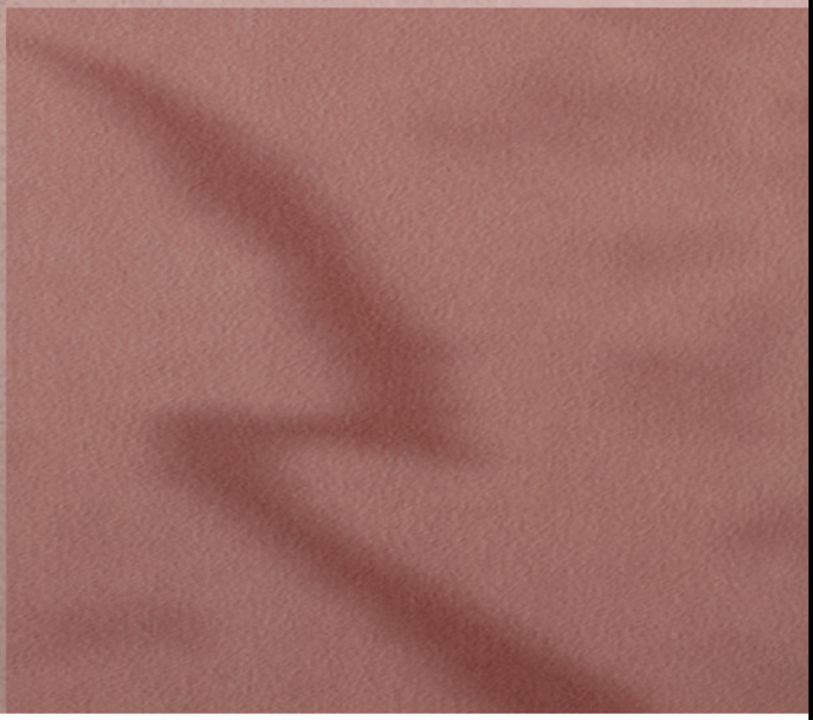
Understanding 'Classical' Economics

Studies in long-period theory

Edited by
Heinz D. Kurz and Neri Salvadori

Routledge Research



UNDERSTANDING 'CLASSICAL' ECONOMICS

The 'classical' approach to economic problems, which can be traced back to Adam Smith and David Ricardo, has seen a remarkable revival in recent years. The essays in this collection argue that this classical approach holds the key to an explanation of important present-day economic phenomena. Focusing on the analytical potentialities of classical economics, the contributors illustrate how an important element of understanding its approach consists of developing and using its explanatory power.

The study opens with a clarification of what is meant by 'classical' economics; modern methods of economic analysis are related to the works of the classical economists. Then follow chapters dealing with the problem of economic growth and foreign trade. Both the von Neumann growth model and the 'new' theories of endogenous growth are shown to belong firmly to the classical tradition. The contributors examine the contribution of Piero Sraffa and clarify some of the more difficult aspects of his analysis. The (un)importance of the labour theory of value in classical thinking is expounded. The work closes with some observations on the critique of neo-classical theory.

Heinz D.Kurz is Professor of Economics at the University of Graz, Austria. The author or editor of twelve other books, including *Theory of Production* (co-authored with Neri Salvadori), he is a managing editor of *The European Journal of the History of Economic Thought* and serves on the editorial board of six other professional journals. Professor Kurz has taught at the Universities of Bremen, Kiel, and the New School for Social Research.

Neri Salvadori is Professor of Economics at the University of Pisa, Italy. The author or editor of four other books, he serves on the editorial boards of *Metroeconomica* and *The European Journal of the History of Economic Thought.* Professor Salvadori has also taught at the Universities of Naples, Catania and Denver and at the Maritime University Institute, Naples.

ROUTLEDGE STUDIES IN THE HISTORY OF ECONOMICS

1 ECONOMICS AS LITERATURE
Willie Henderson

2 SOCIALISM AND MARGINALISM IN ECONOMICS 1870–1930
Edited by *Ian Steedman*

3 HAYEK'S POLITICAL ECONOMY
The Socio-economics of Order
Steve Fleetwood

4 ON THE ORIGINS OF CLASSICAL ECONOMICS
Distribution and Value from Willam Petty to Adam Smith
Tony Aspromourgos

5 THE ECONOMICS OF JOAN ROBINSON
Edited by *Maria Christina Marcuzzo, Luigi Pasinetti and Alesandro Roncaglia*

6 THE EVOLUTIONIST ECONOMICS OF LÉON WALRAS
Albert Jolink

7 KEYNES AND THE 'CLASSICS'
A Study in Language, Epistemology and Mistaken Identities
Michel Verdon

8 THE HISTORY OF GAME THEORY, VOL 1
From the Beginnings to 1945
Robert W. and Mary Ann Dimand

9 THE ECONOMICS OF W.S.JEVONS
Sandra Peart

10 GANDHI'S ECONOMIC THOUGHT
Ajit K Dasgupta

11 EQUILIBRIUM AND ECONOMIC THEORY
Edited by *Giovanni Caravale*

12 AUSTRIAN ECONOMICS IN DEBATE
Edited by *Willem Keizer, Bert Tieben and Rudy van Zijp*

13 ANCIENT ECONOMIC THOUGHT
B.B.Price

14 THE POLITICAL ECONOMY OF SOCIAL CREDIT AND GUILD SOCIALISM
Frances Hutchinson & Brian Burkitt

15 ECONOMIC CAREERS
Economics and Economists in Britain 1930–1970
Edited by *Keith Tribe*

16 UNDERSTANDING 'CLASSICAL' ECONOMICS: STUDIES IN LONG-PERIOD THEORY
Heinz D.Kurz and Neri Salvadori

17 HISTORY OF ENVIRONMENTAL ECONOMIC THOUGHT
E.Kula

UNDERSTANDING 'CLASSICAL' ECONOMICS

Studies in long-period theory

Heinz D.Kurz and Neri Salvadori

London and New York

First published 1998
by Routledge
11 New Fetter Lane, London EC4P 4EE

This edition published in the Taylor & Francis e-Library, 2003.

Simultaneously published in the USA and Canada
by Routledge
29 West 35th Street, New York, NY 10001

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging in Publication Data
Understanding classical economics: studies in long-period theory/
Heinz D.Kurz and Neri Salvadori.
p. cm.
Includes bibliographical references and index.
1. Classical school of economics. I. Kurz, Heinz-Dieter.
II. Salvadori, Neri.
HB94.U53 1998
330.15′3–dc21 97–18644
CIP

ISBN 0-203-21676-8 Master e-book ISBN

ISBN 0-203-21688-1 (Adobe eReader Format)
ISBN 0-415-15871-0 (Print Edition)

CONTENTS

ACKNOWLEDGEMENTS

The essays collected in this volume bear the stamp of the influence of many people; for their encouragement, support and criticism over several years we should like to thank especially the following friends: the late Krishna Bharadwaj, Christian Bidard, Antonio D'Agata, Giuseppe Freni, Pierangelo Garegnani, Christian Gehrke, Harvey Gram, Augusto Graziani, Harald Hagemann, Geoffrey Harcourt, Albert Jeck, Bruno Jossa, Peter Kalmbach, Ulrich Krause, Christian Lager, Lynn Mainwaring, Gary Mongiovi, Takashi Negishi, Edward J.Nell, Carlo Panico, Sergio Parrinello, Alessandro Roncaglia, Paul A.Samuelson, Bertram Schefold, and Ian Steedman. We should also like to thank Routledge for their interest in our work and Ray Offord and Kate Chenevix Trench for the fine processing of the material. Those chapters of the book which were first published elsewhere appeared as follows. Our grateful thanks go to the publishers concerned for permission to reprint them here.

