

PART V

SOCIAL SCIENCE

The Modal View and Defending Microeconomics

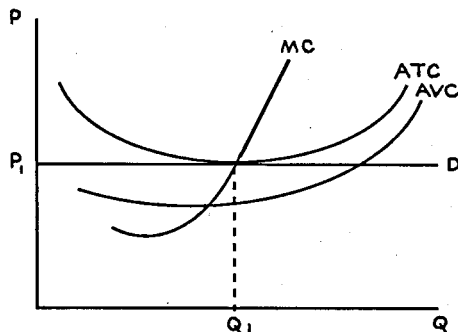
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What Daniel Hausman has called "the simple criticism of economic theory"¹ is succinctly conveyed by the following passage: "We know full well not only that commodities are not infinitely divisible (which is only intended as a simplification), but businessmen do not always attempt to maximize profits and that the preferences of consumers are not always transitive. 'Businessmen maximize profits' and 'a consumer's preferences are transitive' are fundamental economic 'laws'. How can economists rationally accept a theory which is so full of falsehoods?" (1981a, p. 382). In a recent paper Hausman considers several defenses of neoclassical microeconomics against the simple criticism. One of them is the modal view which Hausman initially characterizes in the following admittedly vague and ambiguous manner: "Microeconomic general statements are modal (counter-factual) claims. They reveal to us the pure logic of economic relations in simplified ideal cases and neither are nor are meant to be (precisely) true of real individuals in real economies." (1984, p. 392). Hausman rejects the modal view as any adequate sort of defense of received microeconomic theory against the simple criticism. My aim here is to indicate that the modal view properly spelled out affords a better defense of neoclassical micro theory than Hausman allows.

The modal view needs to be stated in an unambiguous and reasonably precise manner. Neoclassical microeconomics does contain individual generalizations to which economists apply the term 'law'. Examples are the law of diminishing returns and the law of demand. But it is models that are the most important and prominent element in neoclassical micro; neoclassical theory is largely devoted to the elaboration and use of models. Textbook style presentations of neoclassical micro contain a plethora of models such as the model of the rational consumer, the model of the firm under perfect competition, and the model of a firm that is a monopoly buyer of a factor of production. It is best, therefore, to present the modal view as an account of economic models rather than a view about law-like generalizations taken individually. Since the law-like generalizations of neoclassical theory are included in the models, the difference in the two ways of presenting the modal view is largely one of emphasis.

As a matter of fact, when economists elaborate a model, they begin with a set of assumptions plus perhaps one or more definitions. For example, consider the model of the short-run behavior of a firm in a perfectly competitive market.² The elaboration of this model typically begins with a definition of a perfectly competitive market as a market in which (a) the firms on the sellers' side produce a homogeneous product, (b) firms and consumers are sufficiently numerous that sales and purchases of any one economic unit are very small relative to the total quantity of the good exchanged, (c) in the long run there is complete freedom of exit from and entry into the market, and (d) firms and buyers possess complete information. The model we are considering describes the short-run output decision of business firms in the circumstances envisaged by this definition of perfect competition. In addition to the definition, the model of perfect competition includes a number of assumptions or axioms. One of these is that an individual firm has a short-run average total cost (ATC) curve, a short-run average variable cost (AVC) curve, and a marginal cost (MC) curve. These are of the shapes depicted on the following diagram:



Two additional axioms for the model not conveyed by the diagram are that firm managers select the output level (Q) which maximizes firm profits, and that profit can be expressed as a function of quantity of output, i.e., profit equals $P \times Q$ minus $C(Q)$ with $P \times Q$ the total revenue function and $C(Q)$ the total cost function. Using logic and mathematics theorems can now be generated. One theorem is that the firm can sell all it wants at the prevailing market price P_1 . In other words, the demand curve (D) the firm faces is totally elastic at P_1 . The definition of perfect competition--in particular clauses (a) and (b)--is what justifies this conclusion. Another theorem is that the firm will set its output level at Q_1 in the diagram. This is obtained by appeal to the profit maximizing assumption, plus setting equal to zero the first derivative of the profit function with respect to quantity of output. It is this latter operation which tells us that profit is maximized where $d(P_1 \times Q)/dQ$ equals $dC(Q)/dQ$, i.e., where marginal revenue (which equals price in perfect competition) equals marginal cost.

