

“The Death of Neoclassical Economics”

by

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THE DEATH OF NEOCLASSICAL ECONOMICS

BY

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The term “neoclassical economics” was born in 1900; in this paper I am proposing economist-assisted terminasia; by the powers vested in me as president of the History of Economics Society, I hereby declare the term neoclassical economics dead.¹ Let me be clear about what I am sentencing to death—it is not the content of neoclassical economics. As I will discuss below, it is difficult to determine what that content is, and even if I wanted to kill the content, I have no role in determining content. The role of historians of thought is to record, not determine, content. What I am declaring dead is the term.

Historians of thought, especially those of us who write textbooks and teach, have some influence over terminology. One of our important jobs is to provide students and non-specialists with insight into what the content of economics is. One of the ways we do so is through classifying—creating terminology that provides students and non-specialists an entree into debates that would otherwise be too complicated to understand. We adopt classifying terminology and give it definitional content. It is historians of thought who are the primary arbiters of descriptive terminology and, hence, we can have a role in changing that terminology. Therein lies the basis for my decree of death.

I. ON CLASSIFICATION

Classifying is not for the faint of heart nor the perfectionist; it requires you to mix what, in a deeper sense, are unmixables, to blend into composites that which does not blend. When you do this, you’ve got to hold your nose to avoid the resulting reaction, both from researchers who feel mistreated and from other historians of thought who rightly point out the innumerable sensibilities the classification has violated. But classification is necessary, and what we hope is that with the classification, those students who don’t go on to further studies will have a better understanding than they otherwise would have had, and that those

There is a bug—the Y2K bug—that comes along at the turn of the millennium and bites otherwise sane people, leading them to pontificate about grand issues. Individuals, such as me, who have a natural proclivity to pontificate are especially susceptible, so I ask your forbearance at the beginning; this paper was written under the influence.

¹ Actually it is not clear to me that I have the power to do so, but since my term is almost over, I will assume that before impeachment proceedings can be completed, I will be out of office.

students who continue their studies will learn the problems with the classifications, transcend them, and forgive us our compromises that mislead.

Historians of thought have seldom given serious specific consideration to the general characteristics of good classification.² Should one focus on temporal dimensions? Should one use terms that tie together the similarities, or terms that emphasize the differences? What is the ideal terminology?

While I certainly don't have the answers to these questions, I do have a few observations and suggestions. The first observation is that since classifications are usually employed to compare one set of thoughts with another, there is one degree of freedom in making classifications. This means that the reference school can be called anything. For example, the longevity of the term "classical" is not so much because the term is good, but is more because it has been the numeraire for other classifications. The neoclassical and New Classical classifications only make sense in relation to Classical, but in itself "Classical" could have been anything. Had economics chosen a different reference term we could be talking about "the New Ricardians" or the "New Marketeers."

The second observation is that most of the classifications economists use have developed serendipitously. A term is used and repeated by a couple of people, and suddenly it is "in use." Such serendipitous terminology generally has a short-run focus—it refers to what immediately preceded it. That's why we see lots of new, neo, new neo, and post (with and without hyphens) modifications of schools.

Let me suggest five classification criteria that I think are important:

1. A classification should help organize thinking about the issues to which it refers, and it should do so in a way that is understandable to the non-specialist.

The reasoning for this criterion is fairly obvious. The whole purpose of the classification is to help non-specialists understand complicated debates. Based on this criterion, the term "Classical" is not an especially good term.

2. A classification should seem natural and intuitive to most practitioners, and acceptable to those thus classified.

Ultimately, assuming we are talking about an existing school, it is the individuals being classified who will have to say if a classification captures their thinking. If they object to it, it will not be likely to last. Luckily, when classifying historical schools, most practitioners are dead and cannot object.

3. A classification should work well over time.

Classifications that are most useful remain appropriate over a fairly long period of time. This criterion does not bode well for any classification with the prefix

² Joseph Schumpeter (1954) is an exception; he deals with the issue in his discussion of the problems of periodization.

new or neo. Seen against a short term horizon, defining something as "new whatever" makes a lot of sense, since people have a good idea of "whatever" is. But as time goes by, that "whatever" is forgotten and the "new whatever" is less clear. Moreover, what is new in one time period soon becomes old. But, when that happens, the classification often has become sufficiently used so that it is part of the language and difficult to replace. To describe the next development you've got to move to "new new," "neonew," or maybe "neoneo." The same problems exist with the terms modern and post modern.

