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Economics: Disagreements, Critiques, and Progress

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I. Introduction

In 1776, when Adam Smith published his *Inquiry into the Nature and Causes of the Wealth of Nations*, political economy was a relatively minor branch of moral philosophy. Following the publication of Smith's book, political economy quickly became established as an important intellectual discipline in its own right and, perhaps more significantly, became an influential source of ideas for politicians, businessmen, journalists, and private citizens. In the subsequent 200 years, economics, having obtained an amicable divorce from its sister discipline, political science, has continued to expand its influence.

Economics departments have grown in relative size, and business schools and public policy schools are now populated largely by economists. Many other social scientists find themselves being induced to learn basic economic theory to an extent that is not reciprocated by economists (although it probably should be). In politics and in the higher levels of government service, economists are becoming almost as well-entrenched as lawyers, and they have also begun a serious infiltration of corporate executive offices.

A symptom of the expanding influence of economics is the expanding criticism that economists attract. Such criticism comes from many sources, including economists themselves. Two very interesting and thoughtful recent critiques of economics are Scitovsky (1978) and Rhoads (1985). Long-time critics of economists, such as Herbert Simon, himself a Nobel laureate in economics, have been particularly critical of the current state of the economics profession. In this paper I offer a somewhat more sympathetic view of modern economic research, focussing first on the frequent complaint that economists always seem to disagree, and then turning to other critiques of the economics profession.

Section II is devoted to the question of why economists appear to disagree so frequently. Section III discusses several major points of agreement among economists which still seem to be underappreciated by policy makers and

businessmen. Section IV is devoted to some of the major critiques of economic theory and methods. I first outline what I see as the central core of economic theory, which consists of two components. One component is the maximization hypothesis: the assumption that people make consistent choices in the pursuit of well-defined objectives, in effect maximizing their own welfare as individuals. The second component, which I argue is the foundation of normative economics, is individual sovereignty of preferences, or more simply, non-paternalism. Some of the major critiques of these two central components are considered, drawing on the work of Kahneman and Tversky (1979), Thaler (1980), and Rhoads (1985), and including Herbert Simon's alternative to the maximization hypothesis, the satisficing hypothesis. Section V is concerned with some promising lines of current research in economics, including experimental economics, improvements in data collection and econometrics, and the development of game theory and the economic theory of information. Section VI contains concluding remarks.

II. Why Economists Disagree

Public Disagreements Among Economists

The public disagreements among economists are very different from the private disagreements. Most non-economists, of course, observe only the public disagreements. It is a rare week that goes by without the appearance of economists on television, or the reporting of statements by economists in the newspapers. Furthermore, these economists always seem to disagree with each other. One says that money supply growth rates should be increased; another says they should be decreased. One economist says interest rates are going up; another says they are going down. Surely this public disarray is a sign of fundamental confusion in the economics profession.

As has been pointed out before (e.g., Lipsey, 1981), the main reason for public disagreement between economists is that there is a market for disagreement. When a journalist decides to do a story on deregulation of airlines, for example, he or she will seek out different opinions. It might be the case that 95% of economists favour deregulation, but the journalist would search until an opposing view were found. As a personal example, I have on a few occasions been asked to take part in radio panel discussions of international trade policy. The interviewer will normally seek one person who favours freer trade and one who opposes freer trade. Most economists favour freer trade, yet someone who listens to the panel discussion will conclude that the profession is sharply divided on the issue.

As a second example, an economist friend of mine reported to me his experience with a Toronto radio show that was doing a story on rent control. A representative of the station phoned and asked if he would argue in favour of rent control. He refused, after which the person from the radio station confided that he was having a very difficult time finding a reputable economist who would argue in favour of rent control, but that he needed one for the show. Virtually all economists agree that rent controls are a very inefficient method of helping the poor, so it is not surprising that the radio station was having trouble with its search. Presumably, however, someone who would support the use of rent controls was found, and listeners were left with the impression that economists cannot agree.

The problem associated with the market for disagreement is exacerbated by the fact that the economics profession is not really a profession in the sense that medicine, law, engineering and accountancy are. There is no central organization that can decide who may or may not call himself an economist (which is probably just as well). Therefore, anyone can proclaim him or herself an economist, and people with extreme opinions frequently do. If a newspaper reporter or television interviewer is seeking a contrary view, he or she can always find one.