The model of perfect competition is, in the relevant respects, a typical neoclassical micro model. The above presentation of the model allows us to see that it describes the behavior of hypothetical entities of one or more kinds, i.e., entities that would exist were certain

conditions met. Were there to be a real world market fitting the definition of perfect competition in which the model's axioms held, the model would describe the behavior of firms in that real world market. To generalize, an economic model consists of a set K of definitions and non-definitional assumptions plus a set of entities L whose behavior is described by K and K's logical and mathematical consequences. The entities in L are hypothetical in that they would exist if the conditions conveyed by K were met in the real world. This is the modal view of economic models. It fits pretty well the things Professor Hausman says about the modal view. In the paper on Mill's philosophy of economics from which I quoted at the outset, Hausman says the modal view has it that the law-like generalizations of microeconomics state how things would be were certain conditions met (1981a, p. 368). Adjusting for the fact that my version of the modal view applies to models, this remark of Hausman's fits the modal view as I have presented it. In his book on capital theory Hausman says the modal view represents economic models as stating ". . . truths about certain possible economies." (1981b, p. 147). This obviously describes the modal view as presented here.

There is a key aspect of the modal view of economic models in the form in which I am prepared to defend it which does not explicitly emerge in Hausman's treatment. To begin with we need to distinguish theoretical models from applied models.³ An applied model is simply a model that has been applied to a real world situation. To apply a model M to a real world situation S, is to interpret a sufficient number of the variables and general terms in M in terms of S. To interpret a variable in M in terms of S is to replace the variable--in fact or merely mentally--with the corresponding variable whose values are restricted to magnitudes in S. For example, to interpret the variable for price 'P' in the model of perfect competition in terms of the wheat market in the United States, is to replace 'P' in all occurrences in the model with 'the price of wheat in the U.S. wheat market'. To interpret a general term in M in terms of S is to replace the general term with another one denoting only items in S. For instance, the term 'firm' occurring in the model of perfect competition can be replaced with 'American wheat farm'. The account of applying economic models described here fits many of the applications of models found in the writings of economists, including applications in textbook presentations of both macro and micro theory.⁴

Applied economic models have been characterized. Theoretical models are models that have not been applied to some real world situation. It is part of the modal view being presented here that only theoretical models are about hypothetical entities. Various sentences in an applied model will be true or false statements about the real world situation to which the model is being applied.⁵ For example, suppose we apply the model of perfect competition to the American wheat market. The axiom of the model 'firm managers maximize profits' becomes a truth or falsehood about just the firms in the wheat industry. It will be a truth just in case managers of wheat farms set their output level where marginal revenue equals marginal cost (and the second order condition for a maximum is also met). But theoretical models do not contain true or false statements about real world situations. They include true statements about hypothetical entities; or equivalently, theoretical models' non-definitional sentences will be true statements in the

hypothetical circumstances envisaged by the model in abstraction from real world applications of it.

It is worth trying to deflect several misunderstandings to which the modal view might be subject. But before doing so one advantage of the modal view should be mentioned. Neoclassical micro theory is a theory about rational behavior. In the relevant sense of the term, rational behavior is simply behavior consistently in pursuit of some well-defined goal or aim (Tullock and McKenzie 1985, pp. 8-10). Typically neoclassical models attribute some goal to economic agents like utility maximization, profit maximization, or cost minimization. (It is of the essence of neoclassical theory that the goal always consists in maximizing or minimizing something perhaps subject to constraints.) The model will then describe how the goal in question may be reached. This may be by producing the output level at which marginal revenue equals marginal cost, or selecting a market basket of goods at the tangency of the consumer's budget line and the highest attainable indifference curve. The modal view does justice to the fact that neoclassical models describe rational behavior. Real world economic agents may not always act rationally due to various factors such as unclarity about goals, insufficient information, and so on. But then how should a theory of fully rational behavior proceed? A good way would be to develop an account of the behavior of fully rational agents in hypothetical circumstances, cutting away any factors that in the real world interfere with full rationality. Of course, on the modal view, economic models do characterize the behavior of agents in hypothetical situations, or at least theoretical models do. In this way the modal view dovetails nicely with the fact that neoclassical micro describes rational economic behavior.⁶

In one of his discussions of the modal view, Hausman says the view is committed to an ontology of possible or hypothetical entities (1981b, p. 147). But this is a misunderstanding. The modal view says theoretical economic models afford true descriptions of the behavior of hypothetical entities. But this does not mean the modal view is committed to the existence of hypothetical entities of any kind. To say a model provides a true account of hypothetical entities of some sort, is to say the model describes the behavior of entities that would exist if certain conditions were met. This hardly implies that entities of the sort in question actually exist. I can give a true description of a forest fire that would occur in the Santa Cruz Mountains if certain conditions were met. But this does not mean the fire is actually occurring.

