

408: def. "... I am happy to call an economic study microeconomic if its basic decision making-units are treated individually rather than in the aggregate."

what are the units: now individuals, now corporations, now the hive of individuals in a corporation.

410: com. "Through the work of Debreu [30, 1959] and others the mathematical basis for a theory of consumer choice has been changed from indifference curve analysis to a set theoretical basis. This represents a step forward inasmuch as several highly undesirable implicit assumptions associated with continuity, divisibility, and perfect discrimination are no longer present.

411: com. "One of the great breakthroughs in the theory of consumer choice in the 1930s was the discovery that it did not require the postulate of a cardinal measure of utility or worth. It is a remarkable fact that in a world without uncertainty and with the appropriate technical conditions specified, the existence of a price system can be established using only the ordinal properties of consumer preference. If, however, one wishes to consider the possibility that at least on occasion an individual may be required to choose among uncertain prospects, von Neumann demonstrated that by adding some highly plausible axioms to those accepted as true for a consumer choosing among certain outcomes, then a cardinal scale for preferences could be constructed.

It is worth noting that if one is committed to the proposition that consumer preferences cannot be determined beyond an ordinal measure, then nothing whatever can ever be said about welfare schemes involving any form of fair division or equitable settlement.***"

The Theory of the Firm

411 The partial equilibrium analysis of Marshall, cleaned up and somewhat more formalized in the last forty years, still provides the standard fare of the student of microeconomics. The firm is the primitive concept of the theory. It is assumed implicitly, or on occasion explicitly, that the firm is run by an individual owner who is a profit maximizer...

Probably one of the most important technical considerations which made the economic profession adopt the conception of continuous

substitutibility among all input factors is that continuous isoquants are easier to draw than discontinuous ones. Furthermore if you intend to present a theory using calculus, it is useful to have curves with a couple of derivatives defined at every point.

412 The microeconomic texts, in their haste to present the general picture concerning models we know how to handle, give virtually no guidance as to the relevance and importance of factors left out or simplified.

Even three or four pages on the relationship between the theory of the firm and accounting, and the theory of the firm and finance, would provide at least a glimmer of insight to the student. The recent work of... has started to add detail -- this at the cost of abandoning the firm as a primitive concept and describing it as an organization.

Logical consistency between one theory in micro economics and another is not a necessity but a luxury... There is no paradox in the failure of the different theories to dovetail. Frequently a great amount of insight can be gained by asking why they fail to be consistent with one another.

The theories are or should be constructed in order to answer a limited set of questions. The aggregations and selection of variables for one theory will be different from those of another. Thus the theory of the firm and industry in partial equilibrium in a freely functioning price system is not necessarily going to match a theory of oligopolistic competition, and that theory may easily fail to match a general equilibrium treatment of the economy.

413 ... the gradual development of the modern corporation has made the entrepreneur of classical economic theory a somewhat unreal figure in a large part of the typical modern industrial economy.

General Equilibrium Theory

If Hicks had in fact produced the pure logical analysis of capitalism, it would indeed have been a signal breakthrough. I however regard a study... of a system consisting of an indefinite number of utilitarian men, completely informed, trading only in individually owned commodities in a world with no indivisibilities, no externalities, no government, no ~~money~~ taxation, and no money in frictionless instantaneous markets as something less than a pure theory of capitalism.

Yet in Hicks' work the number of commodities is fixed and known at the start.²

² Any microeconomist who is worth his salt will merely enlarge the utility function of his economic man to include commodities that will not be invented for another couple of hundred years. We give our utilitarian man known preferences for the commodities-to-be, then enlarge the commodity space by attaching a date, place, and quantity to all goods and services-to-be and le voilà we have taken care of innovation.

414 To a certain extent one might argue that sense of sterility is also present in Debreu's Theory of Value (30 1959)... (It) is one of the few truly elegant thin books in economics... Yet the theorist interested in ~~political~~ the development of political economy or even economics must regretfully remember that even the work of Debreu is of limited generality.

... sing the praises of the price system. It is fair just equitable democratic etc etc... A question that ~~x~~ occurs to the theorist is, "Is it unique?" If it is not unique, then which one of these fine price systems is fair equitable democratic and so forth?