This discussion of the market for disagreement is not meant as a criticism of the media. Quite the contrary, it is the better investigative journalists who seek out conflicting views. Furthermore, the market for disagreement reflects a basic fact of human nature: conflict is much more interesting than harmony. All novelists know this, and most people in the media know it as well. A television interviewer who has two economists on his show will begin to despair if they agree too much, and will seek out minor areas of disagreement in an effort to keep listeners interested.

A second general reason for public disagreement among economists has to do with the questions economists are typically asked. The most common questions asked of economists in the media have to do with forecasting. Economists are asked, for example, to predict next year's interest rates or housing prices. There are good reasons why such things are very hard to predict with any precision, not the least of which is that anyone who could accurately predict interest rates could make a fortune by taking the appropriate speculative position in the bond market, and would not be talking about on it television. In addition, economic models do not perform well in predicting economic events because the complexity of the models is high compared to the quantity of data available to calibrate the models. All that can honestly be said is that economic

model builders do better than pure chance in making predictions. This is progress, but it should not lead one to expect all forecasters to give the same forecasts.

Agreement needs to be interpreted statistically. If two models predict different values for some interest rate, but each model has wide confidence bands associated with the predictions, then the two predictions do not really disagree. Expressed slightly differently, the predictions are not significantly different, in the statistical sense. Public discussions of forecasts do not normally address such esoteric matters as statistical confidence intervals, and economic forecasters are rarely sufficiently forthcoming about the uncertainty associated with their forecasts. More modesty on the part of economic forecasters is clearly called for. As Leamer (1983) has said, "Let's take the con out of econometrics."

The final observation to be made about public disagreement among economists is that disagreement over economic policy is often a reflection of different basic values rather than a reflection of inconsistency in economic reasoning. For example, one important difference in values concerns whether equality of opportunity or equality of outcome is more fundamental. It is quite possible that policies intended to promote equality of opportunity might be inconsistent with policies designed to equalize incomes. The basic problem is that even if two people confront the same opportunities, they may end up with very different incomes, reflecting differences in innate characteristics and differences in luck.

Many political jurisdictions have broad prohibitions against discrimination on the basis of sex, race, or religion, especially with respect to hiring practices. On the other hand, many socially concerned people have argued in favour of affirmative action quotas. However, if medical schools are required to reserve places for blacks, or if employers are required to hire women into management positions, this has the effect restricting the opportunities of whites or of men. Such policies can be quite effective in raising the expected incomes of the target groups, but they violate the principle of equality of opportunity.

My point here is not to argue that one of these principles is more fundamental than the other. The point is that economists have no special expertise in evaluating alternative social values, and should be expected to disagree over basic values, just as any collection of individuals would. This personal disagreement should not, however, be regarded as a professional disagreement. This distinction, while it is usually made clear in economics textbooks, tends to be insufficiently clear in public debates, which misleadingly reinforces the impression of professional disagreement among economists.

In short, the public impression of disarray among economists is largely a mistaken impression. There is, of course, real disagreement among economists over economic theory, over interpretations of empirical evidence, and over professional policy recommendations. The range of agreement is, however, much more striking than the range of disagreement.

Private Disagreements Among Economists

The private disagreements among economists are very much like the private disagreements among physicists, or among psychologists, or within in any academic discipline.

It was a great surprise to me, as an undergraduate, to discover that disagreement over theory is the normal state of academic disciplines. In my case this revelation occurred when I learned that Einstein's general theory of relativity was only one of several then current alternative theories of gravitation. I understand that since that time, empirical evidence has tended to support Einstein's theory over rival theories, but the basic point to be made is that in physics, as in any active area of intellectual enquiry, there are alternative theories. I now realize that the fundamental nature of intellectual progress revolves around the development of alternative theories. Accumulation of evidence will lead some theories to be increasingly accepted, while others are gradually discarded. New ideas are constantly being generated, however, so at any moment in time there is considerable conflict between competing explanations of reality. Presumably the evolution of these competing views generates valuable new knowledge and leads us closer to something we might call truth. The fact that economists have competing assumptions or hypotheses is merely an indication that economics is an active area of research.

III. Agreement Among Economists

One remarkable feature of the economics profession is the agreement among economists over the importance of two basic ideas: incentive effects and opportunity costs. Sensitivity to these two ideas is what really seems to separate economists from the rest of humanity. When these ideas are explained directly they seem so obvious that everyone should understand them. Yet most non-economists routinely fail to recognize and apply these principles in practical contexts.

