CLASSICAL THEORY AND POLICY ANALYSIS: A ROUND TABLE

Duncan K. Foley, Pierangelo Garegnani
Massimo Pivetti, Fernando Vianello

Materiali di Discussione n. 1
2004
Editorial Note

In May 2001 Professor Foley, then in Rome as a guest of the “La Sapienza” University, was invited to the Centro Sraffa at the “Roma Tre” University to present a review article he had just written on a collection of essays regarding the resumption of classical theory. The result was the roundtable printed in this first number of our Materiali di Discussione. The interest which prompted the invitation was twofold. On the one hand, Foley’s attentive examination provided an opportunity to discuss some points of the theory of distribution and, more generally, of the social-surplus-centered view which the old classical economists took of the economy, with the resulting composite method of their analysis: deductive for the effects of competition on commodity prices; and mainly inductive with respect to distribution and growth. But the Centro’s interest in a discussion with Professor Foley was also a second, more specific one, consisting of his essay’s central thesis according to which “the classical literature [...] offers few demonstrations of the viability of applied classical political economy as an alternative to neoclassical practice” because it tells economists what not to do, but not “what they should do as an alternative”. This explains, Foley thought, why “despite the excellence and persuasiveness of [the “classical”] doctrinal critique”, neoclassical theory continues to dominate.

We hope that this roundtable will contribute towards making more explicit the “viability” of applications of classical political economy, testified by the wealth and variety of the “applied economics” and “policy analyses” of Adam Smith, or Ricardo, or Marx. The problem, we suggest, may rather lie in taking too much for granted the shape and methods which applied economics and policy analysis have assumed within neoclassical theory over the last decades, while also underestimating some radical changes entailed in this field by the resumption of classical theory and by its critical implications. The radical nature of those changes follows from two elements: (i) the compatibility between classical free competition and permanent labour unemployment; (ii) the relevance of the critique of neoclassical distribution in putting on a solid basis the possibility of aggregate demand deficiencies for a long period analysis, no less than for a short-period one. Once they have been solidly founded in theory, these two elements overturn the idea of a Pareto optimality of free competition. The stress of policy analysis shifts then from the allocation of resources to the growth and the distribution of the social product — and with that to a recognition of the centrality for economic policy of conflicts of interest and power within the community. If this means that policy analysis loses in the ease of the neoclassical “routine predictions” which Foley rightly recalls, it may gain from being able to close the gap with a practice in which conflicts and power relations have long been dealt with in all but theory.

1 See Foley’s “Value, Distribution and Capital: A Review Essay”, Review of Political Economy (2001, 13), here reprinted. In the delay of publication of the present issue Foley has published in the Cambridge Journal of Economics a second review article on the resumption of classical theory, bearing partly on questions raised at the roundtable. Some of Foley’s points there are also taken up in this Quaderno (see the Postscript to Garegnani’s intervention).

2 Below p. 7.

3 Below p. 12.

4 Growth of social product here would be one with growth of voluntary leisure, if the community were to choose taking the “product” in that form.

5 Below p. 7.
Value, Distribution and Capital: A Review Essay

DUNCAN K. FOLEY*

1. The World According to Garegnani

The essays in Gary Mongiovi and Fabio Petri’s well-edited and stimulating collection of papers assembled to celebrate Pierangelo Garegnani’s 65th birthday are devoted to explaining and defending Garegnani’s formulation of the “classical” view of the history of economic thought. According to this view, which stems from Piero Sraffa’s efforts to reconstruct the classical political economy of Adam Smith and David Ricardo, which was the object of Karl Marx’s critique of political economy, the classical political economists had a distinctive, consistent, and correct methodological approach that has been, in Sraffa’s words “submerged and forgotten” with the triumph of marginalist and neoclassical economic theory since the 1880s.

The core of this classical theory, in Garegnani’s view, is the principle that competition among mobile inputs to production, labor and capital, tendentially equalize their rates of return, wages1 and profit rates, across different sectors of production given available techniques of production. The classical political economists realized that the mobility of factors is an approximate, unorganized process, so that actual “market” prices, wages, and profit rates observed in any short time period may deviate from the “natural” prices consistent with the equalization of wages and profit rates. However, they recognized that market prices will gravitate around these “long-period equilibrium” natural prices, which constitute the true object of scientific inquiry in political economy.