2 'Von Neumann's growth model and the "classical" tradition', *European Journal of the History of Economic Thought* 1 (1993):129–60.

3 'Adam Smith on foreign trade', *Economica* 59 (1992):475–81.

5 'The non-substitution theorem', *Journal of Economics* 59 (1994): 97–103.

6 'Sraffa, Marshall and the problem of returns', *European Journal of the History of Economic Thought* 1 (1994):323–43.

7 'The "Standard commodity" and Ricardo's search for an "invariable measure of value"', in M.Baranzini and G.C.Harcourt (eds), *The Dynamics of the Wealth of Nations,* London: Macmillan (1993).

8 'Morishima on Ricardo', *Cambridge Journal of Economics* 16 (1992): 227–47.

9 'Peach on Ricardo', *European Journal of the History of Economic Thought* 1 (1994):411–20.

10 'Karl Marx on physiocracy', *European Journal of the History of Economic Thought* 2 (1995):55–92.

11 'No reswitching? No switching!' *Cambridge Journal of Economics* 12 (1988):481–6.

12 ‘On critics and protective belts’, in A.Salanti and E.Screpanti (eds), *Pluralism in Economics,* Aldershot: Edward Elgar.

13 ‘“Productivity curves” in *The Accumulation of Capital’, in C. Marcuzzo, L.L.Pasinetti and A.Roncaglia (eds), The Economics of Joan Robinson,* London and New York: Routledge.

H.D.K.
N.S.

1

UNDERSTANDING 'CLASSICAL' ECONOMICS

An introduction

Ludwig Wittgenstein once remarked, 'The classifications made by philosophers and psychologists are as if one were to try to classify clouds by their shape.' We do not pretend, of course, to know whether this is a fair assessment of the situation in the disciplines mentioned. We rather ask whether it would be true if it were applied to economics. More particularly, we ask whether classifying economic ideas in distinct analytical approaches to certain economic problems and even in different schools of economic thought is a futile enterprise. The title of this book implies that we think that it is not. We are especially convinced that there is a thing that may, for good reasons, be called 'classical' economics, which is distinct from other kinds of economics, in particular 'neoclassical' economics.

This view could immediately be challenged in terms of the indisputable heterogeneity and multi-layeredness of the writings of authors in the two groups. Moreover, whilst with regard to some aspects an author might be classified in one group, with regard to some other aspects he or she might be classified in the other group. Therefore, it should be made clear from the outset that we are not so much concerned with elaborating a classification of authors, which in some cases would be an extremely difficult, if not impossible, task. We are concerned rather with classifying various analytical approaches to dealing with certain economic problems, especially the problem of relative prices and income distribution. What we have in mind is a particular rational reconstruction of 'classical' economics which, in our view, is useful both for an understanding of certain important arguments found in several classical authors and for the development of these arguments. Our interest in these approaches is thus not purely and not even predominantly historical; we consider them rather as containing the key to a better explanation of important economic phenomena. Our concern with classical economics is therefore first and foremost a concern with its analytical potentialities which in our view have not yet been fully explored. If we were of the opinion that they had already been exhausted our interest

in classical economics would be moderate. Hence an important element of 'understanding' classical economics, as we conceive it, consists of developing and using its explanatory power.

In this chapter an attempt will be made to specify what we mean by classical economics and to show that it is not an evanescent concept. We begin, in the next section (pp. 3–6), with a brief discussion of the complexity of most economic problems and of economic theory as an attempt to come to grips with that complexity. This leads us to the identification of a first characteristic feature of classical economics: its *long-period* method. As we shall see in the following section (pp. 6–7), a version of this method was also shared by all major marginalist authors until the late 1920s. However, the similarity of the methods adopted by two theories must not be mistaken for a similarity in the content of the theories. This aspect is dealt with in the subsequent two sections. The first (pp. 7–9) turns to the scope and content of traditional classical economics, whereas the second (pp. 9–13) is devoted to traditional neoclassical economics. The emphasis is on the sets of data, or independent variables, on the basis of which these theories attempt to explain the respective unknowns, or dependent variables, under consideration. It will be seen that in this regard classical economics differs markedly from neoclassical economics, the main difference being the way in which income distribution is determined. These two sections also raise the question of whether the sets of data contemplated by the theories are compatible with the long-period method or whether there exist tensions and contradictions between the method and content of a theory. It is argued that, whilst traditional classical theory can be formulated in a consistent way, traditional neoclassical theory faces insurmountable difficulties in this regard. The latter come to the fore in the shape of inconsistencies that undermine the logical foundation of the approach to the problem of income distribution in terms of the demand for and the supply of the factors of production collaborating in the generation of the social product, when there are produced means of production, i.e. 'capital', among these factors. The following section (p. 14) turns to the attempts of neoclassical authors from the late 1920s onwards to remedy this defect and at the same time render the theory more 'realistic', and indeed 'dynamic', in terms of models of temporary and intertemporal equilibria. It can be argued, however, that these alternatives are beset by a number of methodological difficulties and do not escape the problem of capital, the stumbling block of earlier, i.e. long-period, neoclassical theory. The final section deals with some more recent attempts to come to grips with economic change; some approaches belonging to the classical and some approaches belonging to the neoclassical tradition will be summarized. It is shown that long-period reasoning is flourishing in contemporary economics and that there is no reason to believe that it will be abandoned soon.

ECONOMIC SYSTEMS IN MOTION AND THE LONG-PERIOD METHOD IN THE CLASSICAL AUTHORS

As is well known, the concern of the classical economists from Adam Smith to David Ricardo was the laws governing the emerging capitalist economy, characterized by wage labour, an increasingly sophisticated division of labour, the co-ordination of economic activity via a system of interdependent markets in which transactions are mediated through money, and rapid technical, organizational and institutional change. In short, they were concerned with an economic system in motion. The attention focused on the factors affecting the pace at which capital accumulates and the economy expands and how the growing social product is shared out between the different classes of society: workers, capitalists and landowners.