A good example of insensitivity to incentive effects is provided by a local tennis club that I happen to belong to. The club recently eliminated monthly

dues for juniors (tennis playing children of adult members) on the grounds that this fee did not raise much revenue and that eliminating the fee would be helpful to families. Many eligible children who had not previously been junior members promptly signed up. The club's capacity for juniors was quickly reached and a long waiting list formed. To the surprise and consternation of the club's directors, it soon became clear that anyone wanting to get a new junior into the club would have to put the child on the waiting list at birth (or before). The incentive problem was that as soon as it became costless for juniors to join, every family had an incentive to enroll its children as members, whether or not the children had any interest in tennis. As a result, many of those who might be very interested in tennis would have been prevented from joining by a long waiting list. After a trial period, the club restored dues for juniors.

Economists expect people to follow their economic interests; non-economists often expect people to leave their behaviour unchanged despite changing economic incentives. This was true of my tennis club. It is also true of people who are surprised when unwed motherhood rises as benefits to unwed mothers rise, or when landlords operating under rent controls choose not to maintain their rental units.

A more alarming example than waiting lists at a tennis club concerns the ill-fated Scientific Research Tax Credit, introduced in Canada in 1984 and terminated in 1985. If this tax credit had been applied retroactively to a typical year, like 1982 or 1983, the tax credit would have cost the government about \$200 million. Despite objections by many economists, this seemed to various politicians like a small price to pay in order to be seen to be doing something to encourage research and development in Canada. Once the tax credit was in place, of course, business firms started classifying everything they could as research and development. When the program was terminated in May 1985 after being in effect for 17 months, it had cost the government about \$3 billion in lost revenues. (See, for example, Ferguson, 1986). Economists are sensitive to the incentive effects of government policies; others tend to underestimate or ignore these effects.

The other major point of agreement among economists has to do with opportunity cost. The opportunity cost principle is simply that good decision-making requires comparison of the benefits of any expenditure with the benefits that could be obtained from the best alternative use of that expenditure. This principle is violated by any family that keeps a large savings account earning an interest rate of, say, 6%, while simultaneously financing the purchase of a new car at interest rates of 12% or 14%. The opportunity cost of keeping the savings

account is really the 12% or 14% that is being paid on the car loan. The benefit is only 6%. The family should use its entire savings account, apart from what might be needed as a cushion for unexpected expenses, to pay off as much of the car loan as possible.

Decisions that defy the opportunity cost principle are frequently made by business firms and governments, as well as by private individuals. Probably the most important contribution of economists to public and private decision-making has been to at least increase the attention paid to opportunity costs. In their allegiance to the opportunity cost principle, and in many other areas, economists show remarkable solidarity.

IV. Critiques of Economic Theory

In this section I discuss some of the more interesting critiques of economics. First, however, it is necessary to be clear about what the central theory of economics is. In my view, the central core of economic theory consists of two elements: the maximization hypothesis and the assumption of individual sovereignty over preferences.

The Maximization Hypothesis

Roughly stated, the maximization hypothesis means that human behaviour is taken to be the result of consistent (or rational) pursuit of coherent objectives. Individuals are assumed to do the best they can with what they have. Stated like this, the maximization hypothesis seems almost innocuous. In fact, however, this hypothesis is very strong. In particular, it presupposes the existence of well-defined and relatively stable preferences or objectives. Unfortunately, there is a fair amount of evidence that people do not have stable well-defined preferences. In a remarkable series of experiments, Kahneman and Tversky (1979, 1984) have shown that individual choices or preferences vary according to the way in which the choice is described or framed, even when the actual substance of the choice is unchanged. The following anecdote (based on results presented in Kahneman, Knetsch, and Thaler, 1986) indicates one way such preference reversals come about.

Mr. and Mrs. J go to a restaurant specializing in smorgasbords on a Saturday evening. Upon arrival, they are informed that, because of rising costs, regular prices have been raised by \$5.00 per person, although the restaurant will now be offering \$5.00 discounts on weeknights. Mr. and Mrs. J proceed to eat their

meal, remarking to themselves that they might try to take advantage of the weeknight discounts in future.