In elaborating the theory of long-period equilibrium, continuing Garegnani’s account, the classical political economists characteristically and rightly took the composition of output (determined by social and historical factors) and the distribution of income (as represented by the average wage or the average profit rate) as given prior to and independently of the emergence of long-period equilibrium natural prices. The factors affecting the composition of

*Department of Economics, Graduate Faculty, New School University, 65 Fifth Avenue, New York, NY 10003, USA. This paper reviews Gary Mongiovi and Fabio Petri (Eds), Value, Distribution and Capital: Essays in honour of Pierangelo Garegnani (London and New York: Routledge Frontiers in Political Economy, 1999). I would like to thank Will Milberg for comments on draft of this paper.

1 In this discussion I use “wages” to mean real wages measured in wage goods.
output and the average wage or profit rate belong to a different conceptual realm from the competitive processes that enforce long–period natural prices as a center of gravitation for market prices. In particular, while market prices are determined by the movement of capital between sectors in response to market forces, the wage is determined by social forces that have little or nothing to do with the clearing of the labor market. In the classical political economists’ vision, capitalist economies typically operate with a substantial and varying margin of unemployed labor, which has no generally predictable impact on the level of the wage. In turn, there is no reason to believe that the level of the wage has a systematic impact on the demand for labor.

Fidelity to these submerged and forgotten doctrines, according to Garegnani, requires the honest contemporary historian of political economy to be ever–vigilant against the tendency of neoclassical economics to read back its own doctrines into the thought of the classical political economists. In particular, suggestions that the classical political economists conceived of the composition of output as varying systematically with prices (along the lines of neoclassical demand theory) or of the wage as varying with labor unemployment, or of employment increasing with a fall in the wage, must be resolutely combatted and refuted. Alessandro Roncaglia’s essay in this volume explores this conceptual cleavage between classical and marginalist conceptions of rationality and demand. Antonella Stirati’s contribution criticizes the view that Ricardo shared the “wage fund” theory of McCulloch, J. S. Mill, and Senior, who thought that total wages were constrained in any period by the accumulation of wage goods, and thus that individual wages would vary inversely with employment.2

The classical political economists, as Garegnani sees things, were wise and farsighted in their adherence to these methodological presumptions. Their theory allowed them to see the structural skeleton of capitalist economic life through the confusing interplay of short–term fluctuations of prices and quantities, to recognize the source of capital accumulation in class divisions, and to arrive deductively at correct theorems about the impact of changes in the wage or the composition of output on the profit rate and long–period equilibrium prices. Above all, these methodological predilections protected the classical political economists from succumbing to the fallacies that arose from the attempt of marginalists and neoclassicals to unify the theories of demand, production, and distribution in a single grand synthesis based on the shallow and inadequate conception of universal market clearing. These fallacies are at the

2 There may be some potential confusion on this point because some writers use the phrase “wage fund” to represent the view, shared by Ricardo, that the advance of wages are a part of capital, in contrast with neoclassical production functions, which include only the value of fixed capital in measuring capital input.
root of the widely held but erroneous notion that the capitalist economy is capable of self-regulation toward a full-employment state. This erroneous notion, in turn, is the source of misguided, dangerous, and damaging national and international macroeconomic policies. Massimo Pivetti’s paper illustrates these perils with a discussion of the political economy of the European Monetary Union.

The scientific hubris of the marginalists, Garegnani suggests, lies in their misguided search for a formal synthesis that would explain distribution on the same conceptual basis as prices. This led the marginalists to argue that “scarcity” determines not just rents to unreproducible resources such as land (as the classical political economists had recognized) but the wage and the profit rate as well, despite the reproducibility of capital goods and the social and historical character of wage determination. Tony Aspromourgos and Peter Groenewegen explain the distinctive characteristics of the classical approach to wage determination and contrast it with neoclassical theories of the labor market. In order to fit economic reality into this Procrustean bed, marginalists and neoclassicals must dogmatically deny the existence of sustained unemployment, or relegate it to the category of “market failure”, thereby ignoring one of the most important systematic manifestations of capitalist economic organization. Furthermore, the marginalists and neoclassicals have to take the indefensible position that the profit rate is a scarcity rent to capital goods, in defiance of the well-considered classical view that the reproducibility of capital goods requires a theory of the profit rate that is qualitatively different from the theory of rent. In particular, the application of rent theory to explain the returns of individual capital goods is inconsistent with the fundamental and powerful insight of the equalization of rates of profit that was the heart of classical political economy. In order to bolster the scarcity of capital theory of the profit rate, the marginalists and their neoclassical followers conjured up the phantom of a “capital” that is supposed to be a substance separate from individual capital goods but somehow embodied in them in specific quantities. The uniform profit rate is then to be interpreted as the scarcity return to this phantom substance.

