

On the futility of criticizing the neoclassical maximization hypothesis

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The last couple of decades have seen an intensification of methodological criticism of the foundations of neoclassical theory and in particular of the maximization hypothesis. Harvey Leibenstein argued for a 'Micro-Micro Theory' on the grounds that profit maximization is not necessarily the objective of the actual decision makers in a firm and that a complete explanation would require an explanation of intrafirm behavior. He also gave arguments for why maximization of anything may not be realistic or is at best a special case. Herbert Simon's Nobel lecture argued that individuals do not actually maximize anything – they 'satisfice'. And of course, George Shackle had for many years argued that maximization is not even possible.

Some anti-neoclassical economists are very encouraged by these arguments, but I think these arguments are unsuccessful. For anyone opposed to neoclassical theory, a misdirected criticism which by its failure only adds apparent credibility to neoclassical theory will be worse than the absence of criticism. The purpose of this paper is to explain why, although the neoclassical hypothesis is *not* a tautology, no criticism of that hypothesis will ever be successful. My arguments will be based first on the possible types of theoretical criticism and the logic of those criticisms, and second on the methodological status of the maximization hypothesis in neoclassical explanations.

TYPES OF CRITICISM AND THE MAXIMIZATION HYPOTHESIS

There are only two types of criticism of any behavioral hypothesis once one has established its logical validity. One can argue against the *possibility* of the hypothesized behavior or one can argue against the empirical truth of the premise of the hypothesis. In the case of the neoclassical maximization hypothesis, virtually everyone accepts the logical validity of the hypothesis. For example, everyone can accept that *if* the consumer is a utility maximizer, then for the particular bundle of goods chosen: (a) the marginal utility is zero, and (b) the slope of the marginal utility curve at the point representing the chosen bundle is non-positive and usually negative.¹ That is to say, necessarily the marginal increment to the objective must be zero and falling (or not rising) whenever (i.e. without exception) the maximization premise is actually true. Of course, one could substitute the word 'profit' for the word 'utility' and the logic of the hypothesis still holds. In either form, (a) and (b) are the 'necessary conditions' for maximization. Note that there are no 'sufficient conditions' for maximization. Rather, the maximization premise is the sufficient condition for (a) and (b).

Parenthetically, I should note that economists often refer to (b), or more properly to the conjunction of (a) and (b), as a sufficient condition for maximization. This is a common error. Even if (a) and (b) are both true, only *local* maximization is assured. However, maximization in general (i.e. *global*) is what the premise explicitly asserts and that is not assured by (a) and (b) alone. I will return to this in the last section when I discuss the methodological uses of the maximization hypothesis.

THE LOGICAL BASIS FOR CRITICISM

As stated above, there are two types of criticism of the maximization hypothesis: the *possibilities* criticism and the *empirical* criticism. In this section I will examine the logical bases of these critiques, namely of the possibilities argument which concerns only the *necessary conditions* and

of the empirical argument which concerns only the *sufficient conditions*. In each case I will also discuss the possible logical defense for these criticisms.

The possibilities critique: can the necessary conditions be fulfilled?

The possibilities critique builds on the difference between necessary and sufficient conditions. Specifically, what is criticized is the possibility of fulfilling *all* of the necessary conditions for maximization. Of course, this type of critique begs the question as to what are all the necessary conditions. Are there more conditions than the (a) and (b) listed above? Shackle, following Friedrich Hayek and John Maynard Keynes, argued that maximization also presumes that the knowledge necessary for the process of choosing the ‘best’ alternative has been acquired.² That is to say, as a behavioral hypothesis (i.e. about the behavior of decision makers), if maximization is a deliberate act, Shackle argued that the actor must have acquired all of the information necessary to determine or calculate which alternative maximizes utility (or profit, etc.) and he argues that such acquisition is impossible hence deliberate maximization is an impossible act.

This argument appears to be quite strong although it is rather elementary. A closer examination will show it to be overly optimistic because it is epistemologically presumptive. One needs to ask: *why* is the possession of the necessary knowledge impossible? This question clearly involves one’s epistemology – that is, one’s theory of knowledge. The answer, I think, is quite simple. Shackle’s argument (also Hayek’s and Keynes’) presumes that the truth of one’s knowledge requires an inductive proof.³ And as everyone knows today, there is no inductive logic which could supply a proof whenever the amount of information is finite or it is otherwise incomplete (for example, about the future).