4. A classification should be used to describe content, not to harbor some ideological content.

The argument for this proposition is, again, fairly obvious; one wants a general criterion that is as value neutral as possible. The "Dummies" would not be a good classification.

5. A classification should have a consistent definition.

Classifications exhibit network externality characteristics. The value of the term is in the image, the set of articles and ideas, that a term brings up in people's minds. A good classification has a standard definition, so when people hear it, they know what is meant by it. It should not mean different things to different people. When a single classification means different things to different people, confusion will result.

If a classification doesn't meet these five criteria it will clutter the terminological landscape; if it does, then the name can serve a useful purpose: it can complete a picture, and make clear not only the ideas of the group being described, but, like the final piece of a puzzle, also make the others' work clearer. Otherwise, the classification will confuse, not clarify. Just as a piece of a puzzle in the wrong place will obscure a picture rather than complete it, so, too, will a loosely used term.

All fields have classification problems. In art, for example, one finds some good classifications: impressionism, expressionism, and minimalist bring to mind the art to which they are referring. Of course, art has some bad classifications too. Who knows what is meant by modern or post modern?³

II. WHY THE NEOCLASSICAL CLASSIFICATION SHOULD DIE

Given my acknowledgment of the problems of any classification system, the problems with the term neoclassical must be especially onerous to call for its death. In my view they are. The use of the term neoclassical to describe the economics that is practiced today is not only not useful, but it actually hinders understanding by students and lay people of what contemporary economics is. The term may still have a role in intertemporal comparisons, but if it is to do so,

³ It might be argued by a cynic that that ambiguity is precisely the image the terms are meant to bring forth.

it is even more important to have the neoclassical era end at some point.⁴ Economics has changed enormously from 1870 to now, and is continually changing. To serve an intertemporal purpose, the term "neoclassical economic school" has to die.

Let me be clear about what I see as the largest problem with the use of the term. The problem is its use by some heterodox economists, by many non-specialists, and by historians of thought at unguarded moments, as a classifier for the approach that the majority of economists take today. We all, me included, fall into the habit of calling modern economics neoclassical when we want to contrast modern mainstream economics with heterodox economics. When we like the alternative, the neoclassical term is often used as a slur, with our readers or listeners knowing what we mean. Of course, historians of thought are far better at avoiding this "slur" use than are others. The worst use, and the place one hears the term neoclassical most often, is in the discussions by lay people who object to some portion of modern economic thought. To them bad economics and neoclassical economics are synonymous terms.

There is much not to like in current economics; but slurring it, by calling it neoclassical economics, does not add to students' understanding of the current failings of economics. Economists today are not neoclassical according to any reasonable definition of the term. They are far more eclectic, and concerned with different issues than were the economists of the early 1900s, whom the term was originally designed to describe. If we don't like modern economics, we should say so, but we should not take the easy road, implicitly condemning modern economics by the terminology we choose.

III. EVOLUTION OF THE TERM NEOCLASSICAL

The story of the evolution of the term neoclassical is a story of metamorphosis. Let me briefly recount its history. The root term, Classical, was coined by Karl Marx (1847) as a description of David Ricardo's formal economics; Marx contrasted Classical with vulgar or romantic economics, by which he meant "economics close to the people." Various writers used the "Classical" terminology and, as they did, the term eventually became a general classifier for the economics of the period running somewhere between 1776 and 1870. Thus we could talk about the evolution of thinking from the mercantilist to the Classical period.

Historians of thought have raised numerous issues about the use of the term Classical. One issue is, when did the Classical period begin? Schumpeter, following Marx, starts the Classical era with Ricardo. He places Adam Smith with the mercantilist pamphleteers, taking the Classical period as 1790 to 1879.⁵ Most histories of thought include Smith as a Classical economist. Most writers put the end of the Classical period a bit earlier—in 1870—and start the

⁴ As I will discuss below in my treatment of the history of the neoclassical classification, that intertemporal role is questionable, too.

⁵ Schumpeter considers the issue of classification of Classical economics carefully. In a footnote (p. 379) he remarks that there were three uses of the term Classical. (Elizabeth Schumpeter, who edited the book from his notes states that this section was unfinished.)

neoclassical period with Carl Menger, but such beginning and ending issues, unless they involve a writer of the stature of Smith, are of minor importance. Another issue is whether a single term can encompass such disparate thinkers as Smith and Ricardo. In some ways it would have been much more helpful to have had a separate Smithian school whose focus was on growth, and a separate Ricardian school whose focus was on distributive shares.