Here the neoclassicals, as Garegnani sees things, like the tragic heroes of Greek drama, fell into a trap of their own construction. They were right in their belief that a market-clearing theory of distribution required the concept of capital independent of specific capital goods, but failed to recognize the logical incoherence and unsustainability of this notion of capital. Sraffa was onto this as early as the 1920s, but it was only in the 1950s and 1960s that Joan Robinson, Luigi Pasinetti, and Garegnani himself (among others), were able to bring about a decisive theoretical confrontation over these issues in the series of debates that have become known as the “Cambridge capital controversy”. These debates exploded the claims of neoclassicals that the concept of capital independent of capital goods could be generalized beyond a very special and unrealistic class of
production models, essentially “corn” models in which there is a single output that serves both as capital and as consumption.

However, to Garegnani’s puzzlement and dismay, the neoclassicals continue to adhere to the view that input prices are a reflection of relative scarcities, and refuse to accept the conclusions implicit in the Cambridge capital controversy. Instead, they have retreated to the pure formalism of the Arrow–Debreu conception of intertemporal general equilibrium, in which each capital good at each date (and perhaps in each conceivable contingency) is separately priced in clearing markets, thus dispensing with the need for the concept of a capital substance altogether. This construction, however, springs from the same fallacious method that derailed the marginalists to begin with: it refuses to acknowledge the classical political economists’ central insight that the explanations of distribution, demand and prices belong to different realms of scientific discourse. Fabio Petri’s essay explores these issues in considerable depth. The early marginalists and neoclassicals at least had the good sense to retain long–period equilibrium as the object of their analysis, despite their mistaken idea that the theory of rent could explain wages and profit rates. The modern general–equilibrium neoclassicals, however, have fallen into the irremediable error of abandoning the long–period concept of natural prices altogether. The scientific consequences of this maneuver are disastrous, since it is impossible to find an operational real–world equivalent to the “equilibrium” prices of intertemporal general equilibrium. Roberto Ciccone’s paper investigates and contrasts the conceptions of equilibrium prices in Smith, Ricardo and Marshall, and contrasts them with intertemporal and temporary general equilibrium theory. On the one hand, it is absurd to imagine that buyers and sellers can actually reach these prices in day–to–day trading, especially given the absence of the extensive set of dated commodity markets postulated by the general equilibrium scenario. On the other hand, the prices of intertemporal general equilibrium do not equalize rates of profit on the cost of investment goods. John Eatwell and Murray Milgate elaborate the argument that the neoclassicals dispense with the concept of capital only at the penalty of losing contact with the relevant object of study of scientific economics, long–period natural prices.

2. Neoclassical Hegemony and Classical Subalternship

Much of Garegnani’s reading of the history of economic thought is persuasive and the core critical elements in its evaluation of marginalist and neoclassical economics, particularly the critique of the scarcity theory of distribution, identify fundamental and chronic weaknesses in the neoclassical research program. However, a neoclassical mainstream continues to dominate teaching and
research in economics in America and, increasingly, the rest of the world. Is there another side to the story?

Ricardo’s economic analysis had great success in influencing British economic policy and politics on the issue of free trade in the middle half of the 19th century. This reminds us that the market for analytical economics is fundamentally a market for policy analysis. The neoclassical mainstream does a remarkable job of supplying this market at every possible level of sophistication, from developing the abstract ideology of laissez-faire through market-oriented macroeconomic policy models to bread-and-butter econometric analyses of the impact of tax loopholes on the distribution of economic surpluses. Neoclassical economics, like a shopping mall open twenty-four hours a day, seven days a week, stands ready to meet every policy analysis need. The mall may be built on the flawed foundation of an incoherent theory of distribution, and it may in the end collapse, but in the meantime it is open for business. Foundational weakness is far from the top of the priority list of proprietors who are busy extending the range of services and building up the export market.