Alternatively, Mr. and Mrs. J go to a restaurant on a Saturday evening but are told that weekend patrons will now be subject to a \$5.00 surcharge, although prices during the week are unchanged. Mr. and Mrs. J leave the restaurant and eat elsewhere rather than pay the surcharge.

Rather obviously, the situations confronted by Mr. and Mrs. J are objectively identical, yet their different hypothesized reactions are very plausible to most people. A similar effect is illustrated by the following pair of questions: (drawn from Thaler, 1980).

- (a) You have inadvertently been exposed to a disease which, if you have it, will kill you within a week. The probability you actually have the disease is .001. How much will you pay for a cure?
- (b) Volunteers are needed for research on the disease described in (a). All that is required is that you be exposed to a .001 probability of catching the disease (with no opportunity to get a cure). What is the minimum payment you would require to volunteer yourself as an experimental subject for this research?

Typical answers for the two questions are from \$200 to \$1000 for (a) and from \$10,000 to \$100,000 for (b). The two situations are not identical, but they are mirror images of one another. In each case the person is asked to place an approximate value on the avoidance of a .001 chance of death. In answering question (a) people seem to place a value definitely lower than, say \$5000, on this avoidance of a risk, yet in answering question (b) this value is well above \$5000. How can \$5000 simultaneously be above and below the value of reducing one's probability of death by .001? These answers cast doubt on the existence of well-defined preferences.

The maximization hypothesis embodies many other subtleties. It implies transitivity of preferences (which has been violated in experiments), and it implies substantial powers of calculation on the part of individuals. It rules out so-called self-destructive behaviour, and many other modes of behaviour that seem to have psychological reality. At best, the maximization hypothesis is only an approximation to the truth. The question then becomes whether it is a better approximation than alternative general theories of behaviour. Stigler (1966, p. 6) judges that it is:

When we assume that consumers, acting with mathematical consistency, maximize utility, . . . it is not proper to complain that men are much more complicated and diverse than that. So they are, but if this assumption agrees tolerably well with the facts, it must be used until a better theory comes along.

Maximization versus Satisficing

One of Herbert Simon's longstanding critiques of economics is that the maximization hypothesis is a poor description of the process of decision-making. (See, for example, Simon, 1979.) Certainly, continuous maximization implies an approach to individual decision-making that conflicts with introspection. It implies that managers of business firms and individual consumers are constantly making complicated calculations in response to changing circumstances. An alternative view, suggested originally by Simon, is that individuals follow rules of thumb most of the time. Managers of business firms will not be constantly recalculating efficient production methods or pricing systems. As long as things are going fairly well, they will follow established patterns. Only if confronted by a major change in circumstances will most managers undertake recalculations. This is sometimes referred to as the satisficing hypothesis. Support for this hypothesis can be found in Cyert and March (1963) who argue that "business decision-making in firms [is] very different from the model presented to us in standard economic theory."

The satisficing hypothesis has been much discussed in the mainstream literature of economics, and a generation of graduate students has had the opportunity to choose between maximization and satisficing as a useful foundation for economic analysis. The maximization hypothesis has remained at the centre of economic theory. In my view there are four main reasons why satisficing has not been accepted by most economists as a useful basis for analysis.

First, satisficing is not a useful alternative hypothesis. If all imaginable behaviour is consistent with satisficing, then all we really have is a statement that people do what they do. In fact almost any behaviour is consistent with some rule of thumb. In order to give the satisficing hypothesis scientific power (in the sense of Popper¹) it is necessary to specify precisely the rules of thumb that people follow. Simon and others have tried to do this, but the problem is that people seem to follow different rules in different circumstances. It is hard to generate a list of rules that are consistent with each other, reasonably complete, and that have sufficient scientific power to rule out a wide range of possible observations.

The maximization hypothesis, on the other hand, is scientifically powerful, complete, and consistent.

Second, satisficing is not a good foundation for the analysis of new situations. One great value of the maximization hypothesis is that it can be applied to almost any situation. There is a well worked out set of mathematical techniques that allow the formal analysis of almost any maximization problem. Satisficing has no comparable formal techniques associated with it and is therefore hard to apply to new situations. It amounts to little more than searching for new rules of thumb.

Third, maximization and satisficing are not necessarily inconsistent. One view of satisficing is that it corresponds to a maximization problem that has not been properly specified. Consider a manager who does not undertake maximizing calculations unless under duress. One interpretation is that the cost of making the calculations is sufficiently high, to the manager, that he or she optimizes by not making these calculations unless the potential benefits are very large. Therefore, according to this argument, the manager is really maximizing utility after all.

