

MICHIO MORISHIMA

WALRAS'
ECONOMICS

A pure theory of capital
and money

CAMBRIDGE UNIVERSITY PRESS

Michio Morishima

WALRAS' ECONOMICS

A PURE THEORY
OF CAPITAL AND MONEY

CAMBRIDGE UNIVERSITY PRESS

CAMBRIDGE

LONDON NEW YORK NEW ROCHELLE

MELBOURNE SYDNEY

Published by the Press Syndicate of the University of Cambridge
The Pitt Building, Trumpington Street, Cambridge CB2 1RP
32 East 57th Street, New York, NY 10022, USA
296 Beaconsfield Parade, Middle Park, Melbourne 3206, Australia

© Cambridge University Press 1977

First published 1977
Reprinted 1978
First paperback edition 1981

Printed in Great Britain at the
University Press, Cambridge

Library of Congress Cataloguing in Publication Data

Morishima, Michio, 1923–
Walras' economics.

1. Walras, Leon, 1834–1910. 2. Economics – History. I. Title.
HB105.W3M67 330'.092'4 76–40833

ISBN 0 521 21487 4 hard covers

ISBN 0 521 28522 4 paperback

Preface

In this book I have refrained from recapitulating the full story of Walras' economics and have contented myself with reviewing only its theoretical kernel. Such a restriction will not, I hope, give the reader a distorted view of Walras as perhaps the similar restriction in my previous book on Marx's economics might have given of Marx. In the case of Marx, pure economic analysis was not dominant even in the three volumes of *Capital*.

In Walras, according to his original schedule, his work was expected to be enormous. The existing definitive edition of *Eléments d'économie politique pure* which William Jaffé translated into English is no more than Book One of a treatise on the elements of political and social economy that he was intending to write. The treatise was supposed to be made up of three Books; the other two were entitled 'Elements of Applied Economics or the Theory of Agricultural, Industrial, and Commercial Production of Wealth' and 'Elements of Social Economics or the Theory of the Distribution of Wealth via Property and Taxation'. Unfortunately, however, he could only publish two volumes of collected papers, *Etudes d'économie sociale*, 1896, and *Etudes d'économie politique appliquée*, 1898, instead of the planned Book Two and Book Three. The restricted view which I maintain in this book has naturally resulted in my entirely ignoring Walras' applied economics or social economics, but this will not have serious effects, although I believe that we can only judge the full value of his pure economics by considering it in the context of his original farsighted scheme.

Recent studies of Walras' economics have been mainly devoted to making his general equilibrium theory of exchange and production mathematically rigorous, so that his theory has been completely sterilized. Such work should of course be welcomed, unless it is done to excess. It is, however, neither wise nor consistent with the Walrasian law of the optimum to spend increasing mathematical efforts on a subject of decreasing marginal economic significance. In my opinion, Walras' theory of exchange and production is not the end and aim of his study but an overture to his general equilibrium

theory of capital formation and circulation. Therefore, what we have to do first of all is to elaborate in economic, rather than mathematical terms his theory of growth and money, which in Walras' work was not complete. In reconsidering Walras from such a point of view, he appears as an economist who was comparable with Marx and who anticipated Keynes.

Walras' economics contains various weak points, but I gather all of my major criticisms in the final chapters of the book. In the other chapters, although I criticize him internally on a number of points, I concentrate mainly on revising his economic model and bringing it to completion as Walras' theory. The most important revision is concerned with his four-class view of society, according to which the capitalist society is considered as consisting of four independent classes, workers, landowners, capitalists and entrepreneurs, so that decisions to invest are made by entrepreneurs independently from decisions to save by capitalists. Walras emphasized this view in various places of his book but was unable to construct a mathematical model reflecting this view. One of the main aims of this volume is to present such a model – a microscopic counterpart of Keynes' economy where investment and savings are decided independently and, hence, where Say's law does not prevail.