The ability of neoclassical economics to provide this wide-spectrum analysis is closely linked to some of the features that the classical critique demands that it give up. The classical critique sees the postulate of consumer preferences determining demand functions, for example, as unacceptable on the ground that preferences are inherently unobservable, and changes in the composition of output respond to social and historical forces that cannot be reduced to reversible demand functions. However, it is precisely the logical structure of preference and demand theory, which purports to connect observed behavior to welfare, that allows neoclassical analysis to give answers to questions about the distributional impact of tax or trade policy. It is hard to imagine a policy analysis that could avoid the question of the impact of the policy under consideration on the composition of output and the distribution of incomes. Similarly, it is hard to imagine how one could make satisfactory predictions of the outcome of policies without an analysis of the impact of the policy on the level of the wage. In committing methodological sin by putting the theories of price and distribution on the same level of abstraction, neoclassical practice gains the tremendous advantage of being able to make routine predictions about the composition of output and distribution.

Unfortunately, the classical literature, despite the excellence and persuasiveness of its doctrinal critique and researches in the history of economic thought, offers few demonstrations of the viability of applied classical political economy as an alternative to neoclassical practice. The essays in this book reflect this balance of strengths: only one paper (Massimo Pivetti’s interesting, if gloomy, assessment of the political economy of European monetary union) presents empirical data about real world economies. The ongoing development of a body of applied and policy economics based on classical theoretical and methodological
precepts will greatly enhance the influence and prestige of the classical cause. But there are few clues in these papers for scholars willing to undertake this formidable task. How should a graduate student of classical persuasion who wants, for example, to address the likely consequences of the "harmonization" of European tax policies for the distribution of income between and within the European nations, handle the problem of predicting changes in the wage and the composition of output? Perhaps she might do an econometric analysis to model the movement of the wage in response to a variety of historical and social factors. How different will such an analysis be from a parallel neoclassical attempt to identify a supply curve of labor? How comfortable will her classical thesis adviser be with this effort?

3. The Bath Water

The strongest and most important point that has come out of the classical critique of marginalism and neoclassical economics is its refutation of the capital scarcity theory of the rate of profit.

The notion that the profit rate can be coherently viewed as being determined by a "marginal product of capital" given by technology and input availabilities is one of the more confused and ideologically muddied chapters in the history of economics. A cost–minimizing firm facing a wage, cost of capital, and prices of capital goods determined by markets will adapt its relative use of labor and capital to those prices. The value of capital goods is a rational and appropriate measure of capital input to the firm when the prices of capital goods are determined by market forces outside the firm’s control. When a cost–minimizing firm faces a range of technical methods of production that approximate a smooth continuum of capital–labor ratios, cost minimization entails setting the marginal value product of each input equal to its price. (There is, of course, vigorous debate in all schools of economic thought over how well the assumptions of a cost–minimizing firm facing market prices for inputs fits the behavior of real capitalist firms.) In this scenario, however, it is the wage and the cost of capital that determine the marginal value products of labor and capital, not the other way around.

The vision of the marginalists and their neoclassical followers was that this uncontroversial theorem of cost minimization could somehow be transformed into a theory of the wage and profit rate, and hence into a theory of distribution. Their hopes of accomplishing this transformation stemmed from their anthropomorphic vision of the economy and its markets as analogous to the allocation of scarce resources by a single decision maker with a well–defined objective function, who, at least under the assumptions of concavity of the objective function and convexity of resource constraints, can impute shadow prices (Lagrange
multipliers) to the resources. This program, despite firing the imaginations of many talented economists, has never managed to disentangle the problems of aggregation of disparate preferences, treatment of time and information, definition of resource limitations, and dynamic stability of market clearing that are inherent in carrying it out to arrive at the robust, unified, and transparent account of distribution it sought. Economics owes a particular debt of gratitude (which it shows precious few signs of recognizing, to tell the truth) to Sraffa and his followers for their dogged insistence on bringing to light the ramifying incoherence of this marginalist project.

The basic point at issue in the critique of the marginalist program, as Garegnani rightly insists, is whether the theory of rent can coherently be extended from the pricing of inherently scarce unreproducible resources, such as land, to produced capital inputs and to human labor, which differs from both land and capital in entering capitalist production as the result of complex social and historical developments. One issue here is what boundary conditions it makes sense to impose on an abstract model of the economy. There is little debate that it is appropriate to represent land as being quantitatively fixed, and hence inelastically supplied, as indeed Smith and Ricardo argued. It is not easy to see how to compress the complex process by which labor reproduces itself as an input to capitalist production into a tractable mathematical boundary condition, but the notion that the wage is given to the system is surely just as plausible as the notion that the endowment of labor is given, however inadequate either formulation may be as a representation of reality.