How to analyse such a highly complex system characterized by a dense network of interdependences and feedbacks, *vis-à-vis* which the observer might easily get lost in a myriad of facts and considerations, failing to see the wood for the trees? The ingenious device of the classical authors to see through these complexities and intricacies consisted of distinguishing between the *market* or *actual* values of the relevant variables, in particular the prices of commodities and the rates of remuneration of primary inputs (labour and land), on the one hand, and *natural* or *normal* values on the other. The former were taken to reflect all kinds of influences, many of an accidental and temporary nature, whereas the latter were conceived of as expressing the persistent, non-accidental and non-temporary forces governing the economic system. The classical authors did not consider the 'normal' values of the variables as purely ideal or theoretical; they saw them rather as 'centres of gravitation', or 'attractors', of actual or market values. This assumed gravitation of market values towards their natural levels was seen to be the result of the self-seeking behaviour of agents and especially of the profit-seeking actions of producers. In conditions of *free competition,* that is, the absence of significant and lasting barriers to entry in and exit from all markets—the case with which the classical authors were primarily concerned—profit seeking involves *cost minimization.* This was well understood by the authors under consideration, hence their attention focused on what may be called *cost-minimizing systems of production.*

The method of analysis adopted by the classical economists is known as the *long-period method* or the method of *long-period positions* of the economy. Any such position is nothing but the situation towards which the system is taken to gravitate, given the fundamental forces at work in the particular situation under consideration. A discussion of how the classical economists conceptualized these forces, or determining factors, is deferred to a later section. Here it deserves to be mentioned that in conditions of free

competition the resulting long-period position is characterized by a *uniform rate of profits* (subject perhaps to persistent inter-industry differentials), *uniform rates of remuneration* for each particular kind of primary input in the production process (such as different kinds of labour and natural resources), and prices that are assumed not to change between the beginning of the uniform period of production and its end, that is, *static prices*. Such a situation is to be understood as reflecting the salient features of a competitive capitalist economy in an ideal way: it expresses the pure logic of the relationship between relative prices and income distribution in such an economic system. The prices are taken to fulfil the condition of *reproduction:* they allow producers to just cover costs of production at the normal levels of the distributive variables, including profits at the ordinary rate. These prices have aptly been called also *prices of production* (Torrens, Ricardo). We might also talk of 'prices of reproduction'.

A frequent misunderstanding of the notion of the long-period position should be mentioned. According to it the classical economists' view was 'static': they dealt with a given and immutable economic world and were able to say nothing useful either about how that world had come into being or about how it would develop. In short, they are said to have been concerned exclusively with analysing a *given* system of production, turning a blind eye both to the question of the genesis of that system and the path it would take in the future. In this view classical economics is static, not dynamic. Such an interpretation overlooks, first, a very special property the classical economists attributed to a long-period position, i.e. that the actual system *gravitates* around such a position. This is a property which is most certainly obtained on the assumption that the dynamic process of the actual system converges to the long-period position at a speed that is sufficiently large compared with the rate at which technological change tends to upset any such position. However, the classical economists did not ask for *convergence* of the actual system to the long-period position. They were indeed less demanding: in their view gravitation means market values of prices and the distributive variables never moving 'too far away' from natural levels. Second, the classical economists were not concerned only with studying the properties of a given system of production. They were also interested in which system would emerge as a result of the choices of profit-seeking entrepreneurs from a set of technical alternatives at their disposal, where this set was taken to reflect the technological knowledge available at a given time and place. For example, with new methods of production becoming available alongside the growth in technological knowledge, the economic system was envisaged as gravitating towards a new long-period position, characterized by a new set of relative prices and new levels of the distributive variables. That is, it was assumed that the new long-period position would make itself felt immediately: the short-run adjustment processes triggered would propel the economy towards that position.

Analysing economic change and development in these terms involves, as indicated, a short cut. The adjustment process to any such position is simply taken for granted. This is perhaps expressed too strongly, because the classical economists put forward an argument in support of the supposed gravitation of market values to their natural levels. The discussion of this problem in Smith and the authors following him is based on essentially two propositions. First, the market price of a commodity depends on the difference between current supply and 'effectual demand' for that commodity, where the latter is defined as 'the demand of those who are willing to pay the natural price of the commodity' (Smith, *WN* I.vii.8). If the difference is positive, negative, or zero, the market price is taken to be lower, higher, or equal to the natural price. A positive (negative) deviation of the market price from the natural price is reflected in a deviation of the actual levels of the distributive variables from their normal levels and especially in a positive (negative) deviation of actual profits obtained in the industry from normal profits. Second, this latter deviation provides an incentive to profit-seeking producers to reallocate their capital. Profit rate differentials trigger movements of capital (and labour) and, as a consequence, adjustments in the composition of production: the output of a commodity increases (decreases) if the market price is above (below) the natural price. These movements tend to annihilate the deviations and (re)establish a uniform rate of return on the capital invested in the various industries of the economy. Accordingly, in a long-period position actual outputs equal 'effectual demands' and actual prices are at their normal levels.

The above argument in support of the assumed gravitation process cannot, of course, replace a proper dynamic theory, not least because there are particular difficulties the earlier authors were not aware of. For example, it cannot be presumed that a positive (negative) difference between market and natural price is equivalent to an above (below) normal rate of profit, since the positive (negative) difference between the respective prices of the inputs entering into the production of the commodity under consideration may be even larger (cf. Steedman 1984). The question at issue is whether such a possibility does not prevent the ultimate tendency of the market price to gravitate towards the natural level, by causing the output of the commodity to decrease, thereby raising the market price even more.[1]

Ever since the advent of systematic economic analysis in the seventeenth and eighteenth centuries economists have aspired to elaborate a proper dynamic theory, and many ingenious and hard-working people have made great efforts in this regard. However, given the complexity of the object of their analyses—a socio-economic system incessantly in travail—they realized that the long-period method was the best they had. The latter indeed quickly proved to be a powerful tool in studying certain properties of complex interdependent systems, that is, systems which would be

extremely difficult to model and analyse in a dynamic framework even with the advanced tools of modern mathematical economics. Moreover, the classicals themselves occasionally ventured probing steps in the direction of such a dynamic analysis. Think, for example, of David Ricardo's discussion of the introduction and diffusion of improved machinery in the additional chapter 'On machinery' in the third edition of his *Principles,* published in 1821. However, a general dynamic analysis of the highly complex system under consideration was regarded as impossible at the time. The analytical tools available did not allow of such a dynamic theory, paying due attention to all relevant interdependences. The long-period method was seen as the best available in order to come to grips, however imperfectly, with an ever-changing world characterized by on-going technical progress, the depletion of natural resources, a changing distribution of income, etc. Long-period analysis was devised precisely to overcome the *impasse* in which the social scientist found himself, confronted with a reality which, at first sight, looked impenetrable, made up of a myriad of relationships between people and natural objects. The long-period method introduced some transparency to the complex object of study and allowed the theorist to derive a large number of interesting insights into the functioning (and the sources of malfunction) of the economic system. Because of its fecundity the long-period method was almost universally adopted in political economy until the 1930s.

This does not mean that there was no interest among economists in short-run problems; there was, of course. However, the important point is that the short-period analyses elaborated by the majority of authors dealing with such problems had—as their backbone, so to speak—fully specified long-period theories. In other words, the long-period theory was considered the core of economic analysis, from which there derived several short-period analyses designed to tackle special problems of a short-run nature, such as the implications of a capital stock not fully adjusted to the other data of the system or a sudden increase of the quantity of money in circulation.