One of the ways in which general equilibrium ~~xxxxx~~ economics strives for its apparent generality is by pretending that if firms do not exist, or if they do, they exist as a nebulous mass of profit maximizing automata (for instance, Debreu 1959, Chapter 3).

415 The basic institutional assumption ~~thin~~ general equilibrium ~~xxxxx~~ economics which can fool the unsuspecting into believing that it is somehow institution free is that a price system exists ***

General equilibrium economics is undoubtedly a splendid intellectual achievement. But it is not by any means on the level of Newtonian mechanics... .. the way we stick to our simple models is ludicrous. I am reminded of the story of the drunk who had lost his keys at night and spent his time searching for them under ~~x~~ a street lamp fifty yards from where he had lost them because that was the only place where he could see anything.

Oligopoly theory (Mrs Robinson 415 416)

There is no oligopoly theory *** There are bits and pieces of models: some reasonably well analysed, some scarcely ~~investigated~~ investigated.

416 The understanding of oligopolistic markets is tantamount to the understanding of the economic power of the firm. The power of a firm in one market may depend delicately upon its price control; in another, upon product variation; in yet another, upon its retailing and distribution setup. The important strategic variations variables of a firm maybe advertizing, control of resources, financial strength, advantages in production processes, or / dozens of others depending on economic x circumstances. There is no Royal Road.

417 The future of oligopoly studies: what devices likely to prevail

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Simulation, Gaming, the Behavioral Theory of the firm, Artificial Intelligence.

A computer simulation of an economic institution is a model of the entity written in such a manner that, given the initial conditions which describe the starting state of the system, the computer can produce a time series of future states. Further more by varying the appropriate inputs, time series of contingent future states can be obtained. In other words plans for difference x contingencies can be generated (Shubik 1960).

A computer simulation is far more flexible than a mathematical model and at the same time far more organized and precise than most verbal descriptions. It is a device which, if used with care, enables one to build a model combining logic, mathematics, and a richness of detail.

Artificial intelligence is directed towards producing machines and computer programs which perform tasks that are regarded as requiring human intelligence. Proving theorems and playing chess ~~xxx~~ using computer programs are examples of artificial intelligence.

419 In many business schools of the United States running the business game is now a more or less accepted ~~XXXXXXXX~~ pastime. This is not necessarily an unqualified recommendation...

The business game at Carnegie-Mellon (Cohen 1964) is probably about the most complex and has been used extensively in teaching....

There is also a growing interest in using business of oligopoly games for research ~~xx~~ purposes (This is part of a larger field of experimental gaming encompassing many ~~fixed~~ disciplines). Specifically pertaining to microeconomics there is work by....

420 It may well be that a library of game models and some time spent in war gaming with oligopolistic structure would offer those interested in the social control of industry a new approach...

Welfare Economics and Public Finance

It is interesting that the disease of the new welfare economics produced the very antibodies which finally killed it. The death blow was delivered by the publication of Kenneth Arrow's Social Choice and Individual Values (3, 1951). He produced a proof that if one accepted certain ~~ax~~ axioms usually accepted in the new welfare economics, it was not possible in general to construct a community welfare function. Arrow's book is another of the very few elegant thin books in political economy.

... Arrow's work.. helps us get us back on the tracks by showing that pure logic combined with pure welfare theory does not get us very far. There are many different ways of setting up other axioms from which it is possible // 421 // to construct a community welfare function (89 Shapley and Shubik). The argument is not so much a mathematical one, but to decide whether one wishes to make different assumptions about society.

421 The concept of a community welfare function is probably more a sociological and political concept than it is economic. There is no logical or operational need for a community welfare function to be logically consistent with all individual economic or political choices. If you define what exactly you include in the welfare function, it may still be a useful construct though not necessarily consistent with individual behavior.***

There are some topics of considerable importance which are described in the aggregate by two or three words but in fact comprise a group of extremely different problems hidden behind a

a single title. Welfare economics is one of these (cancer and time-sharing are others).

