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Consequences of New Assumptions in Economic Theory

George A. Akerlof

Excerpt

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Introduction

This book is a collection of previously published essays. It makes sense as a collection because these essays have more to say together than the sum of each individually. That collective message is largely methodological. It concerns the possibility of a style of economic theory rather different from the current stock in most economic journals.

What mainly differentiates these articles from most economic theory today is their willingness to entertain the consequences of new assumptions. Most of the best economic theory of the last forty years has concerned the consequences of application of supply and demand theory to new areas (such as resource economics, the demand and supply of patents, the economics of discrimination, and the economics of foreign exchange markets) and also to the solution of classical problems (such as proof of the existence of equilibrium and the Pareto optimality of that equilibrium in a classical Walrasian model).

In contrast, these essays represent an alternative approach to the advance of economic theory. That alternative approach is to explore the consequences of new behavioral assumptions. To give one example of this exploration, prior to the publication of “The Market for ‘Lemons’” there was very little work on the economic consequences of imperfect information (except in formal game theory). This omission is curious because information imperfections are consistent with economists’ utilitarian view of the world. Since the early 1970s, however, a large literature has grown up on the consequences of imperfect information, some of it concerned with the topic of “asymmetric information,” the concept explored in that paper. The innovation of that paper, as much as any specific results presented there, was the introduction of that concept into economic theory.

Economic theory is written according to a set of traditional rules. Typically, economic theorists – or at least the *neoclassical* theorists who dominate our profession today – are concerned with market equilibria in which individual actors behave selfishly and usually with expectations that, if not precisely correct, nevertheless make

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sense in terms of the individuals' respective environments. These expectations are in this sense rational, either in the technical or non-technical sense of that word. Prior to 1970 this theory was written mostly with perfect information; now that tradition has changed.

These strict, although unwritten, rules underlying economic theory allow results to be assessed and compared. For example, it is immediately clear, given the restriction of models that economists usually consider, that proof of existence of equilibrium and its Pareto optimality in the Arrow-Debreu model is canonical. Somehow this result is useful for analyzing the whole class of models considered by economic theory.

The unwritten rules that only *economic phenomena* be considered in economic models, with agents as individualistic, selfish maximizers, restrict the range of economic theory and in some cases even cause the economics profession to appear peculiarly absurd – because, without relaxation of these rules, certain *almost indisputable* economic facts, such as the existence of involuntary unemployment, become inconsistent with economic theory. Such is the case in the so-called rational expectations models of macroeconomics. These models are inconsistent with persistent high unemployment rates, as occur over the course of a business cycle, mainly because these models rely on market clearing. (Or, to be more careful, such models cannot *convincingly* explain persistent high unemployment, since with suitable torture of parameters such persistence can be shown to occur.)

My view of economic theory differs from that of most economic theorists. Most theorists, I believe, would say that good economic theory concerns interesting outcomes in models in which all agents engage in individualistic maximizing behavior. Individualistic maximizing behavior constitutes an assumption that sharply restricts the domain of possible economic models. It is an assumption that turns out to be surprisingly restrictive. It thus limits the number of possible economic models and allows easy assessment of the *interest* of any particular result.

Alternatively phrased, the preceding argument could be summarized by saying that economic theorists, like French chefs in regard to food, have developed stylized models whose ingredients are limited by some unwritten rules. Just as traditional French cooking does not use seaweed or raw fish, so neoclassical models do not make assumptions derived from psychology, anthropology, or sociology. I disagree

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with any rules that limit the nature of the ingredients in economic models.

In contrast to the unwritten rules whereby only certain stylized models are considered good economic theory, my own definition of “good economic theory” is that it poses interesting “if . . . then . . .” propositions relevant to some economic issue. As an example from classical economics, such a proposition would be the existence of a Pareto-optimal general equilibrium (the *then* statement) if the assumptions of the Arrow-Debreu model are satisfied.