From Classical To Neoclassical

In the 1870s there was a qualitative change in some economists' approach to doing economics. During this time utilitarianism and marginalism rose in importance, and deductive models with utilitarian foundations became more fashionable. To capture this change, it was helpful to develop a new classification to distinguish that approach from the earlier Classical approaches based on the labor, or cost, theories of value. The term that developed was neoclassical.

The term neoclassical was initially coined by Thorstein Veblen (1900) in his "Preconceptions of Economic Science."⁶ As Veblen used the term, it was a negative description of Alfred Marshall's economics, which itself was a type of synthesis of the marginalism found in Menger and W.S. Jevons with broader Classical themes in Smith, Ricardo, and J.S. Mill. Thus, from the beginning, the term was used by an outsider to characterize the thinking of another group. When Veblen coined it, it was not meant as a description of mainstream economics. In the early 1900s, economics was divided and, in the U.S. at least, neoclassical thought was not mainstream; institutionalism was more embedded than neoclassical thought. Veblen's terminology caught on, and the term neoclassical came into general use and can be found in the writings of W.C. Mitchell (1967), J.A. Hobson (1925), and Eric Roll (1938, 1942).

Hicks (1932, 1934) and Stigler (1941) extended the meaning of neoclassical to encompass all marginalist writers, including Menger, Jevons, and J.B. Clark. Most writers after John Hicks and George Stigler used the term inclusively. Thus it lost most of its initial meaning. Instead of describing Marshallian economics, it became associated with the use of calculus, the use of marginal productivity theory, and a focus on relative prices. As has been noted by a number of authors, while the neoclassical terminology makes some sense for Marshall, who emphasized the connection of his approach with the Classical approach, it makes far less sense for the others, such as Jevons, who emphasized the difference between his views and those of the Classics. Some have suggested that anti-Classical would have been preferable.

J.M. Keynes (1936), as was his way, disregarded existing usage and developed his own. He lumped Classics and neoclassicals together, calling them all Classics—suggesting that the distinctions in pre-Keynesian work were of minor importance. Keynes's use added yet another dimension to the Classical classification: it was a term that was to be contrasted with Keynesian. In the third edition of his principles textbook, Paul Samuelson (1955) built on Keynes's

⁶ See Tony Aspromourgos (1986) for a discussion. See also Sasan Fayazmanesh (1998).

classification and turned it around on Keynes by developing the neoclassical synthesis. In the neoclassical synthesis, Keynes's dispute with Classical economists was resolved. This use of the term neoclassical as an alternative to Keynesian models provides another confusion because it adds another reference point that brings to mind different elements of thought than would other comparisons.

IV. CURRENT USE OF THE TERM

The most lavish users of the term neoclassical are heterodox economists. (I can always tell when I am around heterodox economists by the number of times I hear the term.) For the most part, mainstream economists don't use the term; when they do, it is used almost unthinkingly, as in "neoclassical growth theory" or "neoclassical synthesis."

The current use of the term by historians of thought is schizophrenic and inconsistent. Most books follow Stigler's lead and include Jevons, Marshall, Léon Walras, Menger, and similar writers as neoclassical economists, thus starting the neoclassical period in 1870 and ending it around 1930. Consistent with this usage, many history of economic thought texts, mine included, are divided into sections: pre-classical, classical, neoclassical, and modern.

That use has its problems, but they fall within the normal set of problems of any classification. My objections to the term neoclassical involve its use to juxtapose modern mainstream economics with heterodox economics, which is another use historians of economic thought make of the neoclassical classification.

Let me give a couple of examples. Roger Backhouse (1985) discusses the neoclassical period as extending from 1890 to 1939. (It is one of his central divisions.) He contrasts that period with the modern period. But then he concludes his book by contrasting modern economics with heterodox economics. There, he talks about "a neoclassical research program" and writes "for all its limitations, and there are many, neoclassical economics has, over the past century, been successfully applied to an ever-wider range of problems" (1985, p. 414). Somehow, neoclassical economics didn't end in 1939, but became merged with modern economics.

In their text, Robert Ekelund and Robert Hebert (1997) emphasize the early work of Augustine Cournot and Jules Dupuit in their discussion of neoclassical economics. Thus their neoclassical period starts at about 1840. They are unclear as to where it ends; they trace the development of "early neoclassical economics," a term that suggests that there is a "later period." They continue that view in the discussion of twentieth-century paradigms where they state that "neoclassical economics blossomed" (p. 404). Thus it would seem that neoclassical economics became the modern orthodoxy.