Fourth, and most importantly, the evidence against the maximization hypothesis is very mixed. At the level of individual behaviour, there are substantial violations of consistency in making choices, especially under uncertainty, but at the level of market behaviour, the predictions of the maximization hypothesis are, by my reading of the evidence, reasonably robust. Profitable opportunities rarely go unexploited for long. For example, Western economies responded to the oil price increases of 1973-74 and 1979 by converting to fuel-efficient technologies. The maximization hypothesis was a much more useful guide to this behaviour than was a satisficing hypothesis.

As already discussed, at the individual level, maximization is best regarded as a fairly crude approximation. Furthermore, the errors that people make do not necessarily cancel each other out when aggregating individual behaviour to group levels. The real power of the maximization hypothesis comes largely from the survivor principle. In the market, non-maximizing behaviour by managers will result in poor performance. Such performance will be punished by bankruptcy, takeovers, changes in management, or simply by a gradual decline in relative importance. In addition, there is what might be called the experimentation and learning principle. If there is a good way to do things, either for firms or for consumers, someone will discover it and others will imitate. No individual may be carrying out precise maximization, but an economic survival of the

fittest, combined with active learning, will lead to market outcomes that closely resemble those predicted by the maximization hypothesis. There are, however, situations in which psychological perceptions cause even market outcomes to differ from what economic theory would lead us to expect. Kahneman, Knetsch and Thaler (1986) demonstrate that perceptions of fairness can cause such deviations, especially with respect to temporary changes in the economic environment.

My own conclusion is that the maximization hypothesis is certainly incomplete as a foundation for the theory of behaviour. Certain psychological or even physiological explanations are clearly superior at explaining certain types of behaviour. Consider schizophrenia: offering a schizophrenic large sums of money as a reward for maintaining a certain type of behaviour will not have much effect. Administering appropriate drugs will have a major effect. Explaining behaviour in general is, however, very difficult, and most economists believe that economic theory offers a view of behaviour that, for all its weaknesses, is much more useful for many purposes than any alternative.

Sovereignty of Individual Preferences

The foundation of normative analysis is individual sovereignty. In economic analysis, individual preferences are taken as fundamental. Economists do not ask whether the preferences of Mr. X, who enjoys the opera, are superior to those of Ms. Y, who prefers football. In economics, policies are good to the extent that they allow people to satisfy their own tastes and objectives. Different individuals might have conflicting preferences, of course, as Mr. X and Ms. Y would discover if they shared the same television set, but economists have methods (based on the idea of compensation) of aggregating conflicting preferences. These methods are, however, completely non-paternalistic. The idea that certain preferences are inherently superior to others is absent from economic analysis.

A simple-minded critique would then raise the issue of whether a taste for, say, murder, has to be accepted as equivalent to any other taste. The answer is yes. However, murder would presumably conflict with the tastes of other individuals for living, and the way in which economists aggregate preferences would imply that most murders should not be allowed. Economics can therefore handle murder in a way that is not totally unreasonable. (Perhaps this is an overstatement. Noted Australian economist T.W. Swan reported to me that many years ago he was charged with the duty of assisting in the calculation of Gross National Product (GNP) for Papua-New Guinea. His calculations foun-

dered, however, over the issue of whether the activities of headhunters should count positively or negatively in GNP.)

Other issues are more difficult, such as addiction. A strict view of economics would hold that a taste for heroin would have to be respected as much as a taste for anything else. At any time, a heroin addict can choose between the short-run pleasure and long-run pain associated with heroin use, and the short-run pain but long-run benefits of quitting. Who has the right to interfere with the addict's choice? Most of us accept the idea that governments have a right to intervene in this choice, and therefore seem to believe that individual sovereignty is not absolute.² We seem to believe that we have the right to protect the addict from himself. One possible explanation is that society is protecting the rights of the person that the addict will be in the future. If so, this represents a very sharp restriction on the principle of individual sovereignty.