Capital inputs present other problems. Their production is governed by economic calculation, but because of their durability this calculation inevitably involves dealing with time and uncertainty. Furthermore, technical change constantly alters the specific types of capital goods that are used. At the abstract theoretical level the economist is not much interested in the specificity of capital goods, but rather in the general principles that govern the production of produced inputs. The early neoclassicals, such as John Bates Clark, hoped to finesse this problem by treating the value of capital at the system level as analogous to the value of capital to the individual firm, despite the fact that the firm can reasonably be assumed to take market prices as given, while the economic system as a whole cannot. Later, John Hicks, Paul Samuelson, Lionel McKenzie, Kenneth Arrow, and Gerard Debreu elaborated various models (see Arrow and Hahn, 1971) in which it is possible to keep track of an arbitrarily large set of capital inputs to production, and to find equilibrium prices for each of them through the method of imputation. It is, however, impossible in these general models to prove any strong theorems relating the own rates of return of capital goods to the value of the capital stock, or the demand for labor to the wage. It has taken some time for this point to sink in among the neoclassical enthusiasts.

Paul Samuelson revisits this issue in his contribution to the current vol-
Samuelson here reports his belated recognition that there is no general monotonic relation between the interest rate and sustainable rates of social consumption as a result of pondering Sraffa’s arguments, and acknowledges his earlier errors (“Yes, Homer nodded twice”). This is a rather backhanded way to compliment Sraffa’s work. Samuelson frames the issue in terms of the primal problem of comparing growth paths, while Sraffa carefully confined his analysis to the dual system of prices and input prices.

The Cambridge capital debate centered initially on one aspect of this tangle of confusions, the neoclassical hope that the value of capital goods would somehow behave like a single scarce input in equilibrium. The interchanges of this debate, including an important paper by Garegnani (1970), showed unambiguously that the neoclassical construction would work in general only under assumptions on production so stringent as to amount to the assumption of a single capital good. Other work related to the Cambridge debate, for example that of Luigi Pasinetti (1974) and Stephen Marglin (1984), also underlined the other side of Sraffa’s critique, the necessity of taking some distributional variable, either the wage or profit rate, as the boundary condition in production models, rather than the stocks of individual capital goods. This path clarifies the real relationship between input prices and marginal productivities (if indeed they exist), which is that input prices determine marginal productivities through the cost–minimizing choice of technology.

Neoclassical economists have a hard time keeping their minds clear on this point. They are distracted by the fact that it is possible to embed a Sraffian production system in a general equilibrium model with given stocks of inputs and calculate equilibrium prices and rates of return without any reference to the value of capital goods. They read this model as supporting the scarcity theory of profit rates, although in fact it only reproduces its own assumption of the full employment of all inputs except those that have zero prices in equilibrium. The equilibrium allocation can equally well be viewed as one in which given input prices determine cost–minimizing choices of technique that happen to be com-

\[ Q(t) = C(t) + dK/dt = F[\text{labour}(t), \text{land}(t), \text{capital}(t)] = F[L(t), A(t), K(t)] = L^{2/3}A^{1/6}K^{1/6} \]

— capital can be virtually treated like any other input. For such a \( F[L, A, K] \equiv F[V_1, V_2, V_3] \) with real returns \([w_1, w_2, w_3] = [\text{wage rate}, \text{rent rate}, \text{interest rate}]\), marginal productivity does apply: \([w_1, w_2, w_3]\) does equal \([\partial F/\partial V_1, \partial F/\partial V_2, \partial F/\partial V_3]\) and duality theory easily deduces a converse factor–price frontier in \(w_1, w_2, and the interest rate!\)

Singularly in this special model, \(r\) happens to behave just like the primary wage and rent rates!

Samuelson’s intended meaning is clear despite the potentially confusing change in notation from \(L, A, K\) to \(V_1, V_2, V_3\) in midstream.
patible with arbitrarily given supplies of inputs. In the absence of a compelling
dynamic theory that shows how the market might find these prices, which neo-
classical theory has pretty well given up hope for, Sraffa’s critique carries the day.