The strength of the Shackle–Hayek–Keynes argument is actually rather vulnerable. Inductive proofs (and hence inductive logic) are not necessary for true knowledge. One’s knowledge (i.e. one’s theory) can be true even though one does not know it to be true – that is, even if one does not have proof. But I think there is an even stronger objection to the ‘true knowledge is necessary for maximization’ argument. *True* knowledge is not necessary for maximization! As I have argued elsewhere, the consumer, for example, only has to think that his or her theory of what is the shape of his or her utility function is true. Once the consumer picks the ‘best’ option there is no reason to deviate or engage in ‘disequilibrium behavior’ unless he or she is prone to testing his or her own theories.⁴

In summary, the Shackle–Hayek–Keynes inductivist argument against the possibility of a true maximization hypothesis is a failure. Inductive proofs are not necessary for true knowledge and true knowledge (by any means) is not necessary for successful or determinate decision making. Maximization behavior cannot be ruled out as a logical impossibility.

The empirical critiques: is the sufficient premise true?

Simon and Leibenstein argue against the maximization hypothesis in a more straightforward way. While accepting the logical validity of the hypothesis, they simply deny the truth of the premise of the hypothesis. They would allow that *if* the consumer is actually a maximizer, the hypothesis would be a true explanation of the consumer’s behavior. But they say the premise is false; consumers are not necessarily maximizers hence their behavior (for example, their demand) would not necessarily be determinable on that basis. Leibenstein may allow that the consumer’s behavior can be determined, but it is an open question as to what is the determining factor – utility, prestige, social convention, etc.? Simon seems to reject as well the necessity of determinate explanation although he does discuss alternate decision rules to substitute for the maximization rule.⁵

A denial of the maximization hypothesis on empirical grounds raises the obvious question: how

do they know the premise is false? Certain methodological considerations would seem to give an advantage to the critics over those who argue in its favor. Recall that we distinguish between those statements which are verifiable (i.e. can be proven true) and those which are refutable (i.e. can be proven false) on purely logical grounds. As we know, (strictly) universal statements – those of the form ‘all *X*’s have property *Y*’ – are refutable (if false) but not verifiable (even if true). On the other hand, (strictly) existential statements – those of the form ‘there are *some X*’s which have property *Y*’ – are verifiable (if true) but not refutable (even if false). At first glance it would seem that the maximization hypothesis – ‘all decision makers are maximizers’ – is straightforwardly a universal statement and hence is refutable but not verifiable. But the statistical problems of empirical refutation present many difficulties. Some of them are well known but, as I shall show a little later, the logical problems are insurmountable.

The methodological problems of empirical refutations of economic theories are widely accepted. In the case of utility maximization we realize that survey reports are suspect and direct observations of the decision-making process are difficult or impossible. In this sense behavioral maximization is not directly testable. The only objective part of the maximization hypothesis is the set of logical consequences such as the uniquely determinate choices. One might thus attempt an indirect test of maximization by examining the outcomes of maximization, namely, the implied pattern of observable choices based on a presumption that there is a utility function and that utility is being maximized by the choices made.

If one wishes to avoid errors in logic, an indirect test of any behavioral hypothesis which is based on a direct examination of its logical consequences must be limited to attempting refutations of one or more of the necessary conditions for the truth of the hypothesis. For example, in the case of consumer theory, whenever utility maximization is the basis of observed choices, a necessary condition is that for any given pattern of choices the ‘Slutsky Theorem’ must hold.⁶ It might appear then that the above methodological problems of observation could be easily overcome, since the Slutsky Theorem can in principle be made to involve only observable quantities and prices. And if one could refute the Slutsky Theorem then one could indirectly refute the maximization hypothesis.⁷ Unfortunately, even if from this perspective such an indirect refutation cannot be ruled out on logical grounds alone, the methodological problems concerning observations will remain.

The fundamental methodological problem of refuting any behavioral hypothesis indirectly is that of constructing a convincing refutation. Any indirect test of the utility maximization hypothesis will be futile if it is to be based on a test of any logically derived implication (such as the Slutsky Theorem). On the one hand, everyone – even critics of maximization – will accept the theorem’s logical validity. On the other hand, given the numerous constraints involved in any concrete situation, the problems of observation will be far more complex than those outlined by the standard theory. Thus, it is not difficult to see that there are numerous obstacles in the way of constructing any convincing refutation of maximization, one which would be beyond question.