THE ADOPTION OF THE LONG-PERIOD METHOD IN TRADITIONAL NEOCLASSICAL THEORY

The appeal exerted by the long-period method can be inferred from the fact that all early major marginalist authors, including William Stanley Jevons, Léon Walras, Eugen von Böhm-Bawerk, Alfred Marshall, Knut Wicksell and John Bates Clark, fundamentally adopted it. Like the classical economists and Marx they were concerned with explaining the normal rate of profits and normal prices: the concept of long-period 'equilibrium' is the neoclassical adaptation of the classical concept of normal positions. For example, in Marshall's *Principles of Economics* it is stated:

> The actual value at any time, the market value as it is often called, is often more influenced by passing events, and by causes whose action is fitful and short-lived, than by those which work persistently. But in long periods these fitful and irregular causes in large measure efface one another's influence so that in the long run persistent causes dominate value completely.
>
> (Marshall [1890] 1977:291)

And Böhm-Bawerk, agreeing with the classical authors, suggested that the investigation of the permanent effects of changes in what are considered the dominant forces shaping the economy should be carried out by means of comparisons between long-period equilibria. Such comparisons are taken to express the 'principal movement' entailed by a variation in the basic data of the economic system (cf. Böhm-Bawerk [1889] 1959 II:380). This view was shared by Ludwig von Mises, one of the most radical subjectivists of the Austrian school of economic thought, who advocated the long-period method, or, as he preferred to call it, the 'static method', in the following terms:

> One must not commit the error of believing that the static method can be used only to explain the stationary state of an economy, which, by the way, does not and never can exist in real life; and that the moving and changing economy can be dealt with only in terms of a dynamic theory. *The static method is a method which is aimed at studying changes;* it is designed to investigate the consequences of a change in *one* datum in an otherwise unchanged system. This is a procedure which we cannot dispense with.
>
> (von Mises, 1933:117; emphasis added)

However, the adoption of the long-period method was not, of itself, prejudicial as to the *content* of the theory. In order to see this we have to turn to the forces which the classical approach on the one hand and the traditional neoclassical approach on the other conceptualized in order to determine normal income distribution and the corresponding system of relative prices. The emphasis is on the respective sets of data, or independent variables, from which the two types of theory start. We begin with a brief discussion of the classical approach.

THE TRADITIONAL CLASSICAL APPROACH

It is a first characteristic feature of the classical economists' approach to the problem of value and distribution that the data contemplated all refer to magnitudes that can, in principle, be observed, measured or calculated. This point of view, which may be called 'objectivist' or 'naturalistic', is present, for example, in William Petty's *Political Arithmetick,* in François

Quesnay's *Tableau économique* and in the writings of Adam Smith and David Ricardo.[2] These authors refrained from having recourse to any non-observable, non-measurable or non-calculable magnitudes, or metaphysical concepts, in determining the general rate of profits and relative prices.[3]

Second, the many differences between different authors notwithstanding, the contributions to the theory of value and distribution of 'classical' derivation typically start from the same set of data. In general, the data concern:

(i) The set of technical alternatives from which cost-minimizing producers can choose.
(ii) The size and composition of the social product, reflecting the needs and wants of the members of the different classes of society and the requirements of reproduction and capital accumulation.
(iii) The ruling real wage rate(s) (or, alternatively, the rate of profits).
(iv) The quantities of different qualities of land available and the known stocks of depletable resources, such as mineral deposits.

The treatment of wages (or alternatively, in some theories, the rate of profits) as an independent variable and of the other distributive variables, the rate of profits (the wage rate) in particular, as dependent residuals exhibits a fundamental *asymmetry* in the classical approach to the theory of value and distribution. In correspondence with the underlying long-period competitive position of the economy the capital stock is assumed to be fully adjusted to these data, especially to the given levels of output. Hence the 'normal' desired pattern of utilization of plant and equipment would be realized and a uniform rate of return on its supply price obtained. Prices of production are considered the means of distributing the social surplus in the form of profits between different sectors of the economy and hence different employments of capital and, with scarce natural resources, in the form of differential rents of land and mines.

It deserves to be emphasized that these data, or independent variables, are sufficient to determine the unknowns, or dependent variables, that is, the rate of profits (the wage rate), the rent rates, and the set of relative prices supporting the cost-minimizing system of producing the given levels of output. No other data, such as, for example, demand functions for commodities and factors of production, are needed. The classical approach allows the consistent determination of the variables under consideration: it accomplishes the task it sets itself. It does so by separating the determination of income distribution and prices from that of quantities, taken as given in (ii) above. The latter were considered as determined in another part of the theory, that is, the analysis of capital accumulation, structural change and socio-economic development.

It is frequently claimed that an integral part of classical economics is the

labour theory of value. According to that theory relative normal prices are proportional to the quantities of labour needed directly and indirectly in the production of the various commodities. Classical economics is said to stand or fall by the correctness or otherwise of that theory. Although it is true that the labour theory of value was adopted by several classical authors, and played an important role in the course of the development of classical economics, the latter does not depend on it. Relative prices (and the dependent distributive variables) may consistently be determined on the basis of data (i)–(iv) and will only in very special cases be proportional to the relative quantities of labour 'embodied' in the different commodities. Hence, while in some earlier authors, most notably Ricardo, the labour theory of value was elaborated as a simplifying device to see through the complexities of the system under investigation, once a satisfactory and logically coherent theory of value and distribution had been developed, the labour theory of value was dispensable. From the higher standpoint of the advanced theory, the labour theory of value turned out to be untenable in general. However, the fact that it applies in some special circumstances may be taken as a sign of sound intuition on the part of authors like Ricardo who adopted it and were able with its help to derive several interesting results.[4]

The abandonment of the classical approach and the development of a fundamentally different one, which came to predominate in the wake of the so-called 'marginalist revolution' in the later nineteenth century, was motivated by the deficiencies of the received analysis. The main targets of criticism were the labour theory of value and the failure of Ricardo and his followers to develop 'a unified general theory to determine the prices of all productive services in the same way' (Walras [1874] 1954:416). Walras contended that such a unified general theory can be elaborated by generalizing the principle of *scarcity,* which the classical economists had limited to natural resources only, to *all* factors of production, including 'capital'. Let us take a closer look at how the neoclassical authors sought to effectuate this generalization.

THE TRADITIONAL NEOCLASSICAL APPROACH

Since the new theory was to be an alternative to the classical theory, it had to be an alternative theory about the same thing, in particular the normal rate of profits and normal prices. However, the set of data in terms of which the neoclassical approach attempted to determine these variables exhibits some striking differences with respect to the classical approach. First, it introduced independent variables, that is, explanatory factors, that were not directly observable, such as agents' preferences. Second, it took as given not only the amounts of natural resources available but also the economy's

'initial endowments' of labour and 'capital'. The data from which neoclassical theory typically begins its reasoning are:

(i) The set of technical alternatives from which cost-minimizing producers can choose.
(ii) The preferences of consumers.
(iii) The initial endowments of the economy with all 'factors of production', including 'capital', and the distribution of property rights among individual agents.

The basic novelty of the new theory consisted of the following. While the received classical approach conceived the real wage as determined prior to profits and rents, in the neoclassical approach all kinds of income were explained simultaneously and *symmetrically* in terms of the forces of supply and demand with regard to the services of the respective factors of production: labour, 'capital' and land. It was the seemingly coherent foundation of these notions in terms of *functional relationships* between the price of a service (or good) and the quantity supplied or demanded elaborated by the neoclassical theory that greatly contributed to the latter's rapid success in economics.