It would have been a good thing if the Cambridge capital controversy had man-
aged to drive a stake through the heart of the scarcity theory of the rate of profit,
but it hasn’t. I think this has been because the classical critique tells economists
what they shouldn’t do (assume full employment and market clearing in order to
determine input prices) but doesn’t tell them very clearly what they should do as
an alternative, either at the purely theoretical level or in econometric studies.

4. The Baby

Garegnani’s development of the classical critique puts great emphasis on the
crucial role that the mistaken notion of a capital aggregate plays in neoclassical
theory. Garegnani traces essentially all of the inadequacies of neoclassical the-
ory to the problem of capital. In his view, the assumption of an aggregate capi-
tal is the only conceivable path to the results the neoclassicals pursue, particu-
larly the scarcity theory of the profit rate and distribution. If an aggregate capi-
tal existed, the neoclassicals could reconstruct a downward–sloping demand
schedule for labor, which would bolster their assumption of full employment;
they could coherently link the demand for investment to the interest rate, which
would bolster their assumption of Say’s Law; and the problems of the
non–uniqueness and dynamic instability of general equilibrium would be miti-
gated. Garegnani is not so much concerned about the income effects that com-
PLICATE the dynamics of market–clearing equilibrium, even in models of pure
exchange, on the grounds that these are second–order issues that could be dealt
with by separating the analysis of changes in the composition of output through
demand from the determination of long–period equilibrium prices. In this
respect, Garegnani seems to accept more of the neoclassical program than some
other critics, such as Marglin, who argue that it is wrong–headed, even grant-
ed the strong assumptions necessary to support a capital aggregate.

However, it seems to me that it is impossible for the classical tradition to elim-
inate the value of the capital stock and of investment as central theoretical con-
cepts. We can surely do without the scarcity theory of distribution, but I doubt
that we can do without the value of capital. This does not necessarily contradict
Garegnani’s position, since the value of capital can play an important role in the
theories of economic distribution and growth, a fact that does not depend on its
representing a capital aggregate in the sense required by neoclassical theory.

To begin with, the classical political economists regularly use the concept of
the value of capital in their reasoning about distribution and growth. Smith
refers frequently to “stock”, meaning the value of capital, and uses the concept
to frame important and fundamental classical propositions, for example, the notion that the rate of profit declines both in individual sectors and in the economy as a whole with the accumulation of stock. Ricardo phrases his account of accumulation leading to a stationary state with the conversion of surplus into rent in terms of the growth of the value of capital, and the resulting expansion of employment opportunities. Marx, who is perhaps better regarded as a critic of classical political economy than as one of its exponents, but nevertheless contributes important ideas to the classical tradition, develops his theory of the profit rate and its dynamics in terms of the value of capital, using concepts such as the “value composition of capital”, the ratio of the value of flows of non-wage capital outlays to the wage bill. It is difficult to be faithful to the reasoning of the classical political economists without allowing a central role in the theoretical story for the aggregate value of capital.

However, the issues that require economists working in the classical tradition to employ the concept of the value of capital go beyond the question of an accurate understanding of the history of economic thought to the application of classical ideas to contemporary problems of political economy. If classical economics is to develop further as a usable tool for the analysis of current economic problems, which I believe is a desirable goal, it has to link its concepts operationally to available statistics. It is impossible to find reliable and detailed statistics on the individual capital goods of most countries. Leontief’s input–output statistics, which are the most widely employed attempt to sectorize and disaggregate macroeconomic data, are available only for some countries in some years, and in any case depend on theoretical assumptions that are very strong to support its system of disaggregation. The essays in this book remind us that the classical economists eschewed “subjective” explanatory factors, such as preferences, in their arguments in favor of “objective” observables, such as the actual composition of output. But the value of capital is, in fact, one of the most objective of observables available to describe the macroeconomic state and evolution of modern economies. I would argue that it is more directly observable than any facts about stocks of particular capital goods, which can be constructed only by making heroic assumptions to collect complex productive facilities into manageable categories. The fundamental issue in the study of economic growth is the relation between aggregate investment and the transformation of economic production, an issue that can be attacked quantitatively only by employing the concepts of the value of capital and investment. Furthermore, the examination of aggregate macroeconomic statistics on the value of capital reveals strong regularities and patterns that are highly suggestive of precisely the dynamics suggested by the classical political economists and Marx (see, for example, Duménil & Lévy, 1994 and Foley & Michl, 1999).

The critical demonstration that the value of capital cannot coherently be used as a capital aggregate to support the scarcity theory of distribution must
not distract classical economists from formulating better theories of stability, distribution and growth in which the value of capital will have to play a major part.

