RICARDO and the Theory of Value, Distribution and Growth

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Preface and acknowledgments

It was during the discussions of a workshop on topics of growth theories and disequilibrium dynamics – initiated in the early seventies with the financial support of CNR – Consiglio Nazionale delle Ricerche (Rome, Italy) – that we were impressed by what appeared to be the lack of a consistent analytical framework within which to fit the main component parts of Ricardo's theory of distribution and growth.

Our book *Un modello ricardiano di sviluppo economico* originated in the effort to fill this gap and was meant to contribute to the analysis of a dynamic model incorporating the key Ricardian assumptions of diminishing returns and reinvestment of profits. Although some attention was devoted to problems of value, its emphasis was thus on the growth aspect of the Ricardian investigation. The imbalance implicit in this treatment quickly encouraged us to look deeper into the Ricardian theory of value and to plunge into the current revival of classical theory arising from Sraffa's work.

Our main results, which dealt with the problem of a comparison between the Ricardian and the Sraffian approach, and in particular with the possibility of a significant use of Sraffa's standard commodity in the Ricardian framework of analysis, were published in a long paper in *Rivista di Politica Economica* (January 1978). The emphasis here was obviously on value and distribution. The aim of the present book is to integrate the latter results and the previous research into a consistent whole, thus supplying an analytical reconstruction of the Ricardian system, more balanced (and complete) than that contained in our 1974 work.

Integration has been pursued by means of an interpretative approach centred on the concept of natural equilibrium, in which – contrary to what is often maintained – there is no room for a separation between Ricardo's theory of value and his theory of growth. In other words, the

notion of natural equilibrium, which was only implicit in the 1974 book, is here explicitly made the cornerstone of the analysis both of prices (definition of the rate of profit, given the technology and the natural wage) and of the growth process (determination of the time path of the economy in face of a changing technology and with a given natural wage). In this perspective, even Ricardo's reflections on apparently autonomous topics of research such as the 'invariable measure of value' – an issue which we had not tackled in either the 1974 or the 1978 publication – are shown to be parts of the same line of investigation.

The analysis of Ricardo's thought on value and distribution (presented in the first part of this book) is thus almost entirely new with respect to our 1974 publication, while the argument relating to growth (now contained in the second part) has been extensively rewritten for the purpose of a more balanced presentation of the whole subject matter.

In the various stages of the research we have benefited from useful suggestions and constructive criticism on the part of many friends and colleagues. We wish to thank the members of the above-mentioned CNR workshop, as well as those of a similar research group on related topics, with whom we have discussed at length several parts of our work. In particular, we wish to acknowledge the help of Luciano Piccioni for stimulating comments on issues relating to Sraffa's contribution; of Annalisa Rosselli and Enzo Rossi for the mathematical proofs contained in the appendices; and of Memmo Di Bartolomeo for the computer work on which the graphical results presented in Chapters 5-7 are based.

Luigi Pasinetti, Luigi Spaventa and Alessandro Roncaglia have read a first draft of the work, or of parts of it. We are greatly indebted to them for their friendly comments and criticism, which have prompted further reflection on several points of our investigation.

We also wish to thank David Godwin for the knowledgeable and careful editing of the text and Daniela Giacometti and Mirella Garofali for their efficient and conscientious typing of the very tortuous final manuscript.

As already mentioned, our research enjoyed the financial support of CNR, which is here gratefully acknowledged.

We finally wish to express very special thanks to our respective wives, Lucia and Isabella, whose understanding and intelligent presence has been of invaluable help during the long gestation period of this work.

Rome, June 1980

G.A.C.
D.A.T.

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1.1 The renewed interest in Ricardo's theory

Recent years have witnessed a renewed interest in the theoretical work of David Ricardo. On the analytical plane, this circumstance may be attributed both to critical developments in the field of the theory of value and to significant advances in the field of growth theory.

As to the first aspect, it may be recalled that the 'crisis' of the marginal theory of value and distribution is intimately related to the contribution of Piero Sraffa (86), who explicitly points out the connection of his work with the theories of the old classical economists (in particular, of David Ricardo). For Sraffa's suggested reconstruction of the theory of value is based on a logical scheme which rejects the neoclassical supply-and-demand approach and is centred instead upon the notion of 'prices of production', strictly linked to the Ricardian concept of 'natural prices'. As to the second aspect, it may be said that Ricardo can be rightly considered to be a forerunner of modern growth theory, in that he built a simple but impressive macroeconomic model in which the relation between growth and income distribution plays a key role.[1]

On a different plane, an additional reason pointing back to Ricardo may be mentioned – the growing awareness of the relevance of environmental constraints on economic expansion. From this point of view, Ricardo's model with diminishing returns may be viewed as directly pertinent for the problems of a world economy with limited natural resources.

