's analytical bases for the prescription. Alinement with one of two or more conflicting ideologies can place the researcher in the midst of a political battle which could have been avoided had no explicit prescriptions been made.

Of course, there are other reasons for research economists to enter the policy arena cautiously. They may be wrong. They could base the prescription on faulty descriptions or explanations. Or, the prescription may overlook views held by persons other than economists, and the policy may need to be modified to accommodate other social values or political requirements.

Economists have developed a hedge against the vulnerability associated with entry into the policy arena. For example, Robbins advocated that economists simply state the possible alternatives for economic policy and their consequences without advocating one in preference to another (*14*). Thus, the burden of choice is transferred to the policymakers. Not all economists follow Robbins' advice and even he reversed his position two decades later (*15*). Sometimes an entire research organization is dismantled because of its prescriptive activities (*20*). Some economists willingly take a stand on an issue and openly implore their colleagues to do the same (*5*).

The apparent dichotomy between those research economists who risk advocating prescriptions and those who do not has become so strong that a distinction is sometimes made between policy research and other kinds of research. Farrell, noting the declining emphasis on policy research in agricultural economics during the last one or two decades, expresses concern that many recent analyses do not focus on major policy issues (*4*).

Based on the framework for economics research described here, it is difficult to understand what would constitute nonpolicy research, as research is undertaken ultimately to deal with a social problem. At the same time, the framework does explain how this objective can become sidetracked for both positive and negative reasons: the other five steps in the research process can fully and usefully absorb available talent.

Although many obstacles hinder engaging in policy advocacy based on research, some persons make a full-time career of extending research results to final users and specialize in advisory or consulting services. The agricultural extension service was built on the idea of disseminating the results of research in agricultural colleges to farmers; the Congressional Research Staff in the Library of Congress digests existing research reports and puts them in a form useful for legislative action.

Many researchers make a particular effort to follow through to the policy implications of their research, and leaders in the profession urge increased emphasis on this important activity (*4, 6*). Those who accept this challenge frequently find their jobs more interesting, perhaps more lucrative, and occasionally more famous or infamous.

RESEARCH CONFIGURATIONS DETERMINE THE BRANCHES OF ECONOMICS

One of the tasks of economic science is to formalize and institutionalize the decisionmaking process. Politicians fought inflation and businessmen sought profits long before the field of economics was developed. Those politicians and businessmen grappled with some of the same problems then as they do now that economics is a relatively mature science. However, in a mature science, the research configuration contains several parts, each important enough to be a specialty, but all of which function together (*11*). The parts can be used to discriminate among different research configurations.

So far, we have been talking about economics as if it were monolithic. Actually, it has many branches, each using its own data base and theoretical models to work on its own set of problems. Two important, highly developed examples already mentioned are: (1) Macroeconomics, which uses Keynesian and neo-Keynesian economic theory and data such as the National Income and Product Accounts, to deal with problems of inflation and unemployment; and (2) microeconomics, which uses classical and neoclassical economic theory, and market price and quantity data, to deal with problems of allocation of scarce resources. The descriptions, explanations, and prescriptions familiar to a macroeconomist can look strange to a microeconomist. Each of these two examples, and each of the many other subsets of economics, has its own research configuration; some more highly developed than others. The kinds of theories a researcher tends to understand and the kinds of data sources he tends to turn to, depend on the kinds of social problems he is interested in. Hildreth observed that mutual interests among apparently diverse professionals in one or more parts of the research process are the "tie that binds" them into a common organization (*8*).

The potential for economics research is that the research process provides a systematic way for society to deal with social problems. Researchers seek to describe and explain certain social problems and to prescribe remedies based on available data and theory. The collective output of individual researchers and of research teams provides society with a better basis for dealing with certain of its social problems than if one or more of the steps were deleted. Variations in the way these steps are followed by different researchers can identify schools of economics and types of researchers. If one or more of the parts fails to form, the science is not mature. When the science is mature, the research process, whether followed by individuals or teams, includes standard, efficient ways to look at problems, data, and theory, and to provide descriptions, explanations, and policy prescriptions.

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In Earlier Issues

Southern farmers have seldom been lazy but they have experienced low per capita production and income compared with farmers in other major agricultural regions. The South has a long history of methods which use a great deal of labor in relation to other factors of production. Historically the major reasons for this intensive use of labor and for the lag in farm mechanization have been the large available supplies of unskilled labor and the fact that machines to meet the peak labor needs of the South's major cash crops had not been perfected. . . . One of the best-bet approaches to lowered production costs, and thus a chance to meet the competition, is the introduction of new methods and new machines in cotton production.

Grady B. Crowe
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