5. Whig Economic History

The classical view of the history of economic thought, to which Garegnani’s work has made a major contribution, has been a salutary antidote to some neoclassically–oriented scholarship which reads the classical political economists as defective precursors of neoclassical orthodoxy. Thus, for example, Smith’s conception of the Invisible Hand, which in Smith is the tendency for the rate of profit on a nation’s aggregate capital to be maximized by the attempts of individual capitalists to maximize the rate of profit on their own capital, is often represented as an early and incomplete version of the First Welfare Theorem of neoclassical economics, which states that, under full information and the absence of externalities, a competitive equilibrium is Pareto–efficient. The fact that Ricardo used marginal reasoning to establish his theory of differential rent is taken to indicate that he had in mind, but could not flesh out, a general equilibrium system in which the principle of rent governs all pricing and distribution. Heinz Kurz traces part of the story of the development of the concept of rent into a general concept of marginal productivity in a careful examination of the work of Friedrich Hermann and Johann Heinrich von Thünen. This paper illuminates the earliest stages of economic theorists’ confusion over the applicability of the theory of rent to capital. The modern classicals do a major service in insisting on the integrity of the classical political economists’ systems of thought, and their divergence from many of the dogmas of neoclassical theory, such as the insistence that unemployed resources must have a zero market price. Bertram Schefold shows the risks in reading back a theory of marginal utility into classical and pre–classical discussions of use–value in a learned essay that outlines the complexity of the development of the category of use–value from Aristotle to Savary.

However, the defense of the past against illegitimate appropriation carries with it the risk of a counter–appropriation. In their zeal to protect Smith and Ricardo from the “Whig” tendencies of neoclassical historians of economic thought (who don’t seem as eager to appropriate Marx to marginalism), the modern classicals verge on another fallacy: the claim that the classical political economists had a complete, well–worked out method of inquiry into economic phenomena different from, but on the same level as, 20th–century neoclassical economics. The temptation to make this claim is the need for the modern classicals to respond to neoclassical challenges to make their method and models explicit in contemporary mathematical economic language. What the neoclassi-
classical economists claim to want is the formulation of a classical alternative at the same level of mathematical specification as, say, the 20th century's mathematical reconstruction of Walras' general equilibrium theory. Garegnani and other modern classicals are aware of the pitfalls involved in trying to meet this challenge, and have attempted to respond to them with a series of subtle methodological distinctions. The process of competition among capitals that tends to bring about profit rate equalization, according to them, can be modeled at a level of mathematical explicitness comparable to the neoclassical general equilibrium analysis; but the fundamental determinants of distribution, either the wage or the profit rate, and of the composition of social output, lie in a different methodological realm, and must be explained on different principles and with different methods. There are things to be said both in favor of and against this methodological position, but it is not at all clear that it would be recognizable to Smith or Ricardo (or Marx), who seem rather to have thought they were generalizing or abstracting from real economic phenomena, not proposing models in the contemporary methodological sense at all. Thus, I doubt that Ricardo had any strong allegiance to the methodological proposition that the composition of social output was, in fact, determined at a different level from the equalization of the profit rate. On the whole, he seems to have thought that the kernel of his results simply did not depend much on the composition of social output, and therefore did not focus his attention on it. On the other hand, the modern classical position seems to underemphasize the explicit theorization of the wage rate as arising from a subsistence standard of living determined by the fertility behavior of workers in Malthus and Ricardo. This theory was probably wrong, but it depended on much the same type of reasoning in terms of tendencies and feedbacks that are at the heart of the classical account of capital mobility and profit–rate equalization.

The acuity and ambiguity of the classical political economists make their works a rich source of questions and insights for contemporary economics. Many influential and important theoretical advances of 20th century economics, including national income accounting, the theory of general equilibrium, Sraffa's reconstruction of the classical theory of profit–rate equalization, Duménil and Lévy's theory of induced technical change, and much of contemporary growth and trade theory, have their roots in a critical response to the classical political economists. Fernando Vianello's contribution to this volume, for example, explores Smith's conceptualization of social and economic accounting. Sergio Cesaratto surveys recent endogenous growth theory and finds it wanting compared to its classical roots. The modern classical school, in turn, emerged from Sraffa's critical response to the marginalist, mathematical, and statistical methodological movements in 20th century economics. Given the prestige of the classical authors, there is a natural tendency for contemporary schools of thought to enlist them as allies in contemporary debates. The classi-
cal school, having properly brought tendentious neoclassical misreadings of the classical political economists to book, will flourish best, I believe, on the merits of its own positive theoretical positions without modernizing its classical ancestors.

