A Classical Revival

A sharp distinction can be drawn in the theory of general equilibrium between the classical theme of the accumulation and allocation of surplus output, and the neoclassical theme of the allocation of given resources among alternative uses. Without this distinction neither the history of economic analysis nor the structure of modern mathematical models of general equilibrium can be clearly understood.

Our point of view concerning the intellectual history of our subject is consistent with Schumpeter’s distinction between a history of economic analysis and a history of economic thought. Schumpeter defined economic thought as, “the sum total of all the opinions and desires concerning economic subjects, especially concerning public policy bearing upon these subjects, that, at any given time and place, float in the public mind.” He held that the historian could reasonably claim to be able to demonstrate that progress had taken place in economic analysis, but not in economic thought. A study of intellectual history supports the contention that sustained, though not uninterrupted, progress took place in the analytical development of the classical theme of surplus and the accumulation of capital. This theme is clearly stated by Sir William Petty in 1662 and is developed systematically, together with the classical theory of the allocation of surplus output, by Richard Cantillon in 1732. The themes of classical theory developed steadily up to the death of Ricardo in 1823 after which there was a significant decline ending as we can see today with the mature work of Marx, in, for example, his 1857 Grundrisse. Since Marx’s work was long unpublished and longer unread in England, this historical influence came too late to revive classicism in that country. Then, in the
early 1870's, the special neoclassical form of allocation theory—the allocation of given resources—displaced classical theory and came to dominate theoretical economics. Since Léon Walras is usually considered the most important of the great nineteenth century founders of neoclassicism, this version of general equilibrium theory will be referred to as post-Walrasian.

Interest in classical theory was never completely extinguished. Early in the twentieth century the mathematical methods of analysis which had come to characterize neoclassical theory were applied in the construction of models of a recognizably classical type. Piero Sraffa was working on such models at Cambridge from the mid-twenties, and Adolphe Lowe and others were doing so at Kiel at the same time. John von Neumann presented a seminal paper containing a model of this type in Princeton in 1932, and in Vienna in 1936, and published it in 1937. An important generalization of Neumann's model of an expanding economy appeared in a paper by John G. Kemeny, Oskar Morgenstern, and Gerald L. Thompson in 1956. Meanwhile, Joan Robinson had made fundamental contributions to the revival and development of classical theory in her Accumulation of Capital. Then, in 1960, Sraffa published his Production of Commodities by Means of Commodities. The work of Robinson and Sraffa was developed extensively in the journals by Pierangelo Garegnani, Luigi Pasinetti, and others.

Recently, several books have appeared which further elaborate the classical theme of surplus and the accumulation of capital. Michio Morishima uses modern mathematical methods to formalize part of the work of Marx, the last great nineteenth century classical economist. Oskar Morgenstern and Gerald Thompson have generalized the work of Neumann in their Mathematical Theory of Expanding and Contracting Economies; Luigi Pasinetti has published his Lectures on the Theory of Production; and Adolphe Lowe has developed modern classical theories of growth in The Path of Economic Growth. Finally, a number of economists celebrated for their work in the neoclassical tradition, including Kenneth Arrow, Sir John Hicks, and Paul Samuelson, have made contributions to the literature in which the properties of modern classical models are compared with those of conventional neoclassical models.

Such a revival of classical themes is as rare in science as it is common in art, music, and literature where one often sees a "classical" period of substantial duration overthrown by a new theory or movement only to reappear in another form some generations later. A study of the historical roots and formal structure of classical and neoclassical theories of general equilibrium brings out this fascinating renaissance of classical ideas. The revival of clas-
sical theory also sheds light on a much debated question concerning the history of neoclassical analysis: was there a marginal revolution and, if so, in what did it consist?⁰¹²

In short, there was a major change of theme in economic analysis in the later nineteenth century, one which showed itself vividly in the work of Jevons, Menger, and Walras. Their view has been summarized thus:

As far as pure theory is concerned, the essential idea on which they concurred was in recognizing scarcity of given means in relation to alternative ends as the economic problem.⁰¹³

This, in contrast to the classical theme of the production, extraction, and accumulation of surplus was what distinguished the new ideas. Vexed questions about the genealogy and implications of the concept of "utility" are therefore relatively unimportant in deciding how and when neoclassical theory emerged. The early development of the theory of "utility" (in the hands of Ferdinando Galiani, Mountiford Longfield, Hermann Heinrich Gossen, and others) can therefore be passed over since the ancient philosophical idea of utility was not a crucial component of the truly new neoclassical concept of allocation. As has been well said, what was important about marginal utility was the adjective rather than the noun.*

History and Analysis

It is a well-known characteristic of general equilibrium models of the neoclassical, post-Walrasian kind that the economic problem is seen as consisting in the (essentially timeless) allocation of given resources among alternative uses. Here the inputs of the model are the services of given factors which are treated as parameters of its structure.† It is equally characteristic of general equilibrium models of the classical type that inputs are produced commodities which are treated as variables, and not as parameters. Commodities are produced by means of commodities so that time enters essentially into the economic problem: will the corn produced this year be enough to provide the necessary inputs (seed plus subsistence) for next year's production? Here the fundamental concepts are viability and surplus, and the problem of allocating the surplus between the accumulation of capital and luxury consumption (over and above subsistence) come to the fore.