A second difficulty is that tastes themselves can be molded. If a successful advertising campaign creates a taste for jackets with padded shoulders, and consumers satisfy this taste by purchasing new jackets with padded shoulders, are they better off than when they had a taste for their old jackets with form-fitting shoulders? My common sense tells me they are not better off. This example is too frivolous to warrant government intervention, but it raises some serious general issues. Less frivolous examples include advertising of tobacco products, alcohol, and war toys. If additions to GNP reflect the creation and satisfaction of new tastes which contribute no more to basic happiness than old tastes, then economic measures of welfare, such as per capita GNP, are questionable indicators of welfare.

Furthermore, might the government have a role in promoting tastes that experts believe will be more conducive to fundamental happiness? Most governments offer subsidies to orchestras, operas, theater groups, and public radio and television. In doing so they are subsidizing the leisure tastes of a few, who happen, incidentally, to have much higher incomes than average. If governments want to help poor people enjoy their leisure, they would do better to subsidize bowling alleys, bingo parlours, professional wrestling and, of course, commercial television. If this last sentence, advocating subsidies to lowbrow tastes, seems faintly ludicrous, while the earlier comments about subsidizing highbrow tastes seem serious, then I would argue that we implicitly accept the idea that governments have a role in promoting some tastes over others. Such a conclusion is in clear violation of the normative foundation of economic policy.

Individuals sometimes seem to make choices against their best interests even when they are aware of better choices that could be made. Scitovsky (1978), in an interesting critique of economics, points out that many television viewers answer the following question affirmatively: "When you're watching T.V. do you ever feel you'd rather be doing something else but can't tear yourself away?" Over 10% answered this question "Almost always." But they continue watching.

To conclude, the basic concern here is that individual choices and individual tastes cannot be taken as sovereign or fundamental in considerations of human happiness.³ The tendency of economists to accept preferences as sovereign leaves them open to the criticism that they are more concerned with satisfaction of material desires than with true human welfare. Certainly, GNP and other economic measures of welfare are designed to measure the ability of an economy to satisfy tastes and desires, but if satisfaction of these tastes and desires does not produce happiness, then using economic measures of welfare as a guide to policy is not very helpful. My own view is that human happiness is rather more complicated than suggested by the economic approach to choice. However, I suspect that simply having wide freedom of choice in consumer goods, personal behaviour, and political matters is, in itself, a very important contributor to a sense of well-being. In other words, the process of freedom of choice, supported by some notion of individual sovereignty, is more important than the actual choices that people happen to make.

V. Promising Directions of Economic Research

Economists should be modest in making claims about their ability to predict events, and in the value of economic reasoning as a foundation for public policy decisions. Nevertheless, the development of the economic paradigm has contributed enormously to our understanding of individual and social behaviour. Furthermore, economic methodology is improving rapidly. In this section I would like to discuss briefly some of the more exciting recent developments in economics.

Experimental Economics

Some observers, including Herbert Simon, have criticized economists for paying insufficient attention to experiments. I have a very different perspective. As I see it, experimental economics has been very well received by the economics profession and represents one of the most interesting areas of current research. Two widely cited surveys of experimental economics are Plott (1982) and Smith

(1982). These surveys are, incidentally, published in the two most widely circulated economics journals: the *Journal of Economic Literature* and the *American Economic Review*, and a casual glance through recent issues of the major economics journals will demonstrate that experimental economics is well represented. Some interesting examples include Holt (1985), Battalio et al. (1985), and Kagel and Levin (1986).

By experimental economics I refer here to laboratory experiments. Such experiments fall into two general categories: market experiments and experiments on individual decision-making. As already discussed, the latter offer unsettling evidence about whether the economic model is an accurate predictor of individual decisions. Market experiments tell a different story.

For example, a classic experiment concerns whether auction markets converge to the competitive equilibrium price predicted by economic theory. The experimenter would give each seller in the market a cost function $C(x)$ for producing some commodity, creating a supply curve for the industry. The seller's objective is to earn profits by selling the commodity for prices above the cost of production. Similarly, buyers are given demand schedules. (The demand schedules are created as follows. Buyers are able to resell the commodity to the experimenter. A particular buyer might be told he can resell one unit at price p^1 , the next unit at price p^2 , and so on. The buyer earns profits by purchasing the commodity for less than his redemption or resale price). This supply and demand system has an equilibrium that can be easily calculated. The auction then proceeds. In an oral double auction there is simultaneously a bid price and an ask price, and anyone can sell or buy, respectively, at the going bid and ask prices, or announce new bid or ask prices. As reported by Plott (1982), experimental markets of this type converge to the competitive equilibrium with near 100% efficiency.