6. Classical Mathematical Economics

One of the most fertile areas of research spawned by Sraffa’s work is the study of the static and dynamic properties of linear production systems. The problem here is that Sraffa’s simplest square no–joint–production system, in which there is one process to produce each commodity, serves admirably as a counterexample to neoclassical notions of the value of capital as a substance independent of particular capital goods, but is inadequate as the foundation of a general theory of competitive prices. An adequate model has to comprehend the possibility of alternative processes for the production of commodities, a generalization that Sraffa himself undertook, and the less tractable issue of joint–production processes that produce more than one commodity. Joint production is of some importance in itself, but appears to be crucial to the general modeling of long–lived capital: in general, one–period old machines of a given type must be priced as a different commodity from new machines of that type and analyzed as joint products of the process along with final output. In the no–joint–production setting, Sraffa was able to establish certain critical results: weak sufficient conditions under which there is an interval of profit rates, including zero, at which non–negative profit–rate equalizing prices exist (taking the wage bundle as numeraire); the invariance of these prices to changes in net output; and the fact that these prices are non–decreasing functions of the profit rate in the interval of relevant profit rates. If these properties could be generalized to models with joint production, the Sraffa approach would be a strong candidate for a positive general model of pricing and capital. Without this generalization Sraffa’s work still constitutes an unanswered criticism of neoclassical theories of capital, but cannot itself fill the need for a general positive theory of capital. We know, however, from counterexamples, that the crucial properties cannot be proved in a general model allowing for joint production.

The project of classical mathematical economics in the hands of such able practitioners as Bertram Schefold (represented in this volume by an essay on the history of economic thought), Neri Salvadori, Ian Steedman, and Garegnani, has become the investigation of the subtle questions of exactly what class of production models will support which of the crucial propositions, and how far the propositions can go wrong in the general joint–production case. Salvadori’s essay in this volume shows that the basic propositions can be proved in the context of a “fixed–capital” model in which machines can be transferred between
sectors as long as the efficiency profile of the machines is uniform. Steedman ingeniously anatomizes the dependence of prices on the profit rate in a square production system through the analytical device of “vertically integrated” production sectors.

The mathematical power and elegance of these contributions, however, leaves the basic dilemma of the modern classical research program unresolved. My own opinion (see Foley, 1985) is that the general resolution of these issues has to involve the possibility of zero prices for some commodities and the dependence of prices on the composition of net output. This approach allows for a generalization of Sraffa’s fundamental results in terms of a correspondence between the profit rate and a set of prices at which employed processes have equal profit rates and processes that fall short of this profit rate are not in use. The skepticism of the modern classical school about these compromises threatens to become a stumbling block to the future development of its theoretical foundations.

7. Keynes and the Rate of Profit

Sraffa came to Cambridge under Keynes’ sponsorship, and his practical knowledge of economic history and institutions, analytical perspicacity, and insight into the foundational issues of economic theory appear to have been highly prized by Keynes and his circle. This friendly encounter of two of the giants of twentieth century economics held enormous potential for breakthrough or disaster. Unfortunately Keynes and Sraffa, despite their mutual goodwill, seem to have largely talked past each other without, given the peculiarities of their temperaments, recognizing how great a gap separated their visions, and disaster has on the whole predominated. Despite his willingness to jettison Say’s Law and to countenance the idea of equilibrium unemployment, which echoed Marx’s idea of a reserve army of labor, Keynes persistently maintained other positions, such as the notion that the economy would always find itself on a declining marginal productivity curve of labor, and that the “long run” was of no interest, which were sharply at odds with Sraffa’s critique of the marginal productivity concept and focus on long–period equilibrium prices. Nonetheless, there are signs of some tentative attempts at dialogue between Sraffa and Keynes. There exists a draft of parts of the General Theory in unmistakably Marxian technical language; and Keynes’ arguments for the choice of a “wage–unit” for accounting and rejection of the need for indices of capital and aggregate real output suggest conversations with Sraffa. Sraffa, in turn, introduced into his Production of Commodities by Means of Commodities (Sraffa, 1960, p. 33) the suggestion that the distribu-