Many of the newest works on general equilibrium theory are largely con-

* See chapter 5, pp. 130–31.
† On parameters and variables in economic models see chapter 7.
fined to models of the neoclassical type. In this work, however, modern classical models are developed alongside the usual neoclassical model of the allocation of given resources, thus making clear the relations and differences between the two traditions. Initially, we investigate their origins in the history of analysis, offering evidence that one class of simple models can be regarded as "classical," and another as "neoclassical." An elementary mathematical analysis of the two types of models is then presented with a view to highlighting their contrasting features, and to showing why we hold them to be legitimate simplifications of their less formal historical antecedents. In this, the chronological order of the theories is reversed; a neoclassical allocation model is offered first since it will be familiar and so provide a basis for comparison with the structure of a modern classical model.

Throughout the formal analysis, points fundamental to the distinction between classical and neoclassical theory are made in terms of simple two-sector linear models. This raises the question of the proper use of mathematics in formalizing the "models" of classical writers, and (to a much lesser extent) of neoclassical writers (whose original works were often expressed mathematically). There are different levels at which this enterprise can be undertaken. At the most pretentious, one may write out a system formalized in modern mathematics and announce that it is Quesnay's model, or Smith's, or Ricardo's. When this is done serious questions of historical interpretation arise. A reading of primary sources clearly shows that the classical authors, from Petty to Marx, allow themselves a richness of texture and a subtlety and complexity of construction which eludes representation in a convenient mathematical form.

Take the case of constant returns to scale. Eighteenth and nineteenth century English political economists, since they did not construct what are now regarded as formal models, did not feel compelled to restrict themselves to constant-returns models, although they might have believed constant returns to be likely in certain circumstances. Smith's view on the increasing returns resulting from progressive division of labor is the most obvious case of a belief in non-constant returns. Still, it is tempting to offer "models" of Smith's system, or of the other classics, based on linearity assumptions, while granting that, as in the ready-made copies of Paris originals, something is evidently lost when such "copies" are made.

Just as an artist can capture in a few lines a recognizable sketch of a person's face, a mathematical model can be used to give only the simplest sketch of the salient characteristics of an original thinker's work or of a school of thought. And this is our intention: to show by a careful use of the primary
sources of the history of economic analysis that classical writers may best be
distinguished from neoclassical writers by the use of very simple models—out-
lines of the most important aspects of their theories. Our use of mathematics
therefore makes no claim to have captured all the components of a classical or
neoclassical theory, or to render superfluous a recourse to primary sources.
But mathematics does have precedence in the following sense. Suppose it can
be shown that a model constructed in modern terms validly expresses certain
aspects of a classical theory. If the model proves to be inconsistent, or over-
determined, this must cast doubt on the coherence of the original theory. Con-
versely, mathematical model building may demonstrate that a constituent of a
theory can be so interpreted that it is valid and important where previous in-
formal historical criticism had pronounced it false. An example of this is the
way in which Sraffia's analysis of value undermined the validity of neoclas-
sical criticisms of Ricardo's theory of value; another concerns the Pasinetti
Theorem as a basis for reinterpretng classical views on saving. History and
analysis thus complement each other. As has been said of another area which
requires the successful mixture of two very disparate components, we must
remember that:

... not only in the history of opera but in any individual opera the balance between
'drama' and 'music' is continually shifting, that the scales are only rarely exactly
even, and that one side or the other almost always bears the heavier weight.

Our reliance on history extends back more than two centuries before the
writings of Léon Walras, William Stanley Jevons, and Carl Menger in the
1870's, a decade often used to mark the beginnings of general equilibrium
and microeconomics. This is because the present day general equilibrium
model which we have labelled modern classical is in many ways the descen-
dant of models implicit in the work of Sir William Petty, Richard Cantillon,
François Quesnay, Adam Smith, David Ricardo, and Karl Marx. The present-
day neoclassical model can then be seen as typical of a much later tradition.
The revival of classical ideas in modern form therefore carries with it the
thesis that a major theme of classical political economy did not appear in the
type of model used during the neoclassical period. And it implies a thesis
about the needs of current theory: that models of the classical type must be
reintegrated into the structure of economic theory.

Notes
1. Joseph Schumpeter, A History of Economic Analysis, Oxford University Press,


14. Sraffa, Production of Commodities, pp. 18–33, 94.