As any modern student of Walras must, I acknowledge Jaffé's definitive edition: Leon Walras, *Elements of Pure Economics or the Theory of Social Wealth* (a translation by W. Jaffé of the Edition Définitive (1926) of the *Éléments d'économie politique pure*), published by Richard D. Irwin Inc., Homewood, Illinois (1954). I also thank the publishers for permission to quote. A substantial part of this book is based on my articles, 'Short lectures on Leon Walras', *Economic Notes*, Vol. II, No. 2, Siena, 1973 and 'Leon Walras and money' in J. M. Parkin and A. R. Nobay (eds.), *Current Economic Problems*, Cambridge University Press, 1975. The latter was read at an annual conference of the Association of University Teachers of Economics held at Manchester, 1974, while its original version was written in January 1964, at All Souls College, Oxford. I started to write the manuscript of the book in the summer of 1974, at Queen's University, Canada. I have benefited from a number of helpful comments and suggestions from participants in the seminars in numerous universities in Britain, Belgium, Canada, Italy, Japan and the Netherlands where I was given the opportunity to read some chapters of the book, as well as from those students who attended my lectures at the London School of Economics. Finally I am greatly indebted to Ms Jo Bradley for stylistic improvement.

M.M.

January 1977

Contents

Preface	<i>page vii</i>
Introduction	I
PART I. Exchange and Production	
1 Arbitrage and exchange equilibrium	11
2 The <i>tâtonnement</i>	27
3 Walras' law and production	46
4 The dual-adjustment rules: Walrasian and Keynesian	59
PART II. Economic Growth	
5 Capital formation and credit	70
6 A neoclassical theory of growth	82
7 Towards Keynes	100
PART III. Money and Interest	
8 The Walrasian prototype	123
9 General equilibrium with <i>encaisse désirée</i>	133
10 Alternative theories of interest	154
11 The quantity theory of money	170
12 Say's law	185
PART IV. Time Elements	
13 Capital and money reconsidered	195
Index	211

Introduction

Having written in my *Marx's Economics* that Marx should be ranked as high as Walras in the history of mathematical economics, I was almost bound to write a companion book about Walras. I consider it worth writing because I believe that Walras is misunderstood by most students, including those fellow economists who specialize in the so-called Walrasian theory of general equilibrium. There are only a few exceptions; I believe that even Walras himself probably did not perfectly understand the significance and implications of his own contributions.

There are two distinct views of Walras, one originating with Schumpeter and the other with Jaffé. Schumpeter writes about Walras:¹

The simple greatness which lies in unconditional surrender to one task is what strikes us when we look back on this scholarly life. Its inherent logic, inevitability, and power impress us as a natural event. Exclusive meditation on the problems of pure economics formed its content. Nothing else.

The course of his studies shows the thinker's unfitness for practical matters: failures such as we should expect of one who prepared for the *École Polytechnique* by studying Descartes and Newton; lack of enthusiasm for outworn paths such as every searching mind experiences.

[A]lready...in 1859...he was convinced that economic theory could be treated mathematically. From that moment on he knew what he wanted, from that moment on his whole strength was dedicated to *one* end. Here—in the method and not in any specific problems—is the origin of his work. [Schumpeter's italics]

¹ Schumpeter, J. A., *Ten Great Economists from Marx to Keynes* (George Allen & Unwin, London, 1952), pp. 74–9.

He walked a solitary path without the moral support to which the practical man as well as the scientist is usually accustomed. Thus his portrait shows all the characteristics which distinguish the truly creative mind from those that are created.

William Jaffé, on the other hand, describes Walras as follows:² [H]is mathematical attainments proved insufficient to enable him to gain entrance to the *École Polytechnique*. . . With Bohemian insouciance he neglected his engineering studies, which he found distasteful, and turned to literature. . . Realizing that he was not meant for a literary career, he promised his father in the summer of 1858 that he would devote his life to economics.

He tried his hand at journalism but was soon discharged because of the independence of his opinions. . .

In a series of public lectures delivered in Paris during 1867–1868. . . Walras expounded his philosophy of social reform based on the metaphysical ideas of Victor Cousin and Étienne Vacherot, calling for a conciliation of interests. Ideological as his position was, he resisted the efforts of his Saint-Simonian friends to enrol him among their number, because their socialism was ‘unscientific’. He always thought of himself as a ‘scientific’ socialist. . .

Whether only out of caution or out of sheer intellectual curiosity, he initially concentrated upon pure economics, which then became his dominant passion.