Experimental economics has been subject to many criticisms. Perhaps the most difficult to deal with is the simple argument that people do not behave in a laboratory as they do in real life. In order for an experiment to be convincing it must use real money payoffs that are large enough so that subjects can be expected to take the experiment seriously. The rules of the game must be sufficiently transparent that subjects understand the situation they are in. In addition, results have to be replicated with different groups of subjects and by different experimenters. In my view, carefully done experiments shed considerable light on the performance of economic theory in predicting behaviour.

One problem with laboratory experiments is that they cannot replicate whole economic systems of interrelated markets. Unfortunately, it is larger scale models of this sort that are required for macroeconomic prediction and for policy analysis. Furthermore, experimental analysis cannot deal with life cycle decisions such as how much education to acquire, when to quit a job, and so on. Therefore the scope of experimental economics is necessarily very limited. Within that scope, however, experimental methods are very valuable.

Data Collection and Econometric Analysis

Many observers are very critical of the data that economists use. Much of this criticism is justified, and the economist's only response is that he was doing the best he or she could, given the circumstances. My perspective is that bad as economic data may be, the construction of these data represents a scientific and social achievement of a high order. To be more specific, economists have contributed substantially to the development of national income accounts and related data bases. The maintenance of these data bases represents a major commitment by various national governments and international organizations, and many people would argue that these data are very useful for a variety of purposes. In addition, new data bases are being expanded and developed. One very useful data base is the financial market data provided by the Center for Research in Security Prices (CRSP) at the University of Chicago, and the Michigan Panel Survey has provided very valuable data for research in labour economics.

As for methodology, economics has suffered from having a set of statistical tools that were inappropriate to its data. Classical statistics is based on the implicit assumption that data are generated by experiments. In a controlled experiment, the central issue is the sensitivity of the dependent variable to the experimental variable. Since other variables are held constant, specification error is not much of a problem. As a result, comparatively little attention was paid to model selection and most of the attention was paid to estimation.

In economics, unfortunately, most data are non-experimental. They are generated by unique uncontrolled events, are inherently non-replicable, and involve simultaneous changes in many interdependent variables. In such an environment, choosing between models is of fundamental importance. In recent years, considerable progress has been made in the theory and practice of model selection and specification, aided by the enormous increases in computing power that modern technology has made available. In addition, statisticians and econometricians have turned their attention to the properties of actual data and

have developed techniques for dealing with discrete data, truncated data, and missing observations. They have also paid attention to robust estimation, which is concerned with the properties of statistical estimation when the underlying assumptions are slightly wrong.

In summary, economists have made substantial improvements in the quality of their data sets and in their applications of statistical methodology to economic data. This is a very rewarding time to be involved in empirically based economic research.

Information Theory and Game Theory

Finally, it would be very remiss of me to ignore the major areas of current theoretical work in economics: information theory and game theory. Through the 1950s and 1960s, economic theory was focussed on perfectly competitive markets, and used the competitive model as the basic building block for general equilibrium theory, growth theory, and the major applied fields in economics. The competitive model makes two very important assumptions: economic agents are price takers, and all economic agents have access to the same information. The first assumption implies that economic agents do not interact strategically with one another. One firm needn't consider the behaviour of its rivals; all it needs to know are market prices, which it takes as fixed. The second assumption rules out informational asymmetries, which most economists now view as central in understanding the nature of the firm, the behaviour of bureaucracies, and many aspects of real markets.

Relaxation of these two assumptions has led to the major theoretical developments of the 1970s and 1980s. The study of strategic interaction has involved the application and substantial development of game theory, and the study of informational asymmetries has greatly expanded the relevance of the economic theory of information. I do not have space here to even begin to survey the contributions that have emerged from the study of informational asymmetries and strategic interaction. I will just observe that these foundations have been used to construct convincing explanations of the following diverse phenomena:

- (a) why new cars depreciate in value so rapidly when they are driven out of the showroom ("adverse selection", see Akerlof, 1970).
- (b) why some people acquire educations even when they do not enjoy the process and when the education does not directly increase their productivity ("signalling", see Spence, 1973).