The modal view of economic models should not be taken as equivalent to the view that economic models are about ideal objects.⁷ Ideal objects like mass points or frictionless surfaces are objects terms for which are in the vocabulary of some discipline, yet relative to accepted views such objects could not exist. Now some neoclassical models are concerned with ideal objects. Given clause (d) in the definition of a perfectly competitive market, this is obviously true of the model of perfect competition. But other neoclassical models are not about ideal objects. One example is the theoretical model of the pricing and output decisions of a monopoly firm. Relative to accepted views or theory, a monopoly firm could well exist. The distinction between (theoretical) neoclassical models that are, and those that are not, about ideal

objects is compatible with the modal view of economic models. The modal view has it that theoretical models are concerned with the behavior of hypothetical entities. A hypothetical entity is one that would exist were certain conditions to be met. It is not part of the idea of a hypothetical entity that these conditions cannot, relative to accepted theory, be satisfied. But only if this were the case, only if the certain conditions could not be met, would the hypothetical entity be an ideal object.

The simple criticism is that neoclassical micro models contain statements that are (known to be) false, and therefore economists cannot rationally accept these models. This is a version of the familiar and persistent charge that neoclassical theory includes unrealistic assumptions, i.e., assumptions that are not true (or even approximately true).⁸ Professor Hausman says the modal view is of no use whatever in defending neoclassical micro.⁹ But I believe this is mistaken. The modal view does go some way toward rebutting the simple criticism.

As described above, the modal view makes a distinction between theoretical and applied micro models. Thus the simple criticism can be seen as having two forms:

- (A) Theoretical models of neoclassical microeconomics contain falsehoods, and therefore economists cannot rationally accept them.
- (B) Applied neoclassical models include falsehoods, and so economists cannot rationally accept such models.

Now (A) is just a bad argument. Specifically, the single premise of (A) is not true. As indicated above, the sentences contained in theoretical models are truths, albeit about hypothetical rather than real world items. The modal view easily disposes of form (A) of the simple criticism.

A number of objections might arise in response to this short way with form (A) of the simple criticism. Space permits only one of them to be treated here. Consider a theoretical neoclassical model M. Now M has an indefinite number of corresponding applied models, i.e., applied models resulting from applying M, in the way described above, to real world situations. It might be objected to what I said in the previous paragraph that the applied models corresponding to any given theoretical neoclassical model contain empirically false statements. For example, suppose we apply the neoclassical model of the rational consumer to buyers in the retail gasoline market in Santa Cruz County in California. Some of the sentences of this applied model like 'consumers in the Santa Cruz County gasoline market have transitive preferences' will probably be false. And the point holds for all (or at least most) applications of the model of the rational consumer. Thus, the objection continues, this shows that the theoretical models of neoclassical micro include falsehoods. After all, if all the applications of the models include falsehoods, must not the theoretical models themselves contain false statements? In reply, the answer to this question is negative. However large the number n, that n applied models corresponding to a theoretical model M contain falsehoods does not show that M itself includes any false statements.¹⁰ How could it? Once again, on the modal view the

sentences of a theoretical model are not about real world entities at all, but truths about hypothetical entities. To be sure if a theoretical model has a large enough number of corresponding applied models with empirically false statements, then economists' interest in the theoretical model will decrease. This in fact happened to the kinked demand model of oligopoly as a result of George Stigler's empirically based criticism of various applications of the model (Stigler 1947). That economists' interest in a theoretical model rationally decreases in this manner does not reflect any discovery that the theoretical model contains any falsehoods.

I have sketched a defense of neoclassical theory against form (A) of the simple criticism. But what of form (B)? Well, where is the adequate evidence for thinking all or most applied neoclassical models include falsehoods? Those who uphold the simple criticism, or even those who accept only the premise of the criticism, often ask us to consider generalizations found in one or more neoclassical models. The critics usually focus on sentences like 'firm managers seek to maximize profits' and 'consumers' preferences are transitive'. The critics construe such sentences as general claims about each and every real world agent of the relevant sort. For instance, 'firm managers seek to maximize profit' is interpreted as being about each and every real world business firm manager. The critics then claim that the sentences in question fail to fit or be consistent with the observed phenomena.¹¹ But this approach to criticizing neoclassical theory is not legitimate on the modal view of economic models. Consider the sentence (S) 'firm managers seek to maximize profits'. Insofar as S is included in theoretical micro models, the sentence is not about any real world firm managers. To criticize a sentence like S included in a theoretical model on the basis of S conflicting with observational data about real world firm managers is to misconstrue S. But what if S is included in some applied neoclassical model? In this case S is not about each and every real world firm manager. S only makes a claim about firm managers in the specific real world situation to which the model in question is being applied. This follows from the account of applied models given above. Thus, the approach to criticizing neoclassical theory being considered is incapable of supporting the premise of form (B) of the simple criticism.