There are two significant parts to this definition: one is the adjective *interesting*, the other is the phrase *relevant to some economic issue*. What constitutes an economic issue is empirically defined. According to Samuelson, interesting economic issues concern the *what, how, and for whom* of the distribution and use of economic resources. Macroeconomists, to give another example, tend to worry about such things as unemployment, inflation, and productivity growth as their “final” concerns, but they also worry about such things as interest rates, exchange rates, investment, consumption, taxes, and deficits as intermediate concerns. Propositions explaining all these variables may concern an *economic issue*.

A second requirement for an *interesting* propositional (i.e., if . . . then . . .) statement is some surprise relative to what is implicit (or perhaps explicit) in the usual economics literature. Thus my definition of good economic theory says that such theory must take into account economic realities (which define the variables of interest) on the one hand, and economic theory, on the other hand. In this latter regard it is necessary to refer back to existing economic theory to know what will constitute a surprise.

Indeed, the very absence of psychological, anthropological, and sociological factors in economic theory allows a whole new field of potential interest today. (Just as the absence of informational considerations allowed an untapped field for economic theory whose first explorations began about fifteen years ago.) The very absence of these psychological-anthropological-sociological behaviors allows the economic theorist to ask what the consequences of these behaviors will be for the usual economic results, derived either on the assumption that these factors can be trivially incorporated into the usual model or else on the assumption that these factors can be totally ignored. In what way will the introduction of these factors alter the traditional

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equilibria? Will such factors explain unemployment? Will such factors lead to interesting deviations from Pareto-optimal equilibria? Will such factors explain the nature of discrimination in a way deeper than blaming it on "tastes"? Perhaps these tastes will be endogenously explained and there can be interesting equilibria. Perhaps the introduction of these factors will yield economic models of caste and class.

One formulation of the basic idea of economic theory is exploration of the implications of equilibria in which no individuals can by any form of arbitrage make *very large* profits. In all of these chapters this basic idea underlies the notion of equilibrium. But within this conventional framework of equilibrium these essays explore nonconventional assumptions. Examples are asymmetric information, caste behavior, obedience to social customs motivated by the anthropological literature on culture, the nature of jobs, the obedience to work norms as motivated by the sociological literature, behavior according to cognitive dissonance, and the acquisition of loyalty (and personality traits).

The discussions in this volume as they now appear deal with many economic issues but, in honesty, it should be confessed that all are the direct or indirect result of a personal agenda, which is nowhere stated. My father periodically lost his job and the possibility of long-term unemployment (although it never actually occurred) was both sufficiently real and sufficiently frightening that solution of problems of unemployment became an emotional as well as an intellectual goal. My hidden agenda has always been to contribute to the solution of problems of unemployment.

Recently, solution of the problem of discrimination has been added to this agenda. This is, of course, a goal worthy for its own sake. But, also, discrimination, along with unemployment, is one of the few major economic phenomena for which market-clearing models of demand and supply offer insufficient explanation. Quite conceivably, correct models of involuntary unemployment and models of discrimination are sufficiently close that they constitute the study of the same formal phenomenon.

The first two chapters, "The Market for 'Lemons'" and "The Economics of Caste and of the Rat Race," were initially begun as attempts to think about forms of contract that would cause cyclical economic behavior, including involuntary unemployment. Deficiencies of attempts to explain unemployment by imperfect information

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from such an approach have been the impetus for the three chapters that are explicitly about unemployment: "A Theory of Social Custom, of Which Unemployment May Be One Consequence," "Jobs as Dam Sites," and "Labor Contracts as Partial Gift Exchange." These chapters rely on almost perfect information because three problems are always present in models of unemployment which rely on imperfect information. First, people with the lowest training costs and whose output is easiest to measure – low-educated, unskilled workers – always have the highest unemployment rates. If imperfect information coupled with high training costs is the chief reason for involuntary unemployment, on the contrary, managerial employees, with high training costs and output that is difficult to gauge, should have almost the highest unemployment rates. Second, the loss from misestimating labor quality in a *perfect* market is low, since in such a market workers can be dismissed as soon as it is discovered that their wages are higher than the market rate for labor of that quality. Third, it is often surprising how truthful sellers are to buyers who ask the right questions, so that imperfect *asymmetric* information may be a less potent phenomenon than is suggested by a world view that sees all people as selfish maximizers. As Max Weber has sharply pointed out: Benjamin Franklin, in urging the utilitarian reasons for truthfulness, is himself more truthful than consistent with his own dicta.