- (c) why insurance companies ration customers to less than full insurance ("screening, self-selection, and moral hazard", see Rothschild and Stiglitz, 1976).
- (d) why firms choose a mix of debt and equity even though debt has a clear tax advantage ("agency costs", see Jensen and Meckling, 1976).
- (e) why firms frequently carry excess capacity ("credible threats", see Eaton and Lipsey, 1980).
- (f) why it makes sense for some firms to trigger predatory price wars ("reputation-building", see Kreps and Wilson, 1982).
- (g) why wages do not fall even when there is an excess supply of labour at going wage levels (i.e., why there is involuntary unemployment) ("efficiency wage models", see Yellen, 1984).

VI. Concluding Remarks

This essay is intended as a response to some of the criticisms that have been levelled against economics and economists in recent years. I hope that it offers some insight into why the economics profession is thriving and growing despite these criticisms. Economists will always appear in disarray in public, not because of any lack of coherence in the discipline, but simply because there is a market for disagreement, indirectly created by the appetite of newspaper readers, television viewers, and academics for conflict. In private, economists show remarkable agreement over many things, including the importance of economic incentives and the value of the opportunity cost principle. Like any active intellectual discipline, however, economics contains many competing ideas and hypotheses.

The central elements of economic theory remain the maximization hypothesis and the sovereignty of individual preferences, despite the fact that both of these elements have serious weaknesses. The real weakness of the maximization hypothesis is not that it leads to bad predictions about markets, but that it is frequently violated by individual decision-makers, especially in non-market situations. Critics argue that we need a more psychologically accurate theory of individual decision-making as a foundation for economics. (See Thaler, 1980, 1985; and Kahneman and Tversky, 1979 for some very interesting work along these lines.) However, as any psychologist will agree, we are not in danger of discovering "the" correct model of psychological decision-making any time soon.

Furthermore, just as economic behaviour is logically based on individual psychology, individual psychology is logically based on the physiology of the brain which, in turn, is based on the basic principles of biochemistry, and so on. How far do we pursue this reductionist argument? Rather obviously, progress can be made in all fields by making convenient, but not necessarily strictly correct, assumptions about the foundations on which the field is based. Thus economics makes convenient but crude assumptions about human psychology. It does not follow that economists should try to become psychologists, although they should, of course, keep abreast of relevant progress in psychology and possibly modify their theories as a result. In addition, it makes sense that some people, like Thaler, and Kahneman and Tversky should work on the borderline of psychology and economics.

Adam Smith and Alfred Marshall would have reminded us that the primary focus of economics is on the behaviour of markets, not individuals. If economic theory explains market behaviour well, then it is doing its job. As argued above, recent advances in economic theory have produced persuasive insights about the way markets work.

Parallel remarks can be made about concern over the principle of individual sovereignty of preferences. Economists assume that individual choices represent what is best for that individual, even when the choices that are made seem to others like very bad choices. Once again, this is clearly a crude and at least occasionally incorrect assumption. However, consideration of when and how the state should act paternalistically is a difficult problem in philosophy and political ethics. As a first approximation, and possibly as a final approximation as well, it seems clear that individual sovereignty is a very reasonable philosophical basis for economic analysis. In sum, it seems that much of the criticism of economists is that they are not psychologists, nor philosophers, nor even political scientists. But, as Adam Smith observed in the first sentence of *The Wealth of Nations*, "The greatest improvement in the productive powers of labour, and the greater part of the skill, dexterity and judgement with which it is anywhere directed, or applied, seems to have been the effects of the division of labour."

FOOTNOTES

1. Karl Popper (1965) is the best known proponent of the idea that explanations of any phenomenon have scientific value only to the extent that they rule out possibilities. A theory that is consistent with anything is not much of a theory. On the other hand, a theory such as Einstein's special theory of

relativity is consistent with only a small and very precise set of physical relationships. It is inconsistent with a very wide range of imaginable observations, and is therefore scientifically powerful.

2. One way of trying to reconcile individual sovereignty with social controls on heroin is to argue that such controls are really targeted toward protecting potential victims of the crimes that addicts commit to support their habit. In other words, we are not restricting the addict's choice per se, just his tendency to resort to other crimes as a result. This line of argument is, of course, tangential to the main issue. Imagine that the alternative to social control of heroin is to provide low-cost heroin to addicts and that addicts can be easily prevented from engaging in other crimes. The real issue is whether we should try to protect the addict from himself.
3. An interesting extended discussion of these and related issues can be found in Rhoads (1985).

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