This was the achievement of Walras, a lonely, cantankerous savant, often in straitened circumstances, plagued with hypochondria and a paranoid temperament, plodding doggedly through hostile, uncharted territory to discover a fresh vantage point from which subsequent generations of economists could set out to make their own discoveries.

Despite these diverse, if not inconsistent, characterizations of Walras’ life and personality, there are no significant differences between Schumpeter and Jaffé in their appraisal of his academic achievements. They seem to agree in considering that Parts II–VI of the *Elements of Pure Economics* are the richest and most important part of all Walras’ three main volumes on pure eco-

² Jaffé, W., ‘Walras, Léon’, in D. L. Sills (ed.), *International Encyclopedia of the Social Sciences*, Vol. 16 (Macmillan and the Free Press, 1968), pp. 447–53.

nomics, applied economics and social economics.³ In these parts Walras developed four models of general equilibrium, (i) of exchange (of two and then of more than two commodities), (ii) of production, (iii) of capital accumulation or economic growth, and (iv) of money and circulation. He derived demands for commodities, aggregate savings, and the desired cash balance as functions of prices and the rate of interest, from the single principle of maximum utility. He also discussed, not rigorously but rather intuitively or heuristically, the existence and stability of the general equilibrium solutions to each system. He used such novel concepts as 'numéraire', 'tâtonnement', 'rareté', 'coefficients de fabrication', 'revenu net perpétuel', 'encaisse désirée', and so on, all of which were later found to be basic to general equilibrium analysis. Both Schumpeter and Jaffé show a high appreciation of these contributions. They pay them uniform tribute and none is singled out for more praise than the others.

This evaluation of Walras by Schumpeter and Jaffé differs greatly from Blaug's. He writes: 'Walrasian economics is thin in substance, stressing form at the expense of content. We have... seen one example of this in his treatment of capital theory... [H]is monetary theory would supply additional evidence of formalism... Walras' contributions to substantive economics [are] almost solely confined to the theory of consumer behaviour, where he did see much further and more clearly than his contemporaries.'⁴ Blaug also writes: 'In contrast to the thousands of pages that Böhm-Bawerk and Wicksell lavished on the subject, Walras takes exactly 40 pages in the *Elements* to show how the rate of interest is determined. The Walrasian theory is formally impeccable; but what is its substance?'⁵ Similarly, if the number of pages of a work reflects its academic quality (!), we should point out that Walras' general equilibrium theory of

³ Léon Walras, *Elements of Pure Economics or the Theory of Social Wealth*, a translation by W. Jaffé of the Edition Définitive (1926) of the *Éléments d'économie politique pure*, annotated and collated with the previous editions (Richard D. Irwin, Inc., Homewood, Illinois, 1954); *Études d'économie politique appliquée (Théorie de la production de la richesse sociale)*, 2nd edn (Rouge, Lausanne, 1936; originally 1898); *Études d'économie sociale (Théorie de la répartition de la richesse sociale)*, 2nd edn (Rouge, Lausanne, 1936; originally 1896).

⁴ Blaug, M., *Economic Theory in Retrospect*, 2nd edn (Heinemann Educational Books, London, 1973), p. 587.

⁵ *Op. cit.*, p. 585.

money occupies only 20 pages; and the whole money section of the *Elements*, including chapters dealing with the problems, then current, of bimetallism and bank notes and a chapter on foreign exchange, is no more than a 60-page work. Nevertheless, Schumpeter regards Walras' treatment of bimetallism as 'nothing short of classic' and 'definitive for a long time to come', and Jaffé describes it as 'a complete theory of the bimetallist standard'.⁶

Although I know that Blaug's view of Walras is a popular one, I feel that it must be rejected entirely. It is, first of all, completely wrong to confuse Walras with the present-day Walrasians, just as it is to confuse Marx with Marxists. Walras was not only interested in the rigorousness and elegance of the theory. On the basis of his capital theory, Walras proposed the nationalization of a number of private properties (land, natural monopolies, railways, etc.), which led to a tax reform, and his monetary theory provided the basis for a money reform. Moreover, he was not an author who wanted to inflate the number of pages of his writings; he avoided repetition and verbiage as much as possible. For him, there was no reason to make Part v of the *Elements*, on capital theory, and Part vi, on money theory, longer than they actually were; the earlier parts of the book had already provided sufficient explanation of many of the necessary concepts and behavioural assumptions of the theories.