Consistent with its title, this book is the economic theorist's equivalent of a collection of short stories by a single author. What such short stories usually have in common is a style and some common ideas. Here the common ideas are the application of asymmetric information problems in Chapters 2, 3, and 4 and the application of concepts from anthropology, psychology, and sociology in the last five chapters. All eight have in common, as already stated, the "use" of new ingredients in economic theory.

Exploration of the consequences of imperfect information for economic theory needs no plea for further work since imperfect information is now a standard consideration of economic theorists. However, economists have ignored the other social sciences and continue to do so. At its worst, such ignorance may have deprived economists of a sensible theory of unemployment and probably also of a good theory of discrimination. So the lack of consideration of the findings of the other social sciences may make differences of practical importance.

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I would like to think that psycho- socio- anthropo-economics is at the beginning of a period when many people will be working in this area. Thirty years ago mathematical economics was probably at a similar stage of development. It is the purpose of this volume to demonstrate that a certain style of paper can be systematically written (otherwise how could there be *eight* of them?). Nevertheless, this field has not reached the stage where there is a set of problems with a natural research agenda. That will be necessary, however, before this area becomes a “field” like mathematical economics today. Could such a field develop with a similar collection of scholars working on the applications of other social sciences to economics? It is the purpose of this collection to demonstrate that such work is possible.

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The market for “lemons”: quality uncertainty and the market mechanism

I. Introduction

This paper relates quality and uncertainty. The existence of goods of many grades poses interesting and important problems for the theory of markets. On the one hand, the interaction of quality differences and uncertainty may explain important institutions of the labor market. On the other hand, this paper presents a struggling attempt to give structure to the statement: “Business in underdeveloped countries is difficult”; in particular, a structure is given for determining the economic costs of dishonesty. Additional applications of the theory include comments on the structure of money markets, on the notion of “insurability,” on the liquidity of durables, and on brand-name goods.

There are many markets in which buyers use some market statistic to judge the quality of prospective purchases. In this case there is incentive for sellers to market poor quality merchandise, since the returns for good quality accrue mainly to the entire group whose statistic is affected rather than to the individual seller. As a result there tends to be a reduction in the average quality of goods and also in the size of the market. It should also be perceived that in these markets social and private returns differ, and therefore, in some cases, governmental intervention may increase the welfare of all parties. Or private institutions may arise to take advantage of the potential increases in welfare which can accrue to all parties. By nature, however, these institutions are nonatomistic, and therefore concentrations of power – with ill consequences of their own – can develop.

The automobile market is used as a finger exercise to illustrate and

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develop these thoughts. It should be emphasized that this market is chosen for its concreteness and ease in understanding rather than for its importance or realism.

II. The model with automobiles as an example

A. *The automobiles market*

The example of used cars captures the essence of the problem. From time to time one hears either mention of or surprise at the large price difference between new cars and those which have just left the showroom. The usual lunch table justification for this phenomenon is the pure joy of owning a “new” car. We offer a different explanation. Suppose (for the sake of clarity rather than reality) that there are just four kinds of cars. There are new cars and used cars. There are good cars and bad cars (which in America are known as “lemons”). A new car may be a good car or a lemon, and of course the same is true of used cars.

The individuals in this market buy a new automobile without knowing whether the car they buy will be good or a lemon. But they do know that with probability q it is a good car and with probability $(1 - q)$ it is a lemon; by assumption, q is the proportion of good cars produced and $(1 - q)$ is the proportion of lemons.