The renewed interest for the analytical issues tackled by Ricardo, and for the crucial assumptions on which his reasoning rests, has led to a passionate revival of study and debate – for which the publication of Ricardo's complete *Works and Correspondence* (84) has represented

a significant point of reference. The approach of some of the works on the Ricardian theory is predominantly critical in nature,[2] and tends to concentrate on the ambiguities originating in the objective difficulty of the text, in the use, at times inconsistent, of terms and concepts, and in the incomplete specification of the assumptions.

As opposed to this type of analysis, a 'more constructive' approach[3] tends to state 'explicitly the assumptions needed to eliminate the ambiguities' (Pasinetti (64), p. 78) and to reconstruct Ricardo's analytical propositions – generously interpreting obscure or controversial passages of his writings, as Marshall ((54), p. 670) and Barone ((4), p. 435) have suggested we should do. The present work is to be viewed in this latter perspective.

1.2 Scope of the work

Ricardo's thesis of the long-run tendency of the economy towards a stationary-state situation is based on a set of crucial assumptions – diminishing returns in agriculture, reinvestment of profits and a theory of distribution in which the income of the capitalist class represents a residual. This set of assumptions implies a strict connection between the rate of profit and the rate of capital accumulation. It is thus necessary, for a theory which aims at proving the validity of that thesis, to solve the problem of the unambiguous determination of the profit rate and to show how diminishing returns affect its behaviour through time.

These problems found a straightforward solution within Ricardo's primitive agricultural model of the *Essay on Profits* (67). It was in the attempt to escape the limitations of this model that Ricardo felt, in the *Principles* (68), the need for a 'developed theory of value' (Dobb (21), p. 73), to which – we will maintain – the role was attributed of making it possible to draw in the general case the same type of conclusions, as to the relation between diminishing returns and the rate of growth, that had been reached within the more restricted analytical framework of the *Essay on Profits*. In the Ricardian theoretical construction the theory of value thus performs, in our view, a substantially instrumental role.

It is clear that the thesis, occasionally emerging in the literature, according to which the theory of value represents for Ricardo a field of investigation logically autonomous from the rest of his inquiry, does not fit into this approach.

This does not mean that specific attention should not be devoted to Ricardo's long and troubled reflection on the topic of value, but rather that this problem should be treated with the purpose of emphasizing the strict connection between value and growth in the Ricardian framework of analysis. We shall try to show that this aim can be achieved when the whole of Ricardo's theoretical research is viewed as centred on the rate of profit, as the true key variable of the system.

In this perspective the present work is divided in two parts. Part I deals with the problems of value and distribution, while Part II deals with the issues of distribution and growth.

The scope of Part I is that of exploring the possibility of defining an unambiguous relation between diminishing returns in agriculture and the general rate of profit, and of analysing the way in which Ricardo tackled this problem and tried to solve it. In particular, Chapter 2 aims at defining a general (i.e. free of the limitations of the labour theory of value) framework of analysis for the study of the problems of income distribution arising from diminishing returns in agriculture. The distributive antagonism among social classes, stemming from the limited availability of fertile land, is viewed as an essentially dynamic problem; the difference with Sraffa's approach in *Production of Commodities* (86) is accordingly underlined. It is shown that, in the framework of analysis referred to, the issue of the distributive antagonism cannot find a solution when it is posed in terms of the determination of the impact on the aggregate amount (or, what is the same, on the share) of profits. It is further shown that the solution can be arrived at if the problem is posed instead in terms of the determination of the effects of diminishing returns on the rate of profit. The solution is expressed both as a relation between money wages and the profit rate ('wage equation') and as a relation between the level of the labour input in agriculture and the rate of profit ('profit equation'). The implications of the results obtained are briefly commented on, both with reference to Adam Smith's theory of prices and with respect to more general issues relevant for the Ricardian scheme of analysis.

Chapter 3 brings into the picture Ricardo's search for an invariable measure of value and tries to show how this search is to be interpreted as an attempt to find a general solution to the problem of the determination of the rate of profit along a different logical approach. In other words, the effort is made to clarify how this line of research, so tenaciously and admittedly in vain pursued by Ricardo till the end of his life, is addressed precisely to the solution of his central problem

– the relation between diminishing returns and the rate of profit. The subject of the invariable standard of value has been recently resumed, though in a different framework of analysis, by Sraffa with his construction of the standard commodity. A comparison between the requisites of Ricardo's invariable measure of value and the properties of Sraffa's *numéraire* is then made for the purpose of assessing the possibility of a significant use of the standard commodity in the Ricardian context. The analysis carried out seems to indicate that a negative answer should be given to this question.

Part II is devoted to the study of growth in some simplified versions of the Ricardian dynamic model. While the analysis of Part I belongs to the realm of comparative statics in the sense that only the direction of movement of the rate of profit is shown, the method adopted in Part II is truly dynamic – the time path of the rate of profit *qua* rate of capital accumulation as well as that of the other variables being fully specified.