I suspect that eventual pure theory of public goods (which is but a small part of welfare economics) is going to need to develop its theorizing around at least twenty or thirty different classes of public goods (possibly many more) [94 & Shubik 1966).

Marketing and Finance

422 Both of these subjects have not until recently been noted for their intellectual content. They are however critically important to the understanding of two aspects of the firm in an economy such as ours. Furthermore marketing in the sense that it deals with detailed studies of consumer behavior is important to our understanding of the consumer.

In particular, I believe that the financial aspects of oligopolistic competition have been considerably underestimated except in popular left-wing sociologists...

An indication of the size of financial and institutional indivisibilities in our society is given by the rash of take-over bids in the stock market in the last few years where assets may be revalued ~~xxx~~ by forty or fifty percent almost overnight. This is a far cry from a minor adjustment in a smoothly functioning capital market!

423 The theory of consumer behavior is going to be replaced by several theories of consumer behavior, including information costs, search, habit, and a host of other factors introduced in an explicit manner into our studies.

Operations research, Linear, Convex, Integer, and Dynamic Programming

423 If we make the assumption that production takes time and that inventory carrying charges are positive, then the Chamberlinian large group oligopolistic equilibrium does not exist***

The advent of the computer and advances in mathematics have made it possible to carry out computations on economic models with hundreds and even thousands of variables...

The work in linear systems has also been manifested in von Neumann's growth model (71, 1945) and in the input-output analysis of Leontief (58, 1949). In the latter case it is interesting to note that the methodology and the organization it provides

have stimulated data gathering and economic introspection the world over on a scale that can only be compared to the work on national accounts sparked by the writings of Keynes.

Game Theory

424 The theory of games provides a language for the study of multi-person decision-making in detail. The technique of the game tree with its information sets ~~mix~~ offers a manner to describe the anatomy of inter-locking decision-making at a level that was not available previously.

d The demands of model construction when applying game theory are very exacting. Perhaps it is the level of explicitness required in model building that turns one of game theory's weaknesses into a strength. Completeness and consistency are required to such a degree that ridiculous models of human affairs are immediately revealed as ridiculous by the model...

A new branch of investigation -- that can best be described as conflict study -- has to a great extent developed out of the recognition of the inadequacy for some purposes of formal game theoretic models (cf Boulding & Rapoport Schelling)

... involves a mixture of virtually all of the behavioral sciences laid upon social psychology and political science

... the needs for a behavioral theory that takes into account learning, teaching, perception, and // 425 // modification of goals (cf John Cross 27, 1969)

425 .. even at the level of mathematics Debreu (30, 1959) has noted that game theory was outstanding among the influences "which freed mathematical economics from its traditions of differential calculus and its compromises with logic."

What is the solution to an economic problem?...

There are many solutions to an economic problem (eg an outcome of pareto optimal, of equity of distribution, of social stability)

Can a solution have more than one desirable outcome?

Specify what you want and apply game theory

The core of a market game is that set of distributions of goods which cannot be challenged by the economic power of any subgroup of the society. It is a remarkable fact that if the appropriate conditions hold on technology and tastes that a price

system will produce a distribution of goods and services that lies within the core.

It is quite possible that there is no distribution satisfying the conditions required for the existence of a nonempty core for an economic model. When this condition prevails there will be neither a price system nor a taxation ~~system~~ scheme unchallengeable by at least one group in the society*** When the core is empty, it will be always possible for some subgroup¹ of society to have an attractive bribe for some other subgroups, no matter what distribution is suggested. In other words, there will be no way to satisfy all the conflicting claims of all subgroups.

426 In my opinion one of the most important features of game theory in its application to economics has been its concern with numbers of decision makers.

existence of/ eggeduction of/price system as number of participants increase (core shrinks to point, point interpreted as price system)

Competitive equilibrium theory suffers from three sets of sloppy assumptions

The definition of individually owned goods and services is extremely limited

The existence ~~of~~ of markets -- lea¹ from bilateral trade to multilateral with unspecified assumptions about communication, information, trade -- this effective ~~is~~ vacuum somehow qualifies the theory as being institution free...