Stanley Brue (1994) distinguishes the marginalist school of Jevons and Menger from the neoclassical school of Marshall, F.Y. Edgeworth, and J.B. Clark. Neoclassical economists include Edward Chamberlin and Joan Robinson. He then starts the mathematical period in 1935, although he states that that "mathematical economics" does not constitute a separate school of economics (p. 361).

Mark Blaug (1985) does not use the neoclassical term to describe marginalism, but he does use it in two ways, first when discussing macro theory (p. 632), and, second, when he is criticizing modern theory.⁷

As a textbook author, I am sympathetic to the inconsistent use of neoclassical. In popular parlance the term neoclassical is used in two quite separate ways: (1) to describe the economics from 1870 to the 1930s, and (2) to describe modern economics in reference to heterodox thinking today. Textbook authors have a natural tendency to use it in that same way. Unfortunately, the two uses make logical sense only if modern economics is essentially the same in the earlier time period as it is today. You can't have it both ways. Either modern economics is part of neoclassical economics or it isn't.

I quite agree that certain aspects of neoclassical economics remain as part of modern economics. That is true of any field—the new approach accepts certain parts of the previous approach. But, in my view, modern economics is fundamentally different from neoclassical economics and, if students are to understand modern economics, they must understand that. In our choice of terminology it is more helpful to students to emphasize the differences between modern economics and neoclassical than it is to recognize the similarities.

Modern economics involves a broader world view and is far more eclectic than the neoclassical terminology allows. To capture that eclecticism, modern economics must be given a much broader, and more sympathetic classification, including the penumbra surrounding the core ideas. Thus, the argument I am making is that, for outside observers to understand what is happening in economic thinking today, it is necessary to distinguish a new school of economics that can be contrasted with neoclassical economics in the same way that neoclassical economics was contrasted with Classical economics.

I'm not sure when we should say neoclassical economics died. The most logical cutoff would be somewhere between 1935 and 2000. The date cannot be pinpointed because its death was gradual—a slow transition rather than a sudden epiphany. Game theory made its appearance in 1946. In many ways, the two books that tied up the loose ends and captured the essence of neoclassical economics, Hicks's *Value and Capital* (1939) and Samuelson's *Foundations* (1947), were culminating works—they put all the pieces of marginalism together. Important work thereafter was modern. The very fact that the economics of the 1950s was able to include Keynesian economics as its macroeconomics demonstrates an enormous change in method, approach, and content of economics. Keynesian macroeconomics has few of the characteristics attributed to neoclassical economics.

I should make it clear that I am not alone in declaring the neoclassical terminology dead; some historians of thought, such as Jürg Niehans, don't use the term at all. Even some of those who use it question its usefulness. For example, Mark Blaug writes: "Neoclassical economics transformed itself so radically in the 1940s and 1950s that someone ought to invent an entirely new label for post-war orthodox economics" (1998, p. 2).

⁷ For example, in his methodological postscript he writes "the besetting methodological vice of neoclassical economics was the illegitimate use of microstatic theories (p. 701).

Hicks (1983, pp. xiii-xiv), who helped broaden the use of the term to include all marginalists in his *Value and Capital* had second thoughts, and in 1983 he suggested that the term neoclassical be killed. And finally, the two writers who have explored the history of the term in depth, Tony Aspromourgos (1986) and Sasan Fayazmanesh (1998), both conclude that the term should die.

Attributes of the Neoclassical School

To make the comparison between neoclassical and modern more concrete, let me list briefly the primary attributes of neoclassical economics that are found in most history of thought texts and contrast them with the primary attributes of modern economics.

1. Neoclassical economics focuses on allocation of resources at a given moment in time.

This attribute is embodied in Lionel Robbins's definition—the allocation of scarce resources among alternative ends—which became the standard definition of neoclassical economics.

2. Neoclassical economics accepts some variation of utilitarianism as playing a central role in understanding the economy.

The movement to demand and subjective choice theory, and away from supply considerations, was a hallmark of early neoclassical thought. While initially the focus was almost entirely on utilitarianism and demand, the focus quickly evolved to a view that demand was only one blade of the scissors.

3. Neoclassical economics focuses on marginal tradeoffs.

Neoclassical economics came into existence as calculus spread to economics, and its initial work was centered around the marginal tradeoffs that calculus focused on.

4. Neoclassical economics assumes farsighted rationality.

In order to structure the economic problem within a constrained maximization framework, one has to specify rationality in a way consistent with constrained optimization. Specific rationality assumptions quickly became central to the neoclassical approach.