The point of departure of our analysis (Chapter 4) is represented by an examination of Pasinetti's brilliant mathematical formulation of the Ricardian system (64), which appears to be particularly relevant for our purpose on account of its analytical rigour and close adherence to the fundamental traits of Ricardo's theory. Pasinetti's analysis, centred as it is on the definition of individual natural equilibrium positions of the economy and on the proof that only the stationary-state equilibrium is stable, does not, however, represent a truly dynamic study of the Ricardian system in that his model does not include, as an essential part, the interaction between the population adjustment mechanism and that of capital accumulation.

The effort is then made in the following chapters to present a dynamic Ricardian model characterized by the joint consideration of these two mechanisms. On the basis of this model, it becomes possible to determine the time paths of the variables and to describe the transition of the economy from a 'progressive' situation (with growing population and net capital accumulation) to a stationary situation (in which these events cease to occur), due to the working of diminishing returns in agriculture.

Chapter 5, in particular, studies the connection between growth and distribution with reference to a one-sector (agricultural) Ricardian model. In Chapter 6, the same kind of analysis is extended to a two-sector (agriculture and industry) model; some steps in the direction of further extension to a three-sector model (agriculture, industry and machines) are taken in the appendix to Chapter 6. Chapter 7, finally,

examines problems – of 'traverse', in Hicksian terminology (see Hicks (35), ch. 16) – arising from changes in the saving behaviour of social classes.

The time paths of the variables defined in the various models considered are classified in the two categories of *equilibrium* and *disequilibrium paths*. The problems connected with this distinction will be discussed in the following section.

1.3 The concept of natural equilibrium in the Ricardian context

The concept of 'natural equilibrium' is central to Ricardo's theory of value and distribution. This circumstance does not prevent him from recognizing that the working of demand and supply may bring about situations of market equilibrium different from those of natural equilibrium – the basis of the distinction having been laid down by Adam Smith with his definition of 'natural' and 'market' prices. In line with Smith, Ricardo believes that market prices represent only transitory departures from natural prices, which are conceived of as a centre towards which 'the prices of all commodities are continually gravitating' (Smith (80), p. 51). Making direct reference to Smith's *Wealth of Nations*, Ricardo concludes, in effect, the chapter 'On natural and market price' stressing his fundamental theoretical interest for the study of natural values (Ricardo (68), pp. 91–2, italics added):

> Having fully acknowledged the temporary effects which, in particular employments of capital, may be produced on the prices of commodities, as well as on the wages of labour, and the profits of stock, by accidental causes, without influencing the general price of commodities, wages, or profits, since these effects are equally operative in all stages of society, we will leave them entirely out of our consideration, whilst we are treating of *the laws which regulate natural prices, natural wages, and natural profits, effects totally independent of these accidental causes.*

The argument for 'leaving entirely out of consideration' the deviations of market from natural values ultimately rests, as Garegnani aptly points out, 'on the "temporary" nature of these deviations, in contrast with Ricardo's concern with *lasting changes*' ((28), p. 28, italics added). As these lasting changes cannot be conceived of but as a consequence of changes in the difficulty of production owing to diminishing returns, it is clear that when Ricardo speaks of the laws which regulate natural values he has in mind a theory about the be-

haviour of these values over time. The first part of the present work reflects Ricardo's approach to the problem: the attention is, in fact, concentrated on the behaviour of natural values, to the complete disregard of market prices.

The close connection between Ricardo's theory of value and his theory of growth implies, on the logical plane, that the issues of growth must also be analysed in terms of the concept of natural equilibrium, i.e. as a sequence of positions describing what we shall call a *natural equilibrium path*. The use of this concept in the Ricardian context requires that direct reference be made to the tools of modern growth theory – growth rates and conditions for equilibrium growth. What follows – in the spirit of the 'constructive approach' of the present work – aims at defining a consistent framework of analysis in which Ricardo's remarks about the 'actual' behaviour of the economy may be interpreted as referring to departures from the natural equilibrium path. This may therefore be said to represent – also from a strictly dynamic point of view – the centre of attraction for the movement of the economy through time. The absence of an accepted interpretation of Ricardo along these lines calls for a preliminary consideration of the matter.

With fitting intuition Baumol (5) has associated under the heading of 'magnificent dynamics' Ricardo's 'model' with Harrod's work (33) in growth theory, the common feature being represented by the attempt to describe the process of long-term growth with reference to a very limited number of key variables: 'The method employed has . . . involved simple deduction from fairly broad generalizations . . . in the nature of alleged psychological or technological laws' (Baumol (5), p. 8), with the 'ambitious' aim of explaining the development of the whole economy over long periods of time.

The attempt is here made to carry a step further the logic of the connection suggested by Baumol, applying the tools of modern growth theory to the analysis of the time path of the economic system described by Ricardo's fundamental assumptions. It may be said that the results arrived at appear of more general interest, beyond the scope of the present work, for the study of the issues of growth in all cases characterized by diminishing returns in a key sector of the economy.

The central analytical concept of modern growth theory is represented by the equilibrium path which, in the absence of technical progress, is defined by the equality between the rate of growth of population (and employment) and the rate of capital accumulation (which in the Ricardian context coincides with, or is proportional to,