The assumption that individual traders will act as price-takers. Game theory begins from individuals as economic men with freedom of choice and then deduces that as a result of ~~a~~ numbers the economic power of the individual is sufficiently // 427 // weakened that he might as well behave as a price-taker.

427 .. one the prime reasons why oligopoly theory is inconsistent with general equilibrium ~~theory~~ economics is because almost all of oligopoly theory in one form or another is modeled as a non-cooperative game with the individuals possessing freedom of choice. This freedom includes the freedom to make wrong moves, to end up with inventories or be caught out of stock. Yet when we pass to general equilibrium analysis the individuals are price-taking automatically forced to act so that supply equals demand -- forced to do the right thing and forbidden to go bankrupt;

The methodology of game theory makes one describe the whole of the payoff set. In other words you must be able to specify what happens given every feasible ~~XXXXXXXXXX~~ set of moves. You will then deduce that many of the outcomes will be avoided. This situation however is different from assuming that they are avoided. The cost price of going the other way is that you may easily fake yourself into believing that you have a well defined model of an economic activity when you have nothing of the sort.

The methodology of game theory can be applied to political problems involving voting and power as well as to economic problems. It is my belief that many of these topics fall directly into the domain of political economy, especially when we observe how much of the decision-making concerning public goods, school bond issues, zoning, etc. depend upon voting. The book of Farquharson on the Theory of Voting (39, 1969) is the third elegant thin book I can legitimately mention in this article. Arrow's approach to voting is analogous to Debreu's approach to general equilibrium. The individual decision unit is not regarded as a player in a game of strategy, but is an isolated maximizing unit. Farquharson in contrast to Arrow regards the voters as players who may easily vote for their second choice when they think that their first choice is going to lose. The literature on this area is proliferating see ## 24, 108 23 33 and more recently 13 37 55 76 78 109 and many others.

.. with the notable exception of Vickrey, if game theory is mentioned in a microeconomic text, most of the analysis presented is of two person zero-sum games which almost irrelevant.

The Theory of Money

428 .. I will take poetic license to comment on some of the problems and possibilities in the integration of monetary theory in microeconomics.

A central theme in this article is that there is no such thing as institution-free economics. Explicitly or implicitly we slip into assumptions concerning the nature and role of property, political, legal, and social organization. This act does not mean that it is not possible to theorize at levels of great generality. It does mean however that between any two economies there may be subtle differences caused by law or custom which may influence our theorizing. This point is particularly true when dealing with

the phenomenon of money.

Money cannot even be defined in isolation. It must be considered part and parcel with the laws for financial operations. Bankruptcy laws are as much a part of the monetary system as are dollar bills. Economies with different financial laws differ from each other much in the same way as geometries based upon different axiom systems differ from each other. Money and laws for financial operations form ~~the~~ part of the the rules of the economic game. Wehn the rules are different, the game is different. ~~x~~

...

Money is an invention of man. It was introduced in many different ad hoc ways into different economies. Once it was there, it took on a life of its own. In particular, in a general equilibrium model with no government and no financial intermediaries, with no bankruptcies ~~x~~ no uncertainty and no game theoretic maneuvering, it appears to me reasonable to expect that even if someone sneaks in a transactions cost money into a competitive equilibrium system he will get out a very mouselike money. It will be neutral and serve as a means of exchange, a measure of value, a minor store of wealth, but that is all. Some further exercises will be generated in contemplating the effect of velocity of transactions on the worth of this type of money; and if our traders trade at ever increasing velocities, if the theory is any good, with a shriek of triumph the money will vanish at the point of infinity where ~~x~~ it will no longer be needed ~~x~~ as all exchanges have become instantaneous.

The serious theory of money started // 429 // when some ruler appointed himself the issuing authority. It took on new dimensions when the first goldsmith decided that he could lend gold belonging to someone else because he could replace it in time to satisfy the claims on him. These were strategies by players in a nonsymmetric game.

A complete theory of money will need at least three distinguished players: some abstract form of ~~mg~~ governmental body whose preferences and powers must be stated; a distinguished player representing an abstraction of a financial intermediary; everyone else.....