5. Neoclassical economics accepts methodological individualism.

This assumption, like the two before it, is closely tied to the constrained maximization approach. Someone must be doing the maximizing, and in neoclassical economics it was the individual. One starts with individual rationality, and the market translates that individual rationality into social rationality.

6. *Neoclassical economics is structured around a general equilibrium conception of the economy.*

This last attribute is more debatable than the others. Schumpeter made the general equilibrium conception of the economy central to his definition of neoclassical economics. I agree it is important, but if it were absolutely central it would eliminate Marshall from the neoclassical school. However, Schumpeter is right in the following way: in order to make neoclassical economics more than an applied policy approach to problems (something Schumpeter wanted to do) one needs a general unique equilibrium conception of the economy. Formal welfare economics is based on this general equilibrium conception.

V. MODERN ECONOMICS AND THE SIX ATTRIBUTES

My argument against the use of the neoclassical term to describe modern economics is that modern economics does not require adherence to these six attributes. It is much more eclectic. The movement away from neoclassical economics can be traced to the 1930s, when large components of neoclassical theory were being abandoned by cutting edge theorists as they attempted to forge a new economics.

Let me consider each of the six attributes, giving examples of where modern economics parts company with neoclassical economics.

1. *Focus on allocation of resources at a given moment in time.*

The interest in allocation of resources at a given moment in time ended long ago, the problems solved. Been there, done that. The focus of research quickly turned to allocation over time. In the 1990s, for example, growth has been a key topic. New growth theory is decidedly mainstream and decidedly non-neoclassical. In fact, it is generally contrasted with neoclassical growth theory.

2. *Acceptance of utilitarianism.*

Few modern economists today accept utilitarianism; most see it as a quaint aspect of the past. One sees very little operational use of utility theory in modern economics. Critics of my view might claim that, in principles and intermediate books, versions of utilitarianism still reign, but they are presented for pedagogical reasons, not because utilitarianism is the reigning approach of modern economists.

3. *Focus on marginal tradeoffs.*

While many undergraduate texts still present economics within a marginal framework, that is not the way it is presented in graduate schools or the way top economists think about issues. In fact, by the 1930s, in cutting-edge theory, calculus was already being dropped, having been mined for its insights, and math was moving to set theory and topology as economists tried to expand the

domain of the economics to include a wider variety of topics. In modern graduate microeconomics, game theory has almost completely replaced calculus as the central modeling apparatus.

4. Assumption of farsighted rationality.

The decrease in the focus on utilitarianism has been accompanied by a decrease in the far-sighted rationality assumption. In modern economics, bounded rationality, norm-based rationality (perhaps established through evolutionary game theory), and empirically determined rationality are fully acceptable approaches to problems.

5. Methodological individualism.

While individualism still reigns, it is under attack by branches of modern economics. Complexity theorists challenge the entire individualistic approach, at least when that approach is used to understand the aggregate economy. Evolutionary game theorists are attempting to show how such norms develop and constrain behavior. New Institutionalists consistently operate out of a framework at odds with methodological individualism.

6. General equilibrium.

The existence of a unique general equilibrium is still the predominantly held view, but that is primarily because general equilibrium models are seldom used. In theory, multiple equilibria work is ongoing, and equilibrium selection mechanisms are an important element of study. Schumpeter made the existence of a single equilibrium the requirement of science, and neoclassical economics never seriously considered the problem of multiple equilibria.⁸ In modern economics, theoretical economists are quite willing to consider multiple equilibria, as can be seen in the work of Michael Woodward (1991). It is true that modern work in policy generally avoids any discussion of multiple equilibria, and that is one of the contradictions in modern economics, but the multiple equilibria topic is no longer out of bounds.

VI. TOP MODERN ECONOMISTS

My argument is not that neoclassical economic ideas are not still used; they are. My argument is only that they are not constraining attributes; they are not requirements of what a current economist must do to have a reasonably good chance for success. One can work in a quite different vein and still be considered

⁸ Schumpeter writes: "Multiple equilibria are not necessarily useless, but from the standpoint of any exact science the existence of a uniquely determined equilibrium is, of course, of the utmost importance, even if proof has to be purchased at the price of very restrictive assumptions; without any possibility of proving the existence of (a) uniquely determined equilibrium—or at all events, of a small number of possible equilibria—at however high a level of abstraction, a field of phenomena is really a chaos that is not under analytical control" (1954).

mainstream. Consider the following names: David Romer, Buz Brock, Richard Thaler, William Baumol, George Akerlof, Joe Stiglitz, David Card, Alan Krueger, Paul Krugman, Ken Arrow, Amartya Sen, Thomas Shelling, etc. I could go on, but these should make my point. Each is considered a top modern economist, but each operates outside the "neoclassical framework" in portions of his work.