I now wish to offer some new considerations about the potential refutations of the neoclassical behavioral hypothesis. I will argue here that even if one could prove that a consumer is not maximizing utility or a producer is not maximizing profit, this would not constitute a refutation of the neoclassical hypothesis. The reason why is that the actual form of the neoclassical premise is not a strictly universal statement. Properly stated, the neoclassical premise is: ‘For all decision makers there is something they maximize’. This statement has the form which is called an ‘all-and-some statement’. All-and-some statements are neither verifiable nor refutable! As a universal statement claiming to be true for all decision makers, it is unverifiable. But, although it is a universal statement and it should be logically possible to prove it is false when it is false (viz by providing a counterexample), this form of universal statement cannot be so easily rejected. Any alleged counterexample is unverifiable *even if the counterexample is true!*

Let me be specific. Given the premise – ‘All consumers maximize something’ – the critic can

claim he has found a consumer who is not maximizing anything. The person who assumed the premise is true can respond: 'You claim you have found a consumer who is not a maximizer but how do you know there is not something which he is maximizing?' In other words, the verification of the counterexample requires the refutation of a strictly existential statement; and, as stated above, we all agree that one cannot refute existential statements.

In summary, empirical arguments such as Simon's or Leibenstein's that deny the truth of the maximization hypothesis are no more testable than the hypothesis itself. Note well, the logical impossibility of proving or disproving the truth of any statement does not indicate anything about the truth of that statement. The neoclassical assumption of universal maximization could very well be false, but as a matter of logic we cannot expect ever to be able to prove that it is.

THE IMPORTANCE OF DISTINGUISHING BETWEEN TAUTOLOGIES AND METAPHYSICS

Some economists have charged that the maximization hypothesis should be rejected because, they argue, since the hypothesis is not testable it must then be a tautology hence it is 'meaningless' or 'unscientific'. Although they may be correct about its testability, they are wrong about its being necessarily a tautology. Statements which are untestable are not necessarily tautologies because they may merely be metaphysical.

Distinguishing between tautologies and metaphysics

Tautologies are statements which are true by virtue of their logical form alone – that is, one cannot even conceive of how they could ever be false. For example, the statement 'I am here or I am not here' is true regardless of the meaning of the non-logical words 'I' or 'here'. There is no conceivable counterexample for this tautological statement. But the maximization hypothesis is not a tautology. It is conceivably false. Its truth or falsity is not a matter of logical form. The problem with the hypothesis is that it is metaphysical.

A statement which is a tautology is intrinsically a tautology. One cannot make it a non-tautology merely by being careful about how it is being used. A statement which is metaphysical is *not* intrinsically metaphysical. Its metaphysical status is a result of *how* it is used in a research program. Metaphysical statements can be false but we may never know because they are the assumptions of a research program which are *deliberately put beyond question*. Of course, a metaphysical assumption may be a tautology but that is not a necessity.

Typically, a metaphysical statement has the form of an existential statement (for example, 'there is class conflict'; 'there is a price system'; 'there is an invisible hand'; 'there will be a revolution'; etc.). It would be an error to think that because a metaphysical existential statement is irrefutable it must also be a tautology. More importantly, a unanimous acceptance of the truth of any existential statement still does not mean it is a tautology.

Some theorists inadvertently create tautologies with their *ad hoc* attempts to overcome any possible informational incompleteness of their theories. For example, as an explanation, global maximization implies the adequacy of the consumer's preferences or his or her theory of all conceivable bundles, which in turn implies his or her acceptance of an unverifiable universal statement. Some theorists thus find global maximization uncomfortable as it expects too much of any decision maker – but the usual reaction only makes matters worse. The maximization hypothesis is easily transformed into a tautology by limiting the premise to local maximization. Specifically, while the necessary conditions (a) and (b) are not sufficient for global maximization, they are sufficient for local maximization. If one then changes the premise to read, 'if the consumer is maximizing over the neighborhood of the chosen bundle', one is only begging the question as to how the neighborhood was chosen. If the neighborhood is defined as that domain

over which the rate of change of the slope of the marginal utility curve is monotonically increasing or decreasing, then at best the hypothesis is circular. But, what is more important here, if one limits the premise to local maximization, one would severely limit the explanatory power or generality of the allegedly explained behavior.⁸ One would be better off maintaining one's metaphysics rather than creating tautologies to seal their defense.

Metaphysics vs methodology

Fifty years ago metaphysics was considered a dirty word but today most people realize that every explanation has its metaphysics. Every model or theory is merely another attempted test of the 'robustness' of a given metaphysics. Every research program has a foundation of given behavioral or structural assumptions. Those assumptions are implicitly ranked according to their questionability. The last assumptions on such a rank-ordered list are the metaphysics of that research program. They can even be used to define that research program. In the case of neoclassical economics, the maximization hypothesis plays this methodological role. Maximization is considered fundamental to everything; even an assumed equilibrium need not actually be put beyond question, as disequilibrium in a market is merely a consequence of the failure of all decision makers to maximize. Thus, those economists who put maximization beyond question cannot 'see' any disequilibria (for example, as with some uses of the Coase theorem).