In fact, in my opinion, the ultimate aim of the book was to construct a model, by the use of which we can examine how the capitalist system works. The model is first presented, in Parts ii and iii, in its simplest form, by neglecting production, capital accumulation and money, and concentrating attention on exchange. It is then successively made more general and realistic, so as to allow for production in Part iv, then saving and investment in Part v, and finally money transactions and money holding in Part vi. Thus these parts should not have the equal weight that Schumpeter and Jaffé gave them, but should be regarded as indispensable components of an organic unity. In particular, the relationship of Parts v and vi to Parts ii, iii and iv is one of an edifice to its foundations. Blaug appreciates the foundations, whereas I judge that they are great because the edifice built on them is great, though Walras himself thought

⁶ Schumpeter, *op. cit.*, p. 29; Jaffé, *op. cit.*, p. 451.

for many years that his prime contribution to economic theory lay in his marginal utility theory. As much of the groundwork for Parts v and vi had been laid in the earlier parts, it was sufficient to allocate a rather small number of pages to them; it is clear that their shortness has nothing to do with their significance.

Neither Schumpeter, Jaffé nor Blaug recognizes the importance of Part vii, entitled 'Conditions and Consequences of Economic Progress: Critique of Systems of Pure Economics'. Among them Blaug, who complains of Walras' formalism, explicitly criticizes him for not being able to derive the laws of change of the capitalist economy from his systems of general equilibrium. As Blaug points out, Hicks expresses a similar complaint in *Value and Capital*.⁷ The neglected Part vii of the *Elements*, however, includes chapters entitled 'The Continuous Market' and 'The Marginal Productivity Theorem'. The former is concerned with economic fluctuations taking place in an economy with a permanent market which is open at all times. The latter, with the subtitle 'The Law of General Price Movements in a Progressing Economy', clearly derives several laws of the working of the whole system, among which the most important is stated by Walras as: '*In a progressive economy, the price of labour (wages) remaining substantially unchanged, the price of land-services (rent) will rise appreciably and . . . the rate of net income [the rate of profit or the rate of interest] will fall appreciably.*'⁸

By obtaining this apparently Ricardo-like (or Marx-like) conclusion, Walras was led to an examination of Ricardian theory. The rest of Part vii is mainly devoted to critical exposition of the English classical school. Walras writes: 'The efforts of the English School to develop a theory of rent, wages and interest were far more sustained and thorough than those of the various French schools that came into existence after the Physiocrats.' He praises Ricardo as 'the founder of pure economics in England'.⁹ Among other things he considered Ricardo's price-cost equations as constituents of his general equilibrium system and critically examined their working in relation to other components of the system.

Although Walras and Marx were ignorant of each other's

⁷ Hicks, J. R., *Value and Capital*, 2nd edn (The Clarendon Press, Oxford, 1946), p. 61.

⁸ Walras, *Elements*, pp. 390-1. Walras' italics.

⁹ *op. cit.*, p. 398.

work, their relationship becomes clear once we agree to legitimize Walras as a Ricardian. It is true that Marx established his theory on the basis of the labour theory of value, while Walras used the scarcity theory of value. In spite of this difference, I believe that Marx would have been happy to accept the principal conclusion of Walras quoted above. Moreover, both Walras and Marx founded their respective scientific socialisms on their economics—in the case of Walras, on his pure economics and, in the case of Marx, on his scientific economics. We may say, therefore, that Marx would have held Walras in as much respect as he did Ricardo. It is not right to assume that Marx and Walras would have been completely antagonistic towards each other, as many contemporary economists believe. They were the two greatest disciples—or critics—of Ricardo.