Now one could argue that the economists listed above are actually heterodox economists who are deviating from the neoclassical core that is modern economics. But such an argument would be wrong. First, these researchers do not see themselves as heterodox economists, and thus classifying them as heterodox would violate the criterion that a classification should be acceptable to its practitioners. Second, all of them are highly respected economists with jobs at, or offers from, top graduate schools. If the term heterodox is to be meaningful, it should be defined as an approach to problems that is not accepted as legitimate. Thus, my litmus test of heterodox economists is their ability to get jobs at major graduate schools. Marxist and Institutional economist are heterodox economists; those on the above list are not. The reality is that, when it comes to content, modern economics is open to new ideas. (I'm not saying totally open, but I am saying at least begrudgingly open.) There are disagreements about content, and about how consistent with general equilibrium theory models should be, but in terms of content, there is significant flexibility, especially at the cutting edge.

VII. THE CENTRAL ATTRIBUTE OF MODERN ECONOMICS

If content does not define modern economics, what does? It is method. The same modern economics that is enormously broad in its acceptance of various assumptions and content is extremely narrow when it comes to method. As Robert Solow (1997) spells out, and as Niehans (1990) emphasizes, *the modeling approach to problems is the central element of modern economics*. Solow writes:

Today, if you ask a mainstream economist a question about almost any aspect of economic life, the response will be: suppose we model that situation and see what happens ... There are thousands of examples; the point is that modern mainstream economics consists of little else but examples of this process (1997, p. 43).

Modeling is not seen as an end in itself; there is a continual discussion of the need to empirically test, and the formal modeling is undertaken in large part to make the models empirically testable, and applicable to policy, with formal statistical techniques.

Given the changes in economics, the "study of the allocation of scarce resources" definition of economics no longer describes what economists do. A better definition would be, "The study of the economy and economic policies through empirically testable models." An alternative definition comes from Keynes: "Economics is the science of thinking in terms of models joined to the art of choosing models which are relevant to the contemporary world." The point

of these new definitions is that they do not consider content; they consider the approach used. Modern economics is economics of the model.

VIII. A MODEL FOR EVERY PURPOSE

To say that modern economics follows a modeling approach is not to say that other periods did not use models. Economists have always used models. But there is a distinction in how the models are used. To see the distinction between modern economists' use of models and earlier economists', it is useful to distinguish between pure theory models and applied policy models. Formal modeling has always been the essence of the pure theory of economics—the metaphysics, or science, depending on one's view. For example, François Quesnay, Ricardo, Cournot, and Walras all simplified their views to develop a theoretical model. Modern pure theory has evolved from the general equilibrium theory of Walras to the general equilibrium of Arrow/Debreu, but the modeling approach has not changed. These pure theory models are highly formal and mathematically deep. But such formal models are not the type of models that the large proportion of economists deal with.

It is in applied policy where modern economics differs from earlier economics. In previous time periods, economists such as Smith or Marshall kept the theory in the back of their minds and thought about the policy problem as an art. Their models were kept in the background, and reasonableness—critical thought—was emphasized in applying the models. Applied policy belonged in what J. N. Keynes (1897) called the "art" of economics. In the art of economics the pure theory model served as a backdrop, but one approached problems in an informal way. Formal empirical testing of such loose models was impossible, but one could easily include non-quantifiable variables and sensibilities in one's policy consideration.

In modern economics that has changed. There is no art of economics in which policy problems are addressed in an informal manner. Modern applied policy models must be specified in a way that can be directly empirically tested, at least in principle. While such models are informal by mathematical standards, they are formal by artistic standards, which is why some observers call modern economics formalist.

Ironically, the modern modeling approach grew out of the Keynesian macroeconomics of the 1930s and Marshall's practical policy approach to problems. It is a blend of the Keynesian and Marshallian visions of economics with the twist that the models are specified in such a way that they are subject to econometric testing. But in specifying the models so that they are subject to econometric testing, the current approach fundamentally alters the Marshallian approach to policy. The simplified models are moved up to center stage, and the judgment, embodying the blending of the assumptions kept in the back of one's mind which lead to the model's results, are moved to a side stage.

Another aspect of modern applied policy modeling is that, with the exception of work in computable general equilibrium, these models pay almost no heed to consistency with general equilibrium theory. New work in micro emphasizes the development of a variety of practical models, such as the asymmetric pricing

model, that are relevant for specific problems, but make no claim that, and give little thought to whether, they are general-equilibrium consistent. Modern applied microeconomics consists of a grab bag of models with a model for every purpose.