The research program of neoclassical economics is the challenge of finding a neoclassical explanation for any given phenomenon – that is, whether it is possible to show that the phenomenon can be seen as a logical consequence of maximizing behavior – thus, maximization is beyond question for the purpose of accepting the challenge.⁹ The only question of substance is whether a theorist is willing to say what it would take to convince him or her that the metaphysics used failed the test. For the reasons I have given in the previous section, no logical criticism of maximization can ever convince a neoclassical theorist that there is something intrinsically wrong with the maximization hypothesis.

Whether maximization should be part of anyone's metaphysics is a methodological problem. Since maximization is part of the metaphysics, neoclassical theorists too often employ *ad hoc* methodology in order to deflect possible criticism; thus any criticism or defense of neoclassical maximization must deal with neoclassical methodology rather than the truth of the assumption. Specifically, when criticizing any given assumption of maximization it would seem that critics need only be careful to determine whether or not the truth of the assumption matters. It is true that for followers of Friedman's instrumentalism, the truth of the assumption does not matter hence for strictly methodological reasons it is futile to criticize maximization. And the reasons are quite simple. Practical success does not require true knowledge and instrumentalism presumes that the sole objective of research in economic theory is immediate solutions to practical problems. The truth of assumptions supposedly matters to those economists who reject Friedman's instrumentalism, but for those economists interested in developing economic theory for its own sake, I have argued here that it is still futile to criticize the maximization hypothesis. There is nothing intrinsically wrong with the maximization hypothesis. The only problem, if there is a problem, resides in the methodological attitude of most neoclassical economists.

NOTES

- 1 Note that any hypothesized utility function may already have the effects of constraints built in, as is the case with the Lagrange multiplier technique.
- 2 Although the Shackle–Hayek–Keynes argument applies to the assumption of either local or global maximization, it is most telling in the case of global maximization.
- 3 For more will about this see Boland 1978.

- 4 Again this raises the question of the intended meaning of the maximization premise. If global maximization is the intended meaning, then the consumer must have a (theory of his or her) preference ordering over all conceivable bundles. At a very minimum, he or she must be able to distinguish between local maxima all of which satisfy both necessary conditions, (a) and (b).
- 5 Some people have interpreted Simon's view to be saying that the reason why decision makers merely satisfice is that it would be 'too costly' to collect all the necessary information to determine the unique maximum. But this interpretation is inconsistent if it is a justification of assuming only 'satisficing' as it would imply cost minimization, which of course is just the dual of utility maximization!
- 6 For an elementary explanation of the mechanics of the Slutsky Theorem, see Varian 1993, Chapter 8.
- 7 For example, if one could show that when the income effect is positive but the demand curve is positively sloped, then the Slutsky Theorem would be false or there is no utility maximization [see Lloyd 1965].
- 8 See n. 4 above. If one interprets maximization to mean only local maximization, then the question is begged as to how a consumer has chosen between competing local maxima.
- 9 For these reasons the maximization hypothesis might be called the 'paradigm' according to Thomas Kuhn's view of science [1970]. But note that the existence of a paradigm or of a metaphysical statement in any research program is not a psychological quirk of the researcher. Metaphysical statements are necessary because we cannot simultaneously explain everything. There must be some exogenous variables or some assumptions (for example, universal statements) in every explanation whether it is scientific or not.

REFERENCES

- William Baumol, *Economic Theory and Operations Analysis*, Englewood Cliffs: Prentice-Hall, 1977.
- L. Boland, "Time in Economics vs. Economics in Time," *Canadian J. Econ.*, 1978, 11, 240-62.
- F. Hayek, "Economics and Knowledge," *Economica*, 1937, 4, 33-54.
- J. M. Keynes, "The General Theory of Employment," *Quart. J. Econ.*, 1937, 51, 209-23.
- H. Leibenstein, "A Branch of Economics is Missing: Micro-Micro Theory," *J. Econ. Lit.*, 1979, 17, 477-502.
- T.S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1970)
- C. Lloyd, "On the Falsifiability of Traditional Demand Theory," *Metroeconomica*, 1965, 17, 17-23.
- George Shackle, *Epistemics and Economics*, Cambridge: Cambridge University Press, 1973.
- H. Simon, "Rational Decision Making in Business Organizations," *Amer. Econ. Rev.*, 1979, 69, 493-513.
- H. Varian, *Intermediate Microeconomics*, (New York: Norton, 1993)