As has already been indicated, historically long-period neoclassical theory derives from a generalization of the theory of rent in terms of land of uniform quality and 'intensive' margins to all factors of production, including 'capital' (see Bharadwaj 1978). This generalization presupposes a strict analogy between land, labour and 'capital'. On this premiss the principle of scarcity rent, which the classical economists had limited to natural resources in given supply, was thought to be applicable also in explaining the incomes of labour and 'capital', that is, wages and profits. However, in order to be able to conceive of the rate of profits as some kind of index expressing the relative scarcity of a factor called 'capital', that factor had to be assumed to be available in a given 'quantity'. The degree of (relative) scarcity of the given 'quantity of capital', which was taken to be reflected in the level of the rate of profits, was then envisaged as the result of the interplay of data (i)–(iii). The smaller the overall amount of capital at the disposal of producers, other things being equal, the greater in general the relative scarcity of that factor and the higher the rate of profits, and vice versa.

As regards the conceptualization of the 'capital' endowment of the economy, the advocates of the 'marginalist revolution', with the exception of Walras (at least until the fourth edition of the *Elements*), were aware of the following fact. Whereas different kinds of labour and land can be measured in terms of their own physical units, 'capital', conceived of as a bundle of heterogeneous produced means of production, had to be expressed in terms of a *single magnitude,* related in a known way to the *value* of capital goods, allowing 'capital' to assume the physical

composition or 'form' best suited to the other data of the system. For, if the capital endowment were to be given in kind, only a short-period equilibrium, characterized by differential rates of return on the supply prices of the various capital goods, could be established by the forces constituting demand and supply. Such an equilibrium could not, however, be considered a 'full equilibrium' (Hicks 1932:20). Whereas differential wage and rent rates for different qualities of labour and land are perfectly compatible with a long-period competitive equilibrium, differential profit rates are not: competition would enforce a tendency towards a uniform rate of profits.

To define 'capital' as an amount of value required the specification of the standard of value in which it was to be measured. The common procedure was to express capital in terms of consumption goods or, more precisely, to conceive of it as a 'subsistence fund' in support of the 'original' factors of production, labour and land, during the period of production extending from the initial expenditure of the services of these factors to the completion of consumption goods. This notion corresponded to the view that capital resulted from the investment of past savings, which, in turn, implied 'abstention' from consumption. Thus it appeared to be natural to measure 'capital' in terms of some composite unit of consumption goods.

Now the formidable problem for the neoclassical approach in attempting the determination of the general rate of profits consisted in the necessity of establishing the notion of a market for 'capital', the quantity of which could be expressed independently of the 'price of its service', i.e. the rate of profits. If such a market could be conceptualized in a coherent way, profits could be explained analogously to rent (and other distributive variables), and a theoretical edifice could be erected on the universal applicability of the principle of demand and supply.

The plausibility of the supply and demand approach to the problem of distribution was felt to hinge upon the demonstration of the existence of a unique and stable equilibrium in the market for 'capital'.[5] With the 'quantity of capital' in given supply, this, in turn, implied that a monotonically decreasing demand function for capital in terms of the rate of profits had to be established (see Figure 1.1). This inverse relationship was arrived at by the neoclassical theorists through the introduction of two kinds of substitutability between 'capital' and labour (and land, which is ignored for the sake of simplicity): substitutability in consumption and in production. According to the former concept a rise in the rate of profits would increase the price of those commodities whose production was relatively 'capital-intensive', compared with those in which relatively little 'capital' per worker was employed. This would generally prompt consumers to shift their demand in favour of a higher proportion of the cheapened commodities, i.e. the 'labour-intensive' ones. According to the

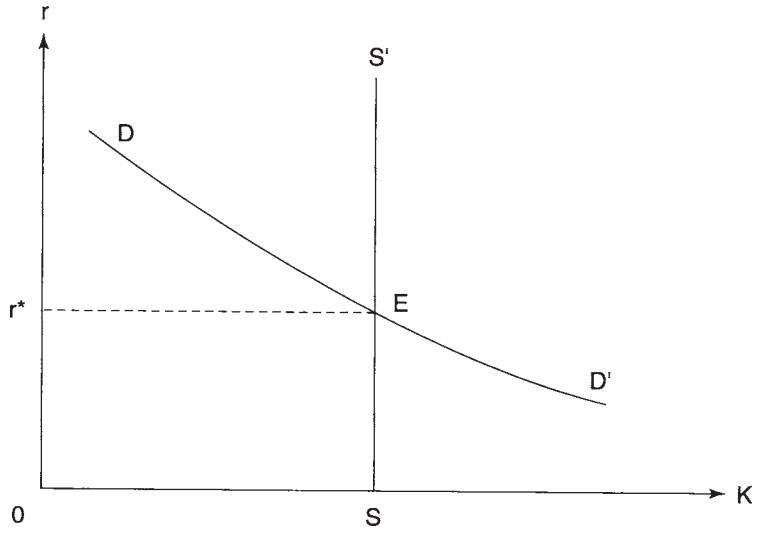


Figure 1.1 Rate of profit determined by demand and supply.

latter concept a rise in the rate of interest (and thus profits) relative to wages would make cost-minimizing entrepreneurs in the different industries of the economy employ more of the relatively cheapened factor of production, i.e. labour. Hence, through both routes 'capital' would become substitutable for labour, and for any given quantity of labour employed a decreasing demand schedule for capital would obtain. In Figure 1.1 the demand schedule *DD'* corresponding to the full employment level of labour *L** (determined simultaneously in the labour market) together with the supply schedule *SS'* would ensure a unique and stable equilibrium *E* with an equilibrium rate of profits *r**. Accordingly, the division of the product between wages and profits is expressed in terms of the relative scarcities of the factors of production, including 'capital' (conceived as a value magnitude) that is considered *independent* of the rate of profits.

While this approach to the theory of income distribution and relative prices became quickly adopted in large parts of the economics profession, and, interestingly, is still advocated in significant parts of contemporary mainstream economics, its deficiencies were spotted soon after it had been put forward. Among the older neoclassical economists it was perhaps Wicksell who understood best the difficulties related to the problem of a unified treatment of all factors, including 'capital', in terms of the demand and supply approach. Wicksell was particularly critical of attempts to work with the *value* of capital as a factor of production alongside the physically specified factors labour and land in the production function of single

commodities. In order to preserve a 'correspondence' between the factors, the different elements constituting social capital would have to be measured in 'technical units'. Starting from value capital implied 'arguing in a circle' (Wicksell [1901] 1934:149), since the value of the capital goods inserted in the production function depends on the rate of interest and will change with it. The different versions in which the theory was put forward were variously criticized both from without and from within the camp of neoclassical economists; see, for example, Friedrich August von Hayek's frontal assault on it in his *Pure Theory of Capital* (1941). The criticism culminated in the so-called Cambridge controversies over the theory of capital, in which the emphasis was on the problem of the choice of technique of cost-minimizing producers. It was shown that the direction of change of 'input proportions' cannot be related unambiguously to changes in so-called factor prices. Thus a fall in the wage rate, accompanied by a rise in the rate of profits, may lead to the adoption of the less 'labour-intensive' (that is, more 'capital-intensive') of two techniques. The discovery of *reverse capital deepening* and of the *reswitching of techniques,* that is, a technique is cost-minimizing at two disconnected ranges of the wage rate and not so in between these ranges, runs counter to the conventional neoclassical view. A central element of the explanation of distribution in terms of supply and demand—the principle of substitution as envisaged by the neoclassical approach—is thus revealed as defective. The theory cannot be sustained other than in singularly special cases.[6]

We may conclude by saying that, in contradistinction to classical theory, long-period neoclassical theory does *not,* as a matter of principle, allow the consistent determination of income distribution and normal prices.