Let us next consider the relationship between Walras and Keynes. One topic in economic theory now enjoying popularity is the provision of a micro-economic foundation for Keynesian economics. This is usually done by using Hicks' model in *Value and Capital* as a foundation on which Keynesian buildings are to be erected. However, this approach is not wise or, at least, not efficient. There is an important difference between Keynes and Hicks: Keynes eliminates the demand–supply equation for bonds, keeping the investment–savings equation within the system, while Hicks presents a model in which there is no explicit place for the investment–savings equation. Walras differs from Hicks in this respect; his system is exactly the same as Keynes', retaining the aggregate equation between investment and savings, instead of the bond equation. From the point of view of traditional general equilibrium theory Walras' system of capital accumulation is rather difficult to understand. In conventional theory, a market is assumed behind each equation of the system, while there is no specific market behind the Walrasian equation between aggregate savings and aggregate investment. It is a macroeconomic equilibrium condition which reflects equilibrium in many markets. It is clear from a reading of Walras' *Elements* what great efforts he expended in interpreting that equation. One can compare them with the efforts which the first-generation Keynesians made to understand the same Keynesian equation immediately after the publication of Keynes' *General Theory*.

Moreover, there is an additional similarity at a deeper level between Walras and Keynes. In the usual theory of general equilibrium after Hicks, the economy consists of firms and households, the latter not being classified. In contrast, Walras' economy has clear class distinctions. It consists of workers, landowners, capitalists and entrepreneurs. Savings are made by the first three classes. As savings by the working and landowning classes are negligible, the major part of aggregate savings comes from capitalists. On the other hand, entrepreneurs decide on production and investment. At the early stages of development of capitalist society, capitalists and entrepreneurs were identical, so there was no great inconsistency between investment and savings. In subsequent stages some capitalists are no longer entrepreneurs and entrepreneurs are not necessarily capitalists. Therefore savings and investment become independent of each other and the inconsistency between them becomes a major issue in the economy. Keynes pursued the consequences which arise from this independence. On the other hand, Walras insisted on his four-class view of society and noticed the independence of entrepreneurs from capitalists, but he did not clarify its economic implications. Besides, the mathematical model he actually formulated is a classical one, based on the identity of entrepreneurs with capitalists, so that there is a big gap between Walras' sociological view and his mathematical model. If we could revise the latter so as to make it consistent with the former, we would have a model which could be equivalent to Keynes' model.

However, it would be rather difficult to obtain as many results from this model as Keynes derived from his macro-economic one. Hicks ascribed the sterility of Walras' analysis to the lack of comparative statics or laws of motion of the economy. This is not precisely correct, as I have already mentioned. In Part VII of the *Elements* Walras obtained several laws from his model, but they are not sufficient to satisfy us. In my opinion the reason for this sterility is not the one deduced by Hicks, but that Walras constructed his theory of general equilibrium as a one-stage theory. As I wrote in my *Marx's Economics*, Marx first constructed a multi-sectoral, price-determination model and then reduced the corresponding output-determination model to a two-sector reproduction scheme to obtain fruitful results.

This kind of two-stage approach was later discovered independently by Hicks. He reduced his complex model, containing many variables, to a simple one, consisting of three equations for 'commodity', 'money' and 'securities', which in turn is reduced to the Keynesian *IS* and *LM* model by further eliminating the equation for 'securities'. In the same way, if we apply the two-stage approach to Walras' system we obtain a model which we can no longer accuse of sterility. In fact, when Walras derived the Ricardian-like conclusion which I quoted above he implicitly used the two-stage approach.

The theory of general equilibrium is a branch of economics in which great names have presented economic models which reflect their views about society. According to the usual view Walras emphasized consumer choice, inter-market relationships and the price mechanism; the Austrians and Wicksell, time preference and the structure of roundabout production; Marx, the exploitation of people by people; Schumpeter, entrepreneurship and innovations; Keynes, the economic role of the government and the central bank; Hicks, expectations, temporary equilibrium and perfect equilibrium over time; etc., etc. This tradition changed entirely after the Second World War; no new view of society has since been presented, although economists have continued to vie with each other in mathematical ability. It seems that general equilibrium theorists are now only interested in proving, re-proving or generalizing the theorems or laws discovered by their predecessors. The primary aim of this book is not to make contributions in this direction; instead I want to extract and gather together Walras' economic visions from various parts of his principal work, the *Elements*, and I want to reconstruct his mathematical economic models so as to fit his visions and to see how these models work.

The book can be outlined as follows: in Part I I make preparations for an explanation of Walras' theory of capital and his theory of money. With this aim his theory of exchange is examined for the existence and stability of an equilibrium in Chapters 1 and 2. Similar work will be done for the model of production in Chapters 3 and 4. I shall not simply reproduce Walras' theory; the reader will see how my understanding of it differs from the conventional one.