Practical models were not always divorced from pure theory models. In the 1950s and 1960s, it was hoped that practical models would be guided by general equilibrium theory. Thus, when Arrow/Debreu proved the existence of a general equilibrium in 1957, there was hope that the pure science of economics would progress in tandem with the practical application of that science. By the 1970s economists recognized that the Arrow/Debreu general equilibrium work was not going to get to the promised land. That recognition freed economists to deal with practical policy models that were inconsistent with general equilibrium theory.

In my view, that recognition accounts for the developments of new growth theory, new trade theory, and other partial equilibrium models that are inconsistent with formal general equilibrium models. They are practical models, which can be loosely tested empirically and which shed some light on issues. Shedding some light on a problem is all that the practical track of modern economics requires. Solow (1997) calls this approach "loose fitting positivism." The difference in view can be seen in the change in approach to increasing returns. Whereas in 1939, when the general equilibrium hope was still alive, Hicks commented that assuming increasing returns could lead to the "wreckage of the greater part of general equilibrium theory" (1939, p. 84), in the 1980s and 90s Paul Krugman, and other new trade, industrialization, and growth theorists proceed as if it is not even an issue. They simply assume away the problems that multiple equilibria and increasing returns raise.

Whereas in micro the evolution has been toward a grab bag of models, the evolution in macro has been different. Modern macro started in the 1940s as a grab bag of ad hoc models inconsistent with general equilibrium theory. Throughout the 1950s and 1960s macroeconomics was the essence of pragmatic eclectic modeling. Macro models focused on consumption functions and quantity theories, based on general aggregate relationships, dominated the field. In these models there was no demand for micro foundations.

That state of affairs was challenged by the New Classical revolution, which argued that Keynesian economics needed micro foundations and had to be consistent with general equilibrium. In the 1980s, New Classical economics had a brief day in the sun by adding farsighted rationality to existing macro models and justifying that addition with a call for consistency with general equilibrium assumptions. In my view it succeeded in becoming important primarily because it offered a relatively easy modeling criterion that led to numerous papers and theses. Its applicability was always in doubt.

By the early 1990s, the New Classical revolution had played itself out; most economists recognized that general equilibrium could not be applied directly to the economy. New Keynesian models incorporated farsighted rationality, but they were primarily partial equilibrium models. Neither New Classical nor New Keynesian models were especially insightful and, in the 1990s, the theoretical focus of attention in macro shifted to growth. Practical and macro modeling was

returned to the real-world practitioners, and applied macroeconomics returned to pragmatic, ad hoc modeling.

IX. PROBLEMS WITH MODERN APPLIED ECONOMICS

In many ways the modern movement to applied modeling is laudable. It is empirical and is an attempt to avoid the pontificating that characterized earlier periods. Modern applied modeling looks to the empirical evidence through models. But it also has problems. Since the connection with general equilibrium theory has been eliminated, there is no theoretical core limiting assumptions. New Classicals criticized the lack of a theoretical core in Keynesian macro; that criticism led to its success. Put bluntly, modern applied economics is essentially data mining with some semblance of "scientific empirical testing" added to make it seem less ad hoc. Don't get me wrong; there is nothing wrong with data mining; you can find out much about the economy in the data. My point is that when you data mine, you undercut your ability to formally statistically test the results in a formal manner. If the assumptions of the model are ad hoc, then the results are ad hoc. That doesn't mean that the models can't be informally empirically tested and compared with reality, but the major thrust of modern economics is on formal empirical testing of the models. They avoid the semblance of pontificating by structuring their models in scientific clothing. Thus, in my view, modern applied economics has serious problems.

The problem is exacerbated by incentives within the profession for publishing; these incentives lead to assumptions for the ad hoc pragmatic models often being chosen based on their likelihood of getting published, which requires "nice" results and empirical statistical applicability, rather than their reasonableness. These problems are serious, but they are not the problems of neoclassical economics. In fact, they are problems that developed because modern economics has moved away from the neoclassical assumptions and become more eclectic.

X. THE BIRTH OF THE NEW MILLENNIUM ECONOMICS

A theory can be replaced only by another theory; a term can be replaced only by another term. The staying power of the term neoclassical can, in many ways, be explained by the absence of an alternative. Unless another term is forthcoming and becomes generally accepted and used by historians of thought and other observers, the term neoclassical will continue forever.