This was well understood by some major protagonists of the demand and supply approach as early as the late 1920s. However, confronted with the alternative of abandoning the demand and supply approach or the long-period method, in terms of which the former had so far been conceptualized, authors such as Friedrich August von Hayek, Erik Lindahl and John Richard Hicks opted for the second alternative. The result of these attempts to overcome the *impasse* in which neoclassical long-period theory found itself was the development of the notions of *intertemporal* and *temporary equilibrium*. In this way the demand and supply approach was meant to be rendered not only consistent but also more 'realistic' (cf. Lindahl [1929] 1939:271; Hicks [1939] 1946:116). Indeed, as the protagonists of the new developments kept stressing, economic theory had to be liberated from the straitjacket of 'static' analysis and turned into a proper 'dynamic' analysis. The declared aim was the elaboration.of a model capable of portraying, in abstract terms, a 'real' economy moving through time.

TEMPORARY AND INTERTEMPORAL EQUILIBRIUM THEORY

The major novelty of the new theories was the abandonment of concern with a uniform rate of interest and static prices. As Lindahl stressed, in the new framework the concept of a uniform rate of interest was generally devoid of any 'clear and precise content' (Lindahl [1929] 1939:245); and, as Hayek insisted, the notion of intertemporal equilibrium is not merely 'incompatible with the idea that constant prices are a prerequisite to an undisturbed economic process, but is in the strictest opposition to it' (Hayek 1928:37; our translation). In contradistinction to traditional neoclassical theory, the capital endowment of the economy was given in terms of a vector of quantities of heterogeneous capital goods which were then treated in full analogy to different kinds of natural resources, that is, as 'rent goods' (Wicksell 1934). As Lindahl pointed out, 'During the initial period in the dynamic process under observation, all existing capital equipment in the community can be regarded as *original,* including any that has actually resulted from the production of earlier periods not covered by the analysis.' Hence 'Produced capital goods have the same significance for price formation as *true original* sources of similar kinds' (Lindahl [1929] 1939:320–1; emphases added). In this way the problem of capital and interest was thought to be reducible to a special case of the problem of scarce factors of production and the type of income typically associated with them: rent.

It should also be mentioned that temporary equilibrium theory in general and intertemporal equilibrium theory until recently assumed a finite time horizon, which was arbitrarily given from outside. This points to the fact that the new approaches were essentially *short-period*. Intertemporal theory, as is well known, culminated in the so-called Arrow-Debreu model (cf. Arrow and Debreu 1954; see also Debreu 1959).

Here it is not necessary to enter into a detailed discussion of the merits and demerits of the temporary and intertemporal equilibrium models; the interested reader is recommended to consult Kurz and Salvadori (1995:455–67). Suffice it to say that in our view those models are beset with serious methodological difficulties and, moreover, do not escape the problem of capital. We shall rather focus attention on some more recent developments in economic theory, and especially the theory of economic growth, which illustrate the resounding come-back of long-period analysis.

LONG-PERIOD ANALYSIS AND CONTEMPORARY ECONOMICS

In this introductory chapter we have specified what we mean by 'classical economics' and defined it in terms of method (long period) and content (the

data do not include an endowment of 'capital'; instead they include either the real wage rate or the rate of profits). It hardly needs to be stressed that, with this definition of 'classical economics', this school of thought did not vanish with the death of Ricardo or some other early classical economists. It is, rather, possible to point out a large number of cases in the economic literature since Smith and Ricardo and up to our own time where in one way or another scholars have adopted the classical point of view. It is our contention that long-period analysis can be performed in a consistent, formally correct way *only* when based on the 'classical' approach. There is no consistent long-period neoclassical theory other than in exceptionally special cases that are of no economic interest.

Whilst some authors working in the classical tradition were keen to analyse systems displaying the whole set of phenomena for which explanations were sought, including reproducible commodities, especially capital goods, and scarce natural resources, others limited themselves to studying only selected aspects of the multi-faceted problem. The contributions of Piero Sraffa (1951, 1960) belong to the first category, whereas the early writings of Wassily Leontief (cf., for example, Leontief 1928) and the famous model of economic growth by John von Neumann ([1937] 1945) belong to the second.

Because of his unique importance for the revival of classical political economy, Sraffa's contributions figure prominently in this book. His ideas permeate several of the reprinted papers and are at centre stage in Part II. There the emphasis is especially on two aspects of his work which met with serious difficulties of understanding: first, the problem that constant returns are not assumed in his analysis (Chapter 6); and, secondly, the role played by the Standard commodity in it (Chapter 7). Two additional chapters (Chapters 8 and 9) deal with Sraffa's interpretation of Ricardo and recent attacks levelled at it.[7]

In the von Neumann model the problem of scarcity is set aside: this involves specifying datum (iv) on p. 8 above in such a way that, whatever the activity level of the economy, there is always an abundance of natural resources; therefore from an economic point of view these resources may be neglected. Attention focuses instead on the choice of technique problem in the case of universal joint production and constant returns to scale. The real wage rate is given from outside the system and any interest (profit) is taken to be accumulated. On the basis of these givens von Neumann determines a (uniform) rate of interest and the system of relative prices, a (uniform) rate of expansion and the activity levels of the different processes, and shows that the rate of interest equals the rate of growth. The model shares with the classical approach the asymmetrical treatment of income distribution, with the real wage rate given from outside and the rate of interest determined endogenously. For a discussion of the 'classical' character of the von Neumann model see Chapter 2 below.

Von Neumann's model is a *steady-state* model. Yet, as the classical economists were already well aware, there is no reason to presume that the actual economy will ever be in a stationary state or will follow closely a path of equi-proportionate growth. The dynamics of the economic system will generally be complex and can at most be expected to come close to such states during short intervals of time. This was also well understood by several authors working on the von Neumann model after its publication in English in 1945. It is not surprising, then, that their efforts resulted in a number of other results with a classical flavour, such as the so-called 'non-substitution' and 'turnpike' theorems.

The non-substitution theorem states that under certain specified conditions, and taking the rate of profits (rate of interest) as given from outside the system, relative prices are independent of the pattern of final demand. The theorem was received with some astonishment by authors working in the neoclassical tradition, since it seemed to flatly contradict the importance attached to consumer preferences for the determination of relative prices. As Samuelson wrote, 'From technology and the interest rate alone, *and completely without regard to the demand considerations*…[,] price relations can be accurately predicted as constants' (1966:530).

In order for demand to exert an influence on the price of a good the supply function must not be horizontal. Then how do neoclassical models that are subject to constant returns to scale, no joint production and homogeneous labour arrive at an upward sloping supply curve? The upward slope of the supply curve reflects the increase in the relative price of the productive service which is required in a relatively high proportion in the production of the good. For example, if the good under consideration happens to be produced with a relatively high proportion of labour to 'capital', that is, a high 'labour intensity', an increase in the demand for the good, that is, a rightward shift of the demand schedule, would lead to a rise in the relative price of the good due to an increase in the wage rate relative to the rate of profits. This change in the relative prices of productive services is ultimately traced back to changes in the relative scarcity of the factors, labour and 'capital', the endowments of which are assumed to be given.