Part II deals with Walras' theory of capital accumulation. As

I have already pointed out, Walras had a four-class view of society (which I take as more advanced than Marx's two-class view) although he was unable to formulate a model in which entrepreneurs behave independently of capitalists. To realize Walras' intentions, Chapter 5 carefully revises his model. I refer to the case where investment is flexible and smoothly and quickly adjusts itself to savings, as in Say's world, and the other case, where investment is decided independently of savings, as in the Keynesian world. Chapters 6 and 7 investigate economic growth in Say's and in the Keynesian world respectively.

It is known that Walras frequently revised his theory of money, so that even the version in the definitive edition should not be regarded as his final word. It should be revised in various respects; it even contains mathematical slips. In Part III we try to reconstruct Walras' theory in his own spirit. In Walras the theory of money is not separable from the theory of growth. Chapter 8 includes a summary of the latter so as to make Part III self-contained. We propose a corrected version of the Walrasian money model. It is a very general system, so that we can discuss various alternative theories of interest so far presented within its framework (Chapter 10). The quantity theory of money, or the so-called classical dichotomy between the real and monetary theories, is the topic of Chapter 11. Say's law is again discussed in Chapter 12 for an economy with money.

Part IV contains only Chapter 13, in which I criticise Walras. The main points of criticism are (i) that Walras does not distinguish between new and old capital goods except in allowing for depreciation of the latter, so that no attention is paid to obsolescence, the age composition of capital, and so on; (ii) that he ignores the production period and always assumes instantaneous production; and (iii) that he does not discuss the period of circulation of money satisfactorily. To remove these weak points I propose to extend Walras' model to produce the one which I call the Walras-von Neumann model. This is a proposal exactly parallel to that which I made for Marx in my *Marx's Economics*. As I have already pointed out, both were Ricardians. Their thinking thus flowed from a common source and formed two tributaries, until they finally converged again with von Neumann at the critical point in the history of the development of economic analysis when the von Neuman revolution was

brought about. Von Neumann himself could not go far into the investigation of his model, except to establish the existence of a balanced growth path. I have shown in my *Theory of Economic Growth*¹⁰ that the von Neumann model has a temporary equilibrium at each point of time and the sequence of these equilibria traces out a path which may be examined for efficiency and optimality. Production and consumption turnpike theorems have also been discussed within the von Neumann framework, but many things remain to be done in order to achieve a complete theory of motion of the capitalist society.

¹⁰ Morishima, M., *Theory of Economic Growth* (The Clarendon Press, Oxford, 1969).

PART I

Exchange and Production

CHAPTER I

Arbitrage and exchange equilibrium

In *Capital* Marx began his investigation of capitalist production by analysing how a particular kind of commodity becomes the *numéraire* in terms of which all other commodities uniformly express their value. He wrote: 'Every one knows, if he knows nothing else, that commodities have a value-form common to them all, and presenting a marked contrast with the varied bodily forms of their use-values. I mean their money-form. Here, however, a task is set us, the performance of which has never yet even been attempted by *bourgeois* economy, the task of tracing the genesis of this money-form, of developing the expression of value implied in the value-relation of commodities, from its simplest, almost imperceptible outline, to the dazzling money-form. By doing this we shall, at the same time, solve the riddle presented by money.'¹ In the first part of his *Elements*² Walras was concerned with more or less similar problems. Of course, their methods of analysis were completely different; they saw different entities behind the system of prices: Marx saw abstract human labour, and Walras *rareté*. But they both thought that it was of basic importance to clarify the problem of the *numéraire*, before launching into detailed examinations of the working of the capitalist economy.

Although Walras was greatly helped by his father's theory of social wealth and Cournot's theory of arbitrage, he began a truly original study of free competition. It was deep, rigorous and revolutionary. In addition, he should be congratulated on his success in his campaign for the mathematization of the social sciences. He wrote: 'The twentieth century, which is not far off, will feel the need . . . of entrusting the social sciences to men of general culture who are accustomed to thinking both inductively

¹ Marx, K., *Capital*, Vol. I (Progress Publishers, Moscow, 1963), pp. 47-8, Marx's italics.

² *Elements*, Part II and Part III, pp. 83-207.