A number of alternative terms have been proposed. Xiaokai Yang and Siang Ng (1994) have proposed "new Classical" to describe modern work. The problems with this are (1) the term has already been used to describe an approach to macro; (2) it is unclear whether modern theory is "Classical" in any meaningful sense; (3) the use of the "new" classification is shortsighted and leads to long-run confusion. Stanley Brue's term for modern economics, "mathematical economics," doesn't work because (1) it is not descriptive of much of what is done—most policy models use little deep mathematics; (2) it

misses the empirical testing aspect of the modeling; (3) practitioners such as Solow don't like it. The "formalist" classification fails for similar reasons.

Jürg Niehans has come the closest in classifying the modern era when he called modern economics "the era of modeling." It is descriptive and acceptable to most practitioners (Solow emphasized the modeling aspect of modern economics in his description). Its problems are that it fails to capture the nature of the modern applied policy modeling, specifically its tendency to simplify in an ad hoc manner and then empirically test. As I stated above, economists have always modeled; what distinguishes approaches is the nature of the modeling. Ad hoc modelers, or eclectic modelers, would be more descriptive.

My proposal for what to call modern economics is "New Millennium Economics." In doing so I am following Schumpeter's lead in classify schools by temporal terms. The advantages of doing so are the following: (1) The term fits in with the millennium rage; (2) it is forward looking, and thus does not have to deal with the issue of what economics was from 1930 to 2000; some can see it as a transition period; others can see it as the early beginning of New Millennium economics; (3) it is ideologically neutral; it does not come with the excess baggage of Classical or Keynesian or neo, new terminology; (although it will have to be changed when 3000 rolls around); (4) it is easily broken up—there can be an early twenty-first century and a late twenty-first century branch.

XI. CONCLUSION

Let me conclude by briefly talking about changes I see occurring in the future. The changes will be driven by developments in theory that allow modern economics to come to grips with the disconnect between their practical ad hoc models and their pure theory general equilibrium models. This can be accomplished in two ways. Either the underlying pure theory can change, or applied policy work can change. I see both occurring.

In pure theory there are two complementary directions research is taking. One is the development of a general equilibrium theory based on evolutionary game theory, supplemented by experimental economics. This approach "solves" the multiple equilibrium problem by adding an analysis of equilibria selection mechanisms. That work has the potential to change the way we think about general equilibrium theory by providing a richer foundation from which to build practical models.

The other direction is the work of complexity theorists. Their work provides an alternative to a general equilibrium foundation. In the complexity approach, one takes the position that something so complex as the aggregate economy cannot have formal analytic foundations; hence our understanding of it must proceed through alternative means. In complex systems, order spontaneously develops as patterns emerge. Simplicity of complex systems is to be found in the study of dynamics and iterative processes, not in structural simplicity. In the complexity approach, everything is data mining, but it is a highly sophisticated data mining done under specific rules—rules which are just now developing. It

is still a modeling approach, but it is done with computer simulations.⁹ The ever-falling costs of computing will push this approach forward in the twenty-first century.

The other change that I see occurring is in how one tests practical models and in how one decides on assumptions. Here I see experimental economics as playing a central role. Experimental economics offers a way of choosing among various equilibria that result from game-theoretic models. I believe it is because of the hope provided by experimental economics that game theory is succeeding now whereas before it did not. Thus, I regard the experimental economics movement as an important development in modern economics. Experimental economics provides a whole new way of testing and applying economic models. Because it does, experimental economics will grow significantly and be an important pillar of twenty-first century economics. Although currently, by my graduate school standards, experimental economics is not yet mainstream, I predict it soon will be.¹⁰

While I think there will be many changes in economics over the coming century, pragmatic modeling, the major focus of what economists do, is here to stay; it will be the hallmark of New Millennium Economics. Current economics is institutionally stable; it can get enough funding to keep its practitioners doing what they are doing. There will be an evolution, not a revolution. It was in thinking about how to tell the story of that evolution that I came to the conclusion that the term neoclassical must die. Modern economics is fundamentally different from neoclassical economics, and if we are to tell the story of modern economics effectively, we must have a term for modern economics that makes that point.

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⁹ One individual stands out at the center of both approaches: John von Neumann. His 1928 and 1937 papers, and his 1944 book with Oskar Morgenstern on game theory, pointed the way to expanding general equilibrium via game theory; his work on artificial life and computers is at the foundation of the complexity approach to economics.

¹⁰ The reason experimental economics hasn't become mainstream is that the training required to do it well is so fundamentally different from the training for doing standard deductive economics. This means that integrating it into the curriculum is not a marginal process; it is a jump process.

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