It is therefore the hypothesis that the rate of profits (or, alternatively, the wage rate) is given and independent of the level and composition of output which account for the theorem. This hypothesis is completely extraneous to the neoclassical approach and in fact assumes away the role played by one set of data from which that analysis commonly begins: given initial endowments. The assumption of a given rate of profits radically transforms the substance of the theory. With the endowment side chopped off, the concept of 'scarcity' of factors of production loses the significance usually attributed to it in neoclassical explanations of relative prices. Hence the demand for goods, and thus preferences, can no longer exert an influence

on prices via the derived demand for factor services which are available in given supply: the prices of goods are independent of demand because income distribution is assumed to be independent of demand. It goes without saying that in the framework of classical analysis, with its different approach to the theory of value and distribution, a characteristic feature of which is the non-symmetrical treatment of the distributive variables, there is nothing unusual or exceptional about the non-substitution theorem.[8] A similar argument can be developed with respect to the turnpike theorems.

Until a few decades ago the time horizon in intertemporal general equilibrium theory was assumed to be finite and, therefore, arbitrary. The introduction of an *infinite* horizon turned out to be critical (see also Burgstaller 1994:43–8). It pushed the analysis inevitably towards the long period. This was clearly spelled out, for instance, by Robert Lucas in a contribution to the 'new' theories of endogeneous growth. Lucas (1988) replaced the 'behaviouristic' approach to the problem of saving in terms of a given saving rate (as in Solow) by assuming that there exists an immortal 'representative' agent concerned with maximizing an intertemporal utility function over an infinite horizon. The utility function is specified in terms of two parameters: the rate of time preference, or discount rate, and the elasticity of substitution between present and future consumption. The production function of the consumption good is specified in terms of human capital and physical capital. There is also a function describing the formation of human capital in terms of human capital and nothing else. Lucas observed that 'for *any* initial capital $K(0)>0$, the optimal capital-consumption path $(K(t), c(t))$ will converge to the balanced path asymptotically. That is, the balanced path will be a good approximation to any actual path "most" of the time' and that 'this is exactly the reason why the balanced path is interesting to us' (Lucas 1988:11). Lucas thus advocated a *(re-)switching* from an intertemporal analysis to a long-period steady-state one. Since the balanced path of the intertemporal model is the only path analysed by Lucas, the intertemporal model may be regarded simply as a step towards obtaining a rigorous long-period setting. (Paraphrasing a dictum put forward by Paul Samuelson in a different context, we may say that intertemporal analysis is a *detour* with regard to long-period steady-state analysis.) Moreover, Lucas abandoned one of the characteristic features of all neoclassical theories, that is, income distribution is determined by the demand and supply of factors of production: if we concentrate on the 'balanced path', capital in the initial period *cannot* be taken as given along with other 'initial endowments'. In Chapter 4 below we show that, as regards its basic analytical structure (as opposed to its building blocks), the so-called 'new' growth theory belongs within the realm of what we have called 'classical' economics. In particular, it will be shown that in the free competition versions of this theory (the other versions are not analysed here) the 'technology' to

produce 'human capital' (or, alternatively, 'knowledge' in some approaches) plays the same role as the assumption of a given wage rate in 'classical' economics.

We hope that this book will make it clear (i) that the long-period method is an extremely powerful tool of analysis, if handled correctly; and (ii) that a correct long-period analysis cannot take the endowment of 'capital' as given. However, our tribute to long-period analysis of 'classical' derivation must not be mistaken to imply opposition on our part to the development of a proper dynamic analysis. We are convinced, rather, that a correct long-period analysis provides the best ground for starting to elaborate a dynamical analysis. As Edwin Burmeister stressed in a recent review of Kurz and Salvadori (1995), 'It is natural to try to answer the easiest questions first, and it is much easier to study economics in a "long-period equilibrium" than ones in which the rate of profit is not uniform and is changing over time. Very little is known about the properties of such more realistic economies…, and even the little that is known usually is only about special and quite unrealistic cases (such as the one-good case). Almost nothing is known about the dynamic behavior of the more complex models', which can be studied within a long-period classical framework (Burmeister 1996:1345–6).

NOTES

1 Garegnani (1990b) has put forward the following argument in support of 'gravitation'. Taking a system in which each commodity enters (directly or indirectly) into the production of all commodities, when a negative deviation in the market price of a particular commodity is accompanied by a positive deviation in the rate of profit, the same opposition of signs cannot be true for at least one of the means of production that enter directly or indirectly into the production of that commodity. For that means of production both the rate of profit deviation and the market price deviation will have to be negative. Hence the fall in its output will tend to raise its market price, leading directly or indirectly to a fall in the rate of profit of the commodity. This fall in the rate of profit will then reverse 'the initial "perverse" rise in output' (ibid: 331).

2 See also Kurz (1994) and Gehrke and Kurz (1995), reprinted as Chapters 9 and 10 below. Whilst most of the reasoning in this book refers to the case of a closed economy, Chapter 3, which is a reprint of Kurz (1992), is concerned with foreign trade, paying special attention to joint production in Adam Smith's 'vent for surplus' argument.

3 It should be pointed out here that we shall encounter a similar perspective in the writings of later authors who can be reckoned as belonging to the classical tradition, including Vladimir K.Dmitriev, Ladislaus von Bortkiewicz, Georg von Charasoff, Wassily Leontief, Robert Remak, John von Neumann and Piero Sraffa. For some evidence see Kurz and Salvadori (1993), reprinted as Chapter 2 below, and Kurz and Salvadori (1995: Chapter 13).

4 The conditions required for the validity of the labour theory of value with no choice of technique are well known (see, for instance, Kurz and Salvadori 1995:110–13).

Starting from Baldone (1984), Salvadori and Steedman (1988, reprinted as Chapter 11 below) have investigated some further requirements when a choice of technique is involved and no technique is cost-minimizing at each relevant rate of profit.

5 On the importance of uniqueness and stability see, for example, Marshall ([1890] 1977:665 n.).

6 For a summary statement of the different versions of the theory and the debates around them see Kurz (1987), Garegnani (1990a) and Kurz and Salvadori (1995: Chapter 14). The debate started with a paper by Joan Robinson (1953), using a description of technology in terms of 'productivity curves'. This description was soon put on one side after the publication of Piero Sraffa's *Production of Commodities by Means of Commodities* (1960). Salvadori (1996, reprinted as Chapter 13 below) provides a mathematical reconstruction of the description of technology introduced by Joan Robinson. This description has the advantage of being more easily accessible to economists with a neoclassical background and an interest in macroeconomics. Kurz and Salvadori (1997, reprinted as Chapter 12 below) put a part of the debate on the theory of capital in a methodological framework and raise the question of how it was possible, despite the fact that the neoclassical authors participating in the debate admitted the difficulty under consideration, for this to have apparently, and surprisingly, gone largely unnoticed in contemporary mainstream economics.

7 For a more detailed discussion of Sraffa's contribution see Kurz and Salvadori (1995, especially Chapter 13).

8 Kurz and Salvadori (1994, reprinted as Chapter 5 below) show that the nonsubstitution theorem conceived of as a uniqueness theorem does not need to hold if the rate of profits equals its maximum level (implying a zero wage rate) unless a further assumption is introduced. However, even if uniqueness may fail in this case, nevertheless demand plays no role in determining prices.

REFERENCES

Arrow, K.J. and Debreu, G. (1954) 'Existence of an equilibrium for a competitive economy', *Econometrica* 22:265–90.

Baldone, S. (1984). 'From surrogate to pseudo production function', *Cambridge Journal of Economics* 8:271–88.

Bharadwaj, K. (1978), *Classical Political Economy and Rise to Dominance of Supply and Demand Theories,* New Delhi: Orient Longman.

Böhm-Bawerk, E. von (1959) *Capital and Interest,* two vols, South Holland, Ill.: Libertarian Press. Translation of the 4th edn of *Kapital und Kapitalzins. Zweite Abteilung: Positive Theorie des Kapitales,* Jena: Fischer, 1921. First edition (1889), Innsbruck: Wagner.

Burgstaller, A. (1994) *Property and Prices. Toward a Unified Theory of Value,* Cambridge: Cambridge University Press.

Burmeister, E. (1996) Review of Kurz and Salvadori (1995), *Journal of Economic Literature* 34:1344–6.

Debreu, G. (1959) *Theory of Value: an Axiomatic Analysis of Economic Equilibrium,* New York: Wiley.

Garegnani, P. (1990a) 'Quantity of capital', in Eatwell, Milgate and Newman (1990), pp. 1–78.

——(1990b) 'On some supposed obstacles to the tendency of market prices towards natural prices', in M.Caminati and F.Petri (eds), *Convergence to Long-period*

Positions, special issue of *Political Economy. Studies in the Surplus Approach* 6 (1990), pp. 329–59.

Gehrke, C. and Kurz, H.D. (1995) 'Karl Marx on physiocracy', *European Journal of the History of Economic Thought* 2:55–92.

Hayek, F.A. von (1928) 'Das intertemporale Gleichgewichtssystem der Preise und die Bewegungen des "Geldwertes"', *Weltwirtschaftliches Archiv* 2:33–76. Translated as 'Intertemporal price equilibrium and movements in the value of money', in Hayek, *Money, Capital and Fluctuations,* ed. R.McCloughry, London: Routledge, 1984.

——(1941) *The Pure Theory of Capital,* London: Routledge.

Hicks, J.R. (1932) *The Theory of Wages,* London: Macmillan.

——(1946) *Value and Capital,* 1st edn 1939, Oxford: Clarendon Press.

Kurz, H.D. (1987) 'Capital theory: debates', in *The New Palgrave: a Dictionary of Economics* I, ed. J.Eatwell, M.Milgate and P.Newman, London: Macmillan, pp. 357–63.

——(1992) 'Adam Smith on foreign trade: a note on his "vent for surplus" argument', *Economica* 59:475–81.

——(1994) 'Peach on Ricardo: a review article', *European Journal of the History of Economic Thought* 1:411–20.

Kurz, H.D. and Salvadori, N. (1993) 'Von Neumann's growth model and the "classical" tradition', *European Journal of the History of Economic Thought* 1: 129–60.

——(1994) 'The non-substitution theorem: making good a lacuna', *Journal of Economics—Zeitschrift für Nationalaökonomie* 59:97–103.

——(1995) *Theory of Production: a Long-period Analysis,* Cambridge, Melbourne and New York: Cambridge University Press.

——(1997) 'On critics and protective belts', in A.Salanti and E.Screpanti (eds), *Pluralism in Economics: New Perspectives in History and Methodology,* Cheltenham: Edward Elgar, pp. 232–55.

Leontief, W. (1928) 'Die Wirtschaft als Kreislauf', *Archiv für Sozialwissenschaft und Sozialpolitik* 60:577–623.

Lindahl, E. (1929) 'Prisbildningsproblemets uppläggning från kapitalteorisk synpunkt', *Ekonomisk Tidskrift.* Translated as 'The place of capital in the theoryof price' and reprinted as Part III of Lindahl (1939).

——(1939) *Studies in the Theory of Money and Capital,* London: Allen & Unwin.

Lucas, R.E. (1988) 'On the mechanics of economic development', *Journal of Monetary Economics* 22:3–42.

Marshall, A. (1977) *Principles of Economics,* London: Macmillan. Reprint, reset, of the 8th edn (1920), 1st edn 1890.

Mises, L. von (1933) 'Intervention', in L. von Mises and A.Spiethoff (eds), *Probleme der Wertlehre* II, *Schriften des Vereins für Socialpolitik* 183/II, Munich and Leipzig: Duncker & Humblot.

Neumann, J. von (1945) 'A model of general economic equilibrium', *Review of Economic Studies* 13:1–9. English translation of 'Über ein ökonomisches Gleichungssystem und eine Verallgemeinerung des Brouwerschen Fixpunktsatzes', *Ergebnisse eines mathematischen Kolloquiums* 8 (1937), pp. 73–83.

Ricardo, D. (1951 *ssq.*) *The Works and Correspondence of David Ricardo,* 11 vols, ed. P.Sraffa in collaboration with M.H.Dobb, Cambridge: Cambridge University Press. In the text referred to as *Works,* volume number and page number.

Robinson, J.V. (1953) 'The production function and the theory of capital', *Review of Economic Studies* 21:81–106.

Salvadori, N. (1996) '"Productivity curves" in *The Accumulation of Capital*', in C.

Marcuzzo, L.L.Pasinettti and A.Roncaglia (eds), *The Economics of Joan Robinson,* London and New York: Routledge.

Salvadori, N. and Steedman, I. (1988) 'No reswitching? No switching', *Cambridge Journal of Economics* 12:481–6.

Samuelson, P.A. (1966) *The Collected Scientific Papers of P.A.Samuelson* I, ed. J.E.Stiglitz, Cambridge, Mass.: MIT Press.

Smith, A. (1976) *An Inquiry into the Nature and Causes of the Wealth of Nations,* 1st edn 1776. Vol. II of *The Glasgow Edition of the Works and Correspondence of Adam Smith,* ed. R.H.Campbell, A.S.Skinner and W.B.Todd, London: Oxford University Press. In the text quoted as *WN,* book number, chapter number, section number, paragraph number.

Sraffa, P. (1951) 'Introduction', in Ricardo (1951 *ssq*.), *Works* I, pp. xiii–lxii.

——(1960) *Production of Commodities by Means of Commodities: Prelude to a Critique of Economic Theory,* Cambridge: Cambridge University Press.

Steedman, I. (1984) 'Natural prices, differential profit rates and the classical competitive process', *Manchester School* 52:123–40.

Walras, L. (1954) *Elements of Pure Economics,* ed. W.Jaffé, London: Allen & Unwin. English translation of the definitive edition of Walras, *Eléments d'économie politique pure,* Lausanne: Corbaz, 1874, 5th and definitive edn Paris: Richon, 1924.

Wicksell, K. (1934) *Lectures on Political Economy* I, London: Routledge. Translation by E.Classen, ed. Lionel Robbins, of K.Wicksell, *Föreläsingar i Nationalekonomi* I, Lund: Berlingska Boktrycheriet, 1901.