After owning a specific car, however, for a length of time, the car owner can form a good idea of the quality of this machine; i.e., the owner assigns a new probability to the event that his car is a lemon. This estimate is more accurate than the original estimate. An asymmetry in available information has developed, for the sellers now have more knowledge about the quality of a car than the buyers. But good cars and bad cars must still sell at the same price – since it is impossible for a buyer to tell the difference between a good car and a bad car. It is apparent that a used car cannot have the same valuation as a new car – if it did have the same valuation, it would clearly be advantageous to trade a lemon at the price of a new car, and buy another new car, at a higher probability q of being good and a lower probability of being bad. Thus the owner of a good machine must be locked in. Not only is it true that he cannot receive the true value of his car, but he cannot even obtain the expected value of a new car.

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Gresham's law has made a modified reappearance. For most cars traded will be the “lemons,” and good cars may not be traded at all. The “bad” cars tend to drive out the good (in much the same way that bad money drives out the good). But the analogy with Gresham's law is not quite complete: bad cars drive out the good because they sell at the same price as good cars; similarly, bad money drives out good because the exchange rate is even. But the bad cars sell at the same price as good cars since it is impossible for a buyer to tell the difference between a good and a bad car; only the seller knows. In Gresham's law, however, presumably both buyer and seller can tell the difference between good and bad money. So the analogy is instructive, but not complete.

B. Asymmetrical information

It has been seen that the good cars may be driven out of the market by the lemons. But in a more continuous case with different grades of goods, even worse pathologies can exist. For it is quite possible to have the bad driving out the not-so-bad driving out the medium driving out the not-so-good driving out the good in such a sequence of events that no market exists at all.

One can assume that the demand for used automobiles depends most strongly upon two variables – the price of the automobile p and the average quality of used cars traded, μ , or $Q^d = D(p, \mu)$. Both the supply of used cars and also the average quality μ will depend upon the price, or $\mu = \mu(p)$ and $S = S(p)$. And in equilibrium the supply must equal the demand for the given average quality, or $S(p) = D(p, \mu(p))$. As the price falls, normally the quality will also fall. And it is quite possible that no goods will be traded at any price level.

Such an example can be derived from utility theory. Assume that there are just two groups of traders: groups one and two. Give group one a utility function

$$U_1 = M + \sum_{i=1}^n x_i$$

where M is the consumption of goods other than automobiles, x_i is the quality of the i th automobile, and n is the number of automobiles.

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Similarly, let

$$U_2 = M + \sum_{i=1}^n \frac{1}{2} x_i$$

where M , x_i , and n are defined as before.

Three comments should be made about these utility functions: (1) Without linear utility (say with logarithmic utility) one gets needlessly mired in algebraic complication. (2) The use of linear utility allows a focus on the effects of asymmetry of information; with a concave utility function we would have to deal jointly with the usual risk-variance effects of uncertainty and the special effects we wish to discuss here. (3) U_1 and U_2 have the odd characteristic that the addition of a second car, or indeed a k th car, adds the same amount of utility as the first. Again realism is sacrificed to avoid a diversion from the proper focus.

To continue, it is assumed (1) that both type one traders and type two traders are von Neumann-Morgenstern maximizers of expected utility; (2) that group one has N cars with uniformly distributed quality x , $0 \leq x \leq 2$, and group two has no cars; (3) that the price of "other goods" M is unity.

Denote the income (including that derived from the sale of automobiles) of all type one traders as Y_1 and the income of all type two traders as Y_2 . The demand for used cars will be the sum of the demands by both groups. When one ignores indivisibilities, the demand for automobiles by type one traders will be

$$\begin{aligned} D_1 &= Y_1/p & \mu/p > 1 \\ D_1 &= 0 & \mu/p < 1. \end{aligned}$$

And the supply of cars offered by type one traders is

$$(1) \quad S_1 = pN/2 \quad p \leq 2$$

with average quality

$$(2) \quad \mu = p/2.$$

(To derive (1) and (2), the uniform distribution of automobile quality is used.)