Now I do not wish to be taken to be suggesting that all sentences in applied neoclassical models are true (or even approximately true). As the example of the kinked demand model cited above indicates, some applied micro models contain statements that are empirically false. The question as to what extent applied neoclassical micro models include falsehoods is a matter for research within economics. It cannot be decided within the second-order discipline of the philosophy of economics. Upholders of the simple criticism may retort that investigation within economics, or perhaps even casual observation, has already shown that all or most applied neoclassical models include empirically false statements. But this is a dubious claim. Douglas Hands, an economist who writes about economic methodology, has this to say:

Rosenberg certainly needs to provide evidence for the ubiquitous predictive failure of applied economic theory. Such criticism is by no means "well known" or "standard" in the literature on economic methodology. It is "standard" to argue that economic theories are

insulated from direct falsification, that they are built on inadequate behavioral foundations, and that in their most abstract form they fail to yield predictions or even to systematically connect up with applied theories that yield predictions. But systematic predictive failure is not a standard methodological criticism of applied economic theory. ... While nowhere near the standard of the best natural science, applied economic theories (both macro and micro) do generate an ocean of successful predictions, on everything from the impact of trucking deregulation to the demand for consumer credit. (Hands 1984, p. 497).

As this passage indicates, the idea that all or most applied micro models include empirically false statements does not command widespread assent within the economics profession. But if investigation within economics, or even casual observation, had already shown applied micro models to be full of falsehoods, one would think economists would be aware of it.

Relying on the modal view of economic models, I have tried to show that form (A) of the simple criticism of neoclassical microeconomics is unsound. And using the theoretical/applied model distinction the modal view makes, I have suggested that the single premise of form (B) of the simple criticism is not a claim we presently can say is known to be true. In this way the modal view does afford a defense of neoclassical theory.

Notes

¹The term 'the simple criticism' is used in Hausman 1984, p. 392.

²Any standard textbook account of neoclassical micro will contain this model. See Henderson and Quandt 1980, pp. 136-137; Nicholson 1978, p. 286, pp. 293-294.

³Hausman ascribes the modal view to, among others, Allan Gibbard and Hal Varian (Hausman 1981a, p. 368). Gibbard and Varian make a distinction between theoretical and applied models (Gibbard and Varian 1978, p. 667). I rely to some extent on their account of the distinction, but dissent from some of the claims they make such as that sentences in theoretical models are truth-valueless.

⁴Gibbard and Varian distinguish casual from econometric applications of economic models (Gibbard and Varian 1978, p. 672). I have been describing casual applications of models in this paragraph rather than applications employing econometric techniques.

⁵It would be better to say sentences in an applied model are true or approximately true concerning the real world situation to which the model is applied. Economic models seldom exactly fit the real world.

⁶Not all accounts of theoretical models seem to square with this fact about neoclassical theory. Gibbard and Varian liken theoretical models to uninterpreted artificial languages (Gibbard and Varian 1978, p. 667). This does not appear consistent with the fact that neoclassical models

describe rational behavior in abstraction from their application to real world situations.

⁷Hausman himself makes this point (Hausman 1981a, pp. 369-370). The initial account of the modal view (Hausman 1984, p. 392) does not take the point into account.

⁸The most famous effort to rebut this charge is Milton Friedman's classic "The Methodology of Positive Economics." I discuss Friedman's views at length in "What is Really Wrong with Friedman's Methodology of Economics," Reason Papers, forthcoming.

⁹See Hausman (1984, pp. 400-401). Hausman seems to think the view that law-like generalizations in micro theory are qualified by implicit or explicit ceteris paribus clauses affords a very limited defense of micro theory (Hausman 1981a, p. 375, pp. 382-383).

¹⁰A point similar to this is made by Boland (1977, p. 103).

¹¹I think an example of this approach is the well-known paper by Lester (1946). Hausman appears to be sympathetic to this approach to supporting the premise